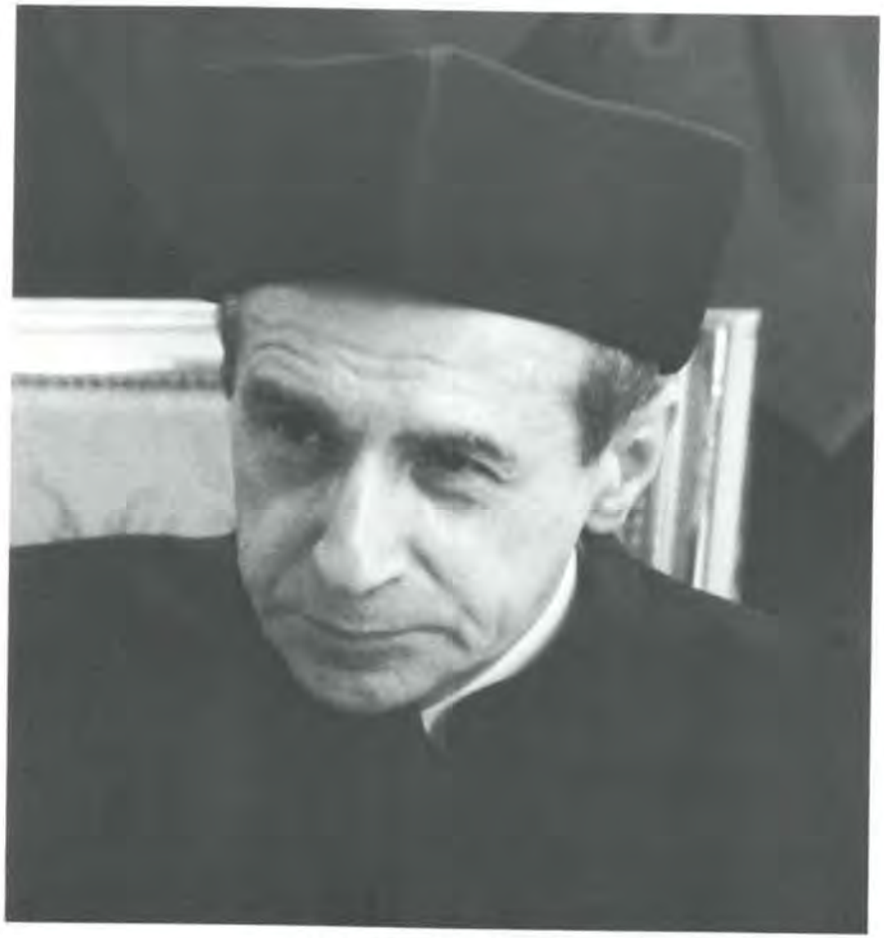

MICHAŁ KALECKI

Collected Works of

MICHAŁ KALECKI

VOLUME VI

STUDIES IN APPLIED ECONOMICS 1927–1941

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To the memory of Adela Kalecki,
who died on 8 June 1994

Jerzy Osiatyński

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List of Abbreviations

BNE	Bank for National Economy (Bank Gospodarstwa Krajowego)
GUS	Główny Urząd Statystyczny (Central Statistical Office)
ISBCP	Institute for the Study of Business Cycles and Prices (Instytut Badania Koniunktur Gospodarczych i Cen), Warsaw
NCOs	Non-commissioned Officers
NIRA	National Industrial Recovery Act
PKO	Powszechna Kasa Oszczędności (Popular Savings Bank)
PWE	Państwowe Wydawnictwo Ekonomiczne (Polish Economic Publishers, Warsaw)
PWN	Państwowe Wydawnictwo Naukowe (Polish Scientific Publishers, Warsaw)
ZUPU	Zakłady Ubezpieczeń Pracowników Umysłowych (White-Collar Workers' Insurance Companies)

List of Polish Journals

Cement	
Economic Studies	
Koniunktura Gospodarcza	Business Review
Kronika Warszawy	Warsaw Chronicle
Kwartalnik Statystyczny	Statistical Quarterly
Polska Gospodarcza	Polish Economy
Prace Instytutu Badania Koniunktur Gospodarczych i Cen	Working Papers of the Institute for the Study of Business Cycles and Prices
Przegląd Gospodarczy	Economic Review
Przegląd Polityczny	Political Review
Przegląd Socjalistyczny	Socialist Review
Przemysł i Handel	Industry and Commerce
Statystyka Polski	Polish Statistics
Statystyka Pracy	Labour Statistics

Editor's Note

The present volume of *Collected Works of Michał Kalecki* contains his empirical studies of the capitalist economy, published primarily in pre-war Poland. In contrast to the original Polish edition of Kalecki's *Collected Works*, the present edition includes over forty papers that have been omitted there. They mainly belong to Part 1 of this volume and deal with economic developments in individual commodity markets and international economic relations.

Part 1 presents papers that have been divided roughly into three areas of Kalecki's economic journalism in 1928–35: reviews of business conditions in particular markets, studies in the structure and operations of large companies and cartels, and articles on international economic relations. There is certainly some overlapping between these three sections, yet it appeared useful to provide some structure for a part of the volume that contains over forty of Kalecki's articles of somewhat different nature and significance. Of course, chronological order is observed within each section of Part 2.

Besides Kalecki's usual concern for the scrupulous presentation of reality, these studies, especially those on international subjects, reveal an ardent political temperament and insight in the interpretation of international consequences of the Great Crisis of 1929–33.

In the Institute for the Study of Business Cycles and Prices Kalecki from 1929 dealt with the methodological problems of examining business fluctuations as well as with other questions. Closely collaborating with Ludwik Landau and Jan Wiśniewski, he learned the art of drawing conclusions from a part about the whole and of constructing indicators of economic trends; these were partially modelled on the Harvard Economic Service business barometers, and partly took account of specific features of the Polish economy. Besides this, he also studied the problems of international comparability of indices of industrial production. Among these studies, included in Part 2 of this volume, there is also his later econometric paper on a method for elimination of trend from statistical series.

Part 3 contains estimates of the national income in Poland and of its components. These studies were done in 1931–5 together with

Ludwik Landau. They were unique in those years, since perhaps for the first time in the history of such estimates they took account of the distribution of aggregate income between the main social classes. Kalecki and Landau's estimate of the social income in Poland in 1929 was given much attention among Polish economists and statisticians and it is still referred to in some contemporary statistical studies. On the other hand, Kalecki and Landau's empirical paper of 1935 on fluctuations in prices and costs in the course of the business cycle in Poland was largely overlooked by the economic profession, although their findings confirm Sraffa's observations (as one may surmise, unknown at the time to Kalecki and Landau) on the relations between unit costs of production and the volume of output.

In accordance with the arrangement of the *Collected Works*, each part of the volume consists of essays devoted to a similar topic, individual papers in each part being arranged in chronological order. The editing principles followed throughout are given in full in the Editor's Note to vol. i; so they will be only briefly summarized here.

Kalecki's texts are published following a final edition of each paper accepted by the author; more important differences between successive versions of the same paper are noted in editorial comments. Kalecki's footnotes—marked in each paper by successive numbers without parenthesis—are placed at the foot of the page. Editor's comments—marked by successive numbers in square brackets within each paper, in the same way as reference to them—are placed at the end of the volume. The first comment on each paper contains information on its first publication, its further editions and translations, and usually also brief information on the background of the paper and the discussions associated with it; it is therefore of a more general nature. Other comments refer to more specific questions. Annexes, also placed at the end of the volume and meant as supplements to the main texts, contain the more important extensions and explanations by Kalecki (and his co-authors), strictly connected with a given work. In order to avoid repetition, the editor's comments on the first essay in a given part of the volume are even more general, providing, *inter alia*, information on the relation of Kalecki's ideas to those of contemporary economic theory, economic discussions at the time, or the actual economic situation and policies.

In the Editorial Notes and Annexes Kalecki's own writings are printed in larger type, except for occasional short quotations used in editorial matter to clarify the context; these are printed in smaller type.

While editing the articles printed in Poland in 1928–35 many imprecise or incomplete references were corrected. Unfortunately, this was not always possible and in some cases the missing references and/or initials could not be traced.

I thank the publishers of Kalecki who very generously granted their permission to reproduce these essays and articles in the *Collected Works of Michał Kalecki*. More specific acknowledgements are made in comments following individual papers. Also I am grateful to the Polish Academy of Sciences and the Stefan Batory Trust for providing financial assistance towards completing the final two volumes of the *Collected Works*. Above all, however, I am especially grateful to Mrs Adela Kalecki for her unyielding assistance and encouragement throughout all phases of this work.

J.O.

Brwinów
July 1994

PART 1
BUSINESS ANALYSES 1927–1935

The Lifting of the British Rubber Restrictions[1] (1928)

The greatest threats to any monopoly structure are: (i) an output expansion by the already existing outsiders or the development of new centres of production, both induced by high prices, and (ii) a widespread use of substitutes and regenerated products. These two factors undermined monopolistic practices of limiting output and thereby maintaining prices and high profits. These factors also played a decisive role in the developments related to the British rubber restrictions.

The purpose of Stevenson's Plan was to limit rubber exports from the Malaya Islands and Ceylon. It was introduced at the end of 1922 and because of the dominant position of these two centres of rubber production, which at the time met 58% of the world demand for rubber, the plan resulted in a large price rise. The mechanism of the plan was as follows. The standard volume of output was determined on the basis of the 1920 volume of production and rubber exports were subject to a progressive export tariff. The minimum tariff rate, at 1*d.* per lb., applied to export quotas only, which were in turn determined as a percentage ratio of the standard volume of production (usually 60% of it); for the next 5% of exports an export duty of 4*d.* per lb. had to be paid, for the successive 5% of exports 5*d.* per lb., and so on.

In this way output expansion during the business upswing was made possible because high prices allowed the payment of export tariffs at a higher rate. Moreover, flexibility of output adjustments under the plan was also enhanced by allowing changes in the percentage quotas subject to export tariff at a minimum rate. These quotas were set quarterly and in relation to the average price of rubber in the preceding period. Export quota equal to 60% of output was related to the basic price of rubber of 15*d.*

per lb.[1] The quota was increased when rubber prices were greater, and reduced when they were lower than this basic price. Nevertheless, the flexibility of Stevenson's Plan was not always satisfactory.

The importance of Stevenson's Plan for the British rubber producers and for the British balance of payments is shown in Table 1. The success in terms of output was relatively high profitability even in the otherwise not too good 1927, but was not accompanied, however, by increasing control over the world rubber market, as will be seen in Table 2.

Table 1. *Rubber Prices and Exports, 1922–1927*

Year	Average price *d.* per lb.	Export from Malaya and Ceylon ('000 tonnes)	Value of exports (£m.)[a]
1922[b]	9.2	262	22.3
1923	15.3	236	33.4
1924	13.8	213	27.2
1925	34.9	258	83.5
1926	23.7	345	75.6
1927	18.5	294	50.4

[a] Calculated from the data of the second and the third columns.
[b] Before the restrictions were introduced.

Table 2. *World Output of Rubber, 1923–1927*

Year	Output[a] ('000 tonnes)	Average output restriction (%)[b]
1923	451	61
1924	496	57
1925	640	67
1926	783	95
1927	778	64

[a] Regenerated rubber including.
[b] In relation to the standard volume of output.

The strong reduction of quotas in 1927 did not cause a reduction in the volume of output. There were two reasons why Stevenson's Plan lost control over the market: (i) rubber production in other countries increased, especially in the Dutch East Indies; and (ii) output of regenerated rubber in the USA also increased. Changes in the world structure of rubber output between 1922 and 1927 are shown in Table 3.

[1] In 1925/6 this basic price was increased to 21*d.*

Table 3. *Relative Shares in the World Production of Rubber, 1922 and 1927*[a] *(%)*

Producer	1922	1927
Malaya and Ceylon	58	38
Dutch East Indies	22	29
Natural rubber produced by other countries	8	11
Regenerated rubber	12	22
TOTAL	100	100

[a] Regenerated rubber included.

It will be noted that in this case the spontaneous operation of the factors that undermine the monopoly position of a producer was reinforced by a co-ordinated action of American buyers. The USA that dominates the world production of automobile tyres and represents over 70% of world rubber consumption had to oppose the British policy of high rubber prices, countering it by the following measures:

1. Some already existing rubber plantations were bought and new plantations were established. The leading tyre producer, Firestone, bought 35 000 acres of rubber plantations in Mexico and together with Goodyear Co. hired 1 million acres of land in Liberia for developing rubber plantations. Ford acquired for the same purpose 1.5 million acres of land in Brazil. Output from these new rubber plantations has not appeared yet on the market as rubber trees do not mature for six years. However, when the future output capacity of the Liberian plantations, estimated at 200 000 tonnes, is taken into account, the forthcoming drastic change in the world rubber market becomes evident.
2. The US government and the American buyers took steps to intensify rubber production in the non-British plantations (in Northern Brazil, the Dutch East Indies, and French Indo-China).
3. The operation of rubber-regenerating factories was expanded and reprocessing of used rubber in 1927 increased threefold in comparison with 1922.
4. Finally, at the end of 1926 the American tyre and automobile producers established a pool the aim of which was to co-ordinate rubber purchases and to counter price rises through stock accumulation in periods of business crisis.

The results of 1927 when, as we saw, a strong reduction in export quotas was fully offset by the expansion of output in other centres of

production, were a clear sign of the British losing control over the market. The situation in 1931 would drastically deteriorate because rubber trees planted during the 1925 boom would by then mature. As we have also already mentioned, there is the possibility during the next few years of large supplies of rubber coming on the world market from plantations started by the American automobile and tyre producers.

In these circumstances Baldwin's declaration of 4 April 1928 on the lifting of rubber export restrictions from 1 November this year is quite clear. Doubts may only arise whether this action was not premature and too abrupt. Due to Baldwin's declaration the London prices of rubber fell from 12¾*d.* per lb. in early April to 8½*d.* per lb. Nevertheless, the swiftness of the British reaction was to some extent justified. Following the period of British monopolistic tendencies in the rubber market in the face of the likelihood of disastrous overproduction, an agreement will probably be reached between all rubber producers and it will possibly include also the American buyers recently engaged in rubber production. Regarding the Dutch rubber producers, the British started to negotiate with them before the sanctions were lifted but without much success. Thus the British decided to persuade their Dutch competitors and the American buyers to show greater flexibility by inflicting huge losses on them, as well as on the British themselves, through large depreciation in the volume of future output and of stocks in hand (those of the American pool included), and a fall in the value of rubber assets. In this way the disadvantages of overproduction were clearly demonstrated. This was done when the British output capacity was still above 50% of the total output capacity of natural rubber. Had the lifting of rubber sanctions been postponed, this ratio would have worked to Britain's disadvantage, because more intensive cultivation of plantations that compete with the British ones and which at the same time were not subject to output restrictions would have reduced the volume of the British quota once the rubber market was eventually organized into a pool. So far, however, the British–Dutch negotiations, resumed after the restrictions had been lifted, have not brought any tangible results.

Regarding the American interests, Ford declared that it will continue to run its rubber plantations. However, this must be considered at least doubtful when high investment costs in new plantations and much greater costs of labour than in the Dutch and

the British plantations are both taken into account. On the contrary, we may expect at least a partial outflow of capital from the new plantations (and from rubber-regenerating factories whose output will be reduced), and the Americans will probably purchase shares of the British and Dutch rubber companies, the price of which is rather low at the moment. In this way the Americans will gain greater control over the world production of rubber.

The World Production of Aluminium[1] (1928)

Since 1913 world output of aluminium has increased more than threefold: it was 65 000 tonnes in 1913 and 200 000 tonnes in 1927. This is explained not only by the development of the aeroplane industry where aluminium, because of its light weight, meets no competition, but also by the fact that the 'white metal' competes successfully with iron in the car industry and copper in the electrical engineering industry.

Aluminium output in 1927 was as follows (in %):

USA	35.7
Canada	13.3
Norway	10.2
Switzerland	9.8
Germany	15.5
France	9.8
Other European countries	5.7
TOTAL	100.0

The distribution of aluminium production is similar to that of zinc metallurgy. As in the latter case, where due to large inputs of coal necessary for zinc-smelting zinc works tend to be located close to coalmines rather than to zinc-ore deposits, so the production of aluminium, which requires 25 000 kWh of electric power per tonne of aluminium, tends to concentrate close to cheap sources of electric energy. This explains why Canada, Norway, and Switzerland, which have no deposits of bauxite but have large hydropower stations, represent together 32% of the world production of aluminium. On the other hand, a typical country where production of aluminium is closely linked with rich deposits of raw material, i.e. bauxite, is France. In addition to France, bauxite deposits are located in the USA, the British India, British and Dutch Guiana, Italy, Yugoslavia, Hungary, and Russia.

As a new branch of industry, where for technical reasons only large plants may be considered economic, production of aluminium shows a high rate of concentration. According to *Wirtschaftsdienst* (13 June, 1928), there was one aluminium company in the USA, one in Canada, two in Norway (each supplying 50% of the Norwegian output), one in Switzerland, two in Germany (one turning out 80% of the German domestic output), and one in France.

Concentration of output is not limited to this; the German, Swiss, French, British, Austrian, and one of the Norwegian companies are grouped together in the European aluminium cartel, and US and Canadian output is in the hands of the Aluminium Co. of America (with an equity capital of $80 million). This company controls, in turn, one of the Norwegian companies. In this way the Aluminium Co. of America controls 54% of the world output of aluminium and nearly all the remaining 46% (except for some small Italian plants) are controlled by the European cartel.

The main task of the cartel is to reduce output with some flexibility and this is achieved in the following way: each member of the cartel is given a definite output quota. If it is exceeded, the producer must buy from other pool members their aluminium output in proportion to its own overproduction. This, of course, requires a very careful expansion of output and at the same time levels off business fluctuations across markets, allocating the gains from expansion of demand between all cartel members.

Till now, the Aluminium Co. of America has not competed with the European cartel, as all output of the US company was absorbed by the US market, and exports of other countries to the USA was rather negligible. It seems that this situation is likely to change since the Aluminium Co. of America is at present constructing a huge aluminium factory on the Saguenay river in Canada. Its annual output capacity will be 100 000 tonnes, i.e. 50% of the present world output. Moreover, the Company aims at expanding its sales in the US market, where at the end of 1927 it reduced its prices from $26 to $23 per lb. This will probably limit imports of aluminium from Europe and will contribute to more applications of aluminium, especially in the American automobile industry. Of course, expansion of sales by 100 000 tonnes cannot be accomplished in this way alone, for this would require the doubling of American consumption of aluminium; the other way must be expansion to foreign markets. This, however, is now possible only provided that dumping is practised, because even current, already reduced, American prices threaten European competitors only in the US market which is protected by an import tariff of £5 per lb. It must be remembered,

however, that the costs of the new Canadian output, based on cheap hydro-energy, will be lower than at present. On the other hand, it is doubtful if the Aluminium Co. really intends to increase its output by the full 100 000 tonnes; probably there will be a partial reduction of output in the USA as a result of cheaper Canadian output.

A clear sign of the tendency of the Aluminium Co. to expand beyond the American market are its recent investments: (i) the purchase of concessions for the use of hydro-energy in the Spanish Pyrenees, (ii) the purchase of a concession for the exploitation of bauxite deposits and development of aluminium production in Russia,[1] and (iii) an attempt to gain control over the German–Hungarian bauxite trust, Bauxit AG in Zurich.

The last two measures are strictly connected with the Aluminium Co.'s raw-material policy. The deposits of bauxite in the USA are quickly drained and hence the Company has gained access to deposits in British India and British and Dutch Guiana. Owing to the Soviet concession, the Aluminium Co. has established, among others, a close link with rich deposits of bauxite near Chivynsk. At the same time, Bauxit AG, established by the German aluminium companies and the Hungarian mining companies, controls bauxite mines in Hungary, being at present the main raw-material supplier for German aluminium production. Thus, gaining control over Bauxit AG, the Aluminium Co. would open the way to the Hungarian deposits and at the same time would undermine the position of the German producers.

[1] This has not been officially confirmed yet.

The World Production of Tin[1] (1928)

The world production of tin in 1927 was about 160 000 tonnes (compared to 136 000 tonnes in 1913). The cross-country structure of tin-ore mining (expressed in terms of pure tin content) was as follows. The share of British Malaya was 33% and the controlling country is Great Britain; 22% was produced by Dutch East Indies where the controlling country is Holland; Siam, Borneo, and China took 10% between them and the country controlling this output is again Great Britain and to a less extent the USA; Bolivia produced 23% of total world output and its production is controlled by USA and by Great Britain, which also controls the 10% share turned out by Nigeria, Australia, North Africa, and Cornwall; the remaining 2% is produced by other countries.

It follows that 50–60% of output of tin-ore mines is controlled by British capital which at the same time is highly concentrated. It also controls even more tightly tin metallurgy. In 1926 the share of the British Malaya, Great Britain and Australia in total tin-smelting was 82%, Dutch East Indies took 11%, and other countries' share was 7%.

In the structure of tin consumption in 1926 the USA's share was 53%, that of Europe 40%, and that of other countries the remaining 7%. Huge American rolling-mills of tinned sheet and the large US automobile industry make the USA the single most important user of tin.

Thus, the situation in the tin market is like that in the synthetic rubber market: the British producer faces the American consumer. Although in this case there is no market regulation similar to Stevenson's Plan in the synthetic rubber market, some natural factors make market prices significantly exceed the average costs of production. These costs vary greatly between individual producers. Large companies in the Far East continue to earn profits at world prices between £150 and £200 per tonne. Yet, for most small producers in this region, e.g. in Bolivia and Cornwall, £230 brings losses and many tin mines in other countries run deficits at prices below £260 per tonne. Because of this structure of costs, supply is elastic and a fall in prices reduces output of high-cost plants. When demand is large, prices are determined by the highest costs of production. This was

the situation in the world tin market in 1925 when the average world price per tonne was £260, in 1926 when it was £290, and in the first half of 1927 when it was £300.

In contrast to other non-ferrous metals, where smelting requires large inputs of energy and expensive equipment, tin is easy to smelt and hence a decisive role is played by the conditions of tin-mining rather than tin-smelting. This explains why the USA could not become independent of their suppliers by establishing tin-works. At any rate, even Bolivian ores, the mining of which is largely controlled by American capital, are processed only in European metallurgic works, mainly in the British ones. Moreover, tin metallurgic works founded some time ago in the USA have been closed.

For this reason the American market responded to high tin prices in recent years by limiting tin consumption, which again was similar to what has happened in the American synthetic rubber market. The only difference was that instead of intensified reclamation, difficult in case of tin which is used mainly for iron-coating, tin is partly eliminated by its substitutes. In the canned-food industry, for instance, glass jars are largely substituted for tin cans, and in one of the rolling-mills of white sheet a varnish has been invented that may well substitute for tin in canned vegetables and meat (it is not suitable for canned fruit, however).

As far as tin production is concerned, high tin prices in recent years not only made the exploitation of high-cost mines profitable, but also led to developing new mines. In the Malayan Islands, for instance, forty new plants are being built with a total annual capacity of 12 000 tonnes, of which twenty-five will go into operation this year; it must also be noted that their cost of production will be no higher than the average cost. Taking into account a decline in the American demand for tin (for reasons explained above), this, of course, must lead to a reduction in world tin prices and the elimination of high-cost producers by the newly constructed plants. The metal stock exchange has already discounted these developments. Since last August there has been a bear market in tin that was not stopped by rumours of the establishment of an international tin cartel. This, however, may well have been a stock exchange manœuvre. In the end, tin prices fell after the middle of 1927 from £300 to £207 per tonne which, together with forecasts on future demand, was due to rising stocks of tin. In May alone they increased by about 15%—a very clear symptom of future developments.

The World Production of Lead[1] (1928)

1. The world metallurgic output of lead in 1927 was about 2m tonnes, of which the share of individual countries was as follows (in %):

USA	38
Mexico	15
Canada	8
Australia	10
British India	4
Spain and Tunis	7
Germany	5
Poland	1
Other countries	12
TOTAL	100

Thus, lead producers fall into three groups: (i) the USA and Mexico that turn out 53% of the total world output, (ii) the British dominions that take 22%, and (iii) Europe and North Africa representing the remaining 25%.

In relation to copper and zinc, the distance between lead metallurgic works and lead mines—expressed in terms of rate of satisfying the demand of the European metallurgic works by the supply of ores mined in Europe—is 70%, compared to 95% for copper and 62% for zinc (the percentages represent the ratio of pure metal content of ores mined in Europe to the European metallurgic output for each of the three metals; the data are for 1926).

It should be noted that lead takes an intermediate position between copper, whose low ore content does not allow for long-distance transport (and thus copper metallurgic facilities have to be located close to copper mines) and zinc, in the case of which, due to the large intake of coal in zinc-smelting and the complexity of the latter, the locating of zinc works close to coalmines and the availability of skilled labour are far more important than the distance between zinc mines and zinc metallurgic works. Moreover, the percentages for lead and zinc are closely linked with each other because both metals appear in the same ore which is then smelted in two processes.

There is a striking difference between zinc and lead metallurgy and mining in Mexico, where coalmining is negligible. According to data of Société des Nations, *Annuaire Statistique* (non-revised data for 1926) the content of lead in the mined lead ore was 210 000 tonnes and the output of smelted lead was 173 000 tonnes, while the content of zinc in the mined zinc ore was 105 000 tonnes and the zinc metallurgic output was zero.

Let us now turn to the relations between production and consumption. With respect to the four non-ferrous metals two types of regions may be distinguished here: (i) zinc and aluminium, for which America and Europe are—broadly speaking—self-sufficient, and (ii) copper and tin where there is a clear dependence of the consumer on the producer—of Europe on America in the case of copper, and of the USA on the British capital in the case of tin. Lead takes again an intermediate position. Europe is not self-sufficient but its dependence on US output, and on Mexican output that is controlled by the USA, is relatively small because a large part of the European demand is met, next to Europe's own production, by the supplies from the British dominions, mainly from Australia. Thus, according to a rough estimate for 1927, Europe met 50% of demand for lead by its own production, 35% by deliveries from the British dominions (Australia, Canada, and British India), and 15% by deliveries from the USA and Mexico.

This absence of domination by lead in the world market, however, accompanied by the lack of division of sales markets (in contrast to zinc and aluminium) makes cartelization difficult, although it might be considered desirable in the face of the present sharp fall in prices. It must be noted in this context that in the world lead market the position of the USA is privileged because of high import tariffs protecting the domestic market. This explains the difference between lead prices in America and world prices: £21 per tonne in the London market compared to £29 per tonne in the USA. Of course, this closes the American market to European competition and secures fat profits on the US market for domestic producers, improving thereby their competitive position on the world market where they can accept lower prices than their competitors.

It should also be noticed that lead metallurgic facilities based on domestic ores represent an important political advantage due to a large demand for lead for ammunition production in event of war.

2. According to American statistics, 21% of American consumption of lead in 1924–6 was absorbed by the electro-technical industry (battery production) and 18% for cable production (lead coating). Hence, about 40% of lead consumption was directly or indirectly linked with the electrical-engineering industry. This explains the relationship between the demand for lead and that for copper, which in turn is closely linked with the electrical-engineering industry. However, it is difficult to trace parallel changes in the prices of these two metals in recent years. In 1925 lead prices reached nearly 200% of their pre-war level, and at present they are £21 per tonne, i.e. little more than before the war (see Table 4). In the same period copper prices oscillated around their pre-war level, deviations not exceeding 10%. Table 4 shows the prices of lead and its output in 1913–28.

Table 4. *Lead Prices and Output, 1913–1928*

Year	Average London lead price (£ per lb.)	Annual world production[a] of		Ratio of lead to copper output (%)
		lead	copper	
1913	$18^{13}/_{20}$	1290	1070	120
1924	$33^{13}/_{20}$	1440	1570	92
1925	$35^{13}/_{20}$	1610	1640	98
1926	$31^{13}/_{20}$	2070	1700	122
1927	$31^{13}/_{20}$	2030	1730	117
1928[b]	$20^{13}/_{20}$	1000	910	110

[a] According to *Die Wirtschaftskurve mit Indexzahlen der Frankfurter Zeitung*, 7/1, 1928
[b] First half of the year only.

In order to eliminate the factor of a steady growth of demand, let us divide the output of lead by that of copper, for which the demand was relatively stable and whose applications are similar to those of lead. Hence the respective volumes may be roughly interpreted as representing output of lead at a stable volume of demand in individual years.

In equilibrium between supply and demand a rise in those indices should be accompanied by a fall in prices and the opposite when output indices decline. However, it will be seen that in 1924–5 prices increased together with output and in 1926–8 they fell accordingly.

This indicates that in the first period supply was insufficient and stocks were reduced, while in the second period overproduction was accompanied by stock accumulation. Apparently supply and demand have now reached approximate equilibrium at prices that are even slightly higher than on average in the first half of 1928.

Of course, the present decline in the rate of expansion is a natural result of price reductions. Some producers have been forced out from the market, while others have limited their output or at least have not increased it.

The fact that in many cases present prices are close to the cost of production is also demonstrated by the critical position of lead-mining and smelting in Spain, which is the most important lead producer in Europe. In 1927 the Spanish government attempted to remedy the situation, among other things by the closure of non-profitable plants. It also granted subsidies when world prices fell below a certain minimum level. Moreover, it has been alleged that, according to the contract with the USSR on oil deliveries for the Spanish government oil monopoly, in 1928 Russia will import lead mostly from Spain.

Rubber[1] (1928)

1. It was commonly thought that a drastic change in the rubber market, caused by Baldwin's declaration of 4 April 1928 on the lifting of rubber export restrictions from 1 November this year, would exert a decisive impact on rubber production.[1] It was believed that price reductions of 8–9*d.* per lb. would often make the concentration of production non-profitable, and would prove a natural check on overproduction, thereby taking over the function that until then was performed by Stevenson's Plan. In these forecasts the greatest importance was attributed to a reduction of local output in the Dutch East Indies and the expansion of American rubber-regenerating factories. All these predictions have in general proved wrong as is shown by Table 5.

Table 5. *Rubber Exports in 1928 ('000 tonnes)*

Rubber exports	First quarter	Second quarter
TOTAL	143	121
of which from:		
Malacca[a]	54	42
the Dutch East Indies plantations	34	31
the Dutch East Indies local production	20	20
US output of regenerated rubber	51	51

[a]Re-exports excluded.

The downward adjustment of local rubber output in the Dutch East Indies and of the regenerated American rubber factories failed completely. In the quarter following Baldwin's declaration on 4 April the volume of rubber output did not change. As Table 5 shows, the reduction in rubber supply was largely due to reduced exports from Malacca which, in turn, was probably caused by Stevenson's Plan remaining in force until 1 November 1928. As it is well known, the plan imposed a progressive export tariff on exports exceeding the predetermined quota. This made it possible to increase exports in

[1] See also M. Kalecki, 'The World Production and Consumption of Cotton', this volume.

the periods of high prices when paying higher tariffs made export expansion profitable. The dramatic decline in prices following Baldwin's declaration made unprofitable exports of rubber above the quota.

Besides Stevenson's Plan, the other factor that limited the world supply of rubber was the reduction in output of free-growing rubber in Brazil which is relatively expensive and therefore unprofitable at the new, lower prices. The capital engaged in this production can be easily withdrawn.

It should also be noted that the volume of exports from Malacca (and Ceylon) must not be identified with rubber output. After Baldwin's declaration plantations stopped restricting their output. With a limited volume of export this resulted in the accumulation of rubber stocks in plantations. These stocks reached about 70 000 tonnes (the normal volume of stocks is 25 000 tonnes). Once export restrictions are lifted on 1 November 1928, these stocks will enter the world market.

A tendency among producers may be observed to use fully their production capacity. The prevailing tendency is not to restrict output and thereby to raise prices, but to reduce production costs. Negotiations between the British and the Dutch producers brought no real results but lowered the cost of labour in the Dutch East Indies. The cost of production in Malacca and Ceylon will automatically fall because of better use of plantations under unrestrained output volume. Even the newly started American rubber plantations (by Ford in Brazil, Firestone in Liberia, and Goodyear in the Philippines) will continue to operate and, because of technical improvements, their productivity is expected to be much greater and their production costs much lower than the average of plantations as presently cultivated. The US Rubber Co. expects to obtain from its plantations in the Dutch East Indies 2000 lb. of rubber per acre while the present productivity of its plantations is 543 lb. per acre and the average productivity of Dutch East Indies' plantations is 325 lb. per acre. Also the American rubber-regenerating factories are likely to keep their markets thanks to technical innovations.

2. Since the time of Baldwin's declaration[2] the world stocks of rubber have been drastically reduced[3] from 261 000 tonnes to about 170 000 tonnes. The volume of rubber stocks at the end of 1927 was

[2] See M. Kalecki, 'The Lifting of the British Rubber Restrictions', this volume.
[3] Excluding the above-mentioned stocks in rubber plantations.

262 000 long tons, 261 000 long tons at the end of the first quarter of 1928 and 212 000 long tons a quarter later. Thus the change in stocks between the end of 1927 and the end of the first quarter of 1928 was 1000 long tons and 49 000 long tons between the end of the first and the second quarter of 1928. If these reductions in stocks are added to the respective volumes of exports from the main production centres, the total consumption of rubber would be 144 000 long tons in the first quarter and 170 000 long tons in the second quarter of 1928.

It is doubtful, however, whether rubber consumption has indeed increased that much. Statistics of the rubber intake processed in the USA show the same figures both for the first and the second quarter of 1928, i.e. 95 000 long tons. Probably a large part of the increase in the world rubber consumption represents a rise in invisible stocks accumulated in expectation of a price rise after a decline in prices to the exceptionally low level following Baldwin's declaration. As it happens, this speculation on a price rise was an important determinant of a slight price rise that in fact took place.

3. Since 1 November exports from Malacca and Ceylon are no longer subject to any restrictions. This will have a twofold influence on the world rubber market. First, the stocks accumulated in these plantations will be exported. Since these stocks have been estimated (as noted above) at 70 000 tonnes and the normal stocks are 25 000 tonnes, the entry of 45 000 tonnes of rubber on the world market may be expected (or more, stock statistics being incomplete). Secondly, a permanent export from Malacca and Ceylon, no longer restrained by Stevenson's Plan, will increase.

It seems unlikely that the supply of an additional 45 000 tonnes of rubber on the world market—in fact no more than the reduction in the London stocks of rubber since April—will generate a significant fall in prices. First of all, in relation to costs of production prices are already very low. Secondly, a fall of prices in an uncertain business situation, as at present, might leave an impression of a recession and thus induce the buyers to keep stocks low and hence not only to reduce temporarily a rise in demand but to stop it altogether. For all these reasons the producers or sellers may be expected not only to reduce prices in order to avoid short-period losses, but also to counter a complete disruption of the rubber market.

It is much more difficult to make any forecasts concerning the increased exports from Malacca and Ceylon. A more than twofold reduction in rubber prices during this year opens completely new areas for the use of rubber that will be steadily penetrated. Thus the future expansion of demand and the market situation are unpredictable at this statge.

Rubber 1929[1] (1929)

In an earlier survey[1] it was pointed out that the fall in prices after Baldwin's declaration of 4 April 1928 did not result in a fall in output in the second quarter of 1928 even in cases where at lower prices production was clearly no longer profitable: both the domestic output of rubber in the Dutch East Indies and of American reprocessing factories did not decline compared to the first quarter of that year. This tendency continued in the second half of 1928 (see Table 6).

Table 6. *Production and Exports of Rubber, 1928 ('000 tonnes)*

	First quarter of 1928	Quarterly average in the second half of 1928
Export of rubber from Malacca[a]	54	100
Export of rubber from Dutch East Indies plantations	34	37
Export of rubber locally produced in Dutch East Indies	20	22
Output of reprocessed rubber in the USA	51	51[b]

[a] Re-exports excluded.
[b] According to data for July–Oct. 1928.

Production of natural rubber in the second half of 1928 shows an increase in all manufacturing countries compared to its volume before Baldwin's declaration. A large growth in Malaccan exports is explained by the fact that after Baldwin's announcement that from 1 November 1928 export restrictions would be lifted, output of local plantations was no longer limited, although additional production could not be exported until Stevenson's Plan was abandoned on 1 November 1928. Hence, large stocks were accumulated and they were exported in November and December after the restrictions were

[1] See M. Kalecki, 'Rubber', this volume.

terminated. In this way, in the second half of 1928 not only the unlimited output of that period was exported but also the rubber accumulated in the preceding three months. As a result, Malacca's rubber exports will continue to exceed the volume of the first quarter 1928, because rubber producers will no doubt use fully the output capacity of their plantations.

Rubber consumption as well as supplies increased strongly in the second half of 1928, as shown by the volume of processed rubber in the USA which determines the world consumption. In the first quarter of 1928 the volume of processed rubber in the USA was 95 000 tonnes, and the quarterly average in the second half of 1928 was 125 000 tonnes. Thanks to this growth of rubber consumption increased exports from Malacca in November and December 1928 were absorbed by the market (London stocks increased in this period only insignificantly) and prices were not reduced. Of course, the additional supply was not wholly used in November and December; in part consumers' stocks that in the earlier months were drawn upon, especially in the USA, were replenished.

As noted above, although supplies increased in November and December, prices did not change, remaining at $8\frac{1}{2}d.$ per lb. However, in the first half of January 1929 they increased markedly, at one stage reaching even $11\frac{1}{4}d.$ per lb. At present (i.e. 10 February 1929) after many fluctuations they are $10\frac{7}{8}d.$ per lb. Possibly developments in the last two months of 1928 convinced all interested parties that a further reduction of prices was unlikely. Hence both genuine consumers who postponed their orders, as well as speculators betting on futures, decided to start their purchases. There are also rumours on the link between speculation on the rubber market and in shares of rubber companies that recently also intensified.

The World Production and Consumption of Cotton[1] (1929)

1. Strong fluctuations of output and stable consumption are the main features of the cotton market. Output fluctuations are due to the dominant position of harvests in the USA that are exceptionally volatile; for instance, the US cotton harvest in 1927 was 30% lower than in 1926.[1] Moreover, cotton consumption does not adjust to annual changes in output. Neither high prices in the case of a poor harvest, nor low prices in the case of a good one, affect strongly the volume of consumption. This is because, on the one hand, cheap cotton textiles meet primary consumer needs, and on the other hand, in the production of more expensive articles the raw-material input represents only an insignificant part of costs. This relative stability of cotton consumption when output fluctuates strongly may be maintained only through compensatory stock changes that play a very important role in the cotton market.

These features of the cotton market appeared clearly in the economic years 1926/7 and 1927/8, as shown in Table 7. In 1926/7 the cotton harvest was better and in 1927/8 it was worse than average. Although for this reason prices in 1927/8 were significantly higher than in 1926/7, consumption hardly changed being supplied from stocks which were increased a year earlier.

Table 8 shows averages of cotton output, exports, imports, and consumption in 1926–8. As we noted above, both in 1926/7 and 1927/8 there was a clear difference between changes in cotton output and in its consumption. This difference was of an opposite nature in 1927/8 from 1926/7, yet in the course of these two years the changes balanced each other and at the end of 1927/8 stocks differed only little from what they had been at the beginning of 1926/7. This explains why cotton consumption, calculated in Table 8 as a sum of

[1] Cotton harvests in other countries are also subject to strong fluctuations; however, they are milder than in the USA. Moreover, cotton harvests in other countries are less significant for the cotton market than those in the USA and as a rule fluctuations in harvests in the USA do not happen at the same time as in other countries.

Table 7. *Cotton Production, Output and Prices, 1926–1928 (million tonnes)*[a]

Year	Average prices of American cotton (spot Liverpool, in *d.* per lb.)	World output	World consumption	Stocks of trade and industry (end of year)
1925/6	10.77			2.2
1926/7	8.15	6.15	5.65	2.7
1927/8	11.17	5.10	5.60	2.2

[a]Approximate data.

Table 8. *Average Cotton Output, Exports, Imports and Consumption, 1926/7 and 1927/8 (million tonnes)*

Country	Output	Export	Import	Consumption
USA	3.35	2.24	0.09	1.20
British India	1.00	0.53	0.04	0.51
Egypt	0.32	0.32	—	—
Great Britain and Ireland	—	—	0.72	0.72
Japan	—	—	0.65	0.65
Continental Europe (USSR excluded)	—	—	1.45	1.45
China	0.37	0.07	0.14	0.44
USSR	0.16	—	0.17	0.33
Other	0.42	0.16	0.06	0.32
TOTAL	5.62	3.32	3.32	5.62

Sources: Mainly from statistics of the International Institute of Agriculture.

cotton output and the balance of exports and imports, does not differ much from the volume of consumption when changes in stocks are accounted for.[2]

The relative shares of individual countries in cotton production, consumption exports and imports that follow from Table 8, are shown in Table 9. About 60% of world cotton output is supplied by the USA followed by India, China, Egypt, and the USSR; most of the rest is produced in South America (Brazil, Argentina, Mexico, and Peru), British Africa (East Africa, South Africa, and Sudan), and the Near East (Turkey and Persia). The USA takes the first place also in cotton consumption, followed by Great Britain, Japan, British India, and China, and then the countries of continental Europe; the rest is consumed by South America and Canada.

[2] i.e., on the assumption that there are no large cross-country changes in the volume of stocks.

Table 9. *Average Relative Shares in Cotton Output, Consumption, Exports, and Imports (%)*

Country	Output	Consumption	Exports	Imports
USA	59	21	68	3
British India	18	9	16	1
Egypt	6	—	9	—
Great Britain and Ireland	—	13	—	21
Japan	—	11	—	19
Continental Europe (USSR excluded)	—	26	—	45
China	7	8	2	4
USSR	3	6	—	5
Other	7	6	5	2
TOTAL	100	100	100	100

The situation is different in the international cotton trade. Broadly speaking, Great Britain, Japan, and continental Europe are supplied with American, Indian, and Egyptian cotton. Both American and the Egyptian cotton have higher percentage shares in cotton exports than in cotton world output, although this does not hold for Indian cotton. A large part of American cotton exports (about 80%), and of Egyptian exports (also about 80%) is absorbed by Europe (Great Britain and the Continent). On the other hand, about 60% of India's exports of cotton are taken by Asia (Japan and China). Chinese exports are directed to Japan.

2. The main centre of cotton production is the USA and its importance in this area is underestimated in the above-quoted statistics. The average fibre-length of American cotton is 3/4–$1\frac{1}{8}$ in., in contrast to long-fibre Egyptian cotton (1–$1\frac{5}{8}$ in.) and short-fibre Indian cotton (1/8–3/4 in.).[3] The medium-length American fibre is used in the manufacture of standard cotton textiles that are commonly used, especially in Europe and America; the short-fibre cotton is used for low-quality textiles only, and Egyptian cotton—except for some brands of textiles—is used for special purposes (tyres, laces, etc.)

As we have already noticed, American harvests of cotton fluctuate strongly. Apart from highly variable weather conditions, especially in the last quarter of the century, the main cause for these fluctuations

[3] As we shall see, part of Indian output of cotton can be considered as medium-length fibre.

is the damage caused by boll-weevil. These primary sharp fluctuations in output lead to secondary fluctuations in the acreage of cotton plantations. For instance, given largely inelastic consumption, a harvest much better than the previous year leads to a sharp fall in prices which in turn caused strong reductions in the plantation acreage the following year. If the harvest in the following year happens to be poor, the fluctuations add up and the reduction in total cotton output will be stronger than in its yield per acre. This actually happened in 1927/8. In 1925/6 the average price of the American cotton (spot Liverpool) was 10.77*d.* per lb.; in 1926/7 the plantation acreage of American cotton was 19.1 million ha., its total harvest 3.9 million tonnes, and its yield 204 kilograms per ha. In 1926/7 the price fell to 8.15*d.* per lb. (see Table 7), i.e. by 24% and in 1927/8 the plantation acreage was reduced to 16.2 million ha. (i.e. by 15%), the yield dropping to 173 kilograms per ha. (i.e. by another 15%), and the total cotton harvest was down to 2.81 million tonnes (a 28% reduction).

Next to these random fluctuations in American cotton production there are more stable tendencies there too. From 1900 to 1914 the spread of boll-weevil affected nearly all American plantations and reduced their yield on average from 210 kilograms per and from 1915 to 1925 to 176 kilograms per ha., i.e. by 16%. The boll-weevil plague affects not only total harvests but also the quality of cotton. The slow-growing long-fibre cotton is less resistant to this insect; hence average fibre-length becomes shorter. This natural process has economic consequences, however. Plantation-owners tend to cultivate short-fibre cotton since the price margin for a better-quality fibre does not compensate for the risk of damage. The share of medium-length types of cotton (e.g. Texas 1⅛ in.) in total cotton output systematically falls.

By reducing cotton yields the plague of the boll-weevil has significantly increased costs of cotton production. Another factor that operated in the same direction has been the reduction in the supply of cheap labour due to migration of Negroes from cotton-cultivation districts to industrial centres short nowadays of overseas migration. As everywhere else in cotton production high labour costs encourage mechanization. The greatest obstacle to mechanization is that cotton bolls do not open at the same time and hence cotton-pickers must walk the plantation many times before the cotton is picked up from the already opened bolls. However, in the western regions of Texas

and Oklahoma, where the climate is much drier than in other regions of cotton cultivation, the opening takes place at the same time. This allowed the introduction of so-called 'sleds', pulled by animals or tractors. Sleds shake the bolls from cotton bushes and collect them in an attached container. The bolls collected this way are transported to machines that next pull the fibre out. By 1926/7 5% of American cotton was harvested in this way. In regions where cotton does not ripen at the same time machines with special arms are to be introduced. The arms end with spindles on which the fibre from the open bolls is spun. Machines that operate as vacuum-pumps that suck out the fibre from the bolls are also being tested.

The medium-length fibre-production centres outside the USA cannot meet changes in the American supplies to the world market. Brazil, which is the second largest cotton producer (120 000 tonnes p.a.), uses most of its output at home. Moreover, expansion of output in Brazil and in Argentina is hardly possible. Apart from Brazil, the medium-length fibre-production is about 200 000 tonnes, which next to the output of Mexico, Argentina, and Peru also includes that of the South American and African dominions of Great Britain which will be discussed below.

More important than output of medium-length fibre in these centres of cotton production is the trend to improve the quality of Indian cotton. Recently more than 40% of Indian output, i.e. about 400 000 tonnes, was of a fibre-length of no less than 1⅞ in. and therefore it corresponded to the short-fibre types of American cotton.

Of course, it is difficult to forecast further developments in medium-length fibre-production outside the USA. At any rate, a factor operating in this direction will be the pressure of American cotton producers to increase prices in view of the above-discussed rises in production costs.

In the Egyptian output of long-fibre cotton mentioned above, 40% is represented by cotton of a fibre-length of 1¼–1⅝ in., called '*sakellaridis*', and the rest by lower-quality cotton (called 'uppers') of 1⅛–1¼ in. fibre-length. While prices of uppers are similar to those of the American cotton, prices of *sakellaridis* hardly depend on prices of the medium-length fibre. However, the monopoly position of *sakellaridis* is limited. At too high price margins cotton of lower quality is used for some types of production (for tyre manufacturing, for instance). Moreover, in Sudan a brand of cotton whose quality is similar to that of *sakellaridis* is produced; in 1927 the harvest of

sakellaridis was 111 000 tonnes and of its Sudanese equivalent 20 000 tonnes, i.e. about 20% of the former.[4] This incomplete monopoly position of *sakellaridis* and the parallel price changes in lower-quality Egyptian cotton on the one hand, and of American cotton on the other, are the main factors against limiting the acreage of cotton plantations in Egypt by a third—a decision made by the Egyptian government for 1927–9 with the aim of maintaining high prices for Egyptian cotton.

Cotton brands equivalent to uppers are also cultivated in small quantities outside Egypt—in the USA, Brazil, Peru, and East and South Africa.

In the present structure of cotton output of British India only 60% is represented by proper short-fibre cotton, and 40% by cotton of fibre-length no less than 1⅛ in. which may be considered as medium-length fibre. This progress, achieved mainly thanks to the work of the regional Agricultural Departments in the past 20 years, is possibly the single most important step towards making the world cotton market independent of the unstable American cotton harvests.

Next to British India, short-fibre cotton is produced also in China, Turkestan (in the USSR), and in insignificant quantities in Persia and Turkey.

Great Britain, after the USA the second largest consumer of cotton, eagerly aims in her output policy to get hold of her own raw-material base for her cotton industry and thus to gain independence of American supplies. This is explained by economic considerations—the desire of the industry to eliminate the impact of the instability of the American cotton market—as well as by political factors. With regard to long-fibre cotton, its largest producer, Egypt, although not a British dominion, is nevertheless in the sphere of British influence. (However, this did not altogether satisfy the British who by means of irrigation have opened long-fibre cotton plantations in Sudan.) Yet, for supplies of medium-length fibre, the British cotton industry heavily depends on the USA. British India's output, notwithstanding its growth, is not well adjusted to the requirements of the British cotton industry and is used more in the continental Europe than in Great Britain. For this reason the British industry and government are keen to develop cotton plantations in the

[4] Also equivalent to *sakellaridis* is the prima brand of cotton that is cultivated in small quantities in Arizona.

dominions, especially in South and East Africa. These efforts have brought no significant results as yet, as evidenced by the structure of British imports of cotton of fibre no more than 1⅛ in. long. In 1928, approximately 75% of these imports came from the USA, 10% from other countries not subject to Britain, another 10% from British India, and the rest from other British dominions (mainly in Africa).

It is noteworthy that of Japanese imports of cotton of no more that 1⅛ in. long (roughly of the same volume as British imports), US supplies represent about 50% and the rest is represented by the Indian and Chinese supplies.

3. The data on cotton consumption given in Tables 8 and 9 are supplemented in Table 10 with information on the number of spindles.

Large cotton consumption per spindle in Asian countries can be explained not only by full-capacity operation of their respective industries but also by the greater thickness of darning thread produced there. Production capacity of cotton-mills in the USA and in continental Europe is at similar rates. The index for Great Britain clearly points to a business crisis that is closely related to the expansion of Asian cotton manufacturing that pushes Britain out of local markets. An important measure to improve the competitive position of the British cotton industry is the establishment, at the beginning of 1929, of a trust that pools together a number of plants

Table 10. *Cotton Spindles and Cotton Consumption, 1926*

Country	Number of spindles (million)[a]	Consumption of cotton (million tonnes per annum)	Consumption per spindle (kg. per annum)
USA	37.6	1.20	32
Great Britain and Ireland	57.3	0.72	13
Continental Europe (USSR excluded)	38.4	1.45	38
USSR	7.2	0.33	46
British India	8.5	0.51	60
Japan	5.6	0.65	116
China	3.4	0.44	130
Other	6.0	0.32	53
TOTAL	164.0	5.62	34

[a] Since 1926 these indices have not changed much.

processing American cotton; the trust's total number of spindles is 8 million. Through reducing overhead costs, more rational purchase and sales policies, a division of labour and specialization among its members in the production of various types of output, etc., the trust will certainly affect the world market of American cotton.

The World Cotton Market[1][1] (1929)

1. The world supply of the American cotton in 1927/8 and 1928/9 is shown in Table 11. In fact, market supplies last year were only slightly greater than this year, yet last year's average price for American middling, spot Liverpool, was 11.17*d.* per lb., while this year—judging by present developments—it will barely exceed, if at all, 10.70*d.* per lb. This will depend on the structure of the disposable supply. Last year the supply from stocks was far greater than this year, as the harvest in 1927/8 was very poor and 2.6 million bales were drawn from stocks to make up consumption. This year the harvest is on its average level and so far, if consumption is maintained at its last year's figure, it will be higher than the harvest by 1 million bales only. Of course, the greater is the compensatory function of stocks, the higher is the price, if only because the stocks are intermediated by salesmen who must be rewarded for performing this function that often involves keeping stocks for long periods.

Table 11. *Supplies of the American Cotton, 1927/8 and 1928/9 (millions of bales, 500 lb. each)*

Year[a]	Stocks of industry and commerce (beginning of year)	Harvests	Total disposable supply	Consumption	Stocks of industry and commerce (end of year)
1927/8	8.1	12.8	20.9	15.4	5.5
1928/9	5.5	14.4	19.9	—	—

[a] The cotton year starts on Aug. 1.

The difference between the present and last year lies not so much in the level of prices but in their relative stability in 1928/9. A year ago information about poor harvests gave rise to a bull market followed by counteraction; this year price fluctuations were much smaller (see Table 12). The margin between the highest and the

[1] See also M. Kalecki, 'The World Production and Consumption of Cotton', volume.

Table 12. *Average Monthly Prices of Cotton, New York, 1928/9 (cents per lb.)*

Month	Average monthly price
August 1928	19.28
September	18.68
October	19.62
November	19.93
December	20.46
January 1929	20.20
February	20.28
March	21.15
April	20.44

lowest average monthly price was about 1.5*c.* compared to 3.5*c.* last year.

One cause for ending the strong advance in prices of American cotton is the poor quality of this year's harvest. Cotton of a fibre-length of more than $^{7}/_{8}$ in. is missing, hence the better-quality brands of Indian cotton, the supply of which is very large this year (see below), compete successfully against American cotton. However, the shortage of better-quality brands of the latter should result in an increased demand for Egyptian uppers (*ashmuni, zagora*, etc.), which in turn should increase the margin between American cotton and uppers. Yet, this margin is significantly smaller this year than a year ago. According to quotatios of 9 May 1928, the Liverpool spot prices for American middling was 11.71*d* per lb., and for Egyptian uppers 15.75*d.*, i.e. the margin was 4.04*d.* per lb., and on 7 May 1929 the price for the former was 10.09*d.*, of the latter 11.70*d.* and hence the margin was 1.61*d.* per lb.

The primary cause for this reduction in price margins was much richer crops of uppers that were 0.72 million bales in 1927/8 and 0.96 million bales a year later. Another cause was weak business conditions in Europe where consumption of textiles of better quality declined more than for other cotton textiles, and hence the demand for high-quality cotton also fell in relative terms. In these circumstances sales of uppers could increase only if its prices were relatively reduced.

2. The recorded world stocks of cotton (which include stocks in warehouses and seaports in the USA, and stocks in Bombay and Alexandria, on ships heading for Europe, and in European seaports) are given in Table 13, and changes in the supplies of American cotton

Table 13. *World Stocks of Cotton, in 1927/8 and 1928/9 (million bales)*

Year	1 Aug.	26 Apr.	Change in stocks
1927/8	4.04	6.63	+1.69
1928/9	4.18	6.75	+2.57
of which American cotton			
1927/8	3.37	4.11	+0.74
1928/9	2.24	3.86	+1.62

Table 14. *Changes in Supplies of the American Cotton, 1928/8 and 1928/9 (million bales, 500 lb. each)*

Year	Recorded stocks at the beginning of the year (i.e. stocks in factory plantations excluded)	Deliveries to warehouses and seaports in the USA	Total disposable supplies on 26 Apr.	Purchases by spinning-mills (i.e. supplies no longer recorded)	Recorded stocks on 26 Apr.
1927/8	3.37	13.06	16.43	12.32	4.11
1928/9	2.24	14.76	17.00	13.14	3.86

Table 15. *Cotton Purchases by Regions, 1927/8 and 1928/9 (million bales, 500 lb. each)*

Region	Purchases between 1 Aug. and 26 Apr.	
	1927/8	1928/9
Great Britain	1.45	1.46
Continental Europe	4.05	3.79
USA	5.94	6.53
Japan and others	0.88	1.36

between 1 August and 26 April of 1927/8, and 1928/9 respectively are shown in Table 14. The difference between supplies available on the market in April 1929 and a year earlier is negligible and of a different nature from that shown in Table 11, where only recorded stocks are taken into account. Stocks in plantations and factory warehouses were much greater this year than last year, while deliveries at the end of April in both years were slightly greater than the respective harvests. Purchases of cotton by spinning-mills were this year only 0.8 million bales less than a year ago, which is explained by the already noted better supply of cotton-mills at the beginning of

1927/8. The shares of individual cotton-buyer regions in total purchases of cotton are shown in Table 15.

The quotations for cotton are already heavily influenced by crop forecasts. Work in plantations is some 2–6 weeks delayed and the increase in the acreage under plantation is estimated at 2.3%. Boll-weevil's chrysalises survived winter apparently rather well and this, combined with the delay in next year's harvest, sends alarming signals.

Table 16. *Changes in Supplies of Indian Cotton, Bombay, 1927/8 and 1928/9 (million bales, 500 lb. each)*

Year	Stocks at the beginning of the year	Deliveries	Total disposable supplies on 26 Apr.	Export	Stocks on 26 Apr.	Stock changes in relation to the beginning of the year
1927/8	0.62	1.93	2.55	0.96	1.59	+0.97
1928/9	1.18	2.69	3.87	2.07	1.80	+0.62

Changes in stocks of Indian cotton in Bombay are shown in Table 16. The volume of available cotton this year was much greater than last year. Yet, because of a sharp rise in sales, stocks on 26 April were only slightly greater than a year ago. This explains why, notwithstanding increased supplies and the increased share of sales from stocks, the difference between the present prices of Indian and American cotton is less than a year ago (although this is due also to the already noted poorer quality of the present year's harvest in the USA). According to quotations on 9 May 1928, the Liverpool spot prices of American middling were 11.71*d.* per lb., and of Indian *Surtee* 10.55*d.* per lb., i.e. the margin was 1.16*d.* per lb. A year later, on 7 May 1929, these prices were 10.09*d.* and 9.05*d.* respectively, and thus the margin was 1.04*d.* per lb.

The main factor responsible for the rise in exports of Indian cotton were increased sales in Japan and China (see Table 17).

3. A comparison of sales of American and Indian cotton indicates that Japanese and Chinese purchases increased very significantly which is mainly caused by the increased consumption capacity of China achieved through internal repression. This rise in consumption

Table 17. *Exports of Indian Cotton, 1927/8 and 1928/9 (million bales, 500 lb. each)*

Importer	Shipments from Bombay from 1 Aug. until 26 Apr.	
	1927/8	1928/9
Great Britain	0.05	0.05
Continental Europe	0.30	0.61
Japan and China	0.61	1.41
TOTAL	0.96	2.07

increased British exports of cotton fabrics to China. In February 1929 it was 13.7 million square yards, compared to 4.4 million a year earlier in spite of the introduction, on 1 February, of the import tariffs for textile products. At present, however, the situation in this market is unstable because of new political disturbances. With regard to the division between Japan and Great Britain of textile exports to China, this much depends on the continuation of a boycott of Japanese goods. Anyway, the newly established British cotton trust, which—besides cotton mills, includes all other stages of cotton-processing and shipments, prepares itself, through cost reductions, for a tough competitive struggle in the Far East against Japan.

The cotton business in continental Europe is in general in poor condition because of reductions in sales markets. These developments hit Germany especially strongly, as well as Czechoslovakia and Poland. In Germany, the union of spinning-mills decided to reduce production by 15% compared to its present volume. Thus, since 1 July 1929 German spinning-mills will operate at 60% of their output capacity.

In the USA, the cotton industry was doing rather well, especially in January and February 1929. This, *inter alia*, caused a rise in prices of raw materials in the first ten days of March which, however, was soon followed by a price reduction. The volume of cotton processed in American spinning-mills between 1 August 1927 and 1 March 1928 was 4.06 million bales (500 lb. each), of which in February alone was 0.60 bales, and a year later was 4.02 million bales, of which 0.57 bales million were processed in February.

4. The Board of the New York Cotton Stock Exchange decided to introduce this year some changes in its charter, forestalling in this way a government intervention that might prove necessary after the investigations of the Senate's special committee into cotton

stock-exchange operations. To reduce speculative deals (according to the committee's report, they represented 20% of total transactions in the Cotton Stock Exchange), next to transactions in New York, those in Memphis, Dallas, Houston, Galveston, and Montgomery (i.e. the main cotton centres in the southern States) will now be permitted. This may help to eliminate the 'secondary' speculation based on insufficient effective stocks in New York. In fact, this change reflects the change that has happened during the past few years. Its essence is a shift of centre of gravity of American cotton-spinning from New England, close to New York, to the southern States directly bordering cotton plantations, and another shift of shipments for Europe and Asia to the seaports of the Gulf. Moreover, in order to reduce stock-exchange speculation, since 15 May 1929 credit transactions have been limited. Stock-exchange dealers are now allowed to grant their customers credits not exceeding $5 per bale (i.e. at prices of 20*c.* per lb. credits cannot exceed 5% of the deal), and not greater than $10 000 per customer.

The International Rubber Market[1] (1929)

1. After a short period of relative stabilization in the first half of February, prices increased sharply reaching at the end on the month 13½*d.* per lb. in London (see Table 18). This was followed by a series of price reductions in March that brought prices back to those of the middle of February. At that level they remained until mid-April and then they fell to 10*d.* per lb.

Table 18. *Prices of Rubber, London 1929 (in d. per lb.)*

1929	Price of standard crêpe	1929	Price of standard crêpe
January 3	8 9/16	March 4	12 3/4
31	10 7/8	21	11 3/8
February 10	10 7/8	25	10 13/16
14	11 3/8	April 15	10 11/16
18	12 3/4	17	10 1/8
25	13 1/2	May 4	9 15/16

The data on output, although in principle favourable, in fact do not give grounds for optimism. Compared with the first quarter of 1928 when exports of rubber from Malacca (re-exports excluded) were 54 000 long tons, and from other production centres 89 000 long tons, in the first quarter of 1929 the former reached 120 000 long tons and the latter 112 000 long tons (the data for March are approximate only).[1] Thus, the exports, of Malacca increased most, not only because compared to the same period a year ago, may were no longer subject to any restrictions but also because part of the export, came from Malayan stocks (see below).

Increase in exports from other production centres must be attributed, *inter alia*, to a rise in exports from Ceylon which, as in the case of Malacca, was limited by the restrictions of Stevenson's Plan. Hence, once restrictions were lifted, Ceylon's supplies increased as well. Finally, as we pointed out in earlier surveys,[2] low prices in

[1] It should be remembered that Baldwin made his declaration on the lifting of restrictions in the beginning of 1928.

[2] See e.g. M. Kalecki, 'Rubber 1929', this volume.

general have not discouraged other producers from continued exploitation of their plantations at unchanged rates.

Changes in rubber stocks in the main centres of production and in the main markets in the first quarter of 1929 are shown in Table 19. In the period between Prime Minister Baldwin's declaration (4 April 1928) and the effective lifting of restrictions (1 November 1928) rubber-growers in Malacca no longer limited their production, although they could not yet export it. The stocks accumulated in this period were exported in November and December. In the first quarter of 1929 stocks continued to decrease and, as during the preceding two months, this was in part at the expense of a reduction in stocks of the rubber trade (10 000 tonnes), while 13 000 tonnes were absorbed by the market.

Table 19. *Changes in Rubber Stocks in the First Quarter of 1929 ('000 tonnes)*

Type of stocks	Stocks at the end of 1928	first quarter	Change in stocks
Malayan (in plantations and trade warehouses)	99	76	−23
British	23	30	+7
American (at home and on ship)	154	157	+3
TOTAL	276	263	−13

As stocks in rubber-consumption centres increased in the first quarter of 1929 by 10 000 tonnes and total exports of rubber-producers amounted to 232 000 tonnes, sales were 222 000 tonnes. In the first quarter of 1928 sales were approximately the same as exports, i.e. 143 000 tonnes, as stocks hardly changed in that period. Let us compare these figures with the actual American consumption (i.e. with the volume of rubber processed into finished goods). In the first quarter of 1928 the world sales of rubber were 148 000 long tons and a year later 222 000 long tons, i.e. a 55% increase, while American consumption was 95 long tons in the first quarter of 1928 and 132 000 long tons a year later[3] i.e. 39% more.

[3] According to the first statistical data, American consumption was 140 000 tonnes. Apparently, re-exports were not accounted for in these data. This resulted in large divergences between the first and the final statistics. On the basis of figures for 1928 we have estimated this difference at 8 000 tonnes per quarter and subtracted it from 140 000 tonnes. Because of these inaccuracies, the data given in our earlier survey [see p. 22 above] require adjustment. The figure for the second half of 1928 was 109 000 tonnes, not 125 000 tonnes.

Of course, this lack of proportion between the rise in total sales and those in the American market cannot be explained by a huge jump in rubber consumption outside America—this would be improbable. It rather indicates the speculative nature of a large part of the sales; they were not destined for consumption but merely unreported. Without these speculative purchases stocks recorded in the centres of rubber consumption would have been much greater.

It is interesting to see what the ratio between rubber supply and rubber consumption would be if the Malayan stocks were not depleted. It follows from the above-quoted data that the supply would then be: 232 000 tonnes (export) – 23 000 tonnes (reduction of the Malayan stocks) = 209 000 tonnes. Compared with the first quarter of 1928, when sales were 143 000 tonnes, this represents a 46% rise, that is also more than the increase in the American rubber consumption (39%). Thus, the present deliveries containing—next to current output—also portions of the continuously reduced Malayan stocks have not significantly added to stocks that are reported in rubber-consumption centres, probably because of intensive speculative purchases of rubber. Moreover, even if deliveries from the Malayan stocks are eliminated, present supplies are probably greater than consumption.

From the above we may draw the conclusion that the reaction of the stock exchange in countering the sharp rise in rubber prices in the second half of February was certainly appropriate. To balance unrestricted supplies of rubber with its consumption a continuous development of rubber applications would be necessary. This is already underway, but it may continue only provided that prices are kept sufficiently low.

2. According to an estimate by Hymans and Kraay, in 1929 rubber output will be 715 000 tonnes and its consumption will be 692 000 tonnes, i.e. a rise in stocks of 23 000 tonnes is expected. American consumption was assumed to increase only marginally compared to 1928, probably following the forecasts of car industry experts that automobile production in the USA in 1929 would not differ much from that in 1928.

Hymans and Kraay estimate the production of rubber in 1929 as follows (in thousands of tonnes): Malacca—342, Ceylon—60, Dutch East Indies—234, and other producers—79, a total of 715 tonnes.

The American rubber pool that was founded some time ago by the leading American consumers is now to be closed. The aim of the pool was at least partly to neutralize Stevenson's Plan through skilful purchase policies allowing avoidance of the consequences of rising prices. After lifting of export restrictions, the pool, which owned large rubber stocks, was interested in preventing a sharp fall in prices. In face of accusations that its present operations violated the anti-trust legislation, and unwilling to face a court action, the pool is to close down. It is doubtful, however, whether this will exert any short-period influence on the rubber market. Most probably the stocks of the pool will not be thrown on to the market but will be allocated between the pool-founding members who are interested in maintaining rubber prices at a specific level, especially those having their own stocks apart from those of the pool.

3. Due to relatively low prices of natural rubber, its competitive position against regenerated rubber increases. Consumption of the latter is approximately stable and that of the former constantly rises. One of the results of this is the increase in the average input of natural rubber in outside layers of automobile tyres from 8.09 lb. per tyre in the first quarter of 1928 to 9.63 lb. in the fourth quarter of this year. In the case of the inside layers of tyres where regenerated rubber maintains its competitive position, the respective figures were 1.74 and 1.78, i.e. the change was small.

New applications of rubber encouraged by its lower prices have taken place in the automobile industry and railways. The car industry now uses rubber in the production of bumpers and bearings, and in the railways tests are being made in Malaya and the Dutch East Indies to attach rubber support plates (2 cm. thick) between sleepers and bedding that would almost eliminate shocks and make the bedding more durable.

As has been pointed out, these applications (as well as the success in competing against reprocessed rubber) are likely to be established only if rubber prices stabilize at a sufficiently low level. Consumption of rubber may also increase, as noted by Eric Geddes, the President of Dunlop Rubber Co., if it could be transported to its centres of

consumption in a liquid form (as latex). This would eliminate the cost of packing and make rubber cheaper. Moreover, liquid rubber is a semi-product that is often more suitable for further processing, e.g. when combined with products other than solid rubber.

Business Conditions of the Textile Industry in 1927–1929[1] (1929)

Business conditions in the Polish textile industry in this two-year period are strictly connected with the extension of the maturity term of bills of exchange. Therefore, before we take up the actual subject of this paper let us briefly look at the influence of extending the maturity term of bills on commodity turnover.

Let us assume that a merchant whose monthly sales are Zl.*a* covers his purchases with three-month bills of exchange. For the sake of simplification it is further assumed that both purchases and repayments take place monthly: every month the merchant redeems bills of exchange for Zl.*a* that were issued three months previously, and at the same time he acquires new goods for Zl.*a* with three-month bills.

Let us now assume that the producer agrees to give our merchant a five-month bill of credit. One can easily show that the merchant then can increase his stocks by the value of Zl.2*a*, which is equal to his two-months sales, i.e. to sales corresponding to the extension of the term of the bill of exchange.

For example, the merchant can increase the value of his stocks in the following way. As usual, he redeems his three-month bills for the sum of Zl.*a*, but besides the normal purchase of goods for Zl.*a* he purchases additional goods for Zl.2*a*, that is, for a total of Zl.3*a*, all for the period of five months. After one month, the merchant repays Zl.*a* of his old three-month obligations and again makes purchases for Zl.*a* for a term of five months; he does so at the end of each month. At the end of the third and the fourth months the merchant has no payments to meet and continues to acquire goods for Zl.*a* (obviously, still for a period of five months). Finally, after the fifth month the time of payment comes for a sum equal to Zl.3*a*. The merchant pays this obligation with funds obtained from sales in the third, fourth, and fifth months, and again acquires goods for Zl.*a*. From then on, as before the extension of the term of bills of exchange, purchases and repayments amount to Zl *a*. This procedure is illustrated by the following scheme:

	Purchases	Repayments
Beginning of the first month of extension of the term of bills	3*a*	*a*
End of the first month of extension of the term of bills	*a*	*a*
End of the second month of extension of the term of bills	*a*	*a*
End of the third month of extension of the term of bills	*a*	—
End of the fourth month of extension of the term of bills	*a*	—
End of the fifth month of extension of the term of bills	*a*	3*a*
TOTAL	8*a*	6*a*
End of the sixth month of extension of the term of bills	*a*	*a*
End of the seventh month of extension of the term of bills	*a*	*a*

Purchases in the intermediate period exceed repayments by a value of Zl.2*a*, i.e. the sum credited to the merchant has increased by Zl.2*a*. Thanks to this increase in credit, the merchant has increased the value of his stocks by Zl.2*a*: for as we see from the above scheme, the merchant acquired additional goods for Zl.2*a* (at the beginning of the first month), while sales remained unchanged at Zl.*a* per month.

Now let us see that would happen if the merchant did not take advantage of the extension of the term of bills of exchange for increasing the value of his stocks. The scheme of purchases and repayments would then change as follows:

	Purchases	Repayments
Beginning of the first month of extension of the term of bills	*a*	*a*
End of the first month of extension of the term of bills	*a*	*a*
End of the second month of extension of the term of bills	*a*	*a*
End of the third month of extension of the term of bills	*a*	—
End of the fourth month of extension of the term of bills	*a*	—

End of the fifth month of extension of the term of bills	*a*	—
TOTAL	6*a*	4*a*
End of the sixth month of extension of the term of bills	*a*	*a*
End of the seventh month of extension of the term of bills	*a*	*a*

In this case also purchases exceed repayments by Zl.2*a*, i.e. the sum credited to the merchant has also increased by Zl.2*a*. On the other hand, there has been no increase in the value of stocks; hence the additional credit in this case has augmented the merchant's cash balance. There is nothing strange about this, since at the end of the third and fourth months the merchant made no repayments, and receipts from sales in these two months remained in his pocket.

Thus the above argument can be summed up as follows: *The extension of term of bills of exchange increases the sum credited to the merchant by the producer by an amount equal to sales over the period of extension. This additional credit can be used entirely to increase stocks which then swell by the above amount. If none of the credit is used in this way, the cash balances of the merchant increase by this amount. In intermediate cases part of the increased credits is located in merchant's stocks and part of them in his cash balances.*

If the producer shortens the term of bills of exchange which was extended earlier (i.e. when he begins to give credit for a shorter term), the merchant who used the extensions wholly for increasing stocks will have to refrain from purchases over a time equal to the length of the reduction in the term of bills. If in the above example the merchant returns from a five-month to a three-month term, he will have to reduce the value of his stocks by Zl.2*a*, which he will do by not making any purchases for two months. On the other hand, if the merchant did not use the extension to increase stocks, then obviously purchases may continue as before at the level of monthly sales. A reduction in the term of bills in this case only results in a return to the producer of the cash that the merchant previously received thanks to the extension of the term.

Table 20 shows quarterly data on the volume of output and sales of the Polish textile industry in 1927–9. The business developments in those years may be divided into four periods:

Table 20. *Selected Indices of the Polish Textile Industry, 1927–1929*

Year and quarter	Imports of spinning-machines[a] (Zl.m.)	Output	Shipments of fabrics by rail
		(ISBCP indices, 1925–7 = 100[b])	
1927, I	0.07	119	118
1927, II	1.85	124	128
1927, III	3.56	127	125
1927, IV	4.68	133	123
1928, I	5.20	136	136
1928, II	0.96	124	131
1928, III	1.00	127	124
1928, IV	1.27	116[c]	115
1929, I	1.41	137	112
1929, II	0.83	111	102

[a] The import of weaving-machines for auxiliary plants (finishing-shops, weaving-mills, etc.) fluctuated relatively little during this period. A large increase in the import of machines took place twice (in the first half of 1927 and the second half of 1928) in the knitted-fabrics industry. The import of machines for the knitted-fabrics industry, however, influenced the textile production much less than the import of spinning-machines

[b] After eliminating seasonal fluctuations.

[c] The index of the Institute for the Study of Business Cycles and Prices was corrected here by taking into account the two-week break caused by a strike (the ISBCP index does not take into account periods of general strikes). Without this correction the index of output cannot be compared with the index of imports.

1. The 1st, 2nd, and 3rd quarters of 1927 represent a period of boom with equilibrium between the volume of output and consumption of textile products.

2. In the 4th quarter of 1927 and the 1st and 2nd quarters of 1928 there follows a period of overproduction and the extension of the term of bills of exchange.

3. The 3rd and 4th quarters of 1928 represent a period of temporary equilibrium between output and consumption with longer term for bills than before.

4. The 1st and 2nd quarters of 1929 represent a period of a fall in consumption because of the reduced purchasing power of farmers, caused in turn by a reduction in prices for agricultural products, with considerable overproduction but without further extension of the term of bills of exchange.

The first period. A sign of equilibrium between the output and the consumption of textile products in this period was that output remained in balance with shipments by rail: the average of the respective indices for both of these values equals 123. This balance between output and shipments by rail only tells us that, together with

the increase in output, its transportation from centres of production and then from wholesale to retail trade centres increased, which means that along the way the goods did not pile up in warehouses. We do not know, however, if the shipments to retail centres were equal to the purchases of consumers, i.e. whether their shipments did not increase the stocks in retail trade or of wholesalers supplying retailers. This does not seem to have been the case in this period, however, and the index of shipments reflects actual changes in consumption.

The second period. Already at the end of the first period there was a considerable increase in the import of spinning-machines. This expansion of investments lasted through the second period and had a decisive impact on business conditions. The increased output of yarn was sold to weaving-mills thanks to more favourable terms of sales, and as a consequence caused an increase in the production of fabrics. The output index rose from 127 in the third quarter of 1927 to 133 in the fourth quarter of that year and to 136 in the first quarter of 1928. The average quarterly index for the second period was 131 compared with 123 for the first period.

On the other hand, in comparison with the first period consumption probably remained unchanged and its index can be estimated at 123. Consequently, the quarterly index of overproduction was probably $131 - 123 = 8$, and for the entire period of three quarters it was $8 \times 3 = 24$, i.e. approximately $\frac{1}{5}$ of the quarterly sales (sales index equal to 123). Hence the overproduction amounted to twenty days of sales (obviously, all these figures should be regarded as rough estimates).

In principle overproduction causes a reduction in prices because of more intense competition. If the market is flexible, however, there follows rather quickly an automatic self-adjustment: lower prices cause an increase in consumption which makes it possible to absorb the increased output. The market for textile products can be regarded as inflexible, however. A very large fall in prices is generally required to stimulate increased consumption. Probably for this reason the reduction in price by producers in the second period was made in a special way, i.e. by an extension of the term of bills of exchange without including the increased costs of credit in the price. For, as we pointed out above, thanks to the extension of the term of bills merchants were able to increase their stocks, thereby absorbing the overproduction of the second period. This development was also in the interest of merchants who were quite willing to increase their stocks provided that the financial costs of this were borne by the

producer, who did not include the costs of the credit extension in his prices.

The overproduction in the second period was estimated above as equal to twenty days of sales. The extension of the term of bills of exchange in this period was three months. This can be regarded as the maximum extension, however, with the average extension probably not exceeding two months, or sixty days. As it follows from our argument at the beginning of this paper, and from the above estimate of overproduction, an extension of the term of bills by only twenty days would have sufficed, if the increased credit was fully used by merchants to increase stocks. From the above figures, however, we can infer that only a relatively small part of this credit was used by merchants to increase their stocks; the remaining part of it (according to our estimate equal to forty days of sales) must have increased merchants' cash balances.

Merchants were encouraged to behave in this way not so much by the desire to maintain large liquid reserves out of prudence as by the high interest rate in the private discount market. Instead of using the extension of the term of bills to increase their stocks, they often preferred cash which they invested in the discount market. In this way the liquid funds returned to producers through this market, after the (indirect) payment by producers of interest to the buyers of their goods. Hence, because of this particular use of the extension of the term of bills, although it represented a price reduction given by industry to merchants it did not contribute to an increased volume of textile goods in the market.

Let us now examine how this course of business conditions was reflected in the relation between the respective indices of output and rail shipments of textiles in the second period. In the fourth quarter of 1927 the output index exceeded the index of shipments; in the first quarter of 1928 both indices were equal; in the second quarter of 1928 the index of shipments exceeded the index of textile output. The average of the output indices for the entire second period was 131, and the average for the indices of shipments was 130.

Following the comments made in examining the indices of output and shipments in the first period, the links between these indices in the second period may be interpreted as follows. In the fourth quarter of 1927 stocks increased in centres of production and trade, where a certain part of output was accumulated. In the first quarter of 1928 stocks in the centres of production and trade did not change,

but the stocks of retailers, or of wholesalers supplying them, increased. The index of rail shipments, 136, equal to the index of output, considerably exceeded the index of actual consumption, which we estimated at 123. This sequence in the increase of stocks, first of the larger wholesalers and then of the smaller wholesalers and retailers, corresponds to the gradual spread of longer-term bills of exchange to various categories of customers.

Finally, in the second quarter of 1928 stocks in centres of production and trade declined but simultaneously they increased in the retail trade, or the wholesale trade supplying it. The index of rail shipments, which is higher than the index of output, considerably exceeded the index of consumption that we estimated at 123. Hence there was a transfer of stocks from the centres of production and wholesale trade to retail outlets, while output (whose index is 124) remained at the level of consumption. The average index of production was not much higher than the average index of shipments. This means that in the final analysis over the second period there was an increase in stocks mainly of retailers and small wholesalers. Hence, in the end, the extension of the term of bills was probably used by small wholesalers and retailers chiefly to increase their stocks and by the large wholesalers to obtain cash for placement in the private discount market, with which the latter are closely linked.

The third period. The term of bills did not change in this period. Output remained approximately in balance with consumption. One of the factors limiting production was a two-week strike in the fourth quarter of 1928. The average of the output indices for the third period was 121.5, the average index of rail shipments 119.5. Consumption was probably close to these figures. The index of consumption fell (from 123) probably because of a reduction in agricultural prices, thus limiting purchasing power of the countryside in the fourth quarter of 1928. Rail shipments of fabrics fell considerably in this quarter.

The fourth period. A further decline in the prices of agricultural products and with it of the purchasing power of the countryside, coupled with increased textile production in the first quarter of 1929, apparently on account of a faulty appraisal of the situation, resulted in great overproduction. The index of output rose in the first quarter of 1929 to 137, whereas the index of rail shipments, which in this case probably corresponds to reduced real consumption, fell to 112. Hence, overproduction reflected in this 25-point gap had to be placed

in the centres of production and trade. This occurred without further extension of the term of bills of exchange, probably in the following way. Having decided not to make further extensions in the term of bills, in many cases producers were forced to make considerable price cuts. This encouraged the large wholesalers, who until then had made little use of the extended term, to increase their stocks. In exchange for this increase of stocks the wholesalers obviously lost the cash balances which had flowed to them before.

A certain adjustment of output to consumption took place in the second quarter of 1929. The latter fell even more with a further decline in the prices of agricultural products. The index of rail shipments, which also probably quite accurately reflected consumption in this case, was 102; the index of output, equal to 111, exceeded it by 9 points. Hence the total overproduction of the fourth period was probably 25 + 9 = 34. The overproduction of the second period was 24; hence the total overproduction in the two-year period under examination was 58 points. This is more than half the index of the present quarterly sales, which does not exceed 110, and corresponds approximately to fifty days' sales. Thus, as we see, the present extension of the maturity periods of bills, equal according to our estimates to sixty days, has been almost completely used up to increase stocks. Consequently, no shortening of the term of bills can be made now without keeping production for some time below the actual level of consumption, as long as merchants—by refraining from purchases corresponding to the shortened term of bills—do not reduce their stocks (see our comments above).

In contradiction to our interpretation of business conditions in the fourth quarter of 1929, it has often been argued that reduced output in the second quarter of that year depleted the stocks of industry and trade, making them relatively small. On our interpretation, this decline in output was only an adjustment to the reduced purchasing power of the countryside and, consequently, did not run down stocks. That the decisive element in business developments in the fourth period was the crisis in final sales is clear from the great increase in protests of bills of exchange, which shows that actual consumption was much lower than had been anticipated. While in the third quarter of 1926 protests of bills of exchange in Łódź amounted to Zl. 12.4 million, in the fourth quarter they were Zl. 13.2 million, in the first quarter of 1929 rising to Zl. 17.9 million, and in the second quarter of 1929 to Zl. 28.1 million. It is also

significant that maturity periods of bills of exchange for good buyers were not shortened for autumn purchases, which could have happened if reduced production had indeed brought about a reduction of stocks.

The Situation in the Rubber Market[1] (1931)

Among price reductions of raw materials that are the most characteristic feature of recent economic developments, prices of rubber are an exception in so far as their collapse occurred in 1928. This was caused by a special factor, i.e. by the failure of Stevenson's Plan that aimed at regulating rubber exports from Malacca and Ceylon. After a sharp fall of rubber prices in the spring of 1928, they were stable for a rather long period and in the middle of 1929 they were rather strong. It was thought then that the reduced rubber prices, compared to those of a few years earlier, would open new outlets for rubber, as, for instance, for rubber soles, and hence that even the unrestricted volume of production would be sold at a price of about 10*d.* per lb. Several other determinants of supply and demand have been overlooked in those speculations, however.

Concerning rubber output, it appears that the Malayan rubber plantations that 'idled' when Stevenson's Plan was observed, improved their productivity and in the autumn of 1929 output of Malacca and Ceylon was unexpectedly large. Furthermore, in 1931 the output capacity of these and other rubber plantations will increase even more as many new rubber trees planted in 1925, i.e. in the period of the rubber bull market, will come to fruition (the maturity period for rubber trees is six years). At the same time the forecasts of the rubber market have not taken into account the world economic crisis, and especially the dramatic fall in production of the US automobile industry. The consumption of rubber fell there during the business crisis not only because of a greatly reduced output of new automobiles, but also because of less frequent replacements of tyres of vehicles in use. In 1930 only 55 million tyres were sold compared to 70 million in 1929. In these circumstances, a sharp reduction in prices that started in the autumn of 1929 and continued for almost a year is not surprising.

As in the case of many other raw materials, the process of market self-regulation failed also in the rubber market: rubber prices collapsed to a level that in 1929 was considered improbable; at the same

Table 21. *Rubber Exports and Prices, 1929 and 1930 ('000 tonnes)*

Year	Exports from					Average price (*d.* per lb.)
	Malacca	Ceylon	Dutch East Indies	Other plantations	Brazil (non-planted rubber)	
1929	455	81	253	45	28	10 1/4
1930	442	77	237	43	24	5 7/8

time rubber output declined in 1930 relatively little—a mere 4% compared to 1929 (see Table 21).

The reason for this lack of market self-regulation in the case of plantation rubber must be sought in the fact that part of its 'normal' price which represents depreciation of the investments already completed, is large in relation to the cost of labour. For the owner of the plantation, its operation is profitable as long as its earnings are at least slightly higher than the costs of labour. Thus a drastic fall in prices of plantation rubber was possible without generating a large reduction in operations. The situation is different in the case of the so-called 'picked-up' rubber that is collected in Brazil, and the supply of this rubber, as will be seen in Table 21, has been reduced much more than the world output of rubber.

An intermediate position between the plantation rubber and the 'picked-up' rubber is occupied by the so-called 'local' rubber, collected in Malacca and the Dutch East Indies. It is grown not in proper rubber plantations but in 'gardens' of Indian rubber that are less attended and therefore less expensive than rubber plantations, although labour productivity and the quality of the product in the former are much lower (due to smaller latex content in rubber bushes, etc.) than in the latter. This explains why the share of local labour cost is significantly larger than the cost of labour in rubber plantations and why the output of local rubber, which fell in 1930 compared to 1929, was much greater than the output of plantation rubber: rubber production in the Dutch East Indies declined in this period from 106 000 tonnes to 86 000 tonnes.

It follows from the above that while in 1929 total output and exports of Brazilian rubber and local rubber from the Dutch East Indies was 134 000 tonnes, compared to 728 000 tonnes of rubber

exported from rubber plantations, which totalled 862 000 tonnes of exports; in 1930 the respective figures were 110 000 tonnes, 713 000 tonnes, and 823 000 tonnes respectively. It should be noted, however, that even this lower volume of output of non-planted rubber was only possible due to a reduction of wage-rates. This, in turn, also reduced costs of production in rubber plantations.

We thus see that an automatic check in the drastic fall of prices has not followed. Attempts to regulate the rubber market through allocating output quota have also not succeeded. When the situation in the rubber market started to deteriorate quickly, two groups of rubber planters—the British Rubber Growers' Association and the Dutch Internationale Vereeniging vor de Rubber en andere Cultures in Ned. Indië—started negotiations on restricting production. It is noteworthy that this time the Dutch were the party that forced output restriction measures, although some time earlier they had not fallen in with Stevenson's Plan and as outsiders strongly expanded their output, thus making the plan ultimately unworkable.

The single result of these negotiations was a temporary suspension in the exploitation of rubber plantations in May 1930 by some planters. However, rubber output in 1930 fell only little. One of the main obstacles to the implementation of output-restriction measures is the production of local rubber. Clearly, only larger planters enter any agreement on rubber limitations; the owners of rubber gardens will not join such an agreement unless it is enforced by government regulations on restriction on exports, as was the case with Stevenson's Plan. However, the Dutch East Indies government is apparently unwilling to take such measures, expecting that they would cause strong protests from local-rubber-growers. In these conditions, large rubber-planters ready to restrict their production must take into account a lack of joint action on the part of local-rubber producers. Yet, local producers are rather difficult outsiders because, as we have already noted, it is precisely their output that is most flexible to price changes. Hence, had the agreement concluded by large rubber-planters been successful in raising present rubber prices, the output of local producers—which fell sharply in 1930—would have picked up again, thus undermining the output-restriction measures. Nevertheless, negotiations on output reduction between the British and the Dutch planters continue.

Low rubber prices, as we have pointed out, resulted in only a small reduction of output. How have they influenced demand and how was market equilibrium reached? In 1929 world export of rubber was 862 000 tonnes, world rubber consumption was 793 000 tonnes, and stocks increased by 69 000 tonnes. In 1930 the respective figures were 823 000 tonnes, 675 000 tonnes, for world rubber consumption, and 148 000 tonnes, for the increase in stocks. Thus consumption lagged behind supply and in 1930 stocks increased more than in 1929. However, when we take into account the general deterioration of business conditions, 1930 rubber consumption must be considered relatively large, being approximately the same as in 1928. Of course, this must be attributed to exceptionally low prices that opened new markets for rubber.

It is remarkable that in the USA rubber consumption fell in 1930 by 19% compared to 1929, and in other countries by only 9%. This is explained by the fact that in the USA a large share in rubber consumption is represented by tyre production and the business crisis in this industry could not be offset by new rubber applications. On the other hand, in Europe these new applications lessened the fall in rubber consumption.

At the present level of rubber prices, of less then 4*d.* per lb., an altogether new application of rubber may be considered that could completely change the structure of rubber sales, i.e. the construction of the road surface from rubber. The above mentioned Dutch and British rubber planters have founded a company that is testing this new system of road construction and are supplying some part of their output free of charge or sell below market prices for more tests.

It must also be noted that the expected sharp rise in the use of rubber, caused by its low price at the expense of regenerated rubber, has not occurred. In 1930 output of regenerated rubber was 45% of the consumption of natural rubber, compared to 42% in 1929; thus the change is relatively small.

For more that half a year now rubber prices have fluctuated relatively less in either direction. It appears that at the price of 3½*d.*–4*d.* per lb. even in the present business crisis an equilibrium has been reached between production and consumption. On the one hand, a further price reduction would cause a fall in output, and on the other hand—as we have already pointed out—even at these prices sales may increase due to new rubber applications. Moreover, it is

believed that the average wear of tyres that were hardly replaced last year in the automobiles used in the USA has significantly increased and therefore large purchases of tyres in the near future are unavoidable.

Cotton Arbitration in Gdynia[1] (1935)

At the Chamber of Industry and Commerce in Łódź the first meeting of the Association of Cotton Dealers in Gdynia was organized. The meeting approved the chart of the association and a project of rules of arbitration, and the organizational committee was elected that will perform the functions of the Board until the chart is approved by the Ministry for Industry and Commerce. In the Board the interests of cotton-spinners, cotton-dealers trading on their own account, cotton-trade intermediaries, banking institutions, cotton inspectors, and cotton-forwarding agents are represented.

After discussing a preliminary budget and fixing the entry fee of Zl. 200, and an annual contributions of Zl. 100, the General Assembly voted in favour of applying to the Association of Cotton Thread Producers for a subsidy of Zl. 100 000 for the construction and equipment of the Office of Cotton Arbitration in Gdynia and for initiating all necessary organizational and technical procedures related to this arbitration.

In this way a very important stage of work on establishing an institution that would create foundations for the future development of an autonomous trade in raw cotton in Poland has been completed. Establishing cotton arbitration in Gdynia will be of great importance not only for the cotton industry and trade but also for Gdynia as a seaport where cotton follows iron-scrap as the second largest import, the shipment of which tends continuously to increase. 1934 was a record year for the import of cotton through Gdynia, reaching 82 000 tonnes, compared to 77 000 tonnes in 1933, and a mere 205 tonnes in 1929.

The first important step towards organizing a cotton-market in Poland is the establishment of cotton arbitration. The need for it is clear, especially considering the constant development of the cotton trade not only of the Polish industry but also of the transit trade to many European countries (Czechoslovakia, Hungary, Romania, Austria, and the Baltic States).

The Association of Cotton Dealers in Gdynia represents all parties interested in the organization and development of the cotton-market

in Poland. Bringing them together in one organization proved necessary in view of the completely different patterns of the cotton trade in Poland. Abroad, where there exists an autonomous cotton trade and autonomous cotton imports, only these two parties actively participate in cotton arbitration. In Poland, where these two partners are only being established, the Association naturally had to include all the economic partners involved in the cotton trade. The Association will be controlled by the respective Chambers of Industry and Commerce both in Gdynia and Łódź. Apart from these special features, the statutes of the Association of Dealers in Cotton in Gdynia do not differ from the usual statutes recommended for economic organizations in the Industrial Law.

The Association is located in Gdynia and its area of activity is the customs territory of the Republic of Poland. The purpose of the Association is to provide technical and economic assistance to trade in cotton and to protect the interests of its members. It will approach government administration and economic spheres that it represents at home and abroad with an initiative aiming at the development of the cotton trade through the preparation of regulations and forms of contracts, through the establishment of arbitration and research institutions, and of courts of conciliation. Individuals and corporate bodies that run autonomous industrial businesses or deal in activities related to the cotton trade are eligible for full membership, while individuals and corporate bodies that operate abroad are eligible for restricted membership.

Control by the Gdynia and Łódź Chambers of Industry and Commerce is executed by delegating one representative each to the Board of the Association. These representatives participate in the meetings of the general assembly, of the Board, and of the Association's committees in an advisory capacity. They can also suspend for fourteen days the decisions of the Board and the general assembly; in that case the Association has the right to appeal to the Ministry for Industry and Commerce. The Gdynia Chamber approves and swears cotton classifiers and other experts that are recommended by the Board of the Association.

Because of the nature of the Polish cotton-market, representatives of the industry, i.e. cotton buyers, have a majority on the Board. This is because the Polish market is not a cotton-market like those in Bremen, Liverpool, or Le Havre, but rather a cotton-spinning market, like those in Gandava or Milan. The Board is composed of

fourteen full members and two advisory members. Five members are elected by the cotton-spinners from their ranks, and two by cotton-dealers on their own account, two by cotton-trade agents, and two by non-full members of the Association. Banking institutions, warehouse owners, and forwarding agents elect one member each.

The Association has prepared projected rules of arbitration, i.e. of regulations on handling arbitration. It includes regulations on the rights and obligations of the parties involved in front of a special Court of Conciliation that decides about issues that arise in practice between sellers and the buyers, regarding the quality of delivered cotton.

This 'quality arbitration' differs from the Court of Conciliation in that the latter decides in all other issues that may arise between partners to a contract, such, for instance, as failing to keep a date of delivery or not paying amounts due. Establishing a permanent Court of Arbitration in Gdynia, operating according to these rules, agreed with the Association of the American Cotton Shippers, will allow the introduction in purchase contracts concluded by Polish cotton-buyers of the so-called 'Gdynia arbitration clause' which is a substitute for that presently used in Bremen or Liverpool, or for other arbitration clauses.

The rules of the arbitration system in Gdynia have been prepared after thorough studies made in Liverpool, Le Havre, Rotterdam, and Bremen, and taking into account the postulates of the American shippers. The Association of Cotton Dealers in Gdynia will employ highly skilled classifiers sworn in by the Gdynia Chamber of Industry and Commerce; they will work full-time for the Association. Next to these classifiers those of satisfactory skills who are at present employed in Gdynia by forwarding agents, or those who will in future live in Gdynia, will be eligible to perform the function of arbitrators. Moreover, there will be one arbitrator from the American suppliers of cotton, who will be a classifier selected by American shippers and as a rule, a permanent resident in Gdynia. This system meets the requests of American shippers who insist that in the court of the first instance of arbitration the classifier representing the supplier is allowed to participate in passing the verdict together with the classifier representing the buyer; in other cotton seaports this is allowed only in the second instance of arbitration.

The legal side of quality arbitration in Gdynia had been decided in such a way that, provided the rules admitted by clauses 499 and 500

of the Code of Civil Procedures are observed, it is possible to accept the rule that the arbitration verdict passed in any specific issue by the Association of Cotton Dealers must be considered as the verdict of the Court of Conciliation in the sense of this Code. According to these legal regulations such a verdict is sufficient for making any deductions, debiting of accounts, or similar book operations between the involved parties.

In order to put the institution of cotton arbitration in Gdynia into operation several technical measures must be undertaken. Arbitrators must operate in a specially designed place, equipped with lighting necessary for examining cotton. Developing such an establishment in Gdynia will thus be the next stage of the technical preparations.

Since cotton arbitration is expected to start this autumn, fees have also been discussed. They are established within the limits paid at the Bremen stock exchange, i.e. Zl.70 for 100 bales. The costs of Bremen arbitration incurred at present by the Polish industry and commerce are higher because they must also include the cost of sending the samples abroad and of correspondence; moreover, the arbitration verdicts will be made much more quickly. With the development of an arbitration institution in Gdynia the fees will be reduced.

At present only the quality arbitration of the first instance will be established. Appeals against verdicts of the Gdynia arbitrators will continue to be decided, as at present, by one of the foreign institutions, most probably in Rotterdam. Clearly, organization of arbitration must be a long process and only future experience will demonstrate if establishing the second instance of arbitration in Gdynia is desirable. With time also the nature of this institution will become better established.

The Swedish Match Trust[1] (1928)

The Swedish match trust is one of the most remarkable economic organizations of our times. During ten years of its existence it has managed to spread its influence over nearly the entire world, controlling approximately 75% of the world production of matches. This is perhaps the only case of control of nearly the entire world market by a certain product by a completely unified organization under a single management. The trust does not owe its position to control of the raw-materials base, which in this case would be impossible. In its expansion it followed unusual paths whose starting-point and direction is discussed below.

The Financial Structure of the Trust

The nucleus of the trust was a few Swedish match factories organized in 1913 by its present managing director, Ivar Kreuger. In 1917 a merger took place with the competing Jönköpöling Konzern through the creation of a holding company called Svenska Tändsticks Aktiebolaget with a capital of Kr.45 million.[1] Through successive emissions, the most recent in 1927, this capital was increased to Kr.270 million. The funds raised were used to gain control over match manufacturing and markets outside Sweden. Svenska Tändsticks AB transferred some of these interests to its American subsidiary, International Match Corporation (also a holding company), which was founded in 1923 to gain access to American capital.

The joint stock of Svenska Tändsticks AB consists of Kr.90 million of common shares (full voting rights) and Kr.180 million of preferred shares (1 vote per 1000 shares). The Swedish Krueger group holds most of the common shares, thereby having the deciding voice.

[1] One Swedish krona is about $0.27 [i.e. it was that much in 1928].

Remaining shares are in British and American hands, and in Holland, Germany, and Switzerland

The capital of International Match Corporation consists of 1 000 900 common shares without nominal value (full voting rights) and $47.25 million of preference shares with a minimum dividend of 7.4% (without voting rights). Nearly all of the common shares are now in the possession of Svenska Tändsticks AB, which also gives the Kreuger group complete control over the American branch of the trust.

The reserve capital of Svenska Tändsticks AB exceeds Kr.200 million, and of its American branch, IMC, $35 million. Hence the capital of these companies breaks down as follows:

Equity capital of Svenska Tändsticks AB		Kr.270 million
Reserve capital of Svenska Tändsticks AB		Kr.200 million
Subtotal		Kr.470 million
Preference shares of IMC	$47.25 million	Kr.175 million
Reserve capital of IMC	$35.00 million	Kr.130 million
TOTAL		Kr.775 million

Naturally, this calculation does not include the IMC common shares since they are in the possession of Svenska Tändsticks AB. Here one should also bear in mind that these balance figures are based on a very conservative estimate and the hidden reserves are probably sizeable.

Another member of the group, Kreuger and Toll AB, with a capital of Kr.50 million, of which Kr.20 million are common shares (full voting rights) and Kr.30 million are preference shares (1 vote per 1000 shares), controls and finances the above two companies. Kreuger and Toll also manages real estate and portfolios of securities owned by the Kreuger group that are not directly connected with match interests. These assets include: (i) real estate property in Germany, mostly blocks of houses in Berlin acquired during the war for revenues from export of matches to Germany at the time when these revenues could not be transferred from the country; the balance-sheet value of this property is $12.8 million; (ii) a large share in the Huvoustaden land company in Stockholm; (iii) securities of the Preussische Hypotheken-Aktienbank; (iv) a large share in the Swedish Grängsberg iron-ore trust; and (v) portfolios of shares of large Swedish banks: Skandinaviska Aktienbolaget, Stockholm's Inteckningss Garanti AB, and Banque de Suéde at de Paris, with which the Swedish match trust is in constant contact.

Part of these interests has been transferred (as was the case of the match company itself) to an American holding company, Swedish–American Investment Corporation, with a capital of $45 million, which consists of $30 million of common shares and $15 million of preference shares that pay a divided of 6.5% but have no voting rights. Most of the common shares are in the possession of Kreuger and Toll. The next largest shareholder is the New York bank, Lee, Higginson & Co.

Outside Sweden shares of the companies of the match trust are quoted in Great Britain, Germany, Switzerland, Holland, and the USA. The market quotation is very high: for example, in Berlin today a Kr.100 share of Svenska Tändsticks AB is quoted at around RM430, that is, 380% of its nominal value. The price is determined by high dividends—Kreuger and Toll pays 25% and Svenska Tändsticks AB pays 15% annually—and by an exceptionally rapid development of the trust. Operations on the stock markets of so many countries (France will soon be added to the list) create a favourable base for the further expansion of the trust.

It is interesting that in 1927 the position of the Kreuger group in the trust strengthened considerably. Thanks to the exchange of the last issue of Svenska Tändsticks AB[2] for the common shares of the International Match Corporation that were in the hands of American shareholders, nearly all of the common shares of the IMC became the possession of Svenska Tändsticks AB. In a similar way Kreuger and Toll increased its portfolio of common shares of its American holding company, Swedish–American Investment Corporation. One should not infer from the above that the trust has shifted the centre of its market for new issues from America to Europe; this is contradicted by the recent American issue of the trust of $50 million in connection with the granting of a loan to the French government (which we discuss below).

The Industrial and Commercial Expansion of the Trust

According to the International Match Corporation report for 1925, at the beginning of 1926 the trust had 150 factories in twenty-eight countries. Since that time its possessions have considerably expanded.

[2] The entire issue consisted of Kr.90 million of preference shares.

Sweden still holds the first place in the production of the trust. The organization of the company there is a typical example of a 'vertical trust': along with match factories it includes the exploitation of woodlands together with sawmills, chemical factories required for the production of matches, and finally machine factories for the match industry. Although the expansion of the trust abroad was mainly directed towards gaining control over production, the export of matches from Sweden has also risen steadily, considerably exceeding the pre-war level: while in 1913 an average of 2900 tonnes monthly was exported, in 1925 this average reached 3100 tonnes, in 1926, 3400 tonnes, and in the first ten months of 1927 it was 3500 tonnes.

The Swedish export is more than 40% of world exports, which is almost entirely controlled by the trust. In other countries exporting matches the situation is as follows. The trust has gained control over the match industry of *Norway* (two factories); it has gained considerable influence in *Latvia* and *Estonia*. In *Finland* the trust owns four of the six factories. With the other two that supply Finish co-operatives it has signed an agreement according to which it completely controls export.

In *Poland* the trust has a monopoly for twenty years and is obligated to export production equal to 33% of Polish domestic consumption. As soon as it gained its monopoly position, in July 1925, the trust granted the Polish government a loan of $6 million (at 7%) for the period of the lease, which because of the weak position of Polish finances at that time was its main ace in this contract. The trust also invested $6 million for the purchase of factories and working capital. The rent for the lease is 5 million gold francs. Besides this, the French Treasury receives half of the net profit from sums above a 12% profit rate annually. After twenty years all of the factories become the property of the Treasury. Among the twenty factories covered by the agreement, the trust has put ten into operation.

The connection of the trust with the match industry of the leading European exporters after Sweden—i.e. *Belgium* (15% of the world exports) and *Czechoslovakia* (7%)—is looser. None the less, the trust has gained considerable influence among Belgian exporting companies and has established contacts with Solo-Konzern, that has a dominant position in the Czechoslovak and Austrian match industry. On the basis of an agreement with Solo-Konzern the trust ensures that this concern exports a definite volume of matches, which is handled by the trust's affiliate Alsing Trading Ltd.

The most serious competitor of the trust was *Japan* (22% of world exports) whose match industry, like Sweden's, developed especially rapidly during the war when the factories of many European countries partially or entirely stopped production. In the post-war years a struggle developed between the trust and the Japanese match industry over the Chinese and Indian markets. While lowering prices on these markets, the trust simultaneously did not neglect to gain control over centres of production. It acquired three match factories in *Manchuria*. In *British India*, where an import duty was introduced on matches, it quickly adjusted to the situation by opening three factories of its own and by purchasing three other that existed there already. In this way it turned the customs duty to its advantage and eliminated the Japanese from the Indian market. By hindering exports of the Japanese match industry, the trust weakened the former's financial situation and subsequently attempted to buy up the Japanese factories. It succeeded in acquiring three factories, but negotiations with the largest producer, Toyo Co., were not successful. Consequently, the trust continued its war with this company, purchasing the Japan Chemical Company, which supplied Toyo with chemicals. The Japanese company did not capitulate and set up its own chemical factory. Finally, in the middle of 1927 the trust gained its objective: after the bankruptcy of the Suzuki concern, to which Toyo belonged, the trust acquired it from among the assets of the concern in receivership. In the autumn of 1927 the trust established a joint stock company with a capital of ¥6 million, controlling approximately 70% of the Japanese production.

Let us now consider the countries that are self-sufficient in match production or import them. In *Germany* the trust took advantage of inflation to acquire several match factories, by means of which in the next period it started a war with the independent factories through systematic dumping. It finally succeeded in gaining control of about 60% of production. The trust did not stop there, however, and in 1926/7 it finally consolidated its position by setting up a syndicate to which nearly all the German factories belong and which sets the production quotas for its members. The interests of the syndicate are protected by a law (whose term is twenty-five years) that prohibits the construction of new factories and the expansion of old ones by more than 33% of their productive capacity; however, the government has retained control over the price of matches.

Sales are centralized in Zündholzvertrieb AG, in which the trust has 50% of the equity capital. Factories working for unions of co-operatives also belong to the syndicate but they are not subject to any restrictions as to the volume of their output, further expansion, and prices. They are only forbidden to sell matches outside the union of co-operatives. One of the reasons why the independent factories agreed to join the syndicate was its concern that through its influence in Poland the syndicate would make it difficult for them to obtain supplies of aspen wood.

It appears that in exchange for legally securing its interests the trust in this case (as well as in others) did not spare certain monetary rewards. Thus, Reichs-Kreditgesellschaft appears as one of the stockholders of Zündholzvertreib AG. Moreover, it certainly is no accident that a few days after the syndicate agreement was concluded, the Swedish banks linked with the trust granted the Preussische Hypotheken-Aktienbank loans of RM10 million (at 7%).

Less clear is the contract of the trust with *France*. As in Poland, the trust tried there to take advantage of the financial difficulties of the period of stabilization to gain a match monopoly. In the spring of 1927 the government even accepted a proposal to grant the trust a monopoly position in exchange for loans of $80 million; however, the French Parliament rejected this offer. At the end of 1927 the transaction took place on different terms. The trust granted the French government a credit of $75 million for fifty years (at 5%). As far as we know, in exchange the trust received a monopoly on the import of matches (domestic production meets about two-thirds of France's needs) and of raw materials and machines for the match industry. Of these $75 million, the trust covered $25 million from its own sources and raised the rest through the issue of 5% obligations of the International Match Corporation in America for a sum of $50 million. The subscription at 98.5% of the issue price was carried out by a consortium of banks headed by Lee, Higginson & Co.[3] Thanks to this credit on favourable terms, France converted an 8% Morgan loan, $70 million of which remained to be paid.

According to rumours, in addition to the above benefits the trust also received certain privileges in the French colonies. It should be mentioned that since 1926 the trust has been the owner of the largest match factory on the African continent, called Causemille Jeune.

[3] Besides the trust, this consortium is the main shareholder in the Swedish–American Investment Corporation.

In *Great Britain* the trust signed an agreement in the autumn of 1927 with the leading British match factory, Bryant & May, which led to the formation of a holding company, British Match Corporation Ltd., with a capital of £6 million. The company is supposed to entirely or partially to take over the shares of Bryant & May and the J. John Masters & Co. factory controlled by the trust. The trust will co-operate with Bryant & May in Great Britain and the dominions, except for India, which—as we noted above—is completely under its control.

Concerning other countries of Europe, the trust dominates in the match industry of *Switzerland* as well as in *Dutch* production and import. It also has an interest in *Danish* factories. In *Lithuania* it purchased all the match factories, closed them down, and started to build its own plants that will entirely meet the demand there. In *Portugal* it has a 75% share in the only factory there, with the other 25% belonging to the government. The trust took advantage of the financial difficulties of *Greece* to become the exclusive supplier of matches for the state monopoly, in exchange for which it gave the government a loan of £1 million for the period of the agreement, at 8.5% and at a price of issue of 94%. The trust is involved in *Yugoslavia* together with the aforementioned Czechoslovak–Austrian Solo-Konzern. The *USSR* and *Spain* are completely outside the influences of the trust.

The trust has also developed large-scale operations in South America. In *Peru* it received a monopoly for twenty years (the rent for the lease is £200 000 per year). It subsequently closed down the only two factories there, covering the demand with imports. Prices were raised sky high: to 1 Peruvian centavo for a match. In *Mexico*, where a high duty was imposed on matches for fiscal reasons, the trust built its own factory. It has 36% of the shares with an option for another 14% of the *Chilean* factory Compania Chilena de Fosforos de Talga, which entirely meets domestic demand. It has also entered into negotiations with *Bolivia* and *Ecuador* aiming at achieving a monopoly position there; these negotiations may already have been completed.

Having a powerful branch in the *USA* in the International Match Corporation, the trust is not interested in the match factories there and dominates only in imports which are handled by Vulcan Match Co. of New York, controlled by the IMC. In the *Philippines* the trust has a match factory called the Philippine Match Factory Manila.

The European Linoleum Trust[1] (1928)

The linoleum industry has developed only recently and therefore, as in the case of other young industries (e.g. the rayon industry), there are clear tendencies of its concentration that is not limited to a single country. An important factor stimulating concentration is dependence of production on raw materials: jute, linseed oil, and cork, the prices of which are subject to strong fluctuations. This in turn requires large reserves in cases when swift adjustment of market prices to increased costs of production is impossible and prompts abandoning competition that makes such adjustments more difficult.

There are already more than thirty linoleum plants in Europe. The list of most important producers includes Great Britain that has twelve factories with an annual total output capacity of about $12 million, and Germany with her eight factories with a total annual capacity of $19 million. There are five linoleum factories in France (of which four are controlled by the British), and Sweden, Norway, Latvia, Holland, Switzerland, Italy, and Spain have one factory each.

The British factories are grouped in a cartel called the British Association. Of the eight German factories more than a year ago already seven pooled together in the Deutsche Linoleumwerke AG. The pool enabled large economies in operations, above all by allocating production of various types among individual factories. This allowed for a nearly non-stop operation of machines, when before they had idled for about a third of their working time due to design changes.

Last spring a convention was concluded that covered all the European linoleum industry except for Spain. It concerned the world market prices (except the US market) and the division of sales markets, especially the British and German shipments to South America where these producers compete with the powerful US linoleum industry (whose annual output is about $124 million, i.e. nearly three times as much as the British and German output together).

The next stage in the concentration of the European linoleum industry was the purchase by a company owning a Swedish factory

in Göteborg, the Linoleum Akciebolegat Forshaga, of a Latvian factory in Libava and a Norwegian factory in Oslo. This may be considered as the introduction to the formation of a trust in continental Europe that we shall now discuss at some detail.

The trust, which was formed at the end of February 1920, includes Deutsche Linoleumwerke AG (seven factories), Linoleum AG Giubiasco in Switzerland (one factory), and Linoleum Akciebolaget Forshaga (three factories: one Swedish, one Latvian, and one Norwegian). Thus the trust controls eleven factories with an annual output capacity of about $25 million. The establishment of the trust was completed by founding a holding company in Zurich, the Continentale Linoleum-Union AG, which took over the controlling block of shares in the three above-mentioned companies.

The share capital of Continentale Linoleum-Union is 28 million Swiss fr. of which so far 23.5 million Swiss fr. were invested through an *al pari* purchase of stocks of the trust member companies that at the same time increased their share capital: the Deutsche Linoleumwerke from RM26.6 million to RM30 million (a new emission of the nominal value of RM3.4 million was exchanged for 4.2 million Swiss fr. stocks of the CL-U), Giubiasco from 3 million Swiss fr. to 5 million Swiss fr. (replacing its new stock for the shares of the CL-U to the value of 2 million Swiss fr.), and finally Forshaga increased its capital from Kr.5 million to 6 million (by issuing a free emission). Thus the total value of capital stock of the trust members, in terms of Swiss fr., is 37.2 + 5.0 + 8.3 = 50.5 million.

It follows from the above that the holding company acquired part of the shares of the trust members through direct exchange of shares with them. The remainder of the shares were bought by each of the trust members that control the company, also in exchange for shares of the Continentale Linoleum-Union.

The traded shares of the holding company and of all trust members receive a dividend of a uniform rate and the shares of one company held by another bring no dividend. Thus the sum total dividend of each of the three member companies will be proportionate, not to its nominal capital, but to the value of its marketed shares and of those shares of the holding company that were sold to non-members of the cartel in exchange for the deposited shares of each of trust member (for instance, Giubiasco will pay a dividend on 3 million Swiss fr., not on 5 million Swiss fr. because 2 million Swiss fr. of the new issue of its shares were exchanged for 2 million Swiss fr. shares of the

CL-U and these shares, to a total value of 4 million Swiss fr., pay no dividend). However, proportionate to the nominal value of capital of the trust members will probably be most of the shares of the Continentale Linoleum-Union held by each trust member.

Operations involved in the establishing of the trust are especially complicated as far as the German partner is concerned. The majority of the old shares of Linoleumwerke AG, of RM26.6 million value, were held by a special German holding company, the Deutsche Linoleumunternehmungen AG. Its share capital was RM11.25 million, of which over RM6 million of shares were held by a consortium which thereby controlled the whole Deutsche Linoleumwerke AG. RM1.8 million were held by Deutsche Linoleumwerke AG itself and the rest of the shares, of about RM3 million, were in the hands of many small shareholders. Both the controlling consortium and possibly the Deutsche Linoleumwerke AG exchanged their blocks of shares of Deutsche Linoleumunternehmungen AG for shares of Continentale Linoleum-Union. Other shareholders were offered an exchange of shares on the following terms: for RM1000 worth of shares of the Deutsche Linoleumunternehmungen AG a shareholder would receive RM600 of shares of the Deutsche Linoleumwerke AG, 750 Swiss fr. (which is equal to RM600) of shares of the CL-U, and RM70 in cash. Once this exchange is completed, Continentale Linoleum-Union could take the majority of shares of the Deutsche Linoleumwerke AG that belong now to the Deutsche Linoleumunternehmungen AG and thereby it could withdraw the shares of the latter.

To exchange shares of small shareholders, to the value of RM3 million, Continentale Linoleum-Union will need $3000 \times 600 =$ RM1.8 million of shares of the Deutsche Linoleumwerke AG and $3000 \times 750 = 2.3$ million Swiss fr. of its own shares. While the former will be covered from the RM3.4 million of the replaced shares of the Deutsche Linoleumwerke, the latter will have to be issued; thus the market value of shares of the CL-U will then be 23.5 million + 2.3 million = 25.8 million Swiss fr. This will be the total value of pooled shares of the trust members in the hands of the holding company after all these operations are completed. This value will represent a 53% majority in relation to total capital of the trust which we calculated above at 50.5 million Swiss fr. Assuming that the shares of Continentale Linoleum-Union kept by the trust members are proportionate to their nominal capital, the structure of shares kept by the trust members is as follows (rounded up to 1%):

	Trust members (exchanged shares)	Controlling consortium of trust members	Other shareholders of Deutsche Linoleumunternehmungen	Total
Germany	14[1]	20	5	39
Switzerland	4	1	—	5
Sweden	—	9	—	9
TOTAL	18	30	5	53

The following conclusions may be derived from these data: (i) Continentale Linoleum-Union achieves control over the trust largely through replacement shares, in fact fictitious, that represent 18% of the total equity capital of the trust; (ii) the German group, which includes representatives of the board of the Deutsche Linoleumwerke AG and the consortium that earlier controlled it through Deutsche Linoleumunternehmungen AG, no doubt tightly linked with each other, has a majority share in the CL-U of 34 : 53 = 64%. Thereby it also controls the whole linoleum trust having only 20/(100 – 18) = 25% of real shares of this trust in its hands. This structure of the trust is an interesting contribution to the evolution of contemporary capitalism towards a separation between the dominating influence exerted upon a firm's policy and the ownership of its equity capital.

The industrial and commercial leadership of the linoleum trust will be monolithic. Its first task will probably be a better use of output capacity of its factory in Latvia and the development and modernization of the Swedish factory.

By establishing the trust the European linoleum industry is divided between two powerful producers of approximately equal position: the Continentale Linoleum-Union and the British Association[2] which, however, due to the agreed convention, will not compete.

[1] This represents shares from exchange of RM3.4 million of the new issue of the Deutsche Linoleumwerke AG of a nominal value of 4.2 million Swiss fr. and from exchange of RM1.8 million of shares of the Deutsche Linoleumunternehmungen AG that were held by the Deutsche Linoleumwerke AG to the value of 2.7 million Swiss fr. (at 1500 Swiss fr. for RM1000). This makes together 6.9 million Swiss fr., i.e. 14% of the total capital of the trust estimated above at 50.5 million Swiss fr.

[2] As it was noted above, its annual output is $25 million.

Monopolistic Tendencies of the German Iron Industry[1] (1928)

It has already been pointed out several times that the monopoly position of German steel- and rolling-mills in the domestic market has been finally consolidated by the Continental Steel Pact. For besides basic provisions to prevent the overproduction of steel on the European continent—through fines paid by members who exceed their quota—this pact also regulates the import of iron from Luxemburgian and French (Lorraine) mills, that have been granted an import quota of 6.5% of the domestic consumption of cast steel, and 10% of the domestic sales of pig-iron, with these sales taking place through German syndicates on an equal footing with their own production. Consequently, in exchange for fundamental provisions of the agreement of the international steel cartel that are generally unfavourable for Germany, and the granting of a permanent share in the German market to Luxemburgian and Lorraine producers, the troublesome competition of the latter, despite the high customs duty, has been eliminated from the German domestic market, especially in southern Germany.

After the signing of this agreement, the German syndicates only had to contend with Belgian competition, whose expansion was much less advanced than that of Luxemburg and Lorraine. Attempts were made to deal with it in a similar way, namely it was proposed during the negotiations on the formation by the international steel cartel of an export syndicate of semi-finished products and girders, to give the Belgians 20 000 tonnes annually from the German quota in exchange for their pledge to limit shipments from Belgium to Germany. The import syndicate has not yet been formed, and the import of Belgian iron is still not subject to control. Belgium has not been very active in the German market, however. An attempt has also been made to limit imports from Belgium another way: agreements between trading companies dependent on producers (*Werkshandel*), and the firms independent of them (*freier Handel*) pledged the latter not to import foreign products.

The conclusion of a pact with Luxemburg and Lorraine clearly was detrimental to the interests of the southern German iron-processing

industry, which could no longer obtain supplies from the nearby steel mills on the other side of the border and was thereby subjected to the dictatorship of German syndicated prices, losing the benefits it derived from the competition of domestic and foreign suppliers. To avoid opposition from this quarter, the steel- and rolling-mill syndicates agreed to the following concessions to the processing industry.

First, for inputs for finished products sold by the manufacturing industry abroad, the syndicates would reimburse the difference between the domestic and the world price of these inputs. In this way for this part of supplies the processing industry pays much less (by custom duties and freight) than if it purchased f.o.b. Antwerp. Thus the competitiveness of German finished products on foreign markets has not been reduced by higher costs of raw materials. Secondly, for the southern German processing industry Neunkirchen freight basis (*Frachtbasis*) was set at RM6 per tonne below the normal level, i.e. below the Oberhausen freight basis.

These rather considerable concessions to the processing industry as well as sizeable fines for overproduction paid to the international cartel have been more than offset, however, by control of the domestic market, whose capacity increased considerably in 1927 thanks to generally favourable business conditions, as may be seen from Table 22.

Three conclusions may be drawn from this table.

1. Whereas during the period under examination world prices declined considerably, the syndicate prices remained unchanged. The spread of these prices was RM35 and exceeded customs duty by approximately RM10, which was obviously possible only thanks to import agreements.
2. The greater capacity of the domestic market caused an increase in sales there. This resulted in an increase in average prices (as calculated in Table 22) of RM3 per tonne.
3. At the same time the clearing prices of syndicates, which reflected actual revenue, increased much more, by RM20 per tonne. Both at the beginning of 1926 and at the end of 1927 they were below our calculated average prices. However, while at the end of 1927 the difference was RM7, at the beginning of 1926 it was RM24. The difference of RM7 results from fines paid to the international steel cartel and from the aforementioned discounts for the processing

Table 22. *Capacity of the Domestic Iron Market in Germany, 1926 and 1927*

	Beginning of 1926	End of 1927
Part of the bar iron and sections production sold at home (%)	63	81
Part of the bar iron and sections production shipped abroad (%)	37	19
Domestic (syndicated) price of bar iron (RM per tonne)	134	134
Price of bar iron, f.o.b. Antwerp (RM per tonne)	108	98
Average price of sales (Rm per tonne)		
$134 \times 0.63 + 108 \times 0.37$	124	×
$134 \times 0.81 + 98 \times 0.19$	×	127
Actual clearing price of the syndicates[a]	100	120
Difference between the average price and the actual syndicate clearing price	24	7

[a]According to W. Pinner's estimate, *Berliner Tageblatt* [*und Handelszeitung*, vol. 57], 14 Jan. 1928.

industry, but the difference of RM24 probably reflected the costs of the fight against the French and Luxemburgian dumping (French prices at that time were much lower than prices f.o.b. Antwerp), which made it impossible to get syndicate prices in all cases. Even if Pinner's estimates contain many inaccuracies, in no case do they undermine the conclusion that the costs of the competitive struggle were much higher than the sacrifices made to regulate the domestic market. In fact, the interested party confirms this. 'The steel pact helped to regulate relations in the domestic market and liberated German industry from the dumping of Lorraine and Luxemburg. Since that time losses have been reduced while prospects for the profitability of enterprises from the point of view of sales prices have increased' (excerpt from the speech of Dr Reichert at a meeting of the Verein. Deutscher Eisen-und-Stahlindustrieller, in October 1927).[2]

As will be seen from Table 22, syndicate prices remained unchanged in 1926–7. The monopoly position was used only to obtain these prices in all cases, despite their fall in the world market. On the other hand, in January 1928 syndicate prices were raised, which was motivated by a court of arbitration decision in a conflict with workers, in December 1927, that introduced an eight-hour

working day in the steel industry and raised wages rates by 2% on average.

The main components of the increase in syndicate prices were as follows: (i) an increase in the price of bar iron and sections by RM3 per tonne and similar increases for other products, (ii) raising the surcharge for open-hearth steel products by RM3 per tonne, (iii) reducing the aforementioned spread between the Oberhausen and the Neunkirchen freight bases from RM6 to RM4, i.e. raising the prices of products sold to Southern Germany by RM2 per tonne.

Table 23 shows to what extent these increases raised the average domestic price per tonne of products sold by the syndicate. This increase was RM5.3, a rise of 4% per tonne, since before the rise in price a tonne of bar cost RM134. The average income of producers increased by less since the increase had to exclude export (19% of total output) and that part of sales for which the processing industry is reimbursed by export compensation (14% of total output). Hence, the increase could be passed on only to the remaining 67% of output. Thus the average revenue per tonne, which according to the data in Table 22 was RM120, would increase by $5.30 \times 0.67 = \text{RM}3.50$, that is, by less than 3%.

This increase gave rise to intense and widespread opposition, especially from the southern German processing industry, which was the most affected by the new prices. The reasons for such a reaction should be sought not so much in the rise of domestic prices by 4% on average but in the fact that it was a clear manifestation of the monopoly position of the syndicates, pointing out at the losses suffered by customers and at the gains of producers who had been strengthened by the continental steel pact. For example, the iron-processing industry announced that because of the considerable gap between domestic and world prices it had to fight in the German

Table 23. *Components of the Increase in the Average Syndicate Price*

	Increase (RM)	Share in domestic sales (%)	Average increase per tonne (RM)
General increase	3	100	3.00
Open-hearth steel products	3	50	1.50
Products sold to southern Germany	2	40	0.80
TOTAL			5.30

market with sharp foreign competition whose production was based on cheaper raw material.

The Ministry for National Economy subsequently became involved in the price increase, declaring that it was extending control over the price policy of the steel syndicates. Under pressure from the Ministry the iron industry gave up that part of the increase that consisted in reducing the difference between the Oberhausen and the Neunkirchen freight bases so that this difference remained at RM6 per tonne (thus the average increase of domestic prices was only a little more than 3%). Moreover, the syndicates promised: (i) not to include in agreements with independent producers the aforementioned clause that compelled them not to make purchases abroad, and (ii) to inform the Ministry each time before making any changes in price lists. On the other hand, the instructions of the Ministry on tighter control were withdrawn.

The giving up by syndicates of the obligation imposed on independent producers not to import iron from abroad could have acted as a restraint to some extent on domestic price hikes through the import of Belgian steel. One should bear in mind, however, that such intervention would have required rather large capital investment, and the financial position of the independent producers worsened considerably in 1927: against the background of discount issues the agreement between *Werkhandel* and *freier Handel* was not renewed at the beginning of 1928, leading to a price war during the next four months, on unequal terms, since the independent producers were handicapped by refusal of discounts. The conflict, from which the independent producers emerged weaker, ended in April 1928 with a provisional arrangement.

Not too long after the first increase in syndicate prices, a second one followed, in May 1928, amounting to RM4 per tonne of bar iron and sections (about 3% rise) and up to RM7 for other products. This time the Ministry for National Economy was informed of the increase beforehand, although the syndicates did not wait for its decision before announcing their new prices. They also gained consent for this increase from the iron-processing industry that promised that prices of pig-iron would not be raised.

This time the producers justified the price hikes by an increase of 8% in the wages of coalminers as a result of a court of arbitration decision of April 1928. Since, in contrast to the price of coal, the price of coke was not affected by this increase in wages, the production

costs of steel-mills operating on coke remained unchanged. A considerable majority of them have their own coalmines and coking-plants, however, and in these cases the increase in the extraction costs of a tonne of coal because of increased labour costs (calculated at one time at 78 Pf.) added about RM1.50 per tonne to the production costs of bar iron. Since the increase can only be passed on to a certain part of sales (excluding exports and products of the processing industry covered by export reimbursement premiums), probably amounting to about 60% of total output in 1928, the price rise necessary to cover the new costs of production should have been 1.50/0.6, i.e. RM2.50 per tonne. In fact, however, prices were raised by RM4 per tonne:

To justify this price increase the iron industry also pointed to the declining average revenue per tonne on account of the contraction in the domestic market and hence of the lesser share of more profitable domestic sales in total sales. It was discretely ignored that since January 1928 world prices per tonne of bar iron had increased by RM8. Essentially, though this argument is also unconvincing. It consists in the flagrant monopolistic reversal of the economic laws of the free market: in this reasoning declining demand is used as an explanation for raising prices. In fact, it may very well be that demand fell precisely on account of the price increases in January 1928.

Through the price increases of both kinds made during the general economic downturn, the syndicates stressed the existence of the iron monopoly and thereby, considering the present composition of the Reichstag, perhaps opened the way for far-reaching government intervention in the interests of the iron and steel industry.

The Match Trust in the First Half of 1928[1] (1928)

1. In the first half of this year the expansion of the trust advanced considerably.[1] The South American operations of the trust have been strengthened by concluding an agreement with *Ecuador*: the trust was granted a monopoly position for twenty-five years in exchange for a loan of sucres (S) 10 million ($2 million) at an issue rate of 88 to 100. The loan will be used to establish an agricultural mortgage in Ecuador. Moreover, under the monopoly arrangement the trust will pay a fee whose total accumulated value will be S6.4 million, which the government of Ecuador will use to pay the interest and amortization of the above-mentioned credit. The trust took over, at compensation, the only existing match factory that it would soon modernize. The prices of matches were increased by more than threefold and made equal to about S1/200 that led to strong protests.

The tendency to completely control export markets dominates the trust's policy. Already last year the trust gained full control over the output of Japan, the single most important match exporter, over Chinese exports (after an agreement with the Solo-Konzern), and over Czechoslovak exports.[2] This year, after the deal with Estonia, Latvia, Denmark, and Hungary, the world export market is almost completely controlled by the trust.

In *Estonia* the trust obtained a monopoly position for twenty-eight years at the cost of: (i) a fee of Danish Kr.3 million, (ii) the purchase of local match factories, (iii) the annual rent of Kr.0.15 million, (iv) a loan of Kr.7 million at a rate of 6% per year and a price of issue of 87–92% (depending on the time of drawing). According to the agreement, import of matches to Estonia is prohibited and the trust guarantees their export at the volume of average exports in the past five years.

In *Latvia* the monopoly agreement binding for thirty-five years is less rigid. Export is not forbidden outright but is limited by a prohibitive import tariff. The match excise is still collected by the government but it cannot be increased by more than 50% above its present value. The trust guarantees export of 80 million boxes of matches per year. It also gives the Latvian government a loan of $6 million, at an interest rate of 6%, for the period of the agreement.

In *Belgium* (the third most important exporter of matches, after Sweden and Estonia), through the operations of plants that the trust owns there, it brought about a sharp crisis in the match industry. This led to a similar solution to that adopted in Germany: the Belgian factories, led by the trust and possibly under its dominating influence, will establish a selling company that will set the output quota. Belgium government assistance by disallowing the new match factories to open was made dependent on the domestic match prices.

At the same time, a Belgian company, Sogalfor, which could not reach an agreement on compensation for a faulty construction of a match factory in Synop, sold the trust its share in the Turkish so-called match monopoly. Since the Swedish trust has recently received an order from the Turkish monopoly for a delivery of 10 000 cases of matches, it appears that the solution by the trust of the past commitments of Sogalfor will soon be reached. Until now Turkey has bought matches mainly in Russia.

In *Denmark* closer links were established with H. E. Gosch & Cos of which the trust is a shareholder. The trust's representative became a member of the Board of the company.

The recently much publicized agreement with the *Hungarian* government has not been approved by Parliament yet but this is scheduled for 15 July this year. Gaining control over the Hungarian match industry was important for the trust, *inter alia*, because of its export market, and more specifically because of the competition of Hungarian matches in the Balkan countries.

In this case the trust used its favoured method. It acquired large blocks of shares of two match factories with the intention of starting tough competition in the Hungarian domestic market. To protect the domestic match industry the Hungarian government then proposed a programme of fixing output quota and prices, thus preventing the dumping practice of the Swedish trust. A few weeks later the situation had changed radically. The Hungarian government is at present on the eve of introducing land reform. Willing to give the present owners, on whose political support it relies, compensation mainly in cash (two-thirds of compensation are to be paid in three

[1] See M. Kalecki, 'The Swedish Match Trust', this volume.
[2] See ibid.

years in cash and the rest in 4% treasury bonds)—while, of course, the new owners will be able to make amortization allowances for the respective sums only gradually—the government was seeking a foreign loan and accepted the offer of the trust. In exchange for a fifty-year-long monopoly position in the match industry the trust will grant for the same period a loan of $36 million at the rate of 5.5% per annum, at an issue rate of 92%.

In the first year the trust is allowed to increase match prices from the present 4 hellers for a box to 5 hellers, and in the next year to 6 hellers. As after two and a half years the government is to regain control over prices, it is surprising that the trust did not obtain assurances that they will not be lowered. According to the *Berliner Tageblatt*,[2] the rate of interest on the trust's capital, including profits on match production, will be 10%. The government plan, which in the final analysis implied paying the landowners compensation from credits the interest on which will have to be paid by all consumers, was strongly opposed, as could be expected, by the parliamentary Left that also criticized the structure of the deal and accused business circles close to the Treasury of bribery. Nevertheless, the Government's parliamentary majority will most probably push the deal through the ratification procedures.

2. However, the domination of the Swedish trust over the world production of matches is not built on solid foundations since these could be undermined if only all monopoly or semi-monopoly agreements were concluded for definite even though long periods. Moreover, in countries where the dominant position of the trust has not been legally warranted, outsiders may well appear. It is noteworthy that precisely for this reason one can observe since last year the trust's expansion into a 'classic' domain of monopoly control over the market, i.e. into raw-materials production.

The match trust, or Kreuger & Toll, was interested in the Swedish iron-ore trust, Grängsberg (of the equity capital of Swedish Kr.119 million) which owns mines in Grängsberg and half of the mines in Luossavaara–Kirunivaara (the other half is owned by the Swedish government). According to the latest financial report of Kreuger & Toll, the block of shares of Grängsberg owned by Kreuger & Toll increased during last year from 10 to 20% of the total equity capital of Grängsberg. Allegedly, the match trust, or its boss, Mr Kreuger, who controls also a block of shares of Grängsberg that is owned by

the American subsidiary of Kreuger & Toll, thereby exerts a decisive influence on the leadership of the iron-ore trust. Probably under Kreuger's influence Grängsberg appeared for the first time on the international market, buying from the Dutch firm H. W. Muller & Co. iron-ore mines in Morocco and Algeria. The acquired shares were put together into the Hematit company, especially founded for this purpose. The equity capital of Hematit is Kr.26.6 million.

It is worth noting that according to data for 1927, the share of Sweden (Algeria including) in the total German import of iron ores was 55%. When it is also remembered that due to relatively small domestic iron-ore mining, German iron metallurgy—the largest in Europe—relies heavily on iron-ore imports, the importance of the already established position of the Swedish capital group in this field becomes immediately clear. It is also interesting to note in this context the negotiations, allegedly under way, between this group and the French heavy industry on a joint control over the Lorraine mines that supply large quantities of ore to Germany (in 1927 they represented 17% of the German imports).

Recently Kreuger & Toll bought from the above-mentioned H. W. Muller & Co. and from Gutehoffnungshütte in Oberhausen a majority of shares of a firm that will exploit iron-ore deposits in Algarrobe in Chile.

It must not be overlooked that control over iron-ore mines will be tightly linked with the interests of the match industry and the former will be used as a means of pressure on individual countries in order to obtain extensions of the monopoly agreements.

The American Copper Cartel[1] (1928)

1. The world output of metallurgic copper[1] in 1927 reached a record volume of 1.7 million tonnes (compared to about 1.1 million tonnes in 1913). This output was divided between individual regions as follows (in %): United States—57; Chile, Peru, and Mexico—20; Europe—8; Congo—6; Canada—2; Japan—4; and others—3.

Copper works are usually located near copper-mines as, due to the low content of copper in the ore (a 5% ore is considered rich), transport is expensive. After smelting, copper is usually refined electrolytically.[2] Since transport costs of smelted copper are low, copper refineries need not be located close to copper works.

It follows from the data on relative shares in output given above that the American copper works, as well as those in Chile, Peru, and Mexico that are under control of the American ones, represent together 77% of the world output of copper. Moreover, the majority of electrolytic refineries that also process copper shipped across the ocean (mainly African copper) is in American hands too. The result of this concentration of ore deposits, smelting-works, and refineries is the dependence of Europe for its supply of copper on America. In 1927 about two-thirds of European demand was met by supplies of American electrolytic copper.

This dependence, however, is a result of natural conditions of copper-mining and smelting. Yet, from the European point of view it would be more rational to have its own copper refineries that would reprocess unrefined copper imported from America, instead of importing refined copper only. The main factor explaining this structure of import is that an electrolytic refinery becomes profitable at a minimum output of 125 000 tonnes per year. This in turn requires large capital outlays that make it difficult to put new refineries into operation.

The stock exchange trades both in refined and raw (i.e. unrefined) copper. In the USA so-called lake copper (i.e. the ore from the

[1] Melting of old copper excluded.
[2] There are also other methods of copper-refining.

Michigan lakes) does not require refining; moreover, unrefined copper is not traded there due to a close link between American copper-works and refineries. In Europe unrefined copper is traded in the London market as 'standard copper'.

2. In October 1926, the position of American producers in the world market was further strengthened by the establishment of a copper export cartel, Copper Exporters Incorporated. This pool groups together, next to American companies, the majority of European producers and Union Minière du Haut Katanga that exploits copper deposits in the Congo and has its copper-mines there. Thus the pool controls more than 90% of production of copper ore, its smelting and refining. The single largest outsider is the British Metal Corporation (in which the decisive share of stock is in the hands of the British government); it controls copper deposits along Rio Tinto in Spain and maintains close contacts with Canadian producers. Japan, the other large outsider, is producing as much copper as it uses and therefore is of no importance to the international copper market.

The main operations of the pool consist in determining the prices of electrolytic copper (i.e. the electrolyte) that are binding for all pool members, and in allocating sales quotas of all refined copper. The pool is called an export cartel as it operates only outside the USA, where co-ordinated determination of prices by trusts or cartels is prohibited by anti-trust legislation. Therefore, the copper pool is restricted to determining prices of the electrolyte in Europe since US domestic prices are in principle determined independently of cartel prices and the margin between the American and the European prices is limited thus making speculation in buying copper in America for resale in European unprofitable. As we shall soon see, however, by means of special arrangements the cartel has been able to overcome this limitation to price rises.

3. Before the cartel was established, a rather important role in the world copper market was played, after American refineries, by the London metal exchange. The foundations for its operations were relatively large stocks of standard copper (at the beginning of 1927 they were 30 000 tonnes) which enabled market interventions and thereby allowed for influencing prices; the London market traditionally favoured the buyers by conducting a policy of low prices through offering supplies from their stocks and next through

replenishing the stocks at prices lowered as a result of these interventions.

Obviously, this did not help the development of the pool: prices of standard copper and the electrolyte are closely linked and a price fall on the standard market leads to a price fall of the electrolyte. This difficulty in the pool's operations created by the London metal market now belongs to the past: the London stocks of standard copper in 1927 fell from 23 000 tonnes to 10 000 tonnes, and in May 1928 they were only 7000 tonnes.

This result is commonly attributed to skilful tactics of the pool which through gradual purchases and shipments to America was able to reduce the stocks of the London market. However, this is a grossly oversimplified explanation of actual developments that rests on the assumed shrewdness of the cartel and helplessness of its victim. Above all, this explanation does not answer the following question: in the first three-quarters of 1927 the stocks in the London market gradually decreased from 32 000 tonnes to 16 000 tonnes, i.e. by half. In this period there was a sharp fall in prices of standard copper and the margin between standard copper prices and electrolyte prices was £7–8 per tonne, while the minimum margin between these prices is £4–5. How can these two phenomena can be reconciled? Why did a reduction in stocks, allegedly acquired by the pool, not result in a price rise, especially as in 1927 business conditions in Europe—which determine the use of the standard—were, generally speaking, favourable?

At the same time it must be noted that exports of standard copper to the USA is not at all the pool's invention. In January–September 1926 exports of standard copper from Great Britain to the USA were 6600 tonnes and in the same period of 1927 6500 tonnes.[3] Hence, there had been the same volume of exports in 1926 and it was much smaller than the reduction in stocks that amounted to 16 000 tonnes.[4]

It follows that in the first three-quarters of 1929 it was not the pool that purchased the stocks of the London market but the latter sold its stocks at low prices and large quantities to copper consumers, i.e. it played the already-mentioned game of betting on a reduction in prices, and it speculated on a large scale, too. One may surmise that in this case the speculation was that the pool would be abolished and,

[3] According to US official statistics of foreign trade.

[4] Total British export of copper in this period was 11 000 tonnes and thus it was also smaller that the stock reduction.

as always, the sales were hoped to assist the desired developments. This speculation was probably based on some disagreement within the pool and on the unfavourable results of the first phase of its activity. The reason for the latter was exceptionally slack business in the USA in 1927 and hence, notwithstanding the relatively large European demand, the prices of electrolyte were 7–10% lower compared with the period when the cartel was being established. This slackness of business could indeed intensify contradictory interests within the cartel and lead to not extending its operations beyond the first year, i.e. beyond the period for which the agreement was initially signed. Of course, the speculation of the London dealers, which was based on a natural fall in demand, strengthened this trend.

It should also be noted that by reducing its stocks the London market did not risk too much because in the event of the pool continuing its operations, the London market would have had to limit its purchases of semi-products only to outsiders since the pool's charter prohibited sales of unrefined copper outside the cartel (once the earlier concluded contracts were fulfilled). Thus, maintaining the unchanged stocks of the London market would no longer be necessary.

Already in early October, i.e. a month before the date when the future of the pool was to be decided, the downward price trend on the standard copper market ended, and in the following month and a half its price increased by 10%. Moreover, the margin between the price for standard copper and for the electrolyte was reduced to its usual minimum, i.e. to £4–5 per tonne. The gamble of the London market failed.

What were the reasons for this sudden change is difficult to say; an equilibrium based on speculative movements was, of course, unstable. Possibly the position of the cartel was reappraised in view of the strong improvement in statistical results it achieved in August and September. This is shown by data given in Table 24.

Soon after the bull market for standard copper ended, the pool (whose existence was meanwhile prolonged) started to increase the American and European prices of the electrolyte. The upward price trend on the copper markets has continued to the present, albeit with short breaks, the final result being that since the end of September 1927 the prices of standard copper have increased by 18%, and those of the electrolyte by 13%.

Table 24. *Output and Consumption of American Electrolytic Copper, July–September 1927 ('000 tonnes)*

Month	Output	Export	Domestic use	Total sales	Stocks (at the end of month)
July	118	48	62	110	104
August	120	58	72	130	94
September	119	55	72	127	86

In the course of this market improvement a new tendency clearly appeared in the pool's tactics—to reduce further stocks of standard copper, for although the margin between prices of the standard and the electrolyte was maintained at the minimum level, the pool continued to export standard copper to America at the same rate as before. These export, reached 2300 tonnes in the fourth quarter of 1927 (as we noted above, in the first three quarters it was 6500 tonnes). At any rate, the London market, which no longer gambled on slack business, could not meet even the 'normal' demand and in the fourth quarter stocks showed a much stronger reduction, of 6000 tonnes. This points to difficulties encountered in the supplies of copper semi-products. In this context it should be noted that since the beginning of 1928 the control of the world output of copper by the pool became even tighter once it was joined by the most important outsider, the British Metal Corporation. The cause for this *rapprochement* between the pool and the BMC was, *inter alia*, the termination of an agreement on supplies of raw copper from Union Minière du Haut Katanga. This agreement could no longer be extended on the grounds of the already-mentioned provisions of the pool's charter.

The London market is unlikely to regain its earlier significance and with time it is likely to fall into dependence on the cartel, becoming in this way an instrument of the cartel's control over the outsiders whose produce it purchases.

4. In this way a factor that constrained the monopoly position of the cartel in Europe has disappeared. Thanks to the anti-trust legislation, the American market is still 'free', standing in the way of the trust. However, these are only appearances since in fact the pool also controls American prices. According to US anti-trust legislation, the American producers must not limit output in any organized way to increase prices. Who, however, will stop them from increasing

their exports—at any given volume of output—on account of allegedly favourable business conditions in Europe? It would be an export expansion that is not necessarily supported by a business upswing in Europe, but is directed to consignment warehouses there!

When the time arrives for a price rise, the following measures, broadly speaking, will be taken. First, intensified transport of electrolyte to Europe (partly fictitious in so far as not all shipments follow contracts) will take place as will, at the same time, a price intervention on the London market of standard copper, which is not too difficult with stocks as low as they are at present. Next, there will follow a 'spontaneous' price rise on the American market whose stocks were reduced by the volume of supplies for Europe. Increasing the prices for the European supplies will complete the operation.

In this way the pool, which operates outside the USA and in line with the usual cartel methods of price and quota determination, applied to the USA a *sui generis* method of indexation. It consists in stocking in European consignment warehouses unnecessary surplus output that thereby evades recording in output statistics.

5. At present the prices of electrolyte exceed the American costs of production by more than 50%. Do there exist, as in the case of other monopolies, any important factors that could slow these price rises? The danger of output expansion by outsiders does not play any significant role here. It is also difficult to see to what extent the smelting of used copper will increase; used copper is already carefully collected as a valuable product (copper wears out very little); moreover, the new production will also be controlled by the cartel.

However, there is yet another factor that must be taken into account. It is the competition of aluminium that is used more and more frequently in the electrical engineering industry which is, in turn, the most important determinant of business conditions on the copper market (according to American data, the use of copper in electrical engineering represents there about 50% of the total use of copper). Moreover, high prices of copper will undermine its use in yet another field. The rate of electrification is slowed down partly by low prices of coal; clearly a rise in copper prices, which will make electric installations more expensive, will tip the scales to the advantage of coal and thereby will limit the use of the 'red metal'. Moreover, a reduction in the world use of copper, which will affect mainly its producers, would lead to conflicts within the cartel. It must

be noted that the most important, non-American member of the pool, Union Minière du Haut Katanga, develops its copper plants and intends in the next years to expand its output by 60 000 tonnes annually.

Performance of the International Steel Cartel[1] (1929)

The agreement on the steel cartel concluded for the period from October 1926 to October 1929 aimed at gaining control over the European steel market in two directions. First, it assured the German producers, who already were themselves strictly cartelized, of a monopoly position in the German domestic market in exchange for certain compensations. Secondly, in a very flexible way it was supposed to limit the supply of steel outside Germany in order to counteract the fall in world prices.

The 'regulation' of the German market was achieved in the following way. The basic agreement of the cartel that set production quotas (breaking the agreement involves payment of a fine of $4 per tonne, while non-fulfilment of the quota is rewarded with a premium of $2 per tonne) was supplemented with an agreement that determined the import of steel to Germany. The steel-mills of Lorraine and Luxemburg, whose previous intense competition with the German mills did not allow the latter to get their syndicate prices (*Verbandpreis*) in all contracts, were given a strictly defined import quota. Furthermore, this import takes place through the brokerage of the syndicate of German steel-mills at the syndicate price. The quota is set at 6.5% of domestic sales of German mills (in semi-finished products, bar iron, track structures, wire rods, and sheet metal). Relations with the Saar basin were regulated in a similar way.

Compensation for the other members of the steel cartel in exchange for halting their expansion in the German market was not limited to the above shares of sales in this market. For, in addition, the production quotas in the basic agreement of the cartel were set according to a scheme that was in fact unfavourable for the Germans. They received a quota of 80% of their production capacity, whereas for the other members of the cartel these quotas were: 96% for France, 87% for Belgium, 92% for Luxemburg, and 68% for the Saar Basin. The effect of this division was that Germany continuously exceeded her quota. Transgression (+) or non-fulfilment (–) of production quotas by members of the cartel is illustrated in Table 25.

Table 25. *Utilization of Quotas by Members of the Steel Cartel (1926–1928, in percentages of these quotas)*

Year and quarter	Germany	France	Belgium	Luxemburg	Saar basin
1926, IV	+18	−4	+13	−2	+9
1927, I	+32	−7	+15	+1	+15
1927, II	+26	−10	+6	+1	+12
1927, III	+32	−10	+10	+4	+14
1927, IV	+32	−6	+10	+5	+11
1928, I	+33	+0.5	+9	+5	+22
1928, II	+17	+2	+13	+4	+19
1928, III[a]	+21	+1	+14	+5	+20

[a] The fourth quarter of 1928 was omitted owing to its abnormal pattern because of the German lockout.

German transgressions were especially large in 1927 and at the beginning of 1928, which can be explained by the then boom in the German domestic market. In exchange for taking full advantage of this situation, the German producers, who were protected by an additional agreement against French (Lorraine) and Luxemburgian competition, paid tribute, as it were, to the other members of the cartel for exceeding the quotas. The Germans regarded this tribute as too high, however, and after the third quarter of 1927 forced on the other members of the cartel the following reduction in penalties. The German production quota was divided into two parts: 72% for domestic sales and 28% for export; for transgression of the domestic quota the Germans were to pay only $1 per tonne, and for transgression of the export quota the normal penalty of $4 per tonne. In the middle of 1928 the normal penalty was modified for all members of the cartel according to the following scheme: each tonne in excess of the quota up to 7.5% of its volume involved a fine of one dollar; each tonne in excess of quota of the next 2.5% of its volume involved a fine of $2; finally, each tonne in excess of the quota above 10% involved a fine of $4.

The cartel is often criticized for fulfilling its task with respect only to 'regulating' the German market, whereas it has done little to raise world prices, which was its main objective. The reduction of prices in 1927 is pointed out here, though the latter was caused by the ending of a strike in England, which allowed the British mills to reopen their operations. Obviously, the period of price reduction was not limited to the first months of 1927 (see Table 26). Prices gradually fell then as demand, which was delayed until the end of the strike, was

satisfied. In fact, the cartel did not counteract this natural fall in prices, but it is doubtful whether this was its main objective. For the essence of cartelization is not to maintain constant prices without regard to business conditions, but rather to soften a price fall by limiting supply.

Self-regulation does not always take place in a free, i.e. non-cartelized economy. During a recession entrepreneurs have a choice of two divergent strategies: (i) to limit output, as a result of which costs increase because of the underemployment of plants, but they also decline because of a lesser demand for credit to finance sales; or (ii) to expand output, owing to which costs rise because of the increased demand for credit to finance sales, but they also decline thanks to full employment of the plants. If in a given industry the first of these strategies prevails, the crisis will be less severe because of the reduction in output; however, when the tendency to expand output prevails, the crisis will continue to deepen.

Hence, the leading task of the cartel is to prevent the second of these possibilities that gives rise to a kind of vicious circle, and to induce cartel members to reduce output during a recession. If the cartel wishes to avoid rapid changes in production, it will not insist on fixed prices regardless of business conditions but will manoeuvre in such a way that prices and output will decline smoothly during a downturn and, contrariwise, rise together with a business upswing. As will be seen, this is indeed the tactic followed by the steel cartel.

Since we examine foreign markets, we have to deduct from the total output of the steel cartel the German domestic consumption of semi-finished products, bar iron, track structures, wire rods, and sheet metal, which represent Germany's own production, or imports that come almost exclusively from Lorraine, Luxemburg, and the Saar. For, as we noted above, as a result of a supplementary agreement the German domestic market is separated from the 'free' world market, and consequently it has no impact on world prices. The German consumption of the above-enumerated rolled products was calculated by adding to their production in Germany their respective foreign trade balances. The quantities obtained represent the weight of the finished product. In order to find the corresponding volumes of steel output, we increased these quantities by 25% (the losses in rolling are approximately one-fifth, hence the finished product weights about four-fifths of the steel used for it, or the input

Table 26. *Share of the Steel Cartel in the World Supply of Steel (1926–1928)*

Year and quarter	Output of the steel cartel	Consumption of steel in Germany (million tonnes)	Sales of cartel output outside Germany[a]	World prices of bar iron (f.o.b. Antwerp, *s.* per tonne)
(1)	(2)	(3)	(4)	(5)
1926, IV	7.95	2.70	5.25	111
1927, I	7.93	2.94	4.99	101
1927, II	8.05	3.40	4.65	95
1927, III	8.27	3.48	4.79	93
1927, IV	8.37	3.49	4.88	95
1928, I	8.59	3.30	5.29	102
1928, II	8.13	2.79	5.34	111
1929, III[b]	8.25	2.71	5.54	118

[a] Differences of columns (2) and (3).
[b] The fourth quarter of 1928 was omitted owing to its abnormal pattern on account of the German lockout.

of this steel exceeds the weight of the finished product by one-quarter).

The data in Table 26 show that the sales of the cartel in the world market did in fact decline and rise together with prices. Indeed, the structure of the cartel stimulates such a regulation of the market: at low prices and hence reduced profits, the payment of fines is very painful, and so in periods of recession the quotas are not exceeded, or are exceeded only slightly. On the other hand, in periods of high prices and hence of increased profits the fines are less troublesome and the members of the cartel are less inclined to restrain the expansion of output (besides this automatic control, the cartel can also adjust itself to the market situation by changing the quotas).

It should also be mentioned that the position of the cartel in the world market is not monopolistic because Great Britain is not a member of the cartel. However, this has not limited its operations: the different grade of British steel and its higher prices produce a rather clear division of the sales markets that are rather weakly interconnected. We see this from the following comparison:

Year and quarter	British sales in percentages of sales of the cartel in the world market	British prices of bar iron in percentages of f.o.b. Antwerp prices
1927, IV	42	146
1928, III	37	126

Despite a reduction in the difference between prices, the British sales fell in comparison with the sales of the cartel. If there were a closer interrelationship between these markets, such a thing could not have happened.

Hence the first attempt to regulate the continental production of cast steel can be regarded as generally successful. The steel cartel has turned out to be a lively organization and unquestionably is an important stage in the development not only of the European steel industry, but of the world economy as a whole.

Ivar Kreuger[1] (1932)

Ivar Kreuger was one of the best-known personalities of our time. His name was praised on the occasion of every price rise of matches, which is a much more effective way to fame than portrait-decoration in schools. We all already know that Kreuger gained control over 75% of the world production of matches and that in 17 countries he exploited match monopolies. Moreover, it is known, too, that he had large interests in iron-ore, cellulose, and telephones, and that he owned a large number of houses, large land estates, and forests. It has also been often said that the most important and characteristic feature of his activity was the granting to governments of the poor countries loans in exchange for the rights to exploit their match monopolies. Financial means for these loans were drawn through the issue of shares of Kreuger's companies in the markets of the rich countries, in the USA in particular, whose capital market considered him absolutely trustworthy.

These operations were therefore spectacular business: the exploitation of the match monopoly allowed for the amortization of such loans including nominal interest and, moreover, thanks to 'professional' calculation of monopoly prices of matches the loans brought profits incomparably higher than interest that Kreuger had to pay for his shares sold in the American market. In this way Kreuger 'facilitated' the international circulation of capital which was constantly lagging behind the needs of development of the post-war capitalist world, and he won the praise of the bourgeois economists who cry after the glorious but past times of the efficient functioning of the international financial system. In fact, the impact of a dozen or so of Kreuger's loans on the international capital circulation was hardly noticeable; they played a much greater role in determining economic and political relations.

After the war international capital entrusted the governments of several semi-capitalist countries with the 'defence of civilization'; all of a sudden the indolent government administrations of the poor countries were turned into 'defenders of the cultural inheritance and humanity'. However, the same international capital was not ready to

grant the defenders any loans. That was not surprising when we remember that it has achieved a much better insight into their respective economies than anyone else.

In other words, the post-war capitalism was unwilling to finance its own defence. It was precisely this contradiction that Kreuger spent much effort to solve. Weak foundation of a government or a mismanaged economy could never prevent Kreuger from concluding a loan-monopoly agreement. On the contrary, only then was the government in question ready for Kreuger to start his operations. Indeed, under Kreuger's system losses were hardly possible. As a rule, the invalidation of the agreement by successive governments was unlikely: Kreuger's authority in the world financial market was so large that such an action would threaten a total cutting off from this market. Only a government brought to power by a social revolt could risk such an action. Kreuger could comfort himself, however, that social revolution would not happen at the same time in all of a dozen or so of his favourite countries. If the agreements were kept, amortization and interest on loans were ensured by the monopoly incomes subject to small fluctuations only, because the demand for matches depends relatively little on the business cycle and the prices of matches were set in the respective agreements.

The main risk was related to fluctuations in rates of exchange because prices were determined in terms of local rates of exchange. Indeed, it appears that the world rates-of-exchange crisis was one of the main factors that undermined the position of Kreuger's pool. (This crisis hit Kreuger not only in countries where he enjoyed a formal monopoly position, e.g. in countries of South America, but also in countries where he merely owned a large number of factories, as in Scandinavia, Britain, the British India, Japan, and so on.)

The loan-monopoly operations represented only one part of Kreuger's activity, however. By using numerous skilful measures he also managed to gain a dominant position in the match-manufacturing industries in countries where he has not had a monopoly agreement. Through keen competition of his factories against outsiders he made the latter conclude with him cartel agreements and thus he was close to monopolizing the world match market except for the USA, France, and the USSR. It is interesting and not altogether unexpected to see that this tycoon, who financed all 'defenders' in the world, met a serious contender in his attempts to monopolize the world market in Soviet match exports. Regarding the

German market, getting rid of this outsider proved for Kreuger rather expensive: in exchange for a ban on imports of matches to Germany he had to give the Reich's Treasury, at the end of 1929, the largest of his 'match' loans, of $125 million. Then world business crisis made it very difficult to take advantage of this transaction, which had in turn a negative impact on the position of Kreuger's pool and complicated it.

What was Kreuger as a man: the protector of reactionary governments, the refined exploiter who asked the Peruvians to pay 1 centavo for a match, the representative of dark powers of monopoly capitalism? He was a simple, modest, and ascetic, and fanatical about his financial ideas. He hated bluff and noisy declarations, he did not shout, as did Deterding about 'stolen oil'; he did not construct with a blunt conceit simplistic capitalist utopias, as those of Ford, and none the less, or perhaps because of all this, Kreuger was one of the most dangerous powers of the old world. For only in semi-capitalist Poland writers such as Mr Kaden-Bandrowski visualize a representative of international capital as a degenerate monster—Coeur.[2] The functioning of capitalism depends not on the nature of individual foremen who control its mechanisms, but on the structure of the latter. An ascetic man who is fascinated by some idea that fits in the general rules of the system usually serves this system much better that a villain devoid of any human features.

III. International Economic Relations

American–Russian Economic *Rapprochement* and Poland[1] (1927)

Economic *rapprochement* between the USA and Russia, long expected by some politicians and economists, becomes ever more clear. This is evidenced first of all by the direction of Soviet purchases which always reflect to some extent the Soviet economic and political priorities in any period of time. The relative shares of individual countries in Soviet imports in the first three quarters of the economic years 1925/6 and 1926/7 are shown in Table 27.

It will be seen that only the USA and Poland have increased their relative shares in Russian imports. Intensive Soviet purchases in the USA continue; recently a very large order for the delivery of steel and aluminium products, of a total value of $5 million, was placed by Russia in the Pittsburgh district mills. Also American–Russian financial and credit relations develop well. According to *Informationes Financieres*, of 22 October this year, the Equitable Trust of New York has recently granted the Soviets a credit of $6 million for the discount of Russian Treasury bills.

Table 27. *Structure of Soviet Imports, 1925/6 and 1926/7 (%)*

Country	First three quarters of	
	1925/6	1926/7
Germany	27.1	24.2
USA	13.7	20.8
Great Britain	19.0	18.3
Egypt	4.5	3.3
Finland	3.2	3.3
Poland	1.2	2.5
Sweden	3.2	1.9
Czechoslovakia	3.2	1.8
Others	24.9	23.9

Source: *Berliner Tageblatt* [*und Handels Zeitung*], [56/493], 18 Oct. 1927.

The rate of expansion of concession between Russia and the USA in even higher. It is known that this year Standard Oil Co. of New York completed for Neftsyndicate an oil refinery in Batum, receiving in exchange its three-year lease and an option for another three years. Output capacity of this refinery, supplied with oil by Neftsyndicate, is 150 000 tonnes per year. This same Standard Oil Co. and Vacuum Oil Co. (they both are sister companies of Standard Oil Co. of New Jersey which, however, takes a neutral position in its relations with the Soviets) in the middle of 1927 concluded a long-term agreement with Neftsyndicate on supplies of oil; the agreement gave rise to a 'petroleum war' between the above-mentioned American companies and the British–Dutch concern—Royal Dutch Shell. The subjects of this agreement were: (i) granting Vacuum Oil a two-year-long monopoly position in the sales of Soviet oil in Egypt; (ii) a contract for delivery for this company in the next five years of 100 000 tonnes of oil annually for sale in the Mediterranean region; and (iii) a contract for delivery in the next five years for the bunker stations of Standard Oil of New York in Istanbul, Port Said, and Colombo of 100 000 tonnes of mazout per year, and additionally of mazout to be used by ships owned by this company. Of course, through the opening of new markets in the Near and Far East for Soviet oil this agreement directly threatens the interests of British oil companies—Royal Dutch Shell and the Anglo-Persian that until now have enjoyed a dominant position in these markets.

Let us now turn to mining concessions. Harriman is known to have had for a long time the Soviet concession on manganese mining in Chitura in the Caucasus (in the economic year 1926/7 the concession amounted to 575 000 tonnes of the manganese ore), and the Allied American Corporation has had an asbestos concession in the Urals. The Aluminium Co. of America is apparently close to successfully concluding its negotiations on the concession to exploit bauxite deposits in Chivinsk (near Leningrad) and on the development of Soviet aluminium industry. The Aluminium Co. of America not only dominates the American market but at the same time it controls the Norwegian company, Aluminium Norse Co., and, next to the European aluminium cartel which includes Germany, Switzerland, France, and Great Britain, it is the largest producer of aluminium. The Russian output will be used partly at home, especially in the production of aeroplanes, and partly exported, thus intensifying the competition between the European cartel and the Aluminium Co. of America.

Moreover, negotiations are under way to giving America a concession to exploit very large deposits of potassium salts (40 km^2 of layers 100-m thick) near Solikamsk. Deliveries from these deposits would make the USA, which imports about 85–90% of its potassium for domestic use, independent of the German–French potassium syndicate which at present enjoys a near monopoly position.

The *rapprochement* under discussion has also some direct importance for Poland. First, as has already been noted, next to the USA, Poland is the only Soviet supplier whose share in total Soviet imports shows a significant rise in the first three quarters of 1926/7 compared with a year earlier. Secondly, the largest American licensees in Russia are at the same time the chief representatives of American capital in Poland: Standard Oil of New York has 62% of shares of the oil company, Standard Nobel of Poland, and Vacuum Oil have in their own name a refinery in Czechowice; moreover, Harriman together with Anaconda Co. have a 51% share in the stock of the largest Polish zinc company, Giesche.

Besides these involvements of the USA in Poland and Russia, whose structure may be called 'horizontal', there is also an interesting company whose structure is of a 'vertical' nature. It is Eitingon Child of New York whose sister company is N. Eitingon and Co. of Łódź. Eitingon Child deals in trade with Russia, importing furs and exporting large quantities of cotton products, especially of darning thread, that is purchased or produced by N. Eitingon and Co. of Łódź. Last autumn it received from the Soviets an order for $1 million.

Thus it appears that some of the links in American–Soviet economic relations, which become ever closer, are related in one way or another to Poland. We should watch them carefully and take advantage of the developments the beginnings of which we may now observe.

Economic Consequences of the British–Soviet Dispute[1] (1928)

After the breaking off of British–Soviet relations in the middle of 1927, it was assumed not without grounds that although this dispute had not led to an armed conflict, it would have a direct bearing on economic relations between the two countries, already made difficult by the closing of the Soviet trade mission in London. Below we examine to what extent these forecasts turned out to be true, primarily by comparing the British–Soviet trade balance in the third quarter of 1927 and in the three previous quarters.

According to British sources, Soviet exports to Great Britain in the third quarter of 1926 amounted to £6.4 million, and in the third quarter of 1927 to £7.6 million, while the average quarterly value of exports in the three previous quarters (the first half of 1926 and the fourth quarter of 1925) amounted to £5.6 million in the period 1925/6 and the same in the period 1926/7.[1]

As we can see, Soviet exports to Great Britain in the third quarter of 1927 considerably exceeded the average of the three previous quarters, since these exports—consisting primarily of agricultural products and wood—are subject to considerable seasonal fluctuations. On the other hand, a comparison with 1926 hardly indicates an end to the purchase of Soviet products after the breaking off of diplomatic relations. It seems that this growth of Soviet exports represents a stable tendency. *Financial News* recently reported that an agreement had been signed between a group of British banks, headed by the 'Big Five', and a group of wood importers for financing imports of Soviet wood in 1928, with a credit of £50 000 by these banks.

The export of British goods to the USSR (re-exports excluding) was £1.2 million in the third quarter of 1926, and £1 million in the third quarter of 1927; the average of three quarters before the third quarter of 1926 was £1.8 million, and the corresponding average for 1927 was £1.3 million.

[1] *The Economist*, 19 Nov. 1927: 868. [The data relate to economic years from 1 Oct. of a given calendar year to 30 Sept. of the following year.]

From these figures it follows that in the three quarters immediately preceding the breaking off of British–Soviet diplomatic relations (the fourth quarter of 1926 and the first half of 1927) British exports to the Soviet market declined considerably in comparison with the same period of 1925/6. To be sure, immediately before the conflict large contracts were negotiated which might have reversed the declining trend of British exports to the USSR, but because of the break in diplomatic relations this trend continues, and British exports in the third quarter of 1927 were smaller than the average for the previous quarters. This decline, however, is not very large.

The probable explanation for this course of events is fulfilling of previous orders by British industry. As far as we know, orders were also taken after the break off in relations. According to a *Berliner Tageblatt* report some time ago,[2] in September 1927 the Soviet textile industry placed another order in Great Britain for textile machines to a value of £500 000. Still unfulfilled Soviet orders in Great Britain for textile machinery were estimated at that time at £2 million.

The further development of British exports to the USSR primarily depends on the credit policy of English producers, for it is understandable that Vnyeshtorg will try to make cash purchases in other countries, e.g. in Germany, and especially in the USA.

Great Britain played an important role in Soviet imports as an intermediary, especially in the supplies of raw materials. In the periods considered, British re-exports in the third quarter of 1926 were £2.2 million and in the third quarter of 1927, £0.8 million; the average of the three quarters before the third quarter of 1926 was £2.6 million, and the similar average for 1927 was £2.5 million.

These figures show that the break off in relations had a clear effect on re-exports only. The decline was sharp, *inter alia* because of the Soviet Union's losing its financial facilities in Great Britain. The dispute hastened the natural tendency of Vnyeshtorg to make purchases at the source and to eliminate brokerage. Regarding textile raw materials, which represent a very large item in British re-exports, the USSR has already opened purchasing agencies for cotton in Egypt and for wool in Australia. It recently completed a rather large contract in Egypt, acquiring 110 000 bales of cotton[3] from government stocks. One should therefore assume that, in contrast to exports and imports, the British re-exports to the USSR will remain at a low level, even after normal relations between these countries are re-established.

The Soviet Union also intends to ignore the British market in its export of platinum. The USSR presently meets 60% of the world demand for this metal. Before the conflict Soviet platinum was sold primarily in London. Since the break off in relations, the USSR has been sending new platinum supplies mostly to Berlin, whence London stocks have been gradually transferred. Because of this German trade in platinum increased to 3800 kilograms in the third quarter of 1927, compared to 400 kilograms in the same period of 1926.[2] Recently the USSR set up its own stores of platinum in New York and simultaneously established relations with Japan which will probably become the sales outlet for Soviet platinum in the Far East, while Berlin will be the outlet for the European market and New York for the American one. Naturally, this would mean a very serious weakening of London's position in the world trade in platinum.

Closely connected with the British–Soviet conflict is the so-called petroleum war, which is being conducted against Soviet oil interests by the leading English concerns, Royal Dutch-Shell and Anglo-Persian. Some people even think that these petroleum antagonisms have played a considerable role in the breaking off of diplomatic relations. The front line against Soviet oil interests extends throughout all Europe and the Near and Middle East. However, the conflict is sharpest in Great Britain, where the *spiritus movens* of the entire operation, Henry Deterding, the president of Royal Dutch-Shell, is fighting against Soviet petroleum both with price reductions and persistent agitation.

The exports of Soviet oil products to Great Britain in the periods examined above were as follows. In the third quarter of 1926 they amounted to 167 000 tonnes and in the third quarter of 1927 to 110 000 tonnes.[3] The average for the three quarters before the third quarter of 1926 was 72 000 tonnes and 90 000 tonnes in the same period of 1927.

Hence the opponents of Soviet petroleum not only have not succeeded in eliminating it from the British market, but the export of oil products from the USSR to Great Britain in the third quarter of 1927 even exceeded the average of the previous three quarters. On the other hand, these exports look much less favourable in comparison with the third quarter of 1926; however, here one should take into consideration the exceptionally favourable market for oil products at that time because of the coal strike.

[2] See *Monatliche Nachweise über den auswartigen Handel Deutschlands.*
[3] According to the official Soviet data.

Let us now compare the entire Soviet export of oil products with their export to Great Britain. In the third quarter total Soviet exports were 625 000 tonnes, of which 110 000 tonnes were sent to Britain. For the total of Soviet exports of oil products the quarterly average for the three preceding quarters was 471 000 tonnes, and for exports to Great Britain it was 90 000 tonnes.

It follows that so far the British companies have been unable to halt the expansion of Soviet oil exports, that to a certain extent depends on Neftsyndicate's agreement with the American companies—Standard Oil of New York and Vacuum Oil Co. On the other hand, Soviet exports to Great Britain have lagged behind the average rate of expansion of export of Soviet oil products.

Forecasting further developments is not an easy thing here. As far as one can see, Deterding scored certain successes in Greece. At the same time, however, the USSR signed new long-term contracts with American companies. Moreover, Shell has been incurring tremendous losses in Great Britain as well as in India (where Standard Oil of New York is selling Soviet oil) and was forced to replenish its coffers with a loan taken out in America.

To sum up: so far the British–Soviet dispute has had less impact on the economic relations of the parties concerned than might have been thought; the only clear and probably permanent consequence is the elimination of British brokerage or re-exports from Soviet foreign trade. These relatively normal trade relations between political antagonists should be attributed largely to the level-headed moderation of Great Britain which has not involved the entire arsenal of her economic advantages in the conflict. While cutting off the USSR from sources of credit financing (which recently has been liberalized), Great Britain has not imposed any import or export restrictions, thereby not taking responsibility for directly and radically impeding trade with the USSR.

The Struggle for the German Coal Market[1] (1928)

In the recent years the power of cartelized German heavy industry increases at a great rate and consistently aims at gaining monopoly control over the raw-material and semi-product markets in which it operates. Through agreements with foreign producers or by means of direct pressure, the cartel attempts to make commercial partners and industrial manufacturers completely dependent on its supplies. The struggle is fought mainly in the coal and iron markets. However, it is also waged in a somewhat different area, i.e. in the supplies of lighting gas (*Ferngasleitung*) through pipes where interests of large coking-coal plants are in conflict with those of communal gasworks.

Production of hard coal in Germany in 1927 was 153.6 million tonnes, coal imports and exports were 5.3 million tonnes and 26.9 million tonnes respectively, and hence the domestic use of coal was approximately 132 million tonnes. Thus, domestic supplies of coal represent the lion's share in total use of coal in Germany, coal imports representing a mere 4% of its use. Germany imports coal from Great Britain and the Saar Basin only. In 1927, 3.3 million tonnes of British coal was imported, i.e. 2.5% of the total. Nevertheless, British coal has an important influence on the German coal market. The maritime transport from Great Britain to Hamburg, which is the centre for the supplies of the British coal, is cheaper than rail transport from the Ruhr Basin, not withstanding the preferential railway tariff for Westphalian coal. This allows the British coal to compete successfully with Westphalian coal in a large area around Hamburg, the borders of the area changing, of course, with the ratio of the British to the German prices.

This flexibility of borders determines prices of coal throughout all Germany for if profitable border changes are neglected, then in the competing region (*bestrittenes Gebiet*) the pricing mechanism is similar to that in the export markets: sales are promoted even at the expense of losses; the lower the export prices, the greater the losses that must be compensated for by price rises in regions which are fully dependent on domestic supplies of coal (i.e. in the *unbestrittenes Gebiete*).

There are, however, some fundamental differences between a domestic competing region and foreign markets. As a result of price rises in a non-competing region the competing region expands, and this partly limits price rises. Thus British export of coal to Germany has two consequences: (i) it creates in Germany a region where prices are determined as in the export markets; and (ii) through changes in profitability it partly affects price determination in the non-competing regions. The latter factor plays a smaller role now because of regulations affecting basic prices of coal that were enforced by the government which more than once had refused to allow for price rises. However, the price-regulating importance of factor (ii) would gain weight if the government yielded to producers' pressures, especially if the government was willing to counter monopolistic tendencies in coalmining by indirect instruments, and decided to lift the restrictions on coal imports—a measure already demanded by the union of British coal importers in Hamburg.

The conflict of interests between this union and the Rhine-Westphalian Coal Syndicate has recently come out into the open. Last year the syndicate circulated a letter to its old Hamburg buyers who were at the same time importers of British coal. In the letter the syndicate threatened to discontinue deliveries of Westphalian coal unless these buyers did not fully protect the interests of the syndicate when selling imported coal. The British coal wholesalers, aware of their strength, turned down these claims, emphasizing the national and economic importance of deliveries of British coal. The situation is more complicated, however, because the trading agencies of large mining companies, such as Stinnes, Thyssen, and Röchling, whose activities spill over to other areas of commerce, deal also in British coal and are, moreover, members of the above-mentioned union of coal importers. Also among shareholders in the Hamburg branch of the Rhine-Westphalian Syndicate—the Wetsfällische Kohlenkontor GmbH—there are companies involved in the import of British coal as well. This moderates the course of the conflict. Recently the syndicate has established a special commission that is supposed shortly to start negotiations with their opposite partners.

In this context noteworthy are the differences between the Ruhr syndicate and the Hamburg trading companies regarding the construction of the Hanzeatic Canal. While the syndicate constantly requests that it is started, emphasizing its general economic importance, the union of coal importers has doubts as to the future

profitability of the canal, pointing out the rapid progress in liquefaction of coal, the development of gas-pipes, and electrification which will significantly reduce the importance of the transport of coal in the future.

Clearly, these arguments only conceal conflicting interests: cheap water transport from coal basins to seaports will improve the competitive position of the Ruhr coalmining and eventually will eliminate British competition, thereby making coal-traders wholly dependent on domestic coal-producers.

Further Developments in British–Soviet Economic Relations[1] (1928)

In the development of British–Soviet economic relations in the last quarter of 1927 (i.e. in the second quarter since the breaking off of diplomatic relations) the same tendencies may be observed as a quarter earlier.[1] British imports from Russia declined somewhat compared with the third quarter of 1927, and by much more compared with 1926. In the third quarter of 1926 they were £6.4 million, in the fourth quarter of 1926 £10.1 million, and in 1927 they were £7.6 million and £6.7 million respectively.[2] This large fall, compared to 1926, largely depends, however, on an exceptionally poor harvest in Russia that resulted in a 21% decline in Soviet exports to Europe in the fourth quarter of 1927 compared to the previous year.

With respect to Soviet trade with large British companies, contracts with furrier firms—C. M. Lampson & Co. and F. Fredka, Huth & Co.—should be noted. They are expected to auction this year Russian furs to a total value of $7 million. Next, Gostorg concluded a three-year agreement with Union Cold Storage Ltd. on a commission sale of Soviet butter, eggs, and poultry. At the same time Union Cold Storage pays in advance 80% of the volume of commissioned deliveries; moreover, it granted Gostorg a loan of £465 000 that will be used for the development of the butter industry in Siberia, Kazakhstan, and the Urals.

British exports to Russia continued to fall but at a lesser rate. They were £1.2 million in the third quarter of 1926, £1.4 million in the fourth quarter of this year, and £1.0 million and £0.9 million in the third and fourth quarters of 1927 respectively. Compared to figures a year ago the fall is quite significant.

Also British re-exports to Russia continued to fall rapidly and in the fourth quarter of 1927 they were over four times smaller than a

[1] See M. Kalecki, 'Economic Consequences of the British–Soviet Dispute', this volume.

[2] See *Accounts relating to Trade and Navigation of the United Kingdom*, London, HM Stationary Office, 1928.

year ago. In the third quarter of 1926 they amounted for £2.2 million, in the fourth quarter of 1927 £2.1 million, and in the third and fourth quarters of 1927 they were £0.8 million and £0.5 million respectively. This was due to the fact that Soviet purchases of raw materials (mainly for the fibre industry) that formerly were bought through British intermediaries are now made directly from the producers.[3] This is shown by the data on exports of Egyptian cotton to Russia which in September–December 1926 amounted to 190 000 bales, and in September–December 1927 to 135 000 bales.[4][2]

The British–Soviet conflict had no influence whatsoever on the British concession of the Lena Goldfields Ltd. in Russia. The concession covers: (i) gold-mining along the Lena river in Siberia, (ii) the exploitation of iron-works and copper-mines in the Urals, and (iii) the exploitation of copper, zinc, lead, and silver mines in Altai. Lena Goldfields received its gold concession for thirty years and the Urals concession for fifty years, on condition that it will invest a total of 25 million roubles of which it has already invested 12 million roubles. Its profit in the economic year 1926/7 was 2.7 million roubles.

In order to complete its investment programme, and especially to develop a copper-ore reprocessing facility and to exploit the Altai mines, Lena Goldfields applied for British credits, as its own financial means were insufficient. Although the application was made before the British–Soviet conflict, it did not bring the desired result. According to a recent report in the *Berliner Tageblatt*,[3] Lena Goldfields received a £1 million credit from a consortium composed of the Deutsche Bank and a New York bank, Blair & Co. Participation of the Deutsche Bank is related to the fact that investment orders were placed with German firms. In the context of this contract, as a result of which a British firm operating in Russia places orders in Germany, the discontent of some British economic circles from the credit restrictions applied to Soviets becomes understandable.

[3] This was noted already in my paper 'Economic Consequences of the British–Soviet Dispute', see p. 103, this volume.

[4] According to *Monthly Agricultural and Economic Statistics* [published by the Ministry of Finance of the Kingdom of Egypt, 16/5 (Jan. 1928), table 3].

The Petroleum War[1] (1928)

The petroleum war that heated up in the middle of 1927 between the leading British concern, Royal Dutch-Shell on the one hand, and the Soviet Neftsyndicate and two American companies linked with it, Standard Oil Company of New York and Vacuum Oil Company, both belonging to the Standard Oil group on the other, is noteworthy for many reasons. Closely connected with various political problems, in many respects it is like a prism that refracts the rays of world politics, giving us a unique spectrum.

The petroleum war is no less interesting from the sociological point of view, being perhaps the first great political and economic conflict on a world-wide scale in which the opponents do not resort to armed force, but use the 'internal' means directly at their disposal: economic diplomacy, economic boycott, price wars, etc.

In the autumn of 1926 the situation in the Soviet petroleum industry was developing in a way that was clearly dangerous to the interests of Royal Dutch-Shell. These developments were determined by the following factors:

1. First, in the first half of the economic year 1925/6 (October 1925–September 1926) Neftsyndicate succeeded in considerably expanding its exports: in the first half of the year a total of 618 000 tonnes of petroleum products were exported from the USSR and in the second half of the year 855 000 tonnes, i.e. nearly 40% more. Soviet exports thereby approached the record level of 1904, when they were approximately 900 000 tonnes on a half-year basis.

The increase in Soviet exports to Britain and her dominions was especially rapid—from 180 000 tonnes in the first half of the year to 289 000 tonnes in the second half (an increase of 60%). This was largely promoted by the favourable conditions in the English market thanks to increased demand for fuel during the coal strike, which Neftsyndicate was able to exploit no less than other exporters. In this way in Britain, as in the markets of Europe and the Near and Far East, very dangerous competition developed for Royal Dutch-Shell—more painful for it than for its American competitor, Standard Oil, which enjoyed easy access to the large domestic market of the USA.

2. The Soviet Union, however, was also plagued by a shortage of capital in its petroleum industry. This deficiency was supposed to be made up through the conclusion of an agreement with France on settling pre-war debts. The agreement would give France petroleum concessions in exchange for granting Russia large credits. Obviously, such a solution would have been highly unfavourable for Royal Dutch-Shell which had been seriously involved in Russian petroleum before the war and hoped for repayment of its claims with the financial weakening of the USSR, forcing it to recognize at last some of the rights of the pre-war owners in exchange for long-term credits. By settling such serious Soviet obligations as its debts to France, a French–Soviet treaty would have given the USSR an injection of capital, thereby weakening the position of Royal Dutch-Shell as a pre-war Soviet creditor. Finally, petroleum concessions obtained by France would have made it difficult for Shell to sell its oil products in the French market.

3. An agreement with France on debts was not the only possibility then open to the USSR to obtain capital, especially for its petroleum industry. For already one could observe large purchases of Soviet oil for resale in the markets of the Near and Far East by Standard Oil Co. of New York and Vacuum Oil Co., both belonging to the American Standard Oil group.[1] For Royal Dutch-Shell this possibility was no less menacing than the signing of the French–Soviet agreement.

To understand this danger we have to say a few words about the methods of operation of Shell and its competitor, Standard Oil. Whereas Standard largely based itself on American sources of oil, attempting to control the world market through a large network of transport and sales structures, Shell attempted to gain control over petroleum fields scattered all over the world[2] and to sell the oil from them in neighbouring markets, thereby saving itself costs of transportation. Standard Oil's establishing contact with Neftsyndicate to sell Soviet oil in the Near and Far East—to which transportation from the USSR is much more profitable than from America—is an

[1] The Standard Oil trust was dissolved in 1911 because of the anti-trust law and broken up into several formally independent companies.

[2] Shell is involved in the Dutch East Indies, Sarawak, Egypt, Romania, Venezuela, Mexico, and Trinidad. Moreover, it has close links with the Anglo-Persian Co. and the Burmah Co. that control the fields of southern Persia and British India. Finally, Shell and Anglo-Persian together control more than 45% of Mesopotamian fields.

example of Shell's tactics and created dangerous competition for Shell in these markets. An even greater advantage that Shell has over Standard is the greater abundance of its crude oil reserves: for the American group this is all the more dangerous because as a result of tremendous oil consumption, American deposits of petroleum appear to be moving towards fairly rapid depletion. Hence, closer access of Standard to the world's richest oil fields in the Soviet Union, which could deprive Shell of this advantage, obviously must have been a cause for great concern.

As a result Shell, through its president, Henry Deterding, took steps against Soviet petroleum interests. In October 1926 a meeting was held, under Deterding's chairmanship, of the so-called Comité International, which included petroleum companies like Shell that before the war had been involved in the Russian petroleum industry. Once again it was decided to form a united front against Soviet petroleum interests (which in 1923 had been broken by Shell).[2] Deterding was given full powers to conduct the operation that included propaganda aimed at a boycott of Soviet oil.

Especially valuable for Deterding in the campaign against the French–Soviet agreement would be co-operation of the French and Belgian members of Comité International grouped in the France–Belge Syndicate. This agreement, that—according to Soviet proposals—did not include compensation for the nationalization of oilfields, would be highly detrimental to French–Belgian capital. It is difficult to say whether and to what degree this had any links with the breaking off of French–Soviet negotiations that followed shortly afterwards as a result of more severe conditions imposed by the Poincaré government.[3]

At the same time, Deterding sent a letter to D. Rockefeller, the founder of Standard Oil, attempting to convince him of the ethical inadmissibility of purchases of Soviet crude oil by Standard Oil of New York and Vacuum Oil Co. This attempt failed, however. On the contrary, negotiations began at that time between Neftsyndicate and the Standard Oil group with a view to granting it a complete or partial monopoly on the export of Soviet Oil. However, at the beginning of 1927 these negotiations were broken off, as one might surmise as a result of the pressure Deterding put on the leading company of Standard: Standard Oil of New Jersey. This company, which laid claim to Russian oilfields because of shares of the pre-war Russian company Nobel acquired in 1920, had in 1924 co-ordinated

its policy with Royal Dutch-Shell regarding Soviet petroleum interests and continued this policy in subsequent years.

Standard Oil of New Jersey, however, apparently could not restrain its sister companies, Standard Oil of New York and Vacuum Oil Co., from making further purchases. They became so bulky and regular that Standard Oil Co. of New York, by an agreement concluded in April 1927, committed itself to building in Batum a refinery with a production capacity of 150 000 tonnes a year in exchange for a three-year lease with an option for another three years.

Meanwhile, as early as January 1927, there was an important development in another field: namely, the Persian government granted a concession to Neftsyndicate for the exploitation of oilfields in northern Persia. Anglo-Persian, which controlled the oilfields in southern Persia, as well as Standard Oil, and later also another American company belonging to the Sinclair group, had also tried to win this concession. However, their efforts were unsuccessful because of the opposition of the Soviet Union which in 1918 relinquished rights to this concession that before the war had been granted to a Russian citizen, [Akaky Mefodievitch] Khoshtaria, on the condition that it would not be granted to any foreign group without the consent of the USSR. In 1924 the MacDonald government offered the USSR £5 million to give up these rights, but the offer was not accepted.

With the ultimate take-over of the concession in northern Persia, Soviet oil interests gained another strong reason for entering into close relations with Standard, which until then had failed to establish itself in Persia, despite long and intensive efforts. For, with time, collaboration with Neftsyndicate could become the basis for granting the Standard group the rights to exploit these fields, since Neftsyndicate lacked adequate capital for such an operation.

The gradual worsening of relations between Royal Dutch-Shell and Neftsyndicate ran parallel to and was connected with the continuous strengthening of political antagonisms between the USSR and Britain. In this context one should mention that Royal Dutch-Shell, or Deterding himself, remains in close contact with the British government, if only on account of close collaboration with Anglo-Persian, in which the British government had a 51% share. Thus one could hardly expect Royal Dutch-Shell to remain completely neutral in the matter of the search of Arcos offices in London,[4] the more so as its

campaign to isolate Soviet petroleum interests, as already mentioned, had not been very successful. The export of Soviet oil products in the first half of 1926/7 amounted to 887 000 tonnes, i.e. it increased still further in comparison with the previous half-year (when it was 855 000 tonnes). The prospects for sales of Soviet oil in England also appeared excellent just before the breaking off of diplomatic relations.[3] Despite the links between the Deterding's policy and that of the British government, the latter maintained a certain reserve and issued no restrictions on the import of Soviet oil, apparently not wishing to involve itself officially in the petroleum war and placing the entire burden for waging it, and the responsibility for its results, on Henry Deterding (who already earlier had been called the 'Napoleon of Oil').

Deterding's vigorous campaign against Soviet oil interests which followed the severing of British–Soviet diplomatic relations had no effect on the policy of Standard Oil Co. of New York and Vacuum Oil Co., who continued their purchases in the USSR and in July concluded with Neftsyndicate a highly publicized agreement.[5] The agreement included: (i) granting to Vacuum Oil the exclusive right to sell Soviet oil products in Egypt; (ii) a contract on supply to this company of 100 000 tonnes of crude oil annually for five years for sale in the Mediterranean region; and (iii) a contract to supply the bunker stations of Standard Oil of New York in Istanbul, Port Said, and Colombo with 100 000 tonnes of mazout for the tanker fleet of the company.

In such a tense situation the conclusion of the above agreements was a clear *casus belli* and resulted in an immediate declaration of war by Deterding on both companies through interviews in the press, which because of their blunt language hardly took the form of diplomatic notes. *À propos* the condemning in these publications of the purchase of 'stolen oil', it will not be irrelevant to quote here the following passage from Shell's report for 1922, in which it justified its purchases of Soviet oil at that time:

> From a few quarters these purchases have been subjected to criticism; some have expressed the opinion that the best manner of attaining a speedy restoration of the confiscated property would be by a general boycott of the Soviet government, by which they think the latter would be compelled, on

[3] Neftsyndicate then received a very substantial order from the British refinery Medway Oil and Storage Co.

account of lack of revenue, to restore this property to its former owners. Personally, we do not think such a policy would be wise or effective. Firstly, a boycott is never an agreeable nor even a clean weapon with which to strive for the attainment of any object, whilst it should not be forgotten that part of the exported products must necessarily come from State fields, i.e. a source to which not the slightest objection can be made.[6]

As already mentioned, Standard Oil Co. of New Jersey, which remains in touch with Shell regarding Soviet oil interests, in contrast to her sister companies held aloof from Soviet petroleum, and it is probably the position of this company that caused the collapse of negotiations conducted on a broad scale at the beginning of 1927. Following the conclusion of the above-mentioned agreements between Standard Oil Co. of New York, Vacuum Oil Co., and Neftsyndicate, Standard Oil Co. of New Jersey announced in the press that it had nothing in common with her sister companies and held fast to its previous position. This is perhaps one of the most interesting elements of the petroleum war. As pointed out earlier, in 1911 the Standard Oil trust was broken up on the basis of the anti-trust law into a number of companies which, however, unquestionably remain in close contact with each other. How then can the above differences be explained?

Two hypotheses have been put forward on this question: either a real cleavage of the Standard Oil group has indeed taken place, such that the companies that previously formed one trust are now conducting independent policies, or we have a deliberate game by these companies, which not all wanting to involve themselves in the petroleum war at the same time, derive various benefits as a result.

The truth probably lies somewhere between the two. It may well be that two different views on their attitude towards Soviet petroleum exist within the Standard Oil group. Yet, the tactical inconsistencies of individual companies that result therefrom hardly mean a complete loosening of ties between them; quite the contrary, for it may lead to greater advantages of the whole group. The well-known principle in the petroleum industry of spreading the risk, which recommends simultaneous drilling in various areas so that the losses from dry holes may be covered by successes elsewhere, has here been applied to trade. A defeat cannot take place along the entire front, since not all the armies have entered the battle. It is interesting that Standard Oil of New Jersey behaves here towards Standard Oil of

New York and Vacuum Oil Co. like Britain towards Royal Dutch-Shell, namely it accepts their activities and probably does not refuse support for them, but itself remains neutral.

The facts have shown what benefits can be derived from such flexible tactics. For example, the conclusion of an agreement between I.G. Farbenindustrie and Standard Oil of New Jersey on synthetic petroleum in August 1928, would have been considerably more difficult if the American company had taken an active part in the petroleum war, since it is very doubtful whether I.G. Farbenindustrie would have wanted to get involved, even indirectly, the more so as at this time it was conducting negotiations on entering into co-operation with the British trust, Imperial Chemical Industries.

One still has to say something about the official policy of the USA towards the purchase of Soviet crude oil by American companies. From the point of view of the national interest of the USA, which despite temporary overproduction will be threatened in the relatively near future with the possible depletion of domestic sources, establishing of links with the richest oilfields in the world is certainly regarded as beneficial. To be sure, Deterding has declared that these purchases deepen the present American oil crisis that has come about because of overproduction, but this does not tally with actual developments. For the size of these purchases is small in comparison with the total volume of American oil production, and besides this they are intended for expanding the sales of American companies in the Near and Far East, precisely at the cost of Shell, by taking advantage of the convenient location of Russian fields with respect to the markets.

In normal everyday operations a petroleum war manifests itself in cutthroat competition in nearly all European markets and in the Near and Far East, through the lowering of prices. These price cuts are more painful for Shell and for Anglo-Persian and Burmah Oil linked with it, in the markets largely controlled by them: for example, in Great Britain and India,[4] since for the attempts to maintain their position there they incur a loss proportional to the large volume of their supplies to these markets. Hence rumours are circulating that the financial position of the Shell group has considerably worsened.

[4] In Great Britain the British concerns are fighting directly with Neftsyndicate, in India with Standard Oil Co. of New York.

This is indicated by the fact that Shell did not pay any dividend for 1927. These sacrifices, however, have not stopped increasing exports of Soviet oil, except to the British market, where Deterding conducted persistent agitation against Soviet petroleum. In the first three quarters of the 1926/7 economic year the quarterly export of oil products from the USSR was on average (in thousand tonnes): 90 to Great Britain and 381 to other countries, while in the fourth quarter of 1926/7 and the first quarter of 1927/8, i.e. after the petroleum war started, it was 110 to Great Britain and 515 to other countries, and 54 to Great Britain and 520 to other countries respectively.

The purchases of Soviet oil by Standard Oil of New York and Vacuum Oil Co. increased with the signing of new agreements in November 1927; Standard Oil of New York then contracted for 300 000 tonnes (to be delivered in six years) and Vacuum Oil Co. for 225 000 tonnes. In subsequent months further orders were placed.

Parallel with the battle over markets, Deterding developed his diplomacy. Many claim that he supported the campaign of the French rightist press during the Rakovsky affair.[7] However, when it did not result in the severing of French–Soviet diplomatic relations and did not completely stop negotiatons on the settlement of debts, Deterding went to Paris where he gathered around him the French–Belgian members of Comité International. These members, who feared acceptance by the French government of a Soviet proposal for settlement of debts that was unfavourable to them, as had happened at the end of 1926, again gave him extensive support in his campaign against the Soviet oil interests.

This campaign did not bring any tangible results, however. Rumours that the French navy had limited its purchases of Soviet oil products turned out to be groundless. On the contrary, in a speech before a parliamentary committee in January 1928 Aristide Briand declared that it was in France's interest to increase purchases of Soviet oil, especially in connection with the possible signing of a treaty on payment of debts: for the stocks of Soviet oil in France would provide a security for granting the USSR credits connected with this agreement. At the same time, France would break away from the hegemony of the Anglo-Saxon companies.

Deterding scored a real success only in Greece, where because of his offers the government did not renew its contract with Neftsyndicate. On the other hand, Deterding's campaign in fascist Italy[5] and in Spain had no concrete results. Recently, the Spanish Oil Monopoly signed an agreement with Neftsyndicate for the supply of 530 000 tonnes of crude oil over three years. Considering the fact that both these countries are in rather close relations with Britain, one may conclude that in line with the already mentioned British policy of restraint towards the petroleum war, the Foreign Office has not exerted special pressure on influential circles in these countries in support of Royal Dutch-Shell's campaign.

Some observers have been inclined to see a sign of end to the petroleum war between the British and American concerns in the conclusion of negotiations concerning the participation of an American consortium in the Turkish Petroleum Co. In fact, after transferring 25% of the shares to the American group, Shell and Anglo-Persian together have more than a 45% share in the Turkish Petroleum Co. (which has the concession for exploitation of the Mosul fields). The leading members of the American group mentioned above are Standard Oil Co. of New Jersey and Standard Oil of New York. Yet conjectures about the end of the war are contradicted by increased purchases of Soviet petroleum by Standard Oil of New York noted above. Obviously, the participation of Standard Oil of New York in the Turkish Petroleum Co. along with its antagonist Shell is rather strange, the more so that sales by Standard Oil of New York of Soviet oil in the Near East, which is a natural sales outlet for Turkish Petroleum Co., strikes directly against the interests of Shell.

In any case, it should be noted that the participation of the American group was probably speeded up by recent oil discoveries in the Mosul region. Concerning British companies, they were probably induced to consent because of the lack of capital required for the construction of a pipeline to the Mediterranean (at a cost estimated at £12 million), the more so as they have become weakened financially as a result of the petroleum war.

Thus one can conclude that Shell's position is now weaker than that of its opponents. Of course, it is difficult to foresee the further consequences of this partial setback. In any case, regardless of its result, the petroleum war is of tremendous importance for the future development of world politics. Above all, it is the embryonic form of

[5] Italy is the largest importer of Soviet oil.

a future economic war that in time may become an armed conflict. Besides this, for the first time we have seen the co-operation of Soviet interests with American capital in the Far East that may become one of the decisive factors in the further historical development of the peoples of Asia.

The Match Trust and the Soviets[1] (1928)

In the August 1928 statistics of German foreign trade a sharp increase in import of matches is striking. According to *Monatshefte für Aussenhandel Deutschlands*,[2] in January–July 1928 the monthly average import of matches to Germany was 3 tonnes and it was 23 tonnes in August. This can be explained by increased deliveries of Soviet matches which have been recently offered at competitive prices in many German cities. Soviet export of matches started in 1924/5 and in 1926/7 it already represented more than 1% of world export of matches. In absolute terms, in 1926/7 the Soviets exported 15 tonnes of matches across their European border and 97 tonnes across their Asian border, which made together 112 tonnes of their total export of matches.

What are the causes of the present Soviet expansion to the German market to which, as follows from the above-quoted data, a significant part of Soviet total export was directed? One part of the explanation is provided by the more general tendency of the Soviets to expand exports in order to earn more foreign exchange that they badly need. It is not clear, however, why for the main area of export expansion they have selected the German market which is heavily protected by import tariffs.

It appears that Soviet operations are directed rather against the Swedish match trust that owns most of the German match factories. Yet, it is not a usual struggle for the sales market. The above-mentioned high import tariff makes the Soviets sell matches in Germany much below their cost of production and thus makes the conquest of the German market a highly unprofitable venture. More probably, giving rise to the Swedish trust's concern and then gaining concessions in exchange for discontinuation of these operations is at stake here. Of course, Soviet imports will not significantly reduce output of the trust's German factories, for the former will represent only a minor fraction of the latter. However, as is well known, even a petty outsider can disorganize a large market: as a result of permanent offers to supply at lower prices even small deliveries of the product, an atmosphere of uncertainty is created which induces the

trade to keep stocks low. The German market may be rather sensitive to such operations because of a natural downward tendency there; the law forced by the Swedish trust prohibits the construction of new match factories but contains provisions that allow for further expansion of output.

On the other hand, the policy of the Swedish trust in the recent period shows that it attaches great importance to the elimination from export markets of even small outsiders as evidenced by its persistent and eventually successful efforts to gain a monopoly position in match manufacturing in Estonia, Latvia, and Hungary[1] in exchange for granting these countries rather generous loans. It is possible also that the Soviets, by undertaking the above-mentioned measures against the Swedish trust want to make it offer some financial compensation, and especially to obtain its assistance in establishing close links with the American capital market that lies open to Kreuger, the boss of the trust, in exchange for Soviets' *désintéressement* in European markets.

An agreement between the Soviets and Kreuger's trust could also become a starting-point for various developments extremely important for the structure of the world economy. The interests of the Soviets and of the boss of the trust have much in common. Russia has an enormous wood raw-material base, suitable for match manufacturing. The trust uses this base already for supplying its factories in India with Siberian wood. Even more important may be an agreement concerning iron-ore. On the other hand, through Grängsberg, which he now controls, Kreuger intends to gain a dominant role in the iron-ore export market.[2] Russia's deposits of iron-ore, whose exports have so far been negligible, are the largest in Europe: the recognized deposits in Siberia and in Asiatic Russia are equal to those of the rest of Europe taken together and, moreover, magnetic investigations indicate layers of iron-ore near Kursk that are many times greater.

Nowadays the ideas and methods of competitive struggle take new shape. Competition is not an outright fight; it is, *inter alia*, a means to achieve future benefits; yet it is part and parcel of the expansion of the firms in question. Lately, however, we often come across

[1] See 'The Match Trust in the Middle of 1928', this volume.

[2] See Wł. Studnicki, 'Economic Importance of Sweden', *Przegąd Gospodarczy*, 9/13 (1928), in Polish.

developments in which tactical considerations take priority. For instance, a company belonging to the Royal Dutch-Shell oil group recently started production of nitrogen salt. According to some commentators, in this way Shell is preparing itself to counter the German chemical trust, I.G. Farbenindustrie, the single largest producer of nitrogen salt in the world that only now has started to manufacture synthetic petrol, thus undermining the future position of Shell. The latter, ready to disorganize the nitrogen salt market, may then be able to get oil concessions from I.G. Farbenindustrie.

One of the fundamental reasons that allows us to raise the question of military disarmament is the development of purely economic warfare through which domination may be achieved by means other than those alien to economic processes, i.e. escaping economic calculation and control.

For a number of reasons the Soviets are predisposed to play an active role in these economic struggles. Above all, Russia has enormous deposits of raw materials. Moreover, Soviet activity in this field follows from its special attitude towards the economy that is tightly linked to its political system and especially to its founding doctrine—historical materialism. Finally, Soviet economic structure, whose organization is similar in many ways to that of the contemporary forms of late capitalism, enables the Soviets to apply the instruments used by large trusts and concerns in their struggle for dominating the world.

British–Soviet Economic Relations[1] (1929)

Trade Turnovers

At one time we argued that the breaking off of diplomatic relations between Great Britain and the Soviet Union that took place in the middle of 1927 had a smaller impact on trade between the two countries in the second half of 1927 than one had expected.[1] But in 1928, economic relations in this area did not worsen and even showed signs of improvement, which has become clear in connection with the planned visit of representatives of British industry to the USSR in the near future.

As in the second half of 1927, in 1928 exports from the Soviet Union to Great Britain developed quite independently of the conflict. This is shown by the export figures in the first half of 1927 and of 1928, and, in the third quarters of 1926, 1927, and 1928 (see Table 28; owing to the seasonal nature of the Soviet exports to Great Britain only the corresponding periods of individual years are directly comparable).

Perhaps the single most important Soviet export to Great Britain is soft timber, which, during the period of conflict, strengthened its position in the British market, overtaking Finland. Finland's share of imports of soft timber to Great Britain was 28% in 1925, 31% in 1926, 28% in 1927, and 26% in 1928, while the corresponding figures for the USSR were 19% in 1925, 15% in 1926, 19% in 1927, and 27% in 1928.

The development of British exports to the Soviet Union is shown in Table 29. In connection with the financial boycott of the Soviet Union by British banks after the break in diplomatic relations, it was assumed that exports from Great Britain to the USSR would only continue until outstanding Soviet orders were delivered. For it was believed that the Soviet Union would avoid making purchases in a country with which it had hostile relations, the more so as for political reasons the USSR had shown a tendency to make cash purchases in the USA.

[1] See 'Economic Consequences of the British–Soviet Conflict' and 'Further Developments in the British–Soviet Economic Relations', both in this volume.

Table 28. *Exports of the USSR to Great Britain (£m.)*

Period	Value
First half of 1927, quarterly average (before the break in diplomatic relations)	3.39
First half of 1928, quarterly average (after the break in diplomatic relations)	3.04
Third quarter of 1926 (before the break in diplomatic relations)	6.37
Third quarter of 1927 (after the break in diplomatic relations)	7.60
Third quarter of 1928	7.55

Source: Accounts relating to Trade and Navigation of the United Kingdom, London, HM Stationary Office, 1925.

Table 29. *Exports of Great Britain to the USSR (£m.)*

Period	Value
First half of 1927, quarterly average (before the break in diplomatic relation)	1.30
Second half of 1928, quarterly average (after the break in diplomatic relations)	0.95
First half of 1926, quarterly average	0.79
Third quarter of 1928	0.71

The actual developments took a slightly different course, however, for in practice even relations with banks have not been broken off completely. For example, the Midland Bank continued to discount the bills of exchange with which the Soviet Textile Syndicate covered the gradual delivery of old orders for textile machines by factories in Lancashire, nor did it refuse to discount bills of promissory notes for new contracts that made them possible. Quite a few orders for textile machines, as well as for electrotechnological installations, were filled in May 1928 in connection with some tension in German–Soviet relations on account of the Shachtyn trial: the Soviet Union supposedly was given two- or three-year credits by British banks.

British re-exports to the Soviet Union, which fell considerably after the break in diplomatic relations, showed no further decline (see Table 30). The sudden initial shrinking of re-exports was primarily caused by the Soviet Union making purchases of textile raw materials at the source: in a short time British re-exports of cotton and wool to the Soviet market fell to zero. On the other hand, the Soviet Union continued purchasing rubber and tea in the British market, though in lesser quantities. Moreover, during the conflict tea continued to be

sold to the Soviet Union for credit by the Co-operative Wholesale Society in Manchester, with which Arcos in previous years had done a brisk business.

Table 30. *Re-exports of Great Britain to the USSR, 1927 and 1928 (£m.)*

Period	Value
First half of 1927, quarterly average (before the break in diplomatic relations)	2.75
Second half of 1927, quarterly average (after the break in diplomatic relations)	0.63
First half of 1928, quarterly average	0.53
Third quarter of 1928	0.58

Thus in 1928 the British–Soviet commodity trade showed signs of relative stabilization. However, while Soviet exports to Great Britain did not contract compared with the period before the conflict, exports of British goods to the USSR was twice as low and re-exports five times lower than before the break in relations.

The Petroleum War

In 1928 the petroleum war strictly connected with the British–Soviet conflict died down. The war had been conducted by the leading British concern, Royal Dutch-Shell, against Neftsyndicate and two American companies purchasing Soviet oil—Standard Oil of New York and Vacuum Oil Co.

As early as May 1928 there were signs of an approaching 'petroleum peace': there was a sharp rise in prices of shares of Shell whose financial situation—because of losses incurred in the petroleum war—was not too healthy. At the same time, the price of petroleum began to rise in British India, where it had earlier fallen to an exceptionally low level because of the cutthroat price war between Shell and Burmah Oil Co. on the one side,[2] and the importer of Soviet petroleum there, Standard Oil Co. of New York, on the other.

Shortly after this, the steps taken towards reconciliation were confirmed by an authoritative source, the president of Royal Dutch-

[2] Royal Dutch-Shell exported to British India petroleum extracted in the Dutch East Indies; Burmah Oil Co. is the main exploiter of sources in British India itself.

Shell. Henry Deterding, who at a shareholders' meeting in June declared that 'we now have every reason to trust that further discussions will convince all parties, including the most important of those who before held a different view, that the principle of compensating owners of confiscated properties will in future be upheld by all parties, and it is, therefore, to everyone's interest that this knotty question of Russian purchases should no longer be discussed in public.'[2] As it later turned out, Deterding had in mind the creation by Standard Oil Co. of New York of a special fund to compensate the former owners of the Soviet oilfields, for which purpose the American company was supposed to set aside 5% of the profits from sales of Soviet petroleum. A rumour was also persistently spread, which seems to have come from sources linked with Shell, that an agreement with Standard Oil Co. of New York in fact had been reached on this basis. This rumour had been firmly denied at one time in New York, where it was argued that Deterding's former charges concerning the acquisition of 'stolen oil' made such a solution impossible; indeed, the payment of damages would confirm the validity of the charges made and would give the former owners of the Soviet oilfields, whom Deterding does not represent, the possibility of making ever new claims.

Thus it can be surmised that ending the price war in the Indian market, which took place in the middle of 1928, was based on no special concessions on the part of Standard Oil Co. of New York. At most, it pledged itself to hold its imports of Soviet petroleum to India within certain limits, while rumours concerning the creation by Standard Oil Co. of New York of a compensation fund were probably spread tendentiously for prestige reasons by Deterding who wanted to show that his campaign against Soviet petroleum had brought concrete results. For, as may be seen from Table 31, Deterding had not achieved his main objective, namely he had not been able to check the import of Soviet oil by Standard Oil Co. of New York to India and by Vacuum Oil Co. to Egypt, or to check the expansion of Neftsyndicate to the other markets, including Great Britain.

The data in Table 31 show that in the third quarter of 1928 exports to India fell. It is difficult to say whether this was the result of the agreement between Standard Oil Co. of New York and Royal Dutch-Shell. At the beginning of 1928 oil producers in India, headed by Burmah Oil Co., submitted a request to the Indian Customs

Table 31. *Exports of Petroleum Products from the USSR, 1927 and 1928 ('000 tonnes)*

Period	Great Britain	India	Egypt	Other countries
First half of 1927, quarterly average	80	—	29	361
Second half of 1927, quarterly average (petroleum war)	81	35	42	440
First half of 1928, quarterly average (petroleum war)	116	40	47	500
Third quarter of 1928	101	30	74	542

Council to impose anti-dumping tariffs against Soviet petroleum. The resolution of this question, which was announced in September 1928—therefore after the conclusion of an agreement concerning the Indian market—was not at all in Shell's favour. The Customs Council dismissed the request to impose customs duties stating that the one to blame for the price reductions was Shell, with which—as the investigation proved—the makers of the request, headed by Burmah Oil Co., were in contact. This impartial attitude of an office of the dominion is highly typical of the British government, which remained almost completely neutral in the petroleum war. For example, the law issued in Great Britain in April 1928, imposing excise duty on paraffin oil and petrol imported from abroad, or made from foreign raw materials, was in no way directed against the expansion of the Soviet oil in the British market.

One outcome of the petroleum war was a tightening of links between the leading British oil companies. In January 1928, Burmah Oil and Royal Dutch-Shell established in India a joint British sales organization called Burmah-Shell Oil Storage and Distributing Co. of India. These consolidation measures also continued after the abatement of the petroleum war. In the autumn of 1928 Royal Dutch-Shell and Anglo-Persian formed the Consolidated Petroleum Co. for the joint sales of petroleum products in South and East Africa, Egypt, Sudan, Palestine, Syria, and Ceylon. On the other hand, Burmah Oil Co., as a demonstration of its close link with Shell, acquired a block of its shares in October. These moves, which were probably directed against the expansion of the Soviet petroleum in the Near and Far East, show that the campaign against Soviet petroleum has not stopped but has only turned less intense, perhaps becoming more systematic instead.

The consolidation movement has not been limited to British concerns. Already at the beginning of the second half of 1928 a meeting was held in Scotland between Deterding (Royal Dutch-Shell), J. Cadman (Anglo-Persian), and W. C. Teagle (president of Standard Oil Co. of New Jersey). Although these negotiations were helped by the agreement reached in the Indian market, in this case it was not a *sine qua non* condition since, despite the fact that it belongs to the same group as Standard Oil Co. of New York and Vacuum Oil Co., Standard Oil of New Jersey remained strictly neutral in the petroleum war.

The joint offer of Anglo-American Oil Co. (branch of Standard Oil of New Jersey in Great Britain), Anglo-Persian, and Burmah Oil, made in September to Neftsyndicate, was probably an outcome of the meeting of the three oil tycoons. They offered the Soviet company exclusive sales of their petroleum products in the British market of 1 million tonnes annually, i.e. twice as much as the Neftsyndicate's exports to Great Britain, but on condition that the Soviet firm paid a 5% commission from its sales to the fund for compensating former owners of oilfields in the Soviet Union.

Not to set a precedent, the USSR rejected this proposal on principle. The oil companies also demanded the payment of 5% for the damages fund on principle. However, the essence of the deal was above all to eliminate from the British market a troublesome competitor that stood in the way of a price agreement. Hence antagonisms in the petroleum market between USSR interests and those of its competitors, who so far have been unsuccessful in stopping Soviet expansion, or in extending control over it, have not been eliminated in the East or in Europe.

The Fight for the Persian Market

Not unrelated to the petroleum war is the Soviet–British fight for the Persian market. After the signing of an economic treaty with Persia at the end of 1927, the Soviet companies began intense competition with British exports which suffered considerably as a result. Whereas in the first three quarters of 1927 British exports to Persia and Iraq[1] amounted to £4.39 million, in the first three quarters of 1928 they fell to £3.39 million.

[1] British exports to Iraq were added to those to Persia since a large part of the former is intended for further shipment to Persia, Baghdad being the main centre for supplying Northern Persia with British goods.

Soviet firms made an especially strong assault on the Persian textile market, selling their goods there at a loss. The export of British cotton fabrics to Persia and Iraq fell as a result from 98.7 million sq. yds. in 1927 to 67.3 million sq. yds. in 1928. The losses incurred from this dumping, introduced for political reasons, are not serious for the Soviet Textile Syndicate, since export to Persia is only a small part of its overall output.

The British Concessions in the USSR

The British–Soviet conflict had no effect on the concession of the British firm, Lena Goldfields Ltd., for exploitation of gold-mines in Siberia, and ore-mining and metallurgy in the Ural and Altai. The company still remains in normal relations with the British government, which in 1928 even gave it credit of £400 000 for a three-year period. This company is making big investments in the Ural and Altai, financing them with credits of £1 million received from the group Deutsche Bank–Blair & Co. (a New York bank). The lion's share of the orders has been going to German industry, which is a striking example of the injuries suffered by British industry because of the financial boycott of the Soviet Union by Great Britain.

Apparently Lena Goldfields recently has negotiated with the Soviet government a stake in the exploitation of potassium salt deposits near Solikamsk. Lena Goldfield's concession is for buildings that before the revolution were largely the property of this firm. A similar agreement is supposed to be concluded shortly with another British company, Russo-Asiatic, which before the revolution had coal- and ore-mines in Siberia and the Ural (the exploitation capacity of these coal-mines amounts to 400 000 tonnes annually). This is a huge complex, whose value the company involved estimates at £56 million. Russo-Asiatic is already negotiating with foreign groups (probably American) on having them take over a block of reserve shares of the company. Also, to make it possible for their own shareholders to participate in this subscription of reserve shares on favourable conditions, the company has offered them the right to acquire one new share for five shares held at a price of 3*s.* 6*d.* for a share with a nominal value of 2*s.* 6*d.* The subscription price of the remaining shares will be higher. News about the near-conclusion of negotiations conducted for many years between

Russo-Asiatic and the Soviet authorities created great interest in City.

Present Prospects of Closer Relations

Recently there have been clear signs of improvement in British–Soviet economic relations; *inter alia*, for the first time since the break off in diplomatic relations the British banks have begun to discount Soviet bills of exchange drawn at the request of German firms. As early as the end of 1928 the Soviet government sent an invitation to British industry to visit the USSR. At a meeting of British industrialists on 5 February 1929 it was decided to accept the invitation and in the immediate future to send a delegation to the USSR to investigate chances of establishing trade relations. This meeting was attended by representatives of the steel, machine, car, cement, and other industries, including such well-known concerns as Armstrong Whitworth & Co. and Dunlop Rubber Co. Financial circles will also take part in this visit to the Soviet Union, which is regarded as highly important because it may be a sign that the Soviet Union will be given access to the London money market.

There are various reasons for the present reconciliatory steps. Above all, they follow, as it were, some mitigation that has taken place in certain areas of British–Soviet economic relations. Next, the economic balance-sheet of the conflict is hardly favourable for Great Britain, especially for her industry. That is why the Tories, who are in power and who were responsible for starting the feud, are now willing to listen to the wishes of British industry to re-establish trade relations with the Soviet Union in order to blunt the edge of criticism by the Tories' opponents in the election campaign set for the spring of 1929. At the same time, however, for all important partners involved—the government, finance, and industry—a strong incentive to establish closer economic relations with the USSR is the progress of competitors in this field. The extension of German–Soviet trade treaty that will facilitate German expansion in the Soviet market, the rapid development of American–Soviet trade, the recent contract of Amtorg with International General Electric—all this creates the rather unpleasant prospect for Great Britain of splendid isolation.

Also in the field of concessions one may note factors increasing British confidence in the Soviet Union—Lena Goldfield's normal co-operation with the Soviet government, the almost completed

negotiations with Russo-Asiatic, and finally the new Soviet concession law. All these increase the value of the Soviet Union as a contracting party in the eyes of the British business.

Besides these direct reasons, however, questions of world politics undoubtedly play a great role. During the time that has passed since the outbreak of the conflict, the Soviet Union has lost its influence in China, thereby putting an end to the old British–Soviet conflict in that region. Now Great Britain's main antagonist in China is the USA with which the Chinese national government, which is not very favourably disposed towards Great Britain, is in close contact.

This course of events is not restricted to China alone. Great Britain is more concerned about sales outlets for her goods than about areas for the investment of capital which at present she does not have in abundance. For this reason Great Britain has opposed the emancipation and industrialization of the countries of Asia. This is the source of her conflict with the Soviet Union which supports their emancipation. Yet, this emancipation is not going in a socialist direction. In these countries, the local progressive bourgeoisie is rising to power, a group that is hostile to both the Soviet Union and Great Britain. Of necessity it seeks support in the USA, which—unlike Great Britain—is more concerned about the investment of capital than about the export of goods and for which emancipation in these countries based on capitalism is a positive phenomenon, the more so as it contributes to the expansion of US political influence.

In this way the British–Soviet conflict that was acute during the emancipation explosion has been losing its edge, yielding place to British–American conflicts. That is why, as the emancipation of the Asiatic continent proceeds—and in 1929 it has gone very far, embracing China—the embers of British–Soviet antagonisms in world politics will gradually die out.

The End of the Petroleum War[1] (1929)

The peaceful atmosphere evident for some time in British–Soviet economic relations[1] did not extend to such an important area as the petroleum war until very recently. The September 1928 negotiations between Anglo-Saxon concerns and Neftsyndicate on an agreement in the British petroleum market produced no concrete results. The Soviet Union firmly rejected the condition to pay 5% of the value of sales of Soviet petroleum products in Great Britain to the former owners of oilfields in Russia. The tightening of links at this time between the leading British concerns—Royal Dutch-Shell, Anglo-Persian, and Burmah Oil—was also commonly interpreted as the organization of a counterattack against the expansion of Soviet oil in the Near and Far East.

The recent developments have completely changed this situation, however, and the area of petroleum issues—hitherto most inflamed with antagonisms—has turned into a focal point for closer economic co-operation between Great Britain and the Soviet Union. The collapsed September negotiations on sales of Soviet petroleum in the British market were reopened and at the end of February 1929 led to the signing of an agreement for three years between the Soviet Union and the Anglo-American Combine, which includes Anglo-American Co. (the British branch of the Standard Oil of New Jersey), Royal Dutch-Shell, and Anglo-Persian, i.e. the companies that dominate in British oil imports.

According to statements of the managing director of Neftsyndicate, G. J. Sokolnikov, and a member of the council of the People's Commissariat of Foreign Affairs, Shlaifer, the main points of the agreement are as follows: (i) The agreement includes both granting a specified quota for British imports of petroleum products for Russian Oil Products[2] (obviously, with a pledge by the USSR to observe the convention on prices) and contracting by the Anglo-American Combine a considerable volume of Soviet petroleum products for sale in Great Britain. The agreement assures the USSR of sales in the British

[1] See 'British–Soviet Economic Relations', this volume.
[2] A Soviet company selling petroleum products in Great Britain.

market of 1 million tonnes of petroleum products annually. (ii) Petrol is not included in supplies for the Combine and all exports of petrol from the USSR will be sold directly by Russian Oil Products. The sales quota for the USSR is 225 000 tonnes annually. (iii) The Soviet Union will make no payments to former owners of Russian oilfields.

If one compares these figures with present Soviet imports of petroleum products and their total consumption in Great Britain, the ratio of the import of Soviet oil products to their total consumption in Great Britain in 1928 was 6% and after signing the agreement it will reach 15%. The corresponding shares for petrol are 6% in 1928 and 9% after signing the agreement.

The pronouncements of Henry Deterding, the managing director of Royal Dutch-Shell and leader of the campaign against Soviet petroleum, really do not conflict with the above information from Soviet sources. In a press interview Deterding said that: (i) the share of the USSR in supplying the British market will not exceed the individual shares of the members of the Combine; (ii) Royal Dutch-Shell has not contracted to purchase petrol or petroleum in the USSR; (iii) concerning other petroleum products, they have been contracted for at prices lower than world prices and the profit margin resulting therefrom will be used to create a fund to compensate the former owners of the Russian oilfields.

The first point, which contradicts rumours in circulation, does not deny Soviet statements on the basis of which the USSR share in British consumption of petroleum products was calculated above at 15%; on the other hand, the share of each member of the Combine is indeed higher than this. Point two, on petrol, agrees entirely with Soviet information. As regards petroleum, it is not yet known whether it will continue to be sold directly by Russian Oil Products, or it will not play a major role in Soviet exports to Great Britain. Finally, point three is only a diplomatic allusion to the fact that the Soviet Union has not committed itself to make any payments for damages. For sale by the USSR of its products below world prices does not depart from generally accepted business practices considering the size of the contract, and in no case can it serve as a proof that Deterding has forced through his postulates. On the contrary, in concluding the above agreement he has purchased, in his own words, the 'stolen petroleum', and his moral defeat must be regarded as complete. The only consolation for him may be the increase in the price of petrol in Great Britain, which shortly after the agreement

rose by 16%. The price of paraffin oil has also risen, and the prices of other petroleum products are also likely to go up. At the same time, the share prices of petroleum companies have risen sharply.

It should be noted that the present hike in prices of petrol and petroleum cannot be regarded as a return of these prices to their normal level from the low level they fell to during the petroleum war. For this reduction of prices was taken advantage of by the British government, which in April 1928 imposed an excise duty on petroleum and petrol thereby raising their prices to the former level. Hence the present hike strikes at the British consumer in comparison with his position before the petroleum war. It is therefore understandable that it caused widespread discontent. The British motor-car industry, which fears a slow-down in British car sales, has been especially vocal in its protests. Questioned in Parliament on its part in the price agreement by Anglo-Persian, most of whose shares it owns, the government answered that as a shareholder in Anglo-Persian it is guided only by the business interests of this company.

The British government generally takes the position of not getting involved, at least openly, in the manœuvres of the petroleum companies. In the petroleum war it also stayed neutral, which is understandable in the light of further developments. It only took advantage of the price reduction brought about by the war to replace antiquated communal taxes with an excise duty on petroleum and petrol. In the same way it is making use of the petroleum peace to establish closer economic relations with the USSR, which it apparently is intent on achieving.

Following the agreement in the British market, the gradual coming to an end of oil conflicts in the Near and Middle East is also probable. If this happens, the world petroleum market will begin to move towards an international agreement. The aforementioned consolidation of the three main British concerns, the creation in the USA of an export cartel of those oil producers, and finally the connections that for two years have linked the Soviet Union with the American companies and now are being formed with the British concerns create a good foundation for such an evolution.

One may surmise that the Soviet Union will derive no less benefit from these future agreements than from the present one. Its relatively small share in supplying the world market is entirely sufficient to prevent the 'regulation' of this market (as happened in the case of Great Britain). That is why the contracting parties from the USSR

in exchange for a convention on prices will probably be willing to increase considerably the share of Soviet petroleum sales; precisely because the present share of the USSR in total sales is small, even its considerable increase will not result in a very serious reduction in the imports of the other suppliers (under the present agreement this reduction in the British market amounts to about 10%), but their profits will jump considerably as a result of an increase in prices.

From the point of view of world politics, the conclusion of a petroleum peace is an important step forward in eliminating British–Soviet conflict. It also has another, more general implication: Deterding's purchase of 'stolen oil', which discredits his activities during the petroleum war, at the same time strengthens the international position of the USSR.

International Coal Competition[1] (1929)

The main arena of international coal competition is the world market, i.e. the sales market of coal transported by sea. As far as shipment of coal by land is concerned, international coal competition does not cover wide areas because of markets near particular coal basins. For example, Austria is such an adjacent area for Polish, Czech, and German coal. In contrast to competition in the world market, which comprises large deliveries, the struggle for coal shipments by land is of only local significance. That is why in what follows we limit ourselves to a study of the world market.

The leading supplier of coal to the world market is Britain, a situation that results from the proximity of her mines to seaports and from the fact that coal is the main export cargo, which makes it possible to use the tonnage of ships sailing from England to bring back on their return route wheat, wood, cotton, and other bulky raw materials.

Germany is another important exporter of coal by sea. Her port of export is Rotterdam, to which coal transports are sent by the Rhine from the Ruhr Valley. Reparations supplies for France and Italy also play an important role in German exports.

Finally, since the outbreak of the German–Polish customs war in the middle of 1925, which closed the German market to Polish coal, Poland has begun her expansion in the world coal market. Gdańsk and Gdynia serve as the ports of export of Polish coal.

Table 32 shows the sales of the three main suppliers to the world coal market in the first half-years of 1925, 1928, and 1929. In order to consider total sales in the world coal market, the sales of naval coal and the export of coke and briquettes have been included.

Next to the competition among suppliers to the world market, there is also competition between coal imported by them by sea and coal transported by land from coal basins closest to the seaports of import. The main area of this competition (similar to the aforementioned competition among coal basins themselves) is North-Western Europe, where 'sea' coal competes with 'land' coal from the German, Dutch, Belgian, and French deposits.

Table 32. *Sales of Coal in the World Market*[a], *1925–1929 (million tonnes)*

Country	First half-year		
	1925	1928	1929
England	36.3	35.0	38.6[b]
Germany[c]	3.8	5.5	4.8
Poland	—[d]	3.3	3.5

[a] Including naval coal, coke and briquettes.
[b] Including 26.8m. tonnes of export coal, 8.1m. tonnes of bunker coal (for ships sailing abroad), and 1.9m. tonnes of coke and briquettes.
[c] Calculated by subtracting from the Rhine shipments the part destined for Holland.
[d] Export through Gdańsk and Gdynia; in the first half-year of 1925 only 20 000 tonnes were shipped through Gdańsk.

The most characteristic feature of the world coal market has been the fall in prices over the last few years (see Table 33). This decline is usually explained by increased supplies in connection with Poland's expansion since the Polish–German customs war, and by the world fall in demand caused by various technological advances. Power stations based on white and brown coal, as well as on natural, metallurgic, and coke-oven gas, enable the exploitation of new energy sources that begin to compete with hard coal. The widespread use of oil-engines based on petroleum derivatives has a similar influence. (Among the latter mazout also competes with coal as a fuel for heating ship-boilers.) Even more than the competition of other sources of energy, the world coal market is affected by savings in the use of coal through improvements in the construction of boilers, the introduction of steam turbines, rationalization of coke-engineering, etc.

Table 33 contains data on the export of coal and its extraction throughout Europe, and the average British export prices of coal. As will be seen, the relation of exports to the world market to the total European extraction remained approximately constant which means that sales in world markets developed at more or less the same rate as consumption of the remaining part of the European output. So we cannot speak of a glut in the world coal market. In these conditions the crisis in demand should have the same effect on world prices as on local prices, which is hardly the case in reality: while world prices have fallen sharply since 1925, prices nearby coalmines not only have not fallen but in many cases have even been raised by producers to offset their losses in the world market.

Table 33. *Supplies of Coal to the World Market, European Extraction of Coal, and Export Prices of Coal, 1925–1929*

	First half-year		
	1925	1928	1929
Exports of coal to the world market (million tonnes)	40.1	43.8	46.9
Extraction of coal in Britain, Germany, France, Poland, Belgium, Czechoslovakia, and Holland (million tonnes)	253.0	274.0	297.0
Relation of export of coal to the world market to European output (%)	15.9	16.0	15.8
Average English export prices of coal (£ per tonne)	4.96	3.74	3.80

[a] Including bunker coal, coke, and briquettes.

To some extent this can be explained by the absence of sharp competition in local markets. Through syndicalization, a group of mines gains a monopoly position in a certain area and can control prices there, from which, however, it does not follow, that such groups can raise prices with no loss in sales, irrespective of the above-mentioned factors reducing the demand for coal. If they were as strong in the vicinity of coalmines as in world markets, then with the same rate of increase in sales (as was the case), the reduction in local prices could have been smaller, but in no case could a reverse movement of prices be possible. Hence, to explain the actual developments we must assume factors having greater influence in reducing demand for coal in the world market than in the coal basins. How can the latter phenomenon be explained?

It seems that the following factors had the greatest influence. First, near coal deposits there are industries in which other fuels cannot be substituted for coal and possibilities of saving on coal input are limited, especially in the iron and steel industry. However, regarding other applications of hard coal, one should remember that, despite relatively cheap maritime transport, world coal prices were incomparably higher than in the vicinity of coal basins. Consequently, the competition from new sources of energy or savings in the use of coal had a greater effect on the world market than on prices of coal in mining regions: for example, the use of a petrol-engine instead of a steam-machine turned out to be uneconomical in Katowice but economical in Naples.

The reduction of world prices with the simultaneous hiking of prices in the vicinity of coalmines reduced the difference between

them to a relatively small margin. This obviously weakens the pressure of factors checking demand for coal in the world market. Besides this, it increases the chances for sale of 'sea' coal in those areas where it competes with 'land' coal. Self-regulation of a certain kind takes place in this way and a further downward movement in prices is checked. This may explain the signs of stabilization in the world market in 1929: as Table 33 shows, in the first half of 1929 world prices no longer showed a decline compared with the first half of 1928, despite the fact that the proportion of exports of coal to the world market to the extraction of coal in Europe did not decline significantly.

Thus, as it turns out, international competition alone is not the only or even the main cause for the fall in world prices of coal. Even if exporters came to an agreement on prices, if such an agreement were not to affect their overall sales, prices would have to be lowered anyway, though probably less than actually was the case. This is especially true for Scandinavia, where British–Polish competition was very intense.

As a result of the resolutions of The Hague Conference, some intensification of international competition may be expected. In accordance with British demands, it was decided to reduce German reparations payments of coal to Italy from RM100 million to RM 52 million annually, which at constant prices amounts to a reduction from 4.5 to 2.3 million tonnes of coal per year. At the same time, Italian State Railways, which till now had covered the lion's share of their annual needs of 3 million tonnes with reparations coal, have committed themselves to purchase at least 1 million tonnes of coal annually from Britain. The reduction in German reparations supplies is much more, namely 2.2 million tonnes. Hence German–British competition will develop over supplies of 1.2 million tonnes. In any case, German supplies to the Italian market will be reduced by at least 1 million tonnes, and Germany's coal expansion will probably be directed to other markets, heating up the competitive struggle there.

The many times discussed idea of an international coal agreement again becomes a question of the day in this context. A factor that to a certain extent favours the conclusion of such an agreement is the formation in Britain, on the initiative and to some extent under the pressure of the government, of a national coal syndicate that probably will start operations as early as the beginning of 1930. The

existence of such an organization, representing the entire British coalmining industry, will make it easier to conduct international coal negotiations if only from the formal point of view. Moreover, the MacDonald government will probably put some pressure on the British syndicate to come to an agreement with other exporters, since it is interested in raising the price of coal to carry out the programme of the Labour Party in shortening the working day of miners, raising minimum wages, introducing old-age insurance, etc.

It follows from the above that any considerable increase in world prices can take place only at the cost of limiting the export of coal because a price increase will strengthen the pressure of competition from other sources of energy and savings in the use of coal; moreover, it will increase the chances of selling 'land' coal in areas where it competes with 'sea' coal. However, it will be very difficult to agree on sales quotas in the world market. Poland in particular, which is now making considerable investments in reloading facilities in Gdynia and in railway connections of the coal basin with the sea, will surely make high demands, and contracting parties will probably be unwilling to make many concessions. Regarding the British coal industry, syndicalization will increase its competitiveness in the world market, since it will largely facilitate shifts of export losses to domestic consumption.

French Petroleum Policy[1] (1929)

1. The French output of petroleum from its fields in Pechelbronn and Gabian meets only 3% of total French demand for oil products that in 1928 were about 2.7 million tonnes. One of the main targets of French foreign policy after the World War was the expansion of the share of French capital in the exploitation of foreign oil deposits. In this way a raw-material base for the French petroleum sector was established, independent of the interests of the large British and American companies. So far this policy has brought tangible results in Poland, Romania, and—for France perhaps most importantly—in Mesopotamia.

In Poland French capital controls about 60% of oil production, i.e. about 450 000 tonnes per year. French participation in oil extraction in south-eastern Poland was strongly concentrated last year and at present Premier Co., whose mother company is Crédit Générale de Pétroles, extracts 43% of the total Polish output of oil. In Romania French capital controls about 25% per cent of local oil output, i.e. about 1 million tonnes per year. According to the San Remo Treaty, the French share in Steana Romana Co. is 50%.

Finally, also in line with the San Remo Treaty, according to the agreement of 3 July 1928 on the exploitation of the Mosul oil deposits, Compagnie Française de Pétroles obtained a 23.75% share in the Turkish Petroleum Co. that has a licence for the exploitation of Mesopotamian oil. Moreover, Compagnie Française de Pétroles, 25% of whose shares are owned by the French government, has the right to buy an amount of extracted oil equivalent to its share in the Turkish Petroleum Co. Since the licence requires that annual extraction of oil reaches 2 million tonnes, France is assured of supplies of oil from this source, i.e. of 2 million tonnes × 0.2375, or 475 000 tonnes per year. In practice the rate of oil production by the Turkish Petroleum Co. will most probably be significantly greater and with it also the share received by Compagnie Française de Pétroles.

Next to the French group, the Turkish Petroleum Co. is shared by Anglo-Persian (23.75%), Royal Dutch-Shell (23.75%), and Near East Development, representing the leading American petroleum companies (also 23.75%), and Gulbenkian (a 5% share). The licence requires that production starts at the end of 1931. By this time an oil pipeline connecting oil deposits with the Mediterranean will be constructed. However, it has not been yet decided if the oil terminal should be located in the zone of British interest (i.e. in Haifa), or in the French one (i.e. in Alexandria). After investigation, the technical experts opted for Haifa but this choice has not been confirmed by the board of Turkish Petroleum Co. and the study will be repeated in October 1929.

Apart from those oil engagements French capital bought fields in Albania and Columbia where test drilling started. In Albania the already-mentioned Premier's mother company, Compagnie Française de Pétroles, is engaged. Another French capital group is considering investment in the rich oil deposits of Venezuela.

The French expansion aimed at gaining control over oil production is co-ordinated with the development of the oil-refining industry in France. With this purpose in mind a newly introduced French oil law increased import tariffs on oil products, thereby strengthening the competitive position of French refineries. From this point of view French engagement in Poland and Romania is much less important than French shares in the Turkish Petroleum Co. Because of insufficient oil production in Poland—oil extraction of Premier Co., for instance, is about 30% below its oil-refining capacity—and high costs of production, oil exports from Poland are out of the question. In Romania oil exports are completely prohibited.

Also, supplies of Polish and Romanian oil products to the French market encounter difficulties. Because of the difficult conditions of oil extraction in Poland, costs of oil-processing are high. Consequently, the French company, as well as others, sells most of its output in the local market at prices much higher than world prices. In Romania the position of French oil companies is uncertain. In accordance with Romanian mining law, companies controlled by French capital had to concede that in future they would surrender the majority of shares to Romanian nationals.

The share of both these countries in the total oil imports of France is negligible. In the first three quarters of 1928 it was 0.7% for Poland and 2.7% for Romania. Hence, the French attach the greatest importance to the exploitation of the Mosul oilfields. France may count on meeting from this source 20–5% of her oil needs (as noted above, in 1928 it was 2.7 million tonnes, of which 20–5% represents

540 000–675 000 tonnes; the minimum supply of Mosul oil for France will be 475 000 tonnes, but the actual French share will certainly be greater). Now, Compagnie Française de Pétroles has established Compagnie Française de Raffinage, which started a refinery to process oil delivered from Mesopotamia. The refinery will be located near Marsil where oil transports will be directed from Haifa or Alexandria.

2. The appearance of Soviets in the world oil market was wholly in line with these tendencies in French policy. The expansion of a new outsider broke the hegemony of the Anglo-Saxon companies and, through lowering prices, allowed France to meet her demand for oil at less cost. In spite of the losses of French oil companies due to the nationalization of Russian oilfields, the Soviets found important customers in the French market, the French navy including. In 1928, the share of Soviet supplies in French oil imports exceeded 9%. The declarations during the petroleum war of Henry Deterding, the president of Royal Dutch-Shell, had no influence on private imports or government orders.

Anyway, the French attitude to Soviet oil was closely linked with the repayment of the Soviet government debt. According to one proposal, persistently put forward in the negotiations, this repayment was to be connected with granting the Soviets new credits for which part of the guarantee would be Soviet stocks of oil in France; of course these would be the greater, the larger the sales of the Soviet oil in France. As it was pointed out by Briand in his report to the parliamentary committee in January 1928, in this way the plan to settle the Soviet government's debt would be combined with a more intensive use of Soviet oil, which would in turn make France less dependent on British and American oil companies. In the negotiations the question of granting France licences to exploit unused Soviet oilfields (in for Caspian lands, Fergana, Ukhta, etc.) was also raised. If that happened, one stage in the French plan to secure access to oil deposits would be accomplished.

Negotiations on the repayment of the Soviet government debt to France have brought no definite results yet, and hence the related issues are not decided. Instead, rumours recently circulated about a combination of French, Persian, and Soviet interests in the exploitation of oilfields in north Persia. Some time ago a British company, Anglo-Persian, which controls oilfields in south Persia, together with

some American oil groups applied for a licence to exploit these fields. Ultimately, however, the licence was probably given in 1927 to the Soviets on unknown conditions. North Persian oil will have to be transported through Soviet lands as, according to the licence agreement on south Persian oilfields, Anglo-Persian is allowed to veto the construction of any oil pipeline from north Persia to the Persian Gulf. Hence, the shortest way for north Persian oil to the world market would lead through the Caspian Sea and the Caucasus to the Black Sea.

According to recent press reports, a French–Belgian syndicate has recently been established, together with Petrofina (the leading importer of Soviet oil to France and Belgium), with the purpose of exploiting the north Persian oilfields. Lenon Wanger, a well-known oil producer and the syndicate's representative, has lately visited Moscow—probably to start negotiations.

The European Coal Crisis[1] (1929)

The main cause of the coal crisis is, no doubt, technological progress. As in the case of mechanization in industry, a direct result of which is a temporary rise in unemployment, intensive improvements in the use of energy reduce demands for coal. Electrification, the use of oil products as fuels or thermal energy, and finally economies in the use of coal allowing for a smaller input per unit of output, are the three factors mainly responsible for the coal crisis.

A characteristic feature of modern electrification is the tendency to transform energy into electric power that is then sent to its destinations by electric cables. Power plants are located close to waterfalls, deposits of hard and brown coal, and peat-bogs (where power plants use gas obtained as a by-product).[1] Electric energy used to operate steam-engines and sent through electric cables competes with success against coal deliveries by land or water transport.[2] Moreover, where power comes from plants based on coal, this competition is reflected not in total coal consumption but in its shift from energy consumers to coalmine locations. It follows that electrification reduces shipments of coal from coalfields rather than coalmining.

The invention of oil-engines allowed oil products to compete with coal as a fuel: the diesel engine competes in industrial plants and on ships with the steam-engine; an automobile with an oil-engine competes with railways. Also in ship's steam-engines, mazout, which is light in relation to its caloric content and—because of its liquid form—extremely easy to load, is substituted for coal.

Yet, for the future use of coal perhaps more important than competition from new sources of energy are gains in economizing on its consumption. In this context improvements in the construction of grates and furnaces should be mentioned. In particular, use of coal dust as boiler fuel has turned a product that once was only of

[1] In the USA natural gas is also used as fuel in power plants located close to oil wells.

[2] Next to electrification, delivery of gas through gas-pipes reduces coal consumption. Natural gas as a source of energy is only so far of great importance in the USA, where it is transported through pipelines from oilfields. Transport of coal gas through gas pipelines in Germany (*Ferngasleitung*) is only at an early stage of development.

secondary significance into a fuel of even better caloric value than the coal itself. Next, the invention of steam-turbines has made possible a much more effective use of steam compared to efficiency coefficients of standard steam-engines. Finally, large economies in the use of coal have been made in metallurgy, especially through rationalization of coke production that has recently made it possible to obtain an 80% coefficient of processing coal into coke.

According to F. G. Tyron (of the US Bureau of Mines), to operate a railway steam-engine 22% less coal was used in 1926 than in 1917. In the same period, economies in the use of cast steel amounted to 11%, and so on.

As noted above, electrification has a greater impact on coal shipments outside coalfields than on coalmining, which is due to savings on cost of transport when power plants are located close to coalmines. This is a special case of a more general impact: the less distant a given coal market is from local mines, the smaller are costs of transport and the less the limitation of coal consumption. If we neglect dumping practices, coal prices are higher, the more expensive the transport of coal from mines, factors which operate more intensely in markets where coal prices are high. Technological improvements that are not yet profitable near coalmines may prove profitable in more distant markets where coal is more expensive. Moreover, in areas close to coalmines those industries are located for which a substitution for coal is impossible and economies in coal input are limited, e.g. metallurgical industries above all.

Thus, if coalmine owners do not follow a policy of price reductions in more distant markets, coal consumption in these markets falls in relation to markets where costs of transport from mines are smaller. This apparently happens now to some extent in the domestic German market where a large part of sales is at higher prices,[3] this probably explains the reduction in the average distance of railway shipments that in the first half of 1925 was 157 km. and in the first half of 1928 148 km. only.[4] Relatively more intensive use of coal in regions close to coalmines than in the more distant ones leads to the average distance of coal transport being shorter and, since coal shipments have a large share in total railway transport, this is reflected in the average distance of all railway shipments.

[3] In the so-called '*bestrittenes Gebiet*'.

[4] Calculated on the basis of data published in *Wirtschaft und Statistik*, 9 (1929); we have no information on the average distance of coal rail shipments.

Table 34. *Coal Exports to the World Market, 1925 and 1928 (million tonnes)*

Country	First half of		Change (%)
	1925	1928	
Great Britain	35.2	33.8	
Germany	4.0	5.7	
Poland	—[a]	3.3	
TOTAL	39.2	42.8	+9.2

[a] In the first half of 1925 coal exports through Gdańsk were 20 000 tonnes only.

In the world market, however, i.e. where coal transported by sea is consumed, the crisis following keen competition among coal-producers practising dumping was reflected in reductions in prices which have come close to prices in coalmining regions. Deliveries of coal to the world market, i.e. through seaports, by main coal exporters in the first half of 1925 and 1928 (coal for ships, coke included) are shown in Table 34.

It will be noted that the rise in total exports to the world market depended largely on Polish sales that followed the outbreak of the Polish–German tariff war which in the middle of 1925 closed the German market to Polish coal and forced Poland to seek new markets. The world price of coal (i.e. the average British export price) was $5.05 in the first half of 1925 and $3.80 in the first half of 1928; the fall in coal prices was thus 25%.

One might think that the rise in coal supplies to the world market by 1.2%, mainly due to new Polish deliveries, resulted in the price of coal falling by 25%. However, this rise in supplies only slightly exceeded the rise in total European supplies of coal. In the first half of 1925 the sum of output of Great Britain, Germany, France, Poland, Belgium, Czechoslovakia, and Holland was 253 million tonnes[5] and in the first half of 1928 it was 274 million tonnes, i.e. it increased by 8.3%.

The sharp fall in coal prices in the world market (which has not happened, however, in the coalmining regions) must therefore be explained, as we noted above, by more intense operation of the 'counter-coal' factors, and not by a strong rise in supplies of coal to the world market compared to markets close to coalmines.

An international agreement of exporters on raising world coal prices would have to reduce coal consumption. Next to 'counter-

[5] USSR is not included here since its coal exports are equal to its coal imports.

coal' factors related to technological progress, whose operation in the world coal market would then intensify, yet another factor must be taken into account. For the countries that export coal by sea and who at the same time are themselves coalmining countries (like Germany, France, Poland, Belgium, and Holland) a rise in coal prices at delivery seaports would facilitate the expansion of local coalmines. The border line along which coal prices, cost of transportation included, are the same for imported and domestic coal would then shift closer to seaports and domestic coal would more often be substituted for imported coal. For this reason all attempts to increase world coal prices without sharply limiting coal exports are doomed to failure.

Control over German Industry by Foreign Capital[1] (1929)

At the present stage of development Germany belongs to countries whose domestic savings fall short of demand for capital. In 1928 deficit in the current account of the German balance of payments, offset by the inflow of long- and medium-term foreign capital, was RM 3.7 billion. This must be partly attributed to the repayment of war reparations amounting in 1928 to RM2 billion of the above-mentioned deficit.

Because of tightness in the world money market for some time now, obtaining loans or long-term credits by German industry and local governments has become increasingly difficult and only at the cost of high interest. This reduces net profits of entrepreneurs while they continue to bear all risks involved. Thus other forms of attracting foreign capital, namely by selling new shares to foreign firms, i.e. by sharing with them the substance of the enterprise sector, gain primary importance. This development has taken place at a time of an ever more intensive penetration of Europe by American capital which is not of a strictly financial nature—not by granting European companies new loans and long-term credits, but through direct investment. In Germany this penetration of industry by American capital was made clear this year by three contracts in particular: (i) General Motors acquired 75% of the shares of the Opel automobile company, (ii) General Electric bought 16% of the shares of Osram electric-bulb factory (the largest in Europe) and, finally, (iii) General Electric acquired 30% of the shares of AEG electrical-engineering company.

In this context a lively discussion has started in Germany. On the one hand, the sell-out of shares is considered to be the only solution to present financial difficulties, while on the other hand warnings of the danger of *Überfremdung*, i.e. taking control over German industry by foreign capital, are put forward. Perhaps the most interesting and inspiring from this point of view was the debate at a session of the National Union of German Industry (Reichsverband der deutschen Industrie) in Düsseldorf. Below we report a summary, as published in *Berliner Tageblatt*.[2]

Dr Kebl,[3] the Chairman of the Deutsche Bank, raised the question whether attracting foreign capital in exchange for partial but direct involvement in a company, i.e. through direct involvement of foreign capital, should not be considered more favourable than taking new credits. In the discussion this view was followed by Mr Meinhardt of the Osram bulb factory who pointed out that direct involvement should not be regarded as a sell-out, especially when foreign partners pay a high price for their shares in German firms. Neither—he argued—does it make sense to raise the question of *Überfremdung* in relation to firms whose management remains wholly in German hands. Thus Dr Meinhardt used the platform of the National Union of German Industry for the defence of financial policies pursued by Osram and AEG without naming them.

These arguments were countered by the next speaker, Dr Sempel of the Vereinigte Stahlwerke trust. He warned against too frequent sell-outs of the substance of firms and observed (again in relation to Osram and AEG) that participation of Americans in boards of German firms was not accompanied by a parallel participation of Germans in boards of American companies (which became partners of the German ones). Moreover, he went on, a solid 30–40% minority, if it followed determined tactics, could also mean *Überfremdung*; even if the leadership of the firm formally remained in German hands, the basic instructions came from America.

At this stage Chairman Duisberg would have been happy to close the discussion but this was prevented by Dr Büchner, a secret councillor of AEG, who replied sharply that the term *Überfremdung* should not be used in relation to a company that placed part of its risks on foreigners but left the company management in German hands. The term *Überfremdung* would be more appropriately used in relation to companies that obtain large foreign credit at high interest that in the final count will have to be paid for by German exporting industries. Although Dr Büchner did not say what credits he had in mind, in the context of the earlier debate it was clear that he referred to the foreign indebtedness of the large German iron industry and its pricing policy which is extremely harmful for the manufacturing sector.

Büchner's reply was, no doubt, the most interesting part of the debate. The large German iron industry has a monopoly position in the German domestic market. This is due to high import tariffs for rolled goods and a cartel quota agreement with foreign exporters

(French and Luxemburgian) on imports of rolled products. This in turn allows the German iron industry not to sell its shares to foreign capital but to take new credits at high-interest rates and through price rises directly or indirectly pass these costs on to German buyers, among them German exporting industries, such as the electrical engineering industry that Mr Büchner represented. Moreover, it is possible that the attack aimed at *Überfremdung* was started by heavy industry mainly as a patriotic call against *Überfremdung* to influence the government when it comes to the next round of price rises, as the latter exercises some control over iron prices in Germany.

Impact of Pound Devaluation on the World Prices[1] (1932)

Several factors are responsible for making Great Britain the world centre of trade in raw materials. The British dominions and colonies take a leading position in the production of many raw materials: Canada and Australia in wheat (i.e. in its exports), the British India in jute, Australia in wool, Malacca and Ceylon in rubber, Australia, Burma, and Canada in lead, and Malacca and Nigeria in tin. At the same time Great Britain, being a typical industrial-processing country, is a great buyer of foodstuffs and industrial commodities, such as wheat, sugar, cotton, wool, metals, and so on. Clearly, all this helped to build in Britain a financial and commercial system that soon started to play an important role not only in handling trade in commodities from the British Empire and in supplying Britain with commodities of all kinds, but in the international commodity trade as a whole.

An important factor which facilitated the efficient functioning of commodity stock exchanges of international significance was the absence of commodity tariffs in Great Britain. This allowed for unrestricted and effective transit transactions and for price determination that depends only on the situation in world commodity markets and not on the British market alone. For instance, in the USA, where the price of tin is protected by a high tariff barrier, it depends only in part on world tin prices, namely the upper limit of the former is approximately equal to the latter plus the US tariff on tin. However, depending on the situation in the US domestic market, its price may fluctuate below this limit. On the other hand, the London price was considered the world price of tin (prior to devaluation of the pound). The close link between British commodity prices and the international trade in commodities may be seen *inter alia* in this that in the less important stock exchanges many commodity prices are quoted in terms of pounds, e.g. rubber quotations in Hamburg, rolled iron in Antwerp, and export prices of sawn timber in Northern and Eastern Europe.

The devaluation of the pound largely reduced its significance as a measuring-rod of world commodity prices, chiefly because the new

rate of exchange has not been stabilized at a new, lower level but is subject to permanent fluctuations. For this reason British prices are no longer world commodity prices in the earlier meaning of the term, as adjustment to the new rate of exchange of the pound will take time. Of course, this disorganizes international trade in commodities that has not get been able to establish new centres of equal significance to the British one. At the same time, in the long-run international commodity prices will adjust to the new rate of the pound—over longer periods the gold parity of commodity prices in terms of pounds continues to represent changes in world commodity prices.

Does the factor discussed above represent all the consequences of the change in the exchange rate of pound for world commodity prices? This would have indeed been the case had Britain been only an intermediary and a buyer of commodities in the world market. However, as we have already noted, although Great Britain is not herself an important supplier of raw materials, her dominions and colonies are. Now, the rates of exchange in these dominions were so tightly linked with the rate of pound that they followed suit: the rate of exchange of the Australian pound and the Indian rupee to the British pound remained unchanged, the Canadian dollar was devalued at a lower rate than the British pound (i.e. at 30%) and is now equal to 82 US cents; only South Africa has not devalued. Of course, the devaluation of the rates of exchange in the British dominions and colonies led to a tendency for prices to fall for raw materials produced there, and in this way the devaluation of the British pound resulted in a new wave of reductions in prices of raw materials supplied by the countries of the British Empire.

Let us now consider changes in prices of individual raw materials that took place after the pound devaluation. In line with our earlier argument, we distinguish two categories of raw materials. The first includes those produced mainly outside the British Empire—copper, American cotton, sugar, and zinc. The second includes raw materials produced mainly in the British Empire or where its supplies play a significant role, such as wheat (in exports but not in output), jute, wool, rubber, lead, tin, coal, and rolled iron. The ratio of prices of these raw materials in the middle of December 1931, recalculated in terms of gold, to their prices in the middle of September 1931 (i.e. shortly before the pound devaluation) is shown in Table 35.

Table 35. *Commodity Prices in the Middle of December 1931 in relation to those in the Middle of September 1931 (September 1931 prices = 100)*

Commodity	British stock exchange quotations	Other stock exchange quotations
Copper	95	98 (New York)
American cotton	94	94 (New York)
Sugar	85	78 (New York)
Zinc	97	—
Wheat	94	105 (Chicago) 93 (Winnipeg)
Jute	87	—
Wool	85[a]	—
Rubber	104	—
Tin	87	—
Lead	100	—
Coal	70	—
Rolled iron	70	89 (Antwerp)

[a] The ratio of the average Dec. to Sept., Bradford quotations.

It will be seen that in the first category there is a clear tendency of British prices to adjust to the devalued rate of the pound: the British 'gold' prices of copper and American cotton have changed in approximately the same proportion as the prices of those commodities quoted in the USA. British 'gold' prices of sugar are even higher than the American prices. A point of reference for zinc is missing because due to high tariff barriers the US prices of zinc are determined depending on the situation in the domestic market. It will be noted, however, that a fall in British 'gold' prices of zinc approximately correspond to the fall in the prices of copper.

Among commodities included in our second category wheat shows a clear fall due to the devaluation of the Canadian dollar. The London and Canadian prices fell by about 6% while US prices increased by 5%. No doubt also, a fall in the prices of jute (notwithstanding a poor harvest) and wool was due to the devaluation of the rupee and the Australian pound respectively. Prices of tin fell as well, but this represents a more complicated case because, due to export restrictions, the supply of tin from Malacca and Nigeria did not increase, although devaluation of the pound reduced its cost of production. It is possible, however, that companies involved in tin production there, taking into account this reduction in cost, sold their European stocks at lower prices. In the lead market, where, as in the case of tin, there operates an international pool that restricts

output and controls a very large part of stocks, a price reduction has not happened. As for rubber, the reason for a lack of price adjustment was different: it followed the allegedly far-advanced negotiations between Dutch and the British producers on a drastic reduction of output.

Finally, it must be noted that prices of raw materials and semi-products produced in Great Britain herself—such as coal and rolled iron—have been maintained at their nominal value, i.e. their 'gold' prices fell by 30%. In the world coal market Great Britain has two important competitors, Germany and Poland; nor does Britain enjoy a leading position in the world iron market: Low British prices in both these cases are explained by a deficient standardization of these commodities. The quality of British coal and iron is better than that of Britain's competitors. Hence, British prices cannot be compared with those of other producers and the difference in prices between the former and the latter have been subject to fluctuation. At present these differences have narrowed significantly although, clearly, prices of other producers have also fallen to some extent under the pressure of British competition.

Foundations of the Manchurian Conflict[1] (1932)

Although, as will be seen below, at the centre of the Manchurian conflict is the problem of the Japanese railways in Manchuria, the conflict cannot be considered as yet another example of colonial imperialism. The collapse of international trade and attempts of individual countries to become self-sufficient, the intersection of Japanese–American and the Japanese–Soviet antagonisms, the struggle for control over China that is of special importance in the period of the world business crisis—all these factors are clearly reflected in international policies which are interwoven with the Manchurian war.

The economic position of Manchuria. The area of Manchuria is 1 million km^2 and its population is nearly 27 million. A large part of this population arrived in Manchuria during the last twenty years from the overcrowded provinces of Southern and Central China. In the past few years, because of civil war in this region, emigration to Manchuria, lying outside the front line, has taken the form of a genuine migration of nations. Colonization of Manchuria by the Chinese has continued until the present and the number of migrants is estimated at 1 million per year.

Manchuria is at present a purely agricultural country. The main crop is pulse soya but wheat is grown, too. However, Manchuria has a natural base for considerable economic development, e.g. forests and mineral deposits, especially of coal and iron-ore, that are little exploited now. The main exports of Manchuria are: soya, soya oil, and soya-oil cakes, ores, and pig-iron; among imported goods manufactured goods, especially textiles should be mentioned.

The network of the Manchurian railways is rather dense. In the north, the East-Chinese line intersects Manchuria and ends in the Soviet stronghold—Vladivostok. This line is under control of a Soviet–Chinese management. The southern branch of the East-Chinese line leaves Harbin to join in Changchun the South-Manchurian line that leads from Mukden to the seaport of Dairen. This line is owned by Japan, as well as the line from Mukden to Seoul, the capital of Korea. The Chinese lines so far are mainly the branches of these main communication arteries (see Fig. 1).

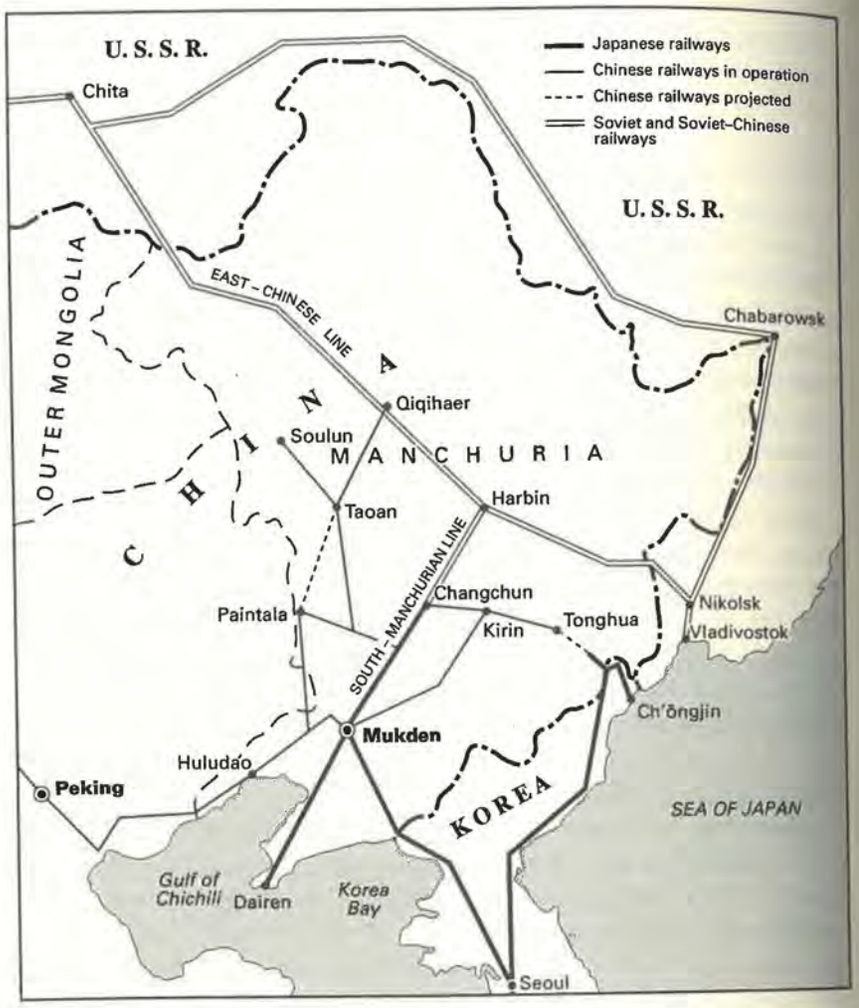


FIG. 1. *Railways in the Far East in 1932*

Japanese interests in Manchuria. Manchuria is the most important area for export of Japanese capital. According to data from the management of the South-Manchurian line, Japanese investments in Manchuria total $850 million (of which $35 million represents investment in the South-Manchurian line itself and $15 million loans for the Chinese railway development in Manchuria). Apart from Manchurian investments, an important field of operation for the export of Japanese capital is in Central China (mainly in cotton

spinning-mills), but the total value of these does not exceed $250 million.[2]

Among investment projects in Manchuria of special interest to the Japanese are those in the development of iron-ore mines and smelting-works (large blast-furnaces) as a supplement to the narrow raw-material base of Japanese heavy industry. Of the Japanese total demand for iron, 60% is met by imports of iron-ore and pig-iron. Half of it comes from Manchuria whose iron-ore mining and smelting is soon to be greatly expanded. Even more important than iron exports are Manchurian exports of soya, representing a substantial share in the total food supplies of Japan. In the first half of 1931 soya supplies from Manchuria represented 11% of all Japanese imports and 60% of Japan's imports from China. Being an important supplier of raw materials for Japan, Manchuria is at the same time a large market for the Japanese industrial goods. Japanese exports to Manchuria in the first half of 1931 represented 7% of her total export and 30% of her exports to China.

According to Japanese plans, capital expansion in Manchuria was to be linked with obtaining there a large settlement for emigrants from Japan. This demographic aspect of the plan was checked by the rather severe climate in Manchuria to which the Japanese (and Japanese women especially) could not adjust. At present of the 27 million population of Manchuria the Japanese represent only 0.2 million and the Koreans 0.8 million.

The 'railway' causes of the conflict. Already Chinese branches of the main lines represent competition against the once monopolistic position of the South-Manchurian line, e.g. the Kirin–Mukden section competes with the Changchun–Mukden one. However, the situation became 'no longer bearable' for the South-Manchurian line when China decided to develop its railways on a larger scale. The most important project in this plan was the construction of the Taoan–Paintala line and the development in the Gulf of Chichili of the Huludao seaport that could play a similar role to that of Dairen. In this way a new line, Qiqihaer–Huludao would be constructed that would have an advantage over the South-Manchurian line in so far as the former would make the distance from the north to the southern seaports shorter and its extension would reach Peking.

If in this case—according to the Japanese—the Chinese constructed 'too much', in another case they constructed 'too little',

postponing the extension of the Chanchun–Kirin–Tunhua connection until it meets the coastal Korean line, to which the Chinese had once committed themselves. Japan was very eager to see this extension completed since she is developing the Korean port of Ch'ŏngjin which would then be connected with Kirin and Changchun and thus compete with the Soviet port of Vladivostok. Moreover, for Japan the Changchun–Ch'ŏngjin connection would be of the utmost military significance as it would enable troops brought from Japan (by sea) or Korea (by railway) to penetrate lands to the west.

The immediate cause of the Manchurian conflict was, no doubt, the development by the Chinese of a communication artery parallel to the South-Manchurian line and the Chinese reluctance to connect the seaport of Ch'ŏngjin to the centre of Manchuria. Both these problems have found their 'solution' in the course of the present military conflict. Japan now is now constructing intensively the connection between Tunhua and the Korean coastline and advances of Japanese troops southwards clearly aim at taking control over the seaport of Huludao.

The general background of the conflict. Japan's own deposits of raw materials are poor, the density of population is very large, as is her birth-rate. Thus Japan faces two alternatives: emigration or a very intensive development of processing industries. Emigration is made difficult by the low climatic adaptability of the Japanese (which we mentioned in the context of the attempted settlements in Manchuria), and by limits placed on Japanese immigration to California that has more suitable climatic conditions. Indeed, immigration restrictions, introduced by the USA as early as 1908, are one of the main causes of Japanese–American antagonisms. The development of processing industries that would enable Japan to exchange her manufactured goods in return for food and raw materials is made difficult by the chaotic nature of the world economy that moves ever closer from an international division of labour to greater self-sufficiency of each country. If in the last few years exports of Japanese industrial goods increased at a high rate, this was due to low wage rates.

However, once the struggle for wages started in Japan, and at the same time the export of industrial capital shifted to countries where the exploitation of labour could be pushed to the limits (*inter alia*, from Japan to Central China), the rate of expansion of Japanese exports had to slow down. *The future of the continued industrialization of Japan within the framework of the capitalist world economy became dependent on the conquest of new lands rich in raw materials and fertile soil that would also make a permanent market for her manufactured goods; this is the broader background to the war in Manchuria.* If it becomes ever more difficult to transport Japanese products to China, Manchuria—to which at the same time constant immigration from other Chinese provinces is taking place—must be taken over and forced to buy these products.

In the political life of Japan an important role is played by a collision of interests grouped around the army and the navy. The first group includes *inter alia* a large industrial concern Mitsui, the other—its competitor, the Mitsubishi concern engaged in the shipyards. The army faction favours a heavy-handed policy in continental Asia which is linked with an anti-Soviet position. In contrast to these plans of conquest of new Asian lands, the navy faction favours the idea of future war with the USA, the result of which would be the lifting of the immigration barriers for Japanese would-be settlers in California and the possible conquest of the Philippine Islands. This faction, aware of the need to secure a benevolent Soviet neutrality in case of a Japanese–American military conflict—obviously bearing in mind the supplies of oil for the Japanese navy from the Soviet port of Sakhalin—presses for good relations with the Soviets.

The present direction of Japanese policy means that the army faction has got the upper hand over the navy faction. A relatively low-profile position of the USA on the question of the advance of Japanese troops in Manchuria is therefore not surprising, bearing in mind the usually great interest of the USA in China-related problems. Moreover, apart from a mitigation of Japanese–American antagonism, the USA expects, as do West European countries, that the occupation of Manchuria will limit Japan's interests in Central China, and they may consider the Manchurian conflict as the beginning of gaining new spheres of influence in the economically enfeebled (e.g. by this year's flood) Republic of China. The foretaste of such 'advantages' of the Manchurian conflict are increased sales of British products on the Chinese market, related to the boycott of Japanese products.

Remarks on Hitlerism and Business Spheres[1] (1932)

1. The investment of capital in enterprises is highly risky during a crisis. That is why one can now see widespread hoarding of foreign exchange and gold: for at the expense of forgoing profits one is at least sure of maintaining one's capital. The large enterprise known as the capitalist system is also endangered during a crisis; in exchange for preserving the whole of its substance it is worth offering its 'shareholders' a share in the social income. A friendly democratic state system, however, is not sufficient to prevent its excesses. It is inflexible, bureaucratized, and étatist. Private initiative is therefore required. An inflow of new, creative, and sober-minded powers is needed. This is costly, even very costly. But that cannot be helped—in matters of this kind there is no place for falsely understood frugality.

2. We are hardly claiming that Hitlerism was created by the 'captains of industry'. It came into being almost spontaneously: business spheres only contributed to its support and occasionally gave instructions on good manners.

During an economic crisis a misfortune often befalls some members of the petty bourgeoisie, intelligentsia and half-intelligentsia, or workers who do not think in class terms and are not intellectually capable of understanding the true causes of their fate. In accordance with their primitive psychology, they look for an explanation of their ruin in its manifestations, in national or racial factors, and in fanciful metaphysical ideas. A German shopkeeper first blames his bankruptcy on the moneylender to whom he paid interest until it ruined him, secondly on the Jewish bankers and the payment of reparations, and thirdly on various international mafias—the poisoning of the German nation by Jews, Marxism, etc.

Accordingly, the ideology of Hitlerism contains a negation of 'interest slavery' (*Zinsknechtschaft*); it argues that everything will turn right if the payment of reparations is stopped, the Jews are expropriated, and the communists hanged. It professes the German nation's

mission in the fight against the international power of Jews and Marxism. However, it is extremely difficult to put this ideology into a system, for its basic feature is obscurity and slipperiness thus making it possible to satisfy the ideological needs of the primitive masses—but diversified in class structure—on which Hitlerism rests.

3. The increase in sympathy of some branches of industry for Hitlerism is not uniform; at the head of the patrons is heavy industry. Its plants are largely concentrated in coal basins. The production of iron and steel, a considerable part of the output of heavy industry, is subject to sharp fluctuations—investments are known to be subject to more severe cyclical oscillations than consumption. For this reason during a crisis coal basins become centres of revolutionary ferment and heavy industry more than other industries is intent on having additional measures of protection.

Is German industry, especially heavy industry, interested in Hitler's coming to power? The answer to this question is not at all simple. If the costs of Hitlerism are already high, they will become even higher when Hitler takes over the machinery of government and in various ways begins to meet the pledges he has made to his supporters. To be sure, heavy industry would then have a privileged position. The part of Hitler's ideology that advocates the abolition of 'interest slavery' fits in beautifully with the high indebtedness of this industry; its concentration in syndicate structures in combination with the great influence the industry has with the Hitlerite leadership gives it the role of one of the main decision-making centres. Quite possibly even for heavy industry it would be more convenient and, moreover, cheaper to keep Hitlerism in the role of bugbear against the social democrats, forcing them in this way to support the Bruning regime that is moving more and more in the direction of fascism.

It is another matter that the Hitlerite movement, which blossomed with the support of 'business spheres', is now only partially under their control; that is why slight differences in the attitude of big industry towards this movement will hardly decide its future.

War in the East[1] (1932)

1. In the last few weeks 'protection of Japanese interests in China' has been largely 'extended' by Japanese troops entering Northern Manchuria and the Inner Mongolia on the one hand, and by the bombing of Shanghai on the other. If operations in Manchuria and Inner Mongolia represent a consistent advance in the plan to conquer new lands rich in raw materials and fertile land, and located to the north of the Great Wall,[1] the main objective of the bombing of Shanghai was the desire to stop the boycott of Japanese products in China introduced there from the beginning of hostilities. At the same time, however, the first direction of Japanese expansion turns ever more into aggression against the Soviets, and the second direction means aggravation of the relations between Japan and the USA, and to some extent also Great Britain.

2. Japanese–Soviet relations became tense in the first stage of the Manchurian conflict. Japan then accused Russia of supplying munitions to the Chinese general Ma.[2] This was strongly denied by the Soviet authorities. In fact, it was speculated at the time that General Ma received arms shipments from the Japanese themselves who wanted to make the conflict more 'intense' and to justify their military advances. At any rate, it is a fact that recently General Ma from being a defender of Manchuria turned into a friend of its invaders. Willing to avoid, at any price, being drawn into war complications, the Soviets then proposed a non-aggression pact but their offer was turned down. Soon Japanese troops entered the areas in Manchuria controlled by the Soviets, invading Harbin and ostentatiously using the East-Chinese railway for military transports. The White Guards, many of whom settled in Manchuria, remained in touch with the Japanese, and their leader, General Horvath[3] organizes White Guard combat troops.

Is this an omen of an outbreak of a Japanese–Soviet war? It is difficult to answer this question definitely; let us only note that Soviets are reinforcing their defence positions in the Far East. At any

[1] See M. Kalecki, 'Foundations of the Manchurian Conflict', this volume.

rate, it is a fact that Japanese–Soviet relations have become critically tense. Japanese domination over Manchuria is already sealed and a farcical 'independent' State will be established there. Next, Japan will probably attempt to eliminate Russia from the management of the East-Chinese line and then, by means of tariff policy, make the development of Vladivostok—the main Soviet centre on the Pacific coast—difficult, as the connection between this seaport and the Trans-Siberian railway line through the Amour and Usour lines is much longer than that through the East-Chinese line. The Japanese leverage on the Soviets in this and other matters may be the continued 'nursing' of the White Guards who may be used for guerrilla raids (e.g. against the Amour railway line that goes along the border with Manchuria). It appears that the statement of the Japanese representative to the League of Nations, Mr Sato,[4] on the question of the memorandum on the Ukrainians is an attempt to find allies in case of a future Japanese–Soviet conflict.

3. The Chinese have used a boycott of Japanese products several times already; however, it has never been as complete and as consistently executed as in the present conflict. Japanese exports to China, which represents nearly 20% of total Japanese exports and nearly 40% of her exports of industrial goods, have been drastically reduced. In particular, deliveries of Japanese textiles have nearly disappeared from the Chinese market (except for Manchuria) and have been replaced by British products (see Table 36).

In the docks and warehouses of the open Chinese seaports about 800 000 tonnes of Japanese goods have piled up and cannot be unloaded because of the boycott; 700 000 tonnes of these are blocked in Shanghai alone. Moreover, huge stocks of goods destined for the Chinese market accumulate in Japanese warehouses. Next to textiles,

Table 36. *Exports to China, September–December 1931*

Month	Total Japanese exports to China (Ym.)	Textile exports from Japan to China (million sq. yds.)	Textile exports from Britain to China (million sq. yds.)
September	23.0	33.2	4.4
October	15.8	9.4	5.8
November	9.0	6.6	6.5
December	5.0[a]	5.0	11.8

[a] Estimated.

products most affected by the boycott are Japanese coal, sugar, and paper products.

The anti-Japan action taken by the Chinese has not been limited to checking the shipments of Japanese products to China, however. First of all, production of Japanese textile factories in China (concentrated mainly in Shanghai) has also been boycotted. Secondly, the Chinese have used their dominant position in the wholesale and retail trade in the nearly all the Far East to stop deliveries of Japanese goods to the Dutch East Indies, Siam, Burma, Malacca, the Philippines, etc. Thirdly, and perhaps more surprisingly, Chinese merchants have stopped not only their purchases from the Japanese but also their sales to them which, of course, does not prevent the Japanese from buying elsewhere, but it disorganizes their routine trade operations and makes them more expensive.

The devaluation of the pound greatly facilitated the boycott of Japanese exports because it reduced the prices of competing British products. To counter this devaluation, Japan, after some hesitation, decided in the middle of December 1931 to suspend the convertibility of the yen into gold, a measure that may somewhat lessen the efficiency of the boycott. Until now the devaluation of the yen has been me same as that of the pound, i.e. 30% of the parity value. It is uncertain, however, if the yen will stabilize at this rate, since war expenditures combined with reduced exports and increasing stocks in factories manufacturing goods for export will cause inflation that to a certain extent has apparently already started. The possibility of a further devaluation of the yen is indicated, *inter alia*, by the very large purchases of cotton in America by Japanese spinning-mills, in spite of a reduction in Japanese sales markets; clearly, 'patriotic' Japanese industry escapes from the yen and invests in foreign raw materials. This, of course, will accelerate the next fall in the rate of exchange.

We have noted above that the devaluation of the yen could not be considered a radical countermeasure against the Chinese boycott. Thus a punitive expedition to Shanghai—the centre of boycott organization—proved necessary. As usual in such instances, the 'national dignity' of Japan could not bear that some Japanese were beaten there (shortly earlier Japanese marines had beaten the US councillor in Mukden). Thus bombing of the Shapei district in Shanghai, where, incidentally, the offices of the boycott action are housed, was started. To bomb defenceless people who live mainly in wooden houses, aeroplanes were used. As we could see, the applied

technique was modern, but the aim is always the same: 'With adequate profit, capital is very bold. A certain 10% will ensure its employment anywhere; 20% certain will produce eagerness; 50%, positive audacity; 100% will make it ready to trample on all human laws; 300%, and there is no crime at which it will scruple' (Karl Marx, *Capital*).[5]

4. The desire to stifle the Chinese boycott was the immediate reason for the raid on Shanghai but it does not at all imply that the consequences of this raid will be limited to Japanese–Chinese relations. After invading Shanghai—the largest Chinese industrial centre (especially of Japanese industry) and the single most important Chinese seaport—the Japanese will not freely leave it. However, capture by the Japanese of the dominating position in Central China obviously threatens the interests of Great Britain, and especially of the USA, in this region.

British capital engagement in China may be estimated at $700 million of which, however, only $150 million represent industrial investments (of which, in turn, $100 million is invested in an industrial and tobacco company, the British-American Tobacco). The rest is invested in Chinese government bonds, in railways, fleet, commercial companies, banks, and concessions for acquiring property rights. British exports to China, consisting mainly of industrial products, was $60 million in 1930. Japanese capital investment in China (Manchuria excluding) is estimated at $250 million of which more than $100 million was invested in industry (mainly the textile industry) and the rest, as in the case of British capital, in government bonds, transport, commerce, and banking.[2] It will be noted that the share of industrial capital investment in the total invested capital is much higher in the case of Japan than Britain. Moreover, Japanese-owned industry in China continuously develops, and that of the British shrinks. In the textile industry 40% of spindles in cotton-spinning are owned by the Japanese capital (of which three-quarters are located in Shanghai), 4% by the British capital, and 56% by the Chinese. In 1930 the value of Japanese exports to China, which represent—as do British exports—mainly industrial goods, was $200 million.

[2] In my paper on the 'Foundations of the Manchurian Conflict' the figure of $25 million was quoted in error; mistaken was also the figure of Japanese interest in Manchuria which is $250 million, and not $25 million [see p. 158, this volume, where both figures were corrected].

This comparison of the structure of interests explains the zigzag line of British policy on the question of the Japanese expedition. The basic *principle* underlying this expedition, which aims at throwing away the meagre advances of Chinese nationalism and at establishing security of Government bonds, greater favours for Japanese firms, and increased access to Chinese market, is wholly consistent with British policy targets, except that British rather than other firms should be favoured. Britain is concerned, however, by the role that Japan will play in the restored *ancien régime*. The British are afraid that their capital may be pushed out by the Japanese from the positions it now occupies in marine transport, commerce, and banking, and that British exports that have already shrunk sharply will be altogether eliminated by Japanese competition or by the development of Japanese factories in China.

US interests in China are completely different and hence their position on Japanese expansion in Central China is much stronger. The share of the USA in Chinese government debt is small and total American capital investment is not greater than $150 million, a large part of it being invested in public utilities (*inter alia*, an power-plant in Shanghai) and in oil-containers. US exports to China, of over $110 million value in 1930, are almost exclusively raw materials and semi-products. In these circumstances the USA has nothing to lose if an independent China ruled by Kuomintang is established, for it represents at present the interests of the large and middle bourgeoisie. On the contrary, owing to its influences in the Kuomintang Government, the USA may play a significant role in the future development of Chinese industry.

This position of the USA has been achieved, however, not without cost. The Americans have invested more capital in establishing a network of missions, schools, and universities in China than in Chinese industry and commerce. It is thought there that in contrast to European and Japanese imperialists, Uncle Sam is a kind-hearted and non-partial protector of the Chinese. Clearly the huge interests expected on this capital, invested in grand-style self-advertising, will be lost if Kuomintang is beaten or even only weakened by the Japanese, and if China is enslaved by Japanese imperialism instead of American.

5. In this interplay of economic and political interests there is yet another special factor that deserves attention. It is the existence of

two 'red' Chinese provinces located along the south-eastern coast, between Nankeen and Canton, and independent of Kuomintang. The threat which their mere existence presents to Kuomintang is, of course, greater in time of war. From this point of view the persistently repeated rumours that the Nankeen government is eager to put an end to hostilities at any price and, to achieve this end, is ready to accept even the greatest concessions for the Japanese become more understandable. On the other hand, the possibility of a new revolutionary wave developing again in China must be taken into account by both Britain and the USA. The lack of agreement between the positions of these two powers may be partly attributed to the fact that the USA would rather see the Kuomintang government preventing the revolution and Britain would rather see Japan doing the job.

From the point of view of the parties most involved in the conflict the situation is extremely complicated. Hence, as yet, these parties steadily reinforce their positions and monitor in silence the war that is waged a few hundred yards from their trenches in the international settlement in Shanghai.

The Fall of Deterding[1] (1932)

1. The placing under arrest Marta Hanau, editor of *Forces*, the Paris stock market review, for spreading false information about large public companies (Mme Hanau at one time predicted the Kreuger crash), is undoubtedly connected with her revelations about the 'Oil Napoleon', Henry Deterding, and his concern—Royal Dutch-Shell. According to *Forces*, A. Tardieu is Deterding's confidential agent, hence the situation is not too difficult to understand. The revelations of *Forces* include the financial position of Deterding's concern, which is supposed to be just as doleful as the remains of Kreuger's concern, as well as the names of several public figures (Tardieu, the former minister F. Marsal) and journals (*Matin*, *L'Ami du Peuple*, *La Liberté*), in Deterding's service.

However, if it is not yet known exactly what expenses Kreuger covered with funds obtained through his forgeries, Deterding's activities served very specific ends—unlimited squandering of the capital of his shareholders for the petroleum war with the Soviet Union and subsidizing various anti-Soviet interventions. One can definitely say that over the last five years Deterding was one of the main centres of counterrevolution and that he was one of the main financial backers of those who were supposed to carry out his incessant prediction of 'a near end of the Soviets'.

2. Deterding's concern, Royal Dutch-Shell, which has coalmines and oil refineries in all parts of the world, controlled 12% of the world production of petroleum in 1930, and together with its affiliated concerns, Anglo-Persian and Burmah Oil, this share reached 16%. For comparison, the companies of its competitor, the American group of Standard Oil, controlled 20%, while the production of the USSR was 10% of world petroleum output.

Before the war Royal Dutch-Shell purchased a large number of Russian oilfields, which previously had belonged to Rothschild.[2] Counting on the imminent fall of the Soviet government, in 1920 Royal Dutch-Shell also acquired the shares of former Russian oil tycoons, L. Mantashov and Lianosov. Its main competitor, the Standard Oil group, was also involved in oil claims against the

USSR by acquiring half of the shares of the Nobel concern, which before the Revolution controlled 40% of oil production in the Baku region.

It is interesting to note that during the Geneva and Hague conferences, officially devoted to the economic reconstruction of Europe and the Soviet Union but which in reality became an arena of bargaining over the payment of pre-war Russian debts and Soviet oil concessions, Deterding was amicably disposed towards the Soviet Union. He then intended to 'rebuild the economy of Europe and the Soviet Union' by acquiring a huge monopoly concession for the exploitation of Soviet oil fields. This concession, which was supported by the British government and close to being granted because of the financial weakness of the USSR, was frustrated by the position of France and Belgium. The governments of these countries clearly served in this case the interests of Shell's competitor—the American Standard Oil group, which, as we mentioned, was also involved in Soviet oilfields and obviously could not be indifferent to Royal-Shell's monopoly efforts.

The Geneva and Hague conferences were a complete failure, but Deterding's 'friendship' for the USSR continued. Despite the calls of owners of Russian oil shares for a boycott of Soviet oil, time and again he bought its large transports and sold them at a fat profit. A radical change took place in Deterding's 'feelings' in the middle of 1925. It suddenly turned out that the petroleum that Deterding himself had been buying for so long time was 'stolen', which he declared in several personal interviews and in an even larger number of inspired enunciations.

This strange change had a very simple explanation. At that time the Soviet Union began to sell its petroleum in England through its own retail company. 'As long as the Royal Dutch-Shell was able to purchase Soviet petroleum wholesale, its directors chose to forget that it was "stolen". The introduction of the Caucasian product upon the retail market, however, was the signal for a general attack'.[1]

Even more important events were taking place behind the scene. The previous enemy of Soviet oil interests, the American Standard Oil group, came in the meantime to the conclusion that the sale in the Near East of the oil produced by the 'red barbarians' was much more profitable because of transportation costs than the sale of

[1] Louis Fisher, *Oil Imperialism: The International Struggle for Petroleum*, New York, International, 1926: 119.

American oil there. The companies of this group were willing to forget Soviet crimes against property—and even about their own claims by virtue of ownership of Nobel shares—and eagerly began to purchase Soviet petroleum. It is perfectly clear that these American purchases in the end had to disqualify the morality of the USSR in the eyes of Sir Henry Deterding. And when they lasted all through 1926, and in 1927 took on the form of long-term contracts, when at the same time Soviet oil began to be dangerous competition for Royal Dutch-Shell in the Near and Far East and in Great Britain—Deterding began his oil crusade.

He was no longer satisfied with usual methods of economic warfare, such as price cuts, but gave a whole series of fiery responses calling for a boycott of the 'stolen' oil. The level of these appeals can only be compared with patriotic sabre-rattling of various kinds, classic examples of which we had an opportunity to admire during the present Japanese–Chinese conflict. And when these proclamations failed to persuade anyone to refrain from making purchases of cheap Soviet oil, Deterding started a game behind the scenes of high diplomacy, where, as Mme Hanau claims, he has numerous influential friends.

Deterding undoubtedly deserves credit for the search in the offices of the Soviet trade agency in London that led to the break in diplomatic relations between Britain and the USSR. Through part of the Paris press dependent on him, he also participated zealously in the Rakovsky affair to interfere with French–Soviet negotiations on repayments of pre-war Russian debts that were to be combined with credits from the French government for the Soviet Union in exchange for concessions for France to exploit some Soviet oilfields.[3] Deterding also spared no effort to prevent purchases of Soviet oil by the French navy and appealed to the conscience of fascist Italy and Spain—but without result: Soviet oil was simply cheap and allowed these countries to become independent of the supremacy of American and British oil companies.

This campaign has been very costly for Deterding. Because of the price war, Royal Dutch-Shell has been given highly unsatisfactory prices in the Far and Near East as well as in Great Britain, which together account for a considerable part of Shell's total sales. The price of the company's shares has been falling. Shell has been raising large loans, which in fact it found difficult to get. In addition to these business losses, personal expenses for influential 'friends' have also

absorbed sizeable sums. Finally, we have Deterding's partial capitulation in the petroleum war. At the beginning of 1929 Royal Dutch-Shell along with Anglo-Persian and the English branch of Standard Oil signed an agreement with the Soviet Union on a division of the British market. The USSR received an import quota twice as large as previous Soviet sales in the British market in exchange for ending the price war. Part of the Soviet exports has been contracted for by Royal Dutch-Shell, which in an attempt to save its prestige and to justify renewed purchases of the 'stolen oil', has pledged officially to pay 5% of the receipts to the former owners of the Russian oilfields. It is obviously difficult to ascertain whether such sums have indeed been paid to pacify former owners. The competitive war in the Far East had already abated in 1928. So in the purely business area Deterding's petroleum war with Soviet oil interests came to an end. However, his anti-Soviet activities in other areas continued.

3 Since when and to what extent Deterding has been financing those who planned armed intervention in the Soviet Union it is difficult to say. From time to time there surface only echoes of this work going on in secret. The trial of counterfeiters of ten-rouble notes in Berlin has revealed their unquestionable link with Deterding. At the same time, they were in close contact with General Hoffmann, one of the main advocates of a French–German military alliance whose objective would be a 'penal expedition' to the Soviet Union.

Subsequently, apparently not unfounded revelations have surfaced that Deterding had given large subsidies to Hitler who more than once has extended his offer in the role of the future conqueror of the Soviet Union in the services of international capitalism. An integral part of Hitler's programme is forcing the separation from the USSR of the Ukraine and the Caucasus with its oilfields. Deterding's subsidies for Hitler must have been large since, not content with these lofty dreams about the future triumphs of German arms, Deterding is said to have received much more concrete pledges from Hitler: the Nazi leader supposedly promised that after he comes to power, he will give Deterding the German oil monopoly in exchange for a payment of £1.5 million and a 20% share in the profits of the monopoly.

It is interesting that the Brüning's government also has its petroleum supporter in the German chemical trust I.G. Farbenindustrie,

whose increase in the production of synthetic petrol was made possible through the imposition of a high import tariff on petrol. So it may very well be that the Brüning–Hitler battle is accompanied by the battle of two concerns for control over the German petroleum market.

4. As we mentioned at the outset, Deterding's activities to ruin the Soviet Union for the benefit of humanity and civilization have no doubt considerably strained his resources. The economic crisis obviously has also not helped the situation. Consequently, in the autumn of 1931 Deterding bet on an entirely new card—and lost completely.

During the collapse of the pound, bimetallist ideas were suggested many times. The price of silver was then on a strong upward trend. Hence, Deterding decided that the era of bimetallism was at hand and, hoping that through his connections with British statesmen he would help this great monetary reform, he purchased huge amounts of silver. These predictions were dashed as were his hopes during the petroleum war. Neither the connections, nor the eloquent pronouncements of the 'Oil Napoleon' on bimetallism as a way out of the crisis were of any use. The price of silver began to fall rapidly.

This 'silver' transaction seems to have finished off Deterding. The price of Royal Dutch-Shell's shares has fallen sharply, and probably Deterding's position in this concern has also been seriously undermined. In one of his most recent interviews Deterding implied that the fall in the price of his company's shares is due to the intrigues of Soviet agents, among whom he includes Mme Hanau. What can one do: poor Sir Henry always has been fond of theatrical gestures. It is interesting that at the same time negotiations have begun in New York between Standard Oil, Royal Dutch-Shell, and the Soviet Neftsyndicate on a division of the world petroleum market. Whether Royal Dutch-Shell will continue to exist and whether it will be able to purge itself, is difficult to say. In any case, the career of the 'Oil Napoleon', financier of intervention and master of corruption, is clearly coming to an end.

Inflation and War[1] (1932)

1. Inflation and war are the two cards on which the system that goes bankrupt, and that fearfully listens to its creditors walking up the steps, may still bet. The wave of inflationary outbursts that has recently swept across the world was accompanied by pistol-shots of assassins that announce cannon shots to follow. Will the bankrupt decide to bet on the cards still in his hands? On which one will he bet? Will he bet on both? Has he got any chances to win back?

2. Inflation is the single 'surgery-type' means of mitigating the crisis of the capitalist system,[1] however, this instrument is of a merely theoretical significance now, since its use in the concrete conditions of contemporary capitalism encounters insurmountable difficulties. For, as we have often emphasized, credit inflation, i.e. a more liberal supply of credit by the central bank, may be of minor significance only when the business crisis is as deep as at present. Entrepeneurs will not, as a rule, invest the newly received credits because easier terms of credit will not induce any investor to build a factory that will have no chance of finding a market for its products. New credits will be used rather to pay back the old ones and the surprised creditors will bring their repaid credits back to banks thus happily closing the circle.

What indeed could change the situation is fiscal inflation on a large scale, for instance, by the government obtaining large credits from the central bank and spending them on massive public works of one sort or another. In this case the money no doubt would be spent and this would result in increased employment (combined with an overall reduction in wage rates). However, even such an intervention could be effective only if it were undertaken in a closed economy, e.g. in the capitalist system as a whole, embracing the whole world, where there is one exchange only and no tariff barriers. If fiscal inflation is carried

[1] When we speak of a 'surgery-type' instrument we neglect the possibilities of overcoming the crisis—that are far away at the moment—through the 'automatic' mechanism of the crisis itself (see M. Kalecki, 'Is a "Capitalist" Overcoming of the Crisis Possible?', *Collected Works of Michał Kalecki*, vol. i, Oxford, Clarendon Press, 1990).

out on a broader scale in one country alone it must cause disturbances in the rate of exchange. A rise in local output requires increased supplies of foreign raw materials and imports as well. At the same time, together with employment domestic prices rise which restricts exports. Consequently, the balance of payments deteriorates, an outflow of gold and foreign exchange follows, and the exchange rate falls.

In general, these processes will end earlier because in expectation of their development foreign capital will withdraw and local capitalists will purchase foreign exchange thus accelerating devaluation. This, in turn, will distort the fiscal inflation process because a rise in prices of foreign raw materials will add to a general price rise until the symptoms of hyperinflation, already known from our experience, appear. Therefore, a necessary condition for fiscal inflation to be effective is an international agreement of the capitalist powers, which is, of course, totally utopian. Thus, *imperialism, which is an unavoidable phase in the development of capitalism, makes the 'inflationary' way of mitigating the crisis unavailable.*

War and inflation have many points in common: war also involves 'public works' on a massive scale; it is always financed through inflation although the latter does not necessarily turn into hyperinflation because the country at war may be aided by foreign capital supporting it, or it may meet its demand for foreign raw materials by plundering the invaded lands.

3. The purchasing power of the dollar should be returned to its average value in 1921–9 (in terms of the wholesale price index) and maintained at this level through regulation of the volume of credit and money supply—this is the essence of Goldsborough's bill[2] that was adopted by the US Congress and sent shock-waves to the rate of exchange of the dollar throughout the world. This achievement cultivated in the capitalist hothouse is not very impressive however: ordering a 50% price rise through a more intensive supply of credit will be no more effective than ordering an immediate stop to economic crisis. However, this nonsense of primitive bourgeois economics, wholly discarded by the capitalist decision-makers, is accompanied by ever more vocal pronunciations of various splinter factions of large capital. Approximately at the same time as the Goldsborough bill was passed, Hoover was approached by a delegation of industrialists, led by Owen Young (the author of the Young

Plan), requesting that public works be started and budget deficits of individual states and cities, equal $2 billion, be paid by the Federal government, which means that eventually they would have to be paid by the Federal Reserve System. In the USA the road from inflation to hyperinflation would be very long. Even if the dollar were devalued, chiefly because of outflow of foreign capital, the share of imports in total US demand is so small that increased costs of raw materials following devaluation would be of hardly any significance. Nevertheless, the financial tycoons of Wall Street opposed and will continue to oppose broad inflation that could follow a large devaluation because it would depreciate the value of their capital invested abroad. Thus the contradictory interests of various groups of large capital dash the efforts to deal with the crisis.

4. In a speech made in the German Reichstag on 6 May 1932, one of the Hitlerite leaders, Georg Strasser, put forward the position of his party on the question of the struggle against unemployment as follows:

> The large wave of anti-capitalist demonstrations that has recently swept through the whole of Germany cannot be accommodated within the requests of the Social Democrats who on 1 May had no more to offer to the masses than the shortening of the working week, international peace and class hatred. Earlier the Social Democrats, next to shortening the working week, at least fought for higher wages. However, the shortening of the working week considered by them as a panacea, if the wage rates are not increased, is equivalent to a 16 per cent reduction in incomes. The Social Democratic trade unions have taken a more sensible position on this question than their own party. We are ready to co-operate in the implementation of the programme of combating unemployment that was put forward by the Social Democratic trade unions, and we share many ideas that were outlined by Herr Woytinsky in their trade union bulletin about the financing of this programme. We reject the government project of a national loan with premium. This attempt to solve our problem . . . is unacceptable for our independent workers' party (interruption by [Ernst] Torgler, a communist MP.: 'But you do depend on Thyssen[2] and on Prince Wilhelm') . . . Our party puts forward a better programme of fighting unemployment—the programme based on the everlasting values of our natural resources and labour, instead of gold. . . . we want public works to be financed by the Bank for National Economy, especially designed for this purpose.[3]

[2] [F.] Thyssen is a leading figure in German heavy industry.

What a moving scene for our Herr Gross:[4] a Hitlerite who with his one hand smashes the capitalist system . . . by means of inflation, and in a friendly way extends his other hand to the Social Democratic trade unions!

It appears that once Hitler takes over power in Germany, or even starts to control it, inflation will no doubt follow. Perhaps the theoreticians of Hitlerism, such as Godfried Feder, are not aware that in German conditions inflation must directly lead to hyperinflation. Aware of this, however, are the bosses of those theoreticians—the barons of heavy industry and the large landowners who all desire cancellation of their huge debts. The Social Democratic trade unions march to meet the Hitlerite heralds of inflation. The already-mentioned theoretician of the Social Democratic trade unions, Woytinsky (who, incidentally, in contrast to Gross, did not pretend to advance socialist ideas) in his book *Internationale Hebung der Preise*[5] sought a capitalist way out of crisis in world-wide inflation combined with international financial co-operation of the capitalist powers—a truly fanciful idea! However, when this failed to appear, Woytinsky abandoned his hope and turned to demonstrating the possibility of 'internal' financing of public works in Germany without exposing the German economy to inflation; for this he was leniently scolded by bourgeois economists.

We thus see that Hitler is clearly betting on both horses—inflation and war: his offers to lead a 'Teutonic Knights' crusade against the 'fortress of Marxism' are well known, not to mention his bellicose plans against Poland. It is here where Hitler receives the friendly support of the Reichwehr's Generals Schleicher and Hammerstein who came out of the shade of the 'grey-headed Marshall'[6] and who in present day Germany together with Hitler openly strive for power. Are these 'brave soldiers' the heralds of a military way out of the crisis in Germany? Are they to succeed in preventing inflation from turning into hyperinflation?

5. Like Germany, a chain of events is also pushing Japan along the 'road to glory', and for more than a year now it has bet on both horses—inflation and war. The balance-sheet of this policy is rather discouraging, however: pacification of Manchuria takes much more time than expected which in turn makes economic penetration very difficult. At least until present, the latter certainly has not compensated for the losses due to the closure of the Chinese market.

Consequently, 'the motherland still needs to be saved' and this task is now being taken over by the military party that is supported by various fascist groups. Heavily loaded with anti-capitalist phraseology and coloured with concern about the future of farmers and small salesmen, this party is at present gaining a decisive influence on the Japanese government and ever more clearly urges that the war against the Soviets be started. The conviction that, next to the overthrow of the Soviet system, this war will also bring an upswing in world business, becomes increasingly popular among the capitalist decision-makers. That these plans altogether neglect factors that may completely wreck them is a quite different question, however.

On the Margin of Events in Germany[1] (1932)

1. A performance of *Faust* is being staged in Germany on the centenary of Goethe's death: the Wilhelmite triumvirate of feudals, generals, and heavy industry leaders is conjuring up the Hitlerite devil, who is supposed to infuse new life into it. For the time being—as in Goethe's drama—Faust is moving about the stage in the company of his devilish servant; to be sure, he has not yet been transformed into a man in his prime: under the make-up wrinkles are visible and the aged body gives off a cadaverous odour that offends the sense of smell even of contemporary Europe. Soon the old man will probably retire, tired out by his new incarnation, and the real Hitlerite devil will appear on the stage, dancing to the melody of the capitalist Faust.

2. If in the immediate future there are no decisive moves on the part of the German working class, the attainment by Hitler of official and decisive influence over the government of the Reich after the July elections seems certain. For although it is not likely that in the elections—even together with the bourgeois Right supporting them—the Hitlerites will gain an absolute majority in parliament, more or less the same constellation is probable in the Reich as now exists in the Prussian Parliament that is incapable of forming any kind of parliamentary government. In one form or another a coalition of Hitler with the present government will then be most likely. In this situation the Hitlerites will have the decisive voice and thereafter—with the support of the Reichswehr and General Schleicher—will be able to maintain themselves in power by force.

It is unlikely that when in power, the Hitlerites will turn out to be very revolutionary in foreign policy; in particular, they are unlikely to decide on a war with Poland just now. However, with all the greater force will they unquestionably start fulfilling their true goal in domestic policy, i.e. to completely control and crush the German workers' movement. Inflation certainly will play a crucial role in this policy.

3. In the Hitlerite programmes inflation is called 'stimulation of the economy' through spending domestic currency in which the

Reichsbank will give the government interest-free loans. This obviously does not change the essence of the inflationary process. That is why the stock exchange reacted to the fall of the Brüning government with a rise in share prices and a fall in prices of fixed-interest securities, i.e. anticipating price inflation.

Inflation would probably be indispensable for Hitler in his very first steps. First, it would supply funds for maintaining the storm battalions and the Hitlerite vanguard as a whole. Secondly, in its early phase, before hyperinflation sets in, through an increase in employment this policy would temporarily fulfil the hopes of the masses standing behind Hitler and would also reduce resistance in the opportunistic ranks of Hitler's opponents—the political centre and the Social Democratic trade unions—which Hitlerism will surely try to draw into 'concrete work'. It should be added here that the period before hyperinflation sets in may be relatively long in present conditions because of the considerable underemployment of capital equipment: the increase in demand caused by inflation will be easy to meet due to an increase in output, and hence at the beginning the increase in prices will not be too large. Only a fall in the rate of exchange, which unquestionably will occur and will cause a rise in prices of foreign goods, will accelerate the upward movement of prices; however, this process will not start right away.

In this way Hitler would have a rather long breathing spell, filled with efforts to split and corrupt the Social Democratic trade unions and with acts of ruthless terror against the communists. For this reason during the transition from inflation to hyperinflation the government apparatus already might be so completely under Hitler's control that the inevitable desertion of him by the masses will no longer be fatal to him. There are all too many good examples of groups that came to power initially on the shoulders of mass social movements and then stayed in power for years despite the complete loss of their initial popularity end even the clearly revolutionary attitude of their disappointed supporters.

Breaking the resistance of the German working class is not easy, however, and for this reason the situation of Germany today really has no precedents in post-war history. None the less, it seems certain that if before or right after Hitler takes power, the working masses do not take decisive action in the broadest sense, Hitlerism will surely succeed in consolidating its power for a long time. That is why the often-repeated statement that 'if Hitler comes to power he will soon

compromise himself and be overthrown by a revolution' seems a very careless prediction.

4. Implementation of the inflationary programme will mean two things for the capitalists: 'social peace' will be established and at the same time profits will be made from inflation. In particular, large landowners and heavy industry with big debts will benefit from the depreciation of their obligations. Obviously, with hyperinflation a stabilization crisis must occur, but today who would think so far ahead! Today the salvation and strengthening of capitalism for several or a dozen or more years is a matter of primary importance.

The Present Phase of the World Crisis[1] (1933)

1. The autumn of 1932 brought some easing of the economic depression, mainly due to a gradual dampening of the financial crisis that culminated in the middle of 1931. The recovery in world money and capital markets may be attributed to several factors that operated from the beginning of 1932. The devaluation of the pound was followed by an unexpected inflow of gold from India's strong-rooms, but more importantly, it allowed the British Empire relatively to improve its balance of payments position and, what follows, facilitated the repayment of outstanding credits to its lenders: the USA and France. This in turn, together with the *Stillhalteabkommen* concluded between Germany and its lenders,[2] and the definite solution of the question of German reparations, contributed to mitigating the 'confidence crisis'. This relative consolidation of the world financial position led to earlier hoarded capital being put to use.

Credit inflation in the USA worked in the same direction, although in an economic crisis as deep as the present one it could not immediately improve investment activity. Credits that in the final resort were granted by the banks of issue, were largely used for repayments of outstanding liabilities and returned to banks in the form of deposits, thus improving liquidity in the financial markets. In these conditions liquidity quickly increased and consequently the rate of discount in the important money markets was reduced to less than 1%. High profitability of stocks and bonds in view of their low rates made them attractive. The demand for them in the stock exchange increased and their rates grew swiftly causing a fall in their profitability; following short-term credit long-term credit also became cheaper.

The second phase in this course of the business cycle was a rise in commodity prices. The bull market in the stock exchange gave rise to rather exaggerated optimism on the pert of investors regarding imminent economic recovery, and to speculative purchases of raw materials, stocks of which could be held much easier because of the low rate of interest. Moreover, a rise in prices of raw materials was followed by speculative purchases of goods manufactured from them.

Their stocks also started to increase quickly which again was facilitated by cheap credit. This in turn added to the bull market for commodities and, what is more important, generated a rise in employment in factories processing raw materials, mainly in the textile industry and above all in the cotton industry.

2. It is known that a rise in employment in one industry must to some extent find reflection in all other industries. Increased employment in the processing industries that were subject to speculative purchases was not, however, the only cause of the general rise in output observed in September and October 1932. Other factors, of a more stable nature, operated, too. One of them was a reduction of output capacity during the two preceding years when investment activity was below the depreciation of capital stock (which improved the profitability of the still-operating factories and led to greater investment activity). The other factor was cheap credit, especially long-term credit. The operation of these two factors together with increased employment—due to the expanded output of the processing industries that were subject to speculative purchases—contributed to a rise in investments that in turn increased overall output still more.

What changes in total world output can we expect in the near future? First of all, the recovery in the textile industry and in other processing industries that were subject last autumn to a speculative boom must end. After the new commercial orders had been filled and stocks replenished, the volume of stocks increased significantly. Sales cannot be expected to rise in the same proportion, however. The growth in total output until now is insufficient to generate such a rise in sales, the more so as, for instance, consumption of textile goods does not change in step with total output; while their consumption by workers may change in the same proportion as total output, that of the middle classes is relatively inelastic.

The end of recovery in those industries is apparently already reflected in the reduction of commodity prices that was observed in the past two months. Of course, this was also caused to some extent by the unfavourable general political situation and by the unregulated question of mutual debts among allies. However, these latter phenomena, which must also influence the rates quoted in the stock exchange, were unable to reduce these rates by as much as the reduction in prices of raw materials.

Thus, we may soon expect total output to decline but its volume to be somewhat higher than in the middle of 1932 because the already started investment projects will be continued and new investment orders will rather tend to rise. Indeed, they are still below the volume of depreciation even at the present level of increased investment, and production capacity continues to shrink. Moreover, in the absence of large political disturbances in the near future one may expect that hoarded capital will continue to be invested and this will be accompanied by a further decline in the cost of long-term credit. On the other hand, one must not forget that investment activity will be relatively insensitive to these stimulants: the present long-lasting crisis during which a large part of production capacity stood idle, not earning enough to cover even its cost of depreciation, in the next few years will undoubtedly affect the psychology of entrepreneurs. Discouragement towards mechanization, the tendency to rent already existing equipment instead of building the new equipment—all these factors are likely to slow down investment, at least in the near future.

Clearly a rise in prices of raw materials, which may well accompany a future bull market in the stock exchange, will more than once contribute to a rise in total output, as was the case in the autumn of 1932. However, this mechanism will be of a permanent nature only if the boom in commodity markets is combined with the already quickly advancing recovery in the whole economy—something that depends in turn on investment activity.

3. In conclusion it may be argued that we are probably now entering the second half of the depression during which world output, though slowly and with the numerous disturbances, will nevertheless rise. This is valid, of course, only in the case of an 'automatic' mechanism of the business cycle. However, the improvement may arrive more quickly if individual governments pursue a policy of economic intervention through inflationary financing of public works.[1] Public works undertaken on a large scale would contribute to the better employment of production capacity, improve profitability, and thereby after a time (possibly not all that soon) would encourage larger investments, and this would generate business recovery. Such an inflationary financing of public works could be

[1] See 'The Business Cycle and Inflation', *Collected Works of Michał Kalecki*, vol. i. 156.

implemented at present without great difficulty only provided that it was done throughout whole world. For in any single country such 'stimulation' of the business upswing leads to increased demand for foreign raw materials, brings about an unfavourable balance of trade and exposes the rate of exchange. However, if the steady inflow of hoarded capital continues, deposits of gold and foreign exchange in the banks of issue will further increase, the necessary cash reserves of the banking system will be reduced and hence the danger of currency shocks involved in the inflationary financing of public works will be diminished.

Indeed, in some countries such inflationary measures can already be undertaken. For instance, the dependence of the USA on foreign raw materials is relatively small and their gold reserves are large; hence public works could be started there without the danger of devaluation. In the middle of 1932 a specific programme of public works to the value of $3 billion was prepared. However not much has been heard of it recently and it is uncertain whether it will be included in Roosevelt's economic programme. Incidentally, it must not be overlooked that economic programmes are decided not by the readiness to stimulate the business upswing alone but also by the contradictory interests of the opposed parties.

The second country that can afford public works is France with the largest reserves of gold in the world in relation to her economy. The recent project of a national loan to finance investments in various areas will consist precisely in such an inflationary financing of public works, because with an extremely large financial liquidity a large loan will not significantly drain the money market that might in turn restrict private investments. However, even if that happened, the bank of issue could easily extend its credit supply without much concern about the rate of exchange if the balance of trade somewhat deteriorated.

Inflationary financing of public works in the USA or France would affect the business cycle in other countries. The direct impact—through increased purchases of foreign goods in the USA or France—would be relatively small. As we noted above, the American economy is so big that it is largely self-sufficient. Of much greater significance, however, would be the mutual links between all stock exchanges in the world. For instance, a business recovery generated by public works in the USA will quickly raise rates quoted in American stock exchanges. This would be followed—precisely be-

cause of the mutual connection of the stock exchanges—by improved quotations of European securities that in turn would encourage investment in them of the capital hoarded so far, and thereby would strengthen the foundations of financing public works in individual countries.

The Fate of Experiments[1] (1934)

1. When in September 1933 we examined the course and effects of a stimulation of the business cycle in the large economic centres of the world,[1] we arrived at the following appraisal of the situation:

(i) The business upswing in the USA caused by the devaluation of the dollar seems temporary because it is based on speculative demand that occurred in anticipation of price rises. After a certain time this demand must end and the running down of previously accumulated stocks may even take place. If during the upswing generated by devaluation, investment activity does not rise to a volume that will replace speculative demand, a downswing is inevitable.

(ii) The effort to increase the purchasing power of the masses by rising wages within NIRA regulations[2] cannot prevent this downswing. If wage rates are not raised, prices in relation to wage rates would fall with the end of speculative demand. With an increase in wage rates, they will rise in relation to prices. Thus independently of the NIRA operation, the profit margin will shrink which will be followed by a reduction in the employment of capital equipment.

(iii) The only way out of this situation will be the payment of unemployment benefits or the starting up of public works, provided that the funds for this purpose are obtained not from additional taxes but by creating additional purchasing power one way or another.

(iv) Germany, which from the outset stimulated the business upswing through the inflationary financing of public works, is not threatened with a domestic recession as in the USA where the upswing was generated by devaluation. However, the weak point of Germany's intervention is the trade balance that will unavoidably worsen because of the ever-increasing demand for foreign raw materials with the rise of output. If Germany does not succeed in increasing her exports, she will find it impossible to acquire adequate supplies of foreign raw materials for her economic expansion.

These forecasts turned out to be generally correct. In what follows, we shall examine these processes and trends in some detail.

[1] See 'Stimulating the World Business Upswing', *Collected Works of Michał Kalecki*, vol. i.

2. The upswing generated by devaluation, which in the USA lasted until the autumn of 1933, caused—as one can infer from subsequently published statistics—a considerable expansion of investment activity, mainly in renewal of capital equipment; the construction of new plants as well as housing construction remained at the previously low volume. In any case, the general volume of investment activity was not high enough to replace speculative demand. Stimulation of the latter by means of another devaluation of the dollar also produced no effect. Experience taught speculators that prices do not rise as fast as rates of exchange fall in relation to gold, and consequently a further fall in the dollar did not generate the speculative fever that followed the first devaluation.

The result was a sharp decline in output. The production index for November 1933 was already nearly 30% lower than its maximum value in the first half of the year and only 10% higher than at the beginning of 1933.

At that stage, in November 1933, various public works were started on a large scale. By the end of February 1934 more than $1 billion was spent on them, thereby achieving an increase in output of more than 12%. The funds were obtained through loans negotiated in the free market. Obviously, this does not end creation of additional purchasing power. Sums previously held in private banks were spent by the government. This does not force these banks to restrict credit, however, for the money spent by the government in the final analysis falls into hands of capitalists as profits and in this form returns to the banks.

Theories on this subject are often advanced to the effect that these funds become tied up in the production process, or in consumption. These theories make sense only if they are supposed to argue that the quantity of money in circulation is thereby increased. In general, this factor plays a relatively small role, however, and in the present economic situation in the USA its significance is out of question: already before November 1933 the quantity of money in circulation was exceptionally high because of the necessity to maintain large emergency funds due to the crisis; that is why, despite large increases in prices and output, the quantity of money in circulation is at present smaller and not greater than a year ago.

Public works were financed not only through the use of deposits, whose owners invested in government securities, but also through the direct purchase of obligations by banks. Namely banks invested a

considerable part of their cash reserves in these obligations which, however, not remaining in circulation, returned to the banks and enabled them to purchase new obligations. Thus the final financial outcome and the cost of public works was an increase in the government debt.

Here the question is often asked: with what will the debt contracted by the government for these investments—the future profits of which are more than doubtful—be paid back? Such a question, however, only shows lack of understanding of the essence of stimulation of the business upswing. The objective of the inflationary financing of public works is to enhance—through artificial stimulation of the business upswing—private investment activity. When this occurs, public works can be discontinued. Increased economic activity will then provide greater revenues for the Treasury thereby enabling amortization of the debt and the payment of interest. Even from a purely fiscal point of view, profitability of stimulation of the business cycle cannot be identified with the profitability of investment projects completed under public works, but will depend on the overall effects of intervention. These rather complicated problems are explained below with the help of an example taken from the actual development of the private sector of the economy.

A certain economic region was heavily dependent on a huge steel-mill located there. The coal for this mill as well as for the entire industry of the region was supplied by a mining company. As a result of an unfortunate accident, the mill blew up. Its owners received the insurance premium, but since business was slack in the steel market and profits were not enough even to balance on-going interest on capital, the owners decided not to rebuild the mill. The result of this was the suspension of production by plants directly connected with the mill, a big increase in unemployment, and collapse of the industry that produced consumer articles for workers—in short, the region was affected by a sharp economic crisis. Also, the coal sales of the mining company shrank to a minimum, and it was faced with bankruptcy. It then negotiated a loan and rebuilt the mill. With slack demand in the steel market the mill was still losing, but the mining company offset these losses with the recovery of its coal sales, not only to the mill but to all the industrial plants of the region.

3. The question arises, however, whether stimulation of the business upswing really achieves its objective, i.e. whether artificial stimulation

brought about by public works turns into natural stimulation, or, to put it more precisely, whether the increased profitability of industry in connection with public works is soon followed by a strong increase in private investments. As far as the present situation is concerned, investments in the engineering industry have reached a normal relation to increased output: both indices roughly correspond to their respective volumes in 1931. At the same time, private construction activity is still extremely low. One may expect, however, that if artificial stimulation of the business upswing continues, investment activity will pick up in this area as well. In estimating the possibility of increased investment activity one must not forget the influence of natural factors—namely wear and tear of capital equipment which is caused by the suspension of investments during the crisis, and which at the same time is the starting point in the automatic transition to the business upswing.

We now come to the question of the influence of stimulation of the business upswing on consumption. If we compare workers' wages today with those a year ago it turns out that they have not changed much: the increase in wage rates approximately corresponds to the increase in the cost of living. However, the salaries of white-collar workers have not kept up with manual workers' wages and hence real salaries have declined. The average real wage rate unquestionably has fallen, which happens during every business upswing. This decline, however, was much smaller than the rise in employment. Consequently, the purchasing power of the population has increased, though so far this does not exceed 5–10%. A more significant increase in consumption can only take place in a later phase of the upswing.

As it was mentioned earlier, another devaluation of the dollar no longer stimulated speculative demand and did not cause another round of price increases; hence prices calculated in gold declined. This obviously had to have an impact on foreign trade. Despite the increased demand for foreign raw materials due to increased output, with the improved competitiveness of American goods in foreign and domestic markets, imports calculated in gold even declined somewhat, while exports rose. As a result, the positive balance of trade grew larger and therefore the American upswing was unable to affect other countries through increased demand for foreign goods. Only if the USA had a large negative balance of trade, would this enable other countries to repay their obligations to the USA in goods that

would at the same time create additional demand in these debtor countries.

4. The main difference between the situation in the USA and in Germany is that the USA has to collect debts and has devalued the dollar, whereas Germany has to pay debts and has not devalued the Reichmark. The depreciation of the dollar to some extent is an unnecessary addition to the present system of stimulating the business upswing in the USA, but its stimulation in Germany has been greatly impaired by the developments in foreign trade.

Under the influence of the stimulation of the business upswing the growth of output in Germany generated a greater demand for foreign raw materials, but without devaluation of the mark there were no incentives that would pave the way for a strong expansion of German exports. This accounts for the continual worsening of the German balance of trade and for the outflow of foreign currency which only for a limited time could be stopped by the partial suspension of the transfer of obligations and interest payments. With a further expansion of output and a following increase in imports this measure turned out to be unsatisfactory and Germany was faced with the question of how to continue stimulation of the business upswing without being able to acquire adequate amounts of raw materials for this purpose. A few alternative solutions exist here, although the German government has not yet definitely decided in favour of any of them.

The first is completely to stop stimulation of the business upswing. For the present German authorities this seems out of the question, for large public works are the only point of their social programme they have fulfilled, and as such it is of great political importance to them.

Also highly unlikely is the devaluation of the mark for psychological and prestige reasons; a more probable measure is the use of some general export premium. The funds for its payment can be raised in the same way as those for public works, that is, through inflationary financing. But the effect of taking this path, as well as the path of devaluation, is still doubtful since a considerable part of German exports goes to countries which in this case can undertake special measures against sales of German goods. Unquestionably, though, something could be gained in this way.

Finally, Germany can suspend capital transfers completely, which would make it possible for her to make ends meet even at a somewhat higher volume of imports than at present. In this case the negative balance of trade would be offset by a positive balance of services (such as transport by German ships) and the repayment of Soviet credits raised in Germany. The conference on suspended German transfers has not produced any results, however. It is an open question therefore, whether Germany will decide on a complete break with foreign capital. Here one should also bear in mind a special aspect of this matter, namely about Germany's positive balance of trade with England which is threatening to confiscate this balance on behalf of English creditors.

For the time being Germany solved the problem of foreign raw materials provisionally by simply limiting their import, hoping to continue production in the few months following with existing stocks. At the same time, a complicated system of regulations has been constructed to prevent increases in prices of these articles.

If account is taken of the fact that possible future increases in international trade promise rather meagre benefits for Germany since—as always happens during an upswing in the business cycle—the prices of raw materials imported by Germany will rise faster than the prices of finished goods exported by her, then it is highly probable that Germany will follow the path of autarky (as she has already done in agricultural products), which is a path close to the spirit of Hitlerism. Obviously, one should not expect Germany to cut herself off from international trade entirely. What is most likely is that imports of foreign raw materials will be kept at the present volume with only the increased demand being covered by local raw materials. Germany's advanced engineering and chemical industries provide an exceptionally promising field here for substitutes and savings in the use of raw materials.

Obviously, like every autarky, this will mean a reduction in living standards of the population. On the other hand, it will not harm the upswing in the business cycle; on the contrary, it will create a field for many new investments. There is nothing strange about this. Only under very special conditions does a business upswing coincide with an increase in the well-being of the masses. Essentially, a boom means the full employment of capital equipment. Ultimately, such employment is determined by the profitability of plants. As it will be seen from the example of Japan, the profitability of plants can even increase with a decline in the overall consumption of the masses. It is another matter that with alternative solutions—i.e. maintaining the

present level of unemployment in Germany, or full employment of productive factors under partial autarky—the latter will imply a certain increase in the overall consumption of the masses. However, the real wages of the employed will inevitably fall sharply, since wage rates fall to some extent during every business upswing and in this case they would be further suppressed by autarky.

So far we have discussed the external difficulties of stimulating a business upswing by Germany. Regarding domestic developments, inflationary financing of public works has had no effects similar to those that are generally considered as inflation. As in the USA, despite an increase in prices and output, the quantity of money in circulation has even declined slightly. As in the USA again a clear sign of inflationary financing in Germany was indebtedness of the central and local governments; in 1933 it increased by RM3 billion.

The problems that arise in such cases have already been discussed in detail in our analysis of the situation in the USA. Now we should point out that—as in the USA—the stimulation of the business upswing in Germany has also influenced the expansion of private investment activity. The inflow of new orders for machines is twice as high at present as a year ago. Orders have also considerably increased from these industries that are not directly involved in public works. Industrial construction has also expanded considerably.

Real wages unquestionably have fallen, though this decline was smaller than the increase in employment. The rise in consumption was very modest, not exceeding 5%. With continued stimulation of the business upswing, there will be a tendency for consumption to rise faster, although this may be checked by further autarkization caused by difficulties in dealing with the unfavourable balance of trade.

5. Simulation of the business upswing in Japan, the third largest industrial centre of the world, has had a somewhat different nature from that in the USA and Germany. Japan has taken the path of inflationary financing of armaments not to fight the crisis but because of her overall foreign policy in the Far East and the conflict in which she has become involved there.

The industrial crisis was rather mild in Japan. Industrial output fell by only a few per cent in comparison with 1929. Considerable unemployment was more of a structural nature and resulted from the rapid modernization of capital equipment combined with a high

birth-rate and no reduction in the working-day. When inflationary financing of armaments began, capital equipment was already nearly fully employed; therefore, in this case the expansion of output was coupled with a sharp decline in real wages. As a result, despite the increase in employment, the purchasing power of the masses has not risen and may even have fallen.

This must always happen when additional demand—resulting from inflationary financing of government investments, or simply from a government deficit—happens in conditions of almost full employment of capital equipment. A large increase in prices in relation to wage rates is then required to employ this equipment even more fully by using its less economically producing parts or by rapidly expanding it. A condition is then created which in certain respects is similar to the period of inflation we experienced after the war: a boom manifesting itself in the full employment of capital equipment accompanied by an extremely low level of mass consumption.

Yet another factor has brought about the reduction in living standards of the Japanese masses. This was the sharp devaluation of the yen. Contrary to what is commonly stated, this factor did not stimulate a business upswing in Japan. All the time, Japan's balance of trade was almost in equilibrium. Hence no additional purchasing power from abroad was flowing in to Japan, which would have been the case if the trade balance had been strongly positive. Japan is only exchanging a greater volume of her products for foreign ones, thereby acquiring a greater amount of raw materials required to increase her output. And she is acquiring them at the cost of the extremely unfavourable relation in which she exchanges her goods for those of other countries. Precisely here—besides the stimulation of the business upswing under near full employment of capital equipment—lies the source of the lowering of living standards of the Japanese masses during the greatest boom that Japan has ever experienced.

Stimulating the Business Upswing in Nazi Germany[1] (1935)

1. The stimulation of the business upswing in Germany in the last two years supplies empirical data essential for the understanding of economic processes. The mechanism of the upswing is in this case exceptionally clear-cut. Since it is the government that finances investment by means of credit, it is easy to discern the cause and effect and analyse precisely the process of creating purchasing power.

Moreover, the German experiment clearly shows the limits of the business upswing as far as balance of payments is concerned if this upswing is not accompanied by an inflow of foreign capital. Finally, we may observe in Germany a specific process—one not devoid, however, of general significance—the process of using for armament purposes those results of the business upswing which should be reflected in increased consumption of the broad masses of the population.

2. The general pattern of stimulating the business upswing in Germany was as follows. Central and local government agencies engaged in public investment were paid in 'work supply bills' discounted in the banks by the various firms. In this way additional purchasing power was created, effective demand was increased, and production rose. Since the increase in money in circulation was rather small—most of the outlays returned to the banks as deposits or as repayments of credits—the amounts in question were at the disposal of the banks for further discounting of the 'work supply bills' by which continued public investment was financed. As a result, the indebtedness of the central and local government increased: either the bank deposits and bank holdings of 'work supply bills' rose, or those bills took the place of private exchange bills in the banks' portfolios. The latter caused a shift in the structure of bill holdings of the banking system from private to public bills, with a large part of the public bills finding their way to the Reichsbank and almost entirely filling its portfolio.

The formal maturity term of all public bills was three months. In fact, however, these were long-term debts of the central and

local government; the payment of bills actually meant issuing new ones. Some commentators describe this situation as one that may end in bankruptcy. It is, however, difficult to fathom how this can happen if the Reichsbank does not refuse to discount the public bills—which is, to put it mildly, rather unlikely. The special advantage of long-term credit comes from the fact that the debtor is not certain of the possibility of a continuing conversion of short-term liabilities. However, in this case such a certainty does exist and as a result commitments which are in essence long-term may be financed by short-term credits. (It is true that the government itself took some steps to convert the short-term debt into a long-term one, but this operation made little progress and was dictated by different considerations, as, for instance, by the interests of private banks.)

It is worth while pondering the following. When it comes to the point that the portfolio of the Reichsbank contains only public bills—and, as noted, this situation is in sight—the amounts spent by the government can no longer return to the Reichsbank via repayment of credits by private firms, and therefore public bills must be accumulated in private banks. What will happen if these banks are unwilling—as is the case now—to hold them? The proposed solution for such an emergency is as abstract as abstract are the misgivings of private banks about holding the 'work supply bills': the Reichsbank is to issue its own bills to be sold to private banks and the money is to be used for discounting public bills; in other words, the central bank is to rediscount the public bills in private banks. From this 'bill' point of view no threat to the German stimulation of the upswing seems to be imminent. It involves a real danger, but one of a quite different nature which we shall discuss in due course.

3. The increase in profits which occurred in 1933 as a result of financing public investment by credit caused a considerable rise in investment in 1934. As will be seen from Table 37, private industrial investment made good 50% of the decline that had occurred during the crisis. This is not much less than the corresponding percentage for industrial production as a whole, which amounted to 60%. However, residential construction, less closely connected to the current business situation, lagged considerably behind, despite some stimulation by the government.

Table 37. *Indices of Current Business in Germany, 1932–1934 (1929 = 100)*

	1932	1934	Ratio of increase (1932–4) to decline (1929–32) (%)
Industrial production	58	83	60
Investment in industry	33	67	50
Residential construction	33	56	35

Source: Data of the German Institute of Survey of Current Business.

As far as industrial investment was concerned, it was undertaken mostly by existing enterprises, while the creation of new establishments was rather the exception. One reason for this is the monopolistic nature of German industry, and this was reinforced by Hitler's government prohibition of new investment in a number of industries.

As will be seen, private investment increased considerably as a result of the government-stimulated upswing, but it still did not reach the level at which it could replace public investment. (In particular, as noted above, residential building lagged considerably behind.) It is very interesting that at present the government is not particularly interested in any further increase in private investment. The point is that because of the difficulties in securing an adequate supply of foreign raw materials—about which more will be said below—a further increase in production is inhibited. This prevents the continuation of the upswing, so that an increase in private investment would require a reduction in the credit financing of public investment. This reduction, however, is also an aim *per se* because of its being military or paramilitary in character. Consequently, as has been officially announced the credits for the government will not be reduced. We can observe the paradoxical misgivings about the stimulation of the upswing succeeding too well.

4. It is obvious that the business upswing in Germany had to cause an increased demand for goods which were not produced in that country at all, or not in sufficient quantities, such as food, industrial raw materials, etc. The resulting difficulties experienced by Germany are today widely known. They are well illustrated by Table 38.

It will be seen first of all that Germany succeeded in increasing the general volume of imports by only a small amount, even though servicing of foreign debts was suspended, which is tantamount to securing an additional source of foreign exchange. This is accounted

Table 38. *Industrial Output and Imports in Germany, 1932–1934 (1929 = 100)*

	1932	1934	Ratio of increase (1932–4) to decline (1929–32)
Industrial production	58.0	83.0	60
Volume of imports of which:	70.0	72.5	8
food	74.5	63.0	—
industrial raw materials and semi-manufactured goods	73.5	82.0	32
finished goods	50.0	59.5	19

Source: Data of the German Institute of Survey of Current Business and the Government Statistical Office.

for by a continuing decline in the volume of exports, more or less compensated by the suspension of foreign transfers.

The shrinkage of German exports in the period considered resulted mainly from a decline in total imports of the main importers of German goods—the countries of Western and Central Europe as well as the USSR—between 1932 and 1934. As far as the USSR is concerned, a fall in the German's relative share in its imports probably occurred for political reasons.

Import restrictions caused a significant increase in the prices of food as imports declined (see Table 38). There was also a rise in the price of industrial goods with a high foreign raw-material content as a result of an inadequate increase in their import. (Examples are textiles, products made from non-ferrous metals, soap, etc.) The increase in prices, along with regulations prohibiting the use of raw materials for certain purposes (e.g. copper in construction) led to a state of semi-autarky. This was reflected in more intensive agriculture, mining of poor ores, and a resort to substitutes (aluminium instead of copper), to synthetic raw materials (artificial fibre, gasoline from coal), and to the use of second-hand goods and waste on a larger scale.

All this facilitated making production more independent of the supply of foreign raw materials which was inadequate. It seems, however, that the relation of imports of raw materials to production has been strained to the limit: without an increase in the latter, which may be achieved merely by a rise in exports (since there is no chance of an influx of foreign capital), the former can hardly grow, and government intervention in the circumstances is confined to maintaining the current level of economic activity. We referred to this situation in the preceding section when we pointed to the competition

between private investment and armaments. We shall see below that armaments also compete with consumption.

5. Let us now consider the question of the effect of the German business upswing on consumption. To what extent did the working class profit from the government's stimulation of this upswing? As will be seen from Table 39, the increase in consumption was totally incommensurate with that of industrial production: while from 1932 to 1933 some 60% of the decline in industrial production of the period 1929–32 was made good, in consumption the figure is only 28%. How can this disproportion be accounted for? Why was a considerable increase in employment so little reflected in the consumption of wage- and salary-earners?

Table 39. *Industrial Output and Retail Sales in Germany, 1932–1934 (1929 = 100)*

	1932	1934	Ratio of increase (1932–4) to decline (1929–32) (%)
Industrial production	58.0	83.0	60
Retail sales at constant prices	82.0	87.0	28

Source: Data of the German Institute of Survey of Current Business.

One of the reasons follows directly from the preceding section. The increase in prices of consumer goods—particularly food—in relation to wages as a result of import restrictions must have restrained consumption to some extent. However, this was not the only factor hampering an increase in consumption.

The business upswing in Germany naturally caused an increase in government revenue. As a result of the rise in employment, the payment of unemployment benefits also declined considerably. What happened to the surplus that thus accrued to the government? It was to a great extent spent on armaments. If this surplus was used to increase the salaries of officials or to increase benefits for the remaining unemployed, it would find its way to the consumer goods market rather than to the armament industries. The same would occur if additional government revenues failed to materialize as a result of tax reductions: in the case of taxes on wages and salaries, this would increase the purchasing power of workers; in the case of indirect taxation, the costs of production would fall and prices of consumer goods would tend to decline.

It will be seen that a considerable part of the potential increase in the purchasing power of the broad masses of the population was allocated to armaments. It is true that a question arises here as to what would have happened if this had not been the case, if there had not been an inadequate supply of foreign raw materials. Would not the increase in the purchasing power of consumers have resulted in an additional rise in prices? Such would in fact be the case if armament production did not require foreign raw materials. This, however, is obviously not the case because such production does absorb large quantities of (mostly non-ferrous) metals which have lately been imported into Germany. Thus even in the present position of German foreign trade, consumption could have increased if raw materials for consumer goods industries had been imported instead of those for the manufacture of armaments.

The effects of the German business upswing in the field of consumption are of considerable interest from a more general point of view. The business upswing is always reflected in an increase in the degree of utilization of equipment. The German example shows that this need not necessarily be associated with a commensurate rise in the standard of living of the broad masses of the population.

PART 2
INDICES OF BUSINESS FLUCTUATIONS

Price Index of Semi-Finished Investment Goods[1] (1930)

One of the main symptoms of the business cycle are fluctuations in fixed capital formation, i.e. in the demand for new buildings, machines, and similar investment goods. For this reason changes in prices for standard semi-finished investment products have great symptomatic value in studies of the business cycle. In recent years, however, these changes have been less significant than previously because of the rapidly spreading cartelization of industries turning out semi-finished investment products, a process that has largely reduced or entirely eliminated the flexibility of these prices. None the less, these price changes still have great importance for examining business fluctuations for the following reasons:

(i) Production of some of the semi-finished investment goods has not yet been cartelized, and changes in their prices retain their significance as symptoms of the business cycle.
(ii) In some cases prices set by cartels also display a tendency to adjust to sale conditions, especially if cartels have to contend with the competition of outsiders.
(iii) Even where cartelized prices are rigid (cartels not restrained by outsiders often raise prices during a downswing), wholesale prices for products of cartelized industries show a certain flexibility, depending on the increase or decline in profit margin of wholesalers; obviously, this takes place only when the cartel does not strictly control market prices all the way to the final customer. Taking into account these factors we attempt, as will be seen, to attribute a certain flexibility to the index of rolled iron in Poland.

It should also be noted that price changes can always be examined not only as a symptom, but also as a determinant of the further development of the business cycle. From this point of view, studies of price fluctuations of semi-finished investment products are indispensable even in cases of their inelasticity with respect to business fluctuations.

Our price index of semi-finished investment products is based on prices of pig-iron, rolled iron, pipes, cement, bricks, and sawn timber. The index is calculated as an aggregate index, i.e. certain constant volumes of these semi-products are taken, and the value of the aggregate is calculated at prices of the period under examination and at prices of the base period. The relation of the values of these two aggregates gives us the index: $I_n = \Sigma qp_n/\Sigma qp_0$, where q represents the constant volume of individual articles, p is the price of each article in the period examined, and p_0 is its price in the base period. This index can also be written in the form: $I_n = \Sigma qp_0(p_n/p_0)$; hence it is a weighted arithmetical average of the respective indices of individual semi-finished goods: the weights are the products qp_0 of the volumes of individual semi-finished goods considered and their prices in the base period.

The actual consumption of the above-mentioned goods in 1928 was taken as the constant volumes of the semi-finished products making up the aggregate; in fact, we tried to consider only their use for investment purposes. For instance, the entire consumption of sawn timber was not taken into account, but only the volume used in the construction of brick houses. This volume was roughly estimated as follows. From the engineering data the average ratio of respective inputs of timber and bricks in the constructing of a brick house was calculated, and then on the basis of the total consumption of bricks the use of timber for the construction of brick houses was estimated (in this way the use of timber for the construction of wooden houses was left out; yet, though the latter can be regarded as investments, they do not represent the main field of investment activity).

In calculating an aggregate index based on constant volumes of individual goods it was tacitly assumed that the proportion of consumption of individual components of the aggregate did not change rapidly over time, for otherwise this index would soon lose all touch with reality. For this reason, we did not include in our aggregate investment inputs used by the Ministry of Communications for the construction of railways (rails and sleepers), since this investment activity develops rather unsteadily and independently from domestic investments as a whole.

The index was calculated on the basis of producers' prices; only in the case of rolled iron (as we mentioned above) did we consider changes in discounts from the warehouse prices given by wholesalers. The calculation for rolled iron was made as follows: the use of iron

corresponding to sales not going through the stocks of merchants was calculated at syndicate prices, whereas the value of the rest was calculated at syndicate prices multiplied by $100 - d$, where d is the discount (in per cent).

For the base period we took 1929 (i.e. p_0 are the average 1929 prices), starting from which we have the necessary statistical series. The value weights of individual semi-finished products, qp_0, were calculated at these prices and are as follows (in Zł. million):

Pig-iron	32.9
Rolled iron	197.7
Pipes	39.8
Total iron	370.4
Cement	75.6
Bricks	124.1
Total minerals	199.7
Sawn timber	95.7
TOTAL	665.8

According to our introductory remarks, besides the general index of semi-finished investment products and group indices (for iron, semi-finished mineral products, and timber), separate indices for cartelized and non-cartelized products were calculated. The cartelized ones are: rolled iron, pipes, and cement. The total value of this group is Zł.413.1 million. The non-cartelized products are: foundry iron, bricks, and sawn timber. The total value of this group is Zł.252.7 million. In calculation of the index of cartelized articles the value of all rolled iron was calculated at syndicate prices. On the other hand, in calculation of the group index for iron, and of the aggregate index, changes in discount from warehouse prices of wholesalers were taken into account in the way discussed above. Hence, the index of cartelized articles reflects only the price policy of syndicates.[1]

[1] The indices for 1929 were given in a table [containing monthly information compiled by the ISBCP], published in *Koniunktura Gospodarcza*, 3/3 (1930), 115.

Profit Margins of Sawn Timber[1] (1930)

We define the profit margin as the difference between the price of the product and the costs of materials necessary for its production. In the case of sawn timber the profit margin is the difference between its price and the cost of the necessary inputs of logs that may be put approximately at 1.4 of the output of sawn timber. However, the latter may be of different types and therefore in calculating a price index of the semi-finished investment goods published by the Institute for the Study of Business Cycles and Prices the following assortments of sawn timber are taken into account (in m^3 million:)[1]

Scantling boards		0.25
Shuttering boards Floorboards	Carpenter boards	0.42
Carpenter construction boards		0.18
TOTAL		0.85

These constant volumes multiplied by the respective prices at different times (i.e. the sums of products of constant weights of individual assortments and their corresponding prices in any given period) represent changes in prices of sawn timber as a whole used in construction.[2] Now, to investigate profit margins of this aggregate of sawn timber, the respective values of logs must be substracted from the value of output. Since to produce 0.85 million m^3 of sawn timber it takes about $0.85 \times 1.4 = 1.19$ million of logs, we shall estimate the value of output (in Zl. million) as products of prices of one cubic meter of logs in each period of time, and 1.19 (see Table 40).

An important factor has been neglected in this calculation, however. The delivery of logs to saw mills does not coincide with the sales of sawn timber: in the first half of the year some stocks of logs accumulate in sawmills to be used in the second half only. Table 41

[1] Following the general rules of constructing the price index of semi-finished investment goods, the use of sawn timber in the construction of brick houses has been considered here (see 'A Price Index of Semi-finished Investment Goods', this volume).

[2] See ibid.

Table 40. *Profit Margins of Sawn Timber, January 1929–March 1930*

Year and month		Price of logs[a] (Zl. per m^3)	Value of logs (Zl. m.)	Value of sawn timber (Zl. m.)	Profit margin (Zl. m.)
1929	Jan.	60.6	72.1	94.3	22.2
	Feb.	60.2	71.6	95.4	23.8
	March	58.6	69.7	97.9	28.2
	Apr.	57.4	68.3	98.1	29.8
	May	56.4	67.1	96.6	29.5
	June	55.3	65.8	96.1	30.3
	July	53.2	63.3	96.8	33.5
	Aug.	52.5	62.5	95.8	33.3
	Sept.	51.5	61.3	96.0	34.7
	Oct.	50.9	60.6	93.0	32.4
	Nov.	51.8	61.6	94.3	32.7
	Dec.	52.4	62.4	93.8	31.4
1930	Jan.	52.0	61.9	91.5	29.6
	Feb.	48.8	58.1	89.1	31.0
	March	46.1	54.9	89.0	34.1

[a] Average prices in government-owned forests.

gives the relevant data for 1929. The sums of domestic railway shipments of sawn timber (which represent a very important part of its domestic sales) and of its exports (according to the GUS foreign-trade statistics) were taken to represent its total sales. The delivery of logs in each month has been estimated by splitting the annual total sales of sawn timber in proportion to domestic railway shipments of logs (railway shipments do not represent a large enough part of the total supply of logs to allow for any other use of these indices than as relative ones).[3]

It will be noted that at present our calculation of the cost of logs at current prices may be considered correct only for the first half of the year. In the second half this cost will be affected, next to current prices, by prices of logs paid in the first half of the year in which surplus deliveries of the first half are used. The respective correction will be carried out as follows. First, we calculate the average cost of excess deliveries over sales in the first half of the year. For this purpose the excess in each month is multiplied by the respective price of logs in this month and the sum of those products is divided by the sum of excess deliveries. In that way we get the average price of

[3] There is yet another inaccuracy in this calculation in so far as it does not take into account possible changes in stocks at the end of the year compared to the beginning of the year.

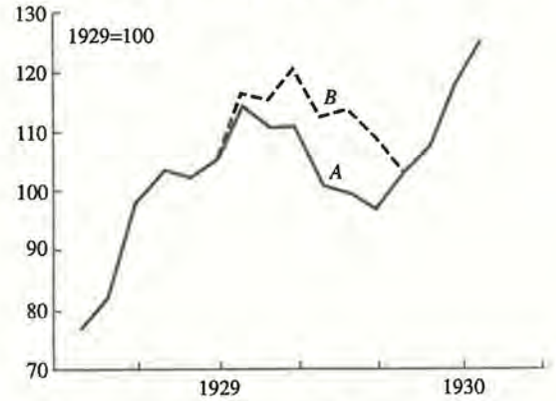
Zl.58.7 per m³. Next we calculate the cost of logs in each month in the second half of the year as the sum of the part that was delivered in the same month and multiplied by the current price, and the part used from the accumulated stocks (i.e. the deficits shown in Table 41) multiplied by the average price of Zl.58.7 per m³. For September 1929, for instance, we get $(135.6 \times 51.5 + 76.8 \times 58.7)/(135.6 + 76.8) = 53.9$. Finally, we calculate the corrected profit margins that are derived as in Table 40 except that for the second half of the year our corrected prices are substituted for the current prices of logs (see Table 42 and Fig. 2).[4]

Table 41. *Deliveries of Logs and Sales of Sawn Timber, 1929*

Months of 1929	Shipments of logs	Sales of sawn timber	Surplus (+) or deficit (–) of deliveries
January	176.4	126.9	+49.5
February	186.6	96.6	+90.0
March	270.1	141.8	+128.3
April	280.8	223.0	+57.8
May	315.5	258.9	+56.6
June	356.8	254.7	+2.1
July	232.5	258.2	–25.1
August	207.0	260.2	–53.2
September	150.9	227.7	–76.8
October	135.6	211.7	–76.1
November	96.3	182.1	–85.8
December	77.0	143.7	–66.7
TOTAL	2385.5	2385.5	0

Table 42. *Corrected Profit Margins of Sawn Timber, January 1929–March 1930*

Year and month		Cost of logs (Zl. per m³)	Value of logs (Zl. m.)	Value of sawn timber (Zl. m.)	Profit margin (Zl. m.)	Index of profit margin (1929=100)
1929	Jan.	60.6	72.1	94.3	22.2	76.9
	Feb.	60.2	71.6	95.4	23.8	82.5
	March	58.6	69.7	97.9	28.2	97.7
	April	57.4	68.3	98.1	29.8	103.3
	May	56.4	67.1	96.6	29.5	102.2
	June	55.3	65.8	96.1	30.3	105.0
	July	53.7	63.9	96.8	32.9	114.0
	Aug	53.7	63.9	95.8	31.9	110.6
	Sept.	53.9	64.1	96.0	31.9	110.6
	Oct.	53.7	63.9	93.0	29.1	100.9
	Nov.	55.1	65.6	94.3	28.7	99.5
	Dec.	55.5	65.9	93.8	27.9	96.7
1930	Jan.	52.0	61.9	91.5	29.6	102.6
	Feb.	48.8	58.1	89.1	31.0	107.4
	March	46.1	54.9	89.0	34.1	118.2



A—corrected profit margin (see Table 42);
B—non-corrected profit margin (see Table 40)
Note: The average corrected profit margin (1929 = 100). Note that in the first half of 1929 the two curves coincide.
FIG. 2 *Profit Margins of Sawn Timber*

Interestingly, Table 42 shows that in spite of the business crisis in 1930 there was a strong rise in profit margins of sawn timber. Apparently, sawmills took advantage of a sharp fall in the cost of logs. This results mainly from different factors that determine the price of logs and the profit margins of sawn timber. The share of prime costs (of manual labour, white-collar workers, keeping the sawmill running, etc.) are incomparably higher in the price of sawn timber than in that of logs. This explains why in periods of poor business sawmills tend to limit output and only make small reductions in their profit margins (or even increase them), while log-producers would rather force their sales through price reductions,

[4] This methodology may encounter difficulties with respect to the present rather than to the past period, however, since before a year ends and the sales of sawn timber for the year as a whole are known it is impossible to estimate the monthly supplies of logs. This difficulty may be overcome with some approximation as follows. We assume that the ratio of sales of sawn timber to railway shipments of logs has not changed in any given year compared to the year before. Then supplies of logs in the year under examination are calculated as a product of this year's ratio of sales of sawn timber to the railway shipments of logs. At the end of the year the calculation is repeated but the present year's ratio is then used.

especially if their financial position did not allow them altogether to forgo their money income.

In Poland such resignation from income is at present out of the question because of the financial position of private log-producers. As a rule, they also own land estates and because of the agricultural crisis their financial position is critical. Moreover, because of keen competition of private log-producers, deliveries from government-owned forests could influence the market only in case of a very sharp reduction of supply that would in turn strongly reduce the incomes of the Treasury.

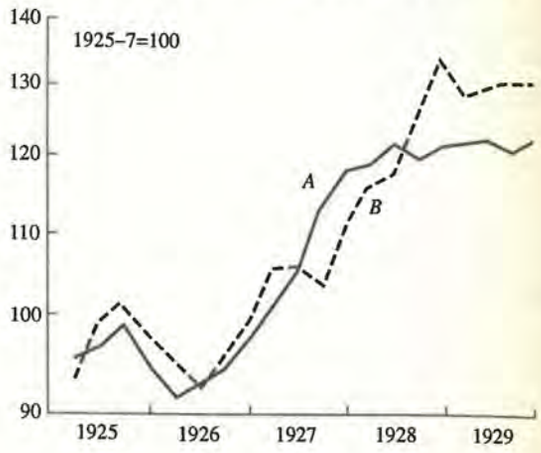
Business crises affect prices of logs especially in a period of seasonal rise of sales. Sawmills, uncertain as to the future market, tend to spread their purchases uniformly over the whole year and therefore during the season of log sales their purchases fall more (compared to their normal sales) than the sales of sawn timber.

Changes in Consumption of Wheaten Bread and Meat in Poland[1] (1930)

1. *Changes in consumption of wheaten bread* will be estimated on the basis of sales of yeast that are derived from the statistics of excise tax revenues. Are these sales equal to yeast consumption? Because of difficulties of storage, stocks of yeast are insignificant; in fact, also some waste is included in yeast consumption. In what follows four-month average data on yeast sales will be used which, we hope, will sufficiently neutralize deviations between sales of yeast and its actual consumption.

Yeast is used in baking wheaten bread and cakes. As a rule, the share of the latter in the total yeast consumption is small; moreover, to some extent cake-baking changes in step with the baking of wheaten bread. Only before Easter and Christmas cake-baking sharply increases which results in a rise in sales of yeast. Thus, to estimate changes in the consumption of wheaten bread with the use of four-month averages of sales of yeast, the data for March, April, and December have been eliminated. Consequently, in the A curve in Fig. 3, the end of the first quarter corresponds to the average sales of yeast in January, February, May, and June; the end of the second quarter to the average of May, June, July, and August; the end of the third quarter to the average of August, September, October, and November, and the end of the fourth quarter to the average of October, November, January, and February. Thus seasonal fluctuations in the sales of yeast have been eliminated.

Changes in consumption of meat in towns are estimated on the basis of data on slaughter under veterinary inspection of grown-up cattle, calves, and pigs. For each of these groups of animals we calculate four-month averages at the end of each quarter; then we deduct the approximate volume of exports in each group and eliminate seasonal fluctuations. In this way for each group we get a definite number of slaughtered animals: x, y, z. To examine changes in the total consumption of meat we construct the sum of $x\alpha + y\beta + z\gamma$, where α, β and γ are constants that represent average prices per animal in



A—consumption of wheaten bread;
B—consumption of meat in towns

FIG. 3. *Consumption of Wheaten Bread and Meat*

each separate group in the years 1925–8. The curve *B* represents changes in the sum $x\alpha + y\beta + z\gamma$ (see Table 43).

2. Consumption of bread in towns is largely determined by the total volume of consumer income and its structure as it is unlikely that changes in prices of bread could result in a shift to consumption of other food. However, substitution between various types of bread is certainly possible. Therefore, consumption of wheaten bread depends on consumer incomes and on the ratio of prices of wheaten bread and ryebread.[1] We calculated this ratio from the GUS statistics for eight large towns; on average it was 1.7 in 1927, 1.8 in 1928, and 2.2 in 1929. When we estimated consumption of wheaten bread on the basis of these ratios, it proved to be even slightly larger in 1929 than in 1928. As it is unlikely that real incomes of consumers in 1929 were significantly higher than in 1928, it follows that a rise in price of wheaten bread in relation to that of rye bread did not reduce the consumption of the former. Hence, substitution of ryebread for wheaten bread hardly influences the consumption of the latter which, therefore, is determined mainly by real incomes of consumers and, indeed, sheds some light on them.

In Fig. 3 the 'meat curve' *B* does not altogether coincide with the 'wheaten bread curve' *A*, and exhibits much less regular changes.

[1] Wheaten bread is consumed mainly in towns.

Table 43. *Indices of Consumption of Wheaten Bread and Meat in Poland, 1925–1929 (average for 1925–7 = 100)*

Year	Consumption of wheaten bread	Consumption of meat	Ratio of consumption of meat to consumption of wheaten bread
1925	97.6	97.4	99.7
1926	94.3	95.8	101.5
1927	108.2	106.8	98.7
1928	120.6	124.8	103.4
1929	123.2	128.5	104.3

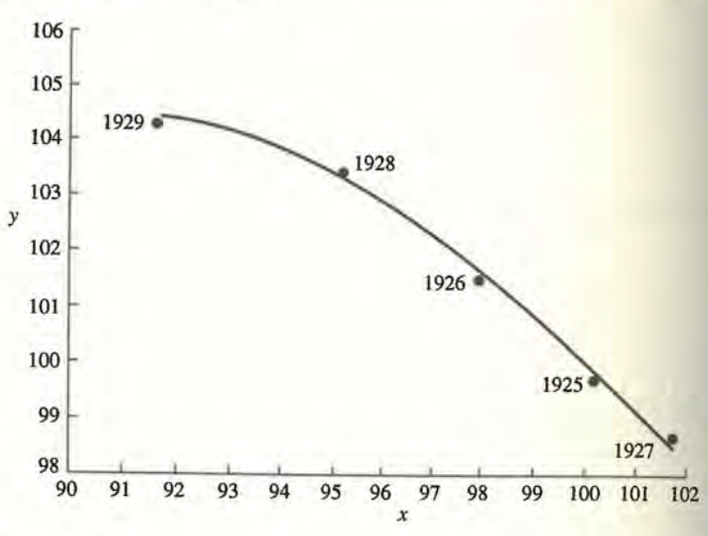
This may mean that the deviations are related to price fluctuations. To investigate this relationship more closely, the ratios between the respective indices of consumption of meat and wheaten bread, calculated for simplicity for each year as a whole (following the above-mentioned rules) were compared with the corresponding ratios of annual average prices. In these comparisons, in order to eliminate fluctuations in the purchasing power of consumer incomes, the retail prices of wheaten bread and meat were divided by the aggregate index of food prices. Comparisons of the ratio of consumption of meat to consumption of wheaten bread with the corrected 'real prices' of beef and of pork sausages did not produce any clear results; therefore the relation of prices of meat to prices of ryebread was introduced into our calculations, because cheap ryebread allows consumers to spend more of their income on meat. This comparison showed a more regular interdependency and did not hold for only one year. In that particular year the price of pork sausages showed a relatively large deviation from the price pattern in other years. This gave birth to the idea of comparing the ratio of consumption of meat and ryebread with a price of a composite product, i.e. a 'bread and sausage sandwich' (1 kilogram of ryebread and 0.2 kilogram of pork sausage). The results of these comparisons are shown in Table 44.

Let us now present the indices shown in the last two columns of Table 44 on a diagram where the first-column data are plotted along the *x* axis and the last-column data along the *y* axis (see Fig. 4). The obtained points are graphically evened out. There is only one small deviation from the derived curve that otherwise is of regular shape. This seems to confirm the existence of a negative relationship that we hypothetically assumed earlier: (i) consumption of wheaten bread is determined mainly by real incomes of consumers and therefore the

Table 44. *Prices of Bread and Sausage Sandwich and Ratios of Meat Consumption to Wheaten Bread Consumption in Poland, 1925–1927*

Year	Prices of bread and sausage sandwich[a] (in Zl.)	Cost of food[a] (1927=100)	Real prices of bread and sausage sandwich (1925–7=100)	Ratio of meat consumption to wheaten bread consumption (1925–7=100)
1925	1.54	108.7	100.2	99.7
1926	1.18	85.0	98.0	101.5
1927	1.44	100.0	101.8	88.7
1928	1.34	99.0	95.3	103.4
1929	1.26	96.8	91.7	104.3

[a] GUS average data for ten large cities.



x—ratio of prices of 'bread and sausage sandwich' to the general index of cost of food;
y—ratio of meat consumption to wheaten bread consumption
FIG. 4. *Ratio of Prices and of Consumption of Food, 1925–1929*

former sheds some light on the latter; (ii) deviations of meat consumption from changes in real incomes of consumers depend strongly on prices of a combined product—a ryebread-and-sausage sandwich—that indeed represents a large part of food consumption.

Sales of Lime as an Indicator of Construction Activity[1] (1930)

A survey on construction works carried out recently by the ISBCP[1] has shown that the GUS index of employment in construction which usually includes overground construction only does not represent accurately construction activity as a whole. It appears, for instance, that in the total value of orders completed by construction firms that report to GUS the data on their employment, in 1927–9 more than 30% represented earthworks (railways, bridges, tunnels, roads, and similar constructions), and in the remaining 70% housing construction was underrepresented compared to its actual share in the total overground construction. In what follows we shall attempt partly to correct these gaps through representing construction activity by the sales of lime (in fact by railway shipments of lime).

Lime is probably the single article that: (i) is used in the majority of brick houses both in the first and the last phase of their construction, first as mortar for bricks, and as plaster in the final stage; (ii) except for repairs, lime is not used in significant quantities for any other purposes. These conditions are not satisfied by other construction materials: bricks are used in the first stage only; sawn timber is used mainly in the second stage of many constructions (like roofs, floors, doors, and windows) since iron beams are used in the beam-framed floors and, moreover, boards are used in large quantities for construction of wooden houses; finally, cement is relatively little used as mortar or plaster, finding most frequent application in concrete or reinforced-concrete constructions (in large buildings, bridges, port facilities, and similar constructions), and in the production of cement products (such as tiles, air-bricks, pipes, etc.).

It appears therefore that only the use of lime represents a well-defined and, at the same time, the most important sector of overground construction in Poland, i.e. construction and repairs of brick houses. It must be remembered, however, that proportions between

[1] See Ludwik Landau, *Survey on Construction Works in 1927–1929*, Sprawozdania i Przyczynki Naukowe ISPBC, vol. x, Warsaw, 1930 [in Polish].

the basic construction, finishing works, and repairs are not constant even if seasonal fluctuations are ignored; depending on various factors the relative share of any of these types of construction works in total construction outlays may increase or fall with time. Hence, consumption of lime would strictly represent total outlay on construction only if lime used as mortar, as plaster in new houses, and as plaster in repair works remained in each period in the same proportion as that of the basic construction works to the finishing works and to repairs.

We shall now examine these ratios, although in a rough approximation only. On average, for each thousand bricks 0.78 m^3 of lime mortar is used. The average content of burnt lime in 1 m^3 of mortar may be estimated at 150 kilograms. Hence, each 1000 bricks require on average 1117 kilograms of burnt lime. Next, each m^2 of wall, covered with plaster 2 centimetres thick, requires 0.02 m^3 of plaster, assuming 300 kilograms intake of burnt lime per m^3 of plaster, we get 6 kilograms of lime per m^3 of a brick wall. Now, if a brick wall one brick wide (i.e. 27 centimetres) is considered, and assuming this represents the average thickness of walls (outside walls are often thicker but partitions are thinner), we find that to each m^2 of a wall there corresponds a volume of wall equal to 0.27 m^3, and lime used for plaster equal to $6 \times 2 = 12$ kilograms, since walls are plastered on both sides. Since 1 m^3 of wall requires 305 bricks, it follows that 1 m^2 of a wall requires $0.27 \times 305 = 82$ bricks, and since 82 bricks absorb 12 kilograms of lime then 1000 bricks will require 147 kilograms of lime. Taking into account the plastering of ceilings,[2] it may be assumed that in plastering the use of lime is 170 kilograms per 1000 bricks.

According to the GUS data, the use of bricks in Poland in 1927–9 may be estimated at 4.2 billion. If only lime mortar and plaster were used with, than we would get 490 000 tonnes of burnt lime used for mortar and 715 000 tonnes for plaster. Since (although seldom) half-cement mortar and plaster are used, too (pure cement mortar and plaster are used very rarely), we deduct 10% and get in approximation 440 000 tonnes and 640 000 tonnes respectively. According to GUS, the total use of construction lime in 1927–9 was 1.8 million tonnes, hence repairs would absorb 1 800 000 – 440 000 – 640 000 = 720 000 tonnes. The ratio of lime used in mortar to the total use of lime in the construction of new houses (which, according to the above, is 1 080 000 tonnes) would be 41%, and the corresponding ratios of the use of lime in plaster and in repairs would be 59% and 67% respectively.

[2] In case of brick ceilings their plastering does not need to be considered separately because, as in the case of walls, there is a definite ratio between the number of bricks used and the volume of lime input.

Now, concerning the relative ratios of various types of construction works, according to data for 1927 (collected by the ISBCP to prepare an index of construction costs),[3] about 50% of construction costs are represented by costs of substructure, wall, and ceiling construction, and the remaining 50% by other construction. It is more difficult, however, to determine the ratio of the value of repairs made in 1927–9 to the value of new buildings. For construction firms covered by the last survey made by the Institute, this ratio is 13%. Yet in the case of these firms repairs are underrepresented compared to other types of construction activity. If we remember that these firms represent only a small fraction of total private housing construction orders by investors other than co-operatives, then the assumption that the ratio of the value of repairs to the value of new buildings is 40% does not appear unrealistic. On this assumption the construction of substructures, walls, and ceilings would be equal to 50% of the value of new buildings, other construction works in new buildings would represent the remaining 50% of their value, and the value of repairs would be equal to 40% of it.

When these ratios are compared with those for the use of lime, some large differences will be seen, though not large enough to undermine the use of lime consumption as a relatively accurate indicator of total outlays in the construction and repairs of brick houses.

Consumption of lime is estimated on the basis of sales of limestone quarries that in turn is estimated from the data on railway shipments of lime. Of course, consumption of lime is not the same as the sales of limestone quarries due to changes in trade stocks and, more importantly, at construction sites and in lime-pits, in the form of slacked lime; since lime-slaking takes time, consumption of lime lags behind lime sales. This factor made us calculate the sales of lime not at monthly, but at quarterly intervals, which no doubt reduced the discrepancy between lime sales and its consumption. It must also be noted that once seasonal fluctuations are eliminated from our series,

[3] See *Koniunktura Gospodarcza*, 1/2 (1928).

Table 45. *Production of Lime and its Railway Shipments, 1925–1928*

Period		Domestic production less exports ('000 tonnes)	Railway shipments of lime ('000 tonnes)	Ratio of lime shipments to lime production less exports (%)
Year	1925	410	403	98.4
	1926	448	337	75.1
	1927	538	458	85.1
	1928	652	547	84.0
Two years	1925–6	858	740	86.3
	1927–8	1190	1005	84.5

seasonal changes in trade stocks and at construction sites are thereby also eliminated.

There still remains the question of to what extent railway shipments of lime represent sales of construction lime, especially as they can also include lime used as a fertilizer. Although a detailed examination showed that railway shipments of lime for fertilization have no significant impact on total railway shipments of lime, there may appear large differences between the latter and total lime sales because lime may be delivered by other means of transport as well. Table 45 shows a comparison between production of slaked construction lime net of lime exports and lime railway shipments.

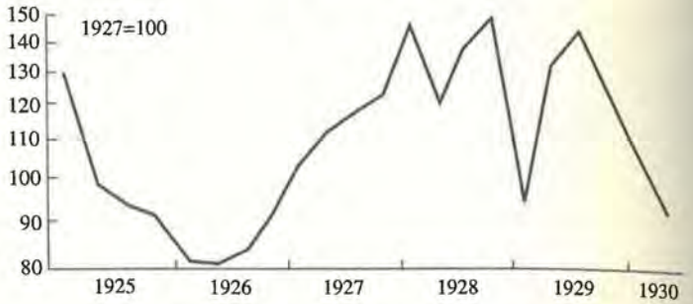
It will be seen that the ratio of railway shipments of lime to the difference between lime production and its export, although large, fluctuates strongly from year to year. These fluctuations disappear, however, when instead of yearly, two-yearly periods are taken into account. This may mean that in individual years the ratio is strongly influenced by changes in stocks in limestone quarries.[4]

The curve of railway shipments of lime was constructed, as noted above, on the basis of quarterly data. The quarterly coefficients of seasonal fluctuations were obtained as follows. First, four-quarter averages and arithmetical means of each pair of the neighbouring four-quarter averages were calculated. Then the arithmetical means were linked to the middle quarter out of the five quarters used in the calculation of those two four-quarter averages. Next the original sequence was divided by the sequence of arithmetical means, thereby

[4] It must be remembered that railway shipments of lime are related to the difference between lime production and its export, and not to domestic sales of limestone quarries.

Table 46. *Railway Shipments of Lime, 1925–1930*

Quarter	Raw index (1925–7 = 100)						Coefficient of seasonal fluctuations	Corrected coefficients seasonal fluctuations eliminated (1925–7=100)					
	1925	1926	1927	1928	1929	1930		1925	1926	1927	1928	1929	1930
I	94.6	59.2	76.2	107.0	68.7	77.0	73.0	129.6	81.1	104.4	146.6	94.1	105.5
II	124.6	102.6	141.9	152.1	168.7	117.1	126.8	98.3	80.9	111.9	120.0	133.0	92.4
III	104.7	94.5	132.1	155.7	164.0		112.3	93.2	84.1	117.6	138.6	146.0	
IV	79.4	80.5	107.8	131.8	110.5		87.9	90.3	91.6	122.6	149.9	125.7	



Logarithmic scale; seasonal fluctuations eliminated.
FIG. 5. *Quarterly Railway Shipments of Lime*

eliminating to some extent both the trend and business fluctuations. Finally, to the resulting sequence the Harvard method of chain ratios was applied under the condition that the product of chain ratio is equal to one (since both the trend and the business fluctuations were eliminated), and this condition was indeed met. Table 46 gives the results of this calculation.

Our curve of shipments of lime is rather smooth and it represents construction activity as a whole, in conformity with what we know about it from other sources (see Fig. 5). The 1925–6 crisis, the severe winter of 1929, and finally the recent slump of the second half of 1929 are all clearly seen in it. However, it also exhibits an unexpected fall in the second half of 1928. It appears that such a fall in the construction activity did in fact take place (although it was not reflected in the GUS indices of employment in construction) and it was related to construction credits granted by the National Economic

Table 47. *Construction Credits and Railway Shipments of Construction Materials, 1927–1928*

Year and quarter	Construction credits granted by the BNE (in Zl.m.) divided by coefficients of		Railway shipments (1925–7=100; seasonal fluctuations eliminated)	
	actual	seasonal employment in construction	lime	sawn timber
1927 IV	25.1	23.0	122.6	130.9
1928 I	31.6	51.0	146.6	155.7
II	20.0	19.5	120.0	147.9
III	26.8	24.5	138.6	150.3

Bank. Those credits reached in the first quarter of 1928 an exceptionally large volume that was then strongly curtailed in the second quarter (it must be noted that seasonal fluctuations in construction go in the opposite direction). Of course, not all credits granted in the first quarter were used in that quarter, nevertheless a cut in credits could have a direct bearing on the volume of construction works, on finishing works especially (considering the time of the year). Furthermore, it is noteworthy that shipments of sawn timber, which is used, as lime, in a large proportion in the second phase of construction, show a similar pattern of development (see Table 47).

It follows from the above that railway shipments of lime indeed give a relatively good idea on changes in construction activity.

Symptomatic Indices of Consumers' Incomes and Investment Activity[1] (1930)

A symptomatic index of incomes of the urban population may be constructed from data on the consumption of wheaten bread and meat. Workers' consumption, which like no other depends on business fluctuations, is relatively sensitive to changes in real incomes and for this reason it should be strongly correlated with fluctuations in the total income of small consumers; below we try to eliminate the influence of other factors that obscure this correlation.

Regarding investments, the growth rate of machine building and steel construction is represented by the data on sales of screws and rivets. In contrast to this index, which mainly represents industrial investments, the index of construction activity represents government, municipal, and housing construction in addition to industrial construction.

Food consumption. I recently discussed a method for calculating the index of consumption of wheaten bread (on the basis of excise data on yeast sales) and meat (on the basis of data on the slaughter of animals) in Poland.[1] The findings presented in this paper in terms of four-month averages are now arranged by quarters (see Table 48). The argument put forward there led me to the conclusion that changes in the consumption of wheaten bread depend mainly on the real incomes of consumers, whereas changes in the consumption of meat in addition to this depend on fluctuations in prices of flour and meat products. This manifests itself in a negative correlation between the ratio of the consumption of meat to the consumption of wheaten bread on the one hand, and prices of a bread-and-sausage sandwich (i.e. the cost of 1 kilograms of ryebread and 20 centigrams of pork sausage) on the other[2] (see Table 49).

The correlation coefficient for the two series compared is 0.962. As the regression curve the parabola of the second order was assumed and thus we got the equation: $y - 100 = 0.0142\ (x - 1000) - 0.582\ (x - 100) - 1.4$ (see Fig. 6).

[1] See M. Kalecki, 'Changes in Consumption of Wheaten Bread and Meat in Poland', this volume.

[2] This dependency was discussed in detail in my paper referred to in n. 1.

Table 48. *Indices of Consumption of Wheaten Bread and Consumption of Meat in Poland, 1925–1930 (1925–7=100, seasonally adjusted)*

Quarter		Consumption of wheaten bread	Consumption of meat
1925	I	92.6	85.6
	II	101.3	98.4
	III	97.9	105.3
	IV	99.5	101.7
1926	I	92.0	94.4
	II	94.5	91.4
	III	95.7	100.0
	IV	95.5	98.6
1927	I	100.7	100.1
	II	105.4	112.2
	III	110.3	102.9
	IV	117.1	111.0
1928	I	121.1	115.3
	II	120.6	123.2
	III	121.5	126.3
	IV	120.7	133.2
1929	I	122.3	124.4
	II	124.0	132.3
	III	123.3	133.1
	IV	124.8	124.4
1930	I	120.4	114.0
	II	124.0	128.0
	III	119.0[a]	

[a] Estimated.

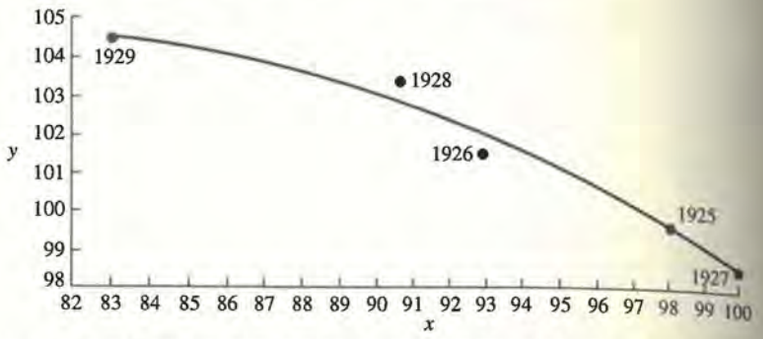
Table 49. *Relations of Consumption of Bread to Consumption of Meat in Poland, 1925–1929*

Year	Consumption of wheaten bread	Consumption of meat[a]	Relation of consumption of meat to consumption of wheaten bread (x)[a]	Relation of the price of bread-and-sausage sandwich to the ISBCP cost of living index[b] (y) (1927=100)
1925	97.6	97.4	99.7	98.0
1926	94.3	96.8	101.5	92.9
1927	108.2	106.8	98.7	100.0
1928	120.6	124.8	103.4	90.6
1929	123.2	128.5	104.3	83.0

[a] 1925–7 indices = 100

[b] In my paper referred to in n. 1 the prices of bread and sausage sandwich were divided by the index of the cost of food.

On the basis of this equation one can also calculate consumption in individual quarters according to the prices of the bread-and-sausage



x—ratio of meat consumption to consumption of wheaten bread;
y—ratio of a bread-and-sausage sandwich to the cost of living index

FIG. 6. *Regression Curve*

sandwich.[3] Dividing consumption of meat by *y*, we eliminate the influence of price fluctuations and get an idea of what the consumption of meat would be in a given quarter if the prices of bread and meat remained constant. These indices will hardly be identical with those of consumption of wheaten bread, for although *y*, calculated from the regression, is the ratio of consumption of meat to consumption of wheaten bread, it is already a corrected ratio from which seasonal fluctuations were eliminated. The results are shown in Table 50.

Both series, which represent the consumption of wheaten bread and meat after elimination of price fluctuations, mainly depend on the real incomes of consumers. Marginal influences and random distributions will be even less reflected in their arithmetical average. None the less, even the latter series only very roughly represents changes in consumer incomes. Above all, the empirical data themselves are not completely reliable. Moreover, in the above argument—the underlying assumptions of which are only probable—factors that also affect the consumption in question were note taken into account. For example, the sharp drop in meat consumption in the first quarter of 1930, after which there followed an increase in the second quarter, may probably be explained not so much by change in incomes as by the substitution of eggs for cold-cuts because of the exceptionally low price of eggs in the first quarter of 1930. On the whole, however, our 'food curve' shows with a fairly good approximation the actual course of changes in consumer incomes.

[3] However, the ratio of consumption of meat to that of wheaten bread must be calculated after the elimination of rather strong seasonal fluctuations.

Table 50. *Indices of Consumption of Wheaten Bread and Meat in Poland, 1925–1950 derived from the Regression Equation (1925–7 = 100; seasonally adjusted)*

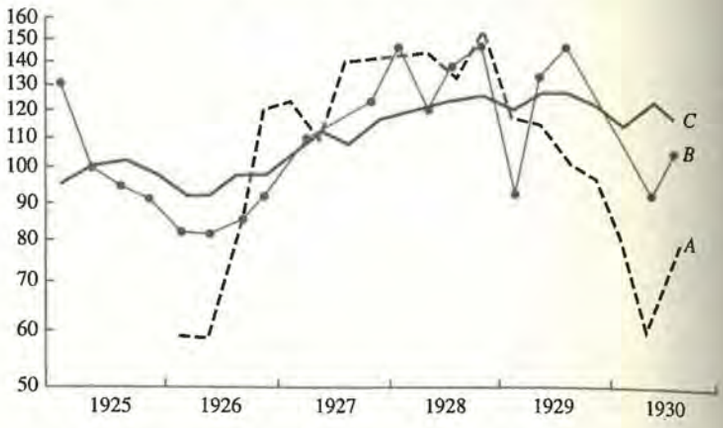
Quarter		Consumption of wheaten bread	Consumption of meat (price fluctuations eliminated)	Arithmetical average
1925	I	92.6	93.6	93.1
	II	101.3	99.2	100.3
	III	97.3	104.9	101.4
	IV	99.5	98.4	98.9
1926	I	92.0	91.2	91.6
	II	94.5	88.7	91.6
	III	95.7	98.3	97.0
	IV	95.5	99.0	97.3
1927	I	100.7	102.0	101.3
	II	105.4	114.0	109.7
	III	110.3	103.5	106.9
	IV	117.1	112.0	114.6
1928	I	121.1	114.2	117.7
	II	120.6	121.5	121.0
	III	121.5	122.0	121.7
	IV	120.7	128.0	124.4
1929	I	122.3	119.1	120.7
	II	124.0	126.8	125.4
	III	123.3	127.3	125.3
	IV	124.8	120.0	122.4
1930	I	120.4	110.0	115.2
	II	124.0	122.3	123.2
	III	119.0[a]		119.0[a]

[a] Estimated.

Industrial investments. In order to construct the index of industrial investments the sales of screws and rivets in the private market (i.e. without supplies for the state railways, etc.) were used, and the data are those of the syndicate that controls nearly all national production of these goods (their import is negligible). Screws and rivets are used mainly to manufacture and assemble machines and steel constructions. However, sales of screws and rivets only roughly reflected changes in investment activity because of (i) changes in stocks of screws and rivets, (ii) changes in stocks of machines they are used to build, and (iii) the import of machines for which domestic screws and rivets are not used.

The index of construction activity. As we have already shown elsewhere, the construction activity in ground-level structures is rather well represented by rail shipments of lime.[4] The relation

[4] See M. Kalecki, 'Sales of Lime as an Indicator of Construction Activity', this volume.



A—industrial investment; *B*—construction activity; *C*—food consumption (price changes eliminated).

FIG. 7. *Symptomatic Indices of Consumer Incomes and Investment Activity in Poland in 1925–1930 (logarithmic scale; 1925–7 = 100)*

between real incomes of consumer and industrial investments is characteristic for particular phases of the business cycle. Fluctuations in investments are always incomparably stronger than fluctuations in real incomes of the population and precede them. Construction activity occupies an intermediate position, since the business downswing is softened here by intervention through government and communal construction outlays and by favourable conditions for housing construction during depression, because of cheap building materials and credit.

These tendencies appear rather clearly in our curves (see Fig. 7). Both *investments* and the *construction activity* rise sharply from the middle of 1926, although industrial investments declined in the second quarter of 1927 because of uncertainty before the stabilization loan was received. The impact of this loan appears in both kinds of investments at the beginning of 1928, which was followed by a certain decline that was overcome in the last quarter of 1928. From the beginning of 1929 we note a continual fall in industrial investments, while construction activity, after a temporary dip due to the severe winter of 1929, remains at a high level and does not decline sharply until the fourth quarter of 1929. Both kinds of investment exceed their minimum in the second quarter of 1930; however, for construction this minimum is considerably higher than for industrial investments (as was also the case in 1926, though not to the same degree as in 1930; see Table 51).

Table 51. *Indices of Consumption of Food, Industrial Investments and Construction Activity in Poland, 1925–1930 (1925–7 = 100; seasonally adjusted)*

Year and quarter		Consumption of food seasonal fluctuations eliminated	Industrial investments[a]	Construction activity
1925	I	93.1	—	129.6
	II	100.3	—	98.3
	III	101.4	—	93.2
	IV	98.9	—	90.3
1926	I	91.6	58.9	81.1
	II	91.6	58.6	80.0
	III	97.0	79.6	84.1
	IV	97.3	118.7	91.6
1927	I	101.3	121.6	104.4
	II	109.7	108.9	111.9
	III	106.9	138.2	117.6
	IV	114.6	140.1	122.6
1928	I	117.7	142.3	146.6
	II	121.0	141.9	120.0
	III	121.7	133.9	138.6
	IV	124.4	153.1	149.9
1929	I	120.7	117.6	94.1
	II	125.4	115.3	133.0
	III	125.3	103.1	146.0
	IV	122.4	98.0	125.7
1930	I	115.2	79.6	105.5
	II	123.2	58.5	92.4
	III	119.0[b]	79.2	105.5

[a] The series on industrial investments represented by the sale of screws and rivets, for which we lack data for 1925, was combined with the food consumption series in the period 1926–7 so that for the years 1926–7 the sum of indices of both series is equal.
[b] Estimated.

The consumption of food shows similar trends to industrial investments. However, changes are much milder and delayed, and sometimes also distorted by random factors. For example, the severe winter of 1929 caused a slight decline in consumption, probably on account of increased expense on fuel. On the other hand, in the first quarter of 1930 there was a substitution of eggs for meat, on whose consumption our food consumption index is based. As regards comparison of changes in the consumption of food in 1925–6 and during the present depression, the fall is now less sharp, which results from the tendency for real wages to remain unchanged, in contrast to what happened during the 1925–6 crisis that was combined with price inflation.

An Index of Taxation of Commodities[1] (1930)

Taxation of commodities is defined here as taxation imposed in proportion to the volume of sales (other conditions unchanged). We shall consider three types of taxes: (i) the trade tax, (ii) the excise tax on sugar (i.e. the most important consumer tax), and (iii) the incomes of the spirit and tobacco monopolies. The index of taxation of commodities is defined as a ratio representing all changes in tax revenues that do *not* depend on the volume of sales. This index is constructed as follows. First, the figures on budget implementation in 1927/8 are taken as the base of our calculations and hypothetical budget revenues are calculated for other budget years on the assumption that the sales of each commodity are the same as they were in 1927/8. Dividing the series thus obtained by the actual tax revenues in 1927/8 we obtain the indices of tax rates on each commodity under examination. To obtain an overall index, the sum of hypothetical budget revenues on these commodities is divided by the sum of the actual budget revenues in 1927/8.[1]

The trade tax. To eliminate changes in the volume of taxed commodities the actual tax revenues in each tax-year are divided by the indices of industrial output calculated by the ISBCP (see Table 52). In that case the effective rate of taxation depends on prices of industrial goods because a turnover tax is calculated in relation to the value of sales, and on the technique of tax collection.

Sugar excise. The basic nominal rate of sugar excise has not changed in the period under examination. The only changes in sugar excise taxation resulted from the introduction of the 10% extra tax, on 16 August 1926, and from changes in the rate of exchange in 1926. Thus, to eliminate changes in the volume of sugar taxed, for the budget years 1928/9 and 1929/30 the same sugar excise revenues must be taken as those in 1927/8; they amounted to Zl.118.1 million. For 1926/7 corrections must be made for both the extra 10% tax introduced in the fourth month of the 1926/7 budget year, and the

[1] In constructing this index the import tariff was not included because it is more of a protective than fiscal nature; when import tariffs are increased, they usually aim at obtaining revenues on a smaller volume of sales of imported goods.

Table 52. *Trade Tax Rates in Poland, 1926/27–1929/30*

Budget year	Actual revenues from trade tax[a] (Zl. m.)	Index of industrial output	Quotients of actual Treasury revenues and indices of industrial output	Rate of taxation index	Index of prices of wholesale industrial goods
1926/27	232.1[b]	84.0	276.3	89.2	91.8
1927/28	309.9	100.0	309.9	100.0	100.0
1928/29	385.5	110.4	349.2	112.7	102.5
1929/30	381.2	104.6	364.5	117.6	100.0

[a] 10% tax included.
[b] Recalculated in terms of the 1927 parity of the zloty.

fluctuations in the rate of exchange. Considering these corrections, sugar excise revenues in 1926/7 were Zl.110.7 million.

Spirit monopoly. To eliminate the impact of changes in the volume of sales, the actual Treasury revenues from the spirit monopoly in each year were divided by indices of the volume of sales of spirits. This method is not precise because the product is not uniform. However, since changes in the structure of sales were insignificant, we may consider the results as a fair approximation. These results are shown in Table 53. The rate of taxation depends in this case on the difference between the monopoly price and the prices of raw materials.

Tobacco monopoly. The procedure followed here is the same as in the case of the spirit monopoly. The results are shown in Table 54.

The overall index of taxation of commodities. We shall now add together tax revenues in the above commodity groups that were corrected by eliminating the impact of changes in the volume of sales.

Table 53. *Rate of Excise Tax on Spirits in Poland, 1926/7–1929/30*

Budget year	Actual revenues from the spirit monopoly (Zl. m.)	Index of spirit sales	Quotients of actual Treasury revenues and indices of sales of spirits	Rate of taxation index
1926/27	268.8[a]	101.4	265.1	73.5
1927/28	360.8	100.0	260.8	100.0
1928/29	433.2	114.2	379.4	105.1
1929/30	419.8	113.0	371.5	103.0

[a] Recalculated in terms of the 1927 parity of the zloty.

Table 54. *Rate of Excise Tax on Tobacco in Poland, 1926/7–1929/30*

Budget year	Actual Treasury revenues from the tobacco monopoly (Zl. m.)[a]	Index of tobacco sales	Quotients of actual Treasury revenues and indices of sales of tobacco	Rate of taxation index
1926/27	297.7	92.4	302.7	81.3
1927/28	372.1	100.0	372.1	100.0
1928/29	384.5	107.5	357.7	96.1
1929/30	390.0	111.7	349.2	93.8

[a] 10% tax included.

Table 55. *Tax Rate on Commodities in Poland, 1926/7–1929/30*

Budget year	Treasury tax revenues (changes in the volume of sales eliminated)	Index of taxation of commodities	Index of wholesale prices for industrial goods
1926/7	954.8	82.2	91.8
1927/8	1160.9	100.0	100.0
1928/9	1204.4	103.7	102.5
1929/30	1203.3	103.6	100.0

Table 55 shows a comparison of the corrected indices with those of wholesale prices for industrial products.

Sales of Thread as an Indicator of Textile Business[1] (1931)

1. The final consumption of thread is closely related to the final consumption of textiles: thread is used to sew underwear and suits. Of course, the volume of thread used in sewing depends on the type of clothing: underwear sewing requires much less thread than suit sewing. The use of thread is therefore a symptomatic indicator of textile consumption, but it is a specifically weighted index since *woollen textiles will be relatively overrepresented compared to cotton textiles.*

The data on sales of thread are based on the statistics of a few factories that represent nearly all domestic production of thread, and on imports of thread on spools; thus the data are exceptionally complete (not included is imported thread which is not on spools and recorded in the foreign trade statistics together with yarn). Of course, the sum of sales of thread by domestic producers and importers is not identical with the final consumption of thread, since trade stocks of thread vary. However, because of the close relation between thread and textile production, changes in stocks will in general be of the same nature as those in the trade stocks of textiles. For this reason our series of sales of thread are likely to follow more closely the sales of textiles by retail shops than the final consumption of textile products. Indeed, the results of a survey carried out by the ISBCP on sales of the wholesale trade and the data on sales of thread show a

Table 56. *Sales of Thread and Textiles in Poland, 1927–1929*

	1927	1928	1929
Sales of thread (tonnes)	686.8	824.0	706.8
(1927–9 = 100)	92.9	111.5	95.5
Sales of textile wholesalers included in the ISBCP survey (Zl.m.)[a]	196.5	228.8	92.2
(1927–9 = 100)	95.3	111.0	93.5
of which sales of woollen products (Zl.m.)	84.4	102.9	86.8
(1927–9 = 100)	92.4	112.5	95.1

[a] The data are available since 1927 only.

large convergence for the years 1927, 1928, and 1929 (see Table 56). It will be seen that deviations in the index of thread sales and that of sales of woollen products from the index of total sales of textiles are in the same direction, which supports the close relationship between the use of thread and the use of woollen products noted above.

Let us now compare the sales of thread and textile output, which we shall express in terms of man-hours worked. However, as the index of sales of thread represents in this case domestic sales of textiles, the number of man-hours worked will be reduced in proportion to the share of textile exports.[1] Moreover, for reasons explained above, the sales of thread must be compared with the output of woollen products alone. However, because of a lack of corresponding employment statistics, as an approximate index of this output we shall use the index of domestic sales of worsted fabric[2] that, as it follows from Landau's essay, is used not only in the production of better-quality woollen textiles but also, combined with coarse yarn, is used in large quantities for the manufacture of lower-quality textiles[3] (see Table 57 and Fig. 8).

Table 57. *Sales of Thread and Textile Production in Poland, 1925–1930 (1927–9 = 100)*

	1925	1926	1927	1928	1929	1930
Sales of thread	55.6	61.4	92.9	111.5	95.5	84.9
Total textile output	69.0	69.5	100.0	105.5	94.5	74.0[a]
Production of woollen textiles (i.e. sales of worsted yarn)	64.6	61.0	103.0	105.9	91.2	74.0

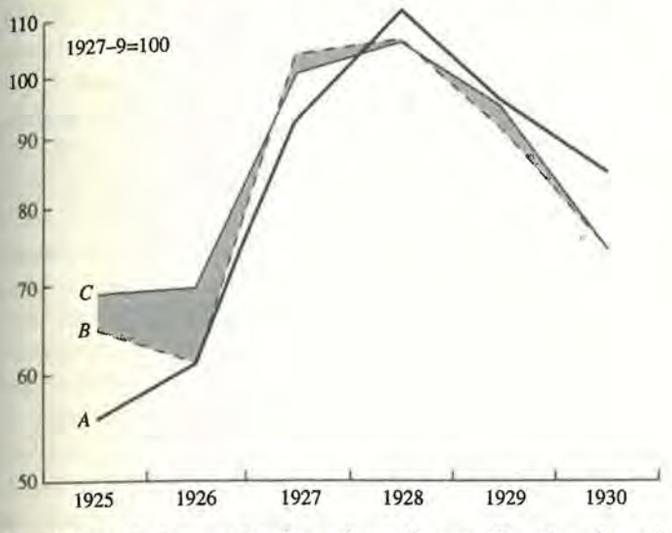
[a] Estimated.

We have concluded above that the sales of thread are probably a reliable approximate index of purchases of textiles by the retail trade. Thus the difference between changes in textile production and changes in sales of thread would give some idea on stock changes in

[1] The share of textile exports was calculated on the basis of B. Winawerówna, *The Importance of Export for the Polish Industry*, ISBCP, Sprawozdania i Przyczynki Naukowe, vol. viii, Warsaw, 1930 (in Polish).

[2] According to data on sales of the Convention of Spinners of Worsted Fabric, plus imports.

[3] See L. Landau, 'Worsted Yarn Industry in Poland', *Koniunktura Gospodarcza*, 3/5 (1930) (in Polish).



A—sales of thread; *B*—production of woollen textiles (i.e. the sales of worsted yarn); *C*—total textile output.

FIG. 8. *Sales of Thread and Textile Production (logarithmic scale)*

factories and wholesale trade warehouses.[4] However, since in our index of sales of thread, used as an approximate index of the sales of textiles, woollen goods are relatively overrepresented compared to cotton textiles, the curve of thread sales index should be compared not with the curve of total textile production but with a curve drawn somewhere between this curve and the curve of production of woollen textiles, i.e. in the shaded area in Fig. 8.

From this comparison it may be concluded that stocks in factories and warehouses increased in 1925, 1926, and 1927, and fell in 1928, 1929, and 1930. Large stock changes are noticeable in 1925 and 1927 (stock rises) and 1930 (stock reduction). These results correspond rather well with actual developments. There was overproduction in 1925 and stocks accumulated in factories and wholesale warehouses were depleted during 1926. However, at the end of this year sales strongly increased, was followed by a rise in stocks, and hence at the year-end stocks might have increased slightly. In 1927 stocks

[4] In the three-year period, 1927–9, taken as the period of reference in our study, the change in stocks was probably insignificant in relation to the volume of sales. Therefore the differences between the indices relating to this reference base represent changes in stocks in each year. Since these indices are not precise, our results may be considered as a rough approximation only.

continued to rise together with sales and at the end of the year there appeared the first symptoms of overproduction. This finds no reflection in 1928 in stock rises in factory warehouses but through extending the terms of bills passed on to the retail trade or sold to final consumers on credit terms.[2] The general strike of textile workers in the fourth quarter of 1928 even resulted in a reduction of factory stocks compared with their value at the end of 1927. A rise in production in early 1929 to offset output reduction caused by the strike soon ended; a wave of bill protests caused a shortage of circulating capital among textile-producers and forced them to reduce stocks by cutting output. In the autumn overproduction reappeared, although on a small scale. As a result, 1929 ended with a small reduction in stocks. In 1930 poor financial liquidity of producers continued and sales fell in the face of a general business crisis. Hence there followed a sharp reduction of stocks that was not offset during a short period of overproduction in the autumn, similar to that of 1929.

2. We now turn to a rather different question, namely to a comparison of sales of thread with the symptomatic index of real incomes of urban consumers, constructed on the basis of consumption of wheaten bread in towns.[5] We have already pointed out that sales of thread are not identical with final consumption. Nevertheless, especially when annual periods are considered, fluctuations in these sales are likely to depend most on fluctuations in consumption and hence on fluctuations in the final consumption of textiles. Therefore there should exist a strong correlation between the index of real incomes of consumers on the one hand, and sales of thread on the other.

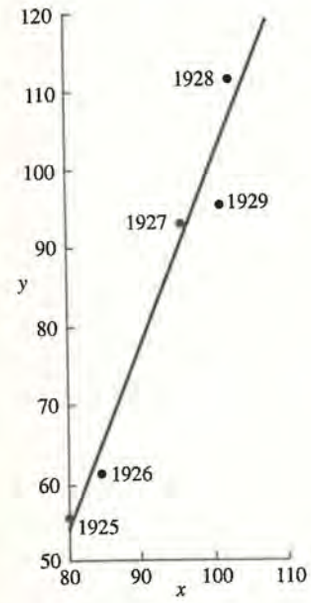
It must also be noted, however, that in addition to some imprecision in representing final consumption of textiles by sales of thread, there are also other factors that disturb this relationship: (i) the index of real incomes refers to urban customers alone which is not true of the index of sales of thread; and (ii) the expansion and reduction of consumer credit may strongly affect consumption.

A direct comparison of the two series under consideration shows no clear interrelation between them. However, if the series of real income indices is lagged half a year, i.e. the index of sales of thread in 1925 is compared with the index of real incomes in the second half

[5] See M. Kalecki, 'Symptomatic Indices of Consumers' Incomes and Investment Activity', this volume.

Table 58. *Sales of Thread and Indices of Real Incomes based on Food Consumption, 1925–1929 (1927–9 = 100)*

	1925	1926	1927	1928	1929
Sales of thread	55.6	61.4	92.9	111.5	95.5
Indices of real incomes based on food consumption	83.8	80.2	92.0	103.0	104.0
Indices of real incomes based on food consumption lagged half a year	80.0	84.5	96.0	102.7	101.3



x—index of real incomes, based on food consumption;
y—the index of sales of thread
FIG. 9. *Regression Line*

of 1925 and the first half of 1926, and so on, then the two series show great consistency (see Table 58 and Fig. 9). The correlation coefficient is + 0.976 and the regression equation is $y = 2.3x - 130$.

Thus we see that changes in the real incomes of consumers lag significantly behind changes in textile consumption. This may be explained as follows. During a business crisis real incomes of consumers are still at a high level but both white- and blue-collar workers become uncertain of the future and they do not spend their savings on clothing, nor do they buy clothing on credit. The middle class also

already feels financial strains and reduces their purchases of clothing; at any rate, during the preceding boom they have already become well stocked in clothing. During a business recovery the situation develops in the opposite direction: although incomes have improved as yet only a little, optimistic white- and blue-collar workers spend their savings freely or purchase on credit for this purpose. The middle class enjoys financial liquidity in money markets and it hastens to renew its stocks of clothes.

The inclination of the regression line shows that changes in the consumption of clothes not only precede changes in real incomes of consumers, but that the former are much stronger than the latter. This is natural for any flexible consumption, such as textile consumption in Poland.

The largest deviations from our regression line are for 1928 and 1929. Probably they can be explained by the operation of the above-mentioned factors that disturb the relationship between real incomes of consumers and the sales of thread. Thus, very large textile consumption in 1928, compared to our regression line, may follow from a large expansion of consumer credit, and very small consumption in 1929 may be due to the agricultural crisis that sharply reduced purchases by the countryside.

3. The annual data on sales of thread have been used in our study; yet, for 1928–30 quarterly data are also available. As they do not show any clear changes (see Table 59) seasonal fluctuations have not been eliminated.

Table 59. *Quarterly Sales of Thread, 1925–1930 (1927–9 = 100)*

Quarter	1925	1926	1927	1928	1929	1930
I	—	—	—	115.3	94.0	71.5
II	55.5	61.4	92.9	115.3	92.9	77.5
III				101.6	97.5	97.8
IV	—	—	—	114.0	98.2	92.9

Elimination of Seasonal Fluctuations from Unemployment Rates[1] (with Jan Wiśniewski) (1931)

In business surveys of the Institute for the Study of Business Cycles and Prices the labour market is represented by the following series: (i) the number of the recorded unemployed (b), except for agricultural workers, transportation workers, domestic servants, adolescents, and white-collar workers; (ii) percentage ratio of the number of unemployed to the sum of this number and the number of the employed (z) in mining, metallurgy (data of the Ministry of Industry and Trade), and manufacturing industry, except for seasonal workers in sugar factories (Central Statistical Office data for factories employing more than twenty workers only): $\alpha = 100b/(b + z)$, where α is the rate of unemployment gross of seasonal fluctuations.

Elimination of seasonal fluctuations from these indices by means of the commonly used Harvard method cannot be considered satisfactory. This method assumes that seasonal fluctuations of any given index are proportional to its non-seasonal volume; however, it is difficult to maintain that in periods of increased unemployment its seasonal fluctuations also increase. On the contrary, it is usually believed that the assumptions of the Harvard method are best suited to indices of the number of the employed. This means that in periods of lower employment fluctuations in employment are smaller, or, in other words, that in periods of greater unemployment fluctuations in unemployment are smaller.

The last assertion leads us to a more suitable method for eliminating seasonal changes from the indices of rates of unemployment: the Harvard method should be applied not directly to the rate of unemployment but to the rate of employment indices, $100-\alpha$. After calculating the seasonal indices of the series $100-\alpha$, we divide each of them by the corresponding component of this series. We then subtract these employment rates (from which seasonal fluctuations were thus removed) from 100, thereby obtaining 'corrected' rates of unemployment with seasonal fluctuations eliminated. For example,

Table 60. *Rates of Unemployment, α, in Poland 1925–1930 (end-month data)*

Month	1925		1926		1927		1928		1929		1930		Seasonality indices (100–α)
	a	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*	
I	14.1	9.4	35.2	31.6	21.8	17.5	19.1	13.6	16.0	11.4	24.1	19.9	94.8
II	15.3	10.0	34.3	30.2	21.7	16.8	17.7	12.5	17.7	12.5	27.3	22.7	94.1
III	15.5	11.2	33.1	29.7	20.6	16.6	16.4	12.2	16.9	12.7	28.7	25.1	95.2
IV	15.3	12.9	30.2	28.2	19.2	16.9	14.7	12.2	14.4	11.9	27.2	25.1	97.2
V	14.8	14.1	28.6	28.0	17.4	16.7	12.8	12.1	11.6	10.9	23.0	22.4	99.2
VI	14.1	15.0	26.4	27.2	15.8	16.7	11.2	12.2	10.3	11.3	21.5	22.4	101.1
VII	15.0	17.1	24.3	26.1	14.6	16.7	9.9	12.1	9.7	11.9	20.4	22.3	102.5
VIII	16.8	20.0	21.9	24.9	13.0	16.3	8.9	12.4	9.0	12.5	18.3	21.4	104.0
IX	18.3	22.5	19.5	23.6	11.5	16.0	7.5	12.2	8.0	12.7	17.8	22.0	105.4
X	20.3	24.3	17.6	21.7	11.6	16.0	7.5	12.2	9.0	13.6	17.5	21.6	105.3
XI	24.2	26.1	17.6	19.7	13.8	16.0	9.1	11.4	12.5	14.7	22.5	24.5	102.6
XII	30.0	29.1	20.3	19.2	16.8	15.7	12.6	11.4	19.6	18.5	32.1	31.2	98.7

Note: *a*—original; *b*—corrected.

for March 1929, $\alpha = 16.9$; $100 - \alpha = 83.1$; the March seasonal index for the rate of employment is 95.2; hence the rate of employment corrected for seasonal changes is 83.1/0.952 = 87.3, and the corrected rate of unemployment is 100 – 87.3 = 12.7. The corrected rates of unemployment in Poland in 1925–30, and the original rates are given in Table 60.

The rate of unemployment series corrected for seasonal fluctuations is a significant index not only from the point of view of the labour market, but also as an important supplement to the production index calculated by the ISBCP. For manufacturing industry, this index is based on output figures of factories which employ more than twenty workers; hence it does not reflect fluctuations in output of small plants. On the other hand, these fluctuations are represented in the unemployment figures that are based on statistics of the total numbers of the recorded unemployed. Regarding the rate of unemployment indices, fluctuations in small industry affect not only the numerator of this fraction (the number of the unemployed), but also its denominator (the number of the unemployed plus the number of the employed in factories with more than twenty workers); a reduction in the number of the employed in factories with less than twenty workers increases the numerator and the denominator of the fraction by the same volume. Since the numerator is much smaller than the denominator, however, the fraction will rise or fall together with the numerator.

Thus we see that the rate of unemployment sheds some light also on changes in the volume of output. As regards the latter use of this index, it can be improved by considering partial unemployment, converting the numbers of the unemployed into those completely unemployed. This recalculation is based on the data of the Central Statistical Office on average number of hours worked per week in manufacturing industry (g), the number of the employed (z), and the volume of output (p). Then we calculate the number of the completely unemployed, corresponding to partial unemployment in manufacturing industry, c, from the equation: $c = p(46–g) : 46$. Next we add c to the number of the recorded unemployed and divide this sum by the sum of the unemployed and the employed, $\beta = 100(b + c) : (b + z)$ where β is the rate of unemployment inclusive of the partially unemployed and gross of seasonal fluctuation. We should not forget that g depends not only on partial unemployment, but also on the number of overtime hours, work on holidays in some branches of

Table 61. *Rates of Unemployment, β, in Poland, 1925–1930 Inclusive of Partial Unemployment (end-month data)*

Month	1925		1926		1927		1928		1929		1930		Seasonality indices (100–α)
	a	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*	
I	16.1	10.5	39.7	35.6	21.7	16.4	18.2	12.7	16.5	10.9	27.7	22.9	93.7
II	18.9	12.0	37.4	32.1	22.0	15.5	17.8	10.9	19.4	12.6	31.1	25.3	92.2
III	17.2	12.0	35.1	31.0	21.0	16.0	16.5	11.2	17.0	11.8	32.4	28.1	94.1
IV	15.7	12.6	32.0	29.6	19.7	16.8	16.8	13.8	14.4	11.3	30.4	27.9	96.5
V	16.6	14.8	32.4	30.9	17.1	15.3	14.2	12.3	15.4	13.5	25.9	24.3	97.9
VI	14.2	15.2	28.1	29.0	15.9	16.9	11.3	12.3	12.9	13.9	23.7	24.6	101.2
VII	15.1	17.5	25.3	27.4	14.5	16.9	10.3	12.8	11.7	14.2	22.2	24.3	102.9
VIII	18.8	22.3	22.3	25.7	13.0	16.8	9.4	13.4	10.9	14.9	20.0	23.5	104.6
IX	22.0	26.0	19.5	24.6	11.8	17.4	7.6	13.5	8.1	14.0	19.3	24.4	106.8
X	24.3	29.3	17.5	23.0	11.4	17.3	7.6	13.8	9.1	15.1	19.1	24.5	107.1
XI	28.3	31.7	17.5	21.5	13.4	17.6	8.5	12.9	13.8	18.0	24.6	28.2	105.1
XII	33.4	31.9	19.9	18.1	16.9	15.0	12.6	10.6	21.2	19.4	34.2	32.7	87.8

Note: a—original; *b*—corrected.

FIG. 10. *Unemployment Rates, α and β, in Poland, 1925–30 (logarithmic scale)*

industry, etc. These factors increase g, hence they reduce c, which in certain cases can even be negative; β is then smaller than α (see Fig. 10). Seasonal fluctuations may be eliminated from the β series in exactly the same way as from the α series. Table 61 shows the original series of unemployment rates in Poland in 1925–30, when account is taken of the partially unemployed, as well as the corresponding corrected unemployment rates.

As can be seen in Fig. 10, curve α is smoother than curve β. There is nothing strange about this, since small and short-term fluctuations in the volume of output as a rule manifest themselves mainly in changes in the number of days of work, and only more far-reaching changes cause the dismissal or hiring of workers.

A Survey on Wholesale Trade[1] (1931)

Introduction

Subject of enquiry. The purpose of the survey on wholesale trade made by the ISBCP for 1927–30 and continued this year is to provide *monthly* data on turnover and stocks of wholesalers. Originally, the survey was intended to cover all important branches of manufacturing but because of lack of satisfactory statistical information its scope was limited to the iron and textile trades alone. At present, about one hundred wholesalers respond to the questionnaire circulated by the Institute; about 25% of replies represent the iron trade and 75% the textile trade.

Methods of analysis. Concerning *turnover*, the *nominal* value of sales of individual wholesalers in each branch is summed up and then (i) these values are divided by the respective price indices to obtain the real value of turnover;[1] (ii) seasonal fluctuations are eliminated. In the case of the iron trade, only the sales on wholesalers' own accounts are included, and in the case of the textile trade commission sales are also included for reasons that will be discussed below.

Concerning *stock changes*, direct information on stocks is available only from data from the end-year inventory volume of goods bought on own account. These nominal values of stocks are summed up and divided—as in the case of sales volumes—by the respective price indices in order to obtain the real values of stocks.

The value of stocks in the course of the year is estimated as follows. Next to information on their sales, our respondents provide also information on their purchases each month. The difference between purchases and sales on own account represents changes in stocks in that month, provided that sales and purchases were made at the same prices which in general is obviously not the case. Furthermore, direct comparisons of sales and purchases are distorted to even a greater extent by the fact that information on purchases is less complete, representing only larger deliveries of goods bought, than information on their sales. Hence, to make information on purchases compatible

[1] Because of lack of satisfactory information on price changes our results are of a tentative nature only.

with that on sales, the former must be augmented by a coefficient whose average value for the year as a whole may be represented as $k = (A + M)/B$, where A is the value of annual sales on own account, B is the value of annual purchases, and M is the annual change in stocks (calculated from the data on stocks at the beginning and end of the year). Multiplying the value of purchases in each month by k and subtracting from the product the value of sales, we get approximate values of changes in stocks and their value each month. The coefficient k, however, can be calculated only after the end of the year. Hence, to estimate changes in stocks in the course of any given year, the previous year's coefficient k must be used and only in the following year these estimates can be corrected.

Iron Trade

The structure and representativeness of information. In this branch of trade our respondents are mainly direct customers of the Syndicate of Iron Mills, and the chief products they buy there are rolled goods (the rest includes sheet zinc, nails, wire, tools, pots and pans, and other iron products). Sales of rolled goods by wholesalers are made on their own account and commissioned sales are of a 'transit' nature, i.e. the buyer places his order in the Syndicate through the wholesaler but the ordered goods are shipped directly from the iron-mill to the buyer. More than half of 'transit' sales of wholesalers represent deliveries for various industries (especially for the metal industry), and the rest for smaller buyers. Sales from warehouses, however, directly or indirectly meet the needs of construction, crafts, and farmers. Hence the destination of sales from warehouses is of a more definite nature than that of total sales, 'transit' sales included, and for this reason in our study only sales from warehouses are included, especially as we have an additional source of information on total sales of rolled goods.

More than 80% of our respondents buy their stocks directly from the Syndicate and on their own account. The value of these sales in 1928 was Z1.93 million, and, according to Treasury statistics, the value of total sales of iron products in 1928 was Z1.0.5 billion.

Turnover. Table 62 shows seasonal coefficients of the sales of iron from wholesale warehouses, and Fig. 11 represents these sales after elimination of seasonal fluctuations in 1927–30. It may be assumed a priori that in the sales of iron from warehouses a large role is played

by iron products used for construction, and among them girders and bar iron, both used at the same stage of construction as bricks; therefore a close correlation between the sales of iron products and sales of bricks may be expected. Such correlation does take place (see Table 63 and Fig. 12): the coefficient of correlation between seasonal coefficients of the sales of iron products and railway shipments of bricks is + 0.865 and the regression equation is $y = 0.52x + 0.48$, where y is the seasonal coefficient of sales of iron products and x is the seasonal coefficient of railway shipments of bricks.

Our regression equation, $y = 0.52x + 0.48$ means that the seasonal sales of iron products in approximately 52% is equal to the seasonal sales of bricks and in 48% it is not subject to seasonal fluctuations. Of course, it does not follow that the share of 'construction iron' in total sales of iron products from warehouses is about 52% because, above all, the sales of 'non-construction iron' are also subject to seasonal fluctuations. A comparison of annual sales of bricks and iron products gives a correlation coefficient equal to + 0.995 and a regression equation, $y = 0.74x + 0.26$. It appears therefore that sales of iron each year were such that 74% of them changed in step with the sales of bricks and 26% remained constant. The share of 'construction iron' in total sales of iron products by wholesale trade

Table 62. *Seasonality Coefficients in Wholesale Turnover of Iron, 1927–1930*

Month	Coefficient	Month	Coefficient
January	77	July	111
February	86	August	117
March	105	September	123
April	87	October	117
May	94	November	103
June	100	December	80

Table 63. *Sales of Bricks and Iron Products, 1927–1929 (1927–9 = 100)*

Year	Sales of bricks[a]	Sales of iron products	
		actual	calculated from the regression equation
1927	84.0	86.6	88.1
1928	118.2	112.2	114.1
1929	97.5	101.1	98.1

[a] According to the GUS annual statistics of output and stocks.

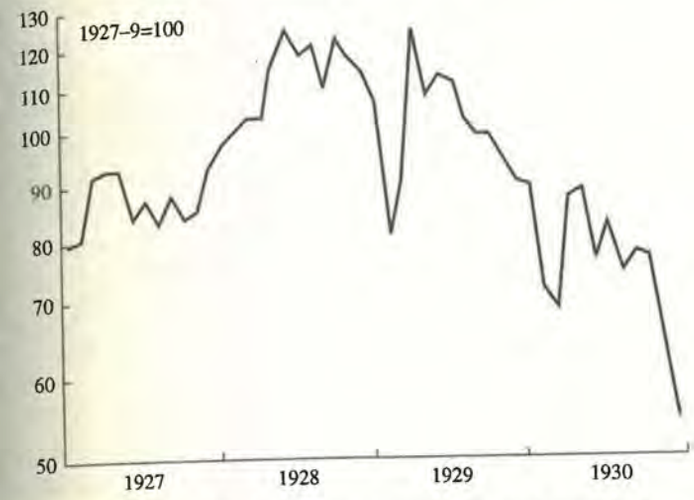
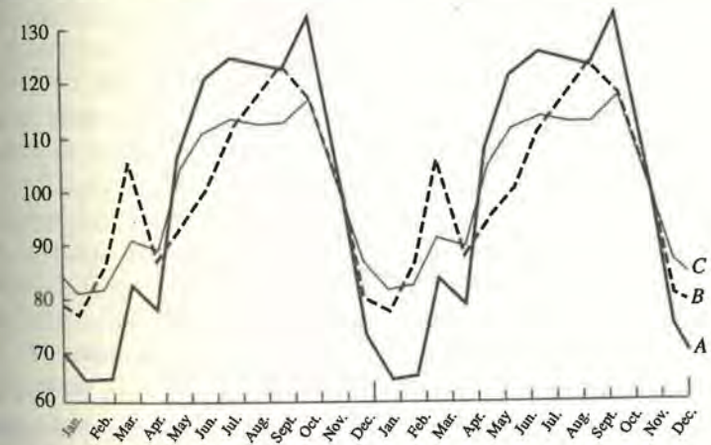


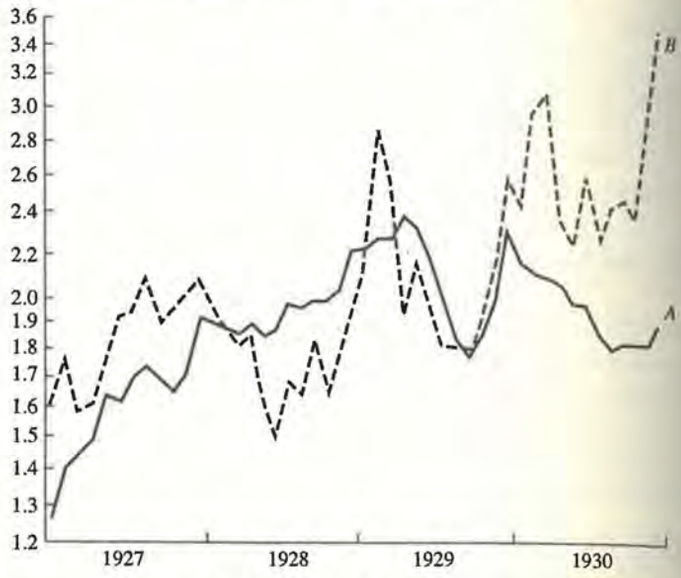
FIG. 11. *Sales of Iron Wholesale Warehouses (logarithmic scale; seasonal fluctuations eliminated)*

obtained from our calculations is probably too high, however, because other sales of iron products—what we know of from direct sources of information—exhibited also changes of a similar nature, although they were much smaller.



A—shipments of bricks; *B*—actual sales in iron wholesale warehouses; *C*—sales of iron wholesale warehouses calculated from the regression equation

FIG. 12. *Seasonality Coefficients (arithmetic scale)*



A—the average sales in 1927–9 = 1; *B*—sales in any given month = 1

FIG. 13. *Stocks in Iron Wholesale Warehouses at the End of the Month (logarithmic scale)*

It follows from the above that, with some reservations, the results of our survey on the sales of iron products are a valuable indicator of changes in construction. Using these results not only in annual, but also in monthly intervals encounters difficulties in so far as we do not have sufficiently reliable monthly indicators of construction activity. The index of employment in construction does not accurately represent overground construction,[2] and, at the same time, railway shipments of bricks represent too small a part of their total sales.[3] Even a first glance at the curve of sales of iron products shows that in some industries it also fails as an indicator of construction activity. For instance, a temporary rise in the first half of 1927 followed exclusively from anticipatory purchases in expectation of a rise in prices of rolled products.

Stocks. In Fig. 13 changes in stocks are expressed in terms of: (i) their ratio to average monthly sales in 1927–9, and (ii) their relation

[2] This index is calculated on the basis of data supplied by firms that to large extent deal in earth construction works and only on a small scale in housing construction (see Ludwik Landau, *Survey on Construction Works in 1927–1929*).

[3] None the less, we have used above the coefficients of seasonality of brick shipments because in this respect the representativeness of a given fraction of total sales is better than in the case of business fluctuations.

to sales in the same month. The first sequence represents the actual changes in stocks and the second sheds some light on the adjustment of stocks to the volume of sales at any given moment. Despite some seasonal fluctuations (of rather an irregular nature) that have not been eliminated, stocks tended to increase from the beginning of 1927 until the middle of 1929 and to fall in 1930. The decline in wholesale trade stocks in 1930 was 0.42 of the average monthly sales in 1927–9, i.e. 3.5% of annual sales. According to the above data, the sales of wholesale trade in 1930 were 25% less than the average in 1927–9. It follows that the fall in stocks of the wholesale trade had only a relatively small influence on the output of iron-mills.

The ratio of stocks to sales increased in 1927, fell in 1928, and increased again in 1929 and 1930. The ratio of the average volume of stocks in the course of the year to the average volume of sales in that year ranges between 1.75 in 1928 and 2.74 in 1930.

Textile Trade

The structure and representativeness of information. Our respondents in the textile trade are direct buyers from large and medium-size industry, and for this reason they may be representative for the textile industry as a whole only in periods when the sales of large and small producers do not show large divergencies. The sales of our respondents (on own account and on commission basis) who deal in textiles, in 1928 represented 15% of total sales of textiles; for our respondents who deal in the cotton trade this ratio was 20%, and for those who deal in wool it was 10%.

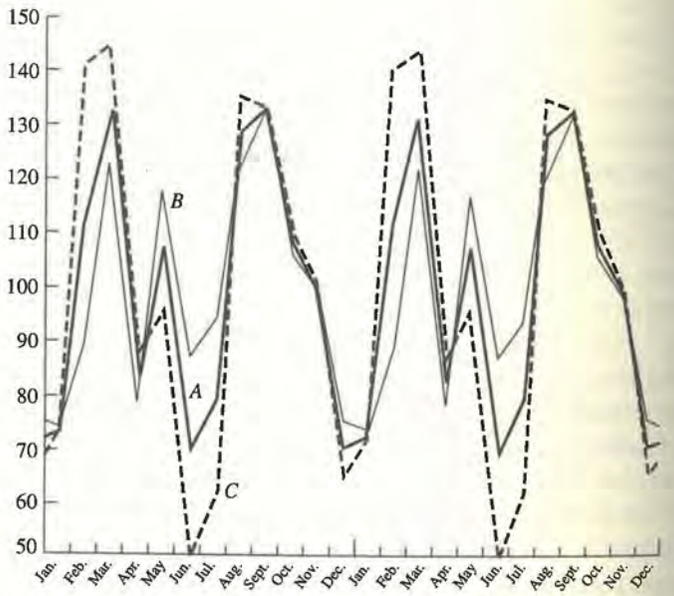
Sales. Table 64 and Fig. 14 represent the monthly indices of seasonal trade in textiles. Two seasons may be clearly distinguished in these indices, in both the cotton and the wool trade. The quarterly index of seasonal sales in textiles shows a similar pattern of development to the index of output, and the amplitude of fluctuations is greater for the former than for the latter. Thus the sale 'season' for wholesalers is at the same time a 'season' for textile manufacturers. However, the industry prepares a part of seasonal output in advance and therefore during the season output increases less than sales do, and it also declines less once the season ends.

In Fig. 15 sales indices are drawn (seasonal fluctuations eliminated). The overall index of sales of textiles is a weighted average of

Table 64. *Seasonality Indices of Wholesale Trade in Textiles*

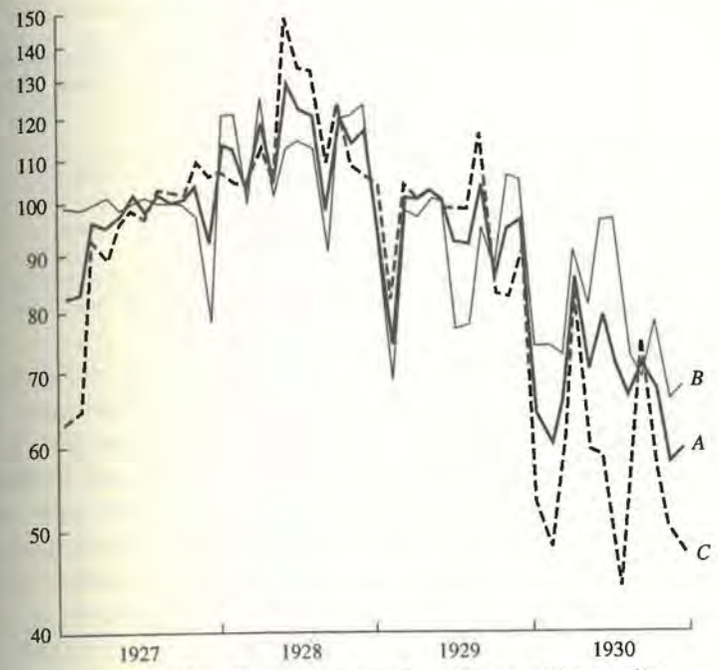
Month	Cotton textiles	Woollen textiles	Total textiles		Textile output[a]
			monthly	quarterly	
January	74.0	72.1	73.1		
February	89.5	141.2	113.3	106.3	102.1
March	122.7	144.8	132.8		
April	78.5	87.3	82.5		
May	117.8	96.5	108.0	86.7	95.3
June	87.1	49.5	69.7		
July	94.1	62.2	79.4		
Augustt	123.3	135.7	129.0	114.1	104.0
September	133.1	133.7	133.3		
October	106.5	111.2	108.7		
November	97.9	100.7	99.2	92.9	98.6
December	75.5	65.1	70.7		

[a] According to the GUS quarterly data on employment.



A—total textiles; *B*—cotton textiles; *C*—woollen textiles

FIG. 14. *Seasonality Coefficients in Textile Trade (arithmetic scale)*



A—total textiles; *B*—cotton textiles; *C*—woollen textiles

FIG. 15. *Sales of Textile Wholesale Warehouses (logarithmic scale, seasonal fluctuations eliminated)*

'cotton' and 'wool' industries respectively,[4] where the weights are the approximate values of output supplied to the domestic market in the period 1927–9.

We shall now compare the results of our survey with some other indices of textile sales (see Fig. 15 and Table 65). The agreement between the survey indices of sales of textiles and the indices of sales of thread in 1927, 1928 and 1929 is striking, especially when one remembers that the respective indices are derived from totally different sources. Hence, it may be surmised that for 1927–9 our survey data accurately represent the actual development of textile sales. There appears a significant difference in 1930: the survey index is much smaller than the thread sales index. The reason is, no doubt, a deficiency in the survey data that is supported by the fact that the index of textile output (see Table 66) also shows a much smaller reduction than the survey index whereas, because of stock reductions

[4] Moreover, the overall index also includes the sales of mixed wholesalers who deal in cotton as well as in wool textiles.

Table 65. *Indices of Sales of Textiles, 1927–1930 (1927–9 = 100)*

Year	Sales according to survey data			Sales of thread[a]	Railway shipments of textiles
	cotton textiles	woollen textiles	total textiles		
1927	97.5	92.4	95.3	92.9	104.7
1928	110.0	112.6	111.1	111.6	107.3
1929	92.5	95.0	93.5	95.5	88.0
1930	76.3	57.7	67.2	84.9	58.9

[a] See M. Kalecki, 'Sales of Thread as an Indicator of Textile Business', this volume.

in 1930, the output index should in fact decline more than the corresponding sales index. This lack of representativeness of our survey follows from the structure of our information that, as noted above, takes into account only the sales of large and medium-size industry whose share in total sales in 1930 was, no doubt, reduced. It is noteworthy that the sales of woollen products, according to the survey data, declined much more than the sales of cotton products. This can be explained by much stronger competition in 1930 in small-size industry in the wool trade than in the cotton trade.

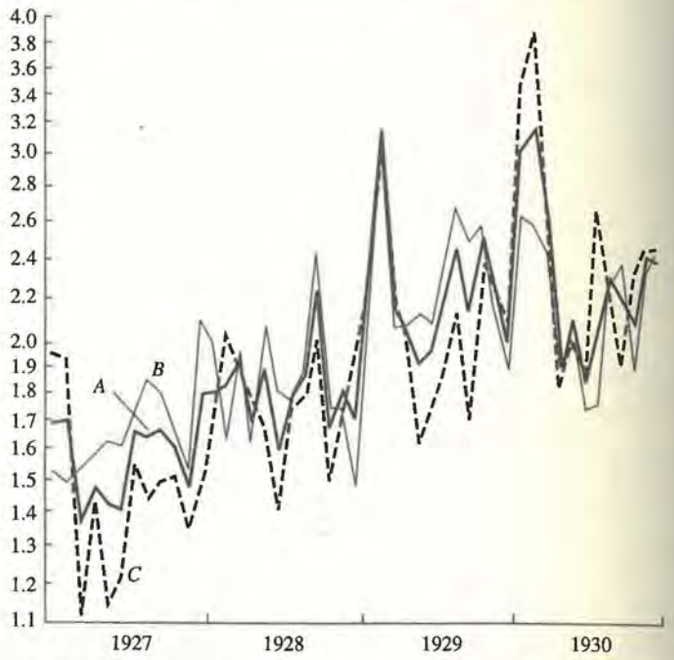
When the results of our survey are compared with the railway shipments of textiles, a large discrepancy appears throughout the whole period. Next to the possible impact of the development of road transport, this discrepancy is most likely explained by the fact that railway shipments reflect only the weight of textile sales, and thus quality changes in the transported textiles are not accounted for. If, for instance, given some constant weights of total sales and constant prices of each brand of textiles,[5] there is a shift towards brands where labour intensity per kilogram of raw material is greater, the value of sales will increase, too; in that case our survey indices based on the value of sales would show a rise although indices based on railway shipments would not show. However, if the differences between the results of our survey and those concerning railway shipments were a result of this factor, then similar differences should be observed between indices of employment and those of raw-material inputs in the textile industry.

Indeed, in 1927, 1928, and 1929 the ratios of indices of sales based on our survey and on railway shipments show a similar pattern as the

[5] As it has been noted in the introductory comments above, we have eliminated price changes recorded in our survey of sales.

Table 66. *Indices of Sales of Textiles, their Railway Shipments and of Textile Output in Poland, 1927–1930 (1927–9 = 100)*

Year	Sales of textiles according to survey	Railway shipments of textiles	Ratio of sales to shipments	Textile output		Ratio of employment to the use of raw materials
				according to employment	according to the use of raw materials	
1927	95.3	104.7	91.0	100.1	105.9	94.6
1928	111.1	107.3	103.5	104.2	103.5	100.7
1929	93.5	88.0	106.1	95.5	91.0	105.0
1930	67.2	58.9	114.1	74.6	81.0	92.2



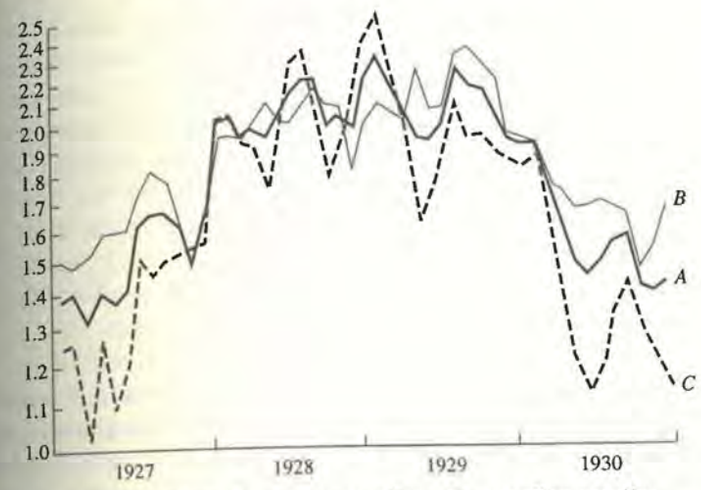
A—total textiles; *B*—cotton textiles; *C*—woollen textiles

FIG. 16. *Stocks in Textile Wholesale Warehouses at the End of the Month (logarithmic scale; the average monthly sales in 1927–9 = 1)*

ratios of indices of employment to those of raw-material inputs. This convergence disappears in 1930 due to the operation of specific factors: on the one hand, railway shipments, according to our survey, fell even more than did sales—possibly because purchases were made in smaller portions, and on the other hand, the use of raw materials shows a smaller decline than employment due to more intensive competition on the part of small manufacturers and handicraftsmen that are not included in labour statistics.

Thus a comparison of the results of our survey with other available statistical information shows that the former are a valuable business indicator provided that it is remembered that this indicator represents the sales of the large and medium-size industry only.[6]

[6] A comparison with other statistical information could be made for annual periods alone because the quarterly data on the sales of thread exist only since 1928 which makes the elimination of seasonal fluctuations from this series impossible: furthermore, as noted above, the railway shipments series are unsuitable for checking the results of our survey.



A—total textiles; *B*—cotton textiles; *C*—woollen textiles

FIG. 17. *Stocks in Textile Wholesale Warehouses at the End of the Month (logarithmic scale; sales in any given month 1927–9 = 1)*

Stocks. Changes in stocks of textiles, expressed in terms of (i) their ratio to the average monthly sales in 1927–9 and (ii) their ratio to sales in each month, are shown in Figs. 16 and 17. Seasonal fluctuations of a rather irregular nature have not been eliminated but this does not disturb the general pattern of business trends in this period.

The diagram in Fig. 16, which represents the actual changes in stocks, shows that stocks of the wholesale trade tended to rise from the beginning of 1927 until the middle of 1929 and then declined. In 1930 the reduction for all textiles taken together was 0.51 of the average value of monthly sales in 1927–9, i.e. 4% of annual sales during this period. According to our survey data, wholesale trade sales in 1930 were 33% lower that the average sales in 1927–9. It follows that the reduction in wholesale trade stocks influenced the reduction in total demand for textiles relatively little. Indeed, the latter depends on the relatively small volume of stocks that are equal approximately to a 'two-months' volume of their sales only (see below) than on the rather small fluctuations in stocks of wholesale trade (which in 1930 were reduced by 27%). Thus, it appears that for business fluctuations in the textile trade of much greater importance than changes in the wholesale trade are those in the retail trade where, naturally, the range of stocks in relation to the volume of sales is much higher.

The ratio of stocks to sales shows a more complex pattern that may be broadly outlined as follows. A rise in 1927 was followed by diversified tendencies in 1928, then by a rise in 1929, and again by diversified tendencies in 1930. The ratio of the annual average volume of stocks to the average sales in the same year oscillated for the cotton trade from 1.64 in 1927 to 2.26 in 1930, for the wool trade from 1.41 in 1927 to 2.45 in 1930, and for all the textile trade taken together from 1.54 in 1927 to 2.37 in 1930.

Conclusions

Our discussion shows that sales indices based on our survey of wholesale trade may play an important role in the studies of business fluctuations. The index of sales of iron products allows us to evaluate business activity in construction. The index of wholesale turnover of textiles is in general a more valuable indicator of textile business than the index of railway shipments of textiles, although we must remember that the former accounts for the sales of the large and medium-size producers only.

Furthermore, our enquiry into stock changes has shown that in both industries under consideration these changes were of secondary importance to their respective business fluctuations. Yet, even there changes in stocks may be of some interest as an indicator of changes in business conditions. Finally, indices of seasonal variations in sales are of great practical importance for wholesalers because they allow them to rationalize their seasonal purchases.

Indices of Consumption and Their Analysis[1] (1932)

On occasion of reorganizing its official reports, the Institute for the Study of Business Cycles and Prices begins a systematic publication of data on consumption, bringing together all their previous findings.[1] At the same time, new studies have been made about the dependence of the consumption of individual goods on the purchasing power of particular groups of the population, and the interdependence of various types of consumption.

1. *Consumption indices.* The following indices were selected as symptomatic for changes in total consumption: the consumption of wheaten bread (calculated on the basis of sales of yeast), cinema attendance, sales of sugar, imports of coffee and tea, consumption of beer, sales of tobacco, and kerosine sales. The consumption of meat and spirits was not included. Concerning meat, a wide range of substitution of other articles is possible, such as eggs, fish, dairy products, etc.; without comparing meat consumption with that of meat substitutes the index of meat consumption alone may lead to false conclusions on changes in total consumption. For example, because of a sharp fall of prices in 1931 consumption of meat increased considerably in comparison with that of the previous year, though the general volume of food consumption no doubt declined. Regarding spirits, in some periods their monopoly sales can be seriously affected by the illicit distilling of liquor, and hence official sales cease to reflect the actual volume of spirit consumption. It is very probable that the sharp decline in sales of spirits during the present crisis is to some extent due to this factor.

In all cases consumption is calculated in physical terms: consumption of sugar, coffee and tea, and tobacco, in kilograms, beer in litres, ticket sales to cinemas in numbers. Thereby changes that may take place in the brand structure of some of these articles will not be

[1] See M. Kalecki, 'Changes in Consumption of Wheaten Bread and Meat in Poland', this volume, and L. Landau and J. Wiśniewski, 'Studies of Changes in Consumption in Poland', *Koniunktura Gospodarcza*, 4/10 (1931) (in Polish).

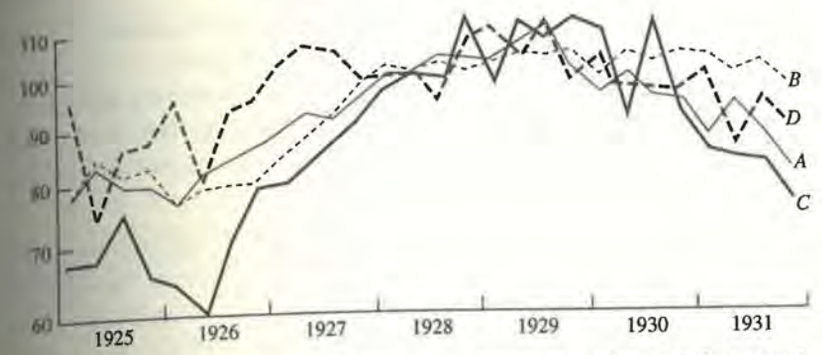
accounted for. The fall in consumption of tobacco during the present crisis, for example, would be much greater if we also took into consideration the worsening of quality by measuring consumption by the value of sales from which the impact of price changes was eliminated.

Limiting oneself to the study of changes in the volume of consumption would be a mistake if we constructed an aggregate index of consumption that would include all of its categories. For, as follows from the above, such an index, based on physical volumes of consumption of individual commodities, would not reflect all changes in the real value of expenditures on consumption. However, in our analysis we hardly use a complete list of consumer goods but merely a few indices that we regard as symptomatic. With such an approach it is even better not to consider changes in the brand structure of particular goods. The physical volume of consumption reacts much weaker to price changes of a given commodity than does its brand structure; hence if the latter is considered, we get a consumption index that is largely dependent on price changes of a given item and for this reason is less significant as a symptom of the volume of total consumption.

For example, an increase in the price of tobacco at a time when consumption expands because of an upswing in the business cycle may cause a significant switching by consumers to lower-quality brands of tobacco and the index of consumption that accounts for quality changes may fall. On the other hand, the impact of the price increase on the volume of tobacco consumption will be very weak and for this reason our index of consumption will not obscure the general trend of the business cycle.

We combine the indices of consumption of sugar, coffee and tea, and beer and tobacco into one index, which we may call the stimulants index. The component indices are weighted according to the value of consumption of individual commodities in the base-year of 1928. The weights in percentages are: sugar—35, coffee and tea—5 (coffee was converted into tea at a ratio of 0.4 which corresponds to the average price ratio of coffee and tea in Poland in 1928), beer—10, and tobacco—50. The indices of consumption in Poland in 1925–31 are shown in Table 67 and in Fig. 18.

On the whole, our indices do not represent final consumption but the sales of individual commodities by producers, or imports; hence they are not influenced by changes in stocks in wholesale and retail



A—stimulants; *B*—wheaten bread; *C*—cinema attendance (after trend elimination); *D*—kerosine

FIG. 18. *Indices of Consumption in Poland, 1925–1931 (logarithmic scale; 1928 = 100; seasonally adjusted)*

trade. Only the index of wheaten bread—based on the sales of yeast, which putrefies quickly—and the index of cinema attendance represent actual consumption in the strict sense of the term. The impact of changes in stocks is somewhat mitigated by our use of quarterly rather than monthly data. Moreover, the general stimulants index depends less on fluctuations in stocks than its component indices, since changes in stocks of the products in question do not as a rule take place at the same time and in the same direction. Moreover, for technical reasons stocks of kerosine are not large in relation to sales and consequently fluctuations in stocks have little impact on the sales of producers. Hence, if we use consumption indices of wheaten

Table 67. *Indices of Consumption in Poland, 1925–1931 (1928 = 100)*

Year	Urban consumption		Urban and rural consumption					Rural consumption
	wheaten bread (*x*)	cinema attendance (*y*)	sugar	coffee and tea	beer	tobacco	total stimulants (*z*)	kerosene (*w*)
1925	80.9	56.1	74.7	86.6	65.6	85.6	79.8	86.5
1926	78.1	59.2	79.5	82.8	66.0	85.7	81.5	91.7
1927	89.6	80.3	92.8	96.7	82.1	91.9	91.5	100.9
1928	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1929	102.2	110.9	106.6	104.0	108.5	101.4	104.1	103.9
1930	101.4	109.0	101.2	99.6	101.5	91.0	95.9	97.4
1931	99.8	95.6	92.6	101.5	79.0	84.6	87.6	91.5

bread, cinema attendance, stimulants, and kerosine, errors resulting from changes in stocks in trade will not be very great.

Our consumption indices of wheaten bread and cinema attendance represent urban consumption, the stimulants index represents urban and rural consumption, and the kerosine index represents mainly rural and small-town consumption.

2. *Correlation of the urban consumption indices.* If our assumption is correct that wheaten bread represents urban consumption, there should be a significant correlation between the index of consumption of this bread and the index of cinema attendance. In determining it, however, we must take into account that cinema attendance should show a much faster steady growth trend than the consumption of bread. This is explained not only by general factors, such as the growth in numbers of the urban population, but also by the constant dissemination of this new need. Hence, if we denote the consumption index of bread by x, that of cinema attendance by y, and the time counted from the base year of 1928 by t, then we must look for the correlation between y on the one hand and x and t on the other. The multiple correlation coefficient calculated for the period 1925–30 does indeed turn out to be very high: it is 0.994. The regression equation is:

$$y = 1.53x + 4.5t - 52.5. \qquad (1)$$

Table 68 gives a comparison of the actual cinema attendance, y, with that calculated on the basis of equation (1).

As we see, in keeping with the high correlation coefficient, the convergence of the two series is very marked in 1925–30. However, there is a very considerable difference in 1931, which is probably due to the exceptionally sharp reduction that year in prices of wheaten

Table 68. *Actual and Calculated Indices of Cinema Attendance in Poland, 1925–1931*

Year	Cinema attendance indices	
	actual	calculated from eq. (1)
1925	56.1	57.5
1926	59.2	57.9
1927	80.3	80.1
1928	100.0	100.5
1929	110.9	108.2
1930	109.0	111.6
1931	95.6	113.7

bread. This might soften the cyclical fall in consumption by raising consumption of wheaten bread at the expense of ryebread. Yet, with smaller price fluctuations of bread in previous years, this substitution apparently was not of great significance and did not disturb the correlation between consumption of wheaten bread and cinema attendance. That this divergence does in fact result from rather specific behaviour of the wheaten bread index is also confirmed by considerations in the last section of this paper.

The higher than unity coefficient of x in equation (1) corresponds to the greater elasticity of cinema attendance. Further, from equation (1) it follows that the steady growth trend in cinema attendance because of the popularity of this leisure activity is 4.5% annually. Thus, since 1928 was taken as 100, the coefficient of the trend is 4.5% of the cinema attendance in 1928. In the larger towns of Poland 30 million cinema tickets were sold in 1928. From this it follows that, with other factors unchanged, the popularization of cinema attendance causes an increase of 1.3 million tickets annually.

From equation (1) we find that cinema attendance, with its specific trend eliminated, will be $y' = y - 4.5t$ (where t is counted from 1928, i.e. in that year $t = 0$); the corrected indices of cinema attendance are given in Table 69.

3. *Dependence of the consumption of kerosine on the purchasing power of small farmers.* Because kerosine satisfies one of the most primary needs of the countryside, the purchasing power of the dominant class of small farmers will have a decisive impact on its consumption. Since the main source of income of these small farmers is the sale of animals, one can expect a clear correlation between these sales and the sales of kerosine. In Table 70 the income of

Table 69. *Consumption of Wheaten Bread and Cinema Attendance in Poland, 1925–1931, after Trend Elimination (1928 = 100)*

Year	Consumption of wheaten bread (x)	Cinema attendance after trend elimination ($y' = y - 4.5t$)
1925	80.9	69.6
1926	78.1	68.2
1927	89.6	84.8
1928	100.0	100.0
1929	102.2	106.4
1930	101.4	100.0
1931	99.8	82.1

Table 70. *Incomes of the Countryside from Sales of Slaughter Animals and Countryside Consumption Indices, in Poland, 1924–1931*

Year	Value of animals slaughtered[a]	Export of hogs	Total income from sale of animals	Index of income from sale of animals	Index of prices of industrial goods[b]	Index of purchasing power of the countryside (u)	Kerosine consumption index (v)
	Z1.m converted to gold			(1928 = 100, in terms of gold)			
1924	1033	50	1083	64.1	110.0	58.4	66.8
1925	1232	117	1349	79.8	106.0	75.3	86.5
1926	1139	80	1219	72.1	90.0	80.0	91.7
1927	1494	168	1662	98.6	96.0	102.9	100.9
1928	1482	208	1690	100.0	100.0	100.0	100.0
1929	1643	185	1828	108.1	101.2	106.8	103.9
1930	1360	139	1499	88.5	96.9	91.2	97.4
1931	1111[c]	52	1163	68.7	84.6	81.1	91.5

[a] Calculated on the basis of the volume of slaughter and the prices of slaughtered animals.
[b] Until 1928 the index of the Central Statistical Office and in subsequent years that of the Institute for the Study of Business Cycles and Prices.
[c] Estimated.

u—purchasing power of small farmers; v—sales of kerosine

FIG. 19. *Dependence of Kerosene Consumption on the Purchasing Power of Small Farmers in Poland, 1924–1931*

farmers from the sales of animals for slaughter is given. To obtain the index of the purchasing power of the countryside the index of this income was divided by the index of prices for industrial goods.

We now mark on the horizontal axis the index of purchasing power on the countryside, u, and on the vertical axis the consumption of kerosine index v (see Fig. 19). Already at first glance we notice that the scatter of the points which represent the interdependence under examination is not great, so that they make up one curve. This indicates that the consumption index of kerosine is in fact a function of the index of purchasing power of the countryside based on income from sales of animals.

As an approximate curve we take two segments of straight lines. The first segment passes almost exactly through points corresponding to the years 1924, 1925, and 1926, and its extension passes through the beginning of the axis of our diagram; the second segment was obtained as a simple regression for points representing the years 1926, 1930, 1928, 1927, and 1929.[2] The correlation coefficient between

[2] The equation of the first segment is $y = 1.5x$ and that of the second segment is $y = 0.367x + 63.4$.

the actual consumption index of kerosine and the index obtained from our approximate curve, v, is very high, namely 0.998. The point corresponding to 1931, which was omitted in the calculation of the curve, is also situated very close to it.

The results can be interpreted as follows. The close correlation between the index of the purchasing power of the countryside, which was calculated on the basis of sales of animals, and the consumption index of kerosine shows that: (i) the sale of animals is in fact the main source of income of small farmers; (ii) kerosine is largely consumed in the countryside or in small towns economically linked with it. As we see from Fig. 19, part of our curve is a straight line passing through the zero point, while the second part is a more gently sloping straight line. This means that up to a certain volume of real income consumption of kerosene is proportionate to this income, but as the latter increases an ever smaller part goes for kerosine. Considering the fact that kerosene satisfies a very elementary need of the countryside, there is nothing strange about this sort of dependency between the kerosine consumption and income.

4. *Correlation of the consumption index of stimulants with indices of rural and urban consumption.* Since the consumption index of stimulants represents urban–rural consumption, one can expect a correlation between the consumption index of stimulants, z, on the one hand, and the consumption index of wheaten bread, x, and the kerosine consumption index, v, on the other hand, or a correlation between the stimulants' consumption index on the one hand, and the cinema attendance index (after trend elimination), y', and the kerosine consumption index, v, on the other.

The multiple correlation coefficient, z, in relation to x, and v (calculated for 1925–30) is in fact very high, amounting to 0.986. The regression equation has the form:

$$z = 0.578x + 0.625v - 21.7. \tag{2}$$

The multiple correlation coefficient z in relation to y' and v is even higher: it is 0.993. The regression equation is:

$$z = 0.441y' + 0.445v + 10.0. \tag{3}$$

In Table 71 we give the indices of actual consumption of stimulants z, and those calculated from equations (2) and (3).

Table 71. *Indices of the Actual Consumption of Stimulants and those Calculated from Regression Equations, in Poland, 1925–1931*

Year	Stimulants consumption indices		
	actual	calculated from	
		eq. (2)	eq. (3)
1925	79.8	79.1	79.6
1926	81.5	80.8	81.1
1927	91.5	93.2	92.5
1928	100.0	98.6	98.7
1929	104.1	102.3	103.3
1930	95.9	97.9	97.6
1931	87.6	93.2	86.0

In accordance with the high correlation coefficients, in the years 1925–30 the convergence of the series is very great. According to the higher correlation coefficient, the actual series is closer to the series calculated from equation (3), i.e. that calculated on the basis of cinema attendance and kerosine consumption. The likely reason for this is that cinema attendance is a need that is closer to the elasticity of stimulants' consumption than to the consumption of wheaten bread, which (together with kerosine consumption) served to calculate the series represented in equation (2). A very considerable difference between the two calculated series does not appear until 1931 (which is not taken into account in our calculation of correlation coefficients and regression equations). While the index calculated from equation (3), i.e. on the basis of cinema attendance, is close to the index of actual consumption, the index obtained from equation (2), i.e. on the basis of consumption of wheaten bread, is incomparably higher. This confirms the hypothesis put forward in section 2 above, that the increase in the consumption of wheaten bread in 1931—probably because of a sharp decline in its price—was incommensurably small in comparison with the fall in the overall consumption.

Conclusions. The considerations of the last three sections of the present paper show that our consumption indices are valuable symptoms of the types of consumption under examination since otherwise the stimulants' consumption index, for example, could not be presented with such a great accuracy as a function of cinema attendance and kerosine consumption indices. However, in those

cases where an index ceases to be representative because of the impact of exceptional factors, they violate the relationships derived above, as happened with the consumption of wheaten bread index in 1931.

Textile Trade in Poland: Outline of Structure[1] (with Ludwik Landau) (1932)

Introduction: General Characteristics of the Study

The survey on textile trade carried out by the Institute for the Study of Business Cycles and Prices intended to include all important centres of textile trade and a sufficiently large number of companies in each sector so that the results were representative for the textile trade as a whole. The information was to be collected on the one hand by means of a questionnaire, and on the other hand through interviews with experts selected by representatives of the wholesale and retail trade. However, because of the specific conditions in the textile industry at the time when the study was carried out by the Institute the scope of our investigations has been radically reduced.

The study was started in the middle of 1930. That summer experts were interviewed in several textile trade centres, i.e. in Łódź, Warsaw, and Lwów. In the same centres, in April–August 1930, a questionnaire was sent to a few dozen of a thousand of textile traders. In Warsaw and Łódź the questionnaire was sent by the Institute, and in Lwów the local textile trade union committed itself to circulate the questionnaire and collect the replies, yet it ultimately failed to do that. In the autumn of 1930 the Institute ended collecting forms from the Warsaw and Łódź companies. The information thus received proved rather scanty and attempts to improve it by additional correspondence or interviews were not very successful. Consequently, the number of replies that could be further analysed and processed was insufficient for a thorough study of the structure and operation of this branch of industry. The Institute considered an increase in the number of forms included in the study but decided against it in view of a continued and exceptionally strong business crisis in the textile trade, and the resulting abnormal trading operations, frequent bankruptcies, significant changes in trade relations (e.g. frequent shifts to commissioned sales), etc. Thus a more extensive and thorough examination of the textile trade was postponed at that stage, and the

collected material was used as a source of a more general analysis of this branch of industry. Consequently, it was also decided not to extend the empirical enquiry, including in forviews with expenses beyond Łódź and Warsaw (the two largest textile centres) and Lwów.

The factor that brought about the poor quality of the information is the primitive organization of the trade. Accounting books are seldom used in the textile trade. According to tax administration data, the percentage of firms that kept accounting books in 1928 was 0.8% in the fourth category of enterprises, 3% in the third category, 26% in the second category, and only in the first category it was 86%.[2] Thus, among retailers who in the overwhelming majority fell into the third and fourth categories those who keep accounting books are a rare exception. In the second category, which includes only the largest retailers and most of the wholesalers, only every fourth company keeps accounting books. It is therefore not surprising that most of the traders approached were unable to provide any precise information on their costs, cost structure, or profits.

Moreover, even in the case of those firms that kept accounting books, providing sufficiently precise information in these areas was extremely difficult, for the main components of trading costs are at present hard to separate; they are included in the price of purchased and sold goods, in price differentials depending on terms of payment, etc. These complex credit and capital interrelations make it difficult also to define the profitability of the firm. In the period under examination the losses due to bankruptcies of customers played a significant role as well, and to generalize the results of the influence of such a factor, especially during the business crisis, is extremely difficult. Compliance with tax regulations also affects the accuracy of information in those infrequent cases when account books were kept. Finally, it must be noted that in completing the questionnaire—that by its nature had to be rather complicated—even the data that were available were not always provided by the tradesmen. In fact, our enquiry proved that more precise information on capital relations, trading costs, and profitability may be derived only by directly investigating the accounting books and similar documents on terms of trade in the industry under examination.

Consequently, in the present study we had to limit our analysis to the information that we managed to collect. In what follows the results of our questionnaire will be reported together with the

conclusions from our interviews with experts. More general conclusions on the basic issues of the organization and the terms of operation of the textile trade will be given in the final part of this survey.

1. Questionnaire circulated among Textile Trade Companies

The Scope of the Questionnaire and the Information Received and Processed

The questionnaire was circulated in two textile trade centres, i.e. in Łódź and Warsaw. In Łódź the form was sent to 37 firms (19 wholesalers and 18 retailers) and in Warsaw to 56 firms (26 wholesalers and 30 retailers). Of these 93 firms, 14 did not reply at all, or the firms have been closed in the meantime. Among the seventy-nine replies received some firms provided no numerical information whatsoever because they had not kept any accounting books, and for some other firms the supplied data appeared on closer inspection to be improbable, showing unexplainable large internal inconsistencies. Thus only 50 forms were suitable for further processing, of which two were neglected because one dealt both with trade and manufacturing and the other concerned a wholesaler of silk who enjoyed a monopoly position. Consequently, twenty-one forms received from wholesalers (ten in Łódź and eleven in Warsaw) and twenty-seven received from retailers (five in Łódź and twenty-two in Warsaw) were subject to further examination. The wholesale trade firms that showed less local differentiation were grouped into one category. Retail trade, however, depends very much on local conditions that vary significantly between Warsaw and Łódź; therefore the forms from these two centres could not be grouped together. Moreover, in view of the small number of forms returned in Łódź we decided to publish the results available for Warsaw only.

Thus the questionnaires examined below refer to twenty-one textile wholesale firms in Łódź and Warsaw, and to twenty-two retail firms in Warsaw. The forms circulated among wholesalers were more extensive and detailed; retailers were asked only more general questions. Although the more detailed questionnaires were sent to larger retailers as well, they were answered very infrequently, hence we do not have sufficient grounds to make generalizations about them.

Not all answers to the questionnaire were considered in our analysis. The more extensive forms were divided into seven sections:

(i) reference information; (ii) general information (legal status, capital value, employment, changes in total sales, and profits, and costs in 1925–9 compared to 1913, i.e. the last year before the World War); (iii) the value of turnover (sales and purchases in the previous year in monthly cross-sections, and sales per day in a week and per hour in a day cross-sections); (iv) trading costs (gross profits, cost components, net profits in 1928 and 1929); (v) calculation of the selling price; (vi) terms of contracts (of sales and purchases); (vii) financial position (more important assets and liabilities, and bills issued and accepted).

The insufficient number of returned forms (from 21 wholesalers only) does not allow us to establish any relationship between the data representing the position of any given firm on the one hand, and the more general data, or the situation before the war, on the other. The monthly data on sales and purchases in 1929 are subject to strong business fluctuations and therefore they do not provide foundations for determining normal seasonal fluctuations. Also, information on terms of sales and purchases was strongly affected by the present general situation and therefore it could shed no light on normal terms of contract in this branch of trade. For all these reasons in the present study only the following questions have been considered: (i) the velocity of stock circulation and that of all circulating capital; (ii) the ratios of main components of trading costs to sales; (iii) the percentage mark-up added to the purchase price in calculating the selling price; and (iv) the structure of assets and liabilities of firms. These data shed some light on the financial position of firms and on the strucutre of their costs, yet the relationship between any of the two and the firm's profitability has not been established; the existing data do not give a chance of even a very preliminary estimate of profits and losses, however.

In the abridged questionnaire circulated among retailers similar limitations to the scope of our enquiry had to be introduced. Thus, only the questions of velocity of turnover and the relation of the two main cost components—wages and taxes—to sales have been considered. The abridged questionnaire has not included the section on the financial position of the firm. Moreover, partly on the basis of the more extensive questionnaire and partly following the information obtained from interviews, the price calculation in the retail trade was estimated.

Because of the small number of companies included in our study, many detailed cross-sections could not be made. Thus there is no

cross-section according to the type of traded goods, especially as retail shops do not usually specialize, dealing in cotton, woollen, and silk textiles at the same time. The single cross-section made is according to the size of the firm. This is established for retailers on the basis of the number of employees, and for wholesalers according to the value of their sales (the number of employees is in this case of a less significance).

Results of the Survey regarding the Wholesale Trade

Twenty-one firms included in our study were divided, according to the value of their sales in 1928, into four categories: (i) sales value of up to Zl.1 million (five firms), (ii) Zl.1–2 million (seven firms), Zl.2–5 million (five firms), and (iv) above Zl.5 million (four firms). Category (i) was represented by Warsaw firms alone and in the remaining categories both Warsaw and Łódź firms were represented. In the tables that follow only those firms are included for which the respective data are available for both 1928 and 1929.

Velocity of stock circulation. The velocity of stock circulation was defined as the ratio of the value of annual sales to stocks, i.e. the index showing how many times a year all stocks are circulated. Strictly speaking, the average value of stocks in any given year should be used here. However, since no such data exist, the value of stocks at the year-end was taken instead. The cross-section of firms according to the rate of stock circulation is given in Table 72.

Table 72. *Velocity of Stock Circulation of Wholesale Trade*

Velocity of stock circulation	No. of firms with sales of Zl.m.							
	up to 1	1–2	2–5	above 5	up to 1	1–2	2–5	above 5
	1928				1929			
Up to 2.0	—	—	—	—	2	—	—	1
2.1–3.0	1	—	—	—	1	—	1	—
3.1–4.0	2	1	2	1	—	1	1	1
4.1–5.0	1	—	—	—	1	—	—	—
5.1–6.0	—	—	—	—	—	1	1	1
6.1–7.0	—	1	—	2	—	—	—	—
7.1–8.0	—	1	1	—	—	—	—	—
8.1–9.0	—	1	—	—	—	2	—	—
9.1–10.0	—	1	—	—	—	1	—	—
Above 10.0	—	2	2	2	—	2	2	1

The average velocity of stock circulation was 6.6 in 1928 and 5.4 in 1929. This may imply that in the face of a reduction in sales and the accumulation of unwanted stock at the beginning of the business recession, the velocity of stock circulation fell in the course of the year by 20%. Periodic studies of sales and stocks in wholesale trade, made by the ISBCP on the basis of a different sample of firms, shows a fall in the velocity of sales of a similar order—by 15%;[1] the consistency between these two velocity rates can be considered satisfactory.

The four categories of firms exhibit rather characteristic differences in velocity rates, although any conclusions may only be drawn provided it is remembered that our sample of firms is very small. In the lowest category of firms (of the sales value of up to Zl.1 m.) the velocity of circulation is small: stocks are circulated two to three times a year. This is likely to follow from the fact that these firms are half-wholesale, half-retail traders that sell relatively less bulky volumes and thus they are in a position similar to that of retail trade where stocks are much larger and the velocity of circulation is correspondingly much lower—not significantly larger that two times a year on average (see below). The highest velocity of circulation is shown by medium-size firms, of sales between Zl. 1–2 million; in both years it is about 9. In the case of larger firms, the velocity of circulation steadily falls; for the sales value above Zl.5 million per year it was 5–6 on average.

This velocity of stock circulation is not very different from that found in Germany by the German Survey Committee: also there only rarely do stocks circulate less than three and more than ten times a year—on average 5–7 times a year.[3] It must also be noted that the German wholesale trade supplies directly to retailers, and in Poland dominate more bulky supplies from larger to local wholesalers. Hence, *ceteris paribus*, stocks of the German trade should be greater. Thus, in so far as it is legitimate to draw any conclusions from our scanty data, the shortage of capital in Poland does not give rise to a tendency to limit the value of stocks and make them circulate faster but it finds reflection merely in the relative shares of own and borrowed circulating capital (see below).

Velocity of circulating capital as a whole. Since, as will be seen, stocks represent about half of the total circulating capital of

[1] See M. Kalecki, 'A Survey on Wholesale Trade', this volume.

the wholesale trade, the velocity of circulation of total circulating capital is approximately half of that of stocks. The limits within which the velocity of total circulating capital fluctuates are 1.3 to 6 times a year; the average velocity of circulation that was 3 in 1928 fell to 2.5 in 1929, in step with the velocity of stock circulation.

The main components of trading costs. The ratio of *wage costs* to sales is shown in Table 73. The mean value of this ratio is 1.7 in 1928 and 2.4 a year later. The shift in this ratio in 1929 appears in all categories of firms and results from sales reductions on the one hand, and the relative rigidity of expenses representing this component of trading costs, on the other.

It appears that wage costs represent on average about 2% of the value of sales. This ratio is especially high in the small firms. As in the case of stocks, this probably follows from a high share of retail sales in those small wholesale firms because retail operations are always more labour-intensive (in the retail trade the ratio of wage costs to sales is usually more than 5%). In the typical wholesale trade the cost of wages in relation to sales is lower, yet one cannot trace any clear tendency for labour costs to decline together with sales expansion. Indeed, for firms with sales between Zl.2 and 5 million the ratio of wage costs to sales is slightly higher than in the category of firms with sales of Zl.1–2 million, and only in the category of firms with sales above Zl.5 million does this ratio significantly fall—to less than 1%. This lack of decline in labour costs in small firms may be attributed to a greater employment there of unpaid family members; however, the incompleteness of our data does not allow us to exclude a merely accidental coincidence of the two series.

Table 73. *Ratio of Wage Costs to Sales, 1928 and 1929*

Ratio of wage costs to sales	No. of firms with sales of Zl.m.							
	up to 1	1–2	2–5	above 5	up to 1	1–2	2–5	above 5
	1928				1929			
Up to 1.0	—	1	1	2	—	—	1	2
1.1–2.0	1	3	1	—	—	3	—	—
2.1–3.0	3	1	1	—	3	1	2	—
3.1–4.0	—	—	—	—	1	—	—	—
4.1–5.0	—	—	—	—	1	—	—	—

According to our questionnaire, the *costs of insurance contributions* oscillate between 0.1 and 0.2% of sales. This corresponds to the ratio of insurance contributions to wage bills that can be calculated from the data on insurance premium rates. Assuming the average premium rate contributed by the employer at 7–8% of the wage bill, and the latter at 2% of the volume of sales (see above), we get the cost of insurance contributions equal to about 0.15% of the value of sales. In the case of large wholesalers, where the ratio of wage costs to sales is lower, the cost of insurance contributions is still smaller.

The cost of *rent* exhibited greater oscillations. However, as a rule, it was not greater than 1% of the sales value. In the case of small firms, of sales up to Z1.1 million per year, the ratio of cost of rent to the value of the sales was usually close to 1%; for larger firms it usually did not exceed 0.5%.

The costs of *heating and electricity* are relatively constant, representing as a rule 0.1–0.2% of the value of sales.

The main components of overhead costs other than taxes—i.e. wages, insurance, rents, heating, and electricity—represented, according to these data, about 2% on average of the value of sales in 1928 and about 3% in 1929, when at a lower value of sales the relative burden of overhead costs increased. In the case of large firms these costs play an insignificant role and usually do not exceed 1.5% of the value of sales.

Compared with the results obtained by the German Survey Committee, the overhead costs of wholesale trade in Poland are very small. This holds true especially of the wage costs that in the German wholesale textile trade are usually 3–5% of the value of sales, in many firms even reaching 6–8% of the sales value and in no firm was the ratio of wage costs to sales lower than 2.4%. Such a high share of wage costs in Germany compared to Poland is due to several factors. The first is a low level of wage rates in Poland with only a little difference in the level of prices of textile goods, which as a rule are not lower in Poland than in Germany. The tariff wage rates in the wholesale textile trade in February 1930 were, in Berlin, for men employed in the first category—RM125–75 per month, in the second category—RM150–200, in the third category—RM180–240, in the fourth category—up to RM290, and in the fifth category—up to RM405. The rates for women employees were 10% lower. The actual wage rates were usually higher, sometimes 30–40% higher, than the tariff rates. The average monthly wage rate was about Z1.500 and in

Poland it was not higher than Z1.250–300, sometimes even lower than that, and it seldom reached Z1.400.

Apart from the differences in wage rates, there are also other factors due to which the number of employees in relation to sales should be greater in Germany than in Poland. On the one hand, the share of small contracts (to retail shops, deliveries to tailoring shops, etc.) is higher in Germany than in Poland. On the other hand, in Poland the organization of trade is more primitive, the use of book accounting is very limited; regarding purchase policies, owners rely much more on their 'own experience' than on economic calculation; family labour is more intensively used, etc.

The cost of rent in Germany is not very different from that in Poland. As a rule, it does not exceed 1% of the value of sales and if it does, it is only small.

Let us now turn to *taxes* that are another component of trading costs. The main role is played here by the turnover tax. Its rate for the wholesale trade is 1%. However, if a 10% extra levy and the highest allowable norm of local tax supplement (of 25%) are taken into account, the rate is then 1.4%. The rate of turnover tax actually paid may differ from these rates depending on the difference between the value of sales estimated by tax authorities and the actual sales. Some light may be shed on these differences by the results of our survey. They point out that for the firms included in the survey the turnover tax was on average 1.1–1.4% of sales and in some cases it was 1.7–1.8%. This implies that sales were some 30% higher than those declared by firms. In one case a firm (belonging to the lowest sales category) reported a significantly higher turnover tax—equal to 4% of the value of its sales; in that case the tax authorities estimated the value of sales as several times greater than that declared by the firm itself. It follows from our survey that in general the burden of turnover tax, given the declared value of sales, is about 1.5% of the latter; there is no clear tendency for any regular changes in this respect between 1928 and 1929. Also absent are any regular differences between the turnover tax burden and the size of the firm.

In calculating the total tax burden, income tax was also included, although, strictly speaking, it should be treated rather as a levy paid on net income than as a cost component. Among other similar payments, the cost of industrial certificates, stamp duties, land and property taxes, and other central and local government taxes should

Table 74. *Relation of Total Tax Payments to Sales, 1928 and 1929*

Relation of tax payments to sales (%)	No. of firms	
	1928	1929
1.1–15	2	1
1.6–2.0	8	5
2.1–2.5	4	8
2.6–3.0	1	1
Above 3.0	2	2

be considered. The distribution of firms according to sum total of all taxes in relation to their sales is shown in Table 74.

The mean value of these ratios was 1.9% in 1928 and 2.3% in 1929. Since turnover tax costs have not in general increased in relation to sales in this period, this rise was due to the greater burden of other taxes. This could result from two factors: (i) some inflexibility of constant taxes (on land and property, of certificate duties, etc.) that rise in relation to sales when the latter fall; and (ii) a delayed adjustment to income tax appropriations as tax paid in 1929 related to incomes reached in 1928, i.e. in a year when both incomes and sales were significantly greater. Consequently, while in 1928 the most frequent tax burden was 1.5–2.0% of sales, in 1929 it was 2.0–2.5%.

According to the German Survey Committee, the average tax burden in Germany was slightly lower and the differentiation between firms or years for the same firm was very large. The relation of all tax and levy costs to sales was 1–1.5% of the sales value on average, but personal taxes and income tax are not included in this calculation.

Thus the total overhead costs, taxes included, of the firms under investigation were on average 4% of the value of sales in 1928 and 5.5% in 1929. The main components of these costs are labour costs and taxes in approximately equal proportion. These costs taken together are not higher in relation to sales compared to the costs of labour alone in relation to sales in Germany.

Among other trading costs our survey allows us to separate to some extent the costs of commissions and the losses due to bankruptcies of debtors. One cannot, however, tell anything about the cost of transport and credit because usually they are wholly or at least in part included in the price and are not indicated separately in account books. The differences in the price of any commodity depending on

the terms of payment represent in fact the cost of credit, but the latter cannot be numerically estimated.

The cost of transport is relatively less significant, but the cost of credit is of prime importance bearing in mind the scarcity of capital of tradesmen, their heavy reliance on borrowed capital and its high cost. Yet, under the widespread use of irregular forms of credit (bank credits are used only seldom but suppliers' credits and those of private persons are very popular), the examination of this cost requires a separate and difficult enquiry. Wholesale trade, which receives credits from producers and grants credits to its retail customers, becomes in fact a part of the crediting system and its performance in this field may well determine its overall results.

The cost of *commissions* in the firms included in our survey is shown in Table 75. In general commissions do not exceed 1% of sales and on average they represent about 0.5% of sales (the mean value of these ratios was 0.5% in 1928 and 0.6% in 1929). In 1929 the ratio of commission to sales increased slightly: while in 1928 in the majority of the firms surveyed commission did not exceed 0.5% of sales, in 1929 it was most often in the range of 0.6–1.0%. This could result from more intense competition in the face of sale reductions.

In Germany the cost of commission is greater: as a rule, commission rates are higher than 1%, sometimes as high as 3.5%. This is due first of all to much higher wage rates than to more frequent use of commission sales. Commission, which represents a type of earned income, must correspond to wage rates.

The data on *losses* are less certain since the numbers shown in this rubric of our questionnaire depend heavily on the system of loss write-offs. The data reported in our survey are shown in Table 76. In 1928 the mean value of losses in relation to sales value was 0.4%, for most firms losses did not exceed 1% of sales, and out of 14 examined

Table 75. *Costs of Commission in Relation to Sales, 1928 and 1929*

Ratio of commission to sales (%)	No. of firms	
	1928	1929
Up to 0.5	9	3
0.6–1.0	4	9
1.1–1.5	—	—
1.6–2.0	1	1
2.1–2.5	—	1

Table 76. *Losses in Relation to Sales, 1928 and 1929*

Ratio of losses on debtors to sales (%)	No. of firms	
	1928	1929
Up to 1.0	9	2
1.1–2.0	2	4
2.1–3.0	1	—
3.1–4.0	1	5
4.1–5.0	1	—
5.1–6.0	—	1
6.1–7.0	—	1
7.1–8.0	—	1

firms only three reported losses greater than 2% of their value of sales. In 1929 there was a drastic change in the performance. This was because of the increased number of bankruptcies due to the business crisis and possibly also because losses incurred already in 1928, in the course of the textile 'branch crisis', but at the time not yet considered as definitive, were written-off only after a further worsening of business in 1929. The rate of rise in losses in 1929 is far from uniform. This is understandable since bankruptcies could affect some firms more than others; moreover, the above-mentioned differences in the system of loss provisions are also reflected here. The losses shown by firms in 1929 were usually between 3 and 4% of sales (the mean value was 3.1%); the actual losses very probably were even higher.

Calculation of the selling price. The questions on the rules of calculating selling prices were included in our survey in so far as the system of determining the calculated profit margins is concerned. The replies to these questions are merely imprecise estimates that, moreover, refer to a period when a sudden change in the business situation took place and therefore often represent the abnormal conditions of a business crisis. Some respondents informed about the rules that they normally observe in calculating their selling prices, others relied on contracts actually made in this period. Another source of the large differences in our data on the calculated profit margins was the difference between selling prices for cash and for credit transactions. Probably the latter were most often taken into account and the discount given in cases of cash transactions was regarded as repayment of the cost of interest on borrowed capital that was not included in calculating trading costs. However, some respondents

apparently calculated their profit margins in relation to this lower price, thus reporting much greater margins than others. Finally, some firms reported their 'net' margins, after deducting some elements of trading costs, without, however, providing any closer explanation on those deductions. All these replies have not been considered in our analysis since they are incompatible with other replies, but even in these replies, in some cases some trading costs have been deducted and then the reported profit margins were underestimated.

The distribution of firms according to the average calculated profit margin reported in our survey is shown in Table 77. The margins oscillate between 3 and 16%, and in the majority of firms between 5 and 10% (for eleven firms out of sixteen considered). The mean value of the profit margin is 8%.

As was stated earlier, the main components of overhead costs were in 1928 about 4% of sales, and commissions and losses were 1% of their value. Thus, the calculated profit margin of 8%, after deducting these two components, would leave 3%, i.e. not much more than must be allowed for meeting the expenses not included here, e.g. the costs of discounts, transport, etc. Of course, the situation in 1929 was worse than a year earlier, bearing in mind that the losses on account of bankrupt debtors were on average no less than 10%.

Although it is impossible to draw any definite conclusions on the basis of the very scanty information available, it may be argued that the wholesalers' profit consists mainly in the discount received from the producer and then in the difference between the basic selling price in relation to which the profit margin is calculated and the lower price that is paid by the customer in case of cash transactions. Whether this difference is cashed by the wholesaler, or by those who finance him, depends on capital relationships: on the relative shares

Table 77. *Calculated Profit Margins in Wholesale Textile Trade*

Calculated profit margin (%)	No. of firms	Calculated profit margin (%)	No. of firms
3	1	10	2
4	1	11	—
5	2	12	1
6	2	13	—
7	2	14	—
8	—	15	1
9	3	16	1

of own and borrowed capital in the total circulating capital of the firm.

The calculated profit margin reported by textile wholesale traders in Germany, according to the data of the German Survey Committee, is much higher and it oscillates between 15 and 25%. It must be emphasized, however, that it is not directly comparable with profit margins in Poland. The German wholesalers investigated by the Survey Committee buy their stocks directly from the producers and sell them directly to retailers or similar customers (tailors, trading agents, etc.). Hence the wholesaler is the single intermediary between the producer and the retailer and his calculated profit margin includes the whole difference between the price of the producer and that paid by the retailer for small quantities of the commodity in question.

In Poland, a large wholesaler is not the single intermediary: small trade, especially in small towns, seldom reaches these large wholesalers and buys at local wholesale and semi-wholesale trade that in turn is supplied by the Łódź and Warsaw large wholesale warehouses. In this way a longer chain of intermediaries shares the costs and profits. The other important factor responsible for this difference refers to the share of own capital. In Germany its cost and profits from it enter the calculation of costs, profit margins, and net profits, and in Poland, as we have noted above, they could not be separated and therefore have not been considered in the calculated profit margins.

The financial position of firms. Our examination of the financial position of firms is based on the following data. In our questionnaire the section on the financial position of firms contains, *inter alia*, information on their cash assets (cash in hand and debit balances on deposit and current accounts), on outstanding liabilities (customers' bills and open credit accounts), on debts due to suppliers (bills and open credit accounts), and on bank and private loans. Moreover, from the section containing general information the balance of stocks was taken. This, together with the information on cash and liabilities, enabled us to determine the value of circulating capital. The difference between the latter and the firm's debts was considered to represent the firm's own circulating capital.

Of course, this is only a rough approximation that cannot represent in any precise way the actual financial position of the firm. No doubt, the way of defining stocks varied among firms (although our questionnaire required that stocks were represented in terms of purchase prices). Furthermore, not all assets have been included; for instance, the value of the stocks, and especially of real estate and property owned by the firm, has been omitted. Because of these exclusions the sums reported as the firm's own circulating capital may appear to be negative although liabilities are not greater than the actual total assets of the firm. Nevertheless, these calculations give us some idea of the financial position of firms.

The ratio of firms' own capital to their assets is shown in Table 78. The average ratio of own capital to total circulating capital (defined as above) in the wholesale firms examined was 15–20%. For about two-thirds of these firms their own capital did not exceed 30% of the circulating capital. A rise in this ratio is reported in 1929 (the mean value was 13% in 1928 and 22% in 1929). It may be related to lower purchase prices at the time of a business crisis, high price discounts, and discount norms for cash transactions; all these included investments into circulating capital rather than elsewhere. Most probably, however, this increase has not been cashed because it took the form of receivable liabilities to be paid by insolvent customers.

Because of the small amount of own capital in wholesale firms these firms obtain the majority of their financial means—80% of their circulating capital—in the form of credit. An insignificant part of it is bank credit, however. Among fifteen firms considered only three

Table 78. *The Ratio of Own Assets and Liabilities of Firms to their Circulating Capital*

Ratio (%)	No. of firms with a given ratio to circulating capital					
	to own capital		to debts due to suppliers			
			in bills		in open credit	
	1928	1929	1928	1929	1928	1929
Negative	3	1	—	—	—	—
0–10	3	5	7	7	—	1
11–20	4	1	—	1	2	1
21–30	—	4	2	3	2	2
31–40	1	—	1	1	3	2
41–50	—	1	2	1	2	4
51–60	1	1	1	1	2	2
61–70	2	—	—	1	1	—
71–80	—	1	1	—	—	—
81–90	1	1	—	—	2	—
91–100	—	—	1	—	1	3

reported bank loans; private lenders' credits are also seldom used (only four firms reported their use). Thus credit is mainly provided by producers (or rather through the intermediation of producers since most of the industry also uses borrowed capital). Wholesalers receive these credits either in the form of bills of credit or open credit accounts. It appears in our questionnaires in 'net' terms because the wholesaler when purchasing commodities for bills first of all uses the bills of his customers ('bills drawn on customers'), and rather rarely he issues promissory notes (sola bills). These customer bills endorsed by the wholesaler represent the balance between his receivables and his liabilities that have not been separated in our questionnaire. This also explains why in our questionnaire the proportion of credit for bills to open credit accounts was about 1 : 2.

Circulating capital of wholesale trade takes the form of cash only to a small extent. It is represented mainly by stocks and receivable accounts.

Cash assets—in the strict sense and as consolidated balances on current account—represent on average 3% of circulating capital. In 1928 in two firms only was the share of cash higher than 5% (at the end of 1929, when a collapse of credit relations in the textile industry only started, the number of such firms was greater). Stocks and amounts due from customers represent on average half each of the total circulating capital.

The same share of stocks and of amounts due in total circulating capital means that stocks of goods supplied by wholesalers to retailers on credit terms are approximately equal to wholesalers' stocks. However, as total stocks of the retail trade are 2.5–3 times as large as those of the wholesale trade (the velocity of stock circulation in 1928 was 6.6 for the wholesale trade and 2.6 for the retail trade), it follows that 30–40% of stocks of the retail trade is financed by credits of wholesalers. This means that apart from the function of a credit intermediary that the wholesale trade performs through endorsing the bills of its customers and passing them on to its suppliers, it directly finances a large part of retailers' stocks. This it does, as follows from our enquiry into the liabilities of the wholesale trade, not from its own financial means but merely at its own risk.

It is precisely this function of the wholesale trade that justifies its existence. However, when financing of the retail trade is done from the wholesale trade's own means, then the latter performs at its own expense the function of mitigating local mistakes in the distribution

of goods. On the other hand, when the wholesale trade finances retailers by means of borrowed capital, received through the intermediation of producers, it no longer protects them from the consequences of misallocation of goods and becomes merely a technical intermediary between producers and the retail trade. This explains why it was relatively easy to substitute commission sales, factory warehouses, etc., for the wholesale trade—a phenomenon that has indeed occurred on a large scale during the crisis.

In Germany, the wholesale trade is much less dependent on producers and it uses primarily its own financial means and bank credits. It is impossible to determine from the data provided by the German Survey Committee the ratios established for Poland, yet a comparison of wholesalers' own capital with the value of their sales shows that usually the former is greater than the latter, sometimes much greater (2–3 times), and only seldom is this relation significantly different. Thus, apart from a widespread loss of a large part of capital in the course of inflation, the circulating capital of the German trade largely consists of its own means of finance. These are supplemented by bank credits the use of which was confirmed by all experts who were questioned by the Survey Committee. In these circumstances producers' credits are used relatively rarely by commerce; many experts admitted to have made all purchases on cash terms, thereby taking advantage of the highest discounts (or they even paid in advance when placing orders to become eligible for special price discounts—*Antizipationszinsen*). Moreover, open letters of credit are used for the periods when no interest is charged (usually up to sixty days); a relatively small part of sales is financed by means of open credit for longer periods or by bills.

Results of the Survey of the Retail Textile Trade

Twenty-two Warsaw firms included in our survey were divided according to the number of their employees (i.e. hired employees and family members) in 1928 into two categories; those employing between: (i) 2–7 workers and (ii) 8–20 workers. As in the case of the wholesale trade, only firms that provided information for both 1928 and 1929 were considered in the survey.

Velocity of stock circulation. The distribution of firms according to velocity of stock circulation is shown in Tables 79 and 80. The mean index of velocity of circulation is 2.4 for 1928 and 1929, i.e. it is about 2.5 times smaller than in the wholesale trade. In contrast to the latter,

Table 79. *Velocity of Stock Circulation of Retail Trade*

Velocity of stock circulation	No. of firms with employment between			
	1928		1929	
	2–7	8–20	2–7	8–20
1.0–1.5	2	2	2	1
1.6–2.0	2	1	2	2
2.1–2.5	3	3	4	3
2.6–3.0	5	1	3	1
3.1–3.5	1	—	2	—
3.6–4.0	1	—	1	—
Above 4.0	1	—	1	—

Table 80. *Average Velocity of Stock Circulation in Retail Trade*

Size of firms	Average velocity of stock circulation (mean value)	
	1928	1929
All firms	2.4	2.4
2–7 workers employed	2.4	2.5
8–20 workers employed	2.3	2.2

in retail trade the velocity of stock circulation did not fall, which is explained by the fact that the business recession of 1929 found no reflection in the volume of retail sales in Warsaw. In fact the sales of firms under consideration were even slightly greater in 1929 than in 1928. We cannot trace any significant difference in the velocity of circulation between large and small firms either (see Table 80).

As in the case of the wholesale trade, a comparison with the data of the German Survey Committee does not show any greater velocity of circulation in the Polish retail trade than in the German one—something that could have been expected in the face of scarcity of circulating capital in Poland. The average velocity of stock circulation for 791 German retailers in 1927 was 2.7.

The main components of trading costs. The ratio of wages (social benefits included) to sales is shown in Tables 81 and 82. The mean value of the ratio of wages to sales is 5.5% both in 1928 and 1929, i.e. it is about three times more than in the wholesale trade. As in the case of velocity of circulation, in contrast to the wholesale trade, no changes occurred here between 1928 and 1929 because, as noted already, in 1929 the sales of Warsaw retail trade had not yet declined.

Table 81. *Ratio of Wage Bill to Sales in Retail Trade*

Ratio of wages to sales (%)	No. of firms with employment between			
	1928		1929	
	2–7	8–20	2–7	8–20
1.1–2.0	2	—	2	—
2.1–3.0	2	—	1	—
3.1–4.0	1	1	1	—
4.1–5.0	3	—	4	1
5.1–6.0	2	3	2	3
6.1–7.0	—	—	1	—
7.1–8.0	2	—	—	—
8.1–9.0	—	—	1	—
9.1–10.0	1	2	2	1
Above 10.0	2	—	1	1

Table 82. *Average Ratio of Wages to Sales in Retail Trade*

Size of firm	Average ratio of wages to sales (mean value)	
	1928	1929
All firms	5.5	5.5
2–7 workers employed	4.4	5.1
8–20 workers employed	5.9	5.8

In larger firms the ratio of wages to sales is greater, which must be attributed mainly to a more intensive employment of family members in small shops.

As in the case of the wholesale trade, German retail trade has a higher ratio of wages to sales than Polish retail trade: for 210 firms examined by the German Survey Committee, the average ratio of wages to sales in 1926 was over 8.2%. In the retail trade the difference between Germany and Poland (Warsaw, in fact) is not as large as in the case of the wholesale trade whose structure is completely different in Germany from that in Poland. Moreover, the smaller differentiation in the retail compared to the wholesale trade between the two countries is due to the fact that wage rates in the Polish (Warsaw) retail trade are not that much lower compared to the German wage rates—as in the case of the wholesale trade: according to our survey the average wage rate can be estimated at Z1.200–300 per month, and according to the German Survey at RM100–200. The difference between these wage rates does not itself explain the gap between Polish and German respective ratios of wage costs to sales, which

must be attributed to a larger number of people employed, especially of hired labour, in German retail trade.

Let us now examine the tax burden of the retail trade (see Table 83). Its mean value was 3.3% of the sales value in both 1928 and 1929. The turnover tax shares more in the total sales of retail than of wholesale trade because in the former the tax rate was twice as high as in the latter, i.e. it reached 2.8% while it was about 1.4% in the wholesale trade. The difference between the mean ratios of taxes to sales in the wholesale and the retail trade is 3.3 – 1.9 = 1.4% for 1928, i.e. it exactly corresponds to the difference in the turnover tax ratios. In 1929 the tax burden of the wholesale trade increased to 2.3% and it did not change in the retail trade. It follows that the increased tax burden of the wholesale trade was due to reduced sales (see p. 276 above) that, as we have noted several times, did not occur in the Warsaw retail trade.

It will be seen from Table 83 that the ratio of tax liabilities to sales shows large differentiation between firms. It must be attributed, as in the case of the wholesale trade, mainly to the differences between the declared volumes of sales and those estimated by the tax authorities. For small firms these differences—judging by relating individual ratios of tax liabilities to sales to the average ratio—reached up to 80%, yet for three out of four firms it did not exceed 20%.

A comparison with Germany shows that the tax burden of the retail trade is much lower there than in Poland: according to the German Survey Committee, in 1926 the average ratio of tax liabilities to sales for 210 German retailers was 2.2%.

Our questionnaire provides no information on other trading costs. According to data for four firms that answered a more extensive

Table 83. *Ratio of Taxes to Sales in Retail Trade*

Ratio of taxes to sales (%)	No. of firms	
	1928	1929
1.5–2.0	1	—
2.1–2.5	1	2
2.6–3.0	5	4
3.1–3.5	6	6
3.6–4.0	4	4
4.1–4.5	1	1
4.6–5.0	—	1
5.1–5.5	—	1
5.6–6.0	2	1

form, the average cost of rent can be estimated at about 2% of sales. This number can be checked to some extent by taking into account that the corresponding cost component of the wholesale trade is 0.5–1.0% of sales and that the velocity of stock circulation in the retail trade is on average 2.5 times less that in the wholesale trade. If we assume that the cost of rent of a shop is approximately proportionate to its size, we get the cost of rent equal to nearly 2% of sales.

Thus the total costs of employed labour, taxes, and rent would amount to 5.5 + 3.3 + 2.0 = 10.8% of sales. This index does not include costs of heating and electricity, costs of credit (of private loans and of the discount of customers' bills, and we must remember that about 25% of sales of the firms under examination was on credit terms), costs of marketing, sales shortages, etc. It appears that the sum of all these miscellaneous expenses is not less than 4% of sales (sales shortages themselves reach 2–3%); it is also unlikely that this sum could be much greater. Thus we can safely assume that the total trading costs represent about 15% of the value of sales. In Germany the average ratio of trading costs to sales for 210 firms under examination was nearly 20%.

Calculation of the selling price. Because information on such calculations is missing in most of our returned forms, we had to rely on the already mentioned four replies to our more extensive questionnaire and on five interviews. The margin usually added in a given firm to the price of purchase (clearly, smaller for the standard products and greater for fashionable and fancy articles) oscillated between 20 and 30% (in one firm only it was less than 20%). We may assume that the average margin was 25%. Since the retailers under examination did not receive any discount on the producer's price (in distinction from the wholesale trade), this margin also represents the gross profits of the firms, equal to about 25 : 125 = 20% of the value of their sales. Trading costs of a firm were estimated above at 15% of the value of sales; hence the owner's profit would represent 5% of the value of sales, a figure that also includes the owner's remuneration for his work. This result is consistent with some direct estimates of profits: in case of the six firms that supplied the necessary information on this subject (i.e. four that replied to the more extensive form and another two that were interviewed on this question) profits represented between 3 and 6.5% of the value of their sales. The estimated retail price calculation in the textile trade is shown in Table 84.

Table 84. *Calculation of Retail Prices in Retail Trade (% of the value of sales)*

Price components	Poland	Germany
Calculating margin	20.0	30.0
of which:		
trading costs	15.0	19.6
of which:		
wages and social benefits	5.5	8.2
taxes	3.3	2.0
rents	2.0	2.9
other	4.2	6.5
profits	5.0	10.4

According to the study of the Germany Survey Committee, the average profit margin may be estimated at 40–50%, i.e. 45% on average. This represents gross profits equal to about 30% of the value of sales. At trading costs equal to about 20%, the owner's profit would represent about 10% of the value of sales—much more than in Poland.

II. Opinions of Experts

This information was partly used as supplementary material in the analysis of our questionnaires. Moreover, interviews with experts allowed us to outline the organizational structure and the operation of trading firms.

Wholesale trade

It has already been noted in the discussion of our questionnaires that large wholesalers that are the main customers of textile factories are not the only link in the chain between producers and the retail trade; they are only the first link to which the smaller, local wholesalers are connected (of course some retailers, especially in large cities, place their orders directly with large wholesalers or even with textile producers). This, in turn, determines the organizational structure of the firm: the staff is small, even firms with the largest sales do not employ more than a dozen or so and at any rate not much more than twenty workers. As a rule, firms are owned by a single person or are private companies; joint stock companies or limited liability companies are very infrequent. The owner or co-owners are at the same time company managers who run their respective businesses mainly

on the basis of their personal experience. The staff chiefly performs clerical and technical functions: concluding transactions, making purchases, etc., is done by the firms' owners only.

The customers are partly retailers but largely smaller wholesalers. 'Recruitment' of customers is done mainly through personal contacts, the use of selling agents, and intermediaries who work on their own account and bring the customers to wholesalers (for instance, in Warsaw, where the whole textile wholesale trade is concentrated in one district, i.e. along the Gęsia Street); marketing is not used at all.

Purchases are made chiefly in domestic factories. Textile imports are very small (relatively larger supplies of foreign textiles are purchased in those areas of partitioned Poland that have not developed their own production and already before the World War imported textile goods from textile-production centres in countries occupying the respective districts of Poland, as was the case e.g. in the Lwów district). Thus textile supplies are heavily concentrated in the Łódź and Bielsko districts. This facilitates operations of the textile trade and, among other factors, makes its primitive organization adequate.

Large purchases are made before the spring and the autumn seasons start and during the season stocks are replenished. This takes place on the basis of owner's observations. As a rule, there is no regular evidence of stocks that would indicate short supplies. Indeed, the time of stock replenishment depends on how difficult this may happen to be; when the factory or factory warehouse is not far away, stocks are refilled when they are nearly exhausted. In Łódź, for instance, larger stocks are accumulated only for speculative purposes: in expectation of price rises, to take advantage of special price reductions, etc. In speculative as well as normal purchases the forecasts of textile wholesale trade managers are based on their personal observations and their contacts with retailers; a professional press does not exist and the general economic press is considered unsuitable for determining future sales.

Relations between the wholesale trade and textile producers lead to many mutual grievances related to weak financial position of both partners. Of course, producers complain first of all about the ill-paying capacity of the wholesalers. The wholesalers complain about not keeping the earlier agreed price terms and about producers 'spoiling' the market by offering the same brands of goods at largely reduced prices shortly after having sold the same type of goods to wholesalers at higher prices, thus causing huge financial losses for the

latter. Similar losses are often incurred when a new product manufactured by one producer is imitated by others at a lower quality and price. The execution of orders by producers also gives rise to complaints (especially from those wholesalers who established contacts with the Łódź textile industry only after the war). Moreover, during a business crisis the industry establishes direct contacts with the retail trade, or even with the final consumers, thus eliminating the wholesale trade.

Price calculations of the wholesale trade are based on an approximate ratio of overhead costs to sales and a profit margin is added to producer prices in proportion to this ratio. Differentiation of this trading margin is usually insignificant and the margin added to standard goods (e.g. to white cotton textiles) is somewhat lower. A larger margin is added in cases of 'special offers' when the obtained producer prices were exceptionally low.

The financial relations have been discussed above on the basis of replies to our questionnaire. It must be added that the interviewed producers, who as a rule financed a large part of their stocks by their own means and whose assets in the form of payments due and stocks were balanced by their liabilities, considered their financial position relatively strong; according to our experts' opinions, financial means of the textile trade were as a rule much lower. Concerning credit, the wholesale trade hardly used bank credit and bank financing of sales was effected mainly through producers discounting the bills of their customers. In this way the producer is the direct creditor of wholesalers who basically get access to the discount credit of the Bank of Poland only in this form. Next to this form of credit, the wholesale trade uses private discount credit, although this is inconvenient in so far as fiscal authorities do not approve of cost allowances for such credits when estimating income tax liabilities (this, of course, is relevant only in the infrequent cases where income tax liabilities are estimated on the basis of account books). Apart from credits of the private discount houses, credits taken from private individuals on the basis of personal relations, mortgage credits, etc., should all be taken into consideration. In those cases the loan is taken on company assets as well as on the private property of its owner—his real estate, buildings, and so on.

Retail trade

The interviewed retailers were all owners of shops that serviced the middle class and white-collar customers. This was reflected in the way

these shops were run. Much attention was reportedly given to fashion changes. Except during periods of business crisis, a lot was sold on credit terms (short-period open credit and bills or instalment sales). Sales on credit generate relatively large demand for capital and, in the absence of bank credit and a high cost of private credit, strengthen the tendency to use mainly commodity credit. Cash reserves were seldom reported. Larger purchases are made before the spring and autumn seasons start and are subsequently replenished. In making purchases most attention is given to adjustment to fashion and tastes of customers and much less to quantitative forecasts of the volume of sales in relation to changes in business conditions of the textile trade as a whole. Corrections in purchases are made by getting rid of less attractive goods at reduced prices and increasing stocks of the attractive goods. This is estimated by guesswork, without any system of monitoring the volume and structure of stocks. In such circumstances no rational policy of maintaining stocks at the minimum necessary level is possible.

Prices are calculated by adding a percentage profit mark-up to the invoice price. Of course, in the case of fancy goods a much larger margin is added, among others, to cover the risk of not being able to sell and loosing on a no longer fashionable product. When 'special offers' allow the purchase of stocks at low prices, the profit mark-up is greater than in the case of standard purchases. After-season sales are usually organized and then marketing is practised on a larger scale than usual.

III. General Conclusions

The huge shock that had affected the textile trade before the general business crisis was related to factors that determine business fluctuations. A rapid shift in the purchasing power of the countryside and the urban population due to the collapse of agricultural prices resulted in a large change in the demand for textile goods. Neither trade nor industry was able to adjust immediately to this shock. During the business upswing in the textile industry, in 1926 and 1927, the expanded output capacity made it possible to continue to increase production the surplus of which was absorbed in 1928 by the textile trade through the extension of terms of bills;[4] at the same time the purchasing power directed to consumer goods was increasing only slowly. However, the scale of the shock and in fact the consequent

near disappearance of the wholesale trade that was replaced by factory warehouses and factory commission sales must be attributed to the structure of the textile trade and the permanent conditions of its operation.

The main determinant of the operation of the textile trade is the financial weakness of its wholesale segment. It reduces the role of the textile wholesaler to that of an expert who helps to decide with whom to conclude a transaction and who is eligible for credit. Because of the insufficiency of its own financial means the wholesale trade is unable, however, to perform the functions of an agent who guarantees that the stock allocation is correct and who may be held responsible for mistakes in this allocation, or for insolvency of retailers. Financing of sales is done only in part from the wholesalers' and producers' own means; as a rule they discount the bills of their customers thus availing themselves of credit—mostly of bank credit alone in the case of textile producers, and of private credit in other cases.

This system of financing sales finds reflection in profit-sharing. At high interest rates (in case of commodity credits they take the form of high discount rates for cash transactions) a large part of the difference between the retail price and the producer price is absorbed by the cost of credit. This part is taken over by the party that finances the sales. To some extent it is the trader and the producer, but next to them it will also be a foreign creditor of the producer (especially when foreign raw materials are involved), a banker, and a domestic private creditor. A high rate of interest makes these profits large and their capitalization is effected 'outside the firm', although it is possible that a significant portion of capital that goes through the private discount market represents the producer's own financial means. In this way the company is separated from its sources of finance and 'depersonified'.

The source of these phenomena lies in the structure of the Polish money market, i.e. in the fact that access to some sources of credit is limited to selected customers only. This refers to foreign credits or credits of the bank of issue. Since total demand for credit cannot be satisfied from these two sources alone, and the supply of capital from other sources is also limited, the price of the latter is very high. In this way two rates of interest are established: a low one, available to the privileged who enjoy access to this cheaper credit, and a higher rate on credit advanced by domestic capital and allocated through

the free market. Producers use both types of these credits and therefore the rate on commodity credit that they grant may be lower—and under the pressure of competition it is indeed usually lower—than the rate offered at the private discount market.

In this way a wholesaler may find it profitable to use the credit of his supplier and at the same time to place his own capital outside his firm. Of course, in many instances the wholesaler does not have any capital of his own and operates only on borrowed capital in which case his remuneration will be rather modest, since the gross profit margin is usually only a little greater than his trading costs. In such a case possibilities of reinvesting profits within the firm are extremely limited. Moreover, as we have already pointed out, the ability of the wholesaler to perform this function depends first of all on the amount of his own capital. This explains why in 1929–30 in the cotton industry the wholesale trade was massively replaced by factory warehouses and factory commission sales. Only direct engagement of already existing capital in the wholesale trade firms would make them strong and meaningful partners in the textile business.

Next to this fundamental feature of the textile wholesale trade, the type of contracts concluded by wholesalers must be noted. While in Germany the direct customers of the wholesale trade are retailers, in Poland the customers represent larger retailers in big cities, while small provincial retailers use semi-wholesalers as another intermediary. Their existence is justified by the fact that these small retail shops sell very little and buy just as much; at the same time these shops have very limited financial means and therefore they must rely heavily on credit, and crediting of such a large number of small retailers requires a very thorough knowledge of local conditions. The lengthening of the chain of intermediaries by adding an additional link that does not exist in Western countries is a direct and necessary result of the pauperization of tradesmen.

Finally, very primitive organizational structures of trade must be noted. Running a firm is based on the experience of the owner in whose hands alone all initiative is placed and who is personally in charge of purchase and stocking policies. Although the sales of wholesale trade are made in Poland in larger portions than in Germany, and despite shortage of capital stocks in Poland are as large as in Germany and the velocity of their circulation is not greater. Economic calculation is primitive. Under complex and unclear capital relations market prices are subject to violent

fluctuations in Poland. Relations between wholesalers and producers as well as those among producers add to this instability (unadvised price undercuts, competition among producers by lower-quality imitations, etc.).

In the retail trade the low rate of profit, especially compared to German retailers, is striking. In the case of small retailers their incomes often hardly allow the owners to earn a very modest living and no capital accumulation is possible. This, of course, results in the weak financial foundations of the retail trade. Consequently a wholesaler who operates rather as a commission agent meets as his partner a retailer who operates rather as a hired worker. This explains the fundamental difference between the nature of the middle-class in Poland and in the West. The Western middle-class enjoys much higher living standards and it reinvests part of its profits in firms that it owns, but also in savings institutions and in securities. The relative poverty of the Polish middle-class probably explains why the securities market and the stock exchange are so shallow, something that was clearly seen especially after the War.

The organizational structure of the wholesale trade is as primitive as that of the retail trade. Employment of family members is very frequent. Although capital is in short supply, the velocity of circulation is no greater than in Germany which indicates that insufficient effort is made to reduce stocks to the necessary minimum.

Let us sum up. The main feature of the textile trade in Poland is its low profitability and its shortage of own capital closely related to it. Trade is largely financed through commodity credits of the producers. This traditional way of financing is relatively cheap which makes it attractive even for firms with sufficient own capital that they invest, however, in the private discount market where it earns high interest. The lack of capital in commerce makes the chain of intermediaries longer. Hence a low rate of profit in every stage of trade is not necessarily reflected in a low final price of the product. Moreover, the extension of the chain of intermediaries absorbs large stocks: it appears that at each stage of trade between the producer and the final consumer stocks are not at all smaller in relation to sales, compared to Germany, for instance. Thus, because of lack of capital and the primitive organization, the textile trade in Poland is unprofitable. All these features follow largely from the fact that in Poland the textile trade employs a relatively large population—which holds for Polish commerce in general. This, in turn, brings the profit

margins down to a level at which only low standards of living and no capital accumulation are possible. A more thorough examination of these phenomena goes beyond the scope of the present study, however.

The Share of Cartels in Industrial Output in Poland[1] (1933)

The high rate of cartelization of Polish industry that characterizes the structure of the whole economy and the course of the business cycle, has not yet been examined in quantitative terms. The aim of this paper is to fill this gap through the calculation of shares of individual cartels, of various groups of cartels (i.e. of syndicates and of pools that control sales, prices, etc.) as well as of the cartelized sector of the economy as a whole, in industrial activity in the Polish market. Cartels will be defined here in a broader sense, including firms that are the sole manufacturers of a given product.

Methodological Notes

1. *The basic definition.* The share of cartels in the industrial activity in the Polish market will be defined as the ratio of output of Polish cartels directed to the domestic market to the total Polish industrial output directed to this market. Industrial output is defined here as output of firms that employ more than twenty workers, i.e. it rather represents output of large and medium-size industry.

2. *The base-year of calculations.* In our calculations concerning presently existing cartels their output in 1930 is taken into account, and not their present output. The relative shares of individual industries cannot be considered 'normal' either at the time of the present business crisis, or in the 1928 and 1929 boom years, because neither of these periods represents the average structure of industrial output. For instance, the share of output of investment goods in total output will be greater than average in the period of boom and lower in the period of crisis. For this reason, as the base-year for our calculation of the share of presently existing cartels in total industrial output, 1930 was selected, as it represents the middle period between the boom and the crisis.

3. *The output index.* As in other ISBCP's studies of the volume of output[1] and the share of export in total output,[2] the index of output is expressed in terms of employment, i.e. in terms of the number of work-days in each industry. The main deficiency of this method of calculation is that disproportionately little weight is attributed to the heavily mechanized industries. This deficiency could be partially remedied if next to employment of labour in a given industry employment of machines was also considered: the number of man-hours worked in the industry would have to be increased by the number of man-hours necessary to replace the wear and tear of machines used in the process of production. However, such a procedure would require special and very laborious calculations, covering all industries, something that goes beyond the scope of this paper. Thus, in what follows we will introduce only one correction to allow for the exceptionally high mechanization of the cement industry. For the index of output in this industry in 1930 we took the number of work-days that would have to be spent to give the actual output of 1930 at the labour productivity norms of 1927, i.e. in the period before the complete modernization of the cement factories, instead of the actual number of work-days spent in the cement industry in 1930.

4. *Output of outsiders and the 'internal use' of cartel members.* A question arises whether the output of cartels should or should not include the output of cartel outsiders and that part of cartels' output that represents the input in cartels' own factories. The output of outsiders will be included into our index of the volume of cartels' output because the very existence of the cartel exerts great influence on prices received by cartel's outsiders. Of course, this will not be the case when the cartel handles too small a part of total output in a given industry to be able to control the market. In that case, however, we shall not consider the industry in question as cartelized (for this reason neither all kinds of local cartels, nor some general cartels, e.g. the syndicate of screws and rivets, have been considered in our calculations).

The question of whether the 'internal use' of the pool members should be included in the volume of cartelized output is simple

[1] See L. Landau, 'Methods of the Study of Industrial Output and Employment', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 2/2 (1933) (in Polish).

[2] See B. Winawerówna, 'Export of Industrial Goods in 1930 and 1931', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 1/2 (1932) (in Polish).

whenever this use is included, together with 'external sales' of the cartel, in the allocated quotas. In that case each pool member will calculate the cost of raw materials processed in his own factories at the cartel price because at that price he can sell this raw material instead of spending his quota as his 'internal input'. The question becomes more complicated when the quotas include only external sales of the cartel. Then the pool member will not calculate his internal use at cartel prices because he will not be allowed to sell this additional output outside the cartel.

It should be taken into account, however, that other cartel members who manufacture the same product must buy the cartelized raw material (which they do not produce themselves). Thus, cartel outsiders will calculate prices of their products at cartel prices of raw materials. In this way cartelizing the raw material influences the market price of the final product processed from it and thereby also the price received for this product by cartel members that manufacture it. Cartel members may ignore cartel prices of raw materials when calculating profitability of their respective outputs, yet the price they will receive for their products will depend on cartel prices.[3] For these reasons we shall always include the internal use by cartel members of their produce to the volume of cartelized output.

5. *Details of calculation.* The number of work-days spent on the manufacturing of products directed at the domestic market in each cartelized industry and in the manufacturing industry as a whole have been calculated on the basis of the employment data of the Central Statistical Office and the calculations already made by the Institute for the determining of the share of exports in total output in Poland.[4] In other cases the number of work-days was estimated in general on the basis of the volume of output, the assumed labour intensity, and daily wage rates. The latter two indices as a rule could be estimated only in rough approximation from the GUS data on labour intensity of production and the average wage rates in those industries in which the manufacturing of any given product is included. The separation of the respective data relevant for individual products under consideration is often not only very complicated but quite impossible because many factories manufacture more than one product. (The

[3] Of course, the profitability calculation by a member of the raw-material cartel may exert only a limited influence on the market price of the final product; at any rate the latter *depends* on the cartel price of the raw material.

[4] See B. Winawerówna, 'Export of Industrial Goods in 1930 and 1931'.

Institute's data on costs of production were also used in some instances for the evaluation of the share of labour cost.) Errors following from the nature of these approximations may only affect our calculation of the share of cartel's output directed to the domestic market to a limited extent because this method of estimation was only applied for cartels whose share in the total cartelized output, as we shall see below, is rather small.

Results and Conclusions

Our results are put together in Table 85. Fifty-six cartels have been considered. The volume of the 1930 output of each cartel directed to the domestic market is given as a percentage of the total industrial output in 1930 directed to that market. The cartels are grouped into three branches of industry: mining, metallurgy, and manufacturing. Besides the cartelized output, Table 85 includes also the volume of industrial output of the government-owned monopolies and the non-cartelized output directed to the domestic market—both, of course, as a percentage of total industrial output directed to that market; the sum of these three components must therefore be equal to 100.

The volume of cartel's output is rounded off to 0.1% of total output, hence its accuracy concerning small cartels may be very limited. Yet, it must be remembered that our results regarding small cartels must also be treated very cautiously; hence the limited accuracy of the data given in Table 85—which in the case of small cartels shed only some light on the order of their sales—has the advantage of not pretending that our estimates are precise. At any rate, as we have already noted, a rough estimate of output of small cartels does not at all imply a lack of accuracy of our estimate of the total cartelized output because the share of the output of small cartels is insignificant. For the same reason, the fact that some small cartels may have been omitted in our calculations cannot have any great impact on our final results.

It will be seen that the volume of 'monopolistic' output is equal to nearly 40% of total industrial output directed to the domestic market. About one-tenth of this is generated by the government-owned monopolies and the remaining nine-tenth by cartels. A first glance at Table 85 suffices to show that this large share of the cartelized output in the Polish market is the product of a few large cartels. The strong

Table 85. *The Share of Cartelized Output directed to Domestic Market in Total Industrial Output, 1930*

Industry	The share of output directed to the domestic market (%)
Cartelized industries (56 cartels according to their list in the middle of 1933)	36.7
Mining	*13.7*
of which:	
coalmining	13.4
potassium salt mining	0.3
Metallurgy	*5.0*
of which:	
iron metallurgy	4.2
pipe-rolling	0.1
zinc and lead metallurgy (the respective mines including)[a]	0.7
Manufacturing	*18.0*
of which:	
metal industry	1.3
of which manufacture of:	
enamelled tin pots	0.3
vertically cast-iron pipes	0.3
electric wires[b]	0.3
electric bulbs	0.1
wire cords, cast-steel products, radiators, spray tubes and corks, spades and shovels, forks, insulation tubes	0.3
Chemical industry	*2.9*
of which:	
oil refineries	0.5
coking-plants[c]	0.3
nitrogen fertilizers[d]	0.9
superphosphates	0.2
explosives	0.4
ammoniac and caustic soda[e]	0.3
paint and vanish, carbide, bone glue, oilcloth, chlorinated lime, muriatic acid and Glauber's salt, carbon acid, borax, black-lead pencils, emery paper	0.3
Mineral industry	*1.3*
of which:	
cement works	1.2
stoneware	0.1
Textile industry	*8.6*
of which	
cotton-spinning[f]	4.7
cheviot-spinning	1.2
jute manufacturing	2.1
cotton hosiery	0.5
bookbinding linen, silk-finishing	0.1
Food industry	*2.5*
of which:	
sugar-mills	2.2
yeast plants	0.2
cooking-oil refineries, rice-mills, vinegar essence production	0.1
Paper industry	*1.4*
of which:	
paper-mills	1.4
coloured blotting paper	0.0
Government owned monopolies	3.9
of which:	
spirits[g]	0.4
tobacco	2.5
salt	0.6
matches	0.4
Non-cartelized industries	59.4

[a] Five cartels together: one in zinc, lead, tin sheets, lead sheets and pipes, and in sulphuric acid each.
[b] Two cartels, one in wires and the other in underground cables.
[c] Two cartels, one in coke production and one in tar products.
[d] Two cartels, one in ammonium sulphate and one in other nitrogen products.
[e] Two cartels, one in ammoniac soda and one in caustic soda.
[f] Two cartels, one in darning-thread of average thickness and one in fine darning-thread.
[g] Distilleries employing more than 20 workers.

concentration of cartelized output is shown still better in Table 86. The share of the five large cartels in the total cartelized output is 73%, of the three medium-size cartels it is 10%, and of the forty-eight small cartels it is only 17%.

Together with concentration of output between cartels we have also examined the organizational forms of cartels operating in Poland; this cross-section is given in Table 87.

Table 86. *Structure of Cartelized Output According to the Size of Cartels in Poland, 1933*

Industry	No. of cartels	The share in output directed to the domestic market in 1930 (%)
Large cartels	5	26.6
of which:		
coalmining		13.4
iron metallurgy		4.2
cotton-spinning		4.7
sugar-mills		2.2
jute-manufacturing		2.1
Medium-size cartels	3	3.8
of which:		
paper-mills		1.4
cement works		1.2
cheviot-spinning		1.2
Small cartels	48	6.3

Table 87. *Organizational Forms of Polish Cartels, 1933*

Form	No. of cartels	The share in output directed to the domestic market in 1930 (%)
Syndicates (cartels with centralized sales) and firms being the single suppliers	40	15.3
Cartels regulating sales and prices	10	14.5
Other cartels	6	6.9

The most common form of cartel in Poland is the syndicate that represents the most coherent form of cartelization. However, syndicates' share in total cartelized output is merely 42%. The large share of cartels regulating sales and prices is caused by the fact that next to a few small cartels in this category is also included one giant cartel, i.e. in coalmining. Among other cartels (representing 19% of the cartelized output in Poland) one must distinguish cartels of cotton-spinning and cotton hosiery that regulate the volume of output, cheviot-spinning that regulates domestic prices through export bonuses (paid from accumulated fines for domestic sales in excess of the allocated quotas), and Polish Oil Exports—a company that may regulate prices of oil-refining products through determination of export quotas.

The following conclusions may be drawn from our study. Cartelized output represents about 37% of output of large- and medium-size industries that they direct to the domestic market. This cartelized output is heavily concentrated: 83% of it is represented by eight cartels and 17% by the remaining forty-eight cartels. As for the organizational forms of cartels, among fifty-six cartels examined above forty were syndicates; their share in total cartelized output was only 42%, however.

A New Index of Investment[1] (1934)

The investment index developed by the Institute for the Study of Business Cycles and Prices showed serious deficiencies in representing non-residential construction in 1933. This index was based on the numbers of workers employed in construction firms (in fact, in larger construction firms employing more than twenty workers), whose operations, strictly connected with larger non-residential buildings, were a pretty reliable index of the volume of this kind of construction. Important changes took place here in 1933 in connection with initiation of construction works financed from the Labour Fund. These works generally were not allocated among construction firms, but were carried out by government and communal agencies themselves. Consequently, the non-residence construction index unquestionably showed a much lower level of activity than was the case in reality.

The present revision of the investment index has not been limited to removing this defect, but attempts also to improve the representation of other fields of investment. Below we discuss in detail the individual component indices that make up the new index of investment as well as ways of weighting its components.

Construction

Housing construction. As an index of housing construction (except for large buildings) we continue to use the index of lime shipments by rail. The reliability of this index has never been questioned. However, in 1931 the Central Statistical Office began to publish rather complete statistics on construction activity in towns, including the cubage of all buildings started or completed in the period under consideration, in residential, industrial, and public building cross-sections. Hence there is now the alternative of using these data for composing our housing construction index.

Examination of these figures showed, first, that the cubage of buildings completed is always smaller than that of the buildings started. The main reason for this unquestionably is that reporting the

start-up of construction is more carefully observed than reporting its completion. This incompleteness of data on finished constructions probably should explain why the curve of constructions completed does not run strictly parallel to the curve of constructions started, which it should follow with a time lag equal to the average period of construction, i.e. six months for housing construction.[1] In view of this, as a basis for the housing construction index we wanted to use the statistics of constructions started, but here also a serious problem was encountered. It turned out that these statistics (as well as those of completed constructions) are permanently improved and their scope is continuously increasing. This improvement is valuable as far as absolute numbers are concerned, but it spoils the analysis of the dynamics of construction activity because it creates a certain upward 'statistical trend' that has nothing to do with reality.

Therefore, we contented ourselves with checking the symptomatic index of the value of lime shipments by comparing them with the corresponding data on residential buildings started up in 1931–3. Since there were inadequate data to eliminate seasonal fluctuations from the index of constructions started, this index, as well as the index of lime shipments, was calculated as the ratios of the respective numbers in one quarter to the numbers in the same quarter of the preceding year. At the same time the index of constructions started in a given quarter was compared with the index of lime shipments in the following quarter. For lime is used both in the initial and in the final stage of construction, so if the construction of a residential building takes six months on average, the distance between the curve of construction started and the curve of lime shipments should be approximately one quarter. The findings of this comparison are shown in Table 88.

A considerable convergence between the two series of indices may be seen at first glance. Moreover, if it is considered that in the 'constructions started' series there is already a statistical trend because of the improvement in these data, the convergence is even greater. The average of the second series is 6.6% lower than the average of the first series. It is quite likely that this is the measure of the yearly improvement of construction statistics. If this is the case, one would eliminate from the first series the effects of improved statistics by substracting 6.6% from the value of these indices. A

[1] See *Ruch budowlany w Polsce w 1931 r.* (Construction Activity in Poland in 1931). GUS, Warsaw, 1933, 74

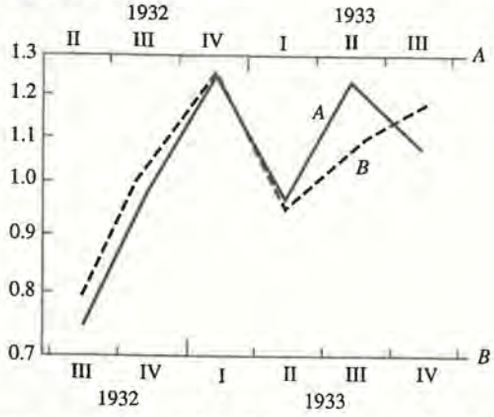
Table 88. *Indices of Housing Construction in Poland, 1932 and 1933*[a]

Year and quarter	Cubage of constructions started	Lime shipments by rail	Year and quarter
1932 II	0.792	0.792	1932 III
III	1.045	0.994	IV
IV	1.321	1.250	1933 I
1933 I	1.029	0.954	II
II	1.312	1.070	III
III	1.145	1.170	IV
Average	1.107	1.038	average

[a] In relation to the same quarter of the previous year.

comparison of the corrected series with the series of lime shipments (similar to the comparison given in Table 88, i.e. calculated as the ratios of the respective numbers in a given quarter to the numbers in the same quarter of the previous year) is shown in Fig. 20.

As we see, the convergence of the two curves is significant, indeed. Moreover, if it is also considered that the uncertain magnitude of 'statistical improvement' was assumed to amount only to 6.6%, we can confidently argue that the exercise of checking the significance of lime shipments as a symptomatic index worked out well for this index. Obviously, systematic comparisons of the two series under consideration are desirable.



A—Cubic capacity of residential buildings started; *B*—shipments of lime

FIG. 20. *The Cubic Capacity of Residential Buildings started and Shipments of Lime in Poland, 1932 and 1933 (ratios of corresponding indices in a given quarter to the respective index one year earlier; logarithmic scale)*

Non-residential construction. Putting together an index of non-residential construction—after rejecting employment in the construction industry as its basis—met with serious difficulties. The statistics of construction activity compiled since 1931 by the Central Statistical Office completely leave out earthworks and military construction. It is also difficult to find an input analogous to lime in housing construction whose sales could serve as a symptom of non-housing construction. A large part of cement output is used in Poland in the countryside. Regarding rolled iron for earthwork and ground-level construction, unquestionably a large part of its output is used in non-residential construction and in large residential structures; hence, a symptomatic index based on its sales would represent rather well construction activity not expressed by lime shipments; however, it is difficult to separate 'construction iron' from the total output of rolled iron.

As a starting-point here one can use the statistics of orders in the Syndicate of Steel Plants according to categories of buyers. Orders of the construction industry and government (except for railway materials), and of municipal agencies unquestionably refer to iron intended for construction alone. Apart from this, 'construction iron' can only appear in the orders of trade. Since we know that sales of iron play a very important role in total sales of construction materials, we can regard the volume of orders for iron (except for railway materials) for construction companies, government and municipal agencies, and trade as an approximate index of the use of iron in construction.

Another reservation is that orders precede consumption. However, salesmen will generally make orders for an amount that covers sales from stocks, and in the total of orders considered here those of trade dominate. In this way a substantial discrepancy between orders for 'construction iron' and its use can occur only if salesmen desire to change the volume of stocks. In order partially to eliminate these fluctuations, which can be considerable especially in the short run, not quarterly but average two-quarterly data are taken into account. They are calculated in such a way that to the volume of stocks in a given quarter, half their volume in the preceding quarter and half in the following quarter are added, and the sum is divided by 2.

The series thus derived may be regarded as a symptomatic index of primarily non-residential construction.[2] In Table 89 annual values of

[2] Of course, 'construction iron' is also used in some residential construction, especially in large apartment houses.

Table 89. *Indices of Non-Residential Construction in Poland, 1927–1933 (1928 = 100)*

Year	Orders for 'construction iron'	Employment in the construction industry
1927	67.0	63.0
1928	100.0	100.0
1929	75.4	97.1
1930	62.6	63.7
1931	33.3	38.5
1932	20.6	20.5
1933	31.2	17.6

this index of non-residential construction are compared with those previously used, based on data on employment in the construction industry. Apart from an extraordinary discrepancy in 1933, which made us revise the index, both series show a consistent direction of change, although in 1929 and 1931 considerable quantitative differences appear. However, they do not necessarily result from any shortcomings of the new index.

As follows from enquiries carried out for the ISBCP,[3] the share of construction firms represented in employment statistics of the Central Statistical Office in the total value of non-residential buildings completed in 1929 did not exceed 50%. Hence, the index of employment for the construction industry does not fully guarantee accurate results. From various empirical observations it appears that in 1929 the contraction of non-residential constructions was much greater than the decline of the index based on employment statistics, and the new index probably gives us more accurate information on the actual situation than the old one. It is hard to say which of the indices is more accurate for 1931, however. In any case, the higher value of the index based on employment statistics could have been influenced by the construction of the Upper Silesia–Gdynia railway, which at that time was allocated between many construction firms. Yet, this construction project was not represented in orders for 'construction iron', in which railway materials were intentionally not included (as we shall see later, railway materials will be put into a separate category).

[3] See L. Landau, 'Ankieta o robotach budowlanych w latach 1927–1929' [A Survey on Construction Works in 1927–9], ISBCP, *Sprawozdania i Przyczynki Naukowe IBKGiC*, vol. x, Warsaw, 1930, and L. Landau and M. Kalecki, 'An Estimate of Investment Activity in Poland', this volume.

A—residential construction; *B*—non-residential construction

FIG. 21. *Indices of Residential and Non-residential Construction in Poland, 1927–1933 (logarithmic scale; 1928 = 100; seasonally adjusted)*

The combined index of construction (the combined construction index I) is based on the index of lime shipments (representing housing construction except for large buildings), and on the index of orders for 'construction iron' (non-residential construction and larger residential structures). From the ISBCP estimate of investment outlays it follows that in the base-year 1928 the value of the first index was smaller, but not significantly smaller, than the value of the second index.[4] Hence, for both indices we assume weights of 1 : 1. The curves of non-residential and housing construction indices are put together in Fig. 21.

To check the combined index of construction we compare its annual values with those of an *ad hoc* index based on the use in construction of four basic building inputs: bricks, reinforced concrete, iron, and timber (the combined construction index II). These inputs are represented by production of bricks (according to data of the Central Statistical Office), by orders in the Syndicate of Steel Plants for iron for reinforced concrete, by orders for other 'construction iron' (the types of orders considered above as representative for 'construction iron', less orders for iron for reinforced concrete), and by shipments by rail of sawn timber. Each of these statistical series was given a weight equal to the value of the part

[4] See L. Landau and M. Kalecki, ibid.

of the building constructed with it, i.e. the value of the brick wall, of the reinforced concrete structures, of the built-in iron, and of the timber after carpentry work. The estimate thus made gave the weights 3 : 1 : 2 : 3, which allowed us to calculate the combined index of construction.

In Table 90 this combined construction index II is compared with the combined construction index I, based on lime shipments and orders for 'construction iron' calculated above (orders for 'construction iron' are included in both these indices, but are weighted differently in each). Both indices essentially move in step with each other, although in some years (especially in 1932) there are rather large discrepancies. They result mainly from the weaker-than-expected decline in brick production, whose index has great weight in the combined index II. As we can see from the comparison, the use of bricks fell less sharply than the use of lime, despite the fact that bricks are used in larger and smaller buildings, and lime only in smaller ones, whose construction was less affected by the crisis. Thus the question arises whether the scope of the Central Statistical Office series was not expanded here.[5]

Railway Investments

In the railway investments index both the construction of track as well as the production of rolling-stock is considered. For the track construction index we took the shipments of iron railway materials from steel-plants. However, owing to wide fluctuations of this series, which result from the fact that the Ministry of Communications receives iron in large lots, we smoothed it out by taking the four-quarterly moving average (we calculated the sum of shipments in a given quarter, in the preceding and the following quarters, and half of the shipments in the quarter before the preceding one and after the following one, and then divided this sum by 4). The production of rolling-stock is represented by the index of the number of man-shifts worked in the factories concerned (the Central Statistical Office employment series). In accordance with the estimate of the

[5] Such an expansion can be confirmed beyond any doubt in the Central Statistical Office series on the production of sawn timber. The index of the sum of domestic rail shipments and export of sawn timber, which represents total sales of sawn timber, was 41.4 in 1932 (1928=100), whereas the corresponding index of the production of sawn timber according to the Central Statistical Office series is 59.5

Table 90. *Indices of Construction Activity in Poland, 1927–1933 (1928 = 100)*

Year	Shipments of lime	Orders for iron	Combined index I	Combined index II	Production of bricks	Orders for reinforced concrete	Orders for other iron	Shipments of sawn timber
1927	83.8	67.0	75.4	70.2	67.2	47.0	69.7	82.1
1928	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1929	93.7	75.4	83.6	81.2	87.8	74.6	75.4	83.6
1930	77.3	62.6	68.5	67.0	70.4	62.9	63.4	67.0
1931	55.1	33.3	44.2	49.9	56.4	40.1	32.4	59.2
1932	44.0	29.6	32.3	39.5	48.3	15.4	20.9	51.6
1933	47.6	31.2	39.4	42.5	—	26.8	31.4	56.1

volume of investments, we took the weights of the two component indices as 2 : 1.

Investments in Machines

The index of machine investments is still based on the data of employment in the machine-building industry and on the imports of machines. The only innovation here consists in separating from employment in the machine-building industry man-shifts worked in rolling-stock factories (as we saw, the production of rolling-stock was included into the category of railway investments), and in distinguishing the production and imports of machines for industry and for agriculture.

Machines for industry. The index of domestic production was obtained by substracting from the total amount of man-shifts worked in the machine-building industry employment in terms of man-shifts in rolling-stock factories and in agricultural machinery factories. The import index of machines for industry was based on the value of total import of machines after subtracting the import of agricultural machines, tractors, and sewing-machines. To eliminate the influence of price changes we divided the value of the import of machines for industry by the corresponding index of German prices (a large portion of machines imported by Poland come from Germany). The indices of domestic production and import of machines for industry were weighted in the 1:1 ratio[6] in our index of investments in machines for the industry.

Agricultural machines. We proceeded here in the same way as with machines for industry, basing the index of domestic production on employment in agricultural machine factories, and the import index on the value of imports of agricultural machines (including tractors). The influence of price changes was eliminated by dividing by the appropriate index of German prices. The weights of the component indices were assumed as 1:1.

The *index of total investments in machines* was obtained from the indices of machines for industry and of agricultural machines, weighting them in the relation of 4:1. The curve of machine investments is shown in Fig. 22.

[6] This conforms with the estimate of the respective values in 1928. The other weights used in our calculations were derived on the same basis.

A—machines for the industry; *B*—agricultural machines

FIG. 22. *Investments in Machines in Poland in 1928–1933 (logarithmic scale; 1928 = 100; seasonally adjusted)*

The Aggregate Index of Investments

The aggregate index of investments was calculated from construction, railway investments, and total machine investments indices, weighting them in the relation of 2: 1:1 (investment indices for each of these categories are represented in Fig. 23). This index is compared with that of shipments of rolled iron from steel plants to the domestic market (see Table 91 and Fig. 24). As we see, there is a considerable, though not complete, convergence. Anyway, complete convergence could not be expected: above all, the disturbing factors here are the changes in stocks of iron; next, and more important, various kinds of investments require inputs of iron in different proportions. Housing construction in particular uses relatively little iron, and imported machines obviously do not contain any domestic iron.

The two last factors work in opposite directions and largely offset each other. That small-housing construction, which is most inflexible in the course of the business cycle, is little represented among the users of iron, makes its sales fluctuate more than aggregate investments. On the other hand, the import of machines, which generally represents more sophisticated machinery, is mainly not of a complementary nature but is intended for new investments; therefore imports of machines are the most flexible element of investment activity. Consequently, since import of machines does not affect the

Table 91. *Investments in Poland, 1927–1933 (seasonally adjusted, 1928 = 100)*

Year and quarter	Old aggregate index of investment	Domestic shipments of rolled iron	New investment index	Construction			Railway investments (construction of track and rolling-stock)	Machine investments		
				combined index	housing (lime shipments)	non-residential (orders for 'construction iron')		total	machines for industry	machines for agriculture
			Weights							
			100	50	25	25	25	25	20	5
1927	74.5	83.2	79.8	75.0	83.8	67.0	90.8	78.3	—	—
1928	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1929	95.5	86.6	92.0	83.6	93.7	75.4	106.8	94.0	98.5	76.2
1930	65.0	58.3	64.8	68.7	77.3	62.6	61.2	60.7	65.1	43.9
1931	43.2	44.1	47.2	43.7	55.1	33.3	63.2	38.4	42.7	21.8
1932	28.1	30.1	32.4	31.9	44.0	29.6	41.7	24.1	27.8	8.8
1933	26.7	37.1	32.9	38.6	47.6	31.2	31.9	22.6	25.8	10.2
1927 I	65.1	82.3	72.7	70.6	76.4	64.7	84.3	65.4	—	—
II	72.0	78.2	78.5	74.3	81.9	66.7	87.7	77.6	—	—
III	77.4	81.0	83.9	79.4	86.1	72.7	94.7	82.2	—	—
IV	82.8	91.3	89.5	83.4	89.7	77.0	103.0	88.2	—	—
1928 I	94.0	102.3	101.7	102.5	107.3	97.6	100.7	101.2	98.3	112.6
II	96.6	93.1	97.0	94.7	87.8	101.6	98.2	100.2	97.7	110.0
III	102.0	92.7	100.7	100.0	101.5	98.4	102.8	99.8	100.1	98.8
IV	106.2	113.0	102.7	101.1	109.5	92.5	108.9	99.6	103.7	83.7
1929 I	88.2	107.7	93.5	77.3	68.9	85.7	118.8	100.4	105.2	81.4
II	102.7	94.5	99.5	88.0	97.4	78.5	115.9	105.9	111.3	84.4
III	98.3	78.3	92.5	89.9	106.9	72.9	98.0	92.0	96.5	74.3
IV	88.7	71.4	80.2	81.1	92.0	70.1	80.9	77.8	81.1	64.6
1930 I	76.4	58.0	71.5	73.9	80.3	67.5	66.8	71.2	75.8	52.9
II	62.8	65.8	64.3	68.1	69.1	67.1	59.2	61.6	66.6	41.8
III	65.7	57.3	66.3	70.3	77.6	63.0	64.2	60.4	63.8	47.0
IV	56.7	51.2	57.1	56.7	66.1	47.3	64.6	50.2	54.3	34.0
1931 I	42.8	46.2	48.4	44.7	53.0	36.3	60.2	43.9	48.3	26.4
II	46.8	45.4	49.9	49.0	61.2	36.7	60.0	41.4	45.5	25.3
III	45.3	42.5	48.4	48.6	63.0	34.2	59.0	37.4	41.7	20.2
IV	35.3	43.2	36.6	32.2	38.8	25.5	50.7	31.2	35.2	15.1
1932 I	26.6	27.3	31.6	26.7	32.8	20.5	47.6	25.4	29.3	10.0
II	30.3	26.6	35.2	35.8	49.3	22.2	42.6	26.6	31.1	8.8
III	28.9	32.9	33.6	35.8	49.8	21.7	40.6	22.2	25.9	7.9
IV	25.1	34.4	32.4	30.1	38.5	21.6	47.1	22.4	25.0	8.6
1933 I	24.6	35.2	33.8	34.0	41.0	27.0	44.3	22.7	25.9	10.2
II	25.7	38.6	34.2	39.1	47.0	31.2	36.9	21.8	25.0	9.3
III	27.6	38.3	33.5	42.8	53.3	32.3	27.8	20.4	23.2	9.0
IV	28.8	35.0	31.9	39.9	46.6	33.2	21.9	25.8	29.1	12.5

A—construction; *B*—railway investment; *C*—investments in machines

FIG. 23. *Investments in Poland, 1927–1933 by Main Categories (logarithmic scale; 1928 = 100; seasonally adjusted)*

sales of domestic iron, fluctuations of the latter are thereby made smaller in relation to those of the aggregate index of investment.

A—aggregate index of investments; *B*—shipments of rolled iron to the domestic market

FIG. 24. *Investments and Sales of Iron in Poland, 1927–1933 (logarithmic scale; 1928 = 100; seasonally adjusted)*

Anyway, the rather close convergence between our new index of investment and the sales of iron can be regarded as an additional test of its reliability.

The International Comparability of Indices of Industrial Output and an Attempt to Improve It[1] (with Ludwik Landau) (1934)

1. International comparisons of changes in industrial output as measures of changes in the economic situation are common. A table of industrial output indices is placed at the head of periodic comparisons published by the League of Nations in its *Monthly Bulletin of Statistics* and in all similar publications. From comparisons of these indices differences in the direction and intensity of economic changes in individual countries are estimated.

Output indices unquestionably are the most synthetic measure of changes in economic activity and best represent their direction and intensity. That is why their calculation has become very widespread. While as recently as the beginning of 1932 the *Bulletin* of the League of Nations gave respective indices for only eight countries, now they are calculated and published for nineteen countries.

Consequently, it becomes all the more important to determine to what extent these indices are comparable with each other not only as to the direction of changes in production and their intensity, but also as to the volume of these changes in individual countries. For instance, the calculation made by the German Institute for the Study of Business Cycles of an overall index of world industrial output would indicate that, despite all reservations, the calculations made in different countries are regarded as directly comparable with each other. Is that really so?

The methods of constructing the indices of industrial output vary between countries. The consequences that may result from this can best be seen in the example of a country for which two indices of output are calculated independently. In Great Britain one index is calculated by the London and Cambridge Economic Service, the other by the Board of Trade. A comparison of the two has shown that the Economic Service index, which essentially moves in the same direction as the Board of Trade Index, is much more sensitive than

the latter.[1] Changes in the Board of Trade index amount on average to only 60% of the changes of the Economic Service index. This means that the scope of the first index is much broader, while the second one gives more weight to branches sensitive to business fluctuation, e.g. to heavy industry.

The subject of our analysis will be to study the international comparability of indices of industrial output. To do this we must first examine differences in methods of their construction. We shall limit ourselves here, apart from Poland, to a few countries that are the industrial leaders: the USA, Great Britain, Germany, France, and Japan.

Differences in methods of construction of the indices in question consist in: (i) differences in sources and type of data on output, and (ii) differences in the number of industries covered by the index and the weights given to individual industries.

The source for calculation of an output index are direct data on production, or indirect data indicating the changes taking place in production, e.g. data on the inputs of raw materials, sales, employment of labour, and capital equipment. The ideal would be direct data on output that would account for fluctuations in its value (obviously, net value at constant prices) resulting from changes in volume as well as in quality. For the value of output can rise through an increase in quantity as well as through an improvement in quality. This ideal would be possible if the data on the value of net output at constant prices were collected, or if there existed detailed information on the volume of output produced in each quality group.

This information is unavailable in practice, hence calculations of our indices must always assume that certain factors remain constant. Thus, data on the total volume produced, without considering quality structure, assume that average quality has not changed; data on the input of raw materials assume that neither the value of raw material intake in the value of net output (at constant prices, of course), nor the stocks of raw materials have changed; finally, data on employment assume that labour input per unit of output has not changed.

None of these assumptions strictly corresponds to reality: the average quality grade changes (especially in such a broad index as e.g. the total output of knitting products). Consequently, owing to

[1] See *London and Cambridge Economic Service Monthly Bulletin*, 11/3 (1933), 81 ff.

quality changes and savings in the use of raw materials, the relative share in the value of total output changes. Finally, labour productivity changes as well.

In the first place, the common features of these omissions affect business fluctuations along the trend-line of output over long period. Moreover, changes caused by these omissions work in the same direction, namely they depress the trend-line of output changes. Owing to the tendency to increase processing of industrial output, more intensive use of raw materials, and a rise in labour productivity, the real development of output contains elements of expansion that are neglected by every one of the above-mentioned assumptions. Regarding comparison of the results obtained with different assumptions, the common direction of the deviations from the actual development caused by them considerably reduces the incomparability resulting from them. On the other hand, their impact on cyclical fluctuations requires further examination; at present it is rather difficult to say anything more precise about it. For the moment we shall put aside this problem, which is of minor importance in the short run, and below we shall deal with the influence of the scope of output indices on their comparability with each other. We shall examine the scope of output indices calculated monthly or quarterly in each of the countries mentioned above.

In the *USA* the index of industrial output calculated by the Federal Reserve Board has a rather broad base of nearly sixty series, including all the more important branches of mining, the iron and steel industry and the non-ferrous metal industry, the production of transport equipment, the wood, chemical and rubber, mineral, textile, leather, paper and printing, and food and tobacco industries. The gaps that prevent us from recognizing this index as a measure of the fluctuations of total industrial output is in particular the following: it omits the construction, metal-processing, machine-building (except for production of transport equipment), and clothing industries (except for the production of shoes), and it also inadequately represents some other branches, especially the chemical and food industries.

Since in the weighting system it was accepted that respective indices do not represent industries that are not covered by them, the ratio of the index of production of consumer goods to that of the production of capital goods may not correspond to the actual relation of production of consumer goods to that of capital goods. In consumer goods industries, the clothing industry and certain parts of the food industry are left out in the index. Even wider are the omissions in the production of capital goods. The index leaves out such a large sector as construction, and the machine-building industry in the strict sense, as well as the metal industry (production of metal equipment, instruments, electrotechnical goods, etc.).

In sharp contrast to this index is the industrial output index calculated in *France* by Statistique génerale de la France. This index is based on a relatively small number of series (eighteen), that represent mining, the iron and steel industry, construction, metal-processing, the machine-building, rubber, textile, leather, and paper industries. Hence, it does not include the mineral, wood, chemical (except for rubber), food, clothing, and printing industries. As we can see, the major omissions of the US index (construction, metal-processing, and the machine-building industries) do not apply to the French index. On the other hand, the food industry, which is strongly represented in the US index, as well as the printing industry, are absent in the French index. Thus in the case of France the omissions are smaller in the production of capital goods, concentrating rather in its less flexible components (mineral, wood, and chemical industries), but much wider omissions appear in the consumer goods industries (food, clothing, and printing). Also in France, the principle that certain industries directly omitted in the index may be represented by other industries of a similar nature is not applied.

In distinction to the American and French cases the industrial output index in *Germany*, calculated by the Institut für Konjunkturforschung is based on the above-mentioned principle of representation. It is calculated on the basis of sixty series, representing mining, iron and steel, and other metal industries, construction, machine-building (machines, automobiles, ships), and the mineral, textile, leather, food, paper, gasworks and electric-power industries. These industries are combined into four groups: investment goods, other capital goods, consumer goods with elastic demand, and consumer goods with inelastic demand. The industries of each of these groups are given a combined weight corresponding not to the weight of the branches that were included in the index, but to the weight of their groups. Hence, those branches that were omitted in the respective indices are represented indirectly. There is indeed a considerable number of such branches: there is no direct representation of the metal industry in the strict sense (except for the

machine-building industry), the electrical-engineering, chemical (except for gasworks and coking plants), wood, leather, clothing (except for shoes), and printing industries. However, the influence of these gaps is offset by the system of weighting, so that the resulting errors in representing industrial output can be substantial only in the short term, probably being very small in yearly periods. Serious misrepresentations could occur only in the event of considerable changes in the structure of industrial output.

If for the USA, France, and Germany—three countries with a similar structure of industry—we compare the respective weights given to the industry groups most tightly linked with investment activity, namely to the iron and steel industry, construction, and metal and machine-building industries, the differences in the structure of the corresponding indices stand out very clearly. In Germany this weight, which is calculated on the basis of data for the industry as a whole, is 40%; for the USA it is only 28%; and for France it is as high as 57%. Clearly these differences do not follow from variations in the structure of industry in these countries, but from omitting construction and machine-building industry in the US index, and from including these branches but omitting some others, especially in the production of consumer goods, in the French index. These differences in the scope of each of these indices obviously work in opposite directions and may add to misrepresenting the actual development of industrial output.

In *Great Britain* the Board of Trade industrial output index is based on about sixty series, including mining, the iron and steel and non-ferrous metal industries, metal-processing, the machine-building and electrical-engineering industries, and the mineral (underrepresented compared to other industries), chemical and rubber, textile, leather, clothing (only footwear), food, paper, and printing industries. Since the wood industry is of little importance in Great Britain, the major shortcomings of the index (as the Board of Trade itself admits) are that it does not include construction and the clothing industry except for footwear. However, the omissions in the British index, in contrast to the respective American and French indices, do not concentrate in one area of industrial output, i.e. either in production of investment goods, or in production of consumer goods.

In *Japan* the index of industrial output calculated by the Mitsubishi Economic Research Bureau has been gradually expanded: first it included eight series, then twelve (the revision of 1933, with recalculation of the respective data back to 1927), and recently it was expanded to twenty-six series (with recalculation of data back to 1930). We have no information on the structure of the index after the last revision, since the publication of its methodological base in the League of Nations *Bulletin of Statistics* has been delayed. The twelve series previously considered included four series for the textile industry (cotton and silk), two series for the chemical industry, two series for the iron and steel industry, and one series each for the copper, paper, cement, and coalmining industries. Since the index was calculated as an average of the indices of individual branches, the greatest weight, 40%, was thereby given to textiles, or more precisely to the cotton and silk industries; in fact, if it is remembered that the chemical industry in large part represents articles connected with textiles, the weight of textiles is as high as 60%.

The textile industry in Japan is chiefly geared towards exports and more loosely tied with the domestic market. Thus the index mainly represents production for export, while the production of consumer goods for the domestic market is very weakly represented in the Japanese index of industrial output. For example, the food industry is left out entirely, and textiles—the wool and clothing industries, as well as part of the chemical and wood industries—are not included in this index. It can be assumed that its most recent revision attempted to consider more comprehensively industrial production for the domestic market.

The *Polish* index of industrial output has a very broad scope because it is based—except for mining and the iron and steel industry—on employment data (number of man-hours worked). This made it possible to include all branches of manufacturing industry in the index, which is almost unattainable if direct data on the volume of output are used. However, the negative aspect of this was that the index did not represent small plants that were not included in the employment statistics (i.e. plants normally employing less than twenty workers). However, first of all, these plants do not react to business fluctuations in the same way as large industry, being generally less sensitive to market fluctuations than the latter; secondly, small plants have a specific composition. On the one hand, they include the construction industry, only a small part of which is represented in Poland by large construction firms; and construction is more sensitive to the business cycle than any other industry.

On the other hand, they include small plants that produce consumer goods for which demand is rather inflexible. Hence, it is difficult to say in which direction this index ultimately diverges from the actual structure of industry.

2. Our analysis so far has shown that as a rule indices of industrial output do not represent its changes as a whole but only changes in the output of a group of branches regarded as representative. If changes in the output of this group are stronger or weaker than in the industry as a whole, the overall industrial output index turns out to be either too sensitive or too rigid. Obviously, for this reason indices of industrial output cannot serve as a basis for comparing the intensity of business fluctuations in individual countries. Thus the problem arises of finding some common measure for comparing the intensity of business fluctuations in industrial output as a whole in various countries.

It appears that such a common measure might well be the index of *consumption of coal* in individual countries (coal equivalent of power generated in hydroelectric power stations included). If in two countries the use of coal fell by, say, 20% in a certain period, obviously one could not argue on this basis that industrial output in these two countries also fell by 20%, for there may be no strict proportionality here; however, with a high probability one could claim that in both countries the fall in output was approximately the same.

However, even this statement cannot be considered strictly accurate: besides industry, coal is also used to propel trains and as home-heating fuel. If the relative shares of these three types of use of coal were different in individual countries and, moreover, if the dynamics of each of these types of use were divergent, an identical fall in the total consumption of coal in individual countries could be linked with an unequal fall in industrial output. These differences will not be great, however. Owing to the interdependence of industry and transport, the relation of 'railway coal' intake to 'industrial coal' intake does not show large discrepancies between countries, and the dynamics of both these types of coal consumption is quite similar. Concerning stove coal, though its share in total coal consumption is smaller in countries with a warm climate and its sales react much weaker to business fluctuations than those of the 'industrial' or 'railway' coal, because in all industrialized countries stove coal

generally has a very small share in the total consumption of coal, the possibility of comparing changes in the total industrial output in individual countries on the basis of coal consumption indices will not be impaired from this side either.[2]

None the less, in making such a comparison serious difficulties are met in connection with the strong influence of random factors on coal consumption. Above all, this consumption is calculated on the basis of coal production to which imports are added and from which exports are subtracted.[3] Hence, this index is always affected by changes in stocks of coal that have nothing to do with changes in industrial output as a whole. Another such factor are changes in temperature that influence coal consumption, not only of stove coal but also in industry and on railways. Thus in order to use indices of coal consumption to compare changes in industrial output in various countries one should first eliminate from them the influence of random factors. It is precisely in this context that we come back to making use of indices of industrial output.

Let us denote the index of total industrial output of a given country along the abcissa, and the index of coal consumption along the ordinate axis (see diagrams in Fig. 25). Now, using the least-squares method we draw a regression line that is a straight line. The ordinates of this line represent what can be considered the 'ideal' consumption of coal, i.e. one that would take place if changes in stocks and in temperature did not disturb the functional interdependence between consumption and industrial output. Thus if we denote the industrial output index of a given country by x, the index of ideal coal consumption would be expressed by the equation: $y = ax + b$, where a and b are coefficients calculated by the least-squares method. Relating the y series in various countries, we can now compare the dynamics of their industrial output. First, however, let us briefly discuss how coefficients a and b are calculated.

[2] Besides this, the divergencies between changes of industrial output and changes in the use of coal may result from differences in the structure of industry, namely from differences between the share of more and less coal-intensive industries. However, it can easily be seen by working out any numerical example that these differences will be not large even if variations in the structure of industry are very large indeed.

[3] Moreover, as mentioned above, in countries where hydropower plays a considerable role (i.e. in Germany, France, the USA, and Japan), electric power generated in hydropower stations was converted into hard coal in the ratio 1 kWh = 1 kg of coal.

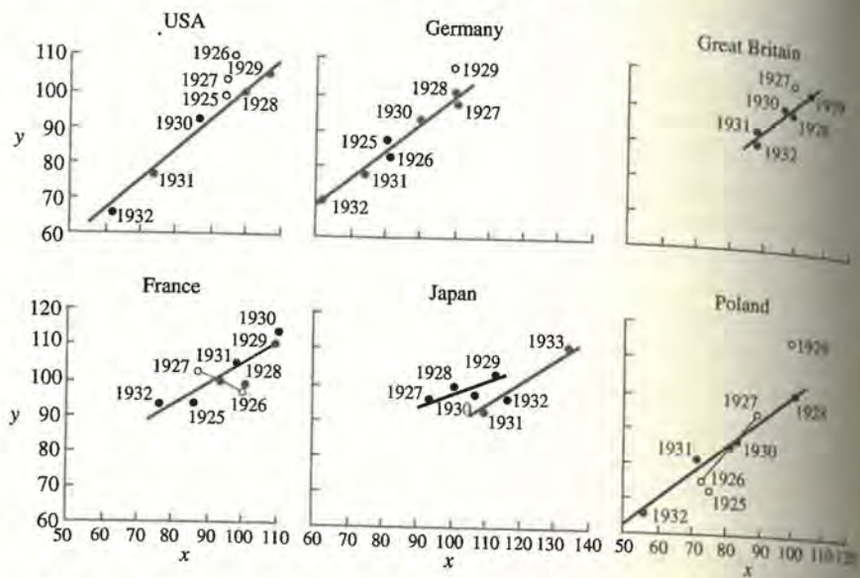


FIG. 25. *Interdependence between Indices of Industrial Output, x, and Coal Consumption, y, in Selected Countries*

On the diagrams the black points represent those years that were taken into account for drawing regression lines, and the white points represent years that were rejected for various reasons. Thus, for Germany and Poland 1929 was excluded because of the extremely severe winter that caused exceptionally large coal consumption in that year. Furthermore, the English coal strike in 1926 caused a running down of coal stocks, which was offset by their increase in 1927. The same thing happened in France, which covered part of her demand with imports (where, as in England, prices rose considerably as a result of this), and in Poland, where increased exports combined with a shortage of rolling-stock for coal transport caused difficulties in supplying the domestic market. Consequently, for France and Poland the points corresponding to 1926 and 1927 were replaced by a point lying between them, which was given double weight. In the case of England, on the other hand, this procedure could not be applied since the index of total industrial output was not calculated until 1926 inclusively, and so the point corresponding to 1927 was simply rejected.

For the USA the points representing the years 1925, 1926, and 1927 were rejected, since they lie considerably above the straight line passing close to the points that represent subsequent years. This

deviation may be due to various changes that took place during this time in the consumption of coal (e.g. the replacement of coal by petroleum products, and economizing in the use of coal). On the other hand, for Poland the point of 1925 was rejected because it lies considerably below the regression line of points for subsequent years. This deviation can be explained by the fact that the Polish industrial output index, which is based mainly on the number of man-hours worked, attributed too high a volume of output for 1925, in which labour productivity was much lower than in subsequent years.

It should also be mentioned that because of a change in the construction of the Japanese index, starting from 1930 two separate regression equations for the periods 1927–30 and 1930–3 had to be calculated.

In Table 92 correlation coefficients between y and x and the equations of respective indices of the 'ideal' use of coal in individual countries are put together. With the help of these equations we could now calculate the indices of the ideal consumption of coal in various countries and compare the dynamics of industrial output in these countries, which is the actual purpose of our study. Before doing so, however, we shall attempt somewhat to improve our method of comparison.

Our argument so far has been based on the approximate assumption that the coal consumption index, y (with random shocks eliminated),

Table 92. *Coefficients of Correlation between Industrial Output and Coal Consumption in Selected Countries*

Country	Coefficient of correlation of y to x	Equation for the 'ideal' index of consumption of coal[a]
USA	0.995	$y = 0.812x + 18.6$
Germany	0.983	$y = 0.751x + 24.9$
England	0.966	$y = 0.760x + 24.0$
France	0.927	$y = 0.567x + 43.3$
Japan		
1927–30	0.818	$y = 0.305x + 69.5$
1930–3	0.900	$y = 0.468x + 33.2$
Poland	0.993	$y = 0.726x + 27.6$

[a] For output indices, x, 1928 = 100. The same basis was taken for the indices of the 'ideal' consumption of coal; this was obtained as follows: both coefficients a and b of the respective regression lines were multiplied by the same coefficient k such that the equation $y = kax + kb$ for $x = 100$ gave $y = 100$. In the case of Japan, only the equation for the period 1927–30 meets this condition; in the equation for 1930–3 the multiplier k was selected in such a way that the first and the second equations would give the same value for 1930, through which the old Japanese industrial output index is linked with the new one.

is the same function of some perfect index of their industrial output, z, for all countries. So we can substitute $f(z)$ in our equations for y, where f is an unknown function but the same for all countries. Now let us remember that from the first part of our study it follows that the German index of industrial output is constructed on a rather broad base and the omissions in it are made up by its system of weighting. Thus we shall not make a big mistake if we assume that in this case the index of output represents best the actual dynamics of total industrial output, $z = x$. Consequently, the equation for Germany can now be written: $f(z) = 0.751z + 24.9$.

This equation determines the shape of function f. However, since this shape is assumed to be the same for all countries, we can now substitute the expression $0.751z + 24.9$ for y on the left side of our equations. Solving these equations for z, we get:

USA	$z = 1.081x - 8.1$
Germany	$z = x$
England	$z = 0.985x + 1.5$
France	$z = 0.755x + 24.5$
Japan	
1937–30	$z = 0.406x + 59.4$
1930–3	$z = 0.864x + 11.0$
Poland	$z = 0.967x + 3.3$

In these equations z approximates for any given country the perfect index of industrial output that in this way can be calculated on the basis of a corresponding unadjusted index. Thus we no longer have to do here with the indices of coal consumption, though the latter were indispensable for calculating the coefficients of our final equations.

Indices calculated by means of equations obtained from the respective values of x are simply the adjusted indices of industrial output. If the coefficient of x is greater than 1 (and consequently the free member in the equation is negative), this means that the unadjusted index of output is too rigid; when the coefficient of x is smaller than 1 (and the free member is positive), then the output index is too sensitive.[4] Thus from the obtained equations it

[4] If we denote the coefficient of x by m, then, since our equation has been constructed in such a way that for $x = 100$ also $z = 100$, this equation can be written as $z = mx + 100(1 - m)$, or $z = x(x - 100) + 100$; in other words, m represents the ratio at which one should increase (or reduce) the deviation of the unadjusted index from 100 in order to obtain our adjusted index.

Table 93. *Indices of Industrial Output in Selected Countries* (1928 = 100)

Year	USA	Germany	England	France	Japan	Poland
Unadjusted indices, x						
1929	107.2	100.4	106.0	109.4	(111.8)	99.7
1930	86.5	90.1	97.9	110.2	(105.8)	81.8
1931	73.0	73.6	88.8	97.6	108.7	69.3
1932	57.7	61.2	88.4	75.6	115.3	53.7
1933	68.5	68.9	93.4	84.6	133.0	55.4
Adjusted indices, z						
1929	107.8	100.4	105.9	107.1	104.8	99.7
1930	85.4	90.1	97.9	107.7	102.4	82.4
1931	70.8	73.6	89.0	98.2	104.7	70.4
1932	54.3	61.2	88.6	81.6	110.6	55.2
1933	66.0	68.9	93.5	88.4	128.5	56.9

follows that only the index of industrial output for the USA is too rigid, that the English and Polish indices do not require major corrections, and, finally, that the indices of industrial output for France and Japan (especially the old Japanese index) are too sensitive.

These findings are entirely in accordance with the structure of particular indices discussed in section 1 above. We saw there that the weight of sensitive branches of industry, producing investment goods, was considerably greater in the French index, and in the American index it was much smaller than in the actual structure of the industry. In England and Poland we discovered no defin-ite tendency that would make the index too sensitive or too rigid. Finally, in the case of Japan our calculations make it possible to express numerically the progress achieved by expanding the base of the index, which in its former structure was extremely sensitive but whose present from occupies an intermediate position between the French and the German indices in this respect.

We may now turn to calculation of the adjusted indices of industrial output by means of the above equations. Table 93 lists in its upper part the unadjusted indices of industrial output, x, and in its lower part the adjusted indices, z, in the years 1928–33. It will be noted that the adjusted indices differ most from the unadjusted ones for the USA and France. In the former country the decline of the adjusted index during the business crisis is much sharper, while in the latter it is much milder than the decline in the unadjusted index.

Domestic and Imported Machines and the Nature of Industrial Investments[1] (1935)

The share of home-produced machines in total sales of industrial machines in Poland shows a steady growth during the business crisis: in 1928 it was 45% and in recent years it was above 60%. At first glance it might appear that home-produced machines replaced the foreign ones. At a closer inspection this explanation gives rise to serious doubts, however. Until 1932 no protective measures had been undertaken that might improve the competitiveness of the former against the latter. At the same time the fall in prices for home-produced machines was no greater than in the world market. Only in 1932 were the so-called import bans for various machines introduced and the new tariff of October 1932 increased significantly import tariffs for machines. However, the share of home-produced machines was rising sharply in 1930–1, and in 1932 this trend nearly ended. Thus only a rise of this share in 1934, following the introduction of the new import tariff, may be interpreted as an expansion of sales of domestic machines at the expense of the foreign ones. It follows that in the course of the crisis there must have operated some factors responsible for a much stronger decline in the import of machines than in the sales of those produced at home. The most probable explanation is that different types of machines are imported from those produced in Poland and the sales of the former were especially affected during the crisis.

The average value of 1 kilogram of the home-produced machines in 1929 was Zl.2.7 and of the imported machines it was Zl.5. What does that mean? It means that imported machines are more complicated and those produced at home meet demand of a more simplistic nature and for parts. A rise in the share of home-produced machines in total sales of machines may therefore result from an especially strong cut during the crisis of demand for investments that require more complicated and modern machinery.

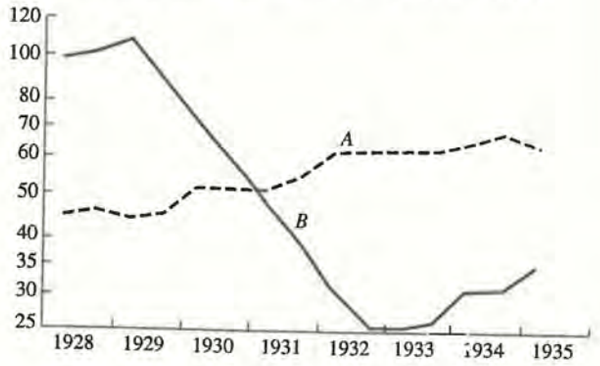
Indeed, the crisis has two effects. First of all, construction of new plant is sharply reduced, especially as the basic part is usually special machinery or equipment. Moreover, if the plant already exists

but its core machinery is altogether depreciated, because of low profitability of production it may pay to limit output rather than to replace machines. Investments in machinery in the already existing plants are thus reduced to overhauls and the replacement of less expensive machines, saving on which does not justify limiting the volume of output. In this way simpler machines and parts are favoured by entrepreneurs compared to imported machines; this apparently resulted in the rise of share of sales of the former during the crisis.

The absence of substitution of home-produced machines by foreign ones is also supported by investigations carried out some time ago by J. Zagórski who examined the rates of growth of sales of home-produced machines of various types and those imported.[1] It follows from his study that for home-produced machines not significantly different from their imported equivalents, in the period 1928–33 the proportion of sales of these two groups remained constant. For wood lathes the regression equation was $y = 1.05x - 5.9$ (where y is the index of import and x is the index of home-produced lathes, at 1928 = 100), and for metal lathes the respective equation is $y = 0.97x + 4.4$. The value of the coefficient of x close to 1 is evidence of the existence of a strong tendency for the same changes in both respective indices. This is not so in the case of textile machines for which the regression equation is $y = 1.38x - 41.3$. In that case, as in the case of machines as a whole, imports were subject to much stronger changes that the sales of home-produced machines, but in that case the above-mentioned factors clearly operated: in the textile industry most home-produced output represents parts of textile machines or machines of simple construction.

In Fig. 26 the curve representing the share of home-produced machines in the total sales of machines, and the curve representing the latter are drawn. It will be seen that a fall in total sales of industrial machines in 1929–33 is accompanied by a rising share in the sales of home-produced machines; in 1932–3 this share stabilizes. In 1932, as a result of increased import tariffs and the introduction of the new tariff system, total sales of machines and the share of home-produced machines in total sales of machines increased together, but by 1935 the situation returned to what we consider a

[1] See J. Zagórski, 'Orders for Industrial Machines', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 3/1 (1934) (in Polish).



A—share of home-produced machines (%); *B*—sales of industrial machines (1928 = 100)

FIG. 26. *Sales of Industrial Machines in Poland and the Share of Home-produced Machines in their Total Sales (logarithmic scale; seasonally adjusted)*

normal pattern of development, i.e. the two curves change in the opposite direction.

It follows from the above that the share of home-produced machines in total sales of industrial machines is an index closely related to the course of the business cycle and reflecting—albeit in a limited way—the nature of industrial investments.

Index of Sales of Industrial Products[1] (1935)

1. *Definition and construction of the index.* Sales of industrial products are defined here as sales of the industry as a whole, i.e. those products that 'leave the industry' are no longer subject to any industrial processing. Thus, when estimating the volume of sales of industrial products in this sense one does not take into account, for instance, coal used up in the industry itself; it is embodied in other products 'leaving the industry'. However, stove coal and coal for rail transport must be accounted for. Therefore, our calculation has to consider: (i) all consumer products (textiles, sugar, kerosine, etc.), (ii) investment goods (buildings, machines, means of transport), (iii) industrial raw materials and semi-products sold for the agriculture, handicrafts, and transport (synthetic fertilizers, tanned leather, coal for rail transport, etc.), and (iv) all exports of industrial goods.

The thus defined index of sales of industrial products corresponds to the index of output calculated by the ISBCP. Indeed, it is constructed on the basis of the volume of output of each industry, weighted according to man-hours spent in that industry in the base-year, i.e. each industry is accounted for at a rate corresponding to the volume of its output that 'leaves the industry'. For example, the sum of man-hours spent in spinning-mills and weaving-mills corresponds to the value of manufactured textiles and not to the value of the sum of yarn and these textiles.

It follows that the difference between the index of sales of products leaving the industry that we want to calculate, and the index of the volume of output calculated by the Institute could in principle result only from changes in stocks of the industry. However, as we shall see below, there may appear also some other discrepancies, especially due to the different scope of each index.

The volume of sales of products leaving the industry was calculated, broadly speaking, as follows. First of all, the volume of sales was divided between the part sold on the domestic market and that exported. In the base-year 1928 the proportions of the former and the latter were approximately 80 : 20. The export index (i.e. export value after elimination of price changes) is regularly calculated in the

Institute according to a method discussed by Landau.[1] The index of domestic sales was based on the data on the sales of textiles, sugar, tobacco, beer, paper, stove coal and coal for the railways, and investment goods produced at home; all these represent more than 90% of total domestic sales of industrial products. The volumes of sales of the majority of the above-mentioned products are readily available from the statistical data of the Treasury (tobacco, beer), or of the respective industrial associations (sugar, paper, stove coal, and coal for the railways). The index of investment products manufactured at home was compiled by subtracting from the overall index of investments (calculated by the Institute) the value of machine imports. Finally, the index of domestic sales of textiles was constructed *ad hoc*.

2. *Index of domestic sales of textiles.* The value of this index in each year was calculated as follows. From data on total output, foreign trade, and stock changes of cotton yarn, its sales were estimated, from which in turn the volume of output of textiles was estimated, and then from the latter the volume of exports of textiles and clothes was subtracted. A similar procedure was used for wool and both these indices—representing domestic sales of cotton and woollen textiles—were weighted in proportions that correspond to their respective values in 1928, i.e. in the ratio of 1 : 1.[2] In Table 94, the results of these calculations are compared with the respective indices of man-hours worked in textile factories employing more than twenty workers.

Larger differences that may be observed since 1932 must not be attributed to the fact that the first index represents output sold on the domestic market only and the second represents total output, for export plays a rather insignificant role in total textile output. Nearly all these discrepancies should be attributed to differences in the scope of each index. The first is based on the sales of yarn and therefore also represents small weaving-mills, and the second, which considers only factories employing more than twenty workers, is much less comprehensive. Now, in recent years the share of large textile factories in total textile output has certainly

[1] See L. Landau, 'Incomes from Hired Labour in 1929', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 3/2–3 (1934) (in Polish).

[2] We should also eliminate changes in stocks of textiles kept by producers but this was not done because of lack of data. However, the potential mistake would be insignificant since the main part of textile stocks is kept by commerce, not industry.

Table 94. *Domestic Sales of Textiles and Man-hours Worked in the Textile Industry in Poland, 1929–1934 (1928 = 100)*

Year	Sales of textiles	Man-hours worked in the textile industry
1929	87.0	91.3
1930	72.1	70.6
1931	68.7	66.7
1932	64.1	57.5
1933	73.3	60.0
1934	83.6	67.4

declined and hence, compared to 1928, the latter is relatively greater that the volume of output of factories that employ more than twenty workers.

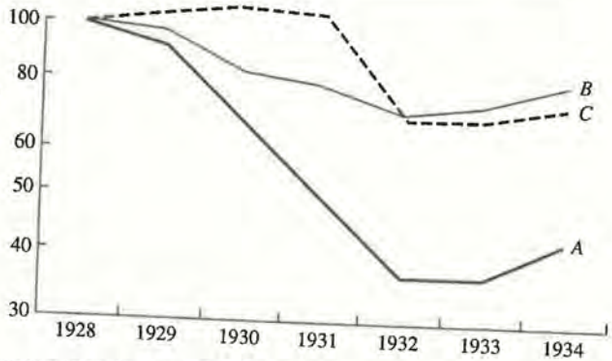
Quarterly indices of domestic sales of textiles are calculated by splitting annual data into quarters in proportion to the quarterly indices of the worked man-hours, as the quarterly changes in man-hours in the textile industry as a whole and in factories employing more than twenty workers do not provide evidence of any marked differences. The indices of the present-year are chain-linked to indices of the number of worked man-hours in the preceding year until the indices for the year as a whole are available.

3. *Calculation of the index of sales of industrial products.* Once all the component statistical series are available, we may start the calculation of our index. The weights attached to individual products included in our index correspond to the sales of these products in the domestic market in 1928, excise taxes (sugar, beer), or monopoly fees (tobacco) excluded. The final structure of our index of sales of products leaving the industry is shown in Table 95.

The results of our calculation are given in Table 96. The group indices, such as the index of sales of investment goods, the index of sales of all other goods leaving the industry and directed to the domestic market, the index of total sales in the domestic market, and the index of exports, allow us to examine the causes for changes in the sales of industrial products. Table 96 shows that growth that took place from the business trough in 1932 until the present resulted mainly from the expansion of the domestic market, and that export sales, although also increased, but at a much lower rate. Among sales in the domestic market those of investment goods and of other products increased (see also Fig. 27). Among the latter, consumer

Table 95. *Structure of the Index of Sales of Industrial Products outside the Industry*

Product	Weight
Textiles	26
Sugar	6
Tobacco	3
Beer	3
Paper	2
Stove coal and coal for the railways	6
Investment goods	34
Total sales on the domestic market	80
Exports	20
TOTAL SALES	100



A—investments (except for imported machines); *B*—other sales of industrial products on domestic market; *C*—export of industrial goods

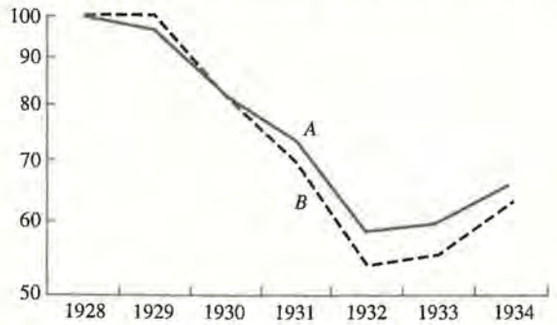
FIG. 27. *Sales of Domestic Industrial Products (logarithmic scale)*

goods dominate (except for coal for the railways), but one must not conclude on this premises that consumption increased very strongly; the index of final consumption compiled by the ISBCP in fact shows a decline in this period. The main determinant of growth of sales of non-investment products in 1932–5 was the growth of sales of textiles. However, this must be attributed not to a rise in their final consumption but to changes in stocks maintained by commerce, especially by the retail trade: in 1932 they, no doubt, had been sharply reduced and in 1934–5 they were replenished.

4. *Comparison with the index of output calculated by the ISBCP.* The two indices are compared in Table 97 and in Fig. 28. The differences that appear between these two series may be attributed to two factors: (i) changes in stocks maintained by producers (as a rule stock

Table 96. *Sales of Industrial Products in Poland, 1929–1935 (1928=100; seasonal fluctuations eliminated)*

Year and quarter	Total sales of industrial goods	Exports	Domestic sales								
			Total	Investment goods (except for foreign machines)	Other domestic sales						
					Total	Textiles	Sugar	Tobacco	Beer	Paper	Stove coal and coal for the railways
1929	96.5	104.7	94.5	90.8	97.2	87.0	104.2	104.0	108.3	105.0	123.7
1930	82.1	107.7	75.8	66.0	83.0	72.1	99.3	102.1	104.5	106.7	86.3
1931	73.3	104.9	65.4	47.8	78.3	68.7	91.5	92.2	78.8	99.7	90.8
1932	58.2	68.8	55.5	35.8	70.0	64.1	84.3	80.5	58.3	92.6	74.1
1933	59.9	69.7	57.5	36.3	73.3	73.5	80.8	73.8	42.4	96.8	72.6
1934	66.0	73.7	64.1	42.1	80.4	83.6	84.6	72.7	46.1	116.5	72.0
1934 I	66.4	74.0	64.5	39.6	82.0	88.3	81.7	74.6	49.3	109.3	71.8
II	66.1	73.3	64.3	40.6	81.7	85.5	91.2	72.2	48.6	120.4	62.9
III	65.1	73.8	62.9	43.3	77.4	78.1	82.2	71.2	42.7	118.3	76.1
IV	67.2	73.8	65.6	45.4	80.7	82.6	83.4	73.0	49.0	121.0	75.1
1935 I	66.9	70.2	66.0	45.8	81.0	84.0	81.6	71.4	41.6	115.6	80.4
II	69.5	69.1	69.6	47.7	85.8	91.6	90.4	73.8	47.2	115.5	73.3
III	71.6	77.0	70.8	50.5	85.0	87.4	90.6	75.6	—	125.0	80.2



A—sales; *B*—output

FIG. 28. *Sales and Output of the Industry (logarithmic scale; 1928 = 100)*

changes should represent differences between the volume of sales and the volume of production), and (ii) a complete lack of agreement between both indices that follows especially from their different scope (which we have already discussed with respect to the textile industry).

It will be seen that larger differences between the two indices (5–8%) appear in 1931–4. Changes in stocks kept by producers do not seem to be of great significance in explaining these differences; most of total stock fluctuations must be attributed to commerce, albeit with one important exception. It refers to the sugar industry that at the beginning of a calendar year keeps stock that largely represents last year's sugar crop. It is therefore clear that a decline in the volume of annual output between one sugar campaign and the next during the crisis was accompanied by a very strong reduction in stocks of sugar (relative to sugar output) between the beginning and the end of each calendar year. Our calculations point out that this reduction in stocks fully explains the difference between the two indices in 1931 and about 60% of the differences in 1932 and 1933.

Table 97. *Index of Sales of Investment Goods and Index of Industrial Output of the ISBCP*

Year	Index of sales of industrial goods (1928 = 100)	ISBCP index of industrial output (1928 = 100)	Ratio of the sales index to the output index
1929	96.5	99.7	1.03
1930	82.1	81.8	1.00
1931	73.3	69.3	1.06
1932	58.2	53.7	1.08
1933	59.9	55.4	1.08
1934	66.0	62.8	1.05

The rest of these differences in those two years (3 percentage points) and the whole difference (5 percentage points) in 1934 (when sugar stocks show no larger changes) approximately correspond to the difference in the scope of the two indices concerning the textile industry that we have already discussed.

It follows that the lack of full agreement between the two indices must in fact be attributed to an imperfect representation of the textile industry in the ISBCP index of industrial output, yet the discrepancies following there from do not exceed 5%. Considering that the index of sales is constructed on the basis of completely different data from the index of output volume, it may be concluded that both indices fairly accurately represent the facts and that occasional opinions on large inconsistencies between the ISBCP index of industrial output and its actual development are groundless.[3]

[3] A similar outcome was reached by examining the significance of the ISBCP index of industrial output by a quite different method, in the study on the international comparability of indices of output (see 'The International Comparability of Indices of Industrial Output and an Attempt to Improve It', this volume).

A New Method of Trend Elimination[1] (with Brian Tew) (1940)

The Essentials of the Method

1. We try here to develop a new method of trend elimination for the case when a time-series y subject to trend is supposed at the same time to be a function of another time-series x (e.g. y being the productivity of labour in a certain industry and x the volume of output in it). Or, if the time influence and that of x are assumed to be additive, the problem may be stated as follows. We want to represent y as a sum of two components,

$$y = f(t) + g(x), \tag{1}$$

where $f(t)$ is the trend function having certain definite properties plus random fluctuations and $g(x)$ the 'pure' functional relation between x and y which we aim to discover.

The problem is usually solved by assuming a definite shape for the trend function and g (e.g. that they are both linear) and applying thereafter the method of double correlation. The method which we present here differs from this procedure in that: (i) no definite shape of g is assumed but this shape is obtained as a result of computation; and (ii) though it is necessary to assume for the purpose of calculation a definite shape of the trend function, it may be demonstrated that, in so far as this function fulfils certain fairly general conditions, its shape does not affect very much the solution obtained for g.

2. The leading idea of our method is very simple. Let us denote the successive time-units, say years, of the period considered by 0, 1, 2, . . . , n. Suppose that in the periods k and l the variable x has the same value or $x_k = x_l$. It follows then from equation (1)

$$y_l - y_k = f(l) - f(k).$$

If we denote the first differences of the function f by $\Delta_1, \Delta_2, \ldots$, the last equation may be written

$$\sum_{r=k+1}^{r=l} \Delta_r = y_l - y_k.$$

If x is a fluctuating variable, we shall have many equations of this type (this is, however, subject to the qualification that in general x is not exactly equal in any two periods; the necessary adjustment will be considered in section 3). Now taking $\Delta_1, \Delta_2, \ldots$, as unknowns we have a number of equations and thus we can express these first differences of f in terms of a few of them, say Δ_a, Δ_b, and Δ_c. Thus we reach the point where we must make some assumptions about the shape of the trend function.

We assume that the differences of the function $f(t)$, $\Delta_1, \Delta_2, \ldots$, should deviate as little as possible from a constant which amounts to the function $f(t)$ having a possibly steady arithmetical rate of change. Now we obtain from the theorem of least squares the condition

$$\sum \left(\Delta_r - \frac{\Sigma \Delta_s}{n}\right)$$

should be a minimum. Δ_r being expressed in terms of Δ_a, Δ_b, and Δ_c, the same is true of this sum. Thus it is easy to obtain from the above condition the numerical values of Δ_a, Δ_b, and Δ_c and consequently also those of all Δ_r.

It must be mentioned that the condition of Δ_r deviating as little as possible from a constant is not equivalent to $f(t)$ deviating as little as possible from a linear function of t. But the assumption that the rate of change of $f(t)$ should be as steady as possible is at least as reasonable as the latter one, and much more convenient for the purpose of calculation. It may also be shown that the difference in the function g obtained on either of these assumptions is small if the random component is not very great as compared with the deviations of $g(x)$ from the mean.

3. As already mentioned certain difficulties arise in the application of the above method since in general x is not exactly equal in any two years, but it may be adjusted as follows. Let us draw the time-curve of x and under it that of y (see Fig. 29; we obtain them by joining the 'annual' points by straight lines). Let us find the points of intersection of the x curve with horizontals drawn at certain equal intervals, mark their abscissae, and project them on y curve. Let us denote the abscissae of these points by $t_0, t_1, t_2, \ldots, t_m$. If the points

of intersection of a horizontal with the x curve are, say, I, K, L, their abscissae t_i, t_k, t_l, and the corresponding ordinates y_i, y_k, y_l, then, since x for these three points is equal, we have the equations:

$$f(t_k) - f(t_i) = y_k - y_i \quad \text{and} \quad f(t_l) - f(t_k) = y_l - y_k;$$

or, denoting the first differences of f by $\Delta_1, \Delta_2, \ldots,$

$$\sum_{r=i+1}^{r=k} \Delta_r = y_k - y_i \quad \text{and} \quad \sum_{r=k+1}^{r=l} \Delta_r = y_l - y_k.$$

Such equations can be obtained for each horizontal and then we are able to express all Δs in terms of some of them, say, Δ_a, Δ_b, Δ_c. And so it will be obviously possible to express in terms of them the rates of change of f, i.e. $\Delta_r/(t_r - t_{r-1})$.

Now we again minimize the sum of squared deviations of these rates of change from the average rate of change $\Sigma\Delta_s/(t_m - t_0)$. Since the intervals $t_{r+1} - t_r$ are in general not equal, the condition of least squares must now be written as follow

$$\sum (t_r - t_{r-1}) \left\{ \frac{\Delta_r}{t_r - t_{r-1}} - \frac{\Sigma \Delta_s}{t_m - t_0} \right\}^2 = \text{minimum.}$$

We obtain from this condition Δ_a, Δ_b, Δ_c, and then all Δ_r.

4. After having determined the first differences of the function f we can now obtain this function itself as the cumulated first difference plus an arbitrary constant C. The function g may be then obtained

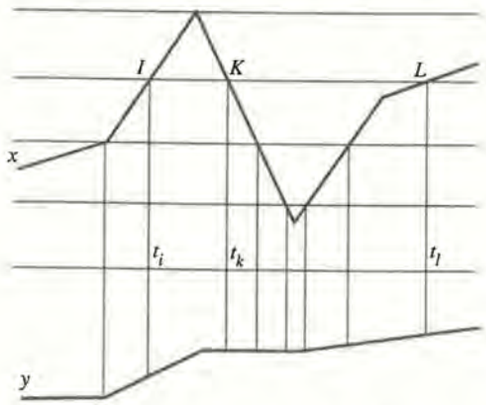


FIG. 29. *Time-Curves of x and y*

by subtracting f from y. It contains, of course, also the constant C. This is not at all surprising since the existence of trend implies that the shape of g must change in time. If, for example, y is the productivity of labour and x the output, the function g must change because of technical progress. If we define C from the condition

$$y_1 = g(x_1),$$

where y_1 and x_1 are productivity and output in the first year, the function g corresponds to the technique of this year except for the random error which may be involved in y_1. We obtain the 'average' g by imposing the condition

$$\Sigma y = \Sigma g(x).$$

The advantage of taking 'average' g is its being less liable to random error than g derived from such an equation for a particular year.

Since we have $g(x) = y - f(t)$, the last equation may be also written

$$\Sigma f(t) = 0. \tag{2}$$

Application of the Above Method of Trend Elimination to an Index of the Real Labour Cost of Production in the British Steel Industry

5. The two variables with which we are here concerned are: y, the index of real labour cost, i.e. man-hours per unit of output, and x, the index of output,[1] in the British steel industry for the period 1920–35, the base-year being 1930. (The years 1921 and 1926 were excluded, since they were years of great strikes.) These variables are also plotted in Fig. 30, the annual values being connected linearly. We assume that y can be represented as the sum of two components

$$y = f(t) + g(x),$$

and our problem is to evaluate $g(x)$.

First we draw the horizontals,

$x = 120$
$x = 110$
$x = 100$
$x = 90$
$x = 80$
$x = 70$

[1] In this index the various types of steel products were weighted according to their estimated average wage cost.

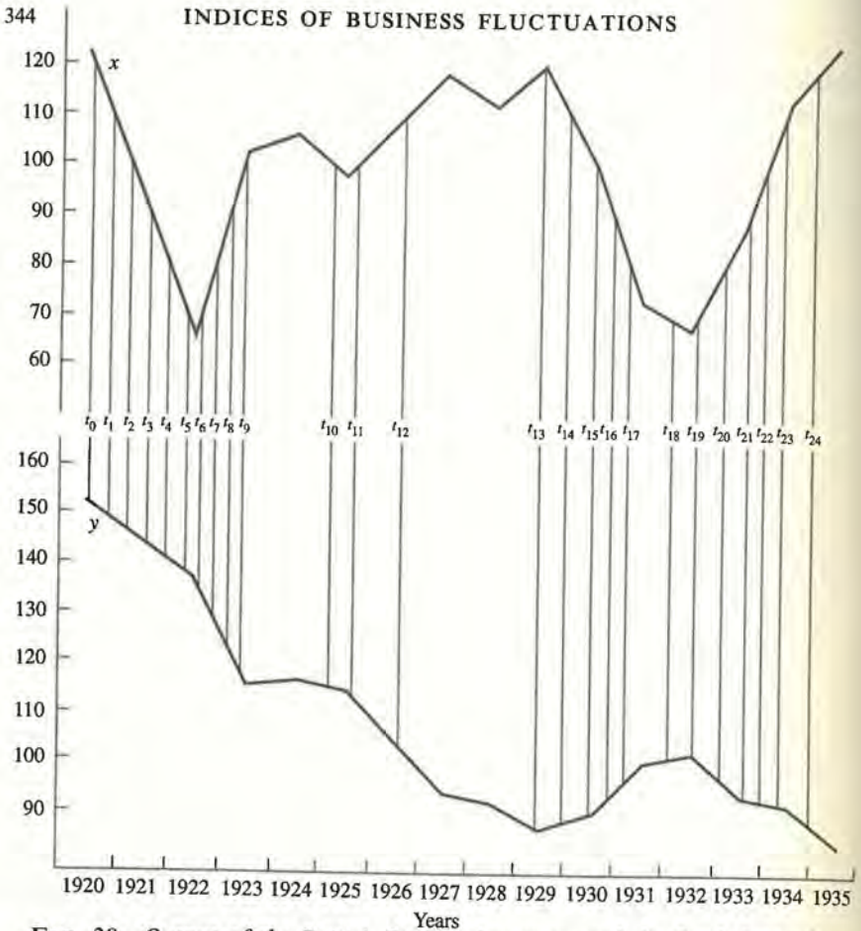


FIG. 30. *Output of the British Steel Industry, x, and the Real Cost of Labour, y, 1928–1935 (1930 = 100)*

and drop perpendiculars on to y from the points of intersection of x with these horizontals. In all there proved to be twenty-five such perpendiculars. The points at which these perpendiculars cut the time-scale were labelled $t_0, t_1, t_2, \ldots, t_{24}$.

The first differences of the unknown function $f(t)$, i.e. the changes in the value of $f(t)$ during the time intervals

$$t_1 - t_0$$
$$t_2 - t_1$$
$$\ldots\ldots$$
$$t_{24} - t_{23},$$

we denoted by $\Delta_1, \Delta_2, \Delta_3, \ldots, \Delta_{24}$ respectively.

Since the difference between the values of y at two dates at which x has the same value (e.g. t_0 and t_{13} in this example) is attributed solely to the change in t, this difference is the sum of the Δs lying between the two dates. Thus, in our example, x takes the same value, 120, at t_0 and t_{13}. At t_0 the value of y can be read off as the value taken by y at the foot of the first perpendicular, namely 161.5, while the value of y at t_{13}, read off in a similar manner, is 96.5. The difference ($96.5 - 161.5 = -65$) is the sum of the Δs lying between t_0 and t_{13}, i.e. $\Delta_1 + \Delta_2 + \ldots \Delta_{13} = -65$.

Since, later on at t_{24}, x again takes the value 120, the value of $\Delta_{14} + \Delta_{15} + \cdots + \Delta_{24}$ can also be obtained; and in general on each horizontal ($x = 120$, 110, 100, 90, 80, and 70) equations involving Δs may be obtained one fewer in number than the number of times which x cuts the horizontal. In this example nineteen equations were obtained.

6. The problem of obtaining all the Δs in terms of a few of them could be tackled by solving the nineteen equations as they stand, but we have found that by setting the equations in the manner described below the calculation is greatly facilitated, since it is then possible to express each of the Δs in terms of only one of the 'unknown' Δs. Consider any 'bay' in the x curve; in our example let us take for instance the one which extends from t_{13} to t_{19}. None of the horizontals which we consider passes through the very end of the bay, i.e. the minimum value of x in this period, since in 1932 x fell to 68, which is slightly lower than the lowest horizontal which we consider ($x = 70$). Consequently one Δ, namely Δ_{19}, may be evaluated immediately, since the x curve cuts the horizontal $x = 70$ at two successive t intervals (t_{18} and t_{19}). The value of Δ_{19} may be read off the graph of the y curve as 0 (since $y = 111$ both at t_{18} and at t_{19}) or we can save time by referring to our nineteen equations, one of which will be $\Delta_{19} = 0$.

The next highest horizontal, $x = 80$, cuts the bay at t_{17} and t_{20}, so that another of our nineteen equations will give the sum of $\Delta_{18} + \Delta_{19} + \Delta_{20}$. We find that the equation is

$$\Delta_{18} + \Delta_{19} + \Delta_{20} = -2.$$

One of these Δs, we have already evaluated, so that we can write

$$\Delta_{18} + 0 + \Delta_{20} = -2$$

or

$$\Delta_{18} + \Delta_{20} = -2.$$

Again, the horizontal $x = 90$ cuts the bay at t_{16} and t_{21}, so that a third equation will be of the form:

$\Delta_{17} + \Delta_{18} + \Delta_{19} + \Delta_{20} + \Delta_{21}$ = some definite value, in this case -1.5.

Since we know that $\Delta_{18} + \Delta_{19} + \Delta_{20} = -2$ we can write:

$$\Delta_{17} + \Delta_{21} = -1.5 - (-2)$$

$$= +0.5$$

In the same way the other Δs in the bay may be evaluated in pairs, and we therefore get

$$\Delta_{19} = 0 \quad \text{(a)}$$
$$\Delta_{18} + \Delta_{20} = -2 \quad \text{(b)}$$
$$\Delta_{17} + \Delta_{21} = +0.5 \quad \text{(c)}$$
$$\Delta_{16} + \Delta_{22} = +3.5 \quad \text{(d)}$$
$$\Delta_{15} + \Delta_{23} = +1 \quad \text{(e)}$$
$$\Delta_{14} + \Delta_{24} = -3. \quad \text{(f)}$$

Consider next the adjacent bay in the x curve, extending from t_6 to t_{13}. The end of this bay (the maximum value of x between t_6 and t_{13}) lies on the horizontal $x = 120$, so that there is not in this case a Δ corresponding to the end of the bay which may immediately be evaluated singly. However, since $x = 100$ cuts the bay at t_{12} and t_{14}, Δ_{13} and Δ_{14} can be evaluated. Actually $\Delta_{13} + \Delta_{14} = -13$.

Owing to the inflexion in the x curve between t_9 and t_{11} the next horizontal ($x = 100$) cuts the x curve at three successive ts, t_9, t_{10} and t_{11}. Consequently Δ_{10} and Δ_{11} may be read off as -1 and -3.5 respectively. In addition, since this horizontal cuts the other side of the bay at t_{15}, we can evaluate $\Delta_{12} + \Delta_{13} + \Delta_{14} + \Delta_{15}$. Thus we get:

$$\Delta_{12} + (\Delta_{13} + \Delta_{14}) + \Delta_{15} = -21.5,$$

i.e.

$$\Delta_{12} + (-13) + \Delta_{15} = -21.5,$$

i.e.

$$\Delta_{12} + \Delta_{15} = -8.5.$$

The other Δs in the bay can in a like manner be evaluated in pairs.

Thus we get

$$\Delta_{13} + \Delta_{14} = -13 \quad \text{(g)}$$
$$\Delta_{12} + \Delta_{15} = -8.5 \quad \text{(h)}$$
$$\Delta_{11} = -3.5 \quad \text{(i)}$$
$$\Delta_{10} = -1 \quad \text{(j)}$$
$$\Delta_9 + \Delta_{16} = -2 \quad \text{(k)}$$
$$\Delta_8 + \Delta_{17} = -3 \quad \text{(l)}$$
$$\Delta_7 + \Delta_{18} = -2. \quad \text{(m)}$$

In the third bay in the x curve, we can evaluate further Δs, singly or in pairs.

$$\Delta_6 = -4 \quad \text{(n)}$$
$$\Delta_5 + \Delta_7 = -8.5 \quad \text{(o)}$$
$$\Delta_4 + \Delta_8 = -9.5 \quad \text{(p)}$$
$$\Delta_3 + \Delta_9 = -8.5 \quad \text{(q)}$$
$$\left.\begin{aligned}\Delta_{10} &= -1\\ \Delta_{11} &= -3.5\end{aligned}\right\} \text{(also evaluated in the preceding bay)}$$
$$\Delta_2 + \Delta_{12} = -12.5 \quad \text{(r)}$$
$$\Delta_1 + \Delta_{13} = -17.5 \quad \text{(s)}$$

We have nineteen equations and twenty-four Δs, so that we can express all the Δs in terms of five 'unknown' Δs. Since each of the nineteen equations contains either one or two Δs, each of the Δs may either be evaluated immediately, or be expressed in terms of *one* 'unknown' Δ. Thus, taking Δ_{13}, Δ_{12}, Δ_9, Δ_8, and Δ_7 as the five unknown Δs, we get

(A)
$\Delta_1 = -17.5 - \Delta_{13}$, from equation (s),
$\Delta_{13} = \Delta_{13}$,
$\Delta_{14} = -13 - \Delta_{13}$, from equation (g),
$\Delta_{24} = +10 + \Delta_{13}$, from equations (f) and (g).

(B)
$\Delta_2 = -12.5 - \Delta_{12}$, from equation (r),
$\Delta_{12} = \Delta_{12}$,
$\Delta_{15} = -8.5 - \Delta_{12}$, from equation (h),
$\Delta_{23} = +9.5 + \Delta_{12}$, from equations (h) and (e).

(C)
$\Delta_3 = -8.5 - \Delta_9$, from equation (q),
$\Delta_9 = \Delta_9$,
$\Delta_{16} = -2 - \Delta_9$, from equation (k),
$\Delta_{22} = +5.5 + \Delta_9$, from equations (k) and (d).

(D) $\Delta_4 = -9.5 - \Delta_8$, from equation (p),
$\Delta_8 = \Delta_8$,
$\Delta_{17} = -3 - \Delta_8$, from equation (l),
$\Delta_{21} = +3.5 + \Delta_8$, from equations (l) and (c).

(E) $\Delta_5 = -8.5 - \Delta_7$, from equation (o),
$\Delta_7 = \Delta_7$,
$\Delta_{18} = -2 - \Delta_7$, from equation (m),
$\Delta_{20} = +\Delta_7$, from equations (m) and (b).

(F) $\Delta_6 = -4$, from equation (n),
$\Delta_{10} = -1$, from equation (j),
$\Delta_{11} = -3.5$, from equation (i),
$\Delta_{19} = 0$, from equation (a),

The above expressions are arranged in their proper order in column (4) of Table 98.

7. We expressed the time-intervals $(t_1 - t_0)$, $(t_2 - t_1)$, . . . , $(t_{24} - t_{24})$ in years by reading the values from the graph. These are shown in Table 98, together with their reciprocals (Columns (1) and (2)).

We then evaluate

$$\Delta_1/(t_1 - t_0)$$
$$\Delta_2/(t_2 - t_1)$$
$$\cdots\cdots\cdots$$
$$\Delta_{24}/(t_{24} - t_{23}).$$

These correspond to the average slope of $f(t)$ in the various time-intervals.

Next we calculated the average slope of $f(t)$ throughout the period t_0 to t_{24}, i.e.

$$\bar{\delta} = \frac{\Sigma\Delta}{t_{24} - t_0} = \frac{-65}{14.5} = -4.5.$$

Thus we obtained the difference between the average slope of $f(t)$ in the various time-intervals and the average slope throughout the period, i.e.

$$7\frac{\Delta_r}{t_r - t_{r-1}} - \bar{\delta},$$

which is shown in column (5) in Table 98.

Table 98. *Results of Trend Elimination from Indices of Real Labour Cost of Production in the British Steel Industry (1930 = 100)*

Time-interval	Length of interval in years	Reciprocal of previous column	Δ_r	$\frac{\Delta_r}{t_r - t_{r-1}} - \bar{\delta}$	Δ_r	$f(t) + c$ at the end of each interval
(1)	(2)	(3)	(4)	(5)	(6)	(7)
						0
$t_1 - t_0$	0.3	3.3	$-17.5 - \Delta_{12}$	$-53.9 - 3.3\Delta_{13}$	-3.7	-3.7
$t_2 - t_1$	0.4	2.5	$-12.5 - \Delta_{12}$	$-26.8 - 2.5\Delta_{12}$	-3.5	-7.2
$t_3 - t_2$	0.3	3.3	$-8.5 - \Delta_9$	$-23.9 - 3.3\Delta_9$	-4.45	-11.65
$t_4 - t_3$	0.4	2.5	$-9.5 - \Delta_8$	$-19.6 - 2.5\Delta_8$	-5.8	-17.45
$t_5 - t_4$	0.35	2.9	$-8.5 - \Delta_7$	$-20.0 - 2.9\Delta_7$	-5.75	-23.2
$t_6 - t_5$	0.3	3.3	-4.0	-8.9	-4.0	-27.2
$t_7 - t_6$	0.25	4.0	Δ_7	$+4.4 + 4.0\Delta_7$	-2.75	-29.95
$t_8 - t_7$	0.3	3.3	Δ_8	$+4.4 + 3.3\Delta_8$	-3.7	-33.65
$t_9 - t_8$	0.3	3.3	Δ_9	$+4.4 + 3.3\Delta_9$	-4.05	-37.7
$t_{10} - t_9$	1.7	0.6	-1.0	$+3.8$	-1.0	-38.7
$t_{11} - t_{10}$	0.6	1.6	-3.5	-1.5	-3.5	-42.2
$t_{12} - t_{11}$	1.0	1.0	Δ_{12}	$+4.4 + \Delta_{12}$	-9.0	-51.2
$t_{13} - t_{12}$	2.75	0.4	Δ_{13}	$+4.4 + 0.4\Delta_{13}$	-13.8	-65.0
$t_{14} - t_{13}$	0.5	2.0	$-13.0 - \Delta_{13}$	$-21.6 - 2.0\Delta_{13}$	$+0.8$	-64.2
$t_{15} - t_{14}$	0.5	2.0	$-8.5 - \Delta_{12}$	$-12.6 - 2.0\Delta_{12}$	$+0.5$	-63.7
$t_{16} - t_{15}$	0.4	2.5	$-2.0 - \Delta_9$	$-0.6 - 2.5\Delta_9$	$+2.05$	-61.65
$t_{17} - t_{16}$	0.4	2.5	$-3.0 - \Delta_8$	$-3.1 - 2.5\Delta_8$	$+0.7$	-60.95
$t_{18} - t_{17}$	0.9	1.1	$-2.0 - \Delta_7$	$+2.2 - 1.1\Delta_7$	$+0.75$	-60.2
$t_{19} - t_{18}$	0.4	2.5	0	$+4.4$	0	-60.2
$t_{20} - t_{19}$	0.55	1.8	Δ_7	$+4.4 + 1.8\Delta_7$	-2.75	-62.95
$t_{21} - t_{20}$	0.5	2.0	$+3.5 - \Delta_8$	$+11.4 + 2.0\Delta_8$	-0.2	-63.15
$t_{22} - t_{21}$	0.35	2.8	$+5.5 - \Delta_9$	$+19.8 + 2.8\Delta_9$	$+1.45$	-61.7
$t_{23} - t_{22}$	0.4	2.5	$+9.5 - \Delta_{12}$	$+28.4 + 2.5\Delta_{12}$	$+0.5$	-61.2
$t_{24} - t_{23}$	0.65	1.5	$-10.0 - \Delta_{12}$	$+19.8 + 1.5\Delta_{13}$	-3.8	-65.0
						-1073.7

We then had to find the values of the unknown Δs (Δ_7, Δ_8, Δ_9, Δ_{12} and Δ_{13}) which minimized

$$\sum (t_r - t_{r-1})\left[\frac{\Delta_r}{t_r - t_{r-1}} - \bar{\delta}\right]^2.$$

Substituting these values for the unknown Δs in column (6) we were able to evaluate all the Δs (see column (6)).

8. We were now able, by cumulating the Δs, i.e.

$$\begin{aligned} &0\\ &\Delta_1\\ &\Delta_1 + \Delta_2\\ &\Delta + \Delta_2 + \Delta_3,\\ &\cdots\cdots\cdots\\ &\Delta_1 + \Delta_2 + \Delta_3 + \ldots + \Delta_{24} \end{aligned}$$

to obtain $f(t) + C$ at the end of each interval,[2] (i.e. the trend function plus an arbitrary constant). We obtained this arbitrary constant C from the condition expressed by equation (2).

The sum of the cumulated Δs above is -1073.7, so that since $\Sigma f(t) + 25C = -1073.7$ and $\Sigma f(t) = 0$, we get $25C = -1073.7$, i.e. $C = -43$.

Having evaluated C, we subtracted it from $f(t) + C$ and obtained $f(t)$ From the equation

$$y = f(t) + g(x)$$

we were able to calculate $g(x)$. Since equal values of $g(x)$ were associated with equal values of x, the result may be presented thus

values of x	values of $g(x)$
120	118.5
110	119.5
100	120.5
90	122.5
80	126.0
70	128.5

These two series are plotted in Fig. 31. Since $y = 100$ in 1930, $g(x)$ is the real labour cost of production at various outputs—the effect of

[2] See Column (7) in Table 98.

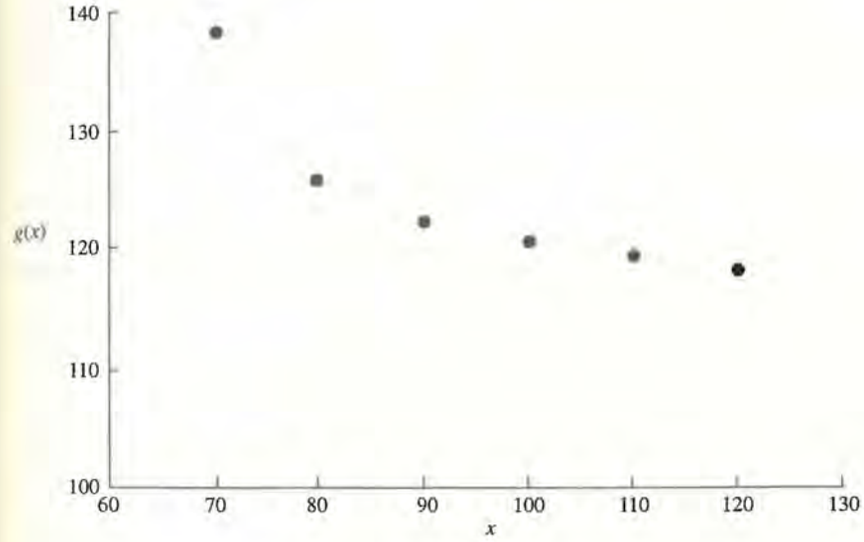


FIG. 31.

trend being eliminated—expressed as a percentage of the actual real labour cost (y) in 1930.

Appendix

We will now show that the assumption we make about the rate of change of the trend function, if it fulfils certain requirements, does not greatly affect the function g obtained from the calculation. (To simplify the exposition we assume all $t_{r+1} - t_r$ time-intervals to be equal.)

Let us suppose the rate of change of the trend function not to be constant but to fulfil some other condition. Let us denote by y', τ' and g' the first differences of y, the trend function, and g respectively; and the deviations of y', τ', and g' from the mean by (y'), (τ'), and (g').

By means of our method (g') may be expressed in terms of some Δs (say Δ_a, Δ_b, and Δ_c); it is easy to see that we shall have

$$(g') = A\Delta_a + B\Delta_b + C\Delta_c,$$

where A, B, and C are determinate functions of x, and Δ_a, Δ_b, and Δ_c are constants to be obtained from the condition:

$$\Sigma [(y') - (\tau') - (g')]^2 = \text{minimum.} \qquad (3)$$

Let us now determine, on the other hand, (g_1') corresponding to the assumption that the rate of change of the trend function is constant or $(\tau_1) = 0$; we have also here:

$$(g_1') = A\Delta_a + B\Delta_b + C\Delta_c,$$

where A, B, and C are the same functions of x as above while the values of Δ_a, Δ_b, and Δ_c are different and are determined by the condition

$$\Sigma [(y') - (g_1')]^2 = \text{minimum.} \qquad (4)$$

It follows that the difference between (g') and (g_1') may be represented as

$$(g') - (g_1') = A\alpha + B\beta + C\gamma, \qquad (5)$$

where α, β and γ are constants.

Now from equation (3) we obtain

$$\Sigma [(y') - (\tau') - (g')]A = 0, \qquad \Sigma [(y') - (\tau') - (g')]B = 0,$$

$$\Sigma [(y') - (\tau') - (g')]C = 0$$

while from the equation (4)

$$\Sigma [(y') - (g_1')]A = 0, \qquad \Sigma [(y') - (g_1')]B = 0,$$

$$\Sigma [(y') - (g_1')]C = 0,$$

and, by subtracting

$$\Sigma [(\tau') + (g') - (g_1')]A = 0, \qquad \Sigma [(\tau') + (g') - (g_1')]B = 0,$$

$$\Sigma [(\tau') + (g') - (g_1')]C = 0,$$

Now taking into account equation (5) we have:

$$\Sigma[(\tau') + (g') - (g_1)'][(g') - (g_1')] = 0;$$

or

$$\Sigma[(g') - (g_1')]^2 = \Sigma(\tau')[(g') - (g_1')].$$

Dividing both sides by $\sqrt{\Sigma[(g') - (g_1')]^2}\sqrt{(\Sigma(\tau')^2)}$ we obtain

$$(\sqrt{\Sigma[(g') - (g_1')]^2})/\sqrt{\Sigma(\tau')^2} = |\rho|,$$

where ρ is the correlation coefficient between $(g') - (g_1')$ and τ'. Since $|\rho|<1$, we have

$$\sqrt{\Sigma[(g') - (g_1')^2]} < \sqrt{(\Sigma(\tau')^2)}.$$

Now x is fluctuating in time (otherwise all our method would be inapplicable) and so will $g(x)$ be almost always. On the other hand our choice of the shape of trend function τ is in general such that (τ') does not fluctuate and very often it changes within a much shorter range than (g'). Under these conditions $\Sigma[(g') - (g_1')]^2$ will be small as compared with $\Sigma(g')^2$, which means that g_1 corresponding to the assumption of a constant rate of change of the trend function does not differ much from g obtained on some other assumption about this function. If, however, there is an important change in the rate of trend while the fluctuations of $g(x)$ are relatively slight, the difference may prove substantial.

PART 3
ESTIMATES OF INVESTMENT, CONSUMPTION, AND SOCIAL INCOME IN POLAND

An Estimate of Investment Activity in Poland[1] (with Ludwik Landau) (1931)

The volume of investment is one of the most important indicators in the study of business fluctuations. Investment activity generates changes in the business cycle and determines their intensity. Other areas of economic activity depend mainly on the volume of investment. That is why knowledge about its volume and structure is extremely important. Consequently, although the available statistical data are only scanty, we have undertaken an enquiry into investment activity in Poland. For it seems better even to have only rough numbers that give merely an approximate information than to have none. However, at the outset it must be emphasized that our estimate is far from precise and in some cases the inaccuracies may even be considerable.

First of all, we should define the meaning in which the term 'investment activity' is used here. Investments are generally understood as net increase in capital equipment and public utility facilities, i.e. after having subtracted the value of those goods that were produced (or imported from abroad) to replace equipment going out of use. In the present study this concept is used in a broader meaning, i.e. without separating amortization of capital goods. For on the one hand no suitable statistical data are available and, on the other hand, we regard this separation as questionable even on theoretical grounds, owing to the ambiguity of the concept of amortization and the fact that the degree of capacity utilization in each industry is influenced exactly in the same way by orders to replace worn-out buildings and equipment, and orders for new capital goods. It should be noted, however, when the volume of investment in Poland and in other countries is compared, that the Polish data include amortization.

The method used below to determine the volume of investment is in a sense similar to that which in calculations of social income is called the method of social income produced. According to this

method social income is calculated not according to the groups of the population obtaining an income, but according to branches of the economy that produce it. The volume of investments, which is strictly connected with the way the income is spent, can also be calculated in two ways: (i) on the basis of investment outlays by particular groups of investors, or (ii) on the basis of data on production of investment goods.

The first method is generally used. In Germany, for instance, it was used in a recent enquiry on investment activity made by the Institute for the Study of Business Cycles.[1] Such a study requires many special estimates, however, and calculations of investments of all firms need to be made on the basis of sample data of representative joint-stock companies, derived from their balance-sheets. Thus, on the one hand, inferences are made about the whole on the basis of a certain part, while, on the other hand, the basis of calculations for this part are the balance-sheets of companies, i.e. a source of information that is both very unreliable and requiring corrections and supplementary information.

The application of this method to Poland would be quite pointless because of a much smaller share of joint-stock companies in the total number of firms and the primarily family nature of these companies, most of whose shares are not publicly traded, whose issue is made to a narrow circle of people, and thus in which certain biases in drawing up balance-sheets do not encounter limitations. Moreover, regarding other fields of investment activity, especially housing construction, the statistical data are highly unsatisfactory.

For these reasons the only method that could be applied was to determine the volume of investments from the value of output of investment goods. This was possible thanks to the publication this year by the Central Statistical Office of estimates of industrial output for 1929 that for the first time provided quantitative data. In spite of all reservations one may have about this first attempt to present the value of industrial output, we decided to use these data, though obviously treating them as rough approximations only. However, in these circumstances any great precision in subsequent calculations seemed pointless and therefore we limited ourselves merely to approximate estimates, taking into account only those categories of

[1] See 'Kapitalbildung und Investitionen in der deutschen Volkswirtschaft 1924 bis 1929', *Vierteljahrshefte zur Konjunkturforschung*, Institut für Konjunkturforshung, Supplement 22, Berlin, Reimar Hobbing, 1931.

investments that are of greater significance. The calculation was made for 1929, the year for which the most comprehensive statistical information is available. Next we attempt to extend our estimates to other years by using indices representing changes in various kinds of investments.

Let us now turn to the estimates of individual categories of investment activity. In each category, besides determining the total sum of investments in 1929, we tried to estimate its distribution according to its final use; this was not possible in all cases, however, for sometimes we had no information at all about the final use of the investment.

Machines for industry. Industrial investments, except for industrial buildings (which are included in total construction works), we estimated from the statistics of industrial output for domestic use, and foreign trade statistics of imported machines. Of the domestic production of machines covered by the statistics of the Central Statistical Office we considered boilers and iron constructions (excluding railway steam-engines, railway constructions, and housing equipment), overhead transmissions, pumps, wheels, bearings, etc. (subtracting roughly a half as representing inputs in the production of machines subsequently considered), all kinds of motors, electrical machines together with transformers, and spare parts as well as instrument boards, cranes, machines for drilling and mining, metal-working and woodworking machines, machines for the textile industry, other machines for the food industry. Of the production of rolling-mills—we included in 'machines for industry' pipes for oil wells whose value we estimated on the basis of their rail shipments. In 1929 the value of all these products sold amounted to Zl.177 million; after subtracting the export of machines of Zl.13 million, we get Zl.164 million.

Similar categories of investment goods were considered in imported machines. From the total imports of machines of Zl.300 million (and Zl.273 million after subtracting imports of agricultural machines) we deduced (i) the value of steam locomotives, parts of pumps, sewing-machines, scales—to a total value of Zl.35 million, and (ii) half of the value of imported machine parts, transmission equipment, heating equipment, and fittings, i.e. Zl.37 million (since these parts are also used for domestic production of machines and for overhauls). Thus we were left with the value of imports of machines of Zl.201 million. This total represents imports of motors, pumps, transmission

equipment, boilers, electric machines, machines for the iron and steel industry, woodworking machines, machines for the textile industry, paper-making and printing machines, machines for the food industry, and finally equipment classified as other machines and machine parts.

Adding up the value of domestic production of machines, equal to Zl.164 million, and the value of imported machines equal to Zl.201 million, we get a total value of machines for industry equal to Zl.365 million. However, we have also to take into account that the sums spent on the purchase of these machines must be increased by costs of transport and—for foreign machines—by customs duties. Next, it should be remembered that the statistics of the domestic production of machines are incomplete, for some categories of machine production have not been registered. So if we increase the sum of Zl.365 million by about 10%, i.e. to Zl.400 million, we shall not be overestimating the value of investments in machines for industry. Moreover, because of lack of data, the costs of installation of machines are not included in our calculation.

Agricultural machines. According to industrial statistics, the value of domestic production of agricultural machines was Zl.46 million in 1929, and Zl.44 million after subtracting exports. Next, adding imports equal to Zl.27 million, we get a total value of Zl.71 million. However, we must note that a large part of agricultural machines is produced in small plants and therefore a significant underreporting in the industrial statistics series is likely. Moreover, when the additional costs (of transportation and customs duties) are taken into account, investments in agricultural machines may be estimated at Zl.90 million.

Land improvement. Of land-improvement projects, drainage works could be considered only. These works, however, definitely dominate in land improvements in Poland. The estimate of the value of drainage works was based on the statistics of production of drains. The sales of drains in 1929 reached Zl.13.6 million. As the price of drains makes up about one-third of the total costs of drainage projects, the value of these works was estimated at Zl.40 million.

Construction. This sector puts together investments of various kinds from the economic point of view. However, our method of calculation requires that first the total value of construction works is estimated, following which it is divided according to the final use of buildings into four groups: (i) industrial constructions,

(ii) railway and post office constructions, (iii) public administration constructions, and (iv) housing constructions (unspecified categories including).

There is no direct statistical information on the volume of construction. The statistics of construction activity published by the Central Statistical Office, which take into account only the larger cities, are incomplete and until recently contained too scanty data on which to estimate the value of construction works (these statistics were not organized until 1931).[2] Consequently, any comprehensive estimate of construction investments could be made only on the basis of data on the production and sales of building materials taken from statistical series of industrial output.

For brick houses the estimate was based on the data of the Central Statistical Office on the sales of bricks. According to this source, in 1929 these sales amounted Zl.95 million at spot brick-yard prices. On the basis of differences between spot brick-yard and spot construction-site prices in several towns, the value of bricks at the construction site was estimated at Zl.120 million. According to information collected at one time by the ISBCP in order to devise a construction cost index,[2] in 1929 the cost of bricks made up about 20% of total costs of material inputs and labour. From this it would follow that the cost of construction of homes was 120 : 0.2 = Zl.600 million. This estimate seems to be too high, however. The data on which the share of bricks in the construction costs was calculated concern houses built in Warsaw, Lwów, and Katowice. Industrial and farm buildings, however, involve less interior finishing. Moreover, labour costs in small towns are also much lower than in larger ones. Taking these factors into account, the estimate of construction costs of brick houses was reduced by 20%, i.e. to Zl.480 million.

To estimate the total value of construction of brick houses, reinforced-concrete structures must also be considered. In the August 1931 issue of *Cement* (2: 251), the total volume of reinforced concrete used in 1929 was estimated at m^3 0.36 million. At an average cost of Zl.250 per m^3 for reinforced concrete, we get a total cost of Zl.90

[2] According to the data of the Warsaw Municipal Council, 8388 dwelling-rooms were built in 1929, of which 6765 were in new buildings (see E. Strzelecki, 'Construction Activity in Warsaw Today', *Kronika Warszawy*, 6/11 (1930), p. 60 [in Polish]); according to statistics of private construction activity, which the Central Statistical Office publishes without any supplementary information from the data supplied by construction inspection agencies, the number of dwelling-rooms in new apartment buildings completed in 1929 was 1018.

million. Since, as in the case of bricks, a given input of reinforced concrete corresponds to a certain value of finished work, the total costs of construction of brick buildings exceed the sum of 480 + 90 = Zl.570 million, and they can probably be estimated at Zl.600 million.

This sum represents outlay on materials and labour. To get the total value of the constructions in question we have to add to it the so-called overhead costs: taxes, social security payments, and profits. Their value is usually assumed to represent 20% of the direct construction costs. Yet, because in Poland a considerable number of buildings are put up on a 'do-it-yourself' basis, the overhead costs are considerably reduced; hence only 10% was added to Zl.600 million, and the value of the buildings erected in 1929 was thus estimated at Zl.660 million.

This sum does not include the costs of installation of water, gas, and electricity supply systems. On the basis of several cost calculations the average ratio of the value of installations to the value of the building was estimated at 10%, i.e. at about another Zl.60 million. Hence, the total value of brick buildings, installations included, constructed in 1929 amounted to Zl.720 million.

The estimate of the value of wooden houses built that year proved even more difficult than that for the brick houses and was based on very shaky foundations. For wood is also used in the construction of brick houses and for making furniture. Whereas estimating the value of bricks that are used almost exclusively for the construction of brick houses gave rise to no serious doubts, in the case of wooden houses wood used for other purposes had to be eliminated.

Domestic rail shipments of timber were assumed to represent its total use. According to data of the Central Statistical Office, the output of sawmills, exports excluded, is smaller than the value of timber shipments; this points to the incompleteness of output statistics of this branch of industry. It clearly follows that our estimate does not include wooden houses built in the countryside, for which 'local' wood is mostly used. The domestic shipments of timber in 1929 were 1 077 000 tonnes, which at an average specific weight of timber equal to 0.6 (soft wood is far mostly used in housing construction) comes to 1 800 000 m^3.

The input of wood in the construction of brick houses was calculated as follows. On the basis of technical sources it was found

that between 0.116 and 0.184 m^3 of timber is used for each m^3 of wall (depending on whether the floor is made of wood or something else); therefore it was assumed that on average 0.15 m^3 of timber is used for each m^3 of wall. Since from 100 bricks one can build approximately 3 m^3 of wall, 0.45 m^3 of wood is used for each 100 bricks.[3] According to industrial statistics, the sales of bricks in 1929 amounted to 1 400 million, and thus the input of wood in brick houses can be estimated at 630 000 m^3. Adding 20% for reinforced-concrete structures,[4] we get a total use of timber in the construction of brick houses of 750 000 m^3.

We finally estimate the use of wood in furniture-making. For a starting-point we take the data on the direct taxes due, according to which the total turnover of the wood industry and carpentry trade in 1928 was Zl.736 million. According to industrial statistics, the sales of sawmills, plywood, and scale-board factories were in 1929 Zl.360 million; allowing for the sales and price changes, one can take Zl.460 million for 1929. Both statistical series—of the Ministry of Finance and the Central Statistical Office—are incomplete. If we assume that the omissions in the two series are about the same, after subtracting from the total turnover of the wood industry and carpentry the sales of sawmills, plywood, and scale-board factories, and of bent-wood furniture, we get Zl.276 million for furniture sales in 1928. Since employment in furniture factories increased by 10% in 1929, furniture sales in that year probably reached Zl.300 million; because of the incompleteness of the statistics, we increase this number to Zl.400 million. On the basis of data on costs of construction in woodworking, the average value of a cubic metre of furniture was estimated at Zl.1 200; therefore, the total use of wood for furniture was 350 000 m^3.

Subtracting from the total use of timber, which is 1 800 000 m^3, the volume used in the construction of brick houses (750 000 m^3), and in furniture-making (350 000 m^3), we get a total of 700 000 m^3 for wooden construction. Taking the average price of 1 m^3 of timber in

[3] In 1929 various sizes of bricks were still in use in the three former zones of occupied Poland; hence the figures given here represent the weighted average of various sizes of bricks.

[4] According do data published in *Cement* of August 1931, the use of reinforced concrete in relation to brick was 27.3%; however, only 20% was added here since in buildings erected entirely or partially from reinforced concrete the average use of wood is less than in brick buildings, in which wooden floors are commonly used.

1929 as Zl.120 on the basis of the ISBCP data, the total value of wood used for wooden houses was estimated at Zl.84 million.

The proportion of the cost of wood in wooden houses of a high standard (villas, etc.) is about 35%. In houses built in small towns this proportion is considerably higher and exceeds 50%. Hence, starting from the figure of Zl.84 million for wood used in the construction of wooden houses, we assume that the total value of these houses built in 1929 was Zl.150 million.

In this way we obtain the value of brick buildings (Zl.720 million) and wooden buildings (Zl.150 million) completed in 1929. Now we shall examine how these outlays were divided according to the final use of these buildings.

Regarding the value of government and communal construction, on the basis of the state budget estimate for 1929/30 and an estimate made from data on outlay for buildings, published in the annual report of the Association of Polish Cities,[3] we get the following information: construction outlay of the government administration equal to Zl.70 million, those of railway and post office—Zl.50 million, and those of communal administration—Zl.30 million, which put together give Zl.150 million.

It was much more difficult to estimate the value of industrial construction. This estimate was made by using two different methods independently. The first method was based on the findings of a questionnaire on construction projects (see *Sprawozdania i Przyczynki Naukowe*, vol. x, ISBCP, Warsaw, 1930).[4] In 1929 the surveyed firms completed non-industrial state and communal constructions at a value of Zl.67 million (i.e. 45% of the total sum that we calculated above), and industrial constructions at a value of Zl.71 million. If the ratio of the total value of state and communal construction to the value of industrial construction is the same as in the projects represented in the questionnaire, we get a total value of industrial construction of Zl.160 million.

The second method was based on a relationship between industrial investments in buildings and in machines. According to the balance-sheets of Polish joint-stock companies, the value of buildings is about 60% of the value of machines. So in the construction of new factories one can expect the same relationship to hold for these two kinds of investement. At the same time, assuming that the amortization period for machines is half that of buildings, the cost of replacement investments would be only 30% in relation to the amortization of

existing plants. Hence, for the ratio of total construction outlay to total machine investments, which in part represent replacements and in part new capital equipment, we take the average value, i.e. 45%. Since the value of machine investments was estimated at Zl.400 million (see p. 360 above), the value of industrial buildings completed would be Zl.180 million. This figure is surprisingly close to our first estimate, i.e. Zl.160 million. So we take the value of construction investments in industry to be Zl.170 million.

Since most of the state and communal constructions as well as industrial constructions are made of brick, by subtracting the value of these two groups from the total value of all brick construction, we get the sum of Zl.400 million for brick-housing construction (including office buildings, etc.). With an average cost of Zl.6500 per brick room, this corresponds to 60 000 rooms. According to construction activity statistics (with adjustments made for Warsaw on the basis of its Municipal Council data), 28 000 rooms were built in cities of more than 25 000 population in 1929. If we take into consideration both the incompleteness of these data, and the suburban, small town, and countryside brick construction (the last especially in the former Prussian occupied zone), our estimate of the number of rooms built can be regarded as plausible.

Thus our final estimate of the value of housing construction (including other construction not distinguished here) is Zl.550 million, of which Zl.400 million is for brick, and Zl.150 million for wooden constructions.

Installation work (except for those in new houses). In the above estimates of construction outlay the cost of installation of water, gas, and electric systems in new houses was included. However, such installations are also made in old houses when these systems are introduced in cities that did not have them before or when the existing systems are developed. Since many residential areas in Poland still do not have these systems at all, or have them only partially, these works are constantly in progress, and outlay for these investments is considerable. Unfortunately, our estimate of the value of these works had to be based on shaky foundations, especially since installation costs, whose relation to the costs of materials greatly varies, represent the dominant part of those investments.

Water and sewage system installations were estimated from the data on the sales of materials. Industrial statistics show sales of sanitary fixtures from foundries of Zl.21 million, and water and

sewage pipes with fixtures of Zl.16 million. Hence the value of materials for house installations comes to Zl.37 million. Since in estimates costs of materials are about half the total costs of these works, their total value was estimated at Zl.70 million.

Determining the value of gas installations met the following difficulty. In the statistics of output the installation material, i.e. pipes, is lumped together with pipes for other uses: for water systems, boiler equipment, as well as for the petroleum industry. The domestic sales of welded tubes came to 19 500 tonnes. On the basis of the installation cost of water-supply systems, the share of these pipes in total cost, and the prices of pipes, the volume of galvanized pipes for water works was estimated at 8000 tonnes. The remaining 11 500 tonnes represent a value of Zl.7.5 million. Adding one-third for drawn tubes (such a ratio was found in works done by the Warsaw gasworks), we get a value of materials equal to Zl.10 million. With a share of materials in the cost of gas installations of one-third, the value of these works was estimated at Zl.30 million. This sum is larger than the one that would correspond to the ratio of costs of installation of a water-supply system to those of gas installation in the same house (which is 0.3; so at Zl.70 million for the water-supply systems more than Zl.20 million would be for gas-supply systems). However, the expansion of these two systems does not progress at the same pace, and this difference is probable.

Our estimate of outlay on electric installations was based on the sales of electric wiring. According to industrial statistics of the Central Statistical Office, the sales of lead-coated cables in 1929 amounted to Zl.26 million, and the sales of non-lead coated wiring were Zl.14 million. Considering imports of Zl.8 million, the value of the former increases to Zl.32 million, and of the latter to Zl.16 million. If we assume, on the basis of cost estimates, that the cost of lead-coated wiring is 40% and of non-lead coated wiring is 25% of the costs of works respectively, we may estimate the value of electric installations at Zl.140 million.

As a result, we get Zl.70 million for water-pipe installations, Zl.30 million for gas, and Zl.140 million for electric installations, making a total of Zl.240 million. After substracting Zl.60 million for installations in new houses, Zl.180 million remains for other installations. A very large part of this sum is for electric installations. If we consider the gradual progress of electrification, these figures seem quite probable (the generation of electricity in power plants with a capacity

above 5000 kWh increased, between 1925 and 1929, to 2355 million Kwh, i.e. by more than 25%). Most probably a large part of this outlay represents industrial investments, but since the exact numbers are unknown, we had to leave this category of investment undivided between industrial and non-industrial investments.

Construction of railways and the telephone and telegraph networks. The estimate of railway, telephone, and telegraph investments was based on budget figures. We took the budget estimate for 1929/30, i.e. in the main season of works coinciding with the calendar year 1929. This budget estimate appropriated Zl.124.4 million for the construction of new railway lines and sidings, Zl.108.8 million for investments in existing railway lines (apart from the construction of station, residential, and workshop buildings), Zl.4.2 million for investments in narrow-gauge railways, and Zl.6.8 million for the reconstruction of equipment destroyed during the war; this comes to a total of Zl. 244 million. However, a comparison of the revenues and expenditures of the State Railways shows that the actual outlay for railroad investments came to only 70% of the budget figures. On this basis, we get the value of railway works of Zl.170 million.

Zl.27.9 million was assigned in the budget for the construction of telephone and telegraph lines and equipment. Work completed in this sector shows that 83% of the budgeted outlay was used, i.e. Zl.26 million; investments for radio-telegraph investments amounted to Zl.2 million; in sum, nearly Zl.28 million was spent for this equipment.

Consequently, a total of nearly Zl.200 million was invested in the construction of railways and telephone and telegraph lines.

Rolling-stock. In 1929/30 Zl.77.8 million was budgeted for the purchase of railway rolling-stock for the standard-gauge railways, Zl.1.4 million for the narrow-gauge railways, and an additional Zl.40 million and Zl.2 million respectively was added to this in the extraordinary budget appropriations; in sum, Zl.121 million was allocated. The figures for execution of the budget appropriations in this sector have not been published. Yet, industrial statistics show sales of railways rolling-stock for Zl.159 million. With small exports (at Zl.2 million), and imports of Zl.9 million, the total sum of these investments (private railways and tramcars including) comes to Zl.170 million.

Other government investments. The most important outlays (according to sums budgeted for 1929/30) considered here were the

construction of state highways and stationary bridges—at Zl.5.4 million, the construction of canals and river ports—at Zl.3.1 million, river engineering—at Zl.7 million (because of combining in the budget figures of the new river-regulation works and the maintenance expenses, we took half of the total outlays for these works), the construction of the seaport of Gdynia (apart from buildings and land purchases)—at Zl.22 million. This gave us a total of Zl.40 million.

Communal investments. Since municipal buildings were already included in the outlays for the construction sector, we now have to account for earthworks: roads and streets, and water, sewage and gas systems, in so far as these installations are the responsibility of municipal authorities. In this sector our estimates are based on the Central Statistical Office data on communal finances, and the (as yet unpublished) information on the execution of the 1929/30 budget appropriations.

The extraordinary budget appropriations for the construction and development of roads under the responsibility of district councils and communal associations amounted to Zl.38 million for the district councils that already filled their reports. Since data for twenty-eight districts were still missing, this figure was increased to Zl.40 million in our estimate. The extraordinary budget appropriations for communications in cities came to Zl.22 million (outlay for the construction of roads and streets included).

In construction of the water and sewage systems the extraordinary budget appropriations of cities were Zl.10.7 million for the construction of water systems in cities above 20 000 population (in Warsaw inclusive of the sewage system), Zl.11.5 million for the construction and installation of sewage systems in these cities, Zl.1.4 million for the construction of sewage equipment, wells, etc., in smaller cities, the total cost for these works thus being Zl.24 million. Investments in the construction and development of the gas system were estimated on the basis of extraordinary appropriations for gasworks, at Zl.5 million (which apparently covers only part of these works). Thus we got a total of Zl.30 million for investments in the water and sewage systems.

Summing up results. Our estimates of investment outlays are given in Table 99 where they are grouped into several larger categories: (i) industrial investments, including machines for industry and industrial construction; (ii) agricultural investments, in which agricultural machines and drainage works are considered; (iii) investments in

Table 99. *Investment in Poland in 1929 (Zl.m.)*

Type of investment	Industrial investment	Agricultural investment	Investments in communications	Public administration construction	Housing and other non-separated construction	Water, sewer, and gas systems, and their installations in old houses
Machines for industry	400	–	–	–	–	–
Agricultural machines	–	90	–	–	–	–
Land improvement	–	40	–	–	–	–
Construction	170	–	50	100	550	–
Installation works (except for new houses)	–	–	–	–	–	180
Construction of railways and telephone and telegraph equipment	–	–	200	–	–	–
Rolling-stock	–	–	170	–	–	–
Other	–	–	40	–	–	–
government investment						
Communal investment	–	–	60	–	–	30
TOTAL	570	130	520	100	550	210

communications, i.e. construction of railways, telephones, telegraphs, rolling-stock, buildings for the railway and post office, construction of roads, streets, bridges, ports, and regulation works; (iv) construction for public, state, and municipal administration; (v) housing construction (including other construction that cannot be separated); (vi) investments in water, sewage, and gas systems, including installations in already existing houses.

The first two categories represent investments for production purposes, directly increasing the stock of capital equipment. Investments increasing capital equipment in the broader sense are those included in our third category. Housing construction investments do not cause direct changes in production capacity. Investments in the last category are mixed in nature: works in the construction of utility systems are like those mentioned in categories (iii) and (iv); however, installations in old houses should be separated into industrial and residential construction, but we lacked the data for doing so.

According to these estimates, the total sum of investments made in 1929 came to Zl.2080 million. Since there are no calculations of the social income in Poland, we are unable to determine the share of investments in it. Therefore, our results will be more telling if we estimate the volume of labour input in these investments; at the same time this will enable us to cross-check our estimate of the value of investments.

To accomplish this, we first separate the volume of investments into two groups: (i) the production of investment goods, and (ii) investment works. In the first group the following outlays are included: machines for industry and agricultural machines as well as rolling-stock—at the value of Zl.660 million, material for land improvement works (i.e. drains)—at Zl.13 million, materials for brick constructions calculated at 70% of the cost of those constructions (overhead costs and installation costs excluded) at a value of Zl.420 million, wood for wooden constructions—at Zl.84 million, installation materials (for water, sewage, gas, and electric installations)—at Zl.95 million; finally, material for telephone and telegraph works, other government investments, and communal investments (estimated at one-third or one-quarter of the costs of these works respectively)—at Zl.50 million. In this way the value of investment materials amounts to about Zl.1 380 million. Thus Zl.700 million remains for investment works themselves.

The investment goods are partially produced at home and partially imported as finished and semi-finished products or raw materials. To determine the cost of domestic labour input we have to separate the entire value of imports. Imports of machines, rolling-stock, and electrical wiring amounted to Zl.265 million; those of metallurgic and metal products to Zl.92 million (of which iron and sheet metal to Zl.28 million, and copper and copper alloy products to Zl.19 million); ceramic products to Zl.19 million; scrap iron and iron-ore and manganic ore (in proportion corresponding to domestic sales of investment goods of the iron and steel industry) to Zl.76 million; copper and other metals together with brass (half, as the other half represents imports of consumption goods), white metal and other alloys to Zl.43 million; finally, mineral and stone raw materials to Zl.8 million. Thus, in 1929 total imports of investment goods reached Zl.500 million. After deducting this value from the total value of investment materials, Zl.80 million represents the value of investment materials of domestic production.

According to available statistical data, the share of labour costs in the value of net production, or in the value added, i.e. the value of the product less the value of raw-material inputs, in industries related to investment activity was 35–40% in 1929. According to industrial statistics, the net labour costs, calculated in percentages of the value of output, in 1929 were e.g. in brickyards 37.8%, in tillers 35.5%, in glassworks 32.3% in limekilns 31.5%;[5] however, these are branches in which the value of raw-material inputs plays a relatively minor role and in which the corresponding percentages calculated for the net value of output increase only slightly. In sawmills, at an output value equal to Zl.386 million and that of sawn-round timber of Zl.254 million, the net labour cost was Zl.43.2 million, that is, 32.7% of the not yet completely refined net value of output. In the iron and steel industry the value of output of iron, sheet metal, rails, and special steel was equal to Zl.390 million (according to industrial statistics) and the value of raw materials used was Zl.230 million (according to a report of the Union of Steel Mills, at domestic prices, or on the basis of foreign trade statistics; the value of coal and coke inputs was Zl.70 million, of scrap iron—Zl.100 million, and of slag and cinders—Zl.60 million). Labour costs in this industry, inclusive of all extras and payments in kind, and after deduction for insurance

[5] See E. Arnekker, 'Industrial Output, Employment and Wages in 1929', *Statystyka Pracy*, 10/3 (1931) (in Polish).

payments, amounted to Zl.56 million, i.e. it represented 35% of the value added.

Thus, if for the aggregate output of investment materials the share of labour costs in the value added ranges between 35 and 40%, at the output value equal to Zl.880 million,[6] the value of domestic labour cost comes to Zl.310–350 million.

The share of labour costs is generally higher in investment works. In our calculations of brick constructions, direct costs were increased by 10% for overhead costs (see p. 362 above); thus of the total costs of Zl.660 million they make up Zl.60 million. Since costs of materials were Zl.420 million, it leaves Zl.180 million for labour costs. Similarly, deducting overhead costs from the value of other investment works (except for public works conducted on one's own account), one gets Zl.500–550 million as representing labour costs. Thus total labour costs in investment works of various categories, labour input in the production of materials for them in all stages of production included, amounts to Zl.800–900 million.

These results can be compared with the data on workers' earnings. For the first group of investment activity, i.e. the production of investment goods, industrial statistics can be used.[7] In the mineral industry we consider the production of bricks, tiles, lime, cement, glass (one-quarter of it, the rest representing glassware); in the wood industry—sawmills (43%; the rest represents exports and wood for domestic furniture production); in the iron and steel, metal and machine industries—blast furnaces, steel plants and rolling-mills (all of these in proportion of domestic sales for investments to total sales, i.e. 63% of the value of output), foundries, wire and nail factories (half), iron-work, electro-technical products (half), rolling-stock, boiler frames and products, agricultural machines and all machines for industry taken into account in our estimate; in mining—iron-ore mines (in proportion corresponding to domestic sales of steel-mills), coking plants (in the same proportion as ore-mines), coalmines (corresponding to the use of coal in the production of investment materials).

For these categories the wage bills in 1929 were Zl.82 million in the mineral industry (with average employment of 49 000 workers), Zl.19 million in the wood industry (17 000 workers), Zl.188 million in the

[6] There is some inaccuracy here in that part of output is estimated at factory prices, part inclusive of costs of transportation (in construction), etc.

[7] See E. Arnekker, 'Industrial Output, Employment and Wages in 1929'.

iron and steel, metal and machine industries (92 000 workers), Zl.47 million in mining (calculated according to employment and wage statistics, and 18 000 employed workers); this gives a total of Zl.336 million (176 000 employed). When it is remembered that there are still some omissions in the present calculation and some underestimation in our first calculation, the agreement between both of them can be regarded as satisfactory. Moreover, in comparing the two estimates one has to remember that gaps in industrial statistics may influence both calculations in ways that such a test would not reveal.

We now turn to checking the estimate of labour costs in investment works. Here industrial statistics are no longer helpful. Therefore data on social insurance will be used instead. However, the only statistical information of a broad enough scope is accident insurance data,[8] which provides information for individual industries. Category XIV of accident insurance, 'Buildings and construction', groups the vast majority of works under consideration, including construction companies involved in earthworks of all kinds, companies of the building industry, the building materials industry, and finally building-maintenance companies (professional fire department, chimney-cleaning, window- and house-cleaning, street-cleaning, and sewer-cleaning).[9] Only the latter should be excluded from our comparison, but numerically they are of little importance. At the same time, not included in this category are installation works in houses: those installed by gasworks and all kinds of electric-wiring installations. Consequently in our comparison total outlays on electric-wiring installations will be excluded, as will be works in wooden constructions which for the most part are done in primitive and unorganized ways, and therefore in the main are not included in the insurance statistics. After these adjustments slightly over Zl.400 million is left to represent labour costs.

According to the accident insurance statistics, earnings in the Lwów insurance district were Zl.220 million (of 133 000 full-time workers, i.e. man-hours converted to year-long employment), in the Poznań district they were Zl.40 million (21 000 full-time workers), and finally in Królewska Huta district they were Zl.38 million (15 000 full-time workers). These figures include salaries of white-collar

[8] See *Rocznik Ubezpieczeń Społecznych w Polsce, 1928* [Yearbook of Social Insurance in Poland, 1928], vol. iv, Ministerstwo Pracy i Opieki Społecznej, Warsaw, 1931.

[9] See *Dziennik Ustaw R.P.* [Official Gazette] 65 (1928), item 599 (in Polish).

workers, which, however, judging by the Poznań office data where employment is divided into the respective categories, are not of great significance. Furthermore, these data relate to 1928 and in the following year investment activity slowed down (see p. 379 below). On the other hand, this sum of earnings is not representative for 1929 when workers' wage rates considerably increased in comparison with the average for 1928. For example, in Łódź they increased by 6.5%, in Warsaw by 10%, in Katowice by 11%, in Lwów by 12%, and in Poznań by 30% (because of the Poznań exhibition). There are also other factors that disturb this evidence: foremen working on their own account are not covered by insurance, yet the cost of their labour is included in our calculation; in the former Russian-occupied zone of Poland not all companies are covered by insurance, many of them being still exempt from it; the wage rates recorded in the Poznań and Królewska Huta insurance offices are 'cut off' at the insurance maximum level, but everywhere else there is a tendency to declare lower wage rates in order to reduce the insurance rate. Taking all these factors into consideration, it appears that the results of the comparison confirm our estimate of the value of investment works in 1929.

Disregarding investment goods obtained from abroad, investments made in 1929 can be described as follows: more than Zl.800 million on labour costs with nearly 400 000 workers employed on annual basis on average (with a seasonal slow-down during the winter) implies that employment in these industries exceeded 400 000 workers. The significance of this number for the economy as a whole can be gathered by comparing it with total employment in industry and the crafts.

In the statistics of accident insurance the sum of earnings in industry and crafts (categories Ib and III–XIV in the Lwów office and the corresponding categories in the two other offices) amounted to Zl.2365 million in 1928. This sum includes salaries of white-collar workers but it omits part of the wages of workers and craftsmen (see above; moreover, part of workers' earnings were not considered because of the kind of insurance used in our study); hence, the actual sum of earnings should be higher. In the National Health Service the sum of premiums in 1928 came to Zl.283 million. After subtracting the premiums of white-collar employees, agricultural workers, and domestic servants, roughly estimated at Zl.83 million, Zl.200 million of premiums at a 7% premium rate renders a total sum of earnings

of Zl.2800–2900 million: This is too much in so far as workers employed in commerce and transportation are included in this number, but independent craftsmen are omitted.

Since the number of workers employed in industry and the crafts, as well as of independent craftsmen, is about 1 700 000,[10] multiplying this number by the average wage rate—which in both insurance statistics is Zl.1600 annually—we get the total sum of earnings equal to Zl.2700 million. This broadly agrees with the estimate made on the basis of premiums paid to the National Health Service. Hence the wages in investment works of Zl.800 million represent roughly 30% of total wages in industry and the crafts.

The structure of investment works in 1929 was such that 80% of total investments were made almost in equal parts in three fields: (i) industrial investments, (ii) private non-industrial construction, chiefly housing, and (iii) communications. The other 20% went for investments in the water and gas systems in old houses (installations included), agricultural investments, and public administration construction. In terms of division between investments expanding capital equipment and those satisfying consumer needs, 35% of investments went for the expansion or replacement of capital equipment in the strict sense and another 25% for communications; some installation investments making up 10% of the total value of investments also went to meet the needs of capital equipment. Consumer housing construction represented 25%, and public administration construction only 5% of the total value of investments.

Let us compare this structure of investment with that in Germany (see Table 100). For this purpose we take 1928 for Germany, which is the year of the greatest investment activity, and 1929 for Poland when investment activity was still very strong. For the sake of comparability our estimates are based on the data for new investments and replacements, i.e. including amortization.[11] However, since there is not sufficiently detailed information on the latter and investment classification in each country is somewhat different, comparability of investment structure in Germany and Poland is limited.

[10] See L. Landau, *The Occupational Structure of the Population of Poland as a Basis for Examining the Structure of the Economy*, ISBCP, Sprawozdania i Przyczynki Naukowe, vol. XI, Warsaw, 1931 (in Polish).

[11] See *Vierteljahrshefte zur Konjunkturforschung*, p. 26.

Table 100. *Investment in Poland in 1929 and in Germany in 1928*

Type of investment	Value of investment (Zl.m)		Share in total investment (%)	
	Poland	Germany	Poland	Germany
Industry and the crafts, electric-wiring, gas, and water–sewer systems	600	4130	31	33
Agriculture	130	660	7	5
Communications and public administration	620	4530	33	36
Housing construction	550	3210	29	26

Since in our calculations machines of all kinds had to be lumped together, we now put into one category investments in industry, the crafts, power plants, gasworks, and water systems. In Poland in 1929 investments in all these areas came to Zl.600 million. In Germany in 1928 investments of industry were RM2850 million, whereas in power plants, gasworks, and water systems they were RM1080 million. In the crafts new investments amounted to RM157 million and for gross investments a sum of RM200 million may be assumed. This gives a total value of investments equal to RM4130 million.

Investment outlays in agriculture in Poland include purchases of agricultural machines and outlay for land improvement. The total amount of investment in these two groups came to Zl.130 million. In Germany these investments, construction of farm buildings included (which could not be separated), totalled RM660 million.

Communication investments, of which the construction of roads, streets, canals, ports, etc., in the German classification is included in investments of public administration, were therefore combined in our comparison with public administration investment. For both of these groups of investments in Poland Zl.620 million were spent in 1929 (omitting investments in shipping, which in Poland play a minor role), whereas in Germany in 1928 they absorbed RM4530 million (new investments in the army and fleet excluded, since they are not included in investment statistics for Poland).

Finally, for housing construction Zl.550 million were spent in Poland in 1929, and RM 3210 million in Germany in 1928. The index for Poland is somewhat too high, since it includes non-industrial constructions of profit-earning institutions and public-utility buildings, which in the German statistics appear under separate headings.

As Table 100 shows, the overall structure of investment in Poland and Germany is quite similar. This obviously refers only to the basic types of investment, since within each type there are some differences (e.g. in communications, railway construction predominates in Poland whereas in Germany the construction of streets, waterways, etc., has a larger share, while the structure of industrial investment is different in the two countries, and so on). The share of industrial investment is smaller in Poland, especially in comparison with investment in housing construction: in Poland this ratio is 31 : 29 and in Germany it is 33 : 26. It should be remembered, however, that in 1929 industrial investment in Poland fell more than other investment (see below); in 1928 the share of industrial investment was larger and did not differ much from that in Germany. Thus, in spite of the tremendous differences in the economic structure of the two countries, we find a similar pattern of use of that part of social income allocated for investment. This in turn is evidence of a boom in industrial investment during the business upswing in Poland.

Investment activity in 1926–31. In contrast to 1929, for other years the data on which our estimate of the volume of investments was based are only fragmentary. Therefore, to obtain information on investment activity suitable for studies of the dynamics of investment in shorter periods of time, we used some symptomatic indicators that roughly measure the volume and changes in the most important areas of investment activity. The results obtained were extrapolated to the other years. These data were listed quarterly. Owing to great importance of seasonality in some investment works (construction of houses and earthworks, for instance), the influence of seasonal fluctuations was eliminated from all series. To determine real changes in the value of investments, and not those due to price fluctuations, we either relied on volume series, or—when value indices were used—the influence of price changes was eliminated.

In our study the following statistical series were used: (i) railway shipments of lime, i.e. a volume series representing housing construction;[12] (ii) the sales of screws and rivets for private firms, i.e. a volume series representing investment in machines of all kinds;[13] (iii) shipments of agricultural machines, i.e. a volume series representing

[12] See M. Kalecki, 'Sales of Lime as an Indicator of Construction Activity', this volume.

[13] See M. Kalecki, 'Symptomatic Indices of Consumers' Incomes and Investment Activity', this volume.

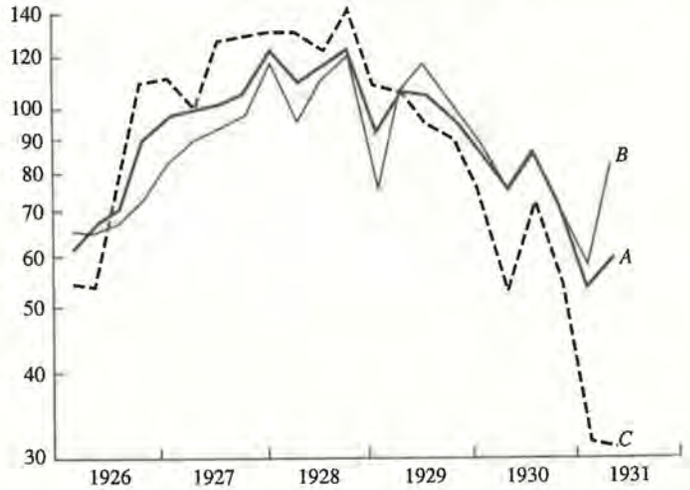
investment in agriculture; (iv) outlays of the State Railways for the construction of new railway lines, developments of existing lines, and the reconstruction of lines destroyed by the war, i.e. a value series representing railway investment; in order to remove the influence of cost fluctuations in railway construction, a special price index based on prices of metallurgical material for the railway and on wages of construction workers was constructed; and (v) employment in public works—a volume indicator representing state and municipal earthworks construction.

Converting these five series according to the base-year (1929 = 100), weights were obtained that corresponded to the share of works of a particular type in total investment. Thus: (i) railway shipments of lime were given a weight corresponding to construction as a whole, brick and wooden; (ii) the sales of screws and rivets were given a weight corresponding to investment in industrial machines and railway rolling-stock; (iii) shipments of agricultural machines were given a weight of total investment in agriculture; and (iv) outlay by the State Railways for construction were given a weight corresponding to works mentioned above as other government and communal investments. The weight of installation works, which are connected on the one hand with construction activity and on the other with the development of the respective utility systems, was divided between the value of housing construction and of public works. In this way lime shipments received a weight of Zl.960 million, sales of screws—Zl.570 million, shipments of agricultural machines—Zl.130 million, outlay by the State Railways for construction—Zl.200 million, and employment in public works—Zl.220 million. The main results of these calculations are presented in Table 101 and in Figure 32.

The beginning of 1926 was the culminating point of the 1925–6 crisis, which after a short depression already in the same year turned into an upswing. From the middle of 1926 investment activity rose sharply, financed from greatly increased private savings and govern-

Table 101. *Investment Activity in Poland, 1926–1930 (1929 = 100)*

Year	Total investments	Construction	Investments in machines
1926	72.0	67.7	72.8
1927	101.0	91.5	117.2
1928	117.8	111.3	131.6
1929	100.0	100.0	100.0
1930	79.7	80.3	64.1



A—investment activity as a whole; *B*—construction; *C*—investments in machines

FIG. 32. *Indices of Investment Activity in Poland in 1926–1931 (logarithmic scale; 1929 = 100)*

ment funds, with real wages depressed because of a devaluation of the zloty, and with sales sharply rising. In the last quarter of 1926 the index of investments in machines and equipment already doubled the volume of the first quarter the year; railway and agricultural investments rose just as rapidly; and construction rose less—its index increased by 13%. The same trends continued in 1927: investment in machines and equipment rose in comparison with the previous year by 60%, railway investment rose even more, and construction increased by 35%. A change took place in 1928: although the rise in construction investment was 22%, investment in machines and equipment rose by mere 12%. Only in railway investment there was another sharp increase, of 60%. In 1928 investment peaked, ending the boom phase of the business cycle.

1929 represents already a transition to recession, which at first was mild. From the beginning of 1929 investment in machines and equipment continuously declined, by the end of the year falling by 24%. Construction, whose index declined by only 10%, reacted less sharply; in 1929 public construction still remained unchanged, and the index of railway investment even rose. The recession deepened in 1930: investments in machines and equipment continued to lead the

decline, falling by 36%. Government investment ceased to cushion the fall and railway investment plunged by 25%. On the other hand, housing construction, which in 1930 was again largely financed from public funds, held up construction activity.

Investment activity continued to shrink in 1931. Investment in machines and equipment reached an exceptionally low volume, although housing construction continued to soften the rate of the overall decline. Thus in 1931 investment activity fell to about half of its volume during the boom. If it is remembered that the number of those directly involved in investment activity is 400 000 employees, this explains the impact that a half of investment—the most important sign of economic crisis—exerts on economic activity as a whole.[5]

Fluctuation in Industrial Output and Consumption[1] (1934) (with Ludwik Landau)

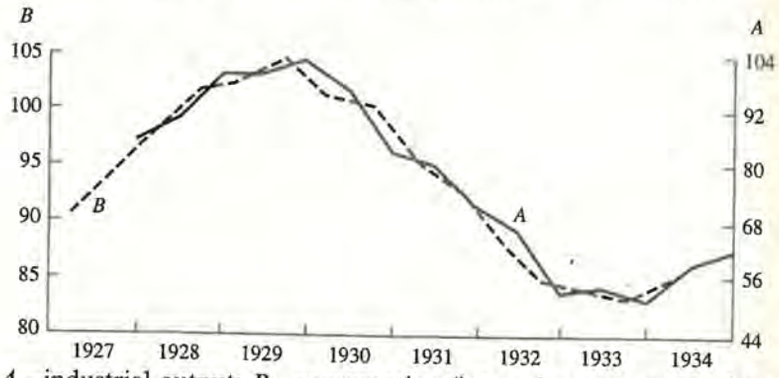
Recent studies made in the ISBCP on social income[1] have made it possible to construct a general index of consumption (i.e. marketable consumption that represents the difference between overall consumption and the internal consumption of the countryside). This in turn made it possible to examine the relationship between fluctuations in industrial output—which is the source of the shock waves passing through the entire economy—and consumption.

A—industrial output; *B*—consumption (internal consumption of the countryside excluded)

FIG. 33. *Industrial Output and Consumption in Poland, 1927–1934 (half-yearly data; 1928 = 100)*

Fig. 33 shows the curves of industrial output and consumption. Each curve is drawn on a different scale selected in such a way that their amplitudes on the diagram are equal. As can be seen from these scales, 12 points of the industrial output index correspond to 5 points of the consumption index, which means that the ratio of the

[1] See M. Kalecki and L. Landau, *Social Income in 1933 and Foundations of Periodic Studies on Changes of Income*, this volume.



A—industrial output; *B*—consumption (internal consumption of the countryside excluded)

FIG. 34. *Industrial Output (moved forward by three quarters) and Consumption in Poland, 1927–1934 (half-yearly data; 1928 = 100)*

amplitudes of fluctuations in these series is 5:12; total consumption fluctuates less than industrial output in the ratio 0.42.

What is striking in the diagram is a rather constant time-lag between the consumption curve and the industrial output curve; it varies from six months to a year. The average lag calculated as the average of horizontal lags between the curves is almost exactly three-quarters. The coefficient of variability, i.e. the ratio of the average mean square deviation of individual horizontal lags to the average lag, equals only 25%, which confirms the constancy of the lag already noticeable at first sight. In Fig. 34 the output curve has been moved forward by the average lag, i.e. by three-quarters. Both curves then show a striking convergence: the difference in the corresponding ordinates never exceeds 2 points on the consumption scale.

The following questions now arise. What are the reasons for (i) considerably less intensity of fluctuations in consumption than in industrial output, and (ii) the delay of the former in relation to the latter? In answering these questions we attempt at the same time to distinguish the special features of these fluctuations in Poland in comparison with developed capitalist countries.

The considerably less intensity of fluctuations in consumption compared with industrial output is a phenomenon that appears in all countries. Two reasons are given for this. First, only part of industrial output is consumed in the strict sense; the rest consists of the production of investment goods and changes in stocks. Transitory fluctuations in this unconsumed part of output are much stronger.

Secondly, not all goods and services consumed are produced by industry. In addition to food, which is chiefly produced by agriculture, an important role among non-industrial goods is played by services, such as the use of housing, entertainment, etc. This non-industrial production fluctuates less than the consumed part of industrial output. Indeed, the two most important types of non-industrial production—the production of food and housing services—are subject to only minor fluctuations: the first because food satisfies the least elastic needs, the second as a result of the inelasticity in the supply of housing, whose percentage changes over short periods of time may be very small.[2] A certain inelasticity—not as strong as in the supply of housing services, but certainly greater than in industrial production—is typical of the supply of handicrafts, which therefore also reduces the range in the fluctuations of consumption in relation to those of industrial output.

Thus industrial output shows more intense fluctuations than consumption because investments fluctuate more intensely than consumption, and the consumption of industrial products is a relatively elastic part of total consumption.

At first glance it would appear that the more industrialized a country is, the smaller the differences in the range of fluctuations in industrial output and consumption. Indeed, with industrialization the consumption of industrial goods becomes an ever greater part of total consumption, chiefly because of the rise in the standard of living which reduces the importance of food in consumers' budget. However, it should not be overlooked that with industrialization, an ever greater part of industrial output goes for investment goods. In this way the range of fluctuations in investment and consumption respectively will have a stronger impact on the intensity of fluctuations of industrial output in relation to those of consumption in a more industrialized country. Since this factor works in the opposite direction to the difference in the proportion of industrial products in total consumption, it may even accentuate the influence of this difference; it turns out, however, that the ratio of the range of fluctuations in consumption and in industrial output for Germany is 0.36, whereas for Poland, as mentioned above, it is 0.42.

[2] The matter is different in the case of supply of industrial goods. In that case a fall in prices eliminates supply from those plants where the price does not cover even prime costs (i.e. of labour and materials). On the other hand, the renting of existing flats involves almost no costs, and so no limitation of supply takes place here.

We now come to the time-lag in fluctuations in consumption in relation to those in industrial output. We shall first examine this question by means of a theoretical model. Let us assume that the production of investment goods has been reduced, and this has resulted in a reduction in employment. Consequently, the purchasing power of workers spent for consumer goods has also been reduced. Then a fall takes place in the prices of these goods in relation to prices of investment goods, and plants with the highest production costs are made idle. In this way the fall in the production of investment goods is followed by a decline in the volume of consumer goods, and consumption immediately follows the decline in industrial output.

However, the course of these processes will be somewhat different if workers have some savings. Let us assume that at first workers discharged in the investment industries draw on their savings and do not reduce their expenditure. Then purchasing power will fall after a certain time, and only then will consumption decline, which accordingly will be delayed in comparison with the fall in production.

The failure of expenditures to keep pace with incomes in other social groups will have a similar effect. If a reduction in employment causes an immediate fall in the demand for workers, but shopkeepers begin to dip into their savings, this obviously will also delay the decline in consumption. Although consumption will decline, it will still be higher than it would be at the present volume of incomes; indeed if the lower-middle class maintains its consumption by drawing from its capital and as do discharged workers by drawing from their savings, consumption may be maintained at a level that corresponds to incomes and production from the earlier period.

It should be made clear, however, that if some social group maintains its consumption *at a completely unchanged level*, only reducing or increasing its savings accordingly, this will only affect the amplitude of the consumption curve but it will not shift it in relation to the curve of industrial output: for the consumption of the 'alimenting' groups will not match their previous incomes (as in the earlier case) but will be constant. So if consumption expenditures of one part of the population react to changes in incomes *immediately* and of the other part *do not react at all*, clearly in such a society the consumption curve will synchronize with the curve of industrial output.

From the point of view of the influence on the delay of consumption in relation to fluctuations in production, social groups can therefore be divided into three categories depending on whether their expenditure reacts to the decline in their incomes immediately, after some time, or do not react at all. Only the second category causes a shift of the consumption curve in relation to the curve of industrial output; when this category is absent the delay in consumption will not occur.

Obviously, in practice no social group can be entirely fitted into one of these three abstract categories, but the typical behaviour of its members generally corresponds to one of them. In Poland a considerable number of workers, white-collar employees, and peasants can be included in the first category, in which expenditures react quickly to changes in incomes; the lower-middle class, whose reactions occur only after some time, can be included in the second category; and finally, the third category, of almost constant consumption, consists of persons who live from profits. It follows that the considerable delay of consumption in relation to industrial production in Poland is caused by the lower-middle class: the craftsmen and small shopkeepers. Differences in the affluence of this social group in Poland and in Germany probably explain the rather surprising fact that the lag of consumption in relation to industrial production is incomparably shorter in Germany than in Poland. A comparison of the German curve of industrial output with that of consumption has shown that the average lag, which in Poland is three quarters, probably does not exceed one quarter in Germany, and perhaps is even shorter there.

The difference between the Polish and the German lower-middle class is that the latter can be included in the third category—persons with constant consumption. This is confirmed by the study of the fall in the real value of total consumption of hired employees in Germany and in their real purchasing power. It turns out that both these indices declined to the same extent during the crisis, that is, only workers and white-collar employees reduced their consumption, whereas consumption of other social classes remained unchanged.

The different consumption attitude of the German lower-middle class results simply from its greater affluence. Its earnings allow for a rather high rate of saving in good times. With a fall in incomes during a crisis, an unchanged level of consumption often can be

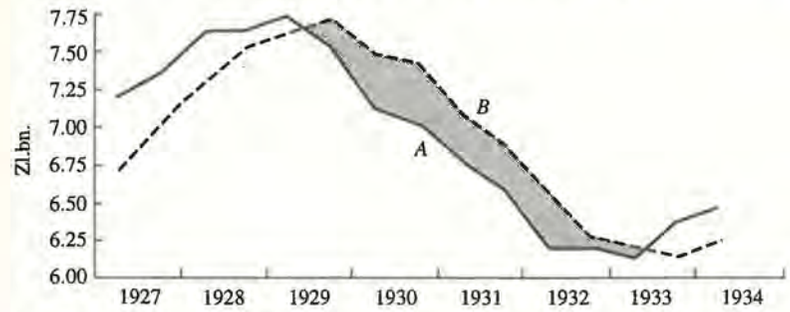
maintained simply by no longer saving. In less favourable circumstances this level can be maintained at the expense of only slightly dipping into savings.

Even during a boom the earnings of a considerable part of the Polish lower-middle class provide only a low standard of living and do not permit the accumulation of capital. Though a corresponding fall in expenditures does not immediately follow a fall in incomes, this takes place at the cost of the assets of the company. The 'consumption' of company assets is made possible by the fact that during the time of crisis sales fall, releasing some circulating capital that is consumed. However, after a rather short time the retail merchant or craftsman considerably reduces his consumption, for otherwise he would risk losing his source of livelihood. During the business upswing the rise of consumption again lags behind, for now it becomes necessary to fill in the gaps made in company assets in the previous period, the more so as with the increase in sales there is a greater need for circulating capital.

Do these adjustment processes of the lower-middle class suffice to explain such a considerable shift of the consumption curve in relation to that of industrial production in Poland? Let us examine this question in some detail. For this purpose let us first estimate the total value that was added to expenditure for consumption from 1929 to 1933 in connection with the lag of this expenditure in relation to current incomes, as well as the total value of the working capital of the lower-middle class in 1929. These estimates will clearly show whether the lower-middle class had in fact sufficiently large financial reserves to delay decisively changes in consumption.

We again draw Fig. 33, with the difference that for the ordinates of the consumption curve we now take not the indices related to the base-year 1928 = 100, but the values of half-yearly consumption calculated at 1929 prices (in Zl.billion).[3] The industrial output curve, drawn with the same amplitude as the consumption curve (as in Fig. 33), represents consumption from current incomes. It then becomes clear that the shaded area in Fig. 35 represents the sum of excess spending over incomes in 1929–33 because of the delay in changes in consumption. The equivalent of this area amounts to about Zl.2 billion (at 1929 purchasing power). If it is assumed that

[3] Here also we use the findings of our study on social income; see M. Kalecki and L. Landau, *Social Income in 1933*, this volume.



A—industrial output; *B*—consumption (internal consumption of the countryside excluded)

FIG. 35. *Industrial Output and Consumption in Poland, 1927–1934 (half-yearly data; 1928 = 100)*

of the three-quarter lag of the consumption curve approximately half a year has been caused by the lower-middle class, we find that it supplemented its current consumption by about Zl.1.3 billion (at 1929 purchasing power).

Now we shall roughly estimate the working capital of the lower-middle class in 1929. According to the estimate of the ISBCP, the value of total consumption in 1929 was Zl.15.3 billion, of which nearly Zl.2 billion was spent on services (housing, health care, servants, entertainment, etc.). Thus about Zl.13.5 billion was left for consumer goods sold by retail trade and the handicrafts. Assuming on the basis of rough estimates that the working capital of firms belonging to the lower-middle class (i.e. cash, stocks, consumer credit advanced) is equal on average to three to four months' sales of consumer goods of retail trade and the handicrafts, the total value of the working capital of the lower-middle class in 1929 may be estimated at nearly Zl.4 billion.

From these calculations it would follow that of the Zl.4 billion of working capital in the hands of the lower-middle class in 1929, Zl.1.3 billion, i.e. one-third, was consumed during the crisis. This conclusion does not seem improbable, the more so as one must obviously take into consideration that not only their own capital was consumed but also—as a result of insolvency—the capital of their creditors.

This process lasted from the middle of 1929 to the middle of 1933. Hence the consumption of capital began when industrial output declined sharply for the first time, in the autumn of 1929, and ended

in 1933, when output—in the second half of that year—began to rise, while consumption was still declining.[4]

These comments are far from final, since the grounds for this are too weak. Rather, their intention is, first, to show how the observed time-lag between fluctuations of industrial output and of total consumption can be explained and, second, what impact the distinct features of Poland's economic structure as a semi-capitalist system—in contrast to highly developed capitalist countries—may exert on this lag. It would be highly desirable to compare fluctuations of industrial output in the highly industrialized countries on the basis of similar or other data on consumption (e.g. suitably collected data on sales in retail trade). This would shed some light on the mechanism of the business cycle. However, such studies must be based on more extensive statistical information than that published so far (comprehensive consumption indices are not yet published), and thus they can be carried out only by the statistical offices of the countries concerned.

[4] The crucial nature of 1933 allows one to conclude that in the end the consumption of capital and its replenishment in that year approximately were in balance, and hence the consumption of the lower-middle class differed little from its incomes; this assumption was taken in the study on the social income in Poland in 1933 (see M. Kalecki and L. Landau, *Social Income in 1933*, p. 455, this volume).

An Estimate of Social Income in 1929 [1] (with Ludwik Landau) (1934)

Contents

I. The Notion of Social Income and Methods of its Estimation

1. The Notion of Social Income

This essay attempts to estimate the social income in Poland. Since the notion of social income is neither precisely defined, nor always used in the same sense, it is necessary to make it clear how the notion will be used in this essay.

The notion of income is strictly linked with that of productive activity: income is its result. In the course of production processes goods and services are manufactured which are used for further processing or consumed by the population, or neither reprocessed nor consumed. The first category we regard as a transition stage in the process of generating income. By income we understand the total value of goods and services of the two other categories, both consumed (consumed income) and not consumed (accumulated income, or the accumulation of capital). Accumulated income consists of: (i) investments, i.e. manufacturing of capital goods (all sorts of productive equipment, means of transport, houses, and installations); (ii) increase in stocks of raw materials and semi-finished and finished products (of producers and in trade); (iii) exports of goods and services (exports of products and transport services, etc.). By exports we obviously understand the surplus of exports of goods and services over imports, since an exchange of some goods for others does not change the value of income. If there is an import surplus, this means that the investments made, or the increase in stocks, have taken place at the cost of production received from abroad and the value of accumulation should be reduced by this import surplus.

In this approach accumulation is defined as gross accumulation and is generally corrected for capital depreciation; thus not investments as a whole are used to calculate accumulation, but only their excess over the necessary amortization of existing equipment. This is similar to the notion of individual income, in calculation of which amortization is deducted. The analogy between social income and individual incomes cannot be used without reservations, however. As Kuznets notes, the consistent use of the principle of deducting amortization would result in an ever greater limitation or even complete elimination of the notion of social income: individual components of consumption, or even consumption as a whole, can be regarded as replacement of the productive capacity of those employed in production.[1]

While the notion of amortization is not without fault in theory, in practice its use encounters tremendous difficulties, since both the estimation of the value of depreciated capital and the determination of the amortization rate are very complex and largely depend on arbitrary decisions of the person making the estimate. In the conditions of Poland, where adequate data on national assets and industrial capital are missing, an estimate of what is needed to replace the used up capital would be more arbitrary than elsewhere. Thus no attempt is made here to estimate the value of amortization, which is included in accumulation, and thus, in the final analysis, what can be called a gross social income is calculated.

The notion of production includes both goods and services; this principle is commonly accepted in present-day calculations. Doubts and differences of opinion appear, however, in limiting the notion of production in another direction, i.e. to goods and services produced for the market. On the one hand, it is clear that estimates of the social income lose any real meaning with the inclusion of such components as, for example, the value of women's work in the household, the valuation of income takes place through the market mechanism and only income that passes through the market can be evaluated objectively. On the other hand, there are kinds of productive activity that partially or in some cases turn out products for the market, and in other cases generate products that are used in the household of the producer. In production of this kind exceptions of varying degree and scope are made from the principle of estimating the social income limited to cash income alone.

These exceptions chiefly concern agricultural production. Part of it, largely food, is marketed, and part goes for consumption in the producers' households. Owing to the tremendous role of food in overall consumption, if in estimating the incomes of farmers their

[1] See S. Kuznets, 'National Income', in: *Encyclopaedia of the Social Sciences*, vol. ix, London, Macmillan, 1933: 205–24; this paper was made available to us in manuscript by the author.

production of food for use in their households was not accounted for, this would make comparisons of farmers' incomes with those of other groups of the population, as well as comparisons of incomes in countries with different shares of agricultural population (*inter alia*, of Poland against those of industrialized countries) fail to give any meaning to the relations of the respective standards of living, or the differences in the level of prosperity. On the whole, if we confined ourselves to cash income, it would none the less lead to this difficulty; however, in some cases differences between groups of the population or between countries concerning the relation of cash income to income internally consumed in the household are not very significant. Consequently, we decided to include in our calculations the incomes of farmers consumed in their households making, however, a clear distinction between their cash income and their income in kind (or, more precisely, only a part of their income in kind).

Public services are a special category of output. We have in mind services of the central government administration (and, to a lesser extent, of local governments) provided to the public without special charges and financed from taxes. This is a specific kind of income because paying the cost of producing government services is compulsory and completely unrelated to using them (taxpayers by no means make use of government services in proportion to taxes they pay), whereas goods and services generated in every productive activity are purchased and become someone's property depending on the free decision of the purchaser and in exchange for paying their price.

The compulsory nature of consumption of services also applies to some other kinds of income—for example, to services provided by health insurance companies—but as a rule the groups of the population using these services are clearly identified. On the other hand, the impersonal nature of government services creates difficulties in determining who actually gets the income generated by public administration. The often used approach of identifying the paying of taxes with the purchase of government services is very artificial.

Hence, government services must be treated as income of a special kind that cannot be assigned to particular groups of the population; this is the income of society as a whole, and this is how it will be treated in our calculation. Moreover, only a part of public services will be considered here, namely educational services. This is in line with our general concept that we regard as income only the products manufactured in the last phase of production. Most public services

should be treated, however, rather as a means of creating the conditions for the production of goods and services, i.e. as the cost of their production. Thus only educational services that represent the closest analogy to other services acquired by the population (apart from government investments that contribute to increasing capital assets on a par with private investments) will be included in our estimates.

Such notion of social income is entirely consistent with the notion of the social income produced. In that notion the often made correction of social income through the inclusion of relations with foreign countries is not considered, that is, incomes from abroad are not added and incomes owed abroad are not subtracted in our estimates. Such corrections have been made, for instance, in England (in estimates by Bowley and Stamp, and by Clark);[2] apart from goods produced at home, these corrections also consider goods received for money owed from abroad, which obviously has special importance for creditor countries. For the debtor countries, however, our approach is more convenient as it includes in income also the sums owed abroad.

It follows that, although we are not concerned with property rights in estimating the volume of the produced social income, obviously they are of critical importance in examining income distribution. So, first of all, we have the share of foreign countries in the social income; this share is determined by the sums owed abroad for various reasons, as a rule chiefly for repayment of the previously received credits (e.g. interest payments), or for foreign capital shareholding in home industries (payment of dividends, profits, etc.), and for war reparations, etc. Only after subtracting this share from total accumulation of capital do we get domestic capital accumulation that is the property of the country (of the government and of private persons). If there were no changes in foreign indebtedness, the share of foreign countries would always be equal to export surplus of goods and services; with changes in debts and liabilities this share can increase (with increasing indebtedness of the country) or decrease (with diminishing indebtedness). The volume of investments and increase of stocks have to be adjusted by changes in foreign indebtedness in order to obtain the volume of domestic capital accumulation in the above sense; obviously, accumulation in this sense could turn out to

[2] See A. L. Bowley and J. Stamp, *The National Income 1924*, Oxford, Clarendon Press, 1927; C. Clark, *The National Income 1924–1931*, London, Macmillan, 1932.

be negative. A further division of social income between public and private incomes, and the division of private incomes among particular groups of the population, also requires consideration of changes in mutual indebtedness.

Besides determining which goods and services will be included in our notion of social income and assigned to particular groups in its distribution, we have to decide the prices at which these goods and services will be calculated in our estimate. The rule most commonly used and the easiest to carry out is to estimate income at retail prices, i.e. at prices paid by the consumer for the goods and services produced. In estimation of accumulated income prices paid by the investor or prices paid by the exporter at the frontier are used. In what follows this approach will be used as consistently as possible and therefore it will be applied not only to cash income but also to the part of internal income accounted for in our calculation, i.e. the income of farmers consumed in their own households. For only then is the goal achieved of including these incomes in the estimate, and thus securing their commensurability with cash incomes. Apart from this, the use of prices paid by the final consumer results from the accepted method of estimation of social income.

2. *Methods of Estimation*

Social income can be estimated by three methods, depending on the stage of economic processes in which income is examined: when it is generated in the course of productive activity, or when it is assigned to individuals as remuneration for their role in production, or, finally, when it is used for consumption or accumulation. In other words, calculation of social income can be made: (i) by adding up the value of all kinds of output, which obviously can be done only for the value of net output, i.e. for the surpluses of the value of goods and services produced over the value of materials used; these values equal the sums of labour, capital costs, and profits in the production process; (ii) by adding up incomes of individuals, leaving out payments that were received not as remuneration for participation in production (such as wages, interest, profits), but which were appropriated from other persons—for such payments reduce the incomes of other individuals (for instance, pensions cannot be counted as incomes without deducting the corresponding contributions from incomes that have been reduced for this purpose); and (iii) by adding up the values of goods

and services that were consumed or saved (in the form of investments, increase in stocks, or claims on foreign countries).

In principle all of these methods should lead to identical results, for the sum received as individual income (method (ii)) debits the production costs of some goods or services (method (i)) by the appropriate amount, and is used for consumption or set aside as savings (method (iii)). Only payments received by reducing other incomes, i.e. without providing services of any kind in exchange, do not enter into production costs and can finance consumption or savings only at the expense of reducing the consumption or savings of another person (in each of these methods government services and the share of foreign countries in the social income require special treatment, according to the accepted notion of social income).

The kind of available statistical data, whose completeness in one area or another is in turn a consequence of the economic and social structure of a country, determines the choice of the method of estimating social income. Thus we should look at the possibility of using each of these methods with the specific Polish conditions taken into account.

The method of estimating social income by adding up the value of output assumes adequate output statistics. As a rule, such statistics exist everywhere—also in Poland—for industrial output, though with the reservation that while the Central Statistical Office provides relatively extensive information on the value of gross industrial output (not without gaps, however, for instance, in construction), there are only very scanty data on raw materials used. Since in output reports products destined for final buyers are combined with products sold for further processing, it is difficult to determine on this basis the value of net output. Moreover, in the case of agricultural output statistical information is inadequate, and in small industry and handicrafts (together with homework) there are no statistics at all (except for the indices of doubtful value, obtained in the course of assessment of tax liabilities by the fiscal authorities). A similar situation appears in the statistical data for other countries, but in the developed capitalist countries these fields of production are of incomparably less importance than in Poland, which is a semi-capitalist country.[3] Finally, it should be added—and this also applies to other countries—that it is difficult to estimate the value of services

[3] See L. Landau, *The Occupational Structure of Population in Poland as a Basis for Examining the Structure of the Economy*, p. 19.

(commercial, transport services, and various personal services), although they play a very important role in the social income. For all these reasons we do not consider this method of estimating the social income in Poland as appropriate. This method was used in Poland by B. Dederko but in our opinion the results were not satisfactory.[4]

The method of estimation by summing up individual incomes is often used on the basis of data received in assessing income tax liabilities. The difficulties with this method stem chiefly from the lack of data on incomes below the 'minimum level of existence', which are not liable to tax, and in differences between the actual incomes of taxpayers and their declared income, which serve—after eventual revisions—as the basis for tax assessment. There is obviously a tendency to underreport actual incomes (differences between the notion of income for tax assessment and the notion used in calculating the social income generally play a less important role). The existence of similar statistics on payments to social insurance agencies makes it possible to overcome partially the first difficulty (these statistics also cover the lowest income brackets but only of hired employees for whom insurance is compulsory).

The smaller the role in the social income of low incomes of transfer nature (i.e. incomes other than from hired work), and the smaller the inaccuracies in tax declarations, the better the results that can be obtained with this method. In this respect the situation in Poland is less favourable than in most Western countries. The lower-middle class, whose incomes are the most difficult to evaluate by this method, plays a dominant role in Poland. Moreover, the differences between actual and declared incomes are large because of the rather recent introduction of income tax, the low standard of living of large groups of taxpayers, etc. Although J. Wiśniewski was able to use these statistical data to study the distribution of social income according to the level of incomes (see ISBCP *Studies*, vol. iii), this was possible only because there was an independent estimate of the total social income that had been made by a different method, and which enabled him to make corrections in the tax data.

The method of estimating the social income by calculating its use for consumption and accumulation also encounters difficulties due to

[4] See B. Dederko, 'The Social Income of Poland', *Kwartalnik Statystyczny*, 9/2 (1932), 135 ff. (in Polish); in particular the production of services was inadequately considered in this estimate.

a lack of statistical information, and therefore is seldom used in practice. While estimating accumulation is relatively simpler (investment activity, which is its chief component, has already been estimated in the papers of the ISBCP),[5] data on consumption of various kinds are especially difficult to obtain. Moreover, the possibility of using the representation method helps to overcome these difficulties and is an argument in its favour. The representation method always gives good results in examining the structure of consumption, since once the structure has been determined the data on a certain part of consumption suffice to estimate all of it. This method has been used in the present study.

In order to calculate the social income three of its basic components have been distinguished: income consumed by the non-agricultural population, income consumed by the agricultural population, and accumulated income.

Income consumed by the non-agricultural population, i.e. consumption in cities, was estimated by examining the structure of consumption from the data on household budgets of blue-collar and white-collar workers' families.[6] Though they cover only part of incomes (i.e. those of hired workers), these data can be regarded as representative of the total urban population because different levels of affluence and different ways of life are represented in this group, and there is no reason to assume that the nature of consumption of hired workers differs from the pattern of consumption of earners of the same incomes who work in their own firms and shops. An estimate of consumption of the non-agricultural population was made on the basis of the structure of consumption determined in this way and on the data on consumption of some selected goods in cities.

In the consumption of the agricultural population we distinguish consumption of articles that pass through the market and consumption of articles produced at home; as we already mentioned, the estimate of the latter can only be approximate. The distinction between the two kinds of consumption was based on studies by the Department of Economics of Small Farms of the Puławy Institute,[7]

[5] See Annexe 5, this volume.

[6] See *Statystyka Polski*, Warsaw, GUS, 1 (1930); 2 (1933) and *Statystyka Pracy*, 11/4 (1932), 345 ff.

[7] See *Badania nad opłacalnością gospodarstw włościańskich w roku gospodarczym 1927/28 (od 1 lipca 1927 do 30 czerwca 1928)* [Studies of the Profitability of Farms

but the representative groups of farms were defined independently in our estimate, since it was clear that none of the averages from the data of the Puławy Institute has such a nature.

The estimate of income accumulation was based on the above-mentioned earlier study, with only certain additions made to account for forms of accumulation other than investments.

More differentiated methods were used to estimate the incomes of particular groups of the population to determine the distribution of social income. Especially for a large part of the population, namely for hired workers, the method of adding up data on individual incomes was used (a description of this method is given in ISBCP *Studies*, vol. ii). The use of different methods to estimate the incomes of individual groups of the population made it possible to control to some extent (but not entirely) the results of calculation of the total social income.

1929 was taken as the base-year of our study. We decided on this chiefly for technical and statistical reasons: the greatest abundance of data exists for this year. On the one hand, this is the last year for which the Central Statistical Office investigated the budgets of workers' households and, on the other hand, this is the first year for which there exist adequate data related to earned incomes (e.g. the data on insurance of white-collar workers, which provide information on the incomes of this group of the population, were not introduced until 1928). Also, the earlier calculation of investment activity in Poland, the results of which are used in the present study, referred to 1929.

It should be remembered, however, that 1929 was a year in which incomes, production, and prices recorded high levels. Calculations for subsequent years based on the estimate presented in this essay will be done by the Institute for the Study of Business Cycles and Prices later on.

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in the Economic Year 1927/28 (from 1 July 1927 to 30 June 1928)], in *Biblioteka Puławska. Seria prac społeczno-gospodarczych*, 20, Warsaw, Państwowy Instytut Naukowy Gospodarstwa Wiejskiego, 1930; *Badania nad opłacalnością gospodarstw włościańskich w roku gospodarczym 1928/1929 (od lipca 1928 do czerwca 1929)* [Studies of the Profitability of Farms in the Economic Year 1928/29 (from 1 July 1928 to 30 June 1929)], in *Biblioteka Puławska*, 29, Warsaw, 1931 and 1932; *Badania nad opłacalnością gospodarstw włościańskich w roku gospodarczym 1929/30 (od 1 lipca 1929 do 30 czerwca 1930)* [Studies of the Profitability of Farms in the Economic Year 1929/1930 (from 1 July 1929 to 30 June 1930)], in *Biblioteka Puławska*, 32, Warsaw, 1931 and 1933.

II. Estimate of the Total Social Income

1. Consumption in Cities

The estimate of total consumption in cities is based on data on consumption of some important articles and on budgets of blue-collar and white-collar workers. To illustrate the method of estimation, we first look at how it is used in a simplified hypothetical case.

Let us assume that in the family budgets of blue- and white-collar workers of varying degrees of affluence, representing entirely different ways of life, the share of consumption of some particular article, X, in total consumption fluctuates within rather narrow limits. One can then assume that in the total consumption in cities the share of consumption of this article also differs little from the average share of its consumption in individual family budgets, x. If we now know the value of total consumption of this article in cities, we can find the value of total consumption in cities by dividing it by this average. This argument can be expressed formally as follows. Since the share in individual family budgets, x, differs little, there is an approximate relationship

$$ax = 1, \tag{1}$$

where a is the reciprocal of the average share x. It can be assumed that this relationship will also hold approximately for the share of consumption in cities of a given article, X_0, in the value of total consumption in cities, which we denote by Z: $a\,(X_0/Z)$. From which we get

$$Z = aX_0, \tag{2}$$

and since we know the value of consumption in cities of a given article, X_0, we have also determined the value of total consumption in cities, Z.

As a rule, there is no article whose consumption in individual family budgets is constant. However, let us assume that we know the total consumption in cities of any two articles, X_0 and Y_0, whose shares in particular categories of family budgets are accordingly

$$x_1, x_2, x_3, \ldots$$

and

$$y_1, y_2, y_3, \ldots$$

Let us further imagine that we have managed to select two constant coefficients a and b, such that $ax + by$ for all family budgets deviates relatively little from 1, i.e. there is an approximate relationship

$$ax + by = 1, \tag{3}$$

similar to the relationship as in equation (1). We can then assume that this relationship will also hold approximately for the shares of consumption of the given articles in total consumption in cities, equal to X_0/Z and Y_0/Z

$$a\,(X_0/Z) + b\,(Y_0/Z) = 1.$$

Hence, we get the equation

$$Z = aX_0 + bY_0, \tag{4}$$

which is similar to equation (2). We still have to consider whether and how one can find two constant coefficients, a and b, such that $ax + by$ for all family budgets deviates little from 1.

Generally speaking, if, for instance, x represents an inelastic need (bread), and y a more elastic need (meat, clothing, etc.), the average share of x will decrease with the affluence of the budgets concerned, while the share of y will increase, or it will decrease more slowly than x. This means that x and y remain in an approximately weak functional relationship, whose expression will be met in the first approximation, chiefly because the functional relationship is weak and because the function that precisely reflects this relationship is not necessarily linear.

Now to find the values of a and b for which the relationship $ax + by = 1$ will be fulfilled as closely as possible we use the least-squares method; thus, we impose the condition that the sum of squares of deviations $ax + by$ from 1, i.e. the equation $\Sigma\,(ax + by - 1)^2$ reaches a minimum for the sought values of a and b. The measure of accuracy of the equation $ax + by = 1$ will be the coefficient of variability,

$$\sqrt{\left(\frac{\Sigma(ax + by - 1)^2}{n}\right)},$$

where n is the number of categories of family budgets considered.

Using this method, we now have to calculate consumption in cities in 1929. We denote by x the share in the family budget of expenditure on bread, flour, cereals, and peas, and by y the share of expenditure

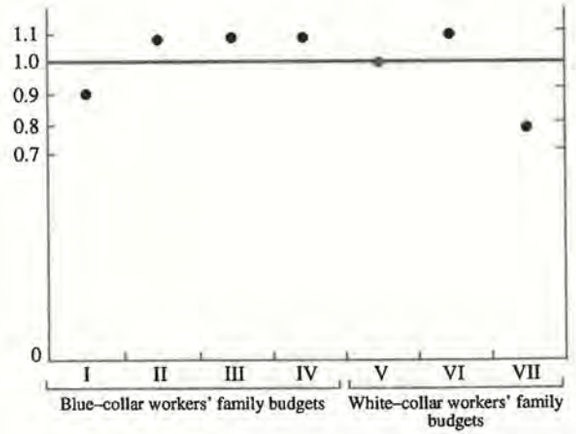

FIG. 36. *Value of the Expression $ax + by$ for Different Categories of Family Budgets in Poland*

on meat, fats (except for butter), and fish. From Appendix 1 we get the following relationships

	Category of affluence						
	I	II	III	IV	V	VI	VII
x	0.238	0.192	0.156	0.108	0.078	0.057	0.036
y	0.204	0.209	0.195	0.178	0.157	0.160	0.111

Using the least-squares method, for the constant coefficients a and b we get $a = -2.93$; $b = 7.85$.

For individual categories of family budgets the expression $ax + by$ will then look as follows (see also Fig. 36):

	Category of affluence						
	I	II	III	IV	V	VI	VII
$-2.93x + 7.85y =$	0.90	1.08	1.08	1.08	1.00	1.09	0.77

As it will be seen, a considerable deviation takes place here for category VII.[8] The coefficient of variability is 11.5%. According to

[8] It can be easily shown that this deviation will have a considerable influence on the precision of our estimate only when the share in the total consumption in cities of the most affluent part of the population, whose average standard of living corresponds to category VII, will not deviate significantly from the reciprocal of the numbers of the income categories examined here, i.e. from 1/7. From the results of

Appendices 2 and 3, the total value of consumption of bread, flour, cereals, and peas in cities is X_0 = Zl.1.2 billion, and the total value of consumption of meat, fats (except for butter), and fish is Y_0 = Zl.1.9 billion. Hence, from equation (4) we get the total value of urban consumption, Z

$$z = aX_0 + bY_0 = 2.93 \times 1.2 + 7.85 \times 1.9 = \text{Zl.11.4 billion.}$$

In subsequent chapters we shall further check this estimate.

As follows from Appendix 1, the shares x and y are not calculated in relation to total expenditures, but in relation to the sum of expenditures less taxes, insurance payments, and servants' wages. Therefore, the value of total consumption in cities calculated above, equal to Zl.11.4 billion, also does not include these expenses. Since, as it was noted in the introduction to this study (see p. 392), we do not regard the payment of taxes as the purchase of services, i.e. as part of consumption, corrections are not needed in this case. The same concerns insurance payments, except for medical benefits of the Health Insurance Fund, which are equivalent to bills for physicians' services (see p. 392 above). The value of these benefits (exclusive of welfare payments) made up 4% of net incomes of insured persons in 1929. Hence, if these services were not excluded from family budgets, our calculation would give a result 4% higher, i.e. Zl.11.9 billion. Moreover, according to ISBCP *Studies*, vol. ii (on wages in Poland), the total expenditure for servants came to Zl.0.3 billion and thus the corrected value of consumption in cities would be Zl.12.2 billion.

Regarding consumption of the richest groups of the population, it can be assumed that it is represented in our calculations only in so far as their ordinary needs are concerned and their consumption of such luxury goods as cars (expenditures for which came to Zl.0.06 billion in 1929—see Appendix 4), foreign travel (which absorbed Zl.0.16 billion), etc., was not included. Total expenditures of such a nature may be roughly estimated at Zl.0.3 billion.

Thus the total value of consumption in cities in 1929, luxury consumption included, amounts to Zl.12.5 billion.

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our further examination this share can be estimated at less than 20%. Thus no greater error will be made in our estimate on account of this deviation.

2. *Consumption of Industrial Products in the Countryside*

In the consumption of industrial products in the countryside one should distinguish between the consumption of the gentry and of the peasants. We can only roughly estimate the consumption of the former. We assume that the standard of living of a family of four of the gentry in 1929 is approximately Zl.1300 per month,[9] which is Zl.3900 per person annually, giving us their total consumption of Zl.0.7 billion for the population of 180 000.[10] Judging from the structure of the family budgets of the well-paid white-collar workers, on such a standard of living approximately 70% would be spent for industrial products, which means the total consumption by the gentry of non-agricultural products of Zl.0.5 billion. The lack of precision of this estimate will not invalidate our final results because of the relative insignificance of this consumption.

We begin our estimate of the consumption of the peasants by calculating the consumption in the countryside of sugar, and of clothing and footwear, which represent a very important part of the total consumption of industrial products of small peasant farms. The value of total consumption of sugar in cities and in the countryside in 1929 was Zl.0.58 billion (see Appendices 5 and 6), and of clothing and footwear Zl.3.3 billion, which makes together Zl.3.88 billion. If one can estimate the value of consumption of these articles in cities, by subtracting it from Zl.3.88 billion, one can find the value of consumption of these articles in the countryside.

The share of consumption of sugar, clothing, and footwear in the family budgets of blue- and white-collar workers is as follows:

	Category of affluence						
	I	II	III	IV	V	VI	VII
Sugar	0.045	0.044	0.041	0.036	0.031	0.028	0.017
Clothing and footwear	0.153	0.160	0.184	0.218	0.192	0.210	0.220
TOTAL	0.198	0.204	0.225	0.254	0.223	0.238	0.237

As will be seen, the shares of the value of total consumption of these articles in family budgets differ only slightly: the relation

[9] We get this number in our calculations of the standard of living of the affluent urban population (see p. 419 below).

[10] See L. Landau, *The Occupational Structure of Population in Poland.*

of the mean square deviation from the average (0.226) to this average equals 8.1%. Hence, it can be assumed with a large probability that the share of consumption of sugar, clothing, and footwear in total consumption in cities differs little from 0.226. This share is calculated for all consumer expenditures except for those on taxes, insurance, and wages of servants (see p. 402). The value of consumption in cities exclusive of this type of expenditure was estimated above at Zl.11.4 billion, from which it follows that the consumption of sugar, clothing, and footwear can be estimated at $11.4 \times 0.226 =$ Zl.2.56 billion. Subtracting this sum from the total consumption of these articles in Poland, which was estimated above at Zl.3.88 billion, we get Zl.1.32 billion for their consumption in the countryside. Again, from family budgets of the well-paid white-collar workers we can estimate the consumption of the same articles by the gentry at 30% of their consumption of industrial products, which we assumed above to be Zl.0.5 billion; hence it is $0.5 \times 0.30 =$ Zl.0.15 billion. This leaves Zl.1.17 billion for the consumption by peasants of sugar, clothing, and footwear.

From the data of the Institute of Rural Economy in Puławy it follows that 51% of total consumer spending of small farmers for industrial products goes for sugar, clothing, and footwear.[11] Hence, consumption of industrial products (consumption in the strict sense, i.e. excluding tools and auxiliary materials) by this group of the population can be estimated at $1.17 : 0.51 =$ Zl.2.3 billion. It should be noted that this figure also includes the consumption of industrial products by farm-hands, which, judging from the relation of their number to that of the total rural population, consume industrial products amounting to nearly Zl.0.2 billion. This gives Zl.2.1 billion for small farmers.

Hence, the value of consumption of industrial products in the countryside would amount to Zl.2.8 billion, of which Zl.0.5 billion is for the gentry, Zl.0.2 billion for farm-hands, and Zl.2.1 billion for small farmers (together with their hired help).

We shall now check the above estimate of consumption of industrial products in the countryside by examining the data on incomes. The weak point in all income and expenditure balance-sheets of the countryside is the inflow of capital from the cities and

[11] For details of the calculation, see note b to Table 102, p. 410.

the payment of debts and interest by the countryside, i.e. financial flows for which there is no statistical information. To avoid this difficulty, we shall check only the consumption of industrial products by small farmers (estimated above, exclusive of expenditure on tools and auxiliary materials, at Zl.2.1 billion), since in this case one can assume that the above-mentioned flows of capital are insignificant.

We begin our calculations with testing the following thesis. The total expenditure of small farmers on industrial products—both for personal consumption and production—and on taxes, corresponds roughly to the value of all agricultural products sold to cities (or for industry) and for export (except for the sales of grain and beet). Indeed, on the one hand, the grain surpluses, of small farmers taken as a whole are relatively small in comparison with their sales of animal husbandry products, vegetables, and fruit. On the other hand, the share of owners of large farms in the sales of animal husbandry products, vegetables, and fruit is also rather small. Consequently, the difference between the sales of grain and beet of small farmers as a whole and the sales of other products by large farms can be regarded as insignificant, and it may be argued that what the peasants as a whole receive from the sales of these products corresponds in the first approximation to the value of all products sold by the countryside 'to the outside', except for the sales of grain and beet. If we now neglect the flows of capital between small owners and the cities (see above), we find that the outlay of peasants for taxes and industrial products of all kinds is also approximately equal to the value of animal husbandry products, vegetables, and fruit sold by the countryside 'to the outside'.

In the above calculations incomes of small farmers from work on landed estates, forests, etc. were not included in their revenues. However, these incomes are relatively small, and they can be counterbalanced on the expenditure side by small expenditures of small farmers on fodder.

We must now calculate total proceeds obtained from the sales of animal husbandry products, vegetables, and fruit to cities and for export. First of all, we shall determine the consumption of these products in cities. From Appendix 1 we can calculate the shares of expenditure for food, except for bread and sugar, in the family budgets of blue- and white-collar workers; these shares are as follows:

	Category of affluence						
	I	II	III	IV	V	VI	VII
Food, except for bread and sugar	0.382	0.390	0.362	0.335	0.346	0.331	0.242
of which meat, and fish	0.204	0.209	0.195	0.178	0.157	0.160	0.111

It will be noted that the share of expenditure on meat, fats, and fish in total expenditure on food, except for bread and sugar, differs little for the individual categories of affluence. The respective rations are as follows:

	Category of affluence						
	I	II	III	IV	V	VI	VII
Ratios	0.534	0.536	0.539	0.531	0.454	0.482	0.460

Thus it can be confidently argued that the ratio of the total consumption of meat, fats, and fish—estimated at Zl.1.9 billion (see Appendix 3)—to the total urban consumption of food (except for bread and sugar) differs little from the average of ratios for individual categories of family budgets. This average is 0.505 and thus we can estimate the value of consumption of food in cities, except for bread and sugar, at 1.9 : 0.505 = Zl.3.8 billion. Along with domestic animal husbandry products, vegetables, and fruit, this sum represents also food imported from abroad. Total imports of food in 1929, inclusive of customs duties, was about Zl.0.5 billion, which in terms of retail prices gives approximately Zl.0.7 billion. After subtracting these imports from Zl.3.8 billion, we get Zl.3.1 billion for urban consumption of domestic animal husbandry products, vegetables, and fruit, all at retail prices.[12] As it follows from the study discussed in Appendix 7, the share of agricultural producers in this consumption is 65%, i.e. Zl.2.0 billion. Next, the value of exports of animal husbandry products, vegetables, and fruit—after deducting the estimated profit margin for the processing of meat, dairy produce, and the exporter's profit margin—can be estimated at Zl.0.5 billion. Consequently, the total sum obtained by agricultural producers from the sale of these products would be Zl.2.5 billion.

Considering the above, this sum should tally roughly with the expenditure of small farmers on state and local taxes, which totals

[12] In fact, only the urban consumption of imported food should be subtracted here, but the consumption of imported food in the countryside is so insignificant that neglecting it does not distort our calculation.

Zl.0.1 billion, plus the consumption of industrial products, estimated above at Zl.2.1 billion, plus the purchases of industrial goods for productive purposes, estimated in Appendix 8 at Zl.0.4 billion, which gives together Zl.2.6 billion. The agreement between these two numbers can be regarded as entirely satisfactory.

3. Consumption of Government Services

In the previous calculations of consumption government services have not been considered. In line with our argument on p. 393, only government educational services are included here, and according to the budget data their value in 1929 was about Zl.0.4 billion.

4. Gross Accumulation of Capital

After estimating the consumption in cities and in the countryside the value of capital accumulation must be determined. As was pointed out in the introduction, gross accumulation of capital, i.e. without deduction of amortization, is taken into account here. This accumulation includes: (i) investments in the sense of production of capital goods for the replacement and expansion of fixed capital; (ii) increase in stocks; and (iii) the foreign-trade balance of goods and services.

Investments in 1929 have been already estimated by the Institute for the Study of Business Cycles and Prices at Zl.2.26 billion.[13]

There is no statistical information that makes it possible to determine the increase in stocks in industry and trade as a whole in 1929. Where suitable data were available (textile products and iron), stocks showed no significant changes from the end of 1928 to the end of 1929. Therefore, in calculation of the accumulation of capital, changes in stocks for the army, i.e. the expenditures for reserve supplies for the Ministry of Military Affairs, were considered; in 1929 they came to Zl.0.15 billion.

In the balance of foreign exchange of goods and services we take into account the balance of trade equal to Zl.–0.49 billion (import surplus) and the balance of transportation services (shipments by rail, sea, etc.) equal to Zl.0.20 billion (the balance of tourist expenditures is insignificant). What is often regarded as other services has not been considered here. For instance, interest and dividends owed abroad

[13] See Annexe 5, this volume.

were not deducted since we regarded them as part of gross accumulation (see p. 393). Thus the balance of the exchange of goods and services in our sense in 1929 was $-0.49 + 0.20 =$ Zl.-0.29 billion.

The total gross capital accumulation in 1929 was thus as follows

(in Zl.billion):	
Investments	2.26
Increase in stocks	0.0
Reserve supplies of the Ministry of Military Affairs	0.15
Balance of foreign exchange of goods and services	− 0.29
TOTAL	2.12

which rounded off gives Zl.2.1 billion.

5. *Total Cash Income*

The above estimates enable us to calculate the total income produced, except for the internal consumption of the countryside, as the sum of consumption in cities and in the countryside, and of gross capital accumulation. The volume of this income (in Zl.billion) amounts to:

Consumption in cities	12.5
Consumption in the countryside	2.8
Government services in education	0.4
Total consumption	15.7
Gross capital accumulation	2.1
Total cash income	17.8

6. *Internal Consumption of the Countryside*

By internal consumption of the countryside essentially we mean consumption in rural households of articles produced by them. However, we expand this concept by including purchases of agricultural products by rural households, since in most cases these purchases are strictly local and confined to a given village.

Internal consumption is calculated at retail prices of particular goods (or craftsmen's wares processed from them) in cities, and not

at actual prices received by agricultural producers of these articles. Thus the value of a quintal of rye consumed on a given farm will be calculated not at the market price of rye, but it will be taken as equal to the value of bread baked from it, calculated at retail prices of bread in urban areas.

In this way comparability of the volume of real consumption in the countryside and in cities is assured; for if in the calculation of the 'income in kind' of the countryside prices received by agricultural producers were used, the same volume of real consumption (e.g. of a loaf of bread) would correspond to a much smaller value of consumption in the countryside than in the city.

Internal consumption of large landowners. Above we estimated the value of total consumption of the gentry at Zl.0.7 billion, of which Zl.0.5 billion was the consumption of industrial goods, so that the internal consumption of the gentry is Zl.0.2 billion.

Internal consumption of small farmers and farm-hands. From the data of the Institute of Rural Economy at Puławy we now estimate the average internal consumption per head of small farmers and their hired help. Since the standard of living of farm-hands, who are a small percentage of the total agricultural population, differs little from the standard of living of peasants, we can get the value of total internal consumption by multiplying this average by the total rural population (the gentry excluded) of 19.4 million.

Let us recall that the total consumption of industrial products in the countryside (excluding consumption of the gentry) was estimated above at Zl.2.3 billion, i.e. at about Zl.115 annually per head. Now, our method of estimating the average internal consumption in principle will be as follows. From the data of the Institute of Rural Economy at Puławy we selected two groups of farm family budgets in which the average consumption of industrial products per head in one group was more, and in the other less than Zl.115 (i.e. the average industrial consumption for small farmers as a whole). We can assume that the average internal consumption of small farmers as a whole is also between the averages of internal consumption of these two family budget groups. Since the difference in internal consumption per head in these two groups is insignificant, the total average internal consumption can thus be estimated with a close approximation.

As family budget groups mentioned above we selected a group of ninety-farms from various regions of Poland of an area of 3–5

Table 102. *Structure of Expenditure in Selected Types of Farm Family Budgets in Poland, 1927/28 (in zloty)*[a]

Groups of farms	Value of annual per head consumption		
	home-made products	purchased agricultural products	industrial products[b]
Farms in all regions of Poland of an area of 3–5 ha.	271	48	153
Farms in the Vilna province of an area of 5–15 ha.	278	21	74

[a] All calculations are for 1929. However, as there is no information on family budgets for 1928/9 and 1929/30 from the Vilna province, the data for 1927/8 will be recalculated at 1929 prices.

[b] In the first group of budgets Zl.78 is for sugar, clothing, and footwear, and in the second group, Zl.38. Hence the shares of these articles in the consumption of industrial products amount to nearly 51.0% and 51.4% respectively. Hence for the average share of consumption of industrial products, placed somewhere between the shares of these two family budget groups, we can take 51% (see p. 404 above).

hectares, and a group of twenty settlers' farms of 5–15 hectares in the Vilna province. Table 102 presents the data of the Institute of Rural Economy on consumption per head in these family budgets.[14]

Home-made products are calculated here at prices received by the agricultural producer. However, agricultural products bought by this producer are often already processed articles (e.g. one farm buys from another not the livestock but meat), and consequently these purchases are calculated at prices that lie between the prices received by agricultural producers and the city retail prices. According to our earlier argument (see p. 394), the value of both home-made products and agricultural products bought by farmers is recalculated at city retail prices. Since the share of agricultural producers in the value of food at retail prices is 0.65 on average (see Appendix 7), we get the value of these products at retail prices by dividing the value of home-made products by this ratio; it comes to Zl.417 for the first group of family budgets and Zl.428 for the second. To the agricultural products bought by farmers we apply a share coefficient between 0.65 and 1, i.e. 0.83, and get Zl.58 and Zl.25 respectively. In this way for the total internal consumption (in our sense) we get 417 + 58 = Zl.475 for the second group of family budges.

[14] The Institute of Rural Economy gives consumption per adult. On the basis of the age structure of the rural population, the coefficient 0.87 was taken for conversion of this consumption into consumption per head.

It will be noted that industrial consumption per head in the first family budget group (Zl.153) is higher than the average total consumption of industrial products in the countryside (Zl.115), and industrial consumption in the second group (Zl.74) is lower than this average. The difference in internal consumption (Zl.474 and Zl.453) is not significant. Hence, with a high degree of probability we can accept Zl.465 as the average internal consumption of a small farmer.

Our calculations were made for 1927/9, in which the price index of agricultural products was 15% higher than in 1929. Thus average internal consumption at 1929 prices would be 465 : 1.15 = Zl.404. Since the standard of living of small farmers in 1929 differed little from that in 1927/8 (in 1929 prices of crops and dairy products fell, but prices of animals rose, and harvests of grain and sales of animal husbandry products increased), this figure can be accepted as the approximate average value of internal consumption in 1929. Multiplying it by the number of the rural population (19.4 million), we estimate the value of total internal consumption at Zl.8 billion.

Hence, according to our estimate, *the total internal consumption of the countryside* is Zl.8 billion for small farmers and farm-hands and Zl.0.2 billion for the gentry, giving a total of Zl.8.2 billion.

7. Total Value of Social Income

In this way we first got the value of cash income, equal to Zl.17.8 billion, and next the value of internal consumption of the countryside (at city retail prices) equal to Zl.8.2 billion. Thus the total value of social income can be estimated at Zl.26.0 billion. It should be noted, however, that our estimate of internal consumption is based on much more shaky grounds than our calculation of the cash income.

III. Distribution of Income according to Social Groups

1. General Comments

Now we turn to determining how total social income in Poland in 1929 was distributed among the major social groups. We shall calculate this distribution separately for income consumed and income accumulated. In the distribution of consumed income we consider the following basic social groups:

1. Hired employees of all kinds, i.e. (i) white-collar workers, (ii) blue-collar workers in industry, transportation, commerce, and handicrafts, as well as servants and clerks of lower categories, and (iii) hired workers (pensioners are included in the number of the actually hired employees).

2. Lower-middle class, i.e. craftsmen, merchants, etc., working in their own small shops.

3. Small-scale landowners, i.e. farmers owning small and average farms of an area up to 50 hectares.

4. Affluent groups of the population, i.e. industrial and large-trade entrepreneurs, owners of large firms, professionals, large landowners, rentiers, etc.

Regarding the accumulated income, in its distribution we consider the share of all of these groups together, but the shares of the central government, local governments, and of foreign countries will be separated.

The distribution of the consumed income tells us about the differences in the average standard of living of particular groups of the population resulting from the distribution of incomes. We shall investigate this distribution by determining the consumption of the working population, the lower-middle class, and the small farmers. The consumption of the affluent groups of the population will be estimated as the difference between total consumption and that of these groups. A certain difficulty arises here, however: whereas for small farmers we already estimated direct data on their consumption, for hired workers and the lower-middle class we can calculate only their incomes. Yet, it may be argued that as a rule the incomes of hired employees and the lower-middle class differ little from the value of their consumption.

Savings in the form of investments in their own shops are insignificant in the handicrafts; they were also small in 1929 in retail trade, and they do not exist at all in the case of hired employees. Consequently, the possible form of savings were deposits in credit institutions, granting of private loans, the purchase of stocks and bonds, and the construction of apartment houses.

The increase of savings deposits in communal savings banks, in PKO (Popular Savings Bank), and in other banks, as well as in credit co-operatives, was about Zl.0.20 billion in 1929. A considerable part of this increase must be attributed to institutions of public law (e.g. social insurance agencies) and to the affluent group of the population

(in the form of personal deposits or the deposits of their enterprises). For instance, at the end of 1928, of the sums saved on deposit accounts (listed according to categories of owners) in communal savings banks were: craftsmen, workers, clerks, and pensioners, 30% share; farmers, businessmen, independent merchants (hence largely of the affluent group of the population), 57%; and corporate bodies, 13%. Thus it appears that in 1929 saving deposits of the lower-middle class and hired employees—which represent the chief form of savings, especially of hired employees—did not exceeded Zl.0.10 billion.

Concerning co-operative housing construction, the sums expended during the year did not exceed a dozen or so million zloty. Investments in small dwelling-houses are much more difficult to estimate, however.

On the other hand, we must take into account that these groups could make partial use in consumption and investments of the savings of other social groups—especially the lower-middle class, by owing money to the government (increase of tax arrears), but also hired employees by making use of consumer credit; in particular, instalment credit showed an increase in this period, and indebtedness no doubt rose. These factors offset a large part of the deposited savings.

Taking all of this into account, we can assume—without much departure from reality—that in the case of these two groups, the lower-middle class and hired employees, the income consumed is equal to their entire income.

2. *Consumption of Hired Employees*

Relatively speaking, we have the best statistical information about the incomes of hired employees. The presentation of this information, its scope, and way of using it for calculating the total value of incomes from hired employment is the subject-matter of of the ISBP *Studies*, vol. ii. Consequently, here we limit ourselves to outlining the methods of calculation and presenting the results.

Our estimate of incomes from hired work (excluding farm workers) is based chiefly on payments to various social insurance agencies. Income tax data (from wages and remuneration for hired work) could not serve as the basis for our estimate as they do not even

include all white-collar workers, and only a small part of blue-collar workers; consequently, these data were used only in part as supplementary information. Neither are statistics on all kinds of remuneration comprehensive enough to serve as the basis of calculations; these statistics were used especially in calculations concerning government employees.

Among various kinds of social insurance, health insurance, (notwithstanding its universal nature) was regarded as inconvenient as the main basis for our estimation, owing to lack of any separation between individual groups of insured employees. For this reason health insurance data were only used for checking the aggregate figures obtained from other sources.

Thus the following statistics were used for our estimates: (i) accident insurance data: for industrial workers and those employed in some other categories of enterprises; (ii) insurance policies of white-collar workers—for white-collar workers and government contract employees; and (iii) retirement fund payments (which are of the same nature as insurance payments) for full-time government employees.

The scopes of the first two sources of data partially overlap (white-collar workers in industrial enterprises, etc.); the double counting was eliminated with help of the remuneration statistics (industrial statistics on wages of blue- and white-collar workers). As was already mentioned, another source of information on government enterprises (especially on the railways, the post office, and the state-owned banks) were data on salaries in the budget information. Income tax data were used to correct the estimate of the wage bill of the best-paid category of white-collar workers.

Certain categories of hired work are not covered by these data, however. This refers especially to certain categories of workers (servants, workers in craftsmen's shops), and their incomes had to be determined on the basis of less accurate estimates.

We can best present the role of these various sources of information in our estimate in terms of relative shares of sums of incomes calculated on their respective basis in the total wage bill. These shares are as follows (in %):

Accident insurance data (after eliminating the double counting of white-collar workers)	36
Insurance policies of white-collar workers	16
Wages on railways, in the post office, in government forests, for the clergy, and in state-owned banks	15
Retirement fund payments of government employees	14
Income tax (on highest wages)	3
TOTAL	84
Estimates: for white-collar workers	2
for blue-collar workers	14

The estimate of wages of farm workers had to rely on more shaky grounds, namely on the 1921 census data for the total number of workers and on the 1921 census of large property for the number of farm workers employed on large land estates (with corrections to account for changes resulting from the breaking up of land estates, intensification of crops, etc.), on the data of the Central Statistical Office and of the National Council of Landowners' Organizations for the wages of farm workers in large land estates, and finally on data of the Puławy Institute for the number and cost of hired labour in peasant farms.

The control of these results against the sum of payments to health insurance agencies (after making necessary corrections, and especially after deducting payments of full-time government employees, all regular railway employees and most farm workers) gave satisfactory results. The incomes from wages of the basic categories of hired employees in 1929 calculated on these bases are as follows (in Zł. billion):

Incomes of white-collar workers	2.5
Incomes of workers (except farm workers), servants and clerks of lower categories	4.1
Income of farm workers	1.1

However, to make these indices consistent with our calculation of total social income, two corrections must be made. First of all, the incomes of farm workers were estimated according to the usual method of calculating part of wages in kind at local prices (i.e. at prices paid to agricultural producers). Now, in line with our argument on p. 394, this part of wages must be recalculated in terms of retail prices.

Regarding wages of farm workers employed on large country estates, in the basic category of such employees the allowance in kind (besides the value of provided housing) was about 80% of their

wages, and this part has to be recalculated at retail prices. However, in view of the higher share of cash in the remuneration of other categories of employees (e.g. tenant farm workers), we assume that wages in kind were only 70% of all wages. Assuming that the producer price is 62% of the retail price (of the basic product and of by-products), we get a coefficient for conversion of the value of wages at retail prices of 1.43. According to the data of the Puławy Institute, the payment in kind of farm-hands employed on peasant farms was about 60%; so in this case the coefficient is 1.37. Converting the respective wages of farm workers with these coefficients, we get Zl.0.59 billion instead of Zl.0.51 billion for farm workers employed on large country estates and Zl.0.81 billion instead of Zl.0.73 billion for farm-hands employed on small farms.

The second correction concerns changes in the gross purchasing power of hired employees, introduced by subtracting social insurance (or retirement) payments and income tax on the one hand, and by adding benefits from social insurance, and annuity and pension payments on the other. This correction also must be made for the sake of comparability with our calculation of total social income. For all groups of hired employees taken together this correction gave a total surplus of sums received by them of Zl.0.265 billion. Its distribution can be shown only roughly, although with sufficient accuracy for our estimate. The main part of the surplus, amounting to about Zl.0.22 billion, falls to workers (except farm workers), clerks of lower categories, and small sums for white-collar workers and farm workers.

After these corrections, the final estimate of incomes of the population living from hired work is as follows (in Zl.billion):

Incomes of white-collar workers	2.5
Incomes of workers (except farm workers), servants and clerks of lower categories	4.3
Incomes of farm workers	1.6

It should be remembered, however, that this population may obtain incomes from sources other than hired work. Whereas in the case of white-collar workers and workers in industry and trade these incomes cannot significantly alter our results, this reservation must be taken into account in the case of farm workers, among whom a considerable part are owners of tiny farms, placing them on the borderline between hired employees and owners of independent farms and obtaining incomes from both these sources.

3. *Consumption of the Lower-Middle Class*

By the lower-middle class we understand here craftsmen and small wholesalers and retailers, i.e. merchants purchasing commercial licenses of category III and lower. *Occupational Composition of the Population of Poland*[2] gives the figure of approximately 3.4 million for this group in 1929 (those economically inactive included). The direct estimate of the income of this group as a whole encounters insurmountable difficulties. It is possible to make a relatively good estimate only of the incomes of the lower-middle class occupied in the processing and sale of food, i.e. a group that makes up about one-third of the entire lower-middle class. Thus we have no alternative but to estimate the total incomes of the lower-middle class using the not unrealistic assumption that the average income per head of this class as a whole deviates little from the income of its 'food' subgroup.

Consumption of food in cities (except for sugar and bread) at retail prices was earlier estimated at Zl.3.8 billion (see p. 406). Bread consumption in cities was estimated at Zl.1.2 billion. Thus in 1929 total food consumption in cities (except for sugar) came to about Zl.5.0 billion. Appendix 7 shows that the costs of transportation, brokerage, and processing of food products by the self-employed constitute approximately 40% of their value at retail prices. A similar mark-up for groceries (which make up approximately 13% of the Zl.5.0 billion received) is about 30%. Consequently, Zl.1.93 billion of Zl.5.0 billion represent costs of transportation, brokerage, and processing of food. The total consumption of sugar in 1929 in the cities and the countryside came to Zl.0.58 billion and the mark-up for transportation and brokerage was 14%, which means that in this case the costs of transportation and brokerage amounted to Zl.0.08 billion. Thus Zl.2.0 billion may be taken as the total cost of transportation, brokerage, and processing of food. In order to separate from this value the incomes of the lower-middle class, we have to subtract from Zl.2.0 billion the costs of transportation, expenditure of the self-employed and merchants for wages, taxes, rents, etc., and the profits of larger merchants.

The revenues of the Polish State Railways from the transport of food in 1929 can be estimated (from the data for 1927 given by

the Polish State Railways before the 1929 tariff reform) at Zl.0.15 billion. Wages of the self-employed in food-processing we estimate at Zl.0.1 billion, assuming the number of workers employed in these shops at 50 000 and their average annual earnings at Zl.2000 (on the basis of the *Occupational Composition of the Population of Poland*).

The wage bill in trade was calculated as follows. According to tax statistics, the total number of firms in the food business was 180 000, and according to the 1921 census, each such firm employed 0.12 workers; this gives total employment of 22 000. We estimate their average annual earnings at Zl.1500, which gives a total wage bill of more than Zl.0.03 billion. We take the average rent for a store of Zl.700 annually (the vast majority are small stores), which for 180 000 stores gives Zl.0.13 billion.

From the tax statistics we estimate the tax liabilities of the self-employed in food-processing and merchants dealing in food at Zl.0.15 billion. We also assume losses from the wastage of goods at 3% of food sales, which gives us Zl.0.15 billion. Hence the total profits of the self-employed in food-processing and merchants dealing in food will be: 2.00–0.15–0.10–0.03–0.13–0.15–0.15 = Zl.1.29 billion.

From this sum profits of larger merchants should still be deducted. The number of business concerns of categories I and II has been estimated on the basis of tax statistics at about 5000. Assuming an average income of a larger merchant at Zl.1000–2000 per month, we get the total income of larger businesses of about Zl.0.10 billion. Thus a total income of about Zl.1.19 billion falls to the 'food' subgroup of the lower-middle class.

We must now calculate the size of this subgroup. Including professional purchasing agencies, the food business numbers about 200 000 enterprises. According to the 1921 census data, four persons earned their living from each enterprise. The number of self-employed in the food sector, their families included, was about 350 000 (see *Occupational Composition of the Population of Poland*). Therefore, the 'food' subgroup of the lower-middle class came to about 1.15 million people, and the average income per head was Zl.1.19 billion : 1.15 million = Zl.1030. Thus, according, to our initial assumption that the average income per head of the lower-middle class as a whole was the same as that of its 'food' subgroup, with a lower-middle class population of 3.4 million, we get a total income in 1929 of

1.03 × 3.4 = Zl.3.5 billion. In keeping with our argument on pp. 412–3, we assume that this income is entirely consumed.

4. *Consumption in Small-Scale Agriculture*

We have already estimated the consumption of industrial products by small farmers and farm workers at Zl.2.3 billion (see p. 404), and the internal consumption of these groups, calculated at city retail prices, at Zl.8 billion (see p. 411). The total income of farm workers was estimated at Zl.1.6 billion. Hence, the consumption of small-scale agriculture comes to 2.3 + 8.0 – 1.6 = Zl.8.7 billion.

5. *Consumption of Entrepreneurs and Professionals*

According to *Occupational Composition of the Population of Poland*, this group, which numbers more than 750 000, includes among the non-rural population large merchants,[15] businessmen, rentiers, and professional men (altogether more than 570 000), as well as gentry (about 180 000). Since consumption of workers (except farm workers) and white-collar workers was estimated above at Zl.6.8 billion, the consumption of larger merchants, businessmen, rentiers, and the professional men comes to: 12.5 – 6.8 – 3.5 = Zl.2.2 billion. With 570 000 population, this means a consumption of about Zl.3900 per person annually, or about Zl.1300 per family per month. This figure appears quite probable for the living standard of a well-off family in 1929, and thus to some extent confirms our other calculations, especially our estimate of the value of total consumption in cities.

The sum of Zl.2.2 billion obtained above, however, can be regarded only as an approximate indicator of the total consumption of the affluent urban population, since even a small error in the estimate of total consumption in cities has a considerable influence on this figure. For instance, if the total consumption in cities were estimated 4% higher, i.e. it would be Zl.13.0 billion instead of Zl.12.5 billion, the consumption of the affluent population in cities would be Zl.2.7 billion, not Zl.2.2 billion, i.e. 23% greater.

Concerning consumption of the gentry, we have assumed above that it enjoys the same standard of living as that of the affluent urban population (see p. 403), i.e. Zl.3900 per head annually. At 180 000

[15] i.e. those who purchase commercial licences of at least category II.

population in this group, this gives their total consumption at Zl.0.7 billion. Hence the total consumption of entrepreneurs and professional men 2.2 + 0.7 = Zl.2.9 billion.

6. *Distribution of the Accumulated Income*

As already mentioned in the introductory comments to Part III of this study, we shall divide total gross accumulation, calculated above at Zl.2.12 billion, into public accumulation (of the central government, local government, and social insurance companies), profits owned to foreign countries, and private domestic accumulation. In calculation of public accumulation we distinguish the following components: (i) central government and municipal investments, (ii) increase in the working capital of the central government and the municipalities, and (iii) total increase in the assets of social insurance companies (according to their balance-sheets).

According to an estimate made by the Institute for Study of the Business Cycles and Prices,[16] in 1929 Zl.0.615 billion was spent for central government and municipal investments in transportation, Zl.0.145 billion for outlay on construction for central government administration and local governments, and Zl.0.03 billion for communal investments in water, sewerage, and gas systems—altogether Zl.0.79 billion. In addition to this, we have to consider the increase in the supply reserves of the Ministry of Military Affairs of Zl.0.15 billion and investments of government enterprises that, according to their balance-sheets, came to Zl.0.06 billion (gross of amortization). In this way we get a total value of investments of the central governments and local governments of Zl.1 billion.

We now come to calculation of the increase in the working capital of the central government and municipalities. The surplus of revenues over expenditures of the expanded budget (i.e. including the ordinary budget, extraordinary budget appropriations, and the extra-budgetary funds) was about Zl.0.075 billion in 1929. It should be noted that tax arrears are not included in budget receipts, and expenditures include investment outlay of the government and the servicing of government debts. It follows that, to calculate the increase in working capital of the government, we have to add to the budget surplus the payment of government debts of Zl.0.095 billion and the

[16] See Annexe 5, this volume.

increase in tax arrears of Zl.0.215 billion, which together come to Zl.0.385 billion. Here we should also consider changes in the working capital of government enterprises, but they were insignificant during this period.

During this time, local governments recorded a total deficit of Zl.0.125 billion,[17] a sum that they borrowed. Hence, the total increase in the working capital of the central government and municipalities was only 0.385 – 0.125 = Zl.0.260 billion.

Finally, the total increase in the assets of insurance companies in 1929 amounted to Zl.0.16 billion, according to their consolidated balance-sheet (including the increase in arrears of premium payments of Zl.0.04 billion).

The total public accumulation can now be calculated as the sum of central and local government investments (Zl.1 billion), the increase in the working capital of the central government and local self-government (Zl.0.26 billion), and the increase in the assets of insurance companies (Zl.0.16 billion), giving a total of Zl.1.42 billion. This includes the increase in tax arrears (Zl.0.215 billion) and arrears in social insurance premiums (Zl.0.040 billion), making a total of Zl.0.255 billion.

According to Poland's balance of payments calculated by the Central Statistics Office, the sum of profits owed to foreign capital comes to Zl.0.380 billion. Therefore, the division of gross accumulation (whose total value was given above as Zl.2.12 billion) according to property rights was as follows: the central government, local governments, social insurance agencies—Zl.1.42 billion, foreign capital—Zl.0.380 billion, and private 'domestic' accumulation—Zl.0.320 billion. Obviously, the last component of income accumulation, obtained by subtracting the first two components from income accumulation, is very imprecise. For instance, an underestimation of total accumulation of Zl.0.1 billion, i.e. of 5% (which could well happen, especially in connection with the assumption that the increase in stocks was equal to zero; see p. 408), would mean that the figure for private domestic accumulation should be Zl.0.42 billion, not Zl.0.32 billion, i.e. more than 30% higher.

[17] Calculated from data published in *Statystyka Samorządowa*, in: *Statystyka Polski*, Series V, vol. 9, Warsaw, GUS, 1933; in the deficit we also included the loans obtained, which in local government budgets were often recorded on the revenue side.

7. *Final Results*

Let us now put together the above derived results concerning the components of consumption and gross capital accumulation. In comparing the distribution of consumption between particular groups of the population we simultaneously give the value of average consumption for four people per month, which illustrates the living standard of a family of four in any given group. It should be remembered, however, that the internal consumption of the countryside was calculated here at retail prices in cities, which makes the living standard of small farmers and farm workers entirely comparable with the standard of living of the urban population. The figures on the division of gross accumulation into private domestic accumulation, accumulation of the central government, local governments, and social insurance agencies, and accumulation owed to foreign capital (interest, dividends, etc., owed abroad) are given in round numbers (see Table 103 and Figs. 37 and 38).

We did not carry out the distribution of income among particular groups to the end. Government services in education and private

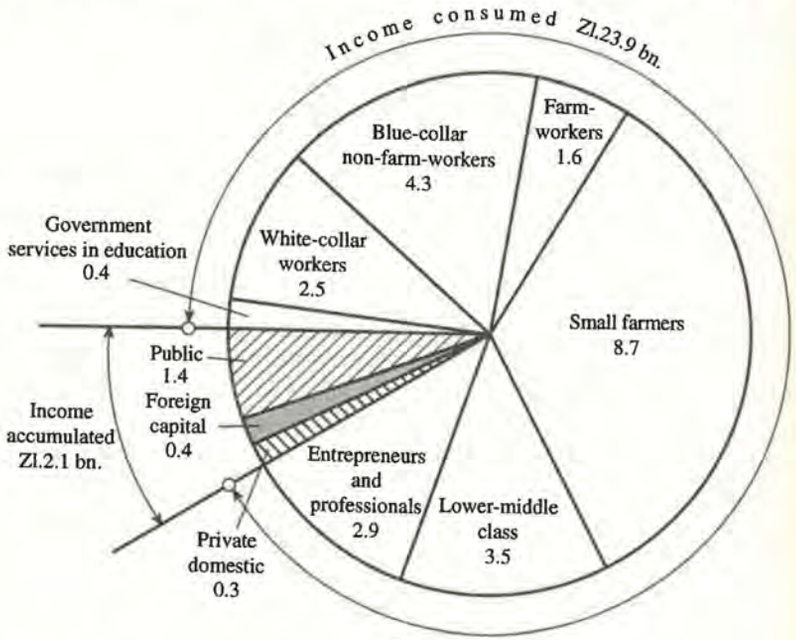


FIG. 37. *Distribution of Social Income in Poland, 1929 (in Zl. bn.)*

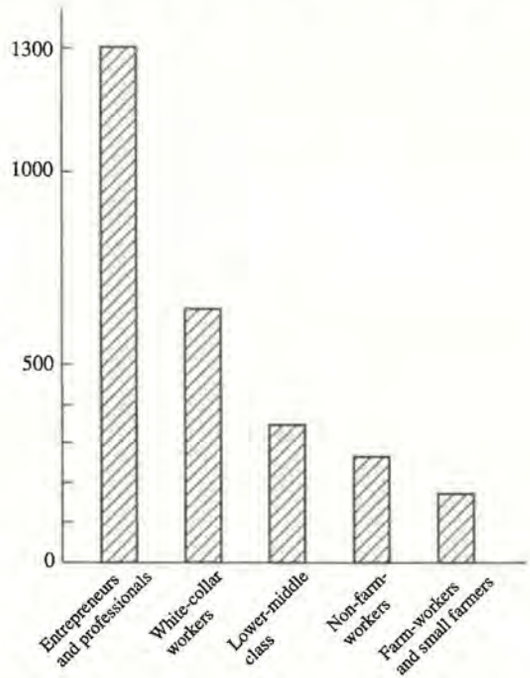


FIG. 38. *Consumed Incomes of Individual Social Groups (in Zl., for a Family of Four)*

domestic accumulation were not separated. An accurate division of the former would require special studies on the social composition of elementary-school pupils. Concerning the latter, the division of private domestic accumulation has no logical ground as long as the total value of this accumulation must be regarded, as we argued above, as highly problematic. In any case, clearly for none of the groups of the population examined above does income consumed differ much from its total income (and it should also be remembered that amortization of fixed capital is included in the accumulated income).

Appendix 1. Family Budgets of Blue-Collar and White-Collar Workers

Below we estimate the distribution of expenditures of blue-collar and white-collar families according to the type of expenditure that is

Table 103. *Distribution of the Social Income in Poland, 1929*

Income groups	Total (Zl. bn.)	Consumption per family of four (Zl. per month)
Total social income	26.0	—
of which:		
income consumed	23.9	—
of which:		
white-collar workers	2.5	640
non-farm workers	4.3	265
farm workers	1.6	175
small farmers	8.7	
lower-middle class	3.5	345
entrepreneurs and professionals	2.9	1300
government services in education	0.4	—
income accumulated	2.1	—
of which:		
private domestic	0.3	—
public	1.4	—
foreign capital	0.4	—

needed for our subsequent calculations. These expenditures were estimated on the basis of the results of a questionnaire of the Central Statistical Office on blue-collar family budgets for 1929 and questionnaires of the Regional Council of the Federation of White-Collar Workers' Trade Unions in Warsaw, for May, 1932. In processing of these findings by the Central Statistical Office, on the basis of the volume of expenditures per person, four categories of blue-collar family budgets and three categories of white-collar family budgets were distinguished. Hence, we examine here a total of seven types of family budgets, the first of which represents budgets of unskilled workers and the last one the budgets of high-salaried white-collar workers.

Since for our studies the structure of expenditures in 1929 was needed, individual types of expenditure in the family budgets of white-collar workers were recalculated according to the price relationship: average 1929/May 1932. Obviously, no exact structure of white-collar family budgets in 1929 could thereby be delivered since dissimilar price changes of individual goods that took place from this time to May 1932 also might have changed the relative consumption of these goods. However, one can assume that these changes within

the social group of relatively affluent white-collar workers, who do not need to continually control their spending, were not significant.

In examining the family budgets of white-collar workers we face still another difficulty; it relates to the share of servants in the consumption of food, since the expenditure entry 'personal services' includes only the cash wages of servants. This difficulty was avoided by considering servants as members of the family: servants' cash wages were included in the expenditure for clothing and footwear, for which a very large part of these wages are spent. The thus modified family budget includes the expenditure of a white-collar worker family and its servants, and excludes this family's expenditure for personal services.

Moreover, taxes and insurance premiums were excluded from the family budgets of both blue-collar and white-collar workers. Hence Table 104 presents total expenditure except for personal services, taxes, and insurance.

Table 104. *Expenditures of Blue-Collar and White-Collar Workers in Poland, 1929 (in %)*

Type of expenditure	Share in expenditure of each category of family budget						
	Blue-collar			White-collar			
	I	II	III	IV	V	VI	VII
Food	66.5	62.6	56.8	47.9	45.5	41.6	29.5
of which:							
bread, flour, cereals, peas	23.8	19.2	15.6	10.8	7.8	5.7	3.6
meat, fish, cold-cuts, fats (except butter)	20.4	20.9	19.5	17.8	15.7	16.0	11.1
sugar	4.5	4.4	4.6	3.6	3.1	2.8	1.7
Clothing and footwear	15.3	16.0	18.4	21.8	19.2	21.0	22.0
Miscellaneous	18.2	21.4	24.8	30.3	35.3	37.4	48.5

Appendix 2. Consumption of Bread, Flour, Cereals, and Peas in Cities in 1929

The average value of the consumption of these articles per head, according to the budgets of blue-collar workers' families for 1929 (at retail prices) is Zl.109 annually. The consumption according to family budgets of white-collar workers for 1932 (at 1929 prices), is

approximately the same. This uniformity of per head consumption between groups so unlike in affluence and customs allows us to infer that the average consumption of bread, flour, cereals, and peas for the population as a whole differed little in 1929 from Zl.109 per head, which for the urban population of 11 million gives Zl.1.2 billion.

Appendix 3. Consumption in Cities of Meat, Fats (except Butter), and Fish in 1929, at Retail Prices

In 1929 the slaughter of farm animals under veterinary supervision, which approximately tallies with the consumption of meat in cities and its exports, in live weight was: pigs—329 000 tonnes, cattle—348 000 tonnes, and calves—75 000 tonnes. To get the volumes of meat and fat corresponding to these live weights, we should multiply them by the appropriate 'coefficients of utilization' which are 0.77, 0.54, and 0.62 respectively; this gives us 254 000 tonnes of pork and pork fat, 188 000 tonnes of beef, and 47 000 tonnes of veal. The average retail prices per kilogram in ten large Polish cities in 1929 were: Zl.3.3. for pork, Zl.3.8 for pork fat, Zl.3.9 for sausage, Zl.2.9 for beef, and Zl.3.3 for veal (according to data of the Central Statistics Office; the price of veal, which is missing there, was calculated on the basis of retail prices of beef and the relation of wholesale prices of veal and beef). The average price of pork products was taken as Zl.3.6 per kilogram (the average retail price of meat as a whole was Zl.3.3. per kilogram). This made it possible to calculate the total value of meat and animal fats from veterinary-supervised slaughter at retail prices. These results are as follows:

	Volume (tonnes '000s)	Retail price (Zl. per kg)	Value (Zl.bn)
Pork and pork fats	254	3.6	0.915
Beef	188	2.9	0.545
Veal	47	3.3	0.155
TOTAL	489	x	1.615

The sum of Zl.1.615 billion also contains some exports of meat. But since the value of this export in 1929 was almost equal to the value of imports of meat, and animal and vegetable fats, the value of

the consumption of meat, and animal and vegetable fats in Poland in 1929 can be estimated at Zl.1.615 billion.

In the above calculation the retail prices of meat and fats are the most uncertain, since we do not know whether the GUS statistics for individual cities record prices close to average prices. Consequently, to check these figures on the basis of data on family budgets of blue-collar workers in Łódź, Warsaw, Dąbrowski Basin, and Silesia, for 1929, we calculated the average price of all meat and animal fats. This came to Zl.3.2 per kilogram. Next, from the data on family budgets of government employees for 1932 (after adjusting these budgets according to price indices for 1929 and for all of Poland) we got a price of Zl.3.4 per kilogram. Thus the average price of all meats and fats in Poland in 1929 can be taken as equal to 3.3 Zl. per kilogram, which agrees perfectly with the results obtained above, that gave us an average price of Zl.3.3 per kilogram as well.

We now come to estimating the consumption of fish in 1929. The catch of fresh-water fish can be estimated at 17 800 tonnes[18] the catch of deep-sea fish—at 2800 tonnes;[19] the import of fish except for herring was 4200 tonnes in 1929; hence the consumption of fish except for herring was nearly 25 000 tonnes. The average wholesale price of carp in 1929 was Zl.4.9 per kilogram. If we now consider that carp is more expensive than other common fish with a wholesale price of Zl.4.9 per kilogram, which is lower than the retail price, we can assume that the average price of a kilogram of fish differed relatively little from Zl.4.9, and thus the consumption of fish (except for herring) can be estimated at Zl.0.12 billion.

The consumption of herring is estimated by adding to the value of imports, equal to Zl.0.057 billion, 40% for the wholesale and retail profit margin, which gives Zl.0.080 billion. Hence, the total consumption of meat, animal and vegetable fats, and fish amounts to 1.615 + 0.12 + 0.08 = Zl. 1.815 billion (as we see, the considerable inaccuracy of our estimate of fish consumption has little effect on this sum).

In the above calculation we did not consider the consumption of poultry. We may assume that it will be about the same as the consumption of fish except for herring, since it is, like a considerable part of fish consumption, a 'luxury' supplement to meat consumption. So it appears that Zl.1.9 billion is a fairly accurate estimate of

[18] See *Kwartalnik Statystyczny*, 7/2 (1930), 993.
[19] See *Rocznik Statystyczny*, 1930, Warsaw, GUS, 1931.

the total consumption of meat, animal fats, and fish in 1929, calculated at retail prices.

Appendix 4. Sales of Automobiles in 1929 at Retail Prices

The increase in the number of registered automobiles in 1929 was 3200. Automobiles that replaced vehicles taken out of service can be estimated at 1500, according to their average age (7 years) and the number of automobiles registered in previous years. So we estimate the total sales of automobiles at 4700. Taking an average price of Zl.12 000, we get the value of sales of automobiles of about Zl.0.06 billion.

Appendix 5. Consumption of Sugar in 1929 at Retail Prices

The sales of sugar to the domestic market was 260 000 tonnes at an average retail price of Zl.1.60 per kilogram. Thus the value of the sales of sugar was about Zl.0.58 billion.

Appendix 6. Consumption of Clothing and Footwear in 1929 at Retail Prices

Clothing. According to data of the Central Statistical Office the sales of fabrics and knitted goods of domestic production in 1929 came to 71 000 tonnes, and their value (at producer prices) was Zl.1.01 billion. However, these statistics do not include many small weaving-mills which can be seen from the fact that the weight of the output of yarn, after 10% subtraction for losses in processing, amounts to 91 000 tonnes, that is, 30% more than the sales of fabrics recorded in these statistics. Increasing the value of the sales of fabrics in this proportion, we get Zl.1.30 billion. Adding to this a surplus of Zl.0.15 billion of imports of fabrics and furs (customs duties included) over exports of fabrics, we get the value of expenditure on fabrics and furs at producer or importer prices respectively of Zl.1.45 billion. Then taking a wholesale mark-up of 8% and a retail mark-up of 25%,[20] we

[20] See M. Kalecki and L. Landau, 'Textile Trade in Poland: Outline of Structure', this volume.

get a value of consumption at retail prices of $1.45 \times 1.08 \times 1.25$ = Zl.1.96 billion.

To move from this number to the value of expenditure on clothing (repairs including) we have to add to it the total income of tailors and their journeymen (or home-workers and their employers) and allied professions (furriers, milliners, hatters, tailors, embroiderers, and lace-makers). According to the *Occupational Composition of the Population of Poland*, the number of employees earning their living by tailoring and the allied professions, members of their families included, was 450 000. The income of this group can be only roughly estimated. The average income per head of the working population in 1929 was Zl.800 (see p. 424). The average income of the population living by tailoring and the allied professions is higher because of the share in this group of self-employed and 'investors', but not much higher since the owners of shops also have annual incomes of about Zl.1000 per head of the occupational active and inactive population (see p. 424). Consequently, we estimate the income per head of the population living by tailoring and the allied professions at Zl.900 annually, which gives a total income for this group of Zl.0.40 billion.

Hence, the total value of expenditures for clothing (repairs included) comes to 1.96 + 0.40 = Zl.2.36 billion (the import surplus of clothing, customs duties included, that should be added to this figure is insignificant).

Footwear. According to data of the Central Statistical Office, in 1929 the sales of tanned skins of domestic production for the shoe industry was about Zl.0.13 billion. Owing to the large number of small tanner's shops, these statistics are very incomplete. Comparing the number of workers corresponding to this volume of production with the number of workers reported in the *Occupational Composition of the Population of Poland*, we conclude that actual production was almost twice as large and estimate it at Zl.0.25 billion. Imports of tanned skins (customs duties included) in 1929 came to about Zl.0.10 billion, and thus the sales of skins in 1929 can be estimated at Zl.0.35 billion. To this value of sales, calculated at producer or importer prices respectively, we add the wholesale and semi-wholesale mark-up (the retail mark-up is not relevant in this case) which we estimate on average at about 15%, i.e. Zl.0.05 billion. Thus we finally get the value of sales of Zl.0.40 billion.

To move from this figure to the value of consumption of footwear (repairs including) we must add to the former—as in our estimate of

the consumption of clothing—the entire income of the population living from the production of footwear (workers and owners of mechanical shoe factories included) whose number, according to the *Occupational Composition of the Population of Poland*, is estimated at 510 000. The average annual income per head in this group is assumed to be the same as that of the population living by tailoring, i.e. Zl.900, and therefore the total income of this group is Zl.0.46 billion. The total expenditure on leather footwear (including repairs) thus comes to 0.40 + 0.46 = Zl.0.86 billion (the import surplus of footwear, customs duties included, that should be added to this figure, is insignificant).

To check these estimates, which of necessity are based on somewhat shaky grounds, we can use the following test. We compare the ratio that results from our estimate of the value of leather in the price of footwear paid by the consumer, calculated for the total volume of leather footwear, with the parallel ratio calculated for mechanically produced footwear. These ratios should be the same, since competition tends to equalize prices, and the value of the raw-material intake is also the same. Since the condition of identical quality obviously is not always met here, and the value of raw materials used up in repairs is included in our estimates, one can expect only a limited convergence of the two ratios, however. Now, according to our estimates, this ratio for footwear as a whole is 0.35 : 0.86 = 0.41. The Central Statistical Office reports the value of skins used in the mechanical production of footwear in 1929 at Zl.0.022 billion, and the value of manufactured footwear at producer prices at Zl.0.041 billion. To obtain the value of consumer expenditures for footwear we have to add to it about 30%, which gives us Zl.0.053 billion. The ratio of the value of raw materials to the retail price is then 22 : 53 = 0.41, which agrees with the ratio obtained above for footwear as a whole.

In our earlier calculation we considered only leather footwear. The value of output of rubber footwear at producer prices was Zl.0.065 billion. Adding to this imports, customs duties included, to the value of over Zl.0.10 billion, and recalculating this sum at retail prices, we get the value of expenditure for rubber footwear of about Zl.0.10 billion.

The total sum of consumer expenditure for leather footwear (repairs included) and rubber footwear thus comes to 0.86 + 0.10 = Zl.0.96 billion. Hence, the total value of the consumption of clothing and footwear at retail prices in 1929 came to 2.36 + 0.96 = Zl.3.3 billion.

Appendix 7. Differences between Consumer Prices and Producer Prices for Agricultural Goods

The margin between the price obtained by an agricultural producer and the price paid by a consumer for the same article, or for a product processed from it, includes incomes of middlemen in various stages of trade (of wholesalers and retailers), the earnings of the self-employed in handling the product (clearing, sorting, processing), the costs of transportation, losses from wastage, and additional costs of articles used in processing, as well as taxes and various charges. To determine this margin (or mark-up) we have compared producer prices of a few agricultural goods with the retail consumer prices for these goods (or goods processed from them); we consider below rye, potatoes, and beef.

In the processing of agricultural goods into food certain by-products are also produced, such as bran in the processing of rye, skins in the production of meat, etc. Therefore, the sum of total proceeds of agricultural producers and of the trade mark-ups on agricultural products is higher than expenditures of consumers on food. Thus, when the sums of producers' proceeds and the mark-ups are related to the sums paid for food—and these are the relations necessary for our calculations—we get percentages that add to more than one hundred.

Rye. According to the data of the Central Statistical Office (collected by GUS's agricultural correspondents), the average price paid to producers for rye in 1929 was Zl.28.44 per quintal. This price does not differ much from average prices recorded in stock markets, which were Zl.27.91 in Poznań, Zl.28.80 in Warsaw, and Zl.28.83 in Lwów. We accept the GUS price in our calculations without any corrections.

The retail price of bread in the larger cities ranged at that time from Zl.0.45 to Zl.0.50 per kilogram; the weighted average is Zl.0.437 (the data from various districts on the number of the non-agricultural population was used for weighting). Taking milling coefficient at 65% and adding 30% for roasting, we get as the equivalent of one quintal of rye 0.845 quintal of bread, which at retail prices is Zl.39.9.

Thus the margin between the prices of bread and rye is Zl.11.5; however, this margin must be increased by the value of obtained bran, which—at Zl.20 per quintal—is about Zl.7; hence the total spread is Zl.18.5. This means that in relation to the retail price paid for bread, the producer's price is 71% of the former and the mark-up in the trade in rye and in its processing is 46%.

Potatoes. Because of seasonal fluctuations in sales of potatoes and their prices, which make it difficult to use averages for the entire year, our calculations are based on price quotations in a rather short but homogeneous period, i.e. in the autumn months (which is also a period when losses from spoilage are not yet very large). From October to December 1929 the average price paid to producers per quintal of consumable potatoes was Zl.4.91, and the average retail price (determined as for bread) was Zl.10.0 per quintal. Thus the price obtained by the producer is 49% of the average retail price of potatoes, and the trade mark-up is 51% of it.

Beef. There are no direct data on prices of cattle paid to producers per unit of live weight; agricultural correspondents give only prices of milch cows, which cannot be used for our purpose. Consequently, our calculation is based on prices of cattle at urban markets. Calculating non-weighted averages for particular districts and then introducing an overall average (weighted according to the number of the non-agricultural population), we get the average price in urban markets in 1929 per kilogram of live weight of a steer of Zl.1.41. However, this price is already higher than the producer price, for it includes part of the earnings of trade (cattle-buying). The price of swine per kilogram of live weight calculated in the same way was Zl.2.33 in 1929, with an average price paid to producers of Zl.2.11; hence, this last price was 9.4% lower than the market price. Assuming that these price ratios were the same for cattle, we reduce its market price correspondingly, and get the price of cattle received by the farmer of Zl.1.28 per kilogram of live weight.

The retail prices of beef, according to quotations reported from particular cities by GUS correspondents, do not seem entirely comparable. This seems mainly due to the existence of two considerably different types of meat in cities with large Jewish populations—the more expensive kosher and the less expensive non-kosher meat. The price quoted in Warsaw corresponds quite closely to the average of these two kinds. However, in other cities of the central and southern provinces only the cheaper meat seems to have been considered by

GUS correspondents, which means that we must increase these quotations by about 15%. After these corrections, we get an average retail price of beef in 1929 of Zl.3.15 per kilogram.

If it is assumed that a 450 kilogram steer yields 250 kilograms of pure meat and 60 kilograms of usable parts, that can be regarded as the equivalent of 30 kilogram of pure meat, we get a total of 280 kilograms of pure meat. The producer price of a steer is Zl.576. The value of the meat received, calculated at retail prices, comes to Zl.882. The margin is Zl.306. It has to be increased by the value of the skins, which we estimate at Zl.61 (for 25 kilograms of the average weight, at Zl.2.42 per kilogram). Hence the total mark-up is Zl.367, i.e. 42% of the price paid by the consumer. The price received by the producer is 65% of this sum.

The results of our calculations are shown in Table 105.

Rye and beef give similar results, the differences resulting chiefly from the different role of by-products: the ratio of producer prices to mark-up in both cases is 61 : 39; the mark-up for potatoes is considerably higher, although no processing is involved here (however, transportation costs and losses from spoilage are both higher). Estimating overall ratios on the basis of our calculations for these three goods, we must take into account that the proportion of by-products (i.e. non-food products) in the case of other goods (such as dairy produce, vegetables, etc.) is smaller, and that part of trade in food takes place through direct transactions between the producer and the consumer, bypassing the sales network, which increases the share of the producer and reduces the share of the mark-up in the retail price. The average for our three articles (weighted according to expenditures in the family budgets of more affluent blue-collar workers) would give 66.5% and 44.5% respectively. Owing to the first of these two factors we correct them to 63% and 42%, and owing to the second one we shift part of the mark-up to the benefit of the

Table 105. *Relations of Producer Prices and Mark-ups to Consumer Prices of Food (%)*

Product	Relation to prices paid by consumers	
	of producer prices	of trade and processing mark-ups
Rye	71	46
Potatoes	49	51
Beef	65	42

producer, and thus we finally get 65% and 40% respectively. Thus we assume that the sums received by agricultural producers for food articles make up 65% of the sums paid for them (or for goods processed from them by the self-employed), and that the gross mark-up for processing and brokerage is 40% of these sums.

Appendix 8. Expenditures of Small Farmers for Non-Consumer Industrial Goods

The basis for our estimate are data from the studies of the Puławy Institute on the profitability of peasant farms. However, these data cannot be used directly because they are not enough representative. The Puławy studies covered farms of peasants at a higher than average educational level, obtaining higher incomes (in relation to acreage), enjoying higher living standards, etc. This lack of representativeness had to appear also in the data on expenditures for producer goods, since the intensity of cultivation is much higher than average in the farms studied by the Institute. So we shall only use these data by relating them to other data on the real expenditures for fertilizers.

According to the studies of S. Wieluńska and J. Poniatowski,[3] the sales of fertilizers in 1929 came to about Zl.0.20 billion. However, these sales are calculated at producer prices and should be increased by costs of transportation and brokerage (over and above discounts, which were not deducted); therefore the sums paid by the ultimate purchasers were higher. According to calculations of the Puławy Institute made at retail prices, the value of fertilizers used was about Zl.0.27 billion.[21] Thus this latter value will be used in our further calculations.

According to the Puławy Institute studies on the profitability of peasant farms, the expenditures for fertilizers in 1928/9 and 1929/30 ranged on average from Zl.17.7 to Zl.25.5 per hectare for particular groups of farms (forests excluded).[22] For agriculture as a whole these

[21] These data were published in W. Sowiński's paper, 'Peasant Agriculture in Statistical and District Outline' in *Biblioteka Puławska. Seria prac społeczno-gospodarczych*, 39, Warsaw, Państwowy Instytut Naukowy Gospodarstwa Wiejskiego, 1933 (in Polish).

[22] According to these data, the expenditure for fertilizers in 1929/30 was higher than in 1928/9, whereas according to data on sales of fertilizers from factories, their use during this time fell. We have to assume that these fluctuations were of an accidental nature.

figures are unquestionably too high: the total use of fertilizers in Poland at such a rate would come to a value of about Zl.50.0 billion—almost twice as high as it is in reality. However, it seems that the Puławy data rather well describe the use of fertilizers on large landed estates. According to these data, in the group of farms from 30 to 50 hectares the use of fertilizers (again according to the average for 1928/9 and 1929/30) was Zl.22.0 per hectare. Taking this number for all large landed estates, we get about Zl.0.12 billion for purchases of fertilizers in 1929. This leaves Zl.0.15 billion for small farms.

Now let us determine the share of fertilizers in expenditures for all industrial inputs in agriculture. Besides expenditures for fertilizers, we include also the construction and overhaul of land improvement equipment, minor repairs to equipment, construction and repairs of buildings, increase in stocks of input, and minor repairs to these inputs. From the value of expenditures on the construction and repair of buildings we deduct a certain part (0.4 for construction and 0.6 for minor repairs) as labour costs (which do not represent expenditure for industrial articles). In relation to the sum of these expenditures, those for fertilizers in 1928/9 and 1929/30 on farms studied by the Puławy Institute were 41% on farms of 2 to 3 hectares, 31% on farms 3 to 5 hectares, and 58% on farms from 5 to 10 hectares. Since data for the smallest farms are relatively the least representative, and that farms from 3 to 5 hectares reflected best the typical relations among farm groups studied by the Puławy Institute, our calculations will be based chiefly on the percentage share estimated for this last group of farms and on the assumption that expenditure on fertilizers were one-third of the expenditure for non-consumer industrial goods; hence for the total value of this expenditure we get Zl.0.45 billion.

Social Income in 1933 and the Foundations of Periodic Studies on Changes of Income[1] (with Ludwik Landau) (1935)

Contents

Subject of the Study

In the recently published *Studies on the Social Income in Poland*, vols. i and ii, the Institute for the Study of Business Cycles and Prices made an estimate of the social income in Poland in 1929. It became

an urgent matter to update these calculations and obtain information for later years, especially because of tremendous changes that had taken place since that time, i.e. from the period when the social income was at its greatest, under the impact of the subsequent crisis. However, a large part of statistical material that served as the basis for estimating the social income in 1929 does not exist for later periods. In fact, it was for this reason that we decided to take 1929 as the starting-point in the *Studies*.

In view of these deficiencies in statistical data it became necessary in the present enquiry to use other methods; they could not be used, however, if the 1929 basic estimate was not available. Now, finding a point of reference, or a starting-point, in the 1929 estimate, our calculations could be made with adequate precision.

Using these other methods, in the present study we first estimated the social income in Poland in 1933. Following this, indices that enable periodic studies of changes in the social income were constructed on the basis of the existing calculations for these two years, i.e. the boom year of 1929 and 1933 which was a year of business depression. We discuss these indices and their structure in the second part of this study.

I. The Social Income in Poland in 1933

There is no need to discuss here the definition of the social income that is used in our study, or the scope of this concept, since we continue to adhere to the definitions given in *Studies on the Social Income in Poland*, vol. i (see pp. 390–4, this volume). Let us only recall that by income we understand the produced income, i.e. the value of goods and services produced, of which some were consumed, and those which have neither been used up in later production processes nor were consumed. Hence, we divide the social income into: (i) the national income consumed and (ii) the national income accumulated. Real accumulation can in turn be subdivided into: (*a*) investments, (*b*) increase in stocks, and (*c*) the surplus of exports over imports of goods and services; obviously (*b*) and (*c*) can be negative, which means that investments are then made at the expense of stock depletion or indebtedness to foreign countries.

In our calculations for 1933 we determine the rate of change since 1929 of real income consumed (i.e. after elimination of fluctuations in purchasing power and without accounting for the internal consumption of the countryside), and of the real income accumulated in

the form of investments; changes in other forms of capital accumulation will not be considered, however. For while it is possible to estimate the export of goods and services, we have no information whatsoever for estimating changes in stocks. However, since as a rule both these components of capital accumulation change in opposite directions, taking into account only one of them is more likely to worsen than to improve the results of our calculations. Moreover, these forms of accumulation are not of great importance from the standpoint of the social income as a whole, and for this reason the difference between the rate at which the sum of consumption and investments changed, and the rate of change of the social income as a whole cannot be significant and would not influence the results of our study. Neither do we have statistical information that would enable us to estimate the internal consumption of farmers.

The estimates of social income consumed made in *Studies on the Social Income in Poland*, vol. i, were based on the data on consumption of certain goods, and on the share of expenditure for these goods in total expenditure. Determination of the share of expenditure on individual goods, i.e. investigation of the structure of consumption of various groups of the population, was possible thanks to information from surveys of family budgets, especially on family budgets of blue-collar workers. However, the studies of family budgets by the Central Statistical Office were discontinued in 1929. Since that time no data on the structure of expenditure of blue-collar workers' families are available. Thus it was no longer possible to use this method for estimating the social income. Therefore, the only method available was the one that was used to determine the distribution of the social income consumed in 1929, i.e. the calculation of consumption as the sum of incomes recorded at the moment of collecting them. The incomes of hired wage-earners, the lower-middle class, and small farmers were determined separately and only a rough estimate was possible for 1929 (by subtraction) of the consumed part of the incomes of entrepreneurs (professionals including).

In these calculations we continue to adhere to the assumption that was explained and justified in detail in *Studies on the Social Income*, vol. i, namely that the incomes of hired employees and the lower-middle class are equal to their consumption.[1]

[1] The objections to which this assumption may give rise with respect to the lower-middle class are discussed in note 8, p. 455.

1. Incomes of Hired Employees

Our calculation of the incomes of hired employees is based on the data on earnings of three groups of employees: (i) white-collar workers insured in the White-Collar Workers' Insurance Companies (ZUPU)—on the basis of premiums paid; (ii) blue-collar workers insured in the Unemployment Fund—also on the basis of premiums; (iii) government and postal employees in regular positions and all full-time railway employees—on the basis of budget data on salaries. As we shall see later, these three groups of employees received Zl.5.25 billion in 1929, which is nearly 80% of the total wage bill. Thus even if an error was made in roughly estimating the remaining incomes from hired work, it can have only a slight effect on our calculation of total incomes of hired employees. Our calculations will be checked, however, against the data on health insurance premiums (in the same way as calculations for 1929 were checked), and the data on the sums of premiums paid to the Work Fund.

To determine the volume of other wages, estimates of incomes of these three selected groups of hired employees will be needed not only for 1933 but also for 1929. Since such estimates have already been made for white-collar workers insured in ZUPU and for government employees, only the earnings of blue-collar workers insured in the Unemployment Fund need to be supplemented.

The earnings of white-collar workers insured in ZUPU were estimated at Zl.1.28 billion in 1929, of which Zl.1.07 billion was the sum subject to insurance and determined on the basis of insurance premiums, and Zl.0.21 billion represented the excess above the maximum considered in insurance and it was determined from the income tax data (on salaries). We do not have the latest data for 1933, so we have to estimate the excess above the insurance maximum in a different way. The reform of the system of calculating insurance premiums that in part (i.e. in the employee's unemployment insurance premium) also considers the excess of wages above the basic insurance maximum level (at Zl.720 per month) offers a new possibility in this respect. As a result of these calculations, whose details are given in Appendix 1, we conclude that the sum of earnings of white-collar workers insured in ZUPU fell in the 1929–33 period by 33%, i.e. from Zl.1.28 billion to Zl.0.86 billion.

We compare this result with the data on earnings of white-collar workers in industry, i.e. the only area for which there are salary

statistics. They show (see Appendix 2) that the earnings of white-collar workers employed in industry fell by 40%. However, white-collar workers employed in industry are not a majority of those insured in ZUPU; in 1929 they only made up about 30% of all insured, with earnings representing about 43% of total earnings. The rest falls to government and other public employees, and to employees in other sectors of the economy, especially in trade and allied sectors (banks, insurance companies, etc.). In these areas reductions of staff were relatively small, and regarding wage cuts, for the government contract employees they were about 22–3%.[2] The fall of total earnings of white-collar workers of 33% (i.e. a fall in industry of 40% and in public administration of 23%), means a fall in earnings of other employees of about 35% taking into account the numbers of employees in each group; such an average reduction of their wages (with small changes in employment) seems plausible.

Earnings of blue-collar workers insured in the Unemployment Fund represent a considerable part of total earnings of blue-collar workers, especially of those employed outside government service. In the calculations for 1929 these data were not used chiefly because the Fund covers various kinds of employment and in the published data they are all lumped together. This makes it impossible to estimate omissions since not all employment groups are covered by the Unemployment Fund. At present, however, having an estimate of total earnings of blue-collar workers in 1929, the data of the Fund can be used. Before doing so we have to make corrections that will take into account changes between 1929 and 1933 both in the way of calculating insurance premiums and insurance coverage.

After making the appropriate revisions (see Appendix 3), we find that earnings of blue-collar workers insured in the Unemployment Fund, adjusted for changes in the coverage, show a fall from Zl.2.23 billion to Zl.0.99 billion, i.e. of 56%. A considerable part of this category of income consists of wages of blue-collar workers employed in big and average-size industry; changes in these wages in 1929–32 were estimated on an entirely separate basis.[3] With the help of the

[2] In Warsaw the elimination of the 15% bonus and the 20% metropolitan allowance meant a total reduction of 27.5%; in the provinces the reduction through the elimination of the 15% bonus and 10% allowance came to 21%; thus the weighted average (the weights being 1 : 3) gives 22.6%.

[3] See L. Landau, 'The Index of Wages and the Index of Other Remunerations in Industry', *Statystyka Pracy*, 11/2 (1932); J. Derengowski, *An Estimate of Workers' Wages in Industry in 1928–1932*, Warsaw, Instytut Spraw Społecznych, 1933 (both in Polish).

index of wages of blue-collar workers in industry (calculated by the ISBCP and GUS) this estimate can also be extrapolated to 1933 which allows us to check the results obtained above.

The sum of workers' earnings in larger industrial plants in 1929 came to Zl.1.646 billion; in 1932 it fell to Zl.0.738 billion and in 1933, according to the index of wages which declined this year to 41.3 (1929 = 100), it was only Zl.0.680 billion. Subtracting from these sums the earnings of juveniles that were excluded in our earlier calculation, we get Zl.1.615 billion in 1929 and Zl.0.675 billion in 1933. This would mean that earnings of the blue-collar workers insured in the Unemployment Fund and employed outside the larger industrial plants (in small industry, trade, etc.) were Zl.0.615 billion in 1929 and Zl.0.316 billion in 1933. Hence the decline of earnings in these groups amounted to 49%.

Calculated in the same way, the number of blue-collar workers employed (and insured in the Unemployment Fund) was 1 005 000 in 1929, and 680 000 in 1933 (after considering changes in the structure of occupation); those employed in larger industrial plants numbered 735 000 and 460 000 respectively. Hence the number of the remaining blue-collar workers was 270 000 and 220 000 respectively. Thus, the number of blue-collar workers employed in large industrial plants declined by 37%, and elsewhere, where employment is less elastic (i.e. in small industry, trade, etc.) by only 18%. The average annual earnings of a blue-collar worker in the big and the medium-size industry fell by 33% (of which 22% was due to wage reduction and the rest to partial unemployment and shifts from better- to worse-paid industries). In small industry, trade, etc., with probably only small reductions in the number of working days in the week, average earnings fell—because of wage cuts—by 38%.

Since these changes correspond well to what is observed in reality, the calculations based on contributions to the Unemployment Fund on the one hand, and on the data on employment and wages in industry on the other hand, should be regarded as consistent with each other.

Earnings of government employees—in regular positions in the administration and post office, and in *permanent employment in the*

railways—can be determined from budget information. For this purpose we use the budget estimate for 1934/5, whose sums correspond almost exactly with the actual expenditures in 1933.[4]

According to this estimate, the total sum of expenditures for wages together with functional and local bonuses and payments for overtime (but less the pay of non-professional soldiers) came to Zl.0.873 billion. Of this for higher and lower supernumerary staff we estimate Zl.0.08 billion (on the basis of expenditure for insurance payments at Zl.6 million). In this way we get Zl.0.79 billion as the wage bill of employees in regular positions in government administration. In relation to Zl.0.940 billion obtained in our calculations for 1929, this means a fall of Zl.0.150 billion, i.e. of 16%. Comparing this reduction with the fall in the wage rates of white-collar workers, it must be noted that the former also include the wages of professional soldiers and policemen that were reduced at a lesser rate (instead of eliminating the 15% bonus, it was reduced to 10%),[5] so that the wage bill of professional soldiers and policemen was reduced by only 12%, from Zl.0.365 billion to Zl.0.320 billion. Thus the wages of other employees in regular positions fell from Zl.0.575 billion to Zl.0.470 billion, i.e. by more than 18%. Wage reductions in the form of elimination of the 15% and 10% bonuses in the provinces and the 20% metropolitan allowance in Warsaw, came to an average of about 22.5% of that part of wages to which these bonuses were related (they were not related to housing allowances), and hence they were about 18–19% of total earnings. Further reductions in the volume of consumed incomes resulting from increased retirement contributions and from subscribing to the National Loan are not considered at present, however, since gross incomes are discussed here; these deductions will be accounted for later on (see pp. 448–9).[6] However,

[4] Expenditures for the administration were estimated for 1934/5 at Zl.2.138 billion. The actual expenditures in 1933 were Zl.2.131 billion, i.e. Zl.7 million less, while in the budget sections concerning expenditures on earnings (except for debt service and pensions) they were Zl.22 million more. The main differences concern the Treasury (Zl.15 million excess of actual expenditures in 1933), the Ministry of Social Welfare (Zl.23 million excess—probably for subsidies to social insurance institutions and social welfare), and finally the Ministry of Military Affairs (with expenditures in 1933 Zl.16 million less); in other sectors the differences are only minor. It follows that in expenditure on earnings the budget estimate made in 1933 corresponded exactly to the conditions existing at that time.

[5] In addition, there was an increase in the number of personnel (in the navy).

[6] These differences explain the apparent inconsistency with the index of wages of government employees which in 1929–33 fell from 104.8 to 80.1, i.e. by 23.6%.

since the number of the employed in the government administration in 1933 was reduced only slightly in comparison with 1929, the reduction in the gross wage bill did not exceed 20% (minor deviations can result from promotions and from changes in the structure of employment up to 1931, etc.).

According to the budget estimate, the expenditure for wages in the Polish Post Office, Telegraph and Telephone Company came to Zl.0.078 billion (the total budget appropriation for 1934/5 was Zl.0.142 billion and the actual expenditures in 1933 were Zl.0.139 billion) of which about Zl.8 million was for contract workers (the sum of their insurance payments was Zl.0.5 million), leaving Zl.0.70 billion for employees in regular positions. In comparison with 1929, when the wage bill was Zl.0.105 billion, the decline was 33%. This considerably greater rate of decline than in the earnings in government administration is due to large reductions of employment (the number of clerks in post offices was reduced from 14 400 to 12 900, and of clerks of the lowest categories from 15 200 to 13 800).

For the Polish State Railways the budget estimate for 1934 anticipated operating expenditures of Zl.0.803 billion, while the actual expenditure in 1933 came to Zl.0.821 billion, i.e. 1.5% more; the sums earmarked for wages (which represent about 60% of the operating expenses) will be increased in the same proportion. Personnel expenditures were estimated at Zl.0.471 billion, of which Zl.0.427 billion is for permanent employees (after deducting refunds and wages of day-labourers); making the aforementioned correction of 1.5%, we get a wage bill of Zl.0.435 billion. Compared with Zl.0.700 billion of the wage bill of employees in a regular position in 1929, the decline is 38%. Such a considerable reduction is due not only to wage cuts, but also to large reductions in employment: the number of employees in regular positions in 1929 was 170 400, while in the budget estimate for 1934 it was only 144 000, thus in 1933 the average number was about 146 000: nearly 15% less than in 1929.

Adding our results for the administration, post office, and railways, we get the wage bill in 1933 equal to $0.790 + 0.07 + 0.495 =$ Zl.1.285 billion (compared with Zl.1.745 billion in 1929). This sum must now be broken down between white-collar workers (clerks of the lowest categories) and blue-collar workers. For the administration this division will be made on the basis of direct data for the army and the

police, and for other employees in the administration the same proportion as in 1929 will be assumed for 1933, for the reductions in employment were not great and the wage cuts were almost proportional in the different wage categories. We also retain the proportions from 1929 for post office workers, since the reductions affected clerks and auxiliary personnel at the same rate. For the railway workers, however, we make a division into wages of employees in regular positions and supernumerary (permanent) employees (according to proportions of 1929). Then we get a fall in the wage bill of 30% for white-collar workers (from Zl.0.23 billion to Zl.0.16 billion) and of 41% for blue-collar workers (from Zl.0.47 billion to Zl.0.275 billion), since personnel reductions affected employees in regular positions less (11%) than supernumerary employees (21%), among whom blue-collar workers are the vast majority.

The earnings of government employees—in regular positions in the administration and post office and all permanent employees in the railway—are given in Table 106.

A summary of the earlier calculations and their comparison with the total sums of earnings of hired employees (except for farm workers) in 1929 are given in Table 107.

In the groups of white-collar workers considered here we covered more than 90% of their earnings. So only a small part is left to estimate, for which we have some fragmentary information, i.e. about earnings in banks with their own retirement programmes, where they fell by about 12%, and about the earnings of physicians in the National Health Service, which declined by more than 30%.

Table 106. *Annual Earnings of Government Employees in Poland in 1929 and 1933 (in Zl.m.)*

Kind of employment	1929		1933	
	white-collar workers	workers (clerks of the lowest categories, NCOs)	white-collar workers	workers (clerks of the lowest categories, NCOs)
Government services				
total	980	765	765	530
adminstration	690	250	565	225
post office	60	45	40	30
railways	230	470	160	275

Table 107. *Annual Earnings of Employees in Poland in 1929 and 1933 (in Zl.m)*

Group of employees	1929		1933	
	white-collar workers	blue-collar workers	white-collar workers	blue-collar workers
Hired employees (except farm workers)	2490	4115		
White-collar workers insured in the ZUPU	1280	—	860	—
Blue-collar workers insured in the Unemployment Fund	—	2230	—	990
Government employees (in regular positions in administration and the post office, and permanent employees on the railways)	980	765	765	530
Others	230	1120		

In other groups the fall was probably close to the average, sometimes perhaps greater (as in agriculture). For these groups taken together we can therefore accept the same decline as the average for government employees insured in ZUPU, i.e. 28%. On this basis we estimate the remaining earnings of white-collar workers in 1933 at Zl.0.16 billion.

More important is the gap in data for the earnings of blue-collar workers: here the calculations for 1929 did not cover more than one-quarter of their total earnings. At the same time this is a very heterogeneous category of employment that covers those hired in very small industrial plants (employing up to five workers), in handicrafts and trade, and domestic servants and janitors. On the whole, employment in all these groups declined only slightly during the crisis, but the fall in wage indices was considerable. Similar characteristics apply also to the category of employment that we have already separated by eliminating from the total earnings of those insured in the Unemployment Fund the earnings of workers employed in large and medium-size industrial plants (hiring more than twenty workers). This being so, we take the decline of these earnings in 1929–33, of 49% as the basis for estimating changes in earnings of workers employed in private plants and not covered by Unemployment Fund insurance. In this way the sum of earnings of these

workers, which was Zl.1.12 billion in 1929, in 1933 came to Zl.0.57 billion.

After supplementing our previous calculations with these estimates, we obtain the following totals of earnings of hired employees in 1933 (gross, social insurance benefits excluded): Zl.1.785 billion for white-collar workers and Zl.2.09 billion for blue-collar workers (domestic servants, clerks of lower categories, and non-commissioned officers included); this gives a total of Zl.3.875 billion. In comparison with 1929, when the gross earnings of white-collar workers were Zl.2.49 billion and of blue-collar workers Zl.4.115 billion, the decline for the former was 28%, for the latter 49%, and the decline in the total wage bill 41%.

We shall now check this result with the data on contributions to medical insurance and on payments to the Work Fund. The data on contributions to medical insurance are used to control the changes in earnings between 1929 and 1933. It must be noted, however, that government employees (in regular positions and all permanent employees in the railways) are not insured in the National Health Service, and so their earnings in both years should be excluded (obviously, then, our test does not cover this part of earnings). After this correction we get for 1929 the sum of earnings of Zl.4.86 billion, and for 1933 Zl.2.58 billion, which represents a decline of 47%. The increases in contributions to the health service in 1929 were Zl.285 million in the system of services put into operation by the law of 1920, and Zl.27.2 million in the Upper Silesian National Health Funds (fraternal, company, municipal, and rural funds); in 1933 the corresponding sums came to Zl.171.8 million and Zl.18.9 million. Thus the total sum of contributions to medical insurance declined from Zl.322.2 million to Zl.190.7 million, i.e. by 41%. Giving the contributions in the Upper Silesian National Health Funds a somewhat greater weight as a result of a lower contribution rate does not change this result much; the decline still does not exceed 42%.

Thus the decline in contributions is smaller than that of earnings which we previously calculated (i.e. 49%, see p. 441). However, it must be noted that the decline in contributions must be smaller than the decline in earnings owing to the wage ceiling in insurance; all wage reductions taking place above this limit are not reflected in changes of contributions. This is why in our calculations of the earnings of white-collar workers insured in ZUPU it

turned out that the decline in earnings at a rate of 0.71 corresponded to a decline in contributions from Zl.98.3 million to Zl.76.4 million, i.e. at a rate of 0.78 (see Appendix 1). The ratio between these two indices (0.71 and 0.78) is the same as that between the now obtained index of the wage decline (which fell at a rate of 0.53) and the decline in contributions (0.58). The wage limit considered in health insurance is lower than in the insurance of white-collar employees (in most cases it is Zl.300–600 in the first case and Zl.720 in the second), which should increase the difference between the rates of fall in contributions even more. This is offset, however, by two factors: (i) in the earnings of blue-collar workers the insurance limit is less often exceeded than in the earnings of white-collar workers, which reduces the rate of restraining the decline of contribution, and (ii) the decline in contributions to medical insurance funds was greater because of the very large decline in the wages of farm workers that are not considered in our calculations. Because of these factors precise agreement between the percentage indices of the decline in contributions and that of wages is obviously impossible. In any case, however, we have found no contradiction between them; thus the discrepancy between our estimate and the estimate based on contributions to health insurance funds is not likely to be significant.

Turning now to data on *payments to the Work Fund*, we must determine the sum of payments that would correspond to our results on earnings, and compare this sum with the actual revenues of the Fund from the contributions from wages and salaries (on the strength of Article 15 of the Law on the Work Fund).

These contributions amount to 1% of salaries of government and municipal employees and 2% of all other wages. The salaries of public employees amount to about Zl.1.5 billion, hence the rest of the wage bill comes to Zl.2.37 billion. However, wages of workers in craftsmen's shops which we estimate in 1933 at Zl.180 million (in 1929 they were Zl.340 million) are exempt from contributions. At the same time, old-age pensions not considered here are subject to such contributions. This refers to old-age pensions that exceed Zl.59 million per month (government employees and those of insurance agencies, as well as some private pensions). The sum of these pensions can be estimated at about Zl.250 million. Hence of Zl.1.7 billion a 1% contribution is paid, and of Zl.2.25 billion a 2% contribution is paid. This gives payments of Zl.17 million and

Zl.45 million respectively, or a total of Zl.62 million annually, i.e. Zl.5.2 million per month.

After considerable fluctuations in the first months of 1933 (when the Work Fund was put into operation) the actual revenues of the Fund from contributions stabilized in September–November of that year at Zl.5.2 million monthly. In the budget estimate for 1934/5 Zl.57 million is anticipated for these revenues which means that a somewhat lower figure is taken there—of Zl.4.75 million per month. These sums differ from our calculations by a few per cent only and so they support the results of our estimate.

In our calculations so far the sum of gross wages has been used. For this sum to represent the incomes of the population living from hired labour it requires *corrections* in two directions. On the one hand it should be reduced by income tax payments, contributions to social insurance, retirement contributions, and payments to the Work Fund. On the other hand, it should be increased by the sum of supplementary benefits received (not by the same individuals, but by the same group of the population) in the form of cash payments: annuities, old-age pensions, disability pensions, allowances to widows and orphans, sick, puerperal and burial benefits, unemployment benefits, and payments in kind, i.e. medical care assistance.

The following sums were deducted in 1933: income tax, i.e. the tax on wages, gave Zl.70.7 million in the budget year 1933/4; together with the crisis tax (for private employees), 10% tax (for government employees) and cumulative tax, income tax paid came to about Zl.80 million. Contributions of employees to social insurance were Zl.148 million; retirement contributions in the government administration were Zl.50 million, in the post office Zl.5 million, and in the railways Zl.23 million, totalling at Zl.78 million. Finally, contributions to the Work Fund (the part paid by the employee) were Zl.14 million. In this way the total deductions in 1933 came to about Zl.330 million.

During the same time the benefits received from pensions and social insurance were as follows: pensions in the government administration were Zl.156 million, in the post office Zl.15 million and in the railways Zl.93 million; a total of Zl.261 million. Social insurance cash benefits, i.e. old-age and disability pensions, were Zl.107 million, sick and puerperal benefits Zl.32 million, unemployment benefits Zl.48 million; a total of Zl.187 million. Medical care benefits of health insurance funds were Zl.123 million and government (and

railways) medical assistance was Zl.13 million. Thus the total sum of these benefits comes to about Zl.585 million.

We thus get an excess of Zl.255 million in benefits over deductions. This sum must be added to the sum of wages as additional income of the population living from hired labour or receiving benefits from past work. Then this sum has to be divided between white-collar and blue-collar workers (with a small part for farm workers not included in our calculations). This division can be made only roughly since for the most part more precise data are lacking. Concerning contributions to social insurance and insurance benefits, they can be easily distinguished in institutions organized separately for both these groups of employees (retirement insurance and unemployment insurance), but we have to rely on rough estimates for sickness insurance (proportionality of the sums of contributions and cash benefits to the earnings of those insured, and proportionality of medical assistance to the number of those insured is assumed) and accident insurance. Retirement contributions and pensions are calculated in proportion to the sums of earnings of white- and blue-collar workers respectively, separately for the administration, post office, and railways. From income tax payments only a small part represents taxes paid by blue-collar workers since their incomes rarely exceed the 'minimum of existence', which is Zl.2 500 annually; we assume that in 1933 this part was one-fifth.

In conclusion we arrive at the following results. For white-collar workers the deductions come to Zl.195 million, the benefits are Zl.250 million (including government and railway pensions of Zl.170 million, old-age and disability pensions of Zl.25 million, and unemployment benefits of Zl.22 million). Thus, the excess of benefits comes to Zl.55 million. For blue-collar workers (except for farm workers, clerks of the lowest categories, and domestic servants) the deductions amount to Zl.125 million, the benefits are Zl.310 million (including government and railway pensions of Zl.90 million, old-age disability pensions of Zl.80 million, medical care and medical insurance benefits of Zl.110 million, and unemployment benefits of Zl.26 million). Thus, the excess of benefits is Zl.185 million.

To get the volume of the income consumed, in addition to these corrections in the total income we have to make yet another one, i.e. we need to account for subscription payments to the National Loan. For all hired workers these contributions in 1933 were about

Zl.50 million, of which about Zl.40 million came from white-collar workers and about Zl.10 million from blue-collar workers.

Hence, it finally turns out that in 1933 incomes of white-collar workers reached Zl.1.8 billion, and those of blue-collar workers, clerks of the lowest categories, and domestic servants Zl.2.25 billion. In comparison with their incomes in 1929, which were Zl.2.5 billion and Zl.4.3 billion respectively, incomes in 1933 represent 72% and 52% of their 1929 respective totals. Therefore the incomes of white-collar workers fell by 28% and those of blue-collar workers fell by 48%.

This is the decline of money incomes. We can determine the changes in real incomes after considering price changes. Their best measure are the indices of cost of living calculated by the Central Statistical Office separately for families of white- and blue-collar workers. For our purposes these indices require some corrections in housing costs. After making them (see Appendix 4), we get indices of the fall in costs of living for families of white-collar workers equal to 0.67. Hence, for the change in real incomes of the working population from 1929 to 1933, calculated as ratios of the change in nominal incomes to the change in the cost of living, we get for white-collar workers $0.72 : 0.69 = 1.04$, and for blue-collar workers $0.52 : 0.67 = 0.78$. In other words, the decline in money incomes of white-collar workers was slightly more than offset by the decline in the cost of living, so that their real incomes increase by 4%. On the other hand, the real incomes of blue-collar workers, after considering the decline in prices, were 22% less than in 1929.

Obviously, these results represent the average for each of the two groups considered, while incomes within each group changed in different directions and at different rates. These average indicators should not therefore obscure the fact that there were categories of the working population whose purchasing power fell catastrophically, whereas other categories, whose money incomes only slightly fell, gained a considerable rise in their real incomes thanks to the fall in prices. In order to bring home how great these differences were, Table 108 presents the data on incomes of selected categories of employees, after accounting for deductions and additional benefits discussed above (except for old-age pensions and annuities only). It should be pointed out, however, that the determination of gross incomes of each of the distinguished employment categories, as well as accounting for the respective deductions and additional benefits, is open to

Table 108. *Incomes of Selected Categories of Employees in 1929 and 1933*

Category of employees	Total income (Zl. bn.)		Index of money incomes in 1933 (1929=100)
	1929	1933	
White-collar workers	2.51	1.80	72
of which:			
industry	0.53	0.31	58
post office and railways	0.27	0.17	63
banks and insurance, trade, etc., municipal, and central government contract employees	0.90	0.63	70
government administration			
of which:			
employees in regular position	0.52	0.39	75
army and police	0.14	0.11	79
pensions and annuities	0.15	0.19	127
Blue-collar workers (farm workers excluded and clerks of the lowest categories, domestics, etc., included)	4.33	2.26	52
of which:			
big and medium-size industry	1.68	0.70	42
handicrafts, small industry, trade, servants	1.82	0.95	52
railways	0.47	0.26	55
army and police	0.21	0.18	86
pensions and annuities	0.15	0.17	113

considerably greater errors than our estimates for each income group as a whole. Hence, the data in Table 108 should be regarded only as an illustration of income differentiation between individual categories of employees.

The increases of income from pensions and annuities for both white-collar and blue-collar workers obviously do not mean an increase in individual pensions, since they are simply due to a greater number of pensioners. Hence, this increase should be considered together with changes in incomes of the employed and regarded as a partial compensation for the fall in income of the latter, especially in relation to the growing number of the population. While income from work of those occupationally active in 1933 fell among white-collar workers to 68% and among blue-collar workers to 50% of their respective 1929 incomes, it is only the increase in pensions and

annuities that raises these numbers to 72% and 52% respectively. This means that the decline of incomes in various groups was on average mitigated at this rate.[7]

If we neglect the minor correction that would result from the above argument, it turns out that among white-collar workers purchasing power rose in the army and police category and to a lesser degree also in the category of other (civilian) employees in regular positions in the government administration (i.e. the fall in money incomes in these categories was less than the decline in the cost of living). On the other hand, the net earnings of white-collar workers employed on the railways and post office fell more than the decline in the cost of living (because of reductions in employment accompanying the fall in wage rates), and the fall in real earnings in industry was especially great.

Among blue-collar workers the only large category whose earnings fell less than the fall in prices, i.e. whose real incomes increased, were non-commissioned officers and lower-rank staff in the army and police. In all other categories the fall in money earnings was accompanied by a decline in purchasing power, which in the category of workers in the large and average industry, mostly affected by reductions in employment, was as much as 40%.

These differences in the changes in income of various categories of employees, however, do not reflect adequately income differentiation among individual families. The fall in purchasing power of the working population resulted chiefly from reduced employment since in most of the discussed categories of employment wage reductions were offset by a fall in the cost of living. So if, for instance, incomes of white-collar workers employed in the government administration fell by 25%, on the railways by 37%, and in industry by 42%, this does not mean that the incomes of individuals employed in these areas fell at the same rate. It merely means that: (i) the incomes of those who remained employed fell in all of these categories by approximately 25% and, at the same time, (ii) incomes of those completely or partially out of work fell sharply—not many such

[7] Counting pensions together with the incomes of the working population, we assume that they add up in the families of each of these two groups, i.e. that retired white-collar workers appear in the same families as active white-collar workers and the same is true for blue-collar workers. For such large groups of the population this assumption is probably a satisfactory approximation, but it cannot be extended to smaller groups, for in this case it may not be even approximately correct.

persons were affected by this in the government administration, but quite a few on the railways, and many more in industry.

Thus the fall in incomes was very uneven. The purchasing power of families of those who remained in employment, both in government administration and on the railways and industry, generally did not change, and often even somewhat increased, while money as well as real incomes of families of the unemployed fell sharply. The same holds for families of blue-collar workers.

A certain levelling of these differences is possible because there were both the employed and the unemployed in the same families. For example, since the unemployed workers from the industry could just as likely belong to families of those employed in the industry as well as in government services, the indices given in Table 108 cannot be regarded as an accurate representation of the purchasing power of individual categories of the employed. In fact, these indices represent merely incomes derived from miscellaneous sources. Only once they are aggregated for the entire groups (white-collar and blue-collar workers) can they be regarded as an adequate representation of the purchasing power of the respective two groups of families. However, it should be remembered that within these groups the income differentiation is tremendous, though it cannot be examined more closely.

2. *Consumption of the Lower-Middle Class*

The lower-middle class can be subdivided into three approximately equal groups: (i) self-employed and small traders involved in the manufacturing and sale of food, (ii) craftsmen and small traders involved in the manufacturing and sale of clothes and footwear, and (iii) others. Below we attempt to calculate the fall in incomes in the first and the second group from 1929 to 1933. We take the arithmetical average of these indices as representative of the fall in total incomes of the lower-middle class.

In Appendix 5 it has been estimated that the ratio of the average fall in the mark-up between the price of the agricultural producer and the consumer price was 0.69. The decline in the volume of sales of food was not great, judging from the sales of individual goods. We estimate it at 5%. Consequently, the gross incomes of the lower-middle class involved in the manufacture and sale of food fell from Zl.2.0 billion in 1929 (as estimated in *Studies on Income*, vol. i, see p. 417 above) to $2.0 \times 0.69 \times 0.95 =$ Zl.1.31 billion in 1933. This sum

obviously includes the costs of transportation and the outlay of the small businesses for wages, rents, taxes, etc. Transportation costs probably changed little, for on the one hand at the end of 1929 railway rates were increased but on the other in subsequent years many reductions were made in these rates; so we take transportation costs as the unchanged figure of Zl.150 million. Likewise rent, the value of which was Zl.130 million in 1929, did not change. However, since other components of mark-ups, i.e. wages, taxes, etc., changed more or less in the same ratio as incomes of the lower-middle class, the relation in which the latter fell can be estimated as follows: $(1.31 - 0.15 - 0.13) : (2.00 - 0.15 - 0.13) = 0.60$

We now turn to the estimation of changes in incomes of the lower-middle class earned in the manufacture and sale of clothes. The ratio of the fall in mark-ups between the wholesale prices of fabrics and skins and the retail prices of clothing and footwear has been estimated in Appendix 5 at 0.62. Since transportation costs and store rent play an insignificant role in these mark-ups, the ratio 0.62 can be accepted as representative also of the fall in incomes of this group of the lower-middle class per unit of output. We now have to estimate changes in the volume of sales. The textile output of big and medium-size industry declined from 1929 to 1933 according to the ratio of 0.68. However, during this time small industry developed considerably, so that for textile production as a whole this index should be corrected to at least 0.75. On the other hand, in 1933 there was an increase in stocks of fabrics, which can be estimated at 5–10% of the annual output. Consequently (and remembering that stocks did not change much in 1929), we conclude that the ratio of the decline in the consumption of textile products from 1929 to 1933 was about 0.70. This index can be regarded as an indicator of changes in the sales of new articles. However, a considerable part of the 'trade' of the self-employed is repairing footwear and clothing that must have been much greater during the crisis. For this reason we increase the index of services performed by this group of the lower-middle class to 0.8; obviously, this index should be regarded as approximate only. Now, multiplying the respective indices of the decline in the profit margins and sales, we find that the incomes of the lower-middle class earned in the manufacture and sale of clothing and footwear fell in the ratio $0.62 \times 0.8 = 0.5$.

Taking the arithmetic average of indices of the decline of incomes of both these groups of the lower-middle class, we get

$(0.60 + 0.50)/2 = 0.55$; we regard this index as representative for changes in the incomes of the lower-middle class as a whole. Since these incomes were estimated for 1929 at Zl.3.5 billion, in 1933 they would be $3.5 \times 0.55 =$ Zl.1.9 billion. According to assumptions accepted in the *Estimate of Social Income in 1929* and repeated in the introduction to the present study, this sum represents at the same time the value of consumption of the lower-middle class.[8]

The cost of living index of blue-collar workers fell from 1929 to 1933 in the ratio of 0.67 (see Appendix 4), and of white-collar workers in the ratio of 0.69. For the lower-middle class we take the average index, i.e. 0.68. Thus the real consumption of the lower-middle class declined in 1933 to $0.55 : 0.68 = 0.81$ of its 1929 volume.

3. *Consumption of Entrepreneurs (except the Gentry) and Professionals*

There is really no statistical information for estimating this consumption. One can only say that most probably its real value did not change much. In fact, with a decline in the incomes of this group its members begin to save less, or even to consume their assets, reducing their living standards only slightly. For their real consumption we assume a small decline, at a rate of 0.95. Since the value of this consumption in 1929 was estimated at Zl.2.2 billion, it follows that with a fall in the cost of living index in the ratio of 0.69 (see Appendix 4; the cost of living index of white-collar employees is used here) the nominal consumption of profit-earners (except the gentry) and of professionals in 1933 would be $2.2 \times 0.95 \times 0.69 =$ Zl.1.4 billion.

4. *Consumption of Industrial Products by Small Farmers and Farm Workers*

The changes in prices for products that determined the fall in incomes of small farmers are given in Table 109.

[8] The assumption that the consumption and incomes of the lower-middle class match was no doubt generally not met in the years of the crisis, since the lower-middle class could spend more than its present incomes by digging into capital or getting into debt. This was discussed more thoroughly in our essay on 'Fluctuations in Industrial Output and Consumption' (see this volume). As regards 1933, however, it follows from the points made in the present study that this phenomenon no longer occurred in that year or at least that it did not operate on a great scale.

Table 109. *Changes in Prices for Agricultural Goods in Poland, 1929–1933*

Year	Crops	Slaughter animals	Dairy products
(1928 = 100)			
1929	75.1	105.5	98.0
1933	41.1	42.5	46.7
(1929 = 100)			
1933	54.5	40.2	47.6

It follows from the statistical data that the sales of animals for slaughter (i.e. the value of sales at constant prices) rose from 1929 to 1933 by 17%. Hence income from the sales of animals fell in the ratio $0.402 \times 1.17 = 0.47$. We have no data on changes in the sales of dairy products. However, it can be surmised that they declined, and that in cities the consumption of meat increased largely at the expense of dairy products. In fact, there is no doubt that the total consumption of food in cities fell during the crisis and consequently the increase in consumption of meat could only have taken place due to the substitution of meat for other articles, chiefly for dairy products. Assuming a fall in the consumption of dairy products of 10–20%, we get a ratio of the decline of incomes from the sales of dairy products of about 0.40. If we now consider that crops play a relatively minor role in the incomes of small farmers and that dairy products are also much less important than animal production, then from the index of decline of incomes from the sale of animals of 0.47, and from the index of sales of dairy products of 0.40, one can estimate the general index of decline of incomes equal to 0.45.

It should be noted that so far we have dealt solely with incomes from sales to cities, i.e. to the domestic market. The value of exports of animal products declined even more from 1929 to 1933, i.e. in a ratio equal to 0.29. Since we estimated the total gross income of small farmers in 1929 at Zl.2.6 billion, of which Zl.2.1 billion came from the domestic market and Zl.0.5 billion from exports, the gross income in 1933 can be estimated at $2.1 \times 0.45 + 0.5 \times 0.29 =$ Zl.1.09 billion.

We now turn to the calculation of the consumption of industrial products by small farmers and their farm-hands. To do so we have to subtract from their gross income: (i) national and local taxes; (ii) payment of principal and interest on loans; and (iii) outlay on industrial articles necessary for production.

We took Zl.0.10 billion as the expenditure of small farmers on national and local taxes in 1929. We reduce these revenues in the ratio in which general revenues from the land tax fell in 1933 compared to 1929, i.e. by 10%, hence to Zl.0.09 billion.

In the estimate of social income in 1929 we assumed that the inflow of capital to small farming offset the payment of principal and interest on loans. For 1933 these relations obviously changed since the inflow of capital ceased completely, and so it became necessary to calculate the servicing of the 'balance of payments' of small farming. The external indebtedness of small farmers (i.e. leaving out debts to other small farmers) was estimated in Appendix 6 as follows: indebtedness to the State Agricultural Bank at Zl.0.75 billion, to other financial institutions at Zl.0.75 billion, and to private creditors at Zl.1 billion. It turns out that in the State Agricultural Bank the total sum of repayments of principal and interest in 1933 was 3.5% of the sums owed, i.e. only half of the 1929 interest rate alone, which was about 7%. We now assume that the servicing of other debts was similar, i.e. that payments of principal and interest on these other debts were half of their earlier interest rate. Assuming the latter at 10% for bank credits except for the Agricultural Bank, and 20% for private debts, we get 5% and 10% respectively for the total servicing of debts, which in turn enables us to estimate the total sum of repayments of principal and interest by small farmers. This may be presented as follows:

	Indebtedness	Debt servicing	
	(Zl. billion)	(% of sums owed)	(Zl. billion)
Agricultural Bank	0.75	3.5	0.026
Other financial institutions	0.75	5.0	0.038
Private creditors	1.00	10.0	0.100
TOTAL	2.50	x	0.164

The expenditures of small farmers for industrial input for production were estimated for 1929 at Zl.0.40 billion. For 1933 we assume Zl.0.15 billion. Since the price index of this input fell from 1929 to about 0.75, this corresponds to a reduction in the real value of purchases of 50%. Although arbitrary, this is rather a probable assumption: agricultural investments declined by much more (e.g. the sales of agricultural machines fell by 85%), yet we must remember that investments are the most flexible part of productive

expenditures, whereas other expenditures, such as repairs or the replacement of materials that wear out quickly (like horseshoes), are much more rigid.

For the use of industrial articles by small farmers (together with their farm-hands) in 1933 we now have (in Zl.billion) gross income of small farmers (1.09) of which:

Outlay for national and local taxes	0.09
Outlay for debt-servicing	0.16
Outlay for industrial inputs	0.15
Left for consumption	0.69

Rounded off this comes to Zl.0.7 billion for expenditure on consumption.

The consumption of industrial goods by small farmers in 1929 was estimated at Zl.2.1 billion and thus the nominal value of these inputs fell from 1929 to 1933 in the ratio 0.33. If we now consider that the prices of industrial goods used by farmers fell in this period in a ratio 0.71, it turns out that the real value of consumption fell to 0.47 in comparison with 1929.

The consumption of industrial articles by farm-hands was estimated for 1929 at about Zl.0.2 billion, which means that the total consumption of these products by small farmers and their farm workers was 2.1 + 0.2 = Zl.2.3 billion. The ratios of the decline in the nominal and real consumption obtained above for small farmers and their farm-hands can be confidently extended to this entire sum.

We shall now attempt to check the results of our calculations. For this purpose we use studies of peasants' family budgets made by the Institute of Rural Economy in Puławy. However, since the latest data of the Institute are for 1931/2, we cannot compare our findings for 1933 directly with the data published by the Institute. Instead, the latter will be compared with the data for the years 1928/32 obtained through interpolation (by means of the sales index of kerosine regarded as representative for rural consumption; see p. 469).

We compare these data with the Puławy Institute data for 1927/8–1931/2, which chiefly concern outlay for the consumption of industrial goods per head in the category of family budgets of 3–5 hectare farms. As was indicated in our *Estimate of Social Income in 1929* (see p. 410, above), in this category the expenditure on consumption of industrial goods is closest to the average expenditure on these

Table 110. *Consumption of Industrial Goods by Small Farmers in Poland, 1927–1932*

	1927–8	1928–9	1929–30	1930–1	1931–2
Outlays on consumption of industrial goods in 3–5 ha. farms, per head in Zl.	152.8	164.1	146.3	119.5	85.5
(1927–8 = 100)	100.0	107.5	96.0	78.3	56.0
Prices of industrial goods consumed by farmers (1927–8 = 100)	100.0	102.0	101.0	95.0	87.0
Real consumption of industrial goods per head in small farming (1927–8 = 100)	100.0	105.0	95.0	82.5	64.5
No. of rural population (1927–8 = 100)	100.0	101.5	103.0	104.5	106.5
Total real consumption of industrial goods by small farmers (1927–8 = 100)	100.0	106.5	98.0	86.0	68.5
Total real consumption of industrial goods by small farmers (calculated by means of the direct estimate for 1929 and 1933 and the index of sales of kerosine)	100.0	106.0	98.4	84.3	67.8

goods by small farmers as a whole, so that one can assume a similar dynamic of both these groups. We next divide the index of consumption expenditure per head by the price index of industrial goods purchased by farmers, thereby obtaining the index of the real consumption per head. Now, multiplying this index by the approximate index of the number of the rural population, we finally get—in a different way from before—the index of consumption of industrial goods by small farmers (see Table 110). As we see, two completely independent methods of calculation give strikingly similar results.

5. *Consumption of Industrial Goods by the Gentry*

We assume that the consumption of the gentry, which was estimated in 1929 at Zl.0.5 billion, fell in 1933 to about Zl.0.3 billion. Since prices of articles consumed by farmers fell between 1929 and 1933 in a ratio 0.71, this means a reduction in real consumption to 0.85 of its 1929 volume. This hypothesis is quite probable: on the one hand, from direct observations one can hardly surmise that this decline was

much less; on the other hand, assuming a fall in the nominal value of consumption of industrial goods by the gentry from Zl.0.5 billion to Zl.0.3 billion, i.e. by 40%, we come near the ratio at which the prices of crops fell (by 45%), so it is hardly plausible that this consumption was significantly overestimated.

6. *Gross Capital Accumulation*[9]

As we mentioned in our introductory comments, among the three components of capital accumulation—(i) investments, (ii) changes in stocks, and (iii) the balance of exchange of goods and services with foreign countries—in estimating changes in gross capital accumulation from 1929 to 1933 we consider only one component, i.e. investments. According to ISBCP calculations, their index in 1929 was 92.0 and 32.9 in 1933 (1928 = 100); thus investments fell in the proportion 32.9 : 92.0 = 0.36, and we take this number as representative for the decline in the real value of gross capital accumulation between 1929 and 1933. This is obviously only a very preliminary estimate of changes in this component of social income but an error made here cannot have a large effect on our calculation of changes in total income.

7. *Fall in Real Incomes*

Above we calculated the percentage changes in the real consumption of individual groups of the population as well as in investments between 1929 and 1933. In Table 111 we present the results of these calculations and, in order to show the weight of incomes of individual groups of the population, we also give there their respective incomes in 1929.

As we mentioned in the introduction, for the rural groups of the population we had to leave with an estimate of their consumption of industrial goods. So it should be kept in mind that the indices for these groups of the population are not directly comparable with those of the consumption of urban groups of the population. Besides the indices of the real total consumption of individual groups of the

[9] It may be noticed that in the *An Estimate of Social Income in 1929* (this volume) we defined the gross accumulation of capital as the increase of social capital including the amortization of fixed capital.

Table 111. *Real Consumption and Capital Accumulation in Poland in 1933*

Component of social income	Consumption in 1929 (Zl. bn.)	Index of real consumption in 1933 (1929 = 100)	Index of real consumption per head in 1933
Consumption in cities	12.5	—	—
of which:			
white-collar workers	2.5	104	100
blue-collar workers (except farm workers)	4.3	78	75
lower-middle class	3.5	81	78
profit-earners (gentry excluded) and the professionals	2.2	95[a]	92[a]
Consumption in the countryside of industrial goods	2.8	—	—
of which:			
small farmers and farm workers	2.3	47	44
the gentry	0.5	85[a]	82[a]
Capital accumulation	2.1	—	—
of which investments	2.3	36	—
Other capital accumulation	−0.2	—	—

[a] Estimate not based on numerical data, see pp. 455 and 459–60.

population in 1933, in Table 111 indices of consumption per head in these groups are also given. They were derived by dividing indices of total consumption by indices of the number of the population in 1933 (assuming 1929 = 100); the indices of growth in the number of the population were estimated at 103.6 for the urban population and the gentry, and at 106.5 small farmers and farm workers.[10]

We now calculate indices of the real value in 1933 of (i) total consumption in cities, (ii) consumption of industrial goods in the countryside, (iii) total consumption (except the internal consumption of the countryside), and (iv) total social income (internal consumption of the countryside excluded). We assume 1929 = 100 and make this calculation by weighting the indices for individual groups of

[10] Obviously, changes in the number of population in individual groups of the urban population could differ from the average change, but we were unable to estimate these deviations. However, they could not have much effect on our consumption indices (with the possible exception of white-collar workers).

Table 112. *Real Consumption and Social Income in Poland in 1933*

Consumption and social income	Value in 1929 (Zl.bn.)	Index of real value in 1933 (1929 = 100)	Index of real value per head in 1933 (1929 = 100)
Total consumption in cities	12.5	87	84
Consumption of industrial goods in the countryside	2.8	54	51
Total consumption (internal consumption of the countryside excluded)	15.3	81	—
Total income (internal consumption of the countryside and government services excluded)	17.4	75	—

income according to the sums of these incomes in 1929. As the index of real total consumption in 1933 we take the index of the real value of investments (according to our argument on pp. 437–8). The results of these calculations are given in Table 112.

It will be seen that the real value of the social income in Poland in 1933 was 25% lower than in 1929. In nominal terms the fall was obviously much greater: combining the incomes of individual groups of the population obtained above and estimating the approximate value of investments, we get the nominal sum of the social income (internal consumption of the countryside excluded) in 1933 equal to Zl.8.9 billion, which is 49% less than in 1929.

8. *Control of Calculations by Estimating Changes in Social Income according to Sectors of Production*

The decline in social income between 1929 and 1933 was calculated by estimating changes in incomes consumed by individual groups of the population and changes in investments. Now we shall attempt to control these results by estimating, though only roughly, changes in the various kinds of production. We divide the entire social output into three sectors: (i) agricultural production and consumer goods produced by the self-employed, (ii) consumer services (housing, health care, etc.), and (iii) industrial production.

First we estimate the value of output of these sectors of social production in 1929, and the value of each of them will be supplemented by the costs of the distribution network, i.e. by costs of transportation and sales. For instance, the value of output of bread, which belongs to the first sector, will include the transportation costs of grain and the sales mark-up of grain and flour; products exported are exchanged for those imported, and hence to the value of the former we must add the costs of handling and sale of imported goods, etc.

Next we estimate changes in the volume of individual components of total output, that is, we determine how much their value fell in 1933 in terms of 1929 prices. With regard to exported goods, what is important for the changes in the real value of social income is not the change in the volume of exports but the change in the volume of foreign goods received in exchange for them. However, since recent studies on Polish exports and imports during the crisis have shown that from 1929 to 1933 there was no essential change in the terms of trade of Polish goods for foreign ones, in our calculation it will suffice to consider changes in the volume of exports.

Let us then turn to investigation of the first sector, which includes *agricultural production and productions of goods by the self-employed.* It follows from *An Estimate of Social Income in 1929* (see p. 417) that the consumption of food except for sugar and groceries, came to Zl.4.3 billion in 1929 (at retail prices). This sum contains nearly all agricultural production for the urban domestic market and its processing by the self-employed together with costs of sales of agricultural consumer goods.[11] The decline in total consumption of food was estimated above at 5% (see p. 453). Since the sum of Zl.4.3 billion does not include food products whose consumption is the most elastic with respect to income, i.e. sugar and groceries, the fall in the real value of total consumption must be estimated at only about 3%.

We next consider agricultural production for export. In 1929 the value of agricultural exports was Zl.1.2 billion. In line with our argument, the costs of sales of goods received in exchange for exports must be added to it. These costs may be estimated at about 30% of the value of imports, and so the value of social income received from

[11] For simplicity, the production of goods necessary for processing of industrial crops, the production of wood, etc., is included in industrial production.

the export of agricultural products would be Zl.1.6 billion. The fall in the volume of this export came to 39%.[12]

The output of the self-employed food producers has already been considered in the value of consumption of food. Besides this, of the output of consumer goods produced by the self-employed we also take into consideration the production of the self-employed in textile and tanning businesses as well as in tailoring and shoemaking; other output of consumer goods produced by the self-employed has no great significance. For 1929 the value of output of the textile and tanning businesses as well as of the smallest industry not using machines was estimated at Zl.0.2 billion. As far as we know, during the crisis this output did not decline, and maybe even increased. We assume that it did not change. For 1929 the value of tailors' production was estimated at Zl.0.4 billion and of shoemakers' at Zl.0.5 billion (in *An Estimate of Social Income in 1929*). Assuming, as on p. 454, that the production of new clothes and footwear fell by 30% and that in 1929 one-quarter of the production of tailors and a half of shoemakers consisted of repairs, whose number in 1933 probably remained unchanged, we get a decline of output of the self-employed businesses in clothing of 18%.

Let us now put together our results and calculate the combined index of the real value of agricultural production and consumer goods produced by the self-employed in 1933 (1929 = 100), weighting the indices of individual component parts according to the value of these components in 1929. The results of these calculations are as follows:

	Value in 1929 (Zl.bn.)	Index of real value in 1933 (1929 = 100)
Consumption of food of domestic origin (except sugar) in cities	4.3	97
Agricultural exports	1.6	64
Production of self-employed		
tailoring and shoemaking	0.2	100
textile and tanning trades	0.9	82
Total output of agriculture and the consumer goods produced by the self-employed (costs of sales included)	7.0	88

[12] See L. Landau, 'Export from Poland during the Crisis', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 3/2–3 (1934) (in Polish).

Now we come to the sector of consumer services. The most important component here are housing services. Their value, i.e. the sum of rents paid for residential dwellings, can be estimated for 1929, according to the income tax data, at Zl.0.7 billion. However, this sum does not include the subtenant's rent over and above the rent paid by the chief tenant. Consequently, we raise the value of housing services in 1929 to Zl.0.8 billion. Their real value can be taken as unchanged in 1933: the small increase in the number of dwellings in these four years compensates for a certain, although small, increase in the number of flats available for renting.

Among consumer services we next consider health care. In 1929 the ratio of the value of health care services provided by health insurance agencies to the incomes of those insured was approximately 4% (see *An Estimate of Social Income in 1929*, p. 402, this volume). We assume the same ratio of health care services to consumption for the entire urban population: among the population not insured in health insurance agencies there are groups that spend both a higher and a lower proportion of their income on health care. Thus the value of total health care services in 1929 can be estimated at 4% of the Zl.12.5 billion of consumption in cities (the value of health care services in the countryside is insignificant). In 1933 the number of those insured in health insurance agencies fell in comparison with 1929 by 20%, and this can be taken as the measure of the decline in the business of health insurance agencies. Regarding the groups of population not insured by these agencies, besides government employees in regular positions and profit-earners who probably use medical services to no less extent, we also have to consider the lower-middle class, which certainly had to limit considerably its use of physicians' services. Accordingly, the assumption that health care services fell in general by 20% seems quite likely.

Finally, we still have to consider the services of domestic servants, whose value in 1929 was Zl.0.3 billion. This probably did not change much since the social groups that make chief use of them—white-collar workers, profit-earners, and professionals—reduced their consumption hardly at all.

Let us now put together these results for the three main components of consumer services and calculate the combined index of their real value in 1933 (1929 = 100), again weighting the indices for individual component parts according to their value in 1929. The results of these calculations are as follows:

	Value in 1929 (Zl.bn.)	Index of real value in 1933 (1929 = 100)
Housing services	0.8	100
Health care services	0.5	80
Services of domestic servants	0.3	100
Total consumer services	1.6	94

Of the total income (internal consumption of the countryside excluded), whose value in 1929 was Zl.17.4 billion, so far we have accounted for agricultural production and consumer goods produced by the self-employed at Zl.7.0 billion, and consumer services at Zl.1.6 billion. Thus there remains 17.4 – 7.0 – 1.6 = Zl.8.8 billion that falls almsot entirely to industrial production together with the production of industrial raw materials of agricultural origin and the goods produced by the self-employed in non-consumer businesses (such as the construction trades). Some consumer-goods-producing business (e.g. cabinet-making) and services (such as entertainment) have not been considered in our calculations, but their value is an insignificant part of this sum and they show a growth trend similar to that of industrial output as a whole. The value of the latter is understood here, as it was emphasized in the introduction, inclusive of the costs of transportation and brokerage; as regards exported products, their value contains the costs incurred in the handling and sale of foreign products received in exchange for them.

The industrial output index in Poland in 1933 (1929 = 100), corrected according to a method recently developed in ISBCP,[13] was 57. This index can be regarded as representative of changes in the part of social income presently under examination. The final results are therefore as follows:

	Value in 1929 (Zl.bn.)	Index of real value in 1933 (1929 = 100)
Agricultural production and consumer goods produced by the self-employed	7.0	88
Production of consumer services	1.6	94
Industrial productions	8.8	57
Social income (internal consumption of the countryside excluded)	17.4	73

[13] See M. Kalecki and L. Landau, 'The International Comparability of Indices of Industrial Output and an Attempt to Improve It', this volume.

Thus the index of the real value of total social income (internal consumption of the countryside excluded) in 1933 (1929 = 100), calculated as the weighted average of the basic indices of the three sectors of production of goods and services, is 73. This index shows an entirely satisfactory agreement with the result obtained in our earlier calculations which rendered an index of income (internal consumption of the countryside excluded) of 75. In this way we have confirmed the reliability of our earlier estimates.

9. *Consumption per Head of Population*

To gain some insight into the living standard of individual groups of the population we still must calculate the average monthly expenditures on consumption of a family of four in these groups in 1933. This calculation is made on the basis of the nominal value of total consumption of these groups, estimated above, and on the population of each group. Only the urban population is taken into account here since, owing to the impossibility of estimating internal income of the countryside, we have no grounds for determining the total consumption per head of the rural population. The population of the urban groups in 1933 was calculated by increasing the respective figures for 1929 by 3.6%, for this was our estimate of the increase of the urban population in 1929–33. The results are presented in Table 113.

Table 113. *Consumption of an Urban Family of Four in Poland in 1933 (monthly, in Zl.)*

Groups of the population	Value of consumption
White-collar workers	445
Blue-collar workers (except farm workers)	135
Lower-middle class	185
Profits-earners (except the gentry) and the professionals	800

II. Consumption Indices and Indices of Social Income

Studying the dynamics of investments and consumption, the Institute for the Study of Business Cycles and Prices until now used an index

that represented approximately only the first of these two components of social income. Changes in consumption were recorded only by means of several symptomatic indices, i.e. indices that only defined the direction of these changes without scaling their magnitude. For the indices representing consumption in cities the baking of wheaten bread (in fact, the sales of yeast) and cinema attendance were used, for consumption in the countryside—sales of kerosine, and finally for mixed consumption—sales of sugar and tobacco (these indices are listed in Appendix 7). The ratios at which these particular kinds of consumption declined between 1929 and 1933 were calculated above. On this basis we can now easily see that none of these symptomatic indices has the same amplitude of fluctuations as the consumption which it represents. The sales of wheaten bread fell from 1929 to 1933 in the ratio 0.77, cinema attendance in more or less the same proportion, and consumption in cities only in the ratio 0.87. The sales of petroleum (after elimination of the trend) declined in 1933 to 0.71 of their 1929 volume, while the corresponding index for the consumption of industrial products by small farmers was 0.47.[14] The sales of sugar declined in the ratio 0.77, the sales of tobacco (at constant prices) in the ratio 0.71, and their consumption (internal consumption of the countryside excluded) in the ratio 0.81.

These differences suggest that it might be worth while to calculate indices corresponding to the symptomatic ones, but of an amplitude equal to that of the respective categories of consumption. If we denote a given symptomatic index by x and the ratio in which it represents the decline of consumption from 1929 to 1933 by m, then, strictly speaking, the task would be to find such an equation, $y = ax + b$, that the ratio of the value y in 1933 and in 1929 would equal m. We now denote the value of x in 1929 by x_1 and in 1933 by x_2 and also impose the condition that $y = 100$ for $x = 100$ (i.e. that if for x we have taken 1928 = 100, the same base is taken also for y). We then obtain two equations for determining the coefficients a and b

$$(ax_2 + b)\,(ax_1 + b) = m,$$

$$a \times 100 + b = 100.$$

[14] The considerably smaller fall in the consumption of kerosine than of industrial products can be explained by the fact that a large part of kerosine sales are to cities and its consumption there reacts weakly to changes in incomes.

The solution of these equations gives

$$a = 100(1 - m):[(mx_1 - x_2) + 100(1 - m)], \tag{1}$$

$$b = 100(1 - a). \tag{2}$$

In Table 114 we present the results of calculations made by means of equations (1) and (2) for individual symptomatic indices of consumption.

The equations $y = ax + b$ allow us to calculate for a given symptomatic index, x, the corrected index, y, of the same amplitude of fluctuations as the consumption that it represents. This hardly means that the 'corrected' index is already a precise index of a given kind of consumption, since by equalizing the respective amplitudes we remove the most important, but not the only source of deviation in the changes of the symptomatic index and in the consumption that it represents. (Here it should be noted that as indices representing consumption we selected articles whose sales are rather weakly affected by changes in their prices; that is why as indices of consumption neither the sales of meat nor of alcohol are used.)

In Table 115 we present the corrected symptomatic indices and from them we calculate the approximate indices of consumption in the following stages: (i) we obtain the index of consumption in cities as the arithmetic mean of the corrected indices of the sales of wheaten bread and the cinema attendance; (ii) for the index of the consumption of industrial goods by small farmers we take the corrected index of kerosine sales; (iii) next, the index of total consumption (internal consumption of the countryside excluded) is calculated by weighting the index of urban consumption and the index of consumption of

Table 114. *Corrected Symptomatic Indices of Consumption in Poland, 1929 and 1933*

Symptomatic indices of consumption	x_1	x_2	m	$y = ax + b$
Consumption in cities				
wheaten bread	102.2	79.0	0.87	$y = 0.57x + 43$
cinema attendance	110.7	85.6		$y = 0.32x + 68$
Consumption in cities and in the countryside				
sugar	104.1	80.8	0.81	$y = 0.84x + 16$
tobacco	104.0	73.7		$y = 0.64x + 36$
Consumption of industrial goods by small farmers (after trend elimination)	102.6	72.9	0.47	$y = 1.87x - 87$

Table 115. *Consumption Indices in Poland in 1927–1934 (seasonal fluctuations eliminated)* (1928 = 100)

Year and half-year	Consumption in cities			Consumption in the countryside (kerosine)	Consumption in cities and in the countryside				
	wheaten bread	Cinema attendance	Arithmetic mean (1) & (2)		Weighted average (3) & (4)	Sugar	Tobacco	Arithmetic mean (6) & (7)	Arithmetic mean (4) & (8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Weights	21	21	42	8	50	25	25	50	100
1927I	91.5	85.6	88.6	104.9	91.2	90.3	89.5	89.9	90.5
II	96.5	91.4	94.0	104.2	95.7	94.0	93.2	93.6	94.6
1928I	99.9	97.2	98.6	95.0	98.0	99.2	98.2	98.7	98.3
II	100.0	102.8	101.4	104.1	101.9	100.9	101.7	101.3	101.6
1929I	101.0	103.9	102.5	107.0	103.2	103.4	100.6	102.0	102.6
II	101.4	107.9	104.7	102.9	104.4	103.6	104.5	104.1	104.2
1930I	100.6	104.6	102.6	93.1	101.1	98.8	102.9	100.9	101.0
II	101.1	105.6	103.4	87.3	100.9	100.0	99.8	99.9	100.4
1931I	100.5	98.3	99.4	80.5	96.4	94.5	96.4	95.5	95.9
II	99.2	96.8	98.0	73.1	94.0	91.2	93.6	92.4	93.2
1932I	96.2	90.9	93.6	62.0	88.5	88.7	88.8	88.8	88.6
II	91.6	89.4	90.5	50.8	84.1	84.9	86.2	85.6	84.8
1933I	87.5	92.4	90.0	52.0	83.9	84.8	83.4	84.1	84.0
II	88.5	91.8	90.2	46.7	83.3	82.9	83.0	83.0	83.1
1934I	91.6	91.0	91.3	46.1	84.1	88.7	83.9	86.3	85.2

industrial goods by small farmers in proportion to the value of these components of social income in 1929, i.e. Zl.12.5 billion and Zl.2.3 billion respectively;[15] (iv) then we calculate another index of consumption as the arithmetical average of the indices of sales of sugar and tobacco; and (v) finally, we take the arithmetic mean of the consumption indices obtained independently of each other in stages (iii) and (iv) and regard this average as the final index of consumption.

To what degree do these consumption indices represent actual changes in consumption? The index of consumption of industrial goods by small farmers was already checked before by comparison with the data of the Institute of Rural Economy in Puławy. The differences between the indices of sales of sugar and tobacco are insignificant; this consistency suggests that they alone, and the more so their average, represent rather well changes in consumption as a whole. This is very much the case of the index of consumption in cities, whose symptomatic indices, i.e. the sales of wheaten bread and cinema attendance, show large differences. However, here as a test we can use a rather close consistency between the two indices of total consumption calculated by two different methods, since the consumption index in cities has a big weight in the first of these indices. This consistency is simultaneously an evidence of the significance of our final index of total consumption (internal consumption of the countryside excluded).

Now let us compare these indices of consumption with the investment index prepared by the ISBCP. Since investments are an important part of gross capital accumulation, we can get an approximate index of income (internal consumption of the countryside excluded) by weighting the index of total consumption and the index of investments in the relation Zl.15.3 billion (i.e. the value of consumption in 1929) and Zl.2.1 billion (i.e. the value of capital accumulation in 1929). The results of these calculations are given in Table 116, and the changes in indices of consumption in cities and in the countryside, and in total consumption, investments, and social income (internal

[15] In calculation of the consumption index (internal consumption of the countryside excluded) we have not considered the consumption of the gentry. However, owing to the marginal importance of this component of the social income and the fact that as regards the intensity of changes it occupies an intermediate position between consumption in cities and the consumption of industrial goods by small farmers, this omission is of no great significance.

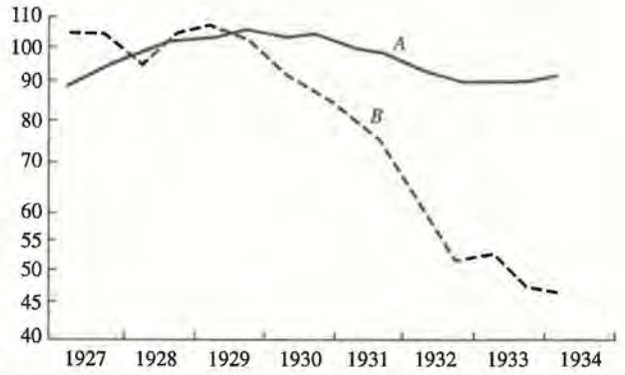
Table 116. *Indices of Consumption, Investment and Social Income in Poland, 1927–1934 (seasonal fluctuations eliminated, 1928 = 100)*

Year and half-year	Consumption (internal consumption of the countryside excluded)			Investments	Social income (internal consumption of the countryside excluded)
	in cities	in the countryside	total		
Weights	74	14	88	12	100
1927 I	88.6	104.9	90.5	75.6	88.7
II	94.0	104.2	94.6	86.7	93.6
1928 I	98.6	95.0	98.3	99.4	98.4
II	101.4	104.1	101.6	101.7	101.6
1929 I	102.5	107.0	102.6	96.5	101.9
II	104.7	102.9	104.2	86.4	102.1
1930 I	102.6	93.1	101.0	67.9	97.0
II	103.4	87.3	100.4	61.7	95.8
1931 I	99.4	80.5	95.9	49.2	90.3
II	98.0	73.1	93.2	42.5	87.1
1932 I	93.6	62.0	88.6	33.4	82.0
II	90.5	50.8	84.8	33.3	78.6
1933 I	90.0	52.0	84.0	34.0	78.0
II	90.2	46.7	83.1	33.3	77.1
1934 I	91.3	46.1	85.2	36.6	79.4

consumption of the countryside excluded) are illustrated in Figs 39 and 40.

Appendix 1. Earnings of Employees Insured in White-Collar Workers' Insurance Companies

For white-collar workers whose wages do not exceed Zl.720 per month we calculate their earnings according to the increase of payments to the retirement insurance fund. In 1933 it came to Zl.61.9 million; to this sum we add Zl.14.5 million, that is, the amount the unemployment insurance payments would have been at the 1929 rate—i.e. before the reform—and thus we get Zl.76.4 million. With a basic insurance rate of 10% of earnings, and after considering the differences that arise from comparing the actual earnings with the so-called basic wages rates, that is, with the lower limits of wage-rate intervals, this insurance rate is about 9.2% of the actual earnings;

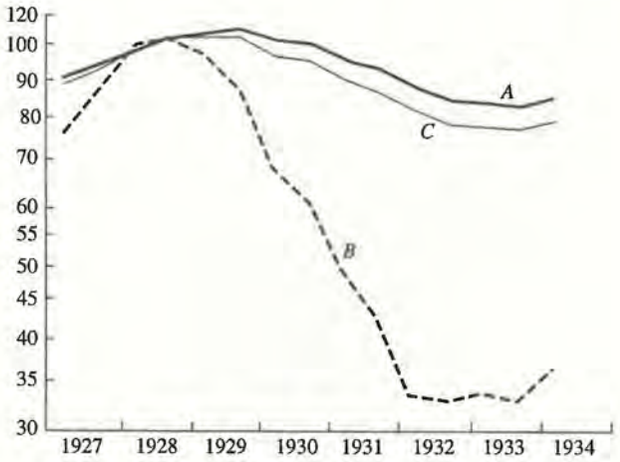


A—consumption in cities; *B*—consumption of industrial products by small farmers

FIG. 39. *Consumption Indices in Cities and in the Countryside in Poland, 1927–1934 (logarithmic scale; 1928 = 100; seasonal fluctuations eliminated)*

Note: Intensity of changes in consumption in the cities and in the countryside is not commensurable since the former represents all urban consumption, and the latter only the consumption of industrial goods, i.e. only the most flexible part of rural consumption.

therefore the latter will be estimated at $76.4 \times 100 : 9.2 = Zl.830$ million.



A—consumption (except for internal consumption of the countryside); *B*—investments; *C*—marketable social income

FIG. 40. *Indices of Consumption, Investments, and Social Income in Poland, 1927–1934 (logarithmic scale; 1928 = 100; seasonally adjusted)*

The volume of earnings in excess of Zl.720 is estimated on the basis of the difference between the increase in unemployment insurance payments calculated above according to the old norms, and the actual increase in 1933 in unemployment insurance payments. This difference was due to two factors. First, rates of unemployment insurance payments on wages not exceeding Zl.720 increased as a result of abolition, from May 1933, of a maximum unemployment insurance lower than retirement insurance (Zl.560), which itself was of a less significance, but more importantly, as a result of raising the basic insurance rate from 2 to 2.8% from June 1933. Secondly, insurance rates increased due to charging the excess of wages above Zl.720—in the part corresponding to the employee's own contribution (i.e. in three-fifths of the wage)—at 1.2% from May, and 1.6% from June. The actual increase of unemployment insurance payments for 1933 was Zl.19.4 million, and so the difference was 19.4 – 14.5 = Zl.4.9 million.

The influence of the first factor, i.e. of the increase in payments on the part of wages not exceeding Zl.720, is estimated at Zl.4.0 million since the premium increased from 1.8 to 2.3% on average during the year, that is, by 28%. Thus Zl.0.9 million remains as an additional charge on the part of wages above Zl.720. Since this charge was 1.2% in May 1933, and 1.68% from June to December 1933, i.e. 1.08% for the year as a whole, for total earnings in excess of Zl.720 we get Zl.0.9 million × 100 : 1.08 = Zl.83 million.

In this way the total earnings of white-collar workers insured in the White-Collar Workers' Insurance Companies come to about Zl.0.91 billion. Compared with 1929, when they were Zl.1.28 billion, the decline is 28%. However, it should be noted that in 1930 premiums in ZUPU still showed a slight increase of 4%, and only later they began to fall. This increase in part was due to the still-rising wage rates in 1929 and, moreover, only during 1929 were all employees covered by this insurance. Therefore the increase in premiums between 1929 and 1930 in part would not result from an increase in earnings. Hence the increase of earnings in that year would be less and, correspondingly, their fall in 1933 in comparison with 1929 would be greater than the above 4% increase in unemployment insurance premiums might suggest. The second factor that also contributed to a too small decline of premiums in ZUPU in comparison with the fall in actual earnings was an expansion of the range of

insurance coverage thanks to the reinterpretation of the Decree of 1927.

The influence of either of these factors could not have been very great: the upper boundary for the first factor is 4% (by which premiums increased in 1930), and the second factor was limited to small groups of employees (mainly shop assistants). Hence we assume that the combined influence of both these factors was 4% of earnings of those insured in ZUPU, and thus that the decline of these earnings was 33%. Since they were Zl.1.28 billion in 1929, this would mean a decline to Zl.0.86 billion in 1933.

Appendix 2. Earnings of White-Collar Workers in Industry

The industrial statistics of the Central Statistical Office give the sums of gross and net wages for white-collar workers for 1932. There are similar data for 1929, but not on net wages for all industries. Yet, since the composition and classification of individual industries seem to have changed somewhat, we do not take the sums of wages directly from these data, but only their ratios to blue-collar workers' wages, and then, bringing over these relations to. J. Derengowski's calculations of earnings of blue-collar workers we determine changes in earnings of white-collar workers in industry. To avoid random fluctuations connected with changes in the structure of the plants under examination, we take into account only large industries; besides manufacturing industry we also consider coalmining for which the ratio of earnings of white- and blue-collar workers is determined according to the data on costs. The ratio of earnings of office workers to blue-collar workers in manufacturing industry are for net earnings (on which there are no data except for 1929), but since we are concerned here only with changes in these ratios, this difference is not very important. The results of our calculation are shown in Table 117.

It will be seen that the ratio of wages of white-collar and blue-collar workers changed definitely in favour of the former. An increase in this ratio was observed in all industries under examination. On average, the ratio increased from 21% in 1929 to 30% in 1932. As a result, with an index of wages of blue-collar workers equal to 47.5 (for the industries selected here and compared with 1929), for the wages of white-collar workers we get an index of 66.5. Since the fall

Table 117. *Earnings of White-Collar Workers in Industry in Poland, 1929 and 1932*

Branch of industry	Ratio of earnings of white-collar workers to blue-collar workers (%)		Earnings of blue-collar workers (Zl.m.)		Earnings of white-collar workers (Zl.m.)	
	1929	1932	1929	1932	1929	1932
Selected branches together	21	30	1108	527	236	157
of which:						
coal mining	16	23	354	195	57	45
metal (metallurgy included)	26	41	208	82	54	34
minerals	15	25	103	32	15	8
chemicals	38	54	94	51	36	28
textiles	21	25	275	141	58	35
wood	22	25	74	26	16	7

of wages in industry as a whole was somewhat greater (the index was 45), by reducing the index of wages of white-collar workers in the same proportion we get an index of 63. In 1933 the wages of white-collar workers declined still further, since wage rates continued to fall and there were also some more (although slight) reductions in employment.[16] Hence for 1933 we can accept an index of 60, which means a decline in wages of white-collar workers in industry of 40%.

Appendix 3. Earnings of Workers Insured in the Unemployment Fund

The sum of insurance premiums in 1929 came to Zl.34.05 million. Premiums in that year were calculated according to two different rates: in the first half-year a 2% rate, and in the second a 1.8% rate of earnings. Dividing the sum of the increase in premiums into sums paid in each half-year and at the rates in effect at the time, we get the total sum of earnings, from which premiums were deducted, of Zl.1.80 billion. However, this sum does not represent all earnings of the blue-collar workers insured since earnings above Zl.7.50 per day

[16] See T. Czajkowski, 'Employment of White-Collar Workers in Industry', *Statystyka Pracy*, 12/4 (1933) (in Polish).

were not considered in the assessment of the premium. Thus we have to determine the sum of earnings in excess of Zl.7.50 per day, i.e. more than Zl.45 per week. According to the data on the distribution of wages of blue-collar workers in industry in 1929,[17] the average weekly wage of Zl.39.80 was reduced to Zl.32.10 after cutting off earnings in excess of Zl.45. Hence, to move from these 'cut-off' wages to the actual ones, the former had to be increased by 24%. Because of the considerable predominance of industrial workers among those insured in the Unemployment Fund, we assume that this was the ratio for all those insured. Increasing the above sum of Zl.1.80 billion by 24%, we get Zl.2.23 billion.

In 1933 premiums were already calculated on actual earnings without any deductions. However, the difficulty consists in this that the premium rate has been diversified: beside the normal premium of 2%, a rate of 4% has been introduced for seasonal workers; these were chiefly workers in the construction industry and in 1933 they made up an average of 6.1% of all those insured. Among seasonal workers some could have been also steel workers, as well as those employed in road construction, on the railways, water-systems, land reclamation, in brick-kilns, navigation, etc. Consequently, we assume that the share of seasonal workers in earnings was somewhat higher and came to 8%. The total sum of the increase in premiums, which in 1933 amounted to Zl.21.763 million, under these assumptions corresponds to a sum of earnings equal to Zl.1.01 billion (Zl.0.93 billion at a rate of 2% and Zl.0.08 billion at a rate of 4%).

As was noted, however, between 1929 and 1933 there were certain changes in the insurance coverage. Therefore, to make the indices comparable, the sums of 1933 have to be adjusted so as to correspond with the scope of operations of the Unemployment Fund in 1929. The insurance coverage was expanded in three directions. First, 16- and 17-year-old workers were insured. Judging from the industrial statistics, their number could not exceed 2% of all workers and the sum of their earnings was probably not more than 1% of total earnings. Secondly, firms employing five and more workers were included (previously only firms employing more than five workers were considered). Relying on industrial statistics again, employment in these firms can be estimated at 1–2%. Thirdly, firms owned by

[17] See L. Landau, *Wages in Poland in Connection with Economic Development*, Warsaw, Instytut Spraw Społecznych, 1933: 31 (in Polish).

local and central government, which do not give workers adequate coverage in case of unemployment, were also included. Considering changes in the number of insured persons employed in firms owned by local government and in state-owned firms from 1931, i.e. when the regulations were changed, to 1933, we find that the increase in insurance coverage on this account could not have exceeded 1% of all those insured.

Thus the increase in insurance coverage could have caused a rise in the sum of earnings subject to payments to the Unemployment Fund of up to 3% of total earnings. However, in other fields the coverage was narrowed by excluding from the insurance requirement certain categories of seasonal workers—in sawmills, land reclamation projects, and also (from November 1933) workers employed in public works for the purpose of providing jobs for the unemployed or financed by the Work Fund. These are all rather small exclusions (concerning sawmills, for instance, this will be immediately seen from the number of those insured in the wood industry) and their total effect could not exceed 2% of total earnings. Thus the range of operations of the Unemployment Fund probably expanded by 1–2% and therefore, to gain comparability with 1929, the above-mentioned sum of earnings of those insured in the Fund should be reduced from Zl.1.01 billion to Zl.0.99 billion.

Appendix 4. Corrections to Calculations of Changes in Cost of Living owing to Housing Costs

Changes in housing costs are accounted for in the cost of living indices according to price changes of flats covered by the Law on Protection of Tenants, for we have some data on these prices only. Thus our indices do not include prices of (i) flats not covered by the Law on Protection of Tenants, i.e. flats in new houses or in houses outside cities, e.g. in suburban localities where the Law does not apply, and (ii) part of flats that are sublet. These categories of flat renting are by no means unimportant, since subletting alone is quite common, and the price changes in these areas were very different from those in the controlled areas. Whereas small flats enter the cost of living index of families of blue-collar workers as the only possibility, they enter the cost of living index of families of white-collar workers as one of several possibilities. The official rent continued to

increase considerably until the fourth quarter of 1930, making renting small flats much more expensive than in 1928 and 1929, but the prices of sublet flats and rented rooms not only did not increase but even declined sharply. Such divergent price changes of services satisfying the same need was possible because of price control; 'compensation' had to be paid for leases of rent-controlled flats, but during the crisis this compensation fell sharply, which (for lack of data) could not be reflected in the indices of the cost of living calculated by the Central Statistical Office. Finally, we must consider yet another factor, i.e. arrears in the payment of rent and special regulations on the unemployed, which, although they did not influence the price directly, nevertheless did reduce the real costs of housing. Considering all these factors, we thought it necessary to reduce the index of housing costs by 25% compared to the index calculated by GUS. By making this correction, the cost of living indices (1928 = 100) are reduced for families of white-collar workers from 75.6 to 72.5, and for families of blue-collar workers from 71.2 to 68.3. Since in 1929 these indices were 105.2 and 101.5 respectively, in comparison with 1929 the cost of living in 1933 fell for families of white-collar workers in a ratio of 0.69, and for families of blue-collar workers in a ratio of 0.67.

Appendix 5. Fall in Profit Margins of the Lower-Middle Class

For 1933 we can determine the profit margins in the sales of agricultural products, i.e. the spread between the prices paid by consumers and those received by producers, in the same way as we determined them for 1929 in the *Studies on Social Income in Poland*, vol. i (see pp. 431–4). By comparing the results for these two years we get the rate of fall in gross income of the lower-middle class (per unit of product) from the processing and sale of food articles.

For rye the situation in 1933 was as follows. The average price received by producers was Zl.16 per quintal, the retail price of bread was Zl.0.326 per kilogram, and the price of rye bran was Zl.9.6 per quintal. Hence, the total revenue from the sale of products obtained from a quintal of rye (i.e. 0.845 quintals of bread and 0.35 quintals of bran) was Zl.30.90, and the profit margin was

30.90 – 16.00 = Zl.14.90. Since in 1929 the profit margin was 18.50, this means a decline in this period by 20%.

Regarding potatoes, in the September to December period that we take as the base in these calculations, the price paid to producers was Zl.3.60 per quintal and the retail price was Zl.0.078 per kilogram, the profit margin was Zl.4.20, i.e. compared with 1929 when it was Zl.5.10 it fell by 18%.

Finally, for beef we get an average market price of Zl.0.536 per kilogram of live weight and a producer's price of 12.3% less (according to the ratio of the corresponding prices for pork, Zl.0.99 and Zl.0.8675 respectively), hence Zl.0.47 per kilogram of live weight. The retail price was Zl.1.40 per kilogram of meat, and the price of skin was Zl.1.17 per kilogram. Assuming that a steer weighs 450 kilograms and yields 280 kilograms of meat (together with pluck converted to the value of meat) and 25 kilograms of skin, we get a sum of Zl.212 paid to the producer for the steer and Zl.421 as the sum received from the sale of meat and skin; thus the profit margin is Zl.209, whereas in 1929 it was Zl.367. This means that the profit margin fell by 43%.

Thus we see that the fall in the profit margin in the processing and sale of agricultural products was not uniform: for bread it was 20%, for potatoes 19%, and for beef 43%. We take beef as representative of half of sales (including other articles whose price changes were similar, i.e. other kinds of meat and part of dairy products), and for the remainder we assume a decline in the profit margin in the same proportion as we obtained for rye and potatoes, i.e. 19%. As a result, we get a decline of 31% of the gross profit margin of the lower-middle class involved in the processing and sale of food products.

In addition to this, by comparing the price changes of clothing and footwear on the one hand, and the materials for them on the other hand (fabrics and skins), we determine changes in the profit margins of the second large group of the population living from self-employment. From 1929 to 1933 the cost of clothing in the cost of living index (of white-collar workers for whom price changes of fabrics and labour costs were taken into account) declined by 40.6%. The indices of the wholesale price of materials declined during this time for fabrics by 40.4% and for skins by 50.0%, which gives an average of 42.3% (attributing a fourfold greater weight to fabrics than to skins). Thus the prices paid by consumers for finished clothing fell in a proportion not much lower than the prices of materials; hence the profit margins (of the self-employed) fell almost in the same proportion. Assuming that the share of materials in the cost of clothing was 60% on average, we can easily calculate that the profit margin fell from 40 to (100 – 40.6) – (100 – 42.3) × 0.6 = 24.8, that is, in a ratio of 0.62 which we accept as characteristic of the decline of the gross incomes of the lower-middle class involved in the processing and sale of clothing and footwear.

Appendix 6. Indebtedness of Small Farmers

In a survey published by the Institute of Rural Economy in Puławy,[18] to which 1503 small farmers from various parts of the country responded, it was found that in the middle of 1933 the average indebtedness per hectare was Zl.315. The division of this sum according to the type of creditor was as follows (in Zl.):

Other small farmers	120
Financial institutions	136
of which the State Agricultural Bank	68
Private creditors (non-farmers)	45
Tax arrears	14
TOTAL	315

Thus indebtedness, which included the payment of principal and interest to others, i.e. not to other small farmers, was 136 + 45 = Zl.181 per hectare (of which Zl.68 was owed to the State Agricultural Bank). If we consider these figures as representative for small farmers as a whole, their total indebtedness—considering that the total area of farms up to 50 ha. was 22 million ha.—would be about Zl.4 billion, of which about Zl.3 billion was owed to financial institutions (Zl.1.5 billion owed to the State Agricultural Bank and approximately Zl.1 billion to private creditors). However, these sums are unquestionably too high. The total credits granted by the State Agricultural Bank at the end of 1933 only came to Zl.0.97 billion, of which approximately Zl.0.75 billion was granted to small farmers, which is half the sum obtained in our calculation. This can be easily explained.

[18] See A. S. Broda, *The Indebtedness of Small Farmers as of 1 July, 1993*, in *Biblioteka Puławska. Seria prac społeczno-gospodarczych*, 48, Warsaw, Państwowy Instytut Naukowy Gospodarstwa Wiejskiego, 1934 (in Polish).

Those who responded to the questionnaire were chiefly farmers who were seriously in debt, and by filling out their answers they expressed their frustration. At the same time, one can surmise that those who knew how to respond to the questionnaire were also better 'qualified' for making use of bank credit. Consequently, the questionnaire showed a greater than average level of indebtedness, and the excess probably falls chiefly to liabilities to financial institutions. For this reason it seems that the best possible estimate of general indebtedness can be obtained by reducing the earlier derived sum of Zl.3 billion owed to financial institutions by the difference between the indebtedness to the State Agricultural Bank calculated above and that shown in reality, i.e. by half, while leaving the sum of obligations to private creditors unchanged. We then get the following estimate of the indebtedness of small farmers in the middle of 1933 (in Zl.billion);

Financial institutions	1.5
of which the State Agricultural Bank	0.75
Private creditors (non-farmers)	1.0
TOTAL	2.5

Obviously, these results cannot claim to be precise and are only a rough approximation.

Appendix 7. Symptomatic Indices of Consumption

Table 118. *Symptomatic Indices of Consumption in Poland in 1927–1934 (seasonal fluctuations eliminated; 1928=100)*

Year and half-year		Consumption in cities		Consumption in cities and in the countryside		Consumption in the countryside (sales of kerosine)	
		wheaten bread (yeast sales)	cinema attendance	sugar (sales)	tobacco (sales at constant prices)	without trend elimination	after trend elimination
1927	I	85.1	73.9	88.5	83.6	100.8	102.6
	II	93.9	84.4	92.8	89.4	101.1	102.2
1928	I	99.8	94.9	99.1	97.2	97.0	97.4
	II	100.0	105.1	101.1	102.7	102.2	101.8
1929	I	101.7	107.1	104.0	101.0	105.0	103.9
	II	102.4	114.4	104.3	107.0	103.2	101.4
1930	I	101.0	108.4	98.6	104.5	98.9	96.4
	II	102.0	110.1	100.0	99.7	96.5	93.5
1931	I	100.8	96.9	93.5	94.4	93.5	89.6
	II	98.6	94.1	89.5	90.0	90.3	85.7
1932	I	93.4	83.4	86.5	82.5	85.0	79.6
	II	85.3	80.7	82.0	78.5	79.6	73.7
1933	I	78.1	86.1	81.9	74.1	81.0	74.3
	II	79.8	85.1	79.7	73.4	78.9	71.5
1934	I	85.3	83.6	75.5	74.8	79.3	71.2

Fluctuations of Prices and Costs and Fluctuations of Industrial Production in Poland[1] (with Ludwik Landau) (1935)

1. The Nature of the Problem

The sharp fluctuations of industrial production that we observe in the course of the business cycle consist chiefly in fluctuations in the use of capital equipment, whereas the volume of this equipment changes by only a few per cent. The relation of prices and costs determines the degree of use of capital equipment. Whether and to what extent a given plant is to be operated is determined by the relation of prices and costs: if the price of the product increases in relation to prices of inputs used in manufacturing this product, the new plants and those previously idled because of their non-profitability will be put into operation.

It should be noted that not all costs are taken into account in this calculation, but only prime costs, i.e. those which are related to keeping the plant in operation, namely the costs of raw and auxiliary materials, of labour, administration, taxes, and interest on working capital. On the other hand, the cost of amortization and interest on fixed capital cannot have any influence on operating of the already existing plants. Every plant, or part of it, will be in operation if prices are even slightly higher than direct costs of producing a unit of output, for it is better to earn at least something to pay for amortization and interest on fixed capital than to earn nothing at all. Here one can raise the objection that a company operating on a long-term loan will have to suspend repayments if it does not earn amortization and interest. But what happens then? The company will be acquired for a low price by someone else, and the new owner will continue production at an unchanged rate (the relation of prices to prime costs has not changed, though) with the only difference that thanks to the low acquisition price, even a small margin of prices over prime costs will suffice for amortization and interest payments on the capital invested.

We noted above that within the already existing capital equipment output is determined by the relation of prices to costs. On this basis it is often claimed that a general reduction of costs leads to expansion of output, and that it is the way of overcoming a crisis. What is forgotten in this argument are the consequences of a reduction in costs for purchasing power and thus for the general level of prices. For instance, a reduction in wages causes a decline in the purchasing power of blue- and white-collar workers directed towards consumer goods and thus a decline in their prices: as much less money flows to industry as a whole than was 'saved' through wage reductions. In this way a reduction of costs hardly leads, at least directly, to an increase in profitability (in terms of of the relation of prices to costs), since it is also followed by price reductions.[1]

This obviously does not exclude indirect effects of these processes. A reduction in costs and prices increases the competitiveness in foreign markets of goods produced in a given country. It also reduces the demand for money, thereby contributing to a decline in the interest rate, and thus encourages investment. Both those factors stimulate an increase in output. In turn, through anticipation, a declining price trend causes clearing of stocks etc., which puts pressure on output. All of these, however, are secondary effects of a reduction in costs which, as we have noted, has no direct effect on profitability and hence on the volume of output.

Changes in the relation of prices to costs are caused by the mechanism of business fluctuations, which manifest themselves in fluctuations in investment activity, or these changes can be caused by exogenous factors (an important technical invention causing a wave of investments, influence of external markets, etc.). The secondary effects of a reduction in costs can be included in the first or second set of factors that we mentioned above, but we shall not go into that here.

Our task is to study the changes in prices and costs of industrial goods in 1928–34 and to show that the curves of prices and costs show a similar pattern while the differences between them, i.e. the

[1] In cartelized industries a decline of demand may not cause price reductions and if cartelization is widespread a wage reduction may lead to an 'improvement' in the relation of prices to costs; however, in this case the result of the 'improvement' will be not an increase but a fall in output. Here we have to do with a special case of perturbations that the existence of cartels brings into the relationship between the average relation of prices to costs and output (see pp. 502–3 below).

margins between prices and wages, have their source in factors other than cost reductions. Next we shall study the dependence between these margins and the volume of output. However, before we turn to these calculations, we must discuss in general terms the method used in our study.

2. *Methodological Comments*

In order to outline the movement of prices and prime costs of the industry as a whole we must construct respective indicators. We shall calculate them by the so-called aggregate method: the price index will represent the changes that would have taken place in industrial output of a constant volume, i.e. changes resulting exclusively from price movements. Similarly, the cost index will represent the changes that would have taken place in the sum of prime costs at a constant value and composition of industrial output, i.e. changes resulting exclusively from the movement of unit costs: the costs of raw materials, wage rates and labour productivity, tax rates, etc.

In keeping with what was said above on the price and cost indices, the index of profit margins calculated by the aggregate method will represent the changes that would take place in the sum of 'values added' in individual industries (i.e. the value added to the value of raw materials in the production processes in these industries) if the volume and structure of output remained unchanged and only profit margins changed. Thus, it will represent differences between the price and costs of raw materials. The index of prime costs will represent changes that would have taken place in the sum of prime costs, except for raw materials, at a constant volume and structure of output. Concerning the first of these indices, however, the sum of the value added in individual industries equals the value added in industry as a whole. Thus it equals the value of all products made by the industry as a whole (i.e. no longer subject to further industrial processing), minus the value of raw materials and foreign semi-finished products, as well as domestic agricultural raw materials, and minus costs of transportation of all kinds of raw materials processed by industry. Hence, the index of profit margins will be calculated by deducting from the price index of industrial goods the indices of raw materials and foreign semi-finished products, of domestic agricultural raw materials, and the index of railway tariffs for all raw materials and semi-finished products processed by industry.

As we see, the essence of our simplification consists in the elimination from our calculation of the changes in prices for raw materials and semi-finished products produced in some industries and intended for further processing in others. In this case, what is the price for one industry is the cost for another, and for this reason it can have no influence on the index of profit margin in the industry as a whole.

Turning to the details of our calculations, it should be noted that to secure comparability of our three series of indices, the indices of profit margins and prime costs concern—similar to as the production index published by the ISBCP—only large and medium-size industry. In calculating the indices of profit margin we also did not take into consideration the prices and costs of monopoly products, in the manufacturing of which the relation of prices to costs plays no role whatsoever. Consequently, one should correct the production index by eliminating from it the production of alcohol, tobacco, and matches; this was not done, however, since these corrections would have been insignificant.

3. *Calculation of the Index of Profit Margins in Industry*

According to our argument above, we made this calculation as follows. First, we calculate the general price index of industrial goods, i.e. all industrial articles except those raw materials and semi-finished products that are intended for further processing in industry. Next we calculate the index of raw materials and foreign semi-finished products and domestic raw materials and semi-finished agricultural products used by industry. Knowing the total value of goods coming from industry in the base-year 1928 (that, as we shall see later, is Zl.6.7 billion), the value in that year of raw materials and semi-finished and agricultural products (Zl.1.7 billion), and the sum paid by industry for the transportation by rail of the raw materials and semi-finished products that it used (Zl.0.3 billion), one can construct the index of profit margins.

We multiply the index of prices of goods leaving industry by Zl.6.7 billion and thereby get the values that industrial output would have reached in individual years if its volume and structure had not changed. Then we multiply the index of prices of foreign raw materials and semi-finished products and domestic raw materials and semi-finished products by Zl.1.7 billion, obtaining the value of these raw materials at an unchanged volume and structure of the industrial

demand for them. Similarly, we multiply Zl.0.3 billion by the index of railway tariffs for the shipment of all kinds of raw materials used by industry. The difference between the first and the two subsequent series gives us for individual years the profit margins that industry would have earned in those years if the volume and structure of output had not changed. Now dividing this last series by the sum of the profit margins in the base-year 1928, i.e. by $6.7 - 1.7 - 0.3 =$ Zl.4.7 billion, we finally get the indices of profit margins in industry. We now come to the details of this calculation.

Index of prices of goods leaving industry. First, we break down these goods into those sold at home and those intended for export, since the domestic and export prices are different. Then we construct an index of prices of goods coming from industry to the domestic market. Here we should take into consideration consumer goods other than food (i.e. fabrics, utensils, furniture, etc.), food and raw materials and semi-finished products for consumption (sugar, beer, kerosine; monopoly products, however, as mentioned above, are not considered here), coal for the railways and for fuel (of course, coal used by industry does not leave industry), finished investment goods (buildings and machines), agricultural inputs (fertilizers, agricultural tools, and machinery, etc.). Obviously, we always consider the wholesale prices obtained by producers. In Table 119 we compare the respective group indices of prices and their weights calculated on the basis of the value of domestic sales of these groups of goods in the base-year 1928.

The group indices used here are either the corrected indices regularly calculated by the ISBCP, or have been constructed *ad hoc*. In the price index of finished products we introduced corrections to account for discounts from list prices in the sale of textile products. The combined index of the prices of sugar, beer, and kerosine was calculated by deducting the excise tax since, as we mentioned, we are always concerned with the prices received by producers. For 'railway' and stove coal we obviously take the price index of coal loco mine (that only coal for the railway and stove coal is taken into consideration is thus reflected only in the weight attributed to this index); discounts are also accounted for in this index. Finally, the index of finished investment goods was constructed specially for the purpose of this study on the basis of prices of construction materials and machines, and the price index of agricultural inputs represents the subgroup of the price index of products purchased by farmers that is

Table 119. *Group Indices of Prices of Goods coming from Industry to the Domestic Market in Poland, 1929–1934 (1928 = 100)*

Commodity group	Weights	1929	1930	1931	1932	1933	1934
Goods ready for consumption (other than food)	34	98.6	91.9	78.9	67.6	61.4	59.2
Sugar, beer, kerosine (excise tax excluded)	12	105.8	108.7	107.3	102.0	90.3	86.0
Stove coal	8	113.8	116.1	116.1	107.2	96.5	91.5
Finished investment goods	36	103.5	101.0	90.5	80.5	70.5	67.7
Agricultural inputs	10	101.3	99.2	91.5	81.4	75.8	71.1
Goods coming from industry to the domestic market	100	102.7	99.9	90.7	80.9	72.4	69.3

regularly calculated by the ISBCP. Here we did not consider many consumer articles of less importance (e.g. newspapers); their influence on our aggregate index would be marginal, however.

Having calculated the price index of goods coming from industry to the domestic market we turn to the price index of exported industrial goods. Such an index was calculated by Landau,[2] but the base used there was prices received at the frontier. By introducing estimated corrections to account for transportation costs, we obtained export price indices received by producers (see Table 120).

We now have to combine these two indices: for the prices of articles coming from industry to the domestic market and for export prices. Using, *inter alia*, the data published in the ISBCP studies of social income, the value of output of big and medium-size industry in the base-year of 1928 was estimated at Zl.6.7 billion (at producer prices), of which about Zl.1.4 billion was for export, i.e. 21%, thus leaving 79% for domestic sales. In other years these percentages obviously changed. So the question arises whether the price indices

Table 120. *Export Price Indices, 1928–1934 (1928 = 100)*

	1929	1939	1931	1932	1933	1934
Export price index	99.1	84.5	70.3	59.0	54.4	51.4

[2] See L. Landau, 'Export from Poland during the Crisis'.

of articles coming from industry to the domestic market and the indices of export prices should be weighted according to constant, or to variable weights. Let us suppose that in some industry which exports its products for lower prices than it sells them at home, the share of exports increased. The *average price* obtained by this industry will then decline. It clearly follows from this example, that variable weights must be used because to calculate the profit margin one has to take into account the average prices. These variable weights will be calculated from the data on changes in the share of exports in total output.

Now we can finally calculate the indices of the average prices of industrial goods coming from industry (see Table 121).

Index of prices of foreign raw materials and semi-finished products and of domestic raw materials and agricultural semi- finished products. The construction of this index was based on the index of prices of foreign raw materials and semi-finished products regularly calculated by the ISBCP, which represents price changes of the chief imported raw materials and semi-finished products, and on the prices of logs and of sugar beet. Regarding the average annual prices of beet, the difficulty encountered here is that they are purchased once a year during the sugar campaign that begins in September. We handle this problem as follows: for each month we take as representative the price of beet in the sugar campaign from which the sold sugar comes. So in the first eight months of the year this will be the price from the previous year's campaign, and in the final four months of the year that from next year's campaign. We thus get the average annual price

Table 121. *Price Indices of Goods Coming from Industry in Poland, 1928–1934 (1928 = 100)*

Indices	1928	1929	1930	1931	1932	1933	1934
Prices of goods coming from industry to the domestic market:							
weight of the index	79	78	72	68	73	74	75
index	100.0	102.7	99.9	90.7	80.9	72.4	69.3
Export prices:							
weight of the index	21	22	28	32	27	26	25
index	100.0	99.1	84.5	70.3	59.0	54.4	51.3
Index of average prices of goods coming from industry	100.0	101.9	95.6	84.2	75.0	67.7	64.8

Table 122. *Price Indices of Foreign Raw Materials and Semi-finished Products and Domestic Raw Materials and Semi-finished Agricultural Products in Poland, 1928–1934 (1928 = 100)*

Indices	Weights	1929	1930	1931	1932	1933	1934
Foreign raw materials and semi-finished products	66	93.3	68.6	51.0	41.6	43.8	43.2
Logs	17	93.3	71.9	49.5	38.3	38.7	44.3
Beet	17	92.1	75.7	58.4	65.7	63.1	69.9
Index of prices of foreign raw materials and semi-finished products, and domestic raw materials and agricultural semi-finished products	100.0	93.1	70.4	52.0	45.1	46.2	47.9

as the price of beet from the previous year's campaign and that from next year's campaign weighted in the ratio of 2 : 1.

Weights for the three indices making up the combined index of imported raw materials and semi-finished products and of domestic raw materials and agricultural semi-finished products were taken according to the value of total use in industry of foreign raw materials and semi-finished products, and the value of consumption of logs and beet in 1928, which is our base-year. These results are presented in Table 122.

Several domestic raw materials (e.g. prices of skins) have not be taken into account here; they are unimportant, however, and their inclusion in the index would have no great significance for it. Consumption of foreign raw materials and semi-finished products and of domestic raw materials and agricultural semi-finished products in 1928 amounted to Zl.1.7 billion.

Index of domestic railway tariffs on raw materials and semi-finished products used by industry. Because of the lack of accurate data, we took as a rough approximation the index of average railway revenues per tonne-kilometre of all kinds of cargo (see Table 123).

This procedure obviously involves many inaccuracies. The average revenue of the railways is for freight as a whole, hence also for agricultural raw materials used by industry (grain, animals for slaughter, etc.), finished articles, and all exports. Concerning the latter, a study of export tariffs for coal (which dominated in shipments abroad) showed that changes of these tariffs were similar to those of the above-mentioned index of average revenues per tonne-kilometre. Consequently, the elimination of exports from total freight

Table 123. *Indices of Domestic Railway Tariffs in Poland, 1928–1934 (1928 = 100)*

	1929	1930	1931	1932	1933	1934
Index of railway tariffs	102.0	106.2	95.7	97.8	81.2	75.0

would have no great impact on this index. With high probability one can argue that the same holds for the first two types of freight.

Another inaccuracy is that the average revenue per tonne-kilometre can change not only because of changes in tariffs (or the use of reduced tariffs), but also due to changes in the structure of freight. For instance, increasing the share in freight of cheap materials, whose transportation also costs relatively little per tonne-kilometre, reduces the average revenue per tonne-kilometre. However, it appears that changes in the structure of freight did not cause important shifts between cheap and expensive freight. Moreover, the lack of precision in our index of railway tariffs for the shipment of raw materials and semi-finished products for industry can have no strong impact on our calculation of the profit margin as a whole, for the total cost of rail shipments of freight of this kind in 1928 only came to about Zl.0.3 billion, which—as it will be seen below—is responsible for the minor role of this index in our final calculation.

Index of profit margin in industry. Now we can turn to the actual calculation of this index. The total value of industrial output in the base-year of 1928 was, as noted above, Zl.6.7 billion. Multiplying it by the price index of articles coming from industry, we get the value

Table 124. *Indices of Profit Margins in Industry in Poland in 1928–1934*

Index	1928	1929	1930	1931	1932	1933	1934
Output if industry (in Zl.bn.)	6.70	6.83	6.41	5.64	5.03	4.54	4.34
Consumption of foreign raw materials and semi-finished products, and domestic raw materials and agricultural semi-finished products (in Zl. bn.)	1.70	1.58	1.20	0.88	0.77	0.79	0.81
Railway shipments of raw materials (in Zl.bn.)	0.30	0.31	0.32	0.29	0.29	0.24	0.23
Profit margins (in Zl.bn.)	4.70	4.94	4.89	4.47	3.97	3.51	3.30
Index of profit margins	100.0	105.1	104.0	95.1	84.5	74.7	70.2

of this output in individual years on the assumption that its volume and composition remained unchanged. Then, multiplying the value of consumption of foreign raw materials and semi-finished products, and domestic raw materials and agricultural semi-finished products in 1928, which come to Zl.1.7 billion, and the total cost of railway shipments of raw materials for industry, which equals Zl.0.3 billion, by the price indices and railway tariffs respectively, we get how much the consumption of these raw materials and the cost of railway shipments of all raw materials for industry would be if the volume and structure of output did not change. We next subtract from the first series the second and the third one. In this way we get the series of profit margins that would be earned in each year if the volume and structure of output did not change. Finally, dividing this series by the sum of profit margins in 1928 we get the indices of profit margins in industry. The results of these calculations are given in Table 124.

In accordance with what we have said above, the cost of shipment of raw materials is only 6–7% of the respective profit margins, and hence the index of railway tariffs plays only a secondary role in our calculations.

4. The Index of Unit Costs of Production

As we have already said, we regard as costs only the *processing costs* in the strict sense, i.e. without costs of raw materials and all other materials purchased by a plant, and only *prime costs*, that is, exclusive of those which exist whether the plant is in operation, or not (this definition of costs does not overlap with that of proportional costs in which, for instance, costs of administration and in part even some wage costs are excluded; such costs, however, must always be taken into account when calculating whether it pays to keep a plant in operation). Therefore, we consider as elements of costs wages of workers and administrative personnel (premiums for social insurance included), taxes related to the operation of plants (i.e. the industrial tax, stamp duties, etc.), and interest on working capital.

These elements of costs do not include all costs that in principle should be considered. For there remain the renovation costs of buildings and equipment (done by the self-employed businesses), the costs of energy bought from power stations (whose prices are not represented in our price index), various office costs such as postal and

telephone expenses, railway-travel costs of the staff, advertising costs, legal fees, etc. However, in comparison with the costs included in our index those left out make up too small a part of total costs for their omission to significantly affect our index.

Workers' wages should be considered in the calculation of our index of unit costs of production as an index of wage bill per unit of output. Such an index can be constructed by considering on the one hand changes in daily wage rates, and on the other changes in labour productivity whose increase reduces labour costs per unit of output in the same proportion. In determining changes in the daily wage rates, we rely on the index of money wages of industrial workers calculated and published monthly by the ISBCP. The matter looks worse regarding changes in productivity. We have detailed data on these changes only for a few industries, of the most important ones for coalmining and the iron and steel industry. Were the changes in other industries small enough to be estimated with sufficient approximation?

Mechanization and rationalization of work unquestionably continued in the period discussed. At the same time, however, certain shifts in production that took place in the years of the business crisis worked in the opposite direction. Capital equipment was not replaced during the crisis and was run down; the sharp decline in the utilization of plants was often accompanied by an increase in labour costs in shops connected with the operations of a plant as a whole or of a part, which changed little in relation to the volume of output (in some industries labour costs of this type dominate). Hence, it appears that in industry as a whole the increase in productivity could not have been very great.

This supposition is confirmed by the fragmentary information that we get by comparing changes in output and employment in 1929–34 (or in 1930–4) according to the GUS industrial statistics. In the largest processing industry, i.e. the textile industry, the change of employment corresponds almost exactly to the change in output. The same is found in the wood industry. In some sectors of the food industry there was even a decline in productivity (e.g. in the sugar industry, and especially in brewing), which unquestionably results from the large share of maintenance costs in total labour costs in these plants. A large increase in productivity was achieved in some branches of the mineral industry, such as brick-kilns, and especially in cement plants. Considering that in the cement industry

a complete technical revolution has taken place and that changes of this kind were rather exceptional, we feel justified in arguing that in those years the increase in labour productivity in the processing industry was not significant and that no serious error is made in assuming that this increase was 15% on average and affected 20% of industry.

We spread this average of 3% increase in labour productivity evenly over the entire period studied. Combining these indices with the available indices of labour productivity in coalmines and steel-mills (in the latter the index for 1934, for which the data are not yet available, is estimated separately), namely weighting them in proportion to their share in the total wage bill, we calculate the aggregate indices of changes in labour productivity. Next, to calculate the indices of unit labour cost we divide the indices of daily wage rates by their corresponding indices of labour productivity. The results are given in Table 125.

Table 125. *Indices of Wage Costs per Unit of Industrial Output in Poland, 1928–1934 (1928 = 100)*

Indices	1929	1930	1931	1932	1933	1934
Daily wage rates	108.4	108.1	100.9	92.8	85.5	82.0
Labour productivity	99.7	101.4	104.0	103.6	108.0	109.9
Wage cost per unit of output	108.7	106.6	97.0	89.6	79.2	74.6

Salaries of white-collar workers (plant administration, technical and office staff) in industry would be expressed by the same indices as labour costs if wage rates changed in the same proportion for blue-collar and for white-collar workers, and if labour productivity also changed in step. This is not the case, however, and productivity especially changes in a different way: managerial costs are relatively rigid, hence this labour input per unit of output changes together with the volume of output. In the years of business crisis the consequence of this is an increase in the costs of salaries of plant administration in relation to wage costs of blue-collar workers. Industrial statistics enable us to determine the fluctuations in this relationship and thereby to determine in which direction and to what extent the cost index of administration labour deviated from the labour cost index. To determine fluctuations in the relation of cost of salaries of white-collar and cost of wages of blue-collar workers we shall use the GUS industrial statistics for the main branches of the

processing industry (metallurgy included) and for the coal industry (calculated on the study of prices and costs of coal extraction),[3] giving individual branches of industry constant weights corresponding to their wage bills in 1928. Since industrial statistics on wages cover only the 1929–33 period, we had to make estimates for 1928 and 1934. For 1928, in which industrial output was the same as in 1929, we also take the same relation of earnings of plant administration to those of blue-collar workers; for 1934, when output exceeded its 1932 volume but did not yet reach its 1931 volume, we take the average for these two years. Adjusting the cost of labour index according to the changes in this relation, we get the cost of the labour index of white-collar workers (administration), which is given in Table 126.

Table 126. *Indices of Salaries of White-Collar Workers per Unit of Output in Poland, 1928–1934 (1928 = 100)*

Indices	1928	1929	1930	1931	1932	1933	1934
Wages per unit of output	100.0	108.7	106.6	97.0	89.6	79.2	74.6
Salaries of white-collar workers in relation to wages of blue-collar workers (%)	23	23	27	30	33	32	31
Salaries of white-collar workers per unit of output	100.0	108.7	125.2	126.5	128.6	110.2	100.6

In the case of earnings of both blue- and white-collar workers we took into account fluctuations in wages alone, leaving aside changes in *premiums for social insurance*. This is of no significance when the premium rate remains unchanged; then the premiums (or, more precisely, only the part of premiums paid by employers) change in proportion with the cost of wages in the strict sense. However, if the premium rate changes, there is a corresponding divergence between changes in expenditure on wages themselves and changes in the expenditure on premiums from them. Considering the changes that took place in the period discussed in premium rates (a temporary reduction of the premium rate to the Unemployment Fund in 1929–31 and its increase in 1932, an increase of premium rates in 1932 in Upper Silesia, an increase in 1933 of the unemployment

[3] See Ludwik Landau, 'Fluctuations in Prices and Costs of Production of Coal', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 2/4 (1933) (in Polish).

Table 127. *Indices of Social Insurance Premiums in Poland in 1928–1934 (1928 = 100)*

Indices	1928	1929	1930	1931	1932	1933	1934
Wages of blue-collar workers	100.0	108.7	106.6	97.0	89.6	79.2	74.6
Premium rates on wages of blue-collar workers (%)	7.20	7.15	7.10	7.20	8.30	9.20	9.30
Premiums on wages of blue-collar workers	100.0	108.0	105.1	97.0	103.3	101.2	96.4
Salaries of white-collar workers	100.0	108.7	125.2	126.5	128.6	110.2	100.6
Premium rates on Salaries of white-collar workers (%)	10.0	10.0	10.0	10.0	10.0	10.8	9.7
Employer premiums on salaries of white-collar workers (%)	100.0	108.7	125.2	126.5	128.6	119.0	97.6

insurance premium rates for white-collar workers, the introduction in 1933 of payments to the Work Fund, and finally the changes caused in 1934 by the Land Consolidation Law) from the wage indices, we calculate the indices of insurance premiums by assuming their changes in proportion to changes in the premium rates. The results are shown in Table 127.

As an additional element of costs we consider *tax liabilities* related to the operation of firms, i.e. chiefly industrial tax and stamp duties. Under unchanged terms of tax collection, fluctuations in tax liabilities per unit of output should correspond in principle to changes in the value of gross output, and hence to changes in the prices of goods produced for the market. However, the terms of tax collection changed in the period under examination due to two factors. On the one hand the tax rate was gradually lowered, and on the other hand in the years of the crisis, with the improved financial position of tax administration, its efficiency in the collection of liabilities unquestionably improved. Both these factors worked in opposite directions, at least partially balancing each other (obviously only for the economy as a whole but not for individual firms). A comparison of fluctuations in the nominal social income (internal consumption of the countryside excluded) with fluctuations in revenues from the industrial tax showed consistency also with respect to the amplitude of both series. Consequently, it seemed reasonable to assume that fluctuations in tax

liabilities per unit of output were proportional to fluctuations in prices.

The data on price changes also help us to determine fluctuations in the cost of *interest on working capital.* For price changes determine fluctuations in the capital used per unit of output, and changes in the cost of this capital are in turn determined by changes in the rate of interest. From this point of view it would be best to have direct information on changes in the average interest rates in both bank and non-bank credit operations. However, since the data on the interest rate on non-bank credit are missing, and considering that larger industrial firms do not use commercial bank credit at all but make extensive use of credit in the bank of issue, the data on changes in the average discount rate of the Bank of Poland and of private banks will be used here. The results of these calculations are given in Table 128.

Table 128. *Indices of the Cost of Interest on Working Capital per Unit of Output in Poland, 1928–1934 (1928 = 100)*

Indices	1928	1929	1930	1931	1932	1933	1934
Tax liabilities (price index of output)	100.0	101.9	95.6	84.2	75.0	67.7	64.8
Interest rate on working capital	10.1	10.8	9.4	9.2	9.0	7.6	7.0
Cost of interest on working capital	100.0	109.0	89.0	76.7	66.8	50.9	4.9

Having determined in this way the main components of costs, to construct an aggregate index we have to give them the appropriate weights. These are taken as relative shares of those components in total costs in the base-year of our calculations, i.e. in 1928.

Following J. Derengowski, whose paper concerns the part of industry that interests us here, i.e. which corresponds to the range of the index of industrial output,[4] as the total wage bill of blue-collar workers in industry in 1928 we take Zl.1.504 billion. From our calculation of the ratio of salaries of white-collar workers to wages of blue-collar workers (see p. 496 above), which was 23% in 1928, we get the sum of salaries of white-collar workers of Zl.345 million. Using again the percentage ratios calculated earlier, to this wage bill there correspond the following total premiums for social insurance:

[4] See J. Derengowski, 'The Earnings of Industrial Workers in 1928–1932', *Statystyka Pracy*, 12/2 (1933) (in Polish).

Zl.108 million from the wages of blue-collar workers, and Zl.35 million from the salaries of white-collar workers. The tax liabilities will be estimated from statistics of tax assessment for 1928, separating from the total industrial tax revenue the share of industrial firms; after subtracting tax liabilities of small industry and adding the special 10% tax as well as communal taxes, these tax liabilities come to Zl.225 million; together with stamp duties on the sales of industrial firms, we estimate total tax liabilities at Zl.275 million. Finally, we have to estimate the interest on working capital. We calculate it from the value of goods and raw materials in companies' balance-sheets, which in 1928 came to Zl.1.2 billion. Since the share of companies in the part of industry considered in our calculations is about 65%, we estimate total working capital in 1928 at Zl.1.8 billion, and interest costs on it at Zl.180 million.

Attributing to the indices of changes in individual components of cost the weights obtained above (which in Table 129 are presented as percentages of the sum of the components of costs considered), we calculate the aggregate index of unit costs of production (see Table 129).

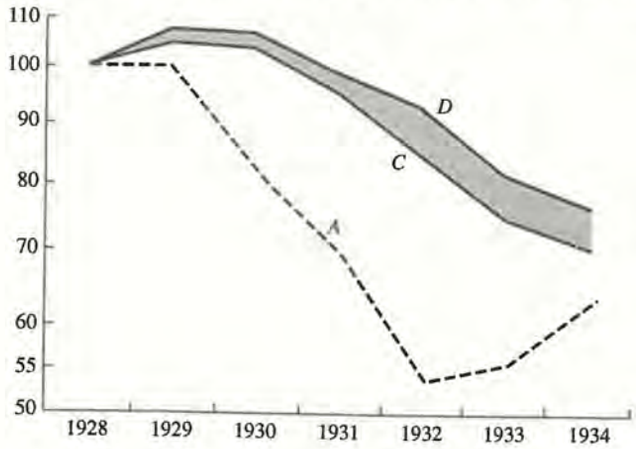
Table 129. *Indices of Unit Costs of Production in Poland in 1928–1934 (1928 = 100)*

Indices	Weights	1929	1930	1931	1932	1933	1934
Wages of blue-collar workers	61.5	108.7	106.6	97.0	89.6	79.2	74.6
Salaries of white-collar workers	14.0	108.7	125.2	126.5	128.6	110.2	100.6
Insurance premiums on wages of blue-collar workers[a]	4.5	108.0	105.1	97.0	103.3	101.2	96.4
Insurance premiums on salaries of white-collar workers	1.5	108.7	125.2	126.5	128.6	119.0	97.6
Taxes	11.0	101.9	95.6	84.2	75.0	67.7	64.8
Interest on working capital	7.5	109.0	89.0	76.7	66.8	50.9	44.9
Total prime costs	100	107.9	106.9	98.6	92.9	81.8	76.3

[a] Payments to the Work Fund included.

5. *Fluctuations in Prices and Costs in Industry and Fluctuations in output in 1928–1934*

The indices of gross profit margins and costs calculated above are compared on a diagram with the index of industrial output



A—industrial output; *C*—gross profit margins; *D*—prime costs less the costs of raw materials

FIG. 41. *Comparison of Prices, Costs, and Industrial Output in Poland in 1928–1934 (logarithmic scale; 1928 = 100)*

(see Fig. 41). Already a first glance at this diagram convinces us that it would be incorrect to perceive any direct link between the direction of cost changes and the direction of changes in output. Production continued to decline between 1928 and 1930 with costs rising, and between 1930 and 1932 with costs falling. Thus, while in the period 1930–2 the reduction in costs was accompanied by a fall in output, in the next period, i.e. in 1932–4, a further reduction of costs took place with increasing production.

This lack of correlation between changes in costs and changes in output consisted in the often unnoticed phenomenon of transferring changes from costs to prices, and in this way—from the point of view of the profitability of production—in the mutual offsetting of changes. In the first year of the business downturn (1929) wages continued to rise (compared with the average for 1928). This contributed on the one hand to a cost increase and, on the other hand—by increasing purchasing power—to a rise of prices. In subsequent years, however, the fall in wages, although it reduced costs, at the same time (by eliminating from the market the corresponding purchasing power) lowered prices. The parallel movement of costs and prices (or, more precisely, of costs and gross profit margins of industry) is clearly seen in Fig. 41 and the year-to-year percentage changes in costs and profit margins are given in Table 130.

Table 130. *Changes in Costs and Profit Margins in Industry in Poland, 1929–1934 (%)*

	1929	1930	1931	1932	1933	1934
Changes in costs	+7.9	−0.9	−7.8	− 5.8	−11.9	−6.7
Changes in profit margins	+5.1	−1.1	−8.6	−11.1	−11.6	−6.0

Obviously, changes in prices and costs are not identical; there are some deviations between the two series: profit margins decline in different periods somewhat more, or less than costs. These deviations determine profitability and are linked with corresponding fluctuations in output. In certain cases a reduction in costs can initiate such deviations, e.g. contribute to the displacement of imports, or to the forcing of exports, and thereby making possible a rise in output and a reduction in prices less than costs, but this depends on specific conditions that must be studied before one can argue that a reduction in costs will alter the situation and increase profitability and production.

Thus with output changes we associate not some specific direction of changes in prices and costs, but only directions of changes in their spread[5]—changes caused by business conditions, whether resulting from the mechanism of the business cycle, or taking place under the influence of external factors. This is already apparent in Fig. 41. Until 1932 the increasing distance between the index of costs and the index of the gross profit margin, i.e. a decline in the margin in relation to costs, is accompanied by a fall in industrial output. From 1933 this fall stops and output begins to rise together with a reduction in the distance between the index of costs and the index of the profit margin, i.e. when the profit margins begins to rise in relation to costs. This relationship is more clearly seen in Fig. 42, which shows the correlation between the relation of profit margins to costs on the one hand, and the index of industrial output on the other (see also Table 131).

As it will be seen in Fig. 42, the relationship between the ratio of profit margins to costs and output is very close. The correlation

[5] The level of prices and costs in general shows a tendency to rise and fall together with output, but this tendency can change depending on monetary policy, social policy, etc.

Table 131. *Indices of Gross Profit Margins, Production Costs, and Industrial Output in Poland, 1928–1934 (1928 = 100)*

Indices	1929	1930	1931	1932	1933	1934
Gross profit margins	105.1	104.0	95.1	84.5	74.7	70.2
Production costs	107.9	106.9	98.6	92.9	81.8	76.3
Ratio of margins to costs	97.4	97.3	96.5	91.0	91.3	92.0
Industrial output	99.7	81.8	69.3	53.7	55.4	62.8

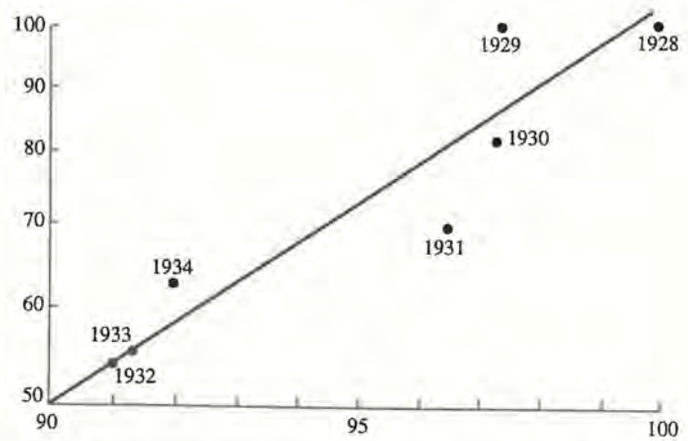


FIG. 42. *Correlation between the Spread of Costs and Prices, and Industrial Output in Poland, 1928–1934 (logarithmic scale)*
Note: The relation of profit margins to prime costs (less the costs of raw materials) is along the horizontal axis, and industrial output is along the vertical axis.

coefficient between the two series, of 0.933, is very high.[6] However, one should remember the factors weakening this correlation, such as (i) the influence of cartels which with a fall in output can maintain unchanged profit margins or even increase them (especially in relation to total costs), and which have the capacity to increase output at an increased profit margin, and (ii) a certain inelasticity with which the firms react to changes in the expected profitability of output (with

[6] This coefficient is calculated by taking instead of the output indices themselves their logarithms (and it is presented in the same way in the diagram), which is consistent with the assumption that relative rather than absolute changes in output are connected with changes in profitability; if output indices were used, the correlation coefficient would be 0.917.

a sudden change in profitability calculations, firms always tend to maintain output for a certain time at the volume corresponding to the earlier calculations of profitability).

If these factors are taken into account, one may conclude that errors in the calculation of our indices of cost and profit margins have not played a major role, except for certain periods in which economic conditions were unusual. These were especially the years 1929 and 1931, in which large deviations from the average value of the output index, and the relation of profit margins to costs are observed. It will be more convenient to study the factors responsible for this by examining the relation of prices to costs on the one hand, and the volume of output on the other, during the entire period in question. This is presented in a diagram constructed in such a way that the scale for the relationship of profit margins to costs is increased so as to correspond to the difference between the amplitude of fluctuations in this relation and the amplitude of fluctuations in the volume of output. This difference is such that a decline of output of 30% corresponds to a fall in the relation of profit margins to costs of 5% (see Fig. 43).

Observing the changes in profitability and in the volume of output in Poland from 1928, as shown in Fig. 43, we find the following course of events. The first year of the crisis (1929) was characterized by an almost unchanged volume of production with already a strong tendency for profitability to fall[7] (there was a rise of profit margins but less than the increase of costs, which was due to the rise of wages in 1928 and 1929). Perhaps this relationship is influenced by a certain inaccuracy in our estimate for 1929, namely estimating changes in labour productivity in manufacturing industry, we assumed its even spread over the entire period under examination and therefore we perhaps underestimated the rate of growth of productivity in the period immediately following the large investments during the years of the boom. However, it is hard to believe that this could have had a decisive impact on our calculation. That a fall in output did not appear with an already worsening relation of prices and profit margins to costs is apparently due to the inelastic reaction of firms, which attempted to keep capital equipment employed at the previously high level.

[7] By profitability we understand here the relation of the profit margin to costs; fluctuations in this relation reflect changes in the relation of gross profit to costs.

A—industrial output; *B*—ratios of gross profit margins to prime costs (less the costs of raw materials)

FIG. 43. *The Spread between Prices and Costs, and Industrial Output in Poland, 1928–1934 (logarithmic scale; indices for 1928 = 100 were plotted at different scales)*

This obviously could last for only a rather short time. So already in 1930 there was a sharp decline in output, although the relation of profit margins to costs had not yet changed much. Thus a comparison of 1930 with the boom period shows a decline of the relation of profit margins to prices of 2.7%, and a fall of output of 18%, which rather accurately corresponds to the average relationship between profitability and the volume of production. It should be noted that this was the first year of reductions in workers' wages; yet, this had no effect at all on profitability since profit margins of firms declined accordingly.

In 1930 another factor began to work that was fully reflected in the averages for 1931, i.e. the financial crisis—the sudden worsening of solvency and the greater risk of transactions. A clear sign of this was the increasing value of protested bills and of the number of bankruptcies. This could not be accounted for in our calculations, so it is not surprising that for 1931 we find a decline in output incommensurable with the decline in profitability: while the relation of profit margins to costs fell only by 0.8%, output shrank during this time by 15%. The influence of the financial crisis on this apparent divergence can be explained as follows. The relation of profit margins to costs in fact declined by more than is shown by our calculation since the actual prices obtained (after deducting losses from the insolvency of debtors) declined more than the price indices. Moreover, costs rose as a result of including in the interest rate in the private market a higher premium for risk, which is not accounted for by our index of profitability based in this respect only on fluctuations in the bank rate. In turn, the decline of output in 1931 deepened the crisis by affecting expected profitability and volume of output, and intensified the influence of an external factor, i.e. the collapse of exports that took place in the autumn of 1931 and at the beginning of 1932. Obviously, in these conditions large-scale wage and cost reductions could not improve profitability and were offset by even more rapidly declining profit margins.

Under the influence of the above factors, in 1932 output and profitability deteriorated still further, reaching the trough of the business cycle. In comparison with 1930 we find a decline in the relation of profit margins to costs of 6.5% and a decline in output of 34%; this is the combined effect of the developments in 1931–2: the financial crisis and the setback to exports. The wage reductions made during this time, which over the year resulted in a reduction in costs of production of 5.8%, were more than offset by price cuts.

This state of affairs continued almost unchanged in 1933. The intensity of price and cost reductions reached then its highest point: a decline of wage rates by 12% and a reduction at the same rate in production costs are almost a record in processes of this type. The reduction in costs was followed by a reduction in prices, so that profitability improved but slightly. No important change took place until the second half of 1933, which found expression in the average indices for 1934.

The impulse to this change was the dissaving that started at that time and lasted through 1934. Thanks to this, the market expanded and so did the sales opportunities of industry, which had a positive influence on prices. Consequently, the continuing decline in profit margins now became clearly less than the decline in costs, promising an improvement to profitability. This would have been even more visible had it not been for a simultaneous phenomenon, namely improved solvency that tended to weaken profitability indicators. Just as in 1931 exceptionally deteriorated solvency caused a greater actual decline in the profitability of production than shown by our relation of profit margins to costs, in 1934 improvement in solvency, attained thanks to only small infusions of credit, in fact caused a greater actual improvement in profitability than that shown by our

indicator. This probably explains the relatively small increase in the relation of profit margins to costs[8] with a rather significant increase in output (of 13%). All these phenomena took place with a still declining price level: in 1934 gross profit margins showed a decline of 6%. The termination of this decline can be expected only when wages stop falling, which seems to be gradually taking place at this time.

[8] Another factor which influenced this relation was the dissolution of the cement cartel which was followed by a tremendous fall in the ratio of prices to costs with hardly any decline at all in output.

EDITORIAL NOTES AND ANNEXES

PART I
BUSINESS ANALYSES 1927–1935

I. Business Conditions in Commodity Markets

The Lifting of the British Rubber Restrictions

[1]

First published as 'Zniesienie angielskich restrykcji kauczukowych', in *Przegląd Gospodarczy*, 9/9 (1928), 451–3. *Przegląd Gospodarczy*, first a monthly, then a biweekly, was founded in 1920 and published by the Union of Polish Industry, Mining, Trade and Finance, or the so-called Leviathan—the leading organization of unions and associations of big capital in interwar Poland.

First Kalecki's business analyses concentrated on three subjects. He devoted much attention to the study of business conditions in commodity markets. From 1928 he wrote regularly in a column on commodity markets in *Przegląd Gospodarczy*. Apart from the studies published in Section I of Part 1 of the present volume, by the end of 1934 in the 'Metals' section of the journal he published over seventy reviews of these markets under the initials M.K. and in 1928–30, under the cryptonym M. K-cki ten reviews of business conditions in the cotton market in the 'Cotton' section of the journal. Finally, in the section 'Rubber', signed also as M.K., in 1928–31 he published many studies of the situation in the rubber market.

The second subject of Kalecki's interest was the structure and operations of big trusts and cartels in Poland and in world markets. He devoted much attention to the Kreuger match trust, to Royal Dutch-Shell and other large oil concerns (these articles, because of their international context are included into Section III above), and to monopoly structures operating in other markets (see also Part 2 in this volume for attempts to measure the rate of cartelization of Polish industry). These papers helped him to get his first permanent job in 1929 which was a research assistantship to study the operations of cartels and large concerns in Poland and abroad, in the Institute for the Study of Business Cycles and Prices directed by Professor Edward Lipiński.

The third and most prolific subject of Kalecki's business analyses in this period were problems of international economic relations. He examined these problems by focusing on the relations between the most industrialized countries and the Soviet Union, as well as between economic centres of the

capitalist world. He devoted much attention to the transmission of business fluctuations among these centres, to their attempts at a more co-ordinated policy to overcome the business crisis, and to various ways to save national economies of individual countries. In many articles, especially in *Przegląd Socjalistyczny*, of which Kalecki was one of the founders and most active journalists (for more on this journal, see *Collected Works of Michał Kalecki; vol. i, Capitalism: Business Cycles and Full Employment*, Oxford, Clarendon Press, 1990: 427–8), he pointed out the dangers for the capitalist system of the crisis that started in 1929. He warned that some countries might seek to overcome their economic difficulties by going to war. He carefully followed the course of the Japanese war in Manchuria and Japan's preparations for war with the USSR, as well as the development of the Hitlerite 'experiment' in Germany.

These three fields of Kalecki's economic journalism in 1927–35 have in common not only the time and the few journals in which they appeared, but above all their subject—the course of the crisis of 1929–33 in the main centres of capitalism and its economic and political consequences for the entire capitalist world and the world as a whole. Although the three subjects of Kalecki's interests often overlap, the papers included in Part 1 were grouped into the three above-mentioned sections; within each section they follow in chronological order.

The World Production of Aluminium

[1]
First published as 'Swiatowa wytwórczość aluminium', in *Przegląd Gospodarczy*, 9/10 (1928), 503–4.

The World Production of Tin

[1]
First published as 'Swiatowa wytwórczość cyny', in *Przegląd Gospodarczy*, 9/13 (1928), 678–9.

The World Production of Lead

[1]
First published as 'Swiatowa wytwórczość ołowiu', in *Przegląd Gospodarczy*, 9/15 (1928), 777–8.

Rubber

[1]
First published as 'Kauczuk', in *Przegląd Gospodarczy*, 9/22 (1928), 1154–5, and initialled M.K.

Rubber 1929

[1]
First published as 'Kauczuk', in *Przegląd Gospodarczy*, 10/4 (1929), 207, and initialled M.K. To distinguish the title of this review from that of 1928, the year '1929' was added to the present title.

The World Production and Consumption of Cotton

[1]
First published as 'Bawełna: wytwórczość i spożycie światowe', in *Przegląd Gospodarczy*, 10/8, (1929), 417–19, and signed M.K-cki.

The World Cotton Market

[1]
First published as 'Swiatowy rynek bawełny' in *Przegląd Gospodarczy*, 10/10 (1929), 509–11, and signed M.K-cki.

The International Rubber Market

[1]
First published as 'Z międzynarodowego rynku kauczuku', in *Przegląd Gospodarczy*, 10/10 (1929), 511–12, and initialled M.K.

Business Conditions of the Textile Industry, 1927–1929

[1]
First published as 'Koniunktury przemysłu włókienniczego w latach 1927–1929', in *Przemysł i Handel*, 10/43 (1929), 1823–6. See also 'Sales of Thread as an Indicator of Textile Business', this volume.

The Situation in the Rubber Market

[1]
First published as 'Sytuacja na rynku kauczuku', in *Przegląd Gospodarczy*, 12/8 (1931), 364–5, and signed M. K-cki.

Cotton Arbitration in Gdynia

[1]
First published as 'Arbitraż bawełniany w Gdyni' in *Polska Gospodarcza*, 16/15 (1935), 500–1, and signed M.K.

II. The Structure and Operations of Trusts and Cartels

The Swedish Match Trust

[1]
First published as 'Szwedzki trust zapałczany', in *Przegląd Gospodarczy*, 9/3 (1928), 101–4; see also 'The Match Trust in the First Half of 1928', 'The Match Trust and the Soviets', and 'Ivar Kreuger', this volume.

The European Linoleum Trust

[1]
First published as 'Europejski trust linoleumowy', in *Przegląd Gospodarczy*, 9/7 (1928), 329–30, and initialled M.K.

Monopolistic Tendencies of the German Iron Industry

[1]
First published as 'Monopolistyczne tendencje niemieckiego przemysłu żelaznego', in *Przegląd Gospodarczy*, 9/11 (1928) 542–4.

[2]
The editor was unable to establish the source of Kalecki's quotation after Dr J. W. Reichert. The quotation appears to have come from the annual report of the Union of German Iron and Steel Industrialists, that was briefly discussed in the *Berliner Tageblatt und Handelszeitung* (56/506, 26 Oct. 1927) and the *Financial News* (88/13 (243), 29 Oct. 1927), neither of which contains the excerpt that Kalecki quotes, however.

The Match Trust in the First Half of 1928

[1]
First published as 'Trust zapałczany w I-ej połowie 1928 r.', in *Przegląd Gospodarczy*, 9/13 (1928), 661–3, and initialled M.K.

[2]
See E. Stern, 'Zündholzmonopol und Bodenreform', *Berliner Tageblatt und Handelszeitung*, 57/290, 21 June 1928.

The American Copper Cartel

[1]
First published as 'Amerykański kartel miedziany', in *Przegląd Gospodarczy*, 9/14 (1928), 732–4.

Performance of the International Steel Cartel

[1]
First published as 'Wyniki działalności międzynarodowego kartelu stalowego', in the weekly *Przemysł i Handel*, 9/14 (1929), 612–4 (for more on this journal, see *Collected Works of Michał Kalecki*, vol. i. 423).

Ivar Kreuger

[1]
First published under the pseudonym H. Br. in *Przegląd Socjalistyczny*, 2/9 (1932), 5–6.

[2]
Juliusz Kaden-Bandrowski (1885–1944), a Polish political writer in the interwar period, was a passionate critic of the political Right just as much as of the communists, but most of all of foreign capital in Poland. Coeur, a French managing director of a Polish company, is a truly devilish character in Kaden-Bandrowski's novel, *Black Wings* (see *Czarne Skrzydła*, Kraków, Wydawnictwo Literackie, 1979).

III. International Economic Relations

American-Russian Economic Rapprochement and Poland

[1]
This is the first economic publication of Kalecki, originally published as 'Zbliżenie gospodarcze amerykańsko-rosyjskie a Polska', in *Przegląd Gospodarczy*, 8/23 (1927), 1029.

Economic Consequences of the British–Soviet Dispute

[1]
This article first appeared as 'Konsekwencje gospodarcze zatargu angielsko-sowieckiego', in *Przegląd Gospodarczy*, 9/1 (1928), 19–20. Kalecki returned to the political and economic consequences of the break off in diplomatic relations between the USSR and Great Britain and to other aspects of the 'Petroleum War' in several articles published in 1928–32 (see 'Further Developments in the British–Soviet Economic Relations', 'The Petroleum War', 'The British–Soviet Economic Relations', 'The End of the Petroleum War', 'The Fall of Deterding'; see also 'The French Petroleum Policy'; all in this volume).

[2]
See *Berliner Tageblatt und Handelzeitung*, 56/466, 2 Oct. 1927.

[3]
i.e. about 5 million tonnes.

The Struggle for the German Coal Market

[1]
First published as 'Walka o niemiecki rynek węglowy', in *Przegląd Gospodarczy*, 9/6 (1928), 274–5. See also 'International Coal Competition' and 'The European Coal Crisis', this volume.

Further Developments in British–Soviet Economic Relations

[1]
First published as 'Dalszy rozwój brytyjsko-sowieckich stosunków gospodarczych', in *Przegląd Gospodarczy*, 9/6 (1928), 260, and initialled M.K.

[2]
i.e. they increased from about 0.864 million tonnes to about 6.14 million tonnes.

[3]
See 'Der deutsch-amerikanische Kredit an die Lena Goldfields', *Berliner Tageblatt und Handelszeitung*, 57/104, 1 Mar. 1928.

The Petroleum War

[1]
First published as 'Wojna naftowa', in *Przegląd Polityczny*, 10/3–4 (1928), 77–85 (a Polish monthly devoted to foreign policy).

[2]
See 'The Fall of Deterding', p. 171 above.

[3]
Talks of the French–Soviet Mixed Commission headed by A. de Monzie on the one side and Kristian Rakovsky on the other, had been going on since 1925. However, not until the middle of May 1927 were the parties able to formulate a compromise draft agreement according to which France was to grant the USSR a commodity credit of 50 million gold francs for twelve years, and the Soviet Union committed itself to pay off Russia's pre-war debt in sixty-two instalments of 75 million gold francs annually. After the breaking off of British–Soviet diplomatic relations (see note [4]) and the press campaign associated with it, to encourage France to do the same, and especially after the outbreak of the Rakovsky affair (see note [6]), there was a brief suspension of talks. At the same time, the deputy Commissar of Foreign Affairs, M. Litvinov, announced that the USSR was close to settling the matter of repayment of the pre-war debts to France, and the

new Soviet proposals were awaited in Paris. They were presented at the beginning of October 1927 by Rakovsky. However, they differed from the draft agreed upon a few months earlier by the Mixed Commission in that now the USSR committed itself to repay in sixty-two instalments of 60 million gold francs annually in exchange for an immediate credit by France of 100 million gold francs annually for six years. The French government considered these proposals as 'unacceptable in their present form', and suggested that the granting of new credits to the USSR would have to be linked with their real guarantee, e.g. in the form of petroleum concessions and the increase of French imports from the USSR of such articles as wheat, flax, and wood. Moreover, considering the volume of French imports from the USSR, the commodity credit granted to the USSR would have to be much smaller. At the beginning of March 1928 a new Soviet Ambassador to France arrived in Paris and the talks were resumed.

[4]
The tension in British–Soviet relations began to increase from the beginning of 1927. In the early spring there was a sharp exchange of notes notes between the Soviet People's Commissariat of Foreign Affairs and the British government. This was accompanied by intensification of a hostile press campaign. In the middle of May 1927 the British police searched the premises of the Arcos company and the Soviet trade mission in London. Arcos was registered as a British company dealing in trade with the USSR. On the Arcos premises (not separated from those of the Soviet trade mission) the police seized documents that subsequently became the basis for charging the employees of Arcos and the Soviet trade mission, among others, of violating the Soviet–British trade agreement and acting to the detriment of the defence interests of Great Britain. Despite the protests of the government of the USSR and Soviet statements of the groundless nature of the charges, on 27 May 1927 Great Britain terminated the Soviet–British trade agreement and broke off diplomatic relations with the USSR.

[5]
See 'The Fall of Deterding', p. 171 above.

[6]
Royal Duch Company for the Working of Petroleum Wells in Netherlands India: Report for 1922, Rotterdam, June 1923, Sijthoff's Boeldrukkereij, p. 16. It appears unlikely, however, that this was Kalecki's original source of reference; probably he quoted the report after some other, possibly 1928 publication, which, however, the editor was unable to establish.

[7]
Kristian Rakovsky (1873–1941), was a Soviet politician and diplomat. In 1889–1907 he was a member of social democratic parties, first in Bulgaria,

then in Romania and Russia. Arrested at the end of the 1905 Revolution (in 1907) he was sentenced to exile. Imprisoned many times during the war in the Balkans. In 1917 he was liberated by Soviet soldiers from a Romanian gaol in Tassa. Subsequently he was Chairman of the Extraordinary Commission in the Ukraine and Chairman of the Council of People's Commissars (1918), then the Soviet Ambassador in Great Britain (1923–5) and France (1925–7). In 1928 he was expelled from the Communist Party of the Soviet Union and accused of Trotskyism; reinstated as a party member in 1934; arrested in February 1938 and a month later sentenced to twenty years' imprisonment for participation in the 'rightist Trotskyite block'.

The breaking off of diplomatic relations between Great Britain and the USSR also caused a worsening of French–Soviet relations. Shortly after the breaking off of the British–Soviet relations, *The Economist* wrote: 'There has for some weeks past been evidence of an organized campaign by important elements of the Paris press in support of similar action by France' (104/4370, 28 May 1927: 1123). An equally spectacular cause was missing, however. It was provided at the end of September by Rakovsky, who was not only the Soviet Ambassador in Paris but also an active organizer of the Third International who signed its Manifesto. This document called upon workers to overthrow capitalism in their countries by force. The French authorities requested the Soviet government to repudiate immediately this step of its Ambassador as an action directed against the legal order of the country in which he was accredited, and promptly received satisfaction. In spite of this, the campaign in the French press to recall Rakovsky from Paris continued. However, the French Ministry of Foreign Affairs, which feared that such a step would only hasten *rapprochement* between the USSR and Germany, quickly came out against linking the Rakovsky affair with the question of diplomatic relations with the USSR and the matter of breaking them off was soon hushed up in the press. The French authorities also did not insist on Rakovsky's recall because of the work of the French–Soviet Mixed Commission and the declarations of the Soviet People's Commissariat of Foreign Affairs to the effect that the USSR was close to accepting the agreement on the repayment of Russia's pre-war debts to France as negotiated by A. de Monzie and K. Rakovsky (see n. [3]). In October 1927 the Soviet People's Commissariat of Foreign Affairs recalled Rakovsky from Paris.

The Match Trust and the Soviets

[1]
First published as 'Trust zapałczany a Sowiety', *Przegląd Gospodarczy*, 9/20 (1928), 1027–8.

[2]
See *Monatliche Nachweise über den auswärtigen Handel Deutschlands*, 1928, July and Aug. Issues, entry 367 in each issue.

British–Soviet Economic Relations

[1]
First published as 'Brytyjsko-sowieckie stosunki gospodarcze', *Przegląd Gospodarczy*, 10/5 (1929), 237–40.

[2]
The quotation is in the present edition is after *The Economist*, 106/4427, 23 June 1928, 1282, yet Kalecki most probably used its German translation published in 'Die Besprechungen Teagle-Deterding', *Berlinier Tageblatt und Handelszeitung*, 57/428, 10 Sept. 1928.

The End of the Petroleum War

[1]
First published as 'Zakończenie wojny naftowej', *Przegląd Gospodarczy*, 10/6 (1929), 301–2.

International Coal Competition

[1]
First published as 'Międzynarodowe współzawodnictwo węglowe', *Przegląd Polityczny*, 11/1–2 (1929), 49–53; see also 'The European Coal Crisis', and 'The Struggle for the German Coal Market', this volume.

French Petroleum Policy

[1]
First published as 'Francuska polityka naftowa' in *Przemysł i Handel*, 10/22 (1929), 972–4, and signed M. Kal.

The European Coal Crisis

[1]
First published as 'Europejski kryzys węglowy', in *Przemysł i Handel*, 10/26 (1929), 1154–5; see also 'The Struggle for the German Coal Market' and 'International Coal Competition', this volume.

Control over German Industry by Foreign Capital

[1]
First published as 'Niemcy: opanowywanie przemysłu przez kapital

zagraniczny', in *Przemysł i Handel*, 10/40 (1929), 1710–11, and signed M. Kal.

[2]
See *Berliner Tageblatt und Handelszeitung*, 58/447, 21 Sept. 1929.

[3]
i.e. Dr Werner Kabl; it proved impossible to trace the initials of doctors: Meinhardt, Sempel, and Büchner, or of Mr Duisberg who chaired the meeting.

Impact of Pound Devaluation on World Prices

[1]
First published as 'Wpływ dewaluacji funta szterlinga na ceny światowe', in *Przegląd Gospodarczy*, 13/2 (1932), 67–8, and signed M. K-cki.

Foundations of the Manchurian Conflict

[1]
First published as 'Podstawy konfliktu mandżurskiego', in *Przegląd Socjalistyczny*, 2/2 (1932), 6–8, and signed the pseudonym H. Br.

[2]
In the original paper the figures on Japanese investment in Manchuria and in Central China were mistakenly given as $85 million and $25 million respectively. They were corrected in Kalecki's next article on this subject to $850 million and $250 million (see p. 167 above).

Remarks on Hitlerism and Business Spheres

[1]
First appeared as 'Uwagi o hitleryzmie i "sferach gospodarczych"', in *Przegląd Socjalistyczny*, 2/3 (1932), 5–6.

From 1932 Kalecki consistently pointed out that paramilitary public works and armaments, financed through budget deficits, could turn out to be the two most popular methods of government intervention to overcome the business crisis. He carefully observed Japan's war in Manchuria (see 'Foundations of the Manchurian Conflict' and 'War in the East', this volume); he warned against similar developments in Europe, and against the danger of Hitlerism. In his article 'Inflation and War' he pointed out that 'Hitler is clearly betting on both horses—inflation and war' (p. 178 above), and that a similar tangle of circumstances was pushing Japan along the 'road to glory', as Japan also was betting on these two horses and, with the war in Manchuria not yet over, was already preparing to go to war with the USSR over markets for her industrial goods.

Kalecki dealt with the development of Hitlerism in Germany also in his articles: 'On the Papen Plan' (*Collected Works*, vol. i), 'On the Margin of German Events', 'The Fate of Experiments', 'Stimulating the Business Upswing in Nazi Germany' (all in this volume; see also 'The Business Cycle and Inflation' and 'The Business Cycles and Armaments', in *Collected Works*, vol. i).

War in the East

[1]
First published as 'Wojna na Wschodzie', under the pseudonym Henryk Braun, in *Przegląd Socjalistyczny*, 2/5 (1932), 1–3.

[2]
In the original, General Maa, but most likely General Chan-shan Ma.

[3]
i.e. General D. L. Horvath, at the time the general manager of the Eastern Chinese Railway.

[4]
General Tetsutaro Sato.

[5]
See Karl Marx, *Capital*, vol. i, London, Allen & Unwin, 1946, 786, n.2; in fact the quotation is after P. J. Dunning, *Trades' Unions and Strikes*, London, 1860: 35.

The Fall of Deterding

[1]
First published as 'Zmierzch Deterdinga' under the cryptonym H. Br., in *Przegląd Socjalistyczny*, 2/12 (1932), 4–5.

[2]
i.e. the 'Rothschild Brothers', in Paris.

[3]
See notes [3], [4], and [6], to the 'Petroleum War', pp. 514–5 above.

Inflation and War

[1]
First published under the pseudonym Henryk Braun as 'Inflacja a wojna', in *Przegląd Socjalistyczny*, 2/13 (1932), 2–3. See also *Collected Works of Michał Kalecki*, vol. i, Pts. 2 and 4 and the corresponding editor's notes (esp. pp. 485–91).

[2]
This probably refers to Thomas Alen Goldsborough's bill on stabilizing the purchasing power of money put forward in the House of Representatives on 9 Dec. 1931 and 15 Jan. 1932.

[3]
See *Verhandlungen des Reichstags*, vol. 446, Berlin, Reichsdrukerei, 1932, 2513.

[4]
Probably Mr Daniel Gross, a senator, author of *Post-war Reconstruction and Economic Transformation of Poland* (Kraków, Prawo i Lud, 1929) (in Polish), where he argued for large government intervention and greater equality in income distribution.

[5]
See W. S. Woytinsky, *Internationale Hebung der Preise als Ausweg der Kriese*, Leipzig, Buske, 1931.

[6]
i. e. Generals Kurt von Schleicher and Kurt von Hammerstein.

On the Margin of Events in Germany

[1]
The article first appeared as 'Na marginesie wydarzeń niemieckich', under the cryptonym H. Br., in *Przegląd Socjalistyczny*, 2/15 (1932), 4–5.

The Present Phase of the World Crisis

[1]
First published as 'Obecna faza kryzysu światowego' in *Polska Gospodarcza*, 14/1 (1933), 9–11.

[2]
This is implied reference to the second Lausanne Conference, of 9 July 1932 which practically relieved Germany from reperations payments (they were reduced to about 8.5% of their original value, the annual payments cut down from about RM3 billion to RM230 million).

The Fate of Experiments

[1]
First published as 'Losy eksperymentów', in *Polska Gospodarcza*, 15/50 (1934), 1531–4; for more on the mechanism of the business upswing, see *Collected Works*, vol. i, pt. 4.

[2]
National Industrial Recovery Act, passed in the USA in 1933, in its first part defined the principles of 'honest' competition and measures to counteract monopolistic tendencies, and in the second part it created the basis for the fight against inflation and economic stagnation (*inter alia*, through public works), and for collective labour agreements. The purpose of the law was to help the American economy to overcome the 1929–33 crisis. NIRA's regulations were terminated two years later as violating the Constitution of the USA.

Stimulating the Business Upswing in Nazi Germany

[1]
The article first appeared as 'Eksperyment niemiecki', in *Polska Gospodarcza*, 16/49 (1935), 1574–6; reprinted (together with his 'The Essence of the Business Upswing' and 'The Business Upswing and the Balance of Payments'—both included in *Collected Works*, vol. i) in the collection: M. Kalecki, *Mechanizm poprawy koniunkturalnej* (The Mechanism of the Business Upswing), Warsaw, Główna Księgarnia Wojskowa, 1936, 26–34. The next reprint, entitled 'Nakręcanie koniunktury w Niemczech hitlerowskich' (Stimulating the Business Upswing in Nazi Germany), appeared in the volume M. Kalecki, *Z ostatniej fazy przemian kapitalizmu*, Warsaw, PWN (1968), 11–20. In that edition Kalecki introduced some minor editorial changes, *inter alia* replacing the terms 'credit inflation' and 'inflationary financing of investments', which he used at the beginning of the 1930s, with the terms 'mechanism of the business upswing' and 'financing investments through credits' respectively, which he used later (for more on this matter, see *Collected Works*, vol. i, 429).

The article appeared subsequently, together with the volume *Z ostatniej fazy przemian kapitalizmu*, or in other collections of Kalecki's papers, in several translations: English (*The Last Phase in the Transformation of Capitalism*, New York and London, Monthly Review Press, 1971, 65–73); Italian (as 'La stimulazione della congiuntura nella Germania hitleriana', in M. Kalecki, *Sul capitalismo contemporaneo*, Rome, Editori Riuniti, 1975); Spanish (as 'Estimulo del auge de los negocios en la Alemania nazi', in M. Kalecki, *Sobre el capitalismo contempráneo*, Barcelona, Editorial Critica, 1979); and Swedish (as 'Stimulering av konjunkturuppgängen i Nazityskland', in M. Kalecki, *Tillväxt och stagnation i modern capitalism*, Bo Carefores Bokförlag, 1975).

In the present edition we follow the version published in *The Last Phase in the Transformation of Capitalism*. The publisher's permission to reproduce this article is gratefully acknowledged.

PART 2
INDICES OF BUSINESS FLUCTUATIONS

Price Index of Semi-Finished Investment Goods

[1]

First published as 'Wskaźnik cen półfabrykatów inwestycyjnych', in the monthly *Koniunktura Gospodarcza*, 3/3 (1930), 106–7. The journal was published by the Institute for the Study of Business Cycles and Prices from April 1928, first as a quarterly and in 1929–31 as a monthly. In this period it contained four basic sections: (i) studies in the business cycle in Poland, (ii) international reviews of business fluctuations, (iii) a section devoted to economic theory and methods, and (iv) statistical tables. From 1932 the statistical section was published separately in the 'Monthly Statistical Tables of the ISPBC' and the theoretical and methodology part was published in the quarterly series: *Prace Instytutu Badania Koniunktur i Cen*, which has been often referred to in the present volume of the *Collected Works*; at the same time *Koniunktura Gospodarcza* was again published as a quarterly (until 1939). In addition, the ISBCP published a fourteen-volume series of monographs, *Sprawozdania i przyczynki naukowe IBKGiC*, on economic relations and the methodology of economic research, as well as a four-volume series, *Badania nad dochodem społecznym Polski* (Studies on the Social Income of Poland), of which Kalecki co-authored two volumes. Kalecki's *Essay on the Business Cycle Theory* (see *Collected Works*, vol. i) was also published by the ISBCP.

In the Institute for the Study of Business Cycles and Prices Kalecki worked, among other subjects, on the methodological problems of studying the business cycles, closely collaborating in this field with Ludwik Landau (for more on Landau, see *Collected Works*, vol. vii), and with Jan Wiśniewski (one of the most talented Polish statisticians, author of the method for measuring seasonality that also became widely used outside Poland). Kalecki's paper on price indices of semi-finished investment products was his first publication in this field of methodological studies.

Enquiry into business cycles was initiated in the USA soon after the First World War and quickly became popular in Europe. For many years, however, the concept of the business cycle was understood in various ways. In the mid-1920s one of the pioneers of studies of the business cycle in Poland wrote: 'In the Polish language the study of the business cycle has two meanings: first, study of the actual possibilities of selling goods of some branch of industry at home or abroad (sale conditions in export markets);

second, study of the economy as a whole in order to determine, after separating seasonality, in what stage of the economic cycle—stagnation, upswing, boom, or crisis—it is in any given period of time' (Edward Lipiński, 'On the Study of the Business Cycle', *Przegląd Gospodarczy*, 8/18 (1926), 873; in Polish).

Kalecki studied the business cycle in both of these meanings. Along with factual examination of business conditions in particular commodity and regional markets (see Part 1, Section I of the present volume), in the ISBCP he also studies the theory of business fluctuations in the strict sense (see *Collected Works*, vol. i), as well as statistical methods and the specific tools for the study of business cycles.

The ISBCP was patterned on the Harvard Economic Service and used its methodology for the study of the business cycle. In the first stage of this method from the observed chronological statistical series the long-run trend and seasonal fluctuations were eliminated so that the refined series represented only endogenous fluctuations of market conditions (corresponding to the business cycle) and random perturbations that could not easily be eliminated. In the second stage a system of indices was constructed that would indicate the phase of the business cycle in which a given economy was in the period under examination, and that would make possible a forecast of its future development. Such a system of indices was constructed in the Harvard Institute first in 1919, and was named the Harvard Barometer. It included indices representing the situation in three markets: index A (speculation) showed the average quotations of stocks on the New York Stock Exchange, index B (commodity market) showed the wholesale prices of goods, and index C (money market) showed the quotations of fixed-interest-rate securities. On the basis of empirical enquiry certain constant relationships were believed to exist between cyclical fluctuation of these indices and the forecasts of the Harvard Economic Service relied on these interrelations, lagged in time (see Oskar Lange, *Introduction to Econometrics*, Oxford–London–Warsaw, Pergamon Press and PWN, 1959).

Although the authors of this method renounced all theoretical assumptions concerning the interrelationship between their A, B, and C indices, a closer analysis has shown that the Harvard method relied on such assumptions (that were not necessarily very realistic), and especially on the assumption that changes in the average quotations of stocks precede and cause changes in demand in the commodity market, which is followed by changes in output and employment. Thus the Harvard method was based almost exclusively on studies of the money market.

The forecasts made on the basis of the Harvard Barometer for 1921–4 (that was constructed and tested on statistical series for 1900–14) showed a good correlation with the actual development of the US economy. However,

in later years discrepancies became more pronounced as the rise in index A was not followed by the two other indices. Based on the rising Harvard Barometer, optimistic forecasts were made for the development of the US economy up to the unexpected crash on the New York Stock Exchange in November 1929. This caused the rejection of the Harvard Barometer as a tool for economic forecasting, but not of the studies of statistical methods of separating seasonal fluctuations and the long-run trend. Moreover, the idea of forecasting the business cycle on the basis of other simplified measuring-rods became increasingly popular. Especially in England and Germany new indices were added to those considered by the Harvard Barometer, especially the ones on the volume of output and employment.

The contribution of the ISBCP, and of Kalecki and Landau especially, was the effort to relate the indices of general business activity more closely to those of investment activity and industrial output on the one hand, and indices of consumption (that of the working population in particular) on the other. This was connected with the stress placed in the ISBCP on the role of investment in the course of the business cycle. With time, general economic forecasts began to rely on balance-sheets of the production and distribution of national income as a whole. Studies of business cycles in individual commodity markets were separated from those of business conditions in the economy as a whole.

Kalecki's papers included in Part 2 of this volume are devoted to the 'pruning' of statistical series of seasonal fluctuations and the long-run trend in order to separate the 'pure' business cycle, and above all, to construct symptomatic indices of investment activity, industrial output, and consumption. Besides this, in his studies of tools for investigating business cycles he also constructed indices characterizing changes in business conditions in individual commodity markets (see 'Sales of Lime as an Indicator of Construction Activity' and 'Sales of Thread as an Indicator of Textile Business', this volume).

Profit Margins of Sawn Timber

[1]

First published as 'Marża zarobkowa drewna tartego', in *Koniunktura Gospodarcza*, 3/5 (1930), 157–8.

Partly related to the question of profit margins of sawmills, but mainly reflecting the economic misery at the depth of the business crisis in Poland, is a short story published by Kalecki two years later, that follows below in Annexe 1.

Annexe 1
A Booming Firm[1]

I was returning home in a horse-cart after some shopping in a sawmill. The prices I had to pay were very low, yet I was uncertain if I would be able to make any profit.

'Is there a sawmill near here', I asked my driver after a while.

'There is one, sir, some three kilometres away.'

'Does it work these days?'

'It very much does, sir. It operates two shifts a day for more than a year now. The former owner did not fare well at all and went bust. But the one who took over keeps it running all days long.'

It works non-stop for the whole year now! On two shifts! I did not understand this and thought I should see this wonder. Although I no longer needed any wood I could pretend I did.

'Well, lets see this sawmill.'

Soon we arrived. The owner immediately told me he had no wood to sell. I understood less and less. And the sawmill was indeed working at full capacity.

'Poor times, aren't they', said the owner. 'Prices go down like waterfalls. You must hardly make a living but this plays into my hands', he added and laughed.

I looked at him thoroughly. He operates his mill for two shifts for the whole year, he does not want to sell his produce and he is happy to see prices rocketing down—he must be nothing but insane, I thought.

'You probably think I am, hem, mentally ill or something', he said and knocked himself meaningfully in the head. Then he laughed again and added: 'It is no madness whatsoever but a good business. You see, my brother and I have undertaking firms in several towns. And, you see, during the crisis people may not buy new dresses, may not eat, but they continue to die. When the previous owner of the sawmill went bankrupt we bought it dirt cheap and it works to meet our needs. Thus the cheaper the wood the better business we do. Now you see my point, don't you?'

I did. Feeling somewhat depressed, we soon parted.

[1] First published as 'Kwitnące przedsiębiorstwo' in *Rynek Drzewny*, 14/88 (1932), 2 (in the journal's column 'Joy and Sorrow'), and initialled M.K.

Changes in Consumption of Wheaten Bread and Meat in Poland

[1]
First published as 'Dynamika spożycia pieczywa pszennego oraz mięsa w Polsce', in *Koniunktura Gospodarcza*, 3/6 (1930), 181–2.

Sales of Lime as an Indicator of Construction Activity

[1]
First published as 'Zbyt wapna jako wskaźnik ruchu budowlanego', in *Koniunktura Gospodarcza*, 3/7 (1930), 227–9.

Symptomatic Indices of Consumers' Incomes and Investment Activity

[1]
First published as 'Symptomatyczne wskaźniki dochodów mas konsumentów oraz ruchu inwestycyjnego', in *Koniunktura Gospodarcza*, 3/12 (1930), 327–9.

The real growth of investment, calculated on the basis of indices of the real growth of construction, railway investments, and outlay on machinery and equipment, was of great interest to Polish economists and statisticians before the Second World War and occupied a prominent place in the studies of the ISBCP. Along with Kalecki's, and Kalecki and Landau's papers included in Part 2 of this volume (see also Annexe 5 below), one can mention, *inter alia*, Jan Wiśniewski's 'Index of Construction Costs in Lwów and Katowice' (*Koniunktura Gospodarcza*, 1/30, 1928) and his 'Construction Costs in Warsaw' (*Koniunktura Gospodarcza*, 12/4 (1939); both in Polish). After the war, Eugeniusz Rychlewski went back to this line of research, but thanks, *inter alia*, to better investment statistics and a broader base of information, he used considerably more complex methods (see his 'Measuring the Real Growth of Investment', *Ekonomista*, 2 (1978), in Polish).

An Index of Taxation of Commodities

[1]
First published as 'Wskaźnik wysokości opodatkowania towarów', in *Koniunktura Gospodarcza*, 3/12 (1930), 330.

Sales of Thread as an Indicator of Textile Business

[1]
First published as 'Zbyt nici jako symptomat koniunktury włókienniczej', in *Koniunktura Gospodarcza*, 4/2 (1931), 56–9.

[2]
For more on the mechanism of extension of the term of bills, see 'Business Conditions of the Textile Industry in 1927–1929,' this volume.

Elimination of Seasonal Fluctuations from Unemployment Rates
(with Jan Wiśniewski)

[1]
First published as 'Eliminowanie sezonowości z odsetka bezrobocia', in *Koniunktura Gospodarcza*, 4/3 (1931), 82–3.

A Survey on Wholesale Trade

[1]
First published as 'Ankieta o handlu hurtowym', *Koniunktura Gospodarcza*, 4/7 (1931), 202–7.

Indices of Consumption and Their Analysis

[1]
First published as 'Wskaźniki spożycia i ich analiza', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 1/1 (1932), 3–6.

Textile Trade in Poland: Outline of Structure
(with Ludwik Landau)

[1]
First published as 'Handel włókienniczy w Polsce: zarys struktury', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 1/3–4, (1932), 30–42. See also 'A Survey on Wholesale Trade' and 'Business Conditions of the Textile Industry in 1927–1929', both in this volume.

[2]
Firms that bought industrial certificates of categories I–III were considered large, those of categories IV–V considered medium-size, and those of categories VI–VII as the small ones (firms belonging to category VIII were usually self-employed trades, as in fact are some of those of category VII). In the years 1929–32 the total number of firms declined from 34 661 to 27 125, of which those with industrial certificates of categories I–III declined from 922 to 676, those of categories IV–V from 8254 to 5968, and those of categories VI–VII from 25 485 to 20 481.

[3]
The German Survey Committee was founded in April 1926 by the German Reichstag, government, universities, and research institutions (Ausschuss zur

Untersuchung der Erzeugungs- und Absatzbedingungen der deutschen Wirtschaft). Shortly earlier the Committee on Industry and Trade, under the chairmanship of Arthur Balfour, was founded in Great Britain, and in the second half of 1926 a similar committee was established in Poland. The results of the German Survey Committee on the retail and wholesale trade were published in several volumes: *Die Grundlagen der Handels-Enquete* (vol. i, Berlin, Mittler & Son, 1929), *Einzelhandel mit Bekleidung* (pts. I and II, vols. 9 and 10, 1930), *Grosshandel mit Lebensmitteln und Kolonialwaren* (vol. 12, 1930), *Selbständiger Grosshandel mit Textilien* (vol. 13, 1931).

[4]

See M. Kalecki, 'Business Conditions in the Textile Industry in 1927–1929, this volume.

The Share of Cartels in Industrial Output in Poland

[1]

First published as 'Udział karteli w działalności przemysłowej na rynku polskim', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 2/3 (1933), 3–6.

Kalecki's paper was criticized in a paper by Wł. C. 'On the Question of the Index of Cartelized Output', *Przegląd Gospodarczy*, 14/22 (1933) (in Polish). Kalecki's reply, which was published in the next issue of the journal, follows in Annexe 2 below.

Annexe 2
On the Question of the Index of Cartelized Output: A Rejoinder[1]

My calculations of the share of cartelized output in total industrial output have been criticized apparently by an expert on the problems

[1] First published as 'W sprawie wskaźnika wytwórczości skartelizowanej: odpowiedź na artykuł "W sprawie wskaźnika wytwórczości skartelizowanej" p. Wł. C. w zesz. 22 *Przeglądu Gospodarczego* z 1933 r.', in *Przegląd Gospodarczy*, 14/23 (1933), 872–3. Wł. C.'s reply followed Kalecki's rejoinder in the same issue of *Przegląd Gospodarczy*.

of cartels. Therefore I was rather surprised to see that nearly all arguments of my critic resulted from a misrepresentation either of the actual position of cartels, or of my argument.

Having declared that 'if . . . one aims at calculating the volume of cartelized output by taking into account the degree of cartelization of each industry, one must very carefully examine the actual position of cartels and their chronology' (pp. 838–9), Wł. C. accuses me of taking into account cartels that have not existed in 1930 although the output of 1930 is taken as a reference point in my calculations. However, it is clearly said in my paper that *cartels existing in the middle of 1933* are taken into consideration; the volume of their output in 1930 is selected only because the year is considered to represent the period of average business, i.e. a relatively 'normal' branch structure of the industry. Of course, not all cartels existing in 1933 were established before 1930 but the presently cartelized industries existed in 1930 and we could estimate the volume of their output. In this way we could also roughly estimate the volume of output of cartels existing in 1933 should business activity remain at its 1930 level.

Examining my 'chronology of cartels' Wł. C. argues that the cartel of oil-refinieries and that of cooking-oil refineries should not be included because they both did not exist in the middle of 1933. However, I considered as the oil-refining cartel Polish Oil Exports for the reasons explained on p. 302 above, and concerning the cartel of cooking-oil refineries, it continues to operate after its two former members left and after its reorganization (the address of its sales office, Atol, is St. Nowy Zjazd 1, Warsaw), and it will be closed only at the end of this year.

'What were the intentions of the author', next asks my critic, in not considering the cartels of cellulose, starch, molasses, chains, lithophone etc.? I admit to have neglected the lithophone cartel but this has no impact on my final results. Had I accounted for it, the general index of the cartelized output would have to be increased from 36.7% to 37.74%. The production of molasses, however, which is a by-product of sugar production, is included in the output of the sugar-mills cartel, as is the output of cellulose—a raw material for paper production that is manufactured by paper-mills alone—which is therefore included in the output of the paper-mills cartel. A cartel of starch production does not exist; there exists merely a company of starch producers that controls 20% of starch output only. If I were

to consider all cartels of this type (for the explanation of causes for their omission see p. 297 above) the share of cartelized output would have been certainly greater than 40%. Finally, listing the cartels that existed in the middle of 1933 I have not considered the cartel of chain producers simply because it was closed on 30 June 1933. 'One must examine with the greatest caution the actual list of cartels and their chronology' [p. 839 of Wł. C.'s paper] not only when estimating the volume of their output but also when criticizing these estimates.

The next criticism refers to my distinguishing between the large and the medium-size cartels. 'We see no reason why the jute industry is included in large industry if in the group of medium-size industry the paper, the cement, and the cheviot spinning industries are included' [p. 839]. Yet, nowhere in my paper do I write about the groups of cartels in large and medium-size industries, but merely about large and medium-size cartels classified according to the volume of their output. Then Wł. C. puts into question the importance of the relative structure of output and he writes: 'The share of the paper and cement industries in total output is no doubt of a much greater importance for the domestic market than that of the jute industry that is largely directed to export'. Why Wł. C. failed to note that in my paper I considered only the output directed to the domestic market, both when discussing the cartelized and the non-cartelized production (see pp. 296 and 299–301 above)?

Then my critic turns to the question of the internal use of cartel members. Two cases are considered in my paper: when this use is included in the sales quota and when it is not. First of all, Wł. C. doubts whether there is in Poland any larger cartel of the first type. Well, what about the cartel of cotton-spinning that allocates output quotas in fact without distinguishing between the purposes for which the yarn is used? Of course, in that case the cartelized output used internally must be calculated at cartel prices that, incidentally, meets no objection of Wł. C. He argues, however, that in other cases, e.g. when special quotas for internal use are allocated, the value of these quotas will not necessarily be calculated at cartel prices.

This, however, is exactly what I argue in my paper: 'Then the pool member will not calculate his internal use at cartel prices because at any rate he will not be allowed to sell this additional output outside the cartel' [p. 298 above]. I only note that the price received by the pool member for the product manufactured from a cartelized raw material depends on the calculation made by cartel outsiders too, although this calculation will be based on cartel prices paid by them for the cartelized raw material. Hence my conclusion: 'Cartel members may ignore cartel prices of raw materials when calculating profitability of their respective output, yet the price they will receive for their products will depend on cartel prices' [p. 298 above]. These complicated problems are not discussed by Wł. C., however.

At the end my critic writes: 'Because of the constantly changing base of the calculation (new cartels are formed and the old ones end their operations) and the changes in the sales inside the pool and outside it, the index of the share of cartelized output in the total output is of relatively limited significance' [p. 840 of Wł. C.'s paper]. I do not think that changes in the number of existing cartels represent a great difficulty, provided that the share of cartelized output is calculated for some given point of time, as argued in my paper. These constant changes require, however, that the index of the share of cartelized output is permanently revised and therefore the last observation of my critic encourages me to publish this index periodically.

A New Index of Investment

[1]
First published as 'Nowy wskaźnik inwestycji', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 3/1 (1934), 10–15.

The International Comparability of Indices of Industrial Output and an Attempt to Improve It (with Ludwik Landau)

[1]
First published as 'Porównywalność międzynarodowa wskaźników produkcji przemysłowej i próba jej poprawienia', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 3/2–3 (1934), 3–8, and also in a French translation, 'Comparabilité internationale des indices de la production industrielle', Warsaw, IBKGiC, 1934.

The paper of Kalecki and Landau was criticized in the periodical of the German Institute for the Study of Business Cycles. Their rejoinder follows in Annexe 3.

Annexe 3
On International Comparability of Indices of Industrial Output[1] (with Ludwik Landau)

In the last year's issue of *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, we published an essay on international comparability of indices of industrial output and attempted to improve this comparability. Our methods were reviewed by the German Institute for the Study of Business Cycles,[1] where certain doubts were expressed, largely resulting from the interpretation of our findings in a way other than we had intended. Considering the exceptionally high standard of papers of the German Institute, and that misunderstandings could arise concerning the suggested method of improving the comparability of industrial output indices, we decided to address the doubts expressed in that review and to point out the essence of our techniques for improving the indices in question.

Let us summarize the essence of the problem. Indices of industrial output calculated in many countries—almost everywhere now—differ very much from each other concerning the methods used, and especially the range of the calculations. These indices are supposed to show the direction and magnitudes of changes in industrial output as a whole. But since nowhere—with the possible exception of the Soviet Union—do statistics, and current statistical information in particular, cover all of industry, these indices have to rely on data applying to only a smaller or larger part of industry regarded thereby as representative. This may result in some discrepancies between changes shown by the index and those actually taking place in industrial output as a whole. These discrepancies can be accidental and of brief duration, for instance, when under the influence of some

[1] First published as 'W sprawie porównywalności międzynarodowej wskaźników produkcji przemysłowej', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 4/3–4 (1935), 108–10, and in a French translation, 'Encore sur la comparabilité internationale des indices de la production industrielle' in the same issue of the journal, pp. 113–6; see also the reprint in French, under the same title, Warsaw, IBKGiC, 1935.

[1] See *Vierteljahrshefte für Konjunkturforschung*, Neue Folge, 10/1, Pt. A (1935), 93–5 [signed as R. Wa.].

special factors there is a sudden increase or decline in output only in the sectors included in the index, or only outside them; however, systematic discrepancies can also appear and these deserve special attention.

From this point of view a special consideration has to be given to a factor connected with the course of the business cycle. Not all industries react identically to cyclical changes. In some industries growth in output during an upswing and its decline during a depression are insignificant; among these is the production of consumer goods for which demand is rather inelastic. Other industries are the starting-point for changes in the business cycle, i.e. in these industries business changes appear with a remarkable strength; among them are industries related to investment activity. Now, depending on whether in the calculations of the index of industrial output there are greater omissions of the consumer industries, or other industries, this index will exhibit stronger or weaker changes in comparison with the actual changes in industrial output as a whole. *The levelling of these differences in the amplitude of fluctuations in individual indices of industrial output*—that is, permanent differences resulting from the structure of these indices—was in fact the reason for the introduction of our corrections.

We tried to achieve this end by using the data on fluctuations in the consumption of coal (including hydroenergy expressed in terms of its coal equivalent). This is not to say that these fluctuations are regarded as a better measure of fluctuations of industrial output than direct indices of output. This is obviously not the case. The consumption of coal—or, strictly speaking, its sales from mines, i.e. coal production plus import of coal less its export, for only such data are available—for various reasons may show fluctuations that have nothing in common with industrial activity and its changes. For instance, the sales of coal depend on temperature fluctuations in the winter: they rise when winters are cold and fall when they are mild; coal stocks are accumulated and run down both by consumers and by the wholesale and retail trade (when data on production of coal instead of its sales are used, the fluctuations of stocks in coal-piles also must be considered). Because of all these factors not only monthly or quarterly fluctuations in the sales of coal (on which stock changes may have big influence), but also annual fluctuations in its sales cannot be regarded as a satisfactory measure of fluctuations in industrial activity.

In actual fact, the use of these data had an entirely different aim: to determine the relation of changes in indices of sales of coal corresponding to identical changes in industrial output as a whole; for, as has already been mentioned, due to differences in the structure of indices of industrial output between individual countries, the same changes in industrial output will correspond to different changes in individual indices. So the purpose of our exercise was to determine coefficients that would give certain constant characteristics of individual indices of industrial output, i.e. a measure of their 'sensitivity'. Finding such a measure would make it possible to reduce fluctuations of individual indices to a common denominator.

The use for this purpose of the data on sales of coal (hydroenergy included) was based on the assumption that their fluctuations, in so far as they are linked with changes in the activity of the economy as a whole (i.e. after elimination of the influence of atmospheric changes and changes in stocks), take place in such a way that in all countries under examination the same changes in the use of coal correspond to the same changes in industrial output (we shall deal with the objections against this assumption later). Thus we assume that if, for instance, in two countries there is a 5% increase in coal sales unrelated either to changes in stocks, or to atmospheric changes, then in both these countries output must have increased at the same rate. If, at the same time, in country A the industrial output index increased by 6% and in country B by 9%, this shows that the structure of these indices is such that the index for country B is more 'sensitive' and reacts to changes in total output with changes one and a half times greater than the index for country A.

How can a relationship of this type be determined? For this purpose we use the method of correlation, studying for individual countries the relationship between indices of coal sales and indices of industrial output (a correlation that is very close everywhere), and calculating regression equations that give the average ratio of changes in coal sales to the industrial output index in any given country. In this way it was possible to determine that, for instance, in country A an increase of 5% in coal sales corresponds to an average increase of 6%, and in country B of 9%, in the output index, and hence that in comparisons of the situation in these two countries one has to take into consideration the different sensitivity of the indices.

To do so and to obtain indices to which there are no objections in this respect, one can reduce all indices to the same amplitude of fluctuations which is typical of fluctuations in coal sales, i.e. to get indices fluctuating not in conformity with movements of the output index, but with the amplitude of fluctuations in coal sales (we called them indices of the 'ideal consumption of coal'). Or, not being content with this, one can pass on immediately to the next stage, i.e. reduce all indices to the same amplitude of fluctuations displayed by one index, the construction of which is believed to be the best. Returning to our numerical example, if, for instance, as such a country-index we regard that for country A, the indices for country B should be corrected in such a way that their amplitude of fluctuations is reduced one and a half times. This is the procedure that we followed in our calculations, using for the 'model' index that for Germany, whose structure at that time (modified later in 1935), seemed to be the most rationally selected.

This, in general outline, is the method used for the improvement of international comparability of output indices. We now move on to the objections made to its use by the German Institute. Already the first sentence of the presentation of our method that 'The industrial output of individual countries is correlated with the ideal consumption of coal', shows that the very essence of our approach was not properly understood (which might result from the inadequacy of our explanation). As one can see from the discussion reiterated above, the 'ideal consumption of coal' is the linear function of production that is closest to the actual consumption of coal. The calculation of this function for individual countries enables us to introduce for them equations correcting the comparability of output indices. At the same time, as we have said in our paper, in these equations 'we no longer have to do here with the indices of coal consumption, though the latter were indispensable for calculating the coefficients of our final equations'.[2] This is already a reply to the doubt of the German Institute as to how we shall correct the monthly data—obviously with the same equations that we used to correct the annual data [see p. 328, this volume].

Perhaps the main objection of the German Institute boils down to the fact that there is no strict correlation between the use of coal and industrial output, which in Germany in 1932 supposedly consumed

[2] p. 328 above.

only 37% of domestic sales of coal. A closer analysis of the relevant data shows, however, that this figure does not include the use of coal by electric power plants (7% of total sales).[3] Then 36% of sales are for stove coal, agriculture, or the so-called *Platzhandel.* However, the latter unquestionably also supplies a large part of small industry, which is clearly confirmed in the material of the German Survey Committee.[4] Consequently, the actual use of coal by industry even in 1932 (when its share in consumption was exceptionally low because of the low level of production) certainly was considerably more than 50%.

Yet, this is not all, since 13% of the total consumption of coal goes for railways and navigation whose activity is very closely connected with the volume of industrial output. The rest (stove coal and gasworks) unquestionably shows great stability over the course of the business cycle, and hence *changes* in the consumption of coal remain under the powerful influence of changes in the volume of industrial output. This is confirmed by the high correlation coefficient of 0.983 between the consumption of coal and industrial production in Germany that we found in our study [see p. 327, above]. Of course, it is clear that any strict proportionality of industrial output and the consumption of coal is out of the question: the equation of the regression curve representing the consumption of coal in relation to the industrial output index for Germany is $y = 0.751x + 24.9$; the appearance of a constant in the equation is primarily a consequence of the existence of an unchanging part of coal consumption—namely non-industrial consumption. Thus the charge of the reviewers that we showed the variability of the consumption of industrial coal in its total sales (see p. 94 of the review) is probably a misunderstanding.

Entirely understandable are, however, the doubts expressed by the German Institute whether the dependence between the actual trend of industrial output and the consumption of coal is the same in all countries, which is the basic hypothesis of our method. If, for instance, in country A the share of stove coal in the total consumption of coal (which shows great stability over the business cycle) is much greater than in country B, then in country A the same fluctuations of output would correspond to smaller fluctuations in the consumption of coal than in country B, and the same fluctuations

[3] See *Vierteljahrshefte für Konjunkturforschung*, 9/1B (1934), 14.
[4] See *Die deutsche Kohlenwirtschaft*, Berlin, Mittler, 1929: 96.

in the use of coal to greater fluctuations in output. We raised such a doubt ourselves [see pp. 324–5, above], but we suggested that the errors resulting therefrom should not be significant. Now we shall try to show this indirectly by calculating indices of industrial output for some countries 'corrected' in a different way, and by comparing them with the indices calculated by our method.

Let us first take the USA. The greatest flaw in their index is the omission of the construction industry. Hence, we calculated a corrected index by combining the previous output index with the index of construction contracts from which we eliminated price changes; the weights for this calculation were based on data taken from W. I. King's estimate of the social income that covers 1923–5, i.e. the period that serves as the basis of the output index;[2] in this way we got the weights 86 and 14. Since contracts precede construction activity itself, we took them from a somewhat earlier period by moving them up one quarter.

The results for 1932 (after conversion to the base-year, 1928) are as follows:

Industrial output index in the USA	57.7
Construction index	27.0
Industrial output index inclusive of construction	52.6
Industrial output index corrected by our method	54.3

We made similar calculations for France. There the greatest deficiency of the index is the omission of the food industry which makes this index excessively 'sensitive'. As one can infer from the employment data, the activity of this industry (number of workers combined with time of work) declined by 8% from 1930 to 1932. Taking the French output index as a rough representation of the activity of the remaining groups of industry and giving the food industry the same weight as it has in the German index, i.e. 15%, for 1932 we get (taking 1930 = 100):

Industrial output index in France	68.6
Index of the food industry	92.0
Industrial output index, food industry included	72.1
Industrial output index corrected by our method	75.7

[2] See W. I. King, *The National Income and Its Purchasing Power, 1909–1928*, New York, National Bureau of Economic Research, 1930.

Obviously, in both cases exact agreement of results is out of the question, but the direction and the order of magnitude of the corrections may be regarded as sufficiently accurate.

Finally, the last comment of the reviewers is that the corrections are rather small, not exceeding 8% of the index, which—in their opinion—is within the allowable limits of error of any index of output. It seems that expressing corrections in percentages of the index is faulty: corrections have the aim of getting better comparability of *changes in industrial output*, and so what is important is not how the correction affects the level of the index, but how it influences the magnitude of the change that has taken place during a certain period (as a measure of the significance of the correction one could take the relation of the difference between the amplitude of fluctuations on the corrected index and of the original one to the former). As we can see from the above comparison for France, the decline in the original index from its highest level in 1930 to its lowest one in 1932 was 31%, but in the improved index it was only 24%. Can a really well-constructed index of output show a percentage change for a few crisis years one-third greater than the real change in production?

Domestic and Imported Machines and the Nature of Industrial Investments

[1]
First published as 'Maszyny krajowe i importowane a charakter inwestycji przemysłowych' in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 4/2 (1935), 68–9.

Index of Sales of Industrial Products

[1]
First published as 'Wskaźnik zbytu produktów przemysłowych', *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 4/3–4 (1935), 105–7.

A New Method of Trend Elimination
(with Brian Tew)

[1]
First published in *Econometrica*, 8/2 (1940), 117–29. The publisher's permission to reproduce this article is gratefully acknowledged.

The need for a new method of trend elimination came up in connection with Kalecki and Tew's work on estimates of real labour costs in the British steel industry, which required removal of the trend from these indices (see

'The Supply Curve of an Industry under Imperfect Competition', in *Collected Works of Michał Kalecki; Capitalism: Economic Dynamics*, vol. ii, Oxford, Clarendon Press, 1991; for more on Kaleki's collaboration with Tew, see *ibid.*, 524–6). However, Kalecki and Tew's article contained certain inaccuracies, and so the authors published a correction that follows in Annexe 4. All necessary corrections have been included in the main body of Kalecki and Tew's original paper.

Annexe 4
A New Method of Trend Elimination: A Correction[1] (with Brian Tew)

Several arithmetical errors in the article 'A New Method of Trend Elimination,' *Econometrica*, 8 (1940), 117–29, have been discovered by Professor Joe J. Livers of Montana State College, and have been brought to our notice. On p. 348, $\Sigma\delta = 65$ and not 64, so that $\bar{\delta} = -4.5$, not -4.4. This correction, we find, has only a negligible effect on the result of the example. On p. 350 the value of $g(x)$ when $x = 70$ should be 128.5 and not 138.5. It should be noted that this changes considerably the appearance of Fig. 31.

We have also found that a typing error has crept into Table 98 (p. 349): the penultimate entry in column (5) should have been $+28.4 + 2.5\Delta_{12}$ and not $24.8 + 2.5\Delta_{12}$. We may also mention that though in this table columns (2) and (3) are given to only one decimal place, somewhat less approximate figures were used in our calculations.

Professor Livers's criticisms, for which we are deeply indebted to him, refer of course to the arithmetic example and not to the substance of the method of trend elimination, as described in the article. However we take this opportunity of mentioning an aspect of this method which was not sufficiently stressed in our article. The calculation of the 'unknown' Δs from the condition

[1] First published in *Econometrica*, 9/1 (1941), 93–4. The publishers' permission to reproduce this note here is gratefully acknowledged.

$$\Sigma(t_r - t_{r-i})\left(\frac{\Delta_r}{t_r - t_{r-1}} - \bar{\delta}\right)^2 = \text{minimum}$$

is extremely simple, since each Δ_r is expressed as a linear function of *one* 'unknown' Δ, and the coefficient of the latter is $+1$ or -1. As a result: (i) each of the 'unknown' Δs may be obtained directly by equating to zero the sum of the derivatives of those members of the series

$$(t_r - t_{r-1})\left(\frac{\Delta_r}{t_r - t_{r-1}} - \bar{\delta}\right)^2.$$

which involve the 'unknown' Δ under consideration; and (ii) the derivatives in question are

$$\pm 2\left(\frac{\Delta_r}{t_r - t_{r-1}} - \bar{\delta}\right).$$

Thus in our arithmetic example we obtain the 'unknown' Δ_{13} from column (5) (corrected so that $\bar{\delta} = -4.5$ instead of -4.4) as follows:

$$\begin{aligned} &-2\,(-53.8 - 3.3\Delta_{13}) \\ &+2\,(+4.5 + 0.4\Delta_{13}) \\ &-2\,(-21.5 - 2.0\Delta_{13}) \\ &+2\,(+19.9 + 1.5\Delta_{13}) \\ &\Delta_{13} = -13.8. \end{aligned}$$

PART 3
ESTIMATES OF INVESTMENT, CONSUMPTION AND SOCIAL INCOME IN POLAND

An Estimate of Investment Activity in Poland
(with Ludwik Landau)

[1]
First published as 'Szacunek rozmiarów ruchu inwestycyjnego w Polsce', in *Koniunktura Gospodarcza*, 4/11 (1931), 276–85.

The third area of Kalecki's empirical research in the ISBCP—in addition to reviews of commodity markets in individual countries and studies of tools to investigate the business cycle—was estimation of the volume and structure of social income in Poland and its component parts: investment and consumption. These studies were undertaken in the ISBCP on the initiative of Landau, Wiśniewski, and Kalecki in the early 1930s. In particular, estimates of investments and their changes were strictly linked with Kalecki's theory of the business cycle being developed at the same time in the ISBCP (see *Collected Works*, vol. i. 437–8). These estimates on the one hand formed the base for some generalizations in his *Essay on the Business Cycle Theory* (see *ibid.*), and on the other hand, they enabled a statistical testing of this theory.

[2]
The indices of construction costs for Warsaw, Katowice, and Lwów, including material and labour costs, were periodically published by the ISBCP in *Koniunktura Gospodarcza*.

[3]
See *Papers of the Annual Assembly of the Association of Polish Cities*, Warsaw, Association of Polish Cities 1930: 46 (in Polish).

[4]
The paper referred to is by Ludwik Landau, *Questionnaires on Construction Works in 1927–1929*, in ISBCP, *Sprawozdania i Przyczynki Naukowe*, vol. x, Warsaw, 1930 (in Polish).

[5]
In 1932 Kalecki and Landau introduced several corrections and additions to their estimate of investments and their changes in Poland in 1929; they follow in Annexe 5.

Annexe 5
An Estimate of Investment Activity in Poland and the Quarterly Index of Investment[1]
(with Ludwik Landau)

In the following comments we make certain additions and corrections to our earlier estimate of investment activity in 1929,[1] and put forward some guidelines for regular calculations of an index of investment activity.

Additions to our estimate primarily concern calculations of investments in communications.

Construction of railways and the telephone and telegraph network can be better estimated after the publication of the closing of government accounts for 1929/30, since they show the actual expenditures. According to the closing balance-sheet, the outlay for the construction of new railways and sidings came to Zl.59.2 million, for investment in existing railways Zl.55.3 million, for investment in narrow-gauge railways Zl.4.1 million, and for replacement of destroyed equipment Zl.4.2 million, making a total of Zl.122.8 million. Outlay for the construction of telegraph and telephone lines and equipment was Zl.27.1 million, and for radiotelegraph construction Zl.0.7 million, which makes together Zl.27.8 million.

Besides this outlay for new equipment, it was decided to consider similar expenses to the ones included in our calculation of expenses for machines and buildings replacing the old ones. In the communication sector such expenses for amortization of equipment are replacement costs of parts of tracks and lines (besides the cost of replacing the rolling-stock that has already been included). As replacement costs we consider railway expenses for surfacing (replacement of rails, sleepers, turn-outs and switch sleepers, labour costs including) at Zl.146.6 million, and half of the maintenance costs of telegraph and telephone lines and

[1] First published as 'Szacunek rozmiarów ruchu inwestycyjnego w Polsce i wskaźnik kwartalny inwestycyj' in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 1/1 (1932), 7–10

[1] See 'An Estimate of Investment Activity in Poland', this volume.

equipment (assuming that repairs absorb half of costs) at Zl.5.7 million. Thus the total expenses for amortization of railway (except rolling-stock) and post office equipment came to Zl.154.3 million.

Adding these costs of amortization to new investment outlay, we got a sum of railway and post office investments equal to about Zl.300 million.

Other government investment. Also in calculations of highway investment we now use figures on the actual execution of the budget and partially consider amortization costs.

Expenses for the construction of state highways, together with the rebuilding of roads, actually came to Zl.6.2 million in the construction year 1929/30, for the construction of new bridges and replacement of the old ones to Zl.5.1 million, for the construction of canals and river ports (regarding as replacement or amortization half of total expenses) to Zl.10 million. Adding Zl.8 million of expenses from extra-budgetary funds (from cash reserves), we get Zl.32 million as the total sum of government expenses for highways and waterways. This sum does not include the amortization costs of roads, which, however, would be difficult to determine exactly.

In 1929/30 the construction of the port of Gdynia consumed Zl.21 million, excluding the construction of houses and the cost of land. Thus the total government expenses for communication investments, apart from the railways and post office, came to about Zl.50 million.

Data on investments in railway and tram rolling-stock were taken from industrial statistics without any corrections. The same applies to expenses of local government for transportation investments, since these data are based on the sums actually spent. In addition, we now try to estimate a previously omitted section of investment in transportation, i.e. in automobile transport.

As *investment in automobile transport* we consider the increase in the number of taxi-cabs, buses, and lorries. Investment for the first two kinds of transport may be regarded as outlay for transportation investment in the strict sense, while the third kind of transport represents in part investments in industry and commerce. For lack of more accurate data we had to include outlay for lorries entirely in investment in transportation. On the other hand, we entirely omitted the increase in the number of motor-cars, regarding it as an increase

in consumer goods that has no place in the notion of investment.[2] Besides the increase in the number of vehicles in service, we should also consider purchases of replacement vehicles. However, with the rapid spread of this means of communication, the estimation of amortization is difficult, but replacement purchases should not as yet be significant.

The estimate of the increase in the number of vehicles was made on the basis of the difference in the number of registered vehicles between the beginning of 1929 and the beginning of 1930, and the average cost of a vehicle in each of the three aforementioned categories was determined from the price lists of typical vehicles. Assuming the price of a taxi-cab at Zl.13 000, of a bus at Zl.20 000, and of a lorry at Zl.15 000, we got the value of 1300 taxi-cabs, 1200 buses, and 1800 lorries, by which the number of registered vehicles increased during 1929, of about Zl.70 million. The value of the import of vehicles and parts also came to Zl.70 million. Although this sum includes motor-cars, one would have to add to it some costs not considered in foreign-trade statistics, especially customs duties and assembly costs of imported parts. Thus, it seems that the sum of Zl.70 million cannot differ considerably from the actual value of investments in this field.

Concerning *construction investments*, based on the data on execution of the government budget, their share was changed according to the purpose of the building.

In the budget year 1929/30 expenses for new buildings in the budget of the administration came to Zl.97 million; besides this, special investments of Zl.20 million (after deducting the construction of roads, etc.) were made from government cash reserves. Thus the total government expenses on administration construction came to about Zl.115 million. According to the closing balance-sheet, outlay

[2] To draw a strict line between investments and the increase of consumer goods is difficult from the methodological point of view; technical and statistical problems add to these difficulties. For instance, in the work of the German Institute for the Study of Business Cycles the inclusion of housing construction in investments is justified on two grounds: (i) these buildings are usually the property of private profit-making capital, and (ii) financing takes place chiefly through the capital market. This second factor in combination with the fact that in housing construction the same branches of industry are mainly employed as in other investment seems decisive from the standpoint of studies of the business cycle. However, this argument is not applicable to all construction works, probably to some no more than to the purchase of motor-cars; nevertheless, it is necessary to draw a boundary line somewhere.

for railway and post office structures reached about Zl.35 million. Thus total public construction (together with those of local government) came to Zl.180 million.

If the ratio of industrial construction to public construction on order from larger construction firms is taken as the base for estimating industrial construction, then we get its value equal to Zl.190 million. If, however, the ratio of construction investment to investment in machines and equipment for industry is taken as the base, then we get for industrial construction a value of Zl.180 million. We consider the latter estimate, which differs little from the former, to represent more accurately the value of industrial construction.

According to these calculations, Zl.360 million remains for brick-housing construction, which at a cost of Zl.6500 per room gives the number of 55 000 rooms constructed. Together with wooden constructions (chiefly in towns), this gives the value of housing construction equal to Zl.510 million.

The influence of these corrections and additions on the aggregate estimate of investments is presented in Table 132. According to these calculations, the total value of investments made in 1929 comes to Zl.2.26 billion. This is Zl.180 million more than the sum obtained in our earlier calculations,[3] of which Zl.70 million was for investment coming entirely from import (vehicles).

At the same time, we reconstructed the *index of investment activity*, for after closer study it turned out that some of the partial indices used to construct the general index do not adequately represent the respective investment sectors.

The sales of screws and rivets, which besides the production and assembly of machines, have considerable use in construction, especially in steel constructions, do not adequately represent 'investments in machines and equipment'; the outlay of the State Railways for railway construction generally does not represent the actual volume of this construction in a given time, since money flows do not take place simultaneously with the carrying out of the works (because of granting firms' advances or credits, accumulating stocks of railway materials, etc.). The new index is based on three component indices only: (i) the railway shipments of lime index, (ii) the employment index in the construction industry, and (iii) the index of sales of machines.

[3] See p. 370, this volume.

Table 132. *Investment in Poland in 1929 (Zl.m.)*

Type of investment	Industrial investment	Agricultural investment	Investments in communications	Public administration construction	Housing and other non-separated construction	Water, sewer and gas systems, and their installations in old houses
Machines for industry	400	—	—	—	—	—
Agricultural machines	—	90	—	—	—	—
Land improvement	—	40	—	—	—	—
Construction	180	—	35	145	510	—
Installation works (except for new houses)	—	—	—	—	—	180
Vehicles	—	—	70	—	—	—
Construction of railways and telephone and telegraph equipment	—	—	300	—	—	—
Rolling-stock	—	—	170	—	—	—
Other government investment	—	—	50	—	—	—
Communal investment	—	—	60	—	—	30
TOTAL	580	130	685	145	510	210

The *railway shipments of lime index*, as representative of housing construction, was also used in the construction of the old index. However, it seems more appropriate to give it only the weight of brick-housing construction (of Zl.360 million) since, relatively speaking, considerably more lime is used in the construction of apartment houses than in the construction of large government and industrial buildings in which reinforced concrete skeletons are often used, as in many cases is cement or half-cement for the mortar and plaster for walls. On the other hand, the *index of employment in the construction industry* will be given the weight of the value of government and industrial buildings, and of the railway construction and land improvement (a total of Zl.520 million).

The data on which this index is based cover factories normally employing twenty or more workers; an ISBCP questionnaire made some time ago showed that the larger construction firms operate chiefly in the above areas and relatively little in housing construction.

Combining the index of lime shipments (representing housing construction) with the employment index in the construction industry (construction of government and industrial buildings, railway construction, and land improvement), we get an index for all construction with a weight of 360 + 520 = Zl.880 million.

The machine sales index, in which we also include agricultural machines and rolling-stock, is calculated on the basis of two series: the import of machines and parts, and employment in the engineering industry (we have data on the domestic sales of machines only for annual periods starting from 1929). Since in the base period approximately half of total sales represented sales of imported goods, we take as the total index the arithmetic mean of the component indices. The general machine sales index has a weight of Zl.660 million.

Finally, the aggregate index of investment is based on the indices of construction and of machine sales. This index corresponds to investments of Zl.1.54 billion, i.e. it covers about 70% of total investments. We decided not to include the other sectors of the economy in it because we do not have sufficiently representative statistical series for them. Table 133 and Fig. 44 represent changes of the corrected index of investment activity.

As will be noticed, in 1927 all investment indices rose sharply. Housing construction showed an especially strong growth in the first quarter of 1928. Though in the second quarter there was a temporary decline, generally speaking—except for an interruption in

Table 133. *Indices of Investment Activity in Poland, 1927–1931 (seasonal fluctuations eliminated, 1928 = 100)*

Year and quarter	Total investments	Construction			Machine sales
		total	housing (rail shipments of lime)	other (employment in construction industry)	
1927	74.5	71.9	83.9	63.9	77.9
1928	100.0	100.0	100.0	100.0	100.0
1929	95.5	95.7	93.7	97.1	95.1
1930	65.0	67.4	72.9	63.7	61.9
1931	43.2	45.6	56.1	38.5	40.1
1927 I	65.5	66.7	76.4	60.1	64.0
II	72.4	68.5	81.9	59.5	77.5
III	77.9	75.5	86.1	68.3	81.0
IV	83.2	79.2	89.7	72.1	88.4
1928 I	94.3	91.9	107.3	81.5	97.4
II	97.0	94.7	87.8	99.3	100.0
III	101.7	102.5	101.5	103.2	100.7
IV	105.4	107.8	109.7	106.5	102.2
1929 I	88.4	79.6	68.9	86.8	100.1
II	103.3	100.0	97.4	101.8	107.7
III	98.1	102.6	106.9	99.7	92.2
IV	88.0	93.0	92.0	93.6	81.4
1930 I	76.6	79.0	80.3	78.2	73.3
II	63.2	64.7	69.1	61.7	61.3
III	65.6	69.4	77.6	63.8	60.6
IV	56.4	58.9	66.1	54.0	53.0
1931 I	42.9	41.3	53.0	33.4	45.1
II	47.0	48.4	61.2	39.7	43.9
III	45.4	50.3	63.0	41.7	38.8
IV	35.9	37.9	42.4	34.8	33.2

A—total investments; *B*—sales of machines; *C*—construction activity
FIG. 44. *Indices of Investment Activity in Poland in 1927–1931 (logarithmic scale; 1928 = 100; seasonally adjusted)*

construction caused by the frosts in 1929—investment activity stayed at a relatively high level until the middle of 1929. The recession already started in the third quarter of that year: a sharp decline began in machine sales; for some time construction stayed at a high level, chiefly thanks to government works, but in the last quarter of 1929 its value also began to decline. From then on the downward trend in all sectors of investment was uninterrupted; only in the third quarter of 1930 did housing construction show an increase as a result of the liberal credit policy of the National Economic Bank. Construction indices rose in the second and third quarters of 1931, but this was solely due to the concentration of works in the season: seasonal fluctuations became sharper, so that we had only an apparent improvement in the summer and a worsening in the winter.

The volume of housing construction in 1931 in comparison with the boom period was considerably higher than the volume of other construction and machine sales. Thus the construction of apartment houses was not reduced as much as the investment activity of government and of industry. Such a phenomenon always appears in the course of the business cycle, usually with even greater intensity; capital released in this field during depression generally sought lower

interest-bearing but safe investments. With the conditions existing in Poland (a sharp decline in incomes of the population and the uncertainty of finding tenants, the continuing tightness on the money market), this factor certainly did not play a large role. At the same time, more homes for personal use were built; because of the cheapness of materials they were regarded as an advantageous and entirely safe investment of small capital.

Fluctuation in Industrial Output and Consumption
(with Ludwik Landau)

[1]
First published as 'Wahania produkcji przemysłowej a wahania konsumpcji', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 3/4 (1934), 3–6; a comprehensive summary, in French 'Corrélation entre la production industrielle et la consommation', appeared in the same issue of the periodical.

An Estimate of Social Income in 1929
(with Ludwik Landau)

[1]
First published as *Szacunek dochodu społecznego w roku 1929* by the Institute for the Study of Business Cycles and Prices in 1934, in Warsaw, as vol. i of a 4-volume ISBCP series: *Studies on Social Income in Poland*; vols. ii and iii appeared at the same time (see Ludwik Landau, *Incomes from Hired Labour in 1929*, Warsaw, ISPBC, and Jan Wiśniewski, *The Distribution of Incomes in 1929*, Warsaw, ISBCP, both in Polish); vol. iv of this series, by Michał Kalecki and Ludwik Landau, *Social Income in 1933 and the Foundations of Periodic Studies on Changes of Income*, was published by the ISBCP in the following year. An abstract from Kalecki and Landau's study appeared in 1935 in English in *Economic Studies* (Kraków, 1/2 (1935), 73–81).

Kalecki and Landau's study was prefaced by Edward Lipiński, the Director of the Institute; his Preface follows in Annexe 6.

Annexe 6
Preface[1]
Edward Lipiński

The enquiry into the social income in Poland published in this series is not the first attempt of this kind, but it is the first attempt made on such a wide scale. The publication consists of three parts: volume one, written by Ludwik Landau and Michał Kalecki, contains the methodological part and the calculation of the social income; volume two, whose author is Landau, studies in detail incomes from hired work;[2] in volume three Jan Wiśniewski examines the distribution of incomes and their differentiation.[3] The social income was estimated for 1929, and its calculations in subsequent years are planned in the future. In preparation is also a kind of index of current income.

The chief significance of calculations of the social income is that they are an invaluable tool for the study of social and economic structure of a country. As we know, the notion of social income is rather ambiguous: it can represent money incomes as well as income received in terms of goods—income in kind. Some researchers, I. Fisher, for example, do not include savings in income. As well as income, one could also include services of durable goods, like pianos, but then it would be impossible to calculate the value of the social income.

That is why in *Studies on Social Income in Poland* social income is understood as the sum of the value of goods and services produced, both for consumption and accumulation, i.e. goods and services that are not used in other production processes. Moreover, in principle only consumption in kind was not considered, except for the consumption of farmers. If social income is defined in this way, its calculations give a series of balance-sheets characterizing the economic structure of the country.

1. One can distinguish income received in terms of money and income in kind received on one's own farm. In highly industrialized countries the share of income in kind will obviously be smaller than in agricultural countries. In Poland, owing to the consumption of a large share of their own products by farmers, the share of income in kind in the total social income of Zl.26 billion was as high as Zl.8 billion in 1929.

[1] Michał Kalecki and Ludwik Landau, *An Estimate of Social Income in 1929*, pp. 5–8 of the Polish edn. (in Polish).
[2] See Ludwik Landau, *Incomes from Hired Labour in 1929*.
[3] See Jan Wiśniewski, *The Distribution of Incomes in 1929*.

2. Despite the agricultural profile of the country, the share of the countryside in the total money income was not very large. The income of the countryside spent on consumer articles came to Zl.2.8 billion, while total consumer spending was Zl.15.3 billion, and that for non-food products was Zl.11 billion, which means that farmers represented only about 25% of total expenses on articles other than food.

3. There are some interesting data on the differentiation of the living standards of the individual groups of population. This is the main subject matter of vol. iii of the *Studies*. Here we can only quote its findings that the average monthly consumer expenses of a family of four living from profit were Zl.1300, of a white-collar worker family Zl.640, of a middle-class family Zl.345, of a manual-worker's family Zl.265, and of a peasant's family Zl.175.

4. Poland is primarily an agricultural country and the urban industrial population is largely lower-middle class in nature; their living standard is not much higher than that of industrial workers, however. Of the total sum of incomes outside agriculture, amounting to about Zl.15 billion, Zl.3.5 billion goes to the lower-middle class.

5. What is striking in income from hired work is the high share of incomes paid by the government and other public agencies: one-third of the incomes of hired workers (leaving out incomes of agricultural workers) and half of the total earnings of white-collar workers come from these sources.

Income is either spent on consumer goods and services, or is saved, which means refraining from the purchase of consumer goods by the saver. In this way investments become possible. The study of social income enables the calculation of the proportion between income spent for consumption and the accumulation of capital.

The studies of the Institute have shown that of the total value of accumulated capital only a small part (Zl.300 million) falls to the private accumulation of the population deriving incomes from profit, whereas a disproportionally greater role is played by accumulation of the government and public agencies, amounting to Zl.1.4 billion. This implies the clear predominance of 'forced' over voluntary accumulation. The accumulation of foreign capital, equal to Zl.400 million, is also greater than accumulation by the population living from profit.

The study of social income gives only an indirect measure of the affluence of society. Social incomes in individual countries cannot be directly compared. Owing to the different real value of money that makes up social income, such comparisons would require taking into consideration differences in the purchasing power of money. Moreover, one has to pay heed to the consistency of the range of the concept of income. Likewise, comparison of social income over time requires elimination of the influence of price

changes, which is possible at least in rough approximation. The value of such comparisons is unquestionably very great not only because it makes it possible to estimate the scale of increase or decline in affluence, but chiefly from the point of view of the influence that shifts in the incomes of individual groups of buyers exert on the volume and nature of demand.

Income consumed is spent in various ways, depending on the social group. Although within every group (or stratum) of buyers there are unquestionably individual differences, nevertheless we can treat these strata as homogeneous concerning the structure of goods purchased. Thus in the market for every good we have to do with strata of buyers of different affluence. This stratification has a large influence on the prices of goods, and changes in incomes of individual strata of buyers must cause corresponding changes in the structure of goods that will be purchased in the period after these changes have taken place. As we know, the structure of purchases of every stratum is different. The working class spends an incomparably higher percentage of its incomes on food (those are inflexible components of their expenditures) than, for instance, better-off civil service employees. If the incomes of workers decline, expenses on food remain almost unchanged, but expenses on clothing decline more than proportionally. Hence, a decline in income of the working classes by a certain percentage causes an incomparably greater decline in the purchase of goods whose consumption is more elastic with respect to income. On the other hand, if incomes of the more affluent strata rise, one can expect that these strata will not increase their purchase of food or even clothing but will increase their outlay for more luxurious goods. It follows that exact knowledge of the structure of incomes is important for analysis of the market. More precise statistical information about the structure of incomes can therefore enable some forecasts of changes in demand for individual goods when incomes of individual strata of buyers change.

With the adequate statistical information one can divide the entire social income according to categories of expenses: for food, rent and fuel, direct public services, clothing, household furnishings, savings, etc., describing each category of expenses by means of an appropriate index of share in the total income. Furthermore, if it were possible to determine the distribution of expenses of individual groups of buyers, this would provide a very valuable instrument of market analysis (especially if, in addition to this, it was possible to make a more precise study of changes in incomes of individual groups).

This calculation of the social income supplies a very important tool of economic analysis of changes in prices of individual commodities and changes in demand for individual goods when incomes change. Though neither this analysis, nor possible forecasts, can be absolutely precise, since a change in incomes of a certain group of buyers caused, for instance, by a

change in prices of goods sold by this group, can cause a number of compensatory or cumulative movements, which reduces the accuracy of forecasts, nevertheless the value of efforts made in this field is unquestionably very great.

The history of estimates of the national income goes back to the middle of the seventeenth century. In 1665 William Petty made the first estimate of the income of England; these studies were continued by G. King and C. Davenout. About the same time the first estimates of the national income of France were made by P. Boisguillebert. Towards the end of the eighteenth century the first estimates of the national income were made in Russia. On the threshold of the twentieth century systemic estimates of the national income were made in about ten countries, and in 1918–39 their number increased from thirteen to thirty-three; besides Poland, among the countries that joined this group were Belgium, Czechoslovakia, Finland, Hungary, Latvia, Spain, Sweden, and Yugoslavia. However, these were pioneering studies and the notions of national income and social product commonly used at present were only being developed in the 1930s (for more on the history of estimates of the national income, see P. Studentski, *The Income of Nations*, New York, University Press, 1958).

The method used in *Studies of Social Income in Poland* differed from methods used in most other countries in that it represented a compromise between the approach based on the notion of every production being included in the calculation, and that based on the inclusion of material production only (see Studentski, *Income of Nations*, 187). A similar method was used by M. Matolcsy and I. Varga in their study, *The National Income of Hungary 1924/5–1936/7* (London, B.S. King & Son, 1938), and after the war by O. Kraus (see his 'Sozialprotukt und Volkseinkommen', *Volkswirtchaftliche Schriften*, 3, Berlin, Humboldt, 1952).

In his recollections of Ludwik Landau, in 1964 Kalecki wrote about their *Estimate of Social Income in 1929* what follows:

It is worth recalling that our study was at the time the only attempt in the capitalist world to show a detailed distribution of the national income according to social classes. As Landau had distinguished them in the social structure of the population, we respectively separated the incomes of the upper- and the lower-middle class. Likewise, in agriculture we distinguished the incomes of large landowners and peasants. After the war we were reproached for obscuring class differences in the countryside, for not further breaking down peasant incomes into those of the well-to-do, average, and poor peasants. These were unreasonable demands, however, considering that such an estimate has not been made in the subsequent twenty years of the existence of People's Poland. As it is, the two of us did a job that is usually handled by many institutions. This was only possible thanks to Landau' (*Collected Works of Michał Kalecki; Studies in Applied Economics, 1940–67 and Various Studies*, vol. vii, forthcoming)

In 1946–9, in the first plans and economic forecasts of Poland's development after the war, references were often made to Landau and Kalecki's estimates of the social income in pre-war Poland, especially to their estimate of income in 1929. Kalecki himself referred to them several times in his papers on comparison of household incomes in Poland in the 1930s and after the war (see *Collected Works of Michał Kalecki; Socialism: Economic Growth and Efficiency of Investments*, vol. iv, Oxford, Clarendon Press, 1993: 226–33 and 343–3).

Much use was made of Kalecki and Landau's estimates by Z. Knakiewicz (see her study, *The Polish Deflation 1930–35*, Warsaw, PWE, 1967, esp. pt III). In her own estimates of the social income in Poland in 1929 she got a smaller figure (between Zl.16.8 and 17.1 billion, depending on the variant of the estimate) than Kalecki and Landau (Zl.23.5 billion). However, in examining the volume of social income and consumption, Knakiewicz used the estimates of Kalecki and Landau because, she believed, 'they are the only original source considering the structure of the distribution of social income' (ibid. 308).

Knakiewicz's greatest objection was to the consumption expenses of a four-person family, which Kalecki and Landau estimated at Zl.175 per month (see Table 103, p. 424 above). Explaining the way of correcting this figure, she wrote: 'From the data elaborated by the Institute of Rural Economy in Puławy it follows that the total annual consumption of a farmer's family (at a farm size of 2–50 ha.) was Zl.4070.04 in 1928/9, with only Zl.1317.06 for cash outlays, and the rest for consumption in kind not going through the market. The data for 1929/30 are even less favourable. In that year the total consumption of a family was Zl.3412.61, of which Zl.1223.71 represented cash expenses (see *Studies of the Profitability of Peasant Farms*, 123, 145–6, 157, and 163). From these data it follows that the monthly outlay of a family for total consumption (including consumption in kind and the purchase of goods and services) came to Zl.334.57 in 1928/9 and to only Zl.284.17 in 1929/30. Cash expenses in 1928/9 came to only Zl.109.75 and in 1929/30 even less, namely to Zl.101.98. Moreover, these data are still not fully comparable with figures for other groups of the population. There are two main reasons for this: they are higher than the real average consumption of the rural population, as the studies were carried

out on better farms and they concern not a statistical family of four, but actual families that as a rule had more persons (Knakiewicz, *The Polish Deflation*, 310–11).

[2]
See Ludwik Landau, *Occupational Composition of the Population of Poland.*

[3]
See S. Wieluńska and J. Poniatowski, *Use of Fertilizers in 1924–1929*, vol. ix, Warsaw, *Sprawozdania i Przyczynki Naukowe*, ISBCP, 1930.

Social Income in 1933 and the Foundations of Periodic Studies on Changes of Income
(with Ludwik Landau)

The estimate was first published as *Dochód społeczny w roku 1933 i podstawy badań periodycznych nad zmianami dochodu*, by the Institute for the Study of Business Cycles and Prices, in 1935, in Warsaw, as vol. iv in the series: *Studies of Social Income in Poland* (see p. 552 above). An abstract from Kalecki and Landau's study appeared in 1935 in English in *Economic Studies* (Cracow, 1/4 (1935), 77–80).

In 1948 Kalecki again took up the methodological problems of calculation of the national income, in connection with a new approach to the statistics of the national income by the US Department of Commerce. Next to Kalecki, the other contributors in this discussion were S. Kuznets, M. Gilbert, G. Jaszi, E. F. Denison, and C. F. Schwartz. Kalecki's contribution is included in Annexe 7.

Annexe 7
Further Comments on the Department of Commerce Series[1]

The publication of the Department of Commerce contains much new statistical material on various aspects of the US economy. However, the most important data are the revised series of national product

[1] First published in the *Review of Economics and Statistics*, 30/3 (1948), 195–7. The publishers' permission to reproduce this article here is gratefully acknowledged. Kaleeki's references to tables in Annexe 7 refer to the publication of the Dept. of Commerce.

and income. They cover the period 1929–46 and are presented in the first five tables. In Table 2 the gross national product and its components (personal consumption, gross private domestic investment, net foreign investment, and government purchases of goods and services) are given. Table 4 shows the relation between gross national product, national income, and personal income which involves, roughly speaking, the reconciliation between the gross national product and the money flows it generates on the income side. Tables 1 and 3 show the share of various social classes in the national income and in personal income, respectively. In addition, Table 3 shows the disposition of personal income for taxes, consumption, and saving. Finally, Table 5 (which is based on the statistical data in the first four tables) provides a balance-sheet of gross savings (personal savings, corporate saving, and depreciation, etc.) on the one side, and of gross investment (domestic and foreign) plus government deficit on the other.

The information provided in these tables is of fundamental importance for economic research, especially on the subject of changes in the distribution of national income, of the consumption–income relation, of determinants of private investment both in fixed capital and in inventories, etc.

In what follows, we shall confine ourselves to a discussion of the revisions introduced in these fundamental series. These revisions may be subdivided into two categories: (i) conceptual revisions which change the actual content of the series considered, and (ii) statistical revisions arising from the availability of new sources or new methods of estimation. We shall deal first with *conceptual* revisions, which are as follows:

1. Interest payments on government debt have been eliminated from the national income and product. This revision is very reasonable because it is difficult to imagine any production of goods and services that corresponds to a large part of such payments. Sometimes the difference is drawn between interest paid by the central government and that paid by local authorities, on the assumption that the former reflects interest on debt which was created to finance wars and current expenditures while the latter represents mainly interest paid on productive investment (roads, bridges, etc.) made by local governments and thus may be considered an equivalent of the imputed services concerned. Such procedure is, however, highly questionable for various reasons and I agree with the authors that

probably the best solution of this difficult problem is to exclude all interest payments on public debt from the national product.

2. Imputed net rent on owner-occupied dwellings has been added to national income and product and to personal income and personal consumption. This is a sensible revision to provide comparable treatment between rented and owner-occupied houses.

In line with this change, depreciation and taxes on owner-occupied houses, in addition to net imputed rent, have been included in gross national product and personal consumption. On the balance, personal savings have been reduced, compared with the old series, by the amount of depreciation of owner-occupied houses. (Taxes on owner-occupied houses are now treated as indirect, while in the old series they were treated as direct, taxation. Previously the tax was deducted from personal income in the derivation of disposable income; now it is added to consumption. Thus no change in the amount of saving is involved.)

3. Corporate profits before tax rather than profits after tax have been included in the national income. This follows from the change of view on the incidence of corporate profit taxes. According to the present concept, they are considered on the same basis as income tax and not as an indirect tax. This seems to me very sensible and in line with economic theory.

These are the main conceptual changes. Among others one should mention: (i) national income has been computed without deduction of allowances for depletion; (ii) the inventory valuation adjustment has been incorporated in national income in order to secure conceptual comparability with the national product; (iii) income in kind received by the armed forces, and government contributions to family allowances to dependants of enlisted personnel, have been included in national income and product. The first item has increased *pro tanto* personal income and consumption; the second item has not, because it was previously included in government transfers; (iv) government subsidies paid to private enterprises have been eliminated from national product so as to have the value of national product calculated in all instances at market prices; and (v) the value of the services of banks and other financial intermediaries rendered to persons without the assessment of specific charges is regarded as imputed interest (income in kind) accruing to persons.

All these changes except (v) do not seem to me to raise any objections. The change introduced by (v), however, seems of doubtful

use and even confusing. From the fact that, in this way, services which are really rendered are accounted for, it does not follow that they should necessarily be included in income and consumption. From the same point of view, the value of quite a number of other services—for instance, using a public park, etc.—should be included in income and consumption. Apart from the arbitrariness of the estimates in such cases, this procedure involves the inclusion in income and consumption of items which the individual never takes into consideration in his spending decisions. (It should be noted here that the method of estimating imputed income from deposits, as given in the paper quoted by the authors,[1] seems to me open to serious objections.)

Of the many *statistical* revisions, the most important is the treatment of personal consumption expenditure. In the old series, it was estimated indirectly; personal saving was obtained from the balance between gross saving, on the one hand, and gross investment plus government deficit, on the other, taking into consideration the level of undivided corporate profits and depreciation. Subsequently, personal saving was deducted from disposable income and thus personal consumption expenditure was obtained as a residual. The present series is based on an independent estimate of personal consumption expenditure. The difference between disposable income and consumption expenditure provides an estimate of personal saving. Because of statistical errors, this estimate need not agree with that obtained from the comparison of gross saving with gross investment plus government deficit as described above. The difference between these two estimates appears as a 'statistical discrepancy' in the comparison between gross national product and the income flow generated by it and also in the comparison between gross saving and gross investment plus government deficit. The user of the statistics can choose between two variants of personal savings, of which one is equal to the difference between disposable income and the independent estimate of consumption, and the other is derived from the comparison between savings and investment plus government deficit, as was done in the old series. Although in this way the authors of the estimate disclaim cautiously the responsibility for the choice between

[1] D. B. Yntema, 'National Income Originating in Financial Intermediaries', *Studies in Income and Wealth*, National Bureau of Economic Research, New York, 1947, vol. x.

these two alternatives, it does not seem to me a very fortunate course from the point of view of the user. It is perfectly clear that, however inexact would be the allocation of the discrepancy, the authors, with their knowledge of the nature of the estimates, are much more able than the users to make such allocation. It seems to me likely that the variant of savings determined from the comparison between savings and investment plus government deficit is more exact than the other variant obtained as a difference between disposable income and consumption, because both these last two quantities are very much larger than the difference between them. However, the authors are the ones who must pass judgement in this matter.

Fluctuations of Prices and Costs and Fluctuations of Industrial Production in Poland
(with Ludwik Landau)

[1]
First published as 'Wahania cen i kosztów a wahania produkcji przemysłowej w Polsce', in *Prace Instytutu Badania Koniunktur Gospodarczych i Cen*, 4/2 (1935), 51–61 (a long summary of this article in French appeared in the same issue of the journal). For the discussion of the common points of this paper with the 'classic' paper of Piero Sraffa, 'The Laws of Return under Competitive Conditions' (*Economic Journal*, 36/4, 1926), see *Collected Works of Michał Kalecki*, vol. ii. 483–4.

The statistical series calculated in this article and representing (i) the price index of goods 'coming from industry', (ii) the price index of foreign raw materials and domestic agricultural inputs used by industry, and (iii) labour cost indices per unit of output, were extended by Kalecki to 1937 and used in his analysis of the relation of prices, prime costs, and wages in Poland (see his 'Money and Real Wages', in *Collected Works*, vol. ii. 40–50).

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Note: References are to Poland except where specifically stated otherwise