Mankiw Macroeconomics
A VoxEU Course Companion
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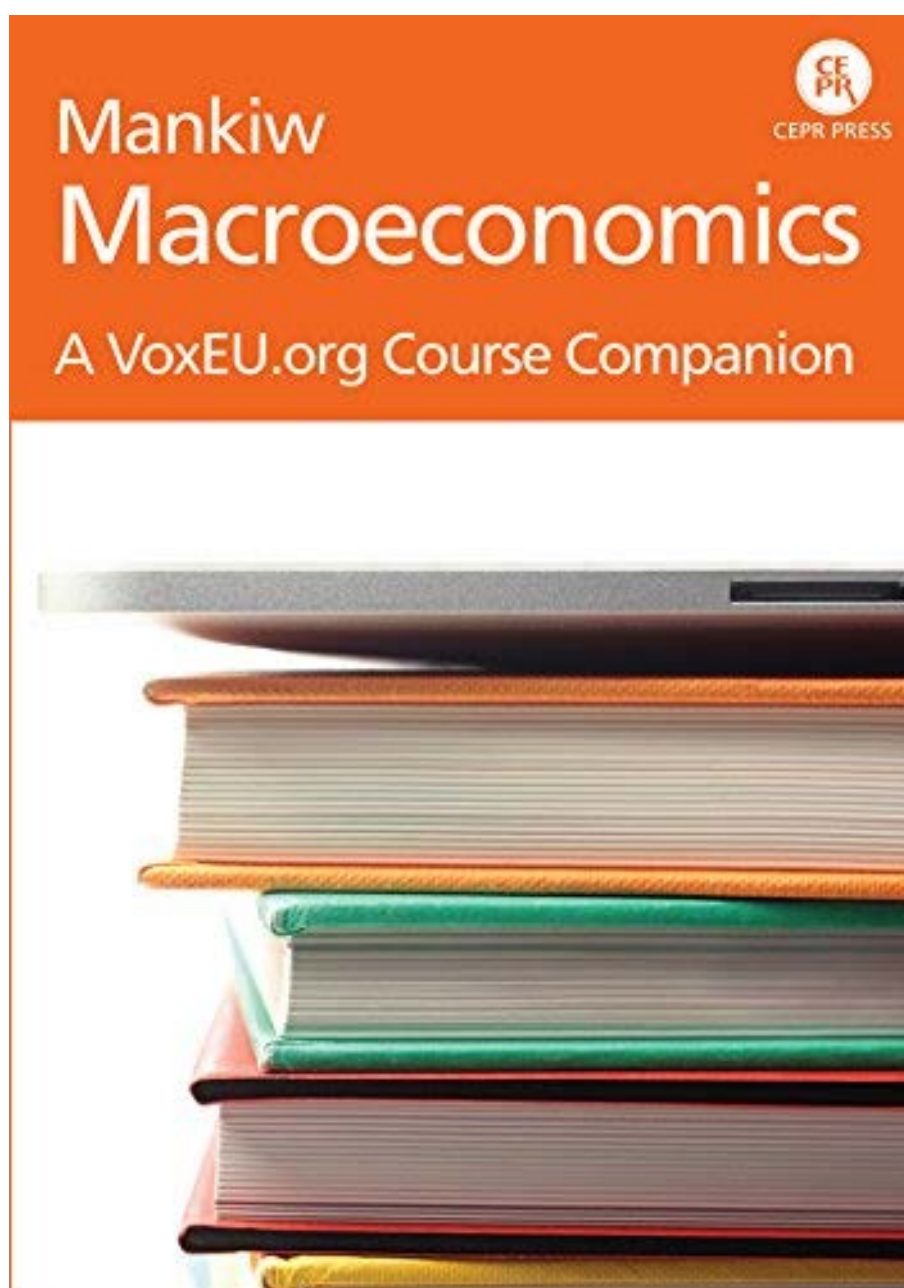
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Introduction

Richard Baldwin

Editor-in-Chief of VoxEU.org

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Economics can seem complex and mysterious to students who have just started studying the subject.

Even excellent textbooks like Greg Mankiw's Macroeconomics.

Very often, the theory in the textbook remains abstract and one ponders how it applies to the economic and policy activity we observe in reality. Sometimes we recognise in the business and economics news certain terms and theories from our macroeconomic classes, while the complete concept and any policy implications remain incomprehensible.

This VoxEU Course Companion tries to bridge this gap, providing students with a collection of columns that accompany the chapters of their macroeconomic textbook by Mankiw. The columns were written by leading scholars in the field of economics and cover recent events and trends in the world of economics and policy analysis. As the columns are aimed at economists in the government and private sectors, as well as academics, they might not be immediately understandable by students who are just making their entrance into the world of economics. But as we know, Rome was not built in a day. It might take gradual exposure to the style and language of the columns for students to become fluent in the highly technical lingo. That is why we do not believe this book should be read all at once or understood all at once. It is meant to accompany a textbook and, just like a textbook, it should be read and grasped chapter by chapter. By the end, students will have mastered the way vague and abstract concepts of economic theory are applied in the real world, and will have learned to apply them themselves. In this way, their understanding of macroeconomics can be greatly enhanced.

The columns we have selected follow the chapters in Mankiw's textbook on macroeconomics. Note that this is not a strict classification and many columns could be placed into more than one chapter, simply because economic concepts and theories are often intertwined and it is difficult to talk about one particular problem in isolation without touching upon a number of other issues. After two discussions of the science of

macroeconomics, we offer some recent European insight on national income, followed by columns discussing the international monetary system. Then we have selected columns discussing recent inflation policies and the way economies influence each other's inflation rates. We finish the part on classical theory with columns on trade, inequality, export growth, and on recent (especially youth) unemployment trends.

The next part starts by highlighting interesting country cases that offer examples of recent economic growth and proceeds with the contemporary drivers of this growth, most prominently technology.

A few chapters presenting the economy in the short run follow, with columns highlighting key macroeconomic theory and policy aspects. Some interesting columns here – to mention just a few examples – deal with a psychological explanation of investment in housing, the added value of the euro, the connection between the Great Depression and the current recession, the causes and consequences of the crisis in Europe, and, of course, columns discussing the future of macroeconomic policy.

Part I: Introduction

Chapter 1 The Science of Macroeconomics

The return of schools of thought in macroeconomics

Simon Wren-Lewis

University of Oxford

24 February 2012

Just five years ago, macroeconomists talked about a new synthesis, bringing together Keynesian and Classical ideas in a unified, microfounded theoretical framework. Following the Great Recession, it appears that mainstream macroeconomics has once again split into schools of thought. This column explains why macroeconomics, unlike microeconomics, periodically fragments in this way.

In the 1970s and 1980s, macroeconomics was all about 'schools of thought'. A popular textbook (Snowdon et al 1994) had the title *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*. Macroeconomists tended to take sides, and different schools had clear ideological associations. Antagonists often talked across each other, and anyone not already on one side just got totally confused. Schools of thought fragmented mainstream macroeconomics in a way that had no parallel in mainstream microeconomics.

But then things began to change. The discipline appeared to become much more unified. It would be going much too far to suggest that there was a general consensus, but to use a tired cliché, most macroeconomists started talking the same language, even if they were not saying the same thing. Goodfriend and King (1997) coined the term 'New Neoclassical Synthesis'. Other authors wrote along similar lines (eg Woodford 2009 and Arestis 2007).This synthesis did only apply to what is generally described as mainstream economics. Heterodox economists continued to organise in schools (for example neo-Marxists, post-Keynesians, and Austrians). The synthesis was reflected in master's-level textbooks (eg Romer 1996), which would typically begin by setting out a Ramsey-style model, then discuss 'real business cycle' models, and finally move on to add sticky prices to get New Keynesian theory.

There were two main factors behind this synthesis. The first was microfoundations, ie deriving the components of macro models from standard optimisation applied to representative agents. This gave

macroeconomics the potential to achieve the same degree of unity as microeconomics. The second was the development of New Keynesian theory, which allowed an analysis of aggregate demand within a microfounded framework, and which integrated ideas like rational expectations and consumption-smoothing into Keynesian analysis. All models were now 'dynamic stochastic general equilibrium' models.

Following the Great Recession, things seem rather different. In popular discussion of macroeconomics, schools of thought in macro are definitely back. Bitter disputes have broken out between those advocating fiscal stimulus ('Keynesians') and those against. (For just one example of such quarrelling, see DeLong 2012.) For those in freshwater departments like Chicago, the idea of an effective fiscal stimulus was something they thought had died with the rational expectations and New Classical revolutions. It must therefore have been something of a shock to see it being resurrected, and it is understandable that they might dismiss it as invoking long-discredited 'fairy tales'. It looked as if 30 years of progress in the discipline was being ignored. Those advocating stimulus and deploring premature austerity, on the other hand, were understandably taken aback to find their analysis dismissed in this way. They thought they were using mainstream macroeconomic theory, not the partisan analysis of a Keynesian school of thought. In a recent Vox column, Jonathan Portes (Portes 2012) describes his puzzlement at being labelled Keynesian, when he thought he was following synthesis macroeconomics.

So why have schools of thought within mainstream macroeconomics returned? One simple story is that schools of thought are associated with macroeconomic crises, and macro synthesis follows periods of calm. Keynesian theory itself was born out of the Great Depression. The first Neoclassical Synthesis arose from the period of strong growth and low inflation in the postwar period. Monetarism gained strength from the rapid inflation of the 1970s. The more recent synthesis may be a child of the Great Moderation, and now we have the Great Recession, schools of thought have returned. Because these crises are macroeconomic, and there are no equivalent crises involving microeconomic behaviour or policy, then fragmentation of the mainstream into schools will be a macro, not micro, phenomenon.

However I think this is too simplistic a view of what is happening today. One interesting feature of the current divide is that the label 'Keynesian' appears to be used more by those opposed to certain policies – and in particular fiscal stimulus – than those on the other side. Typically

Keynesians see themselves as putting forward synthesis analysis, without the need for branding. What has become clear is that the New Neoclassical Synthesis was in many ways a celebration of New Keynesian theory which was not shared by many freshwater departments in the US.

There may be good reasons why New Keynesian economists might have imagined that their analysis was now an uncontested part of the mainstream. In particular, it is used in nearly all central banks as their main tool in carrying out monetary policy. With monetary policy somewhat depoliticised through central bank independence, the successful implementation of New Keynesian theory during the Great Moderation allowed divisions among academic departments to remain dormant.

On the other side, there was a belief that New Classical economics had been revolutionary, ie a successful counter-revolution against Keynesian ideas. Once again there were good reasons supporting this belief. On consumption, rational expectations, the Lucas critique and more, traditional Keynesians had unsuccessfully opposed New Classical ideas. Furthermore, many of the leaders of New Classical thought did not want to update Keynesian thinking; they wanted to destroy it. The label 'Keynesian' was associated with much more than a belief that prices were sticky and that therefore aggregate demand mattered. Instead it became associated with state intervention. Wikipedia, in its third paragraph on 'Keynesian economics', says: "Keynesian economics advocates a mixed economy – predominantly private sector, but with a significant role of government and public sector...".

The New Classical counter-revolution failed in one respect. While Keynesian analysis may have suffered a near-death experience, it survived and subsequently prospered. New Classical critiques led to fundamental and largely progressive changes. Yet, for many reasons including ideological ones, the would-be counter-revolutionaries did not want to give up their counter-revolution. Partly as a result, the degree to which New Keynesian theory was taught to graduate students differed widely among academic departments, at least in the US.

So, perhaps unlike the first (postwar) neoclassical synthesis, the New Neoclassical Synthesis was partial in terms of its coverage among academics. This incompleteness was not apparent during the Great Moderation, because in central banks the synthesis was uncontested. The fault lines only became evident when monetary policy became relatively impotent at the zero bound after the Great Recession, and fiscal stimulus was used both in the US and UK. Once that happened, what might be

called the Anti-Keynesian school re-emerged.

Using this account, it is perhaps possible to view the current emergence of schools of thought as a historical aberration. The microfoundation of macroeconomics would seem to imply that mainstream macro should be as free from fragmentation into schools as microeconomics. As it becomes clear that the New Classical counter-revolution was not successful, the New Neoclassical Synthesis may yet become complete. (For an argument along these lines, see Economist 2012) After all, New Keynesian models are essentially real business cycle models plus sticky prices, and the addition of price rigidity seems both empirically plausible and inoffensive in itself. Both sides could agree that for economies with a floating exchange-rate monetary policy is the stabilisation tool of choice, with fiscal policy only being used if monetary policy is constrained (Kirsanova et al 2009). When interest rates are stuck at the zero lower bound, synthesis models clearly show fiscal policy can be highly effective at stimulating output (Woodford 2011). What has been called 'demand denial' appears not to make academic sense, particularly at a zero lower bound (Wren-Lewis 2011).

This outcome may, however, represent wishful thinking by New Keynesians. An alternative reading is that the Keynesian/Anti-Keynesian division is always going to be with us, because it reflects an ideological divide about state intervention. That divide occurs all the time in microeconomics, but because it involves arguing about many different externalities or imperfections it does not lend itself to fragmentation into schools. In macro, however, there is one critical externality to do with price rigidity, and so disagreements about policy can easily be mapped into differences about theory. Demand denial is attractive because it gives a non-ideological justification for what is essentially an ideological position about economic policy. Unfortunately, there is a danger that dividing mainstream analysis this way makes macroeconomics look more like a belief system than a science.

Author's Note: This column combines a number of recent posts from my blog, mainly macro.

References

Arestis, P, ed, (2007), *Is There a New Consensus in Macroconomics?* London: Palgrave Macmillan.

DeLong, B (2012), "Understanding the Chicago Anti-Stimulus Arguments" , blogpost, Grasping Reality with the Invisible Hand, 4

January.

Economist (2012), "Stimulus, austerity and the weltgeist", blogpost, Democracy in America, 1 February.

Goodfriend, M and RG King (1997), "The New Neoclassical Synthesis and the Role of Monetary Policy," in Bernanke, B and J Rotemberg, eds, *NBER Macroeconomics Annual*. Cambridge, MA: MIT Press, 231–82.

Kirsanova, T, C Leith, C and S Wren-Lewis (2009), "Monetary and Fiscal Policy Interaction: The current consensus assignment in the light of recent developments", *Economic Journal* 119: F482–96.

Portes, J (2012), "Fiscal Policy: What Does 'Keynesian' mean?", VoxEU.org, 7 February.

Romer, D (1996), *Advanced Macroeconomics*, New York: McGraw-Hill.

Snowdon, B, H Vane, and P Wynarczyk (1994), *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*, Aldershot, UK and Brookheld, USA: Edward Elgar.

Woodford, M (2009), "Convergence in Macroeconomics: Elements of the New Synthesis", *American Economic Journal: Macroeconomics* 1(1): 267–79.

Woodford, M (2011), "Simple Analytics of the Government Expenditure Multiplier," *American Economic Journal: Macroeconomics* 3(1): 1–35.

Wren-Lewis, S (2011), "Lessons from failure: fiscal policy, indulgence and ideology", *National Institute Economic Review* 217(1): R31–R46.

How should macroeconomics be taught to undergraduates in the post-crisis era? A concrete proposal

Wendy Carlin and David Soskice

University College London; London School of Economics

25 October 2012

Is economic teaching keeping up with the changing economy? This column presents a new way of teaching economics in light of the continuing crises. It argues that if we are to create a better-informed public debate we must begin by improving the economics curriculum and our students' ability and their willingness to communicate about economic ideas and issues.

Economics students have started to establish new student societies, which focus not on how to get a job in the City, but on the question 'How can economics be used to understand the world better and improve it?' This suggests an increasing appetite to participate in policy discussions. But how well-equipped are they to engage in debates about the causes of the Eurozone crisis or the conflicting claims about austerity policies, or whether quantitative easing will lead to inflation? Do they feel more confident to discuss those questions than their peers who study physics or anthropology? Diane Coyle (2012) reports the dissatisfaction of employers of young economists about their training; they need to know more about the economic conjuncture, economic institutions, and the operation of the financial system, as well as enough economic history to provide a context for current policy debates.

Are the revised versions of popular macroeconomics textbooks an adequate response to the challenges thrown up by the crisis? Do they equip the new generation of undergraduates – for whom crisis has been the continuous background to their lives since the age of 13 – to evaluate the economics commentary in the *Financial Times* and *The Economist* or the many, often conflicting, economics blogs; and can they explain their views to their non-economist peers?

A visible gulf exists, in the cases of such textbook writers as Blanchard (2011) and Krugman and Wells (dated 2013 but available now), between what the authors say in their opinion columns, blogs and speeches and

what they say in their textbooks. Both of these textbooks contain new sections dealing with the crisis. The liquidity trap is explained but there is no modelling of how the crisis arose. Both books use IS/LM as their core model and the Mundell-Fleming variant for the open economy. Inflation-targeting by central banks is discussed in chapters on monetary policy but, since it is incompatible with the IS/LM model, it is not integrated in either the core modelling or in the discussion of the crisis and its origins. The 7th edition of Mankiw's textbook (2010) follows a similar pattern, general equilibrium modelling being done using IS/LM. Mankiw does devote one chapter to deriving a 'dynamic AD/AS model' but does not use it in the chapter where inflation targeting is discussed.

None of these books bring the financial sector into the core macroeconomic model and so, although they provide insightful discussions of the financial crisis, they remain essentially descriptive. There seems to be a lack of ambition in the response of popular textbooks to the challenges presented by the crisis. We are presently writing a new undergraduate macro textbook, influenced both by the need to understand the continuing macroeconomic crisis in Europe and North America and by the signs that students' expectations and needs are changing.

In our view undergraduates need a unified integrated model through which they can understand the major business cycle events of the past century and see how economic theories and policy regimes have evolved in response to these events. We have already developed part of such a framework in two previous texts published in 1990 (emphasising the supply-side and the stagflation of the 1970s and 80s), and in 2006 (emphasising the inflation-targeting regimes that emerged in the 1990s). Now, in a third book to be published in 2013, we integrate the financial sector into the model, showing show how a financial crisis can develop in an economy even while inflation targeting is being successfully carried out.

What are the differences between our approach and that taken in typical macro textbooks and undergraduate courses?

- In our approach, there is a single general equilibrium model (the three-equation model plus financial sector) to explain how the economy works in both good and bad times; we do not need a different model to deal with the 'pathologies' of high unemployment or stagflation or depression or asset price bubbles.
- In constructing a model that matches key features of real-world

economies, we adopt an original modelling strategy. Instead of avoiding explicit micro-foundations altogether, or starting with unrealistic competitive assumptions, we take as our starting point an economy with imperfect competition in product markets in which a variety of institutional forms of wage setting, including efficiency wages, results in equilibrium unemployment. We assume that there is a mixture of credit-constrained and unconstrained households and firms, and that fiscal policy is non-Ricardian, so that the financing of government expenditure matters.

- This single model explains how output, unemployment, and inflation are determined. Using it as a framework students can analyse developments in the real world: rapid changes in demand (such as a housing boom) and in supply (such as technology shocks, changing forms of wage bargaining, labour market deregulation, shifts in product market competition, and commodity price shocks). Such a model depicts an economy which is not self-stabilising. If the economy is to be kept close to a constant-inflation equilibrium purposeful policymaking is indispensable.

- The objectives of policymakers are specified explicitly. This means we can model how the central bank or the government analyses the consequences of the shocks that affect the economy. The analysis allows for uncertainty in the economic environment and for lags in the effect of policy on the economy. Forecasting and the way expectations affect the constraints on the policymaker are part of the core model. Most of this was contained in the three-equation model (IS-PC-MR) in our previous book (Carlin and Soskice 2005).

- Now, in our new book, the same model is extended to deal with the open economy. We show how the foreign exchange market interacts with the central bank in forecasting the effects of shocks and in determining the mix of exchange rate and interest rate adjustment to them (for an initial presentation of this, see Carlin and Soskice 2010). The case of a common currency area is handled within the core model enabling students to see how the Eurozone economy worked in its first decade and how an attitude of benign neglect by national policymakers towards stabilisation policy contributed to the origins of the sovereign debt problem.

- The new book includes three chapters addressing the most glaring absence in macroeconomic models and courses, that of the financial sector. We integrate a model of the banking system with the macro-model, showing how the margin of the lending rate over the policy

rate is set in the commercial banking sector, how money is created in a modern banking system and how the central bank takes account of the working of the banking system (and of government funding needs) in order to achieve its desired policy outcome. This produces the three-equation model plus financial sector.

- Having included the commercial banking system in the core macro-model, we extend the model further to include highly-leveraged financial institutions and the transformation of risky loans from the balance sheets of commercial banks into marketable securities (in the spirit of Shin 2009 and Geanakoplos 2009). This step provides the tools to analyse how a leverage cycle can take hold in the economy. The modelling of a financial crisis and the consequences for policymakers of a subsequent balance sheet recession is also done within the same framework (reflecting the approach of Eggertsson and Krugman 2012).

Is teaching the three-equation model plus financial sector to undergraduates practical? The large number of students in the UK and Europe doing specialist degrees in economics can certainly be taught the formal (diagram-based) modelling, especially if the repetition that currently characterises the principles and intermediate levels of macroeconomics teaching in many universities could be reduced. It is also quite feasible for students on degrees with a smaller economics component to be taught the logic of the core model (without deriving it explicitly) and shown how to use it to interpret the behaviour of policymakers and macroeconomic performance data.

In addition to the initiative of the UK Government Economic Service and the Bank of England (reported in Coyle 2012), a major push to renew the economics curriculum is being supported by the Institute for New Economic Thinking, INET. A new INET project will generate new teaching material (to be delivered in the class-room and via the internet) and will explore innovative approaches to both the teaching and wider communication of economic concepts and models. This is a matter of broad public interest because citizens – most immediately in Eurozone countries – are being asked to make choices between different macroeconomic scenarios. They are usually obliged to make these choices with only a minimal understanding of the issues involved. If we are to create a better-informed public debate we must begin by improving the economics curriculum and our students' ability and willingness to communicate about economic issues.

References

Blanchard, Olivier (2011 updated 5th edition), *Macroeconomics*, Pearson

Carlin, Wendy and David Soskice (1990), *Macroeconomics and the Wage Bargain: a modern approach to employment, inflation and the exchange rate*, Oxford University Press

Carlin, Wendy and David Soskice (2005), "The 3-equation New Keynesian model – A graphical exposition", (with David Soskice), *Contributions to Macroeconomics*: 5(1):13.

Carlin, Wendy and David Soskice (2006), *Macroeconomics: Imperfections, Institutions and Policy*, Oxford University Press.

Carlin, Wendy and David Soskice (2010), "A New Keynesian Open Economy Model for Policy Analysis", CEPR Discussion Paper No. 7979

Carlin, Wendy and David Soskice (2013, forthcoming), *Macroeconomics and the Financial System: stability, growth and the role of policy*, Oxford University Press.

Coyle, Diane (2012b), "What's the use of economics? Introduction to the Vox debate", VoxEU.org, 19 September

Eggertsson, Gauti and Paul Krugman (2012), "Debt, deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach", *Quarterly Journal of Economics*, online, June.

Geanakoplos, John (2009), "The Leverage Cycle", *NBER Macroeconomics Annual* 2009, MIT Press.

Krugman, Paul and Robin Wells (2013 3rd edition), *Macroeconomics*, Macmillan.

Mankiw, Greg (2010 7th edition), *Macroeconomics*, Worth.

Shin, Hyun-Song (2009), "Comment" on Geanakoplos (2009) *NBER Macroeconomics Annual*, MIT Press.

Chapter 3 National Income: Where It Comes From and Where It Goes

Are Germans really poorer than Spaniards, Italians and Greeks?

Paul De Grauwe and Yuemei Ji

London School of Economics and CEPR; University of Leuven

16 April 2013

A recent ECB household-wealth survey was interpreted by the media as evidence that poor Germans shouldn't have to pay for southern Europe. This column takes a look at the numbers. Whilst it's true that median German households are poor compared to their southern European counterparts, Germany itself is wealthy. Importantly, this wealth is very unequally distributed, but the issue of unequal distribution doesn't feature much in the press. The debate in Germany creates an inaccurate perception among less wealthy Germans that transfers are unfair.

Rarely have statistics been misused so much for political purposes as when recently the ECB published the results of a survey of household wealth in the Eurozone countries (2013a).[1] From this survey it appeared that the median German household had the lowest wealth of all Eurozone countries. Figure 1 summarises the main results for the most significant Eurozone countries.

Figure 1. Net wealth of median households (1000€)
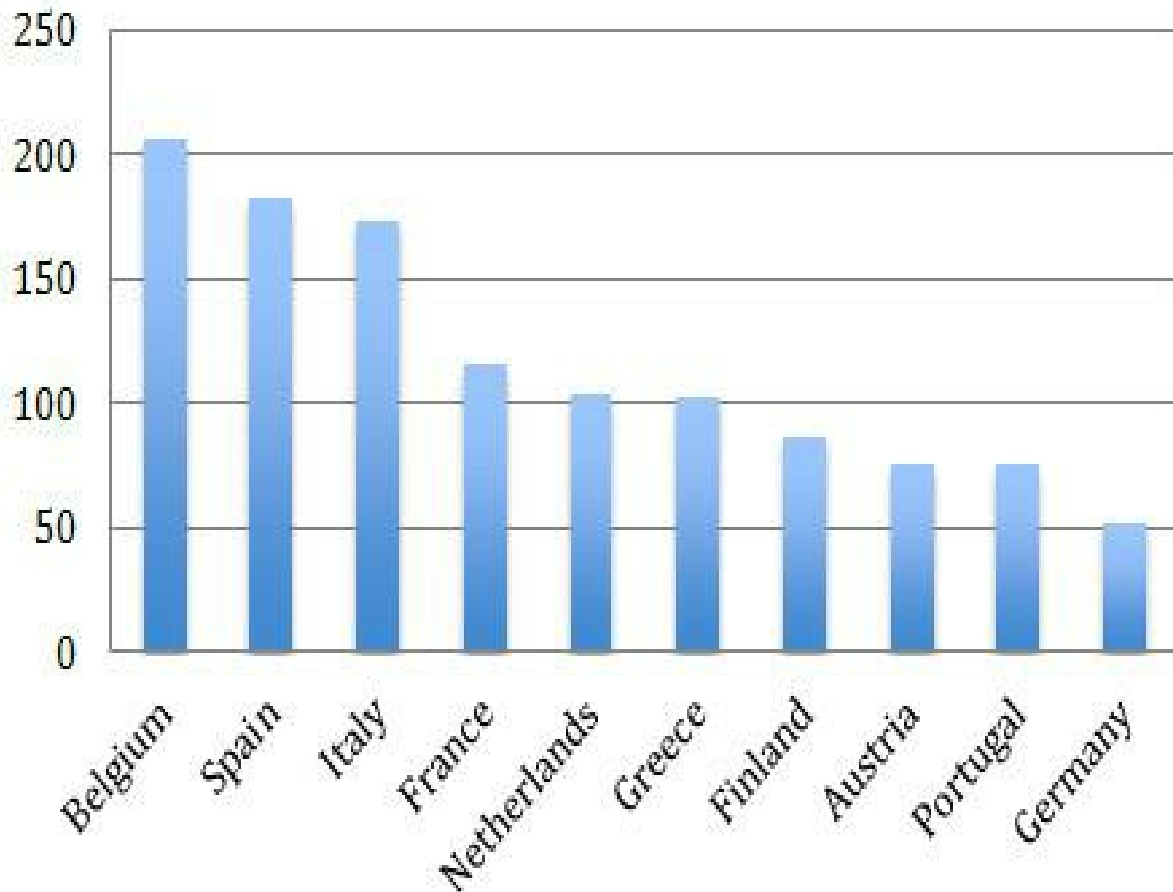
From Figure 1 it appears that not only the median German household has the lowest wealth, but also that the differences within the Eurozone are enormous. The median households in countries like Belgium, Spain and Italy appear to be three to four times wealthier than the median German household. Even the median Greek household is twice as wealthy as the German one.

The publication of these numbers by the ECB quickly led many observers to conclude that it is unacceptable that the poor Germans have to pay for the rescue of the much richer Greeks, Spaniards and Portuguese (see, e.g., *Wall Street Journal* 2013, *Financial Times* 2013, *Frankfurter Allgemeine* 2013).

Is this the right conclusion?

A first thing to note is that the ECB also published the mean net wealth of households in the Eurozone. Surprisingly, the mean household wealth numbers were not given much attention in the media, despite the fact that when compared with the median numbers they provide important

information about the distribution of wealth in the different member countries. We show the mean wealth numbers in Figure 2. It is striking to find that the mean household wealth of Germany (approximately €200,000) is not the lowest of the Eurozone anymore.

Figure 2. Mean household net wealth (1000€)
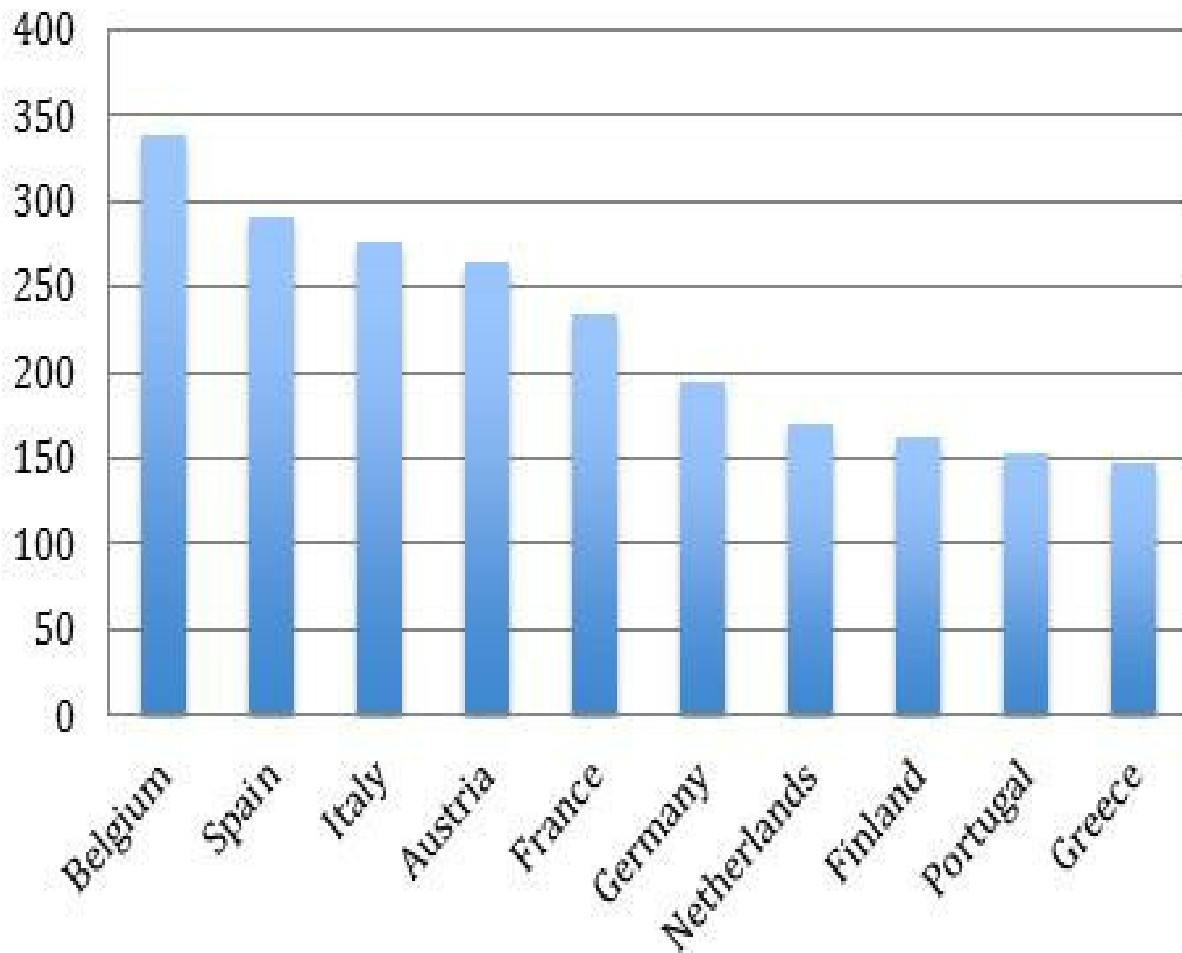
A comparison of the median and mean wealth reveals something about the distribution of wealth in each country. If the largest difference is between the mean and the median, the greater is the inequality in the distribution of wealth. It now appears that the difference is highest in Germany. We show this by presenting the ratios of the mean to the median for the different countries in Figure 3. In Germany the mean household wealth is almost four times larger than the median. In most other countries this ratio is between 1.5 and 2. Thus household wealth in Germany is concentrated in the richest households more so than in the other Eurozone countries. Put differently, there is a lot of household wealth in Germany but this is to be

found mostly in the top of the wealth distribution.

The inequality of the distribution of household wealth is made even more vivid by comparing the wealth owned by the median household in the top 20% of the income class to the wealth owned by the median household in the bottom 20% of the income class. This is shown in Figure 4 (corrected from an earlier version). We find that in Germany the median household in the top 20% of the income class has 74 times more wealth than the median household in the bottom 20% of the income class. Judged by this criterion Germany has the most unequal distribution of wealth in the Eurozone.

Figure 3. Mean/median
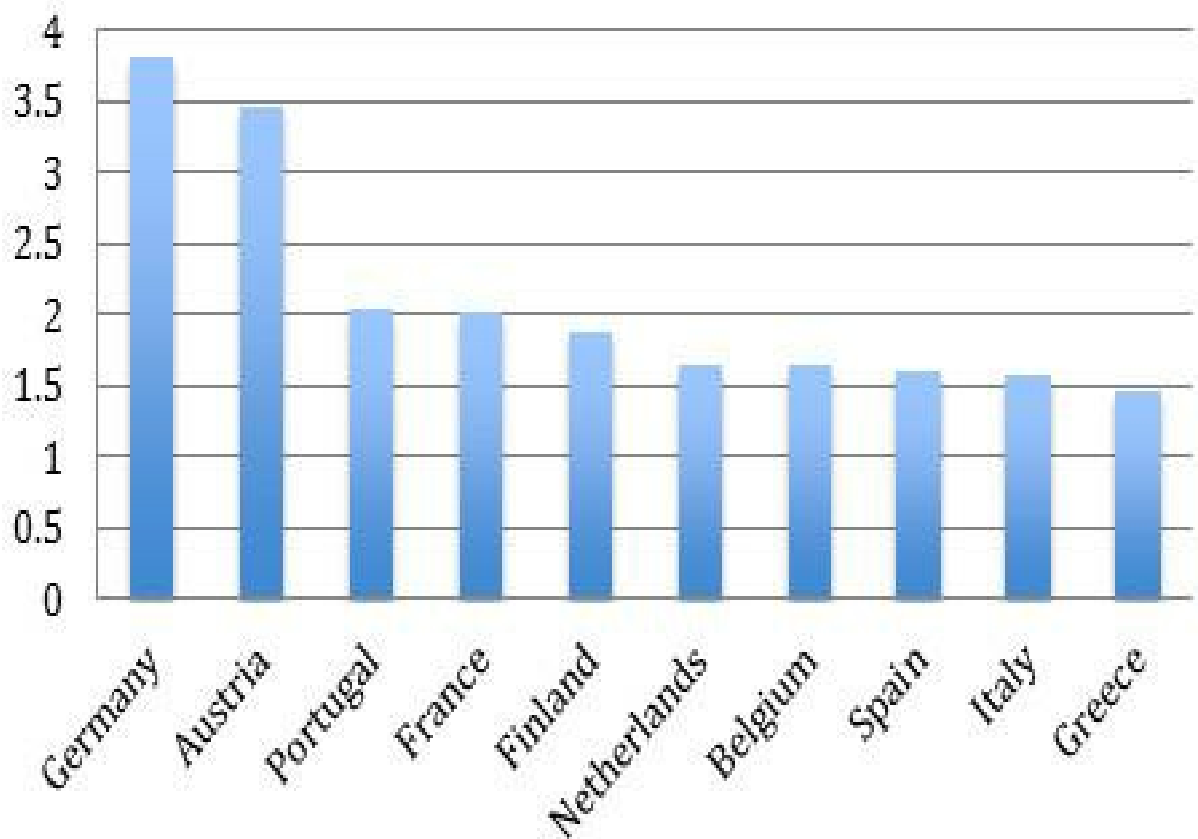
Source: Own calculations based on European Central Bank (2013).

Figure 4. Wealth median top 20% / wealth median bottom 20%
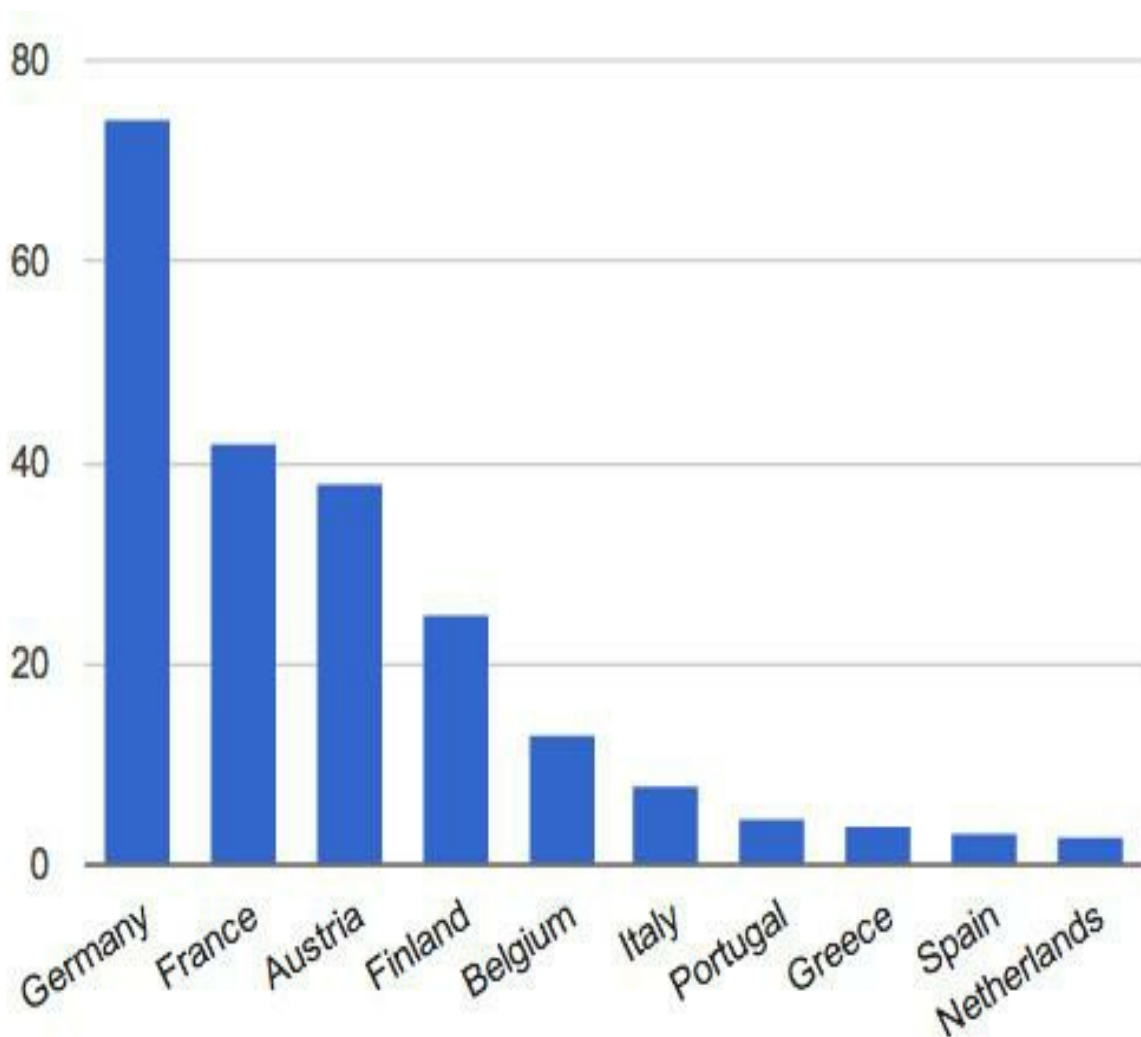
Wealth of households and wealth of nations

The next question that arises is whether household wealth is a good indicator of the wealth of a nation. A significant part of a nation's wealth can be held by the government or the corporate sector and not by the household sector. If the question is to find out how much capacity Germany has to make transfers to other countries a more comprehensive measure of wealth should be used. Such a more comprehensive measure of wealth is available. This is the total capital stock of a nation. This is a measure of the capacity of a nation to generate (together with human capital) an income stream.

We used available information on the capital stocks in OECD countries and updated this to 2012 (see Appendix for more information). We then computed the net capital stock per capita in the member countries of the Eurozone. We use two definitions. The first one is the domestic capital

stock per capita (Figure 5). The second one is the sum of the domestic capital stock and the net international investment position vis-à-vis the rest of the world. We call this the total capital stock per capita (figure 6). We find strikingly different results when compared with the household wealth figures.[2]

Figure 5. Domestic capital stock per capita (euro)

Figure 6. Total capital stock per capita (euro)

The most important difference is that the northern Eurozone countries are the wealthiest countries in the Eurozone. This conclusion can be made by looking at the domestic and the total capital stock numbers (Figures 5 and 6). When concentrating on the total capital stock (Figure 6), it appears that Germany belongs to the top two countries in terms of per capita wealth. In contrast the southern European countries have the lowest wealth. Wealth per capita is more than twice as high in northern European countries than in southern countries such as Greece and Portugal.

Conclusion

From this analysis it follows that it is misplaced to conclude from the ECB study that Germany is poor compared to some southern European countries and that therefore it is not reasonable to ask German taxpayers to financially support 'richer' southern countries (see e.g. Wall Street Journal 2013). The facts are that Germany is significantly richer than southern Eurozone countries like Spain, Greece and Portugal.

There does seem to be a problem of the distribution of wealth in Germany:

- First, wealth in Germany is highly concentrated in the upper part of the household-income distribution.
- Second, a large part of German wealth is not held by households and therefore must be held by the corporate sector or the government.

Thus while it is may not be reasonable to ask the 'poor' median German household to transfer resources to southern European countries, it may be more reasonable to make such demands on the richer part of the German households and the corporate sector. Put differently, the opposition in Germany to making transfers to the south finds its origin not in the low wealth of the country. The facts are that Germany is one of the wealthiest countries of the Eurozone. The problem is that this wealth is very unequally distributed in Germany, creating a perception among less wealthy Germans that these transfers are unfair.

References

European Central Bank, (2013a), "The Eurosystem Household Finance and Consumption Survey, Results from the First Wave", Statistics Paper Series 2, April.

European Central Bank (2013b), "Statistical Tables to the Eurosystem Household Finance and Consumption Survey".

Christophe Kamps (2005), "New Estimates of Government Net Capital Stocks in 22 OECD Countries 1960–2001", IMF Staff Papers.

Financial Times (2013), "Poor Germans tire of bailing out Eurozone".

Frankfurter Allgemeine (2013), "Reiche Zyprer", arme Deutsche, 10 April.

The Wall Street Journal (2013), "Europe's Poorest", Look North, 10 April.

Appendix

We use the estimates of net domestic capital stock (1960-2001) from Kamps (2005). Net domestic capital is defined as the sum of government capital, private residential capital and private non-residential capital. The net refers to the fact that a depreciation rate is applied to the existing stock. Different depreciation rates are applied to different types of capital stock in order to extend the data to 2012 add the yearly gross fixed investment (2002-2012) to generate the total net domestic capital stock of each country in 2012. We apply a yearly depreciation rate in the period 2002-

2012 of 3%.

In order to obtain the total net capital stock we add the net international investment position to the net domestic capital stock. For countries like Germany this the total net capital stock exceeds the domestic one as German has accumulates large current-account surpluses. The opposite is true for most southern Eurozone countries.

All the final values are adjusted to the price level of the 2012 euro.

<u>1</u> The survey is based on a sample of 62000 households across 15 Eurozone countries.

<u>2</u> Note that we use per capita wealth numbers not wealth per household.

Russia's national income in war and revolution, 1913 to 1928

Mark Harrison and Andrei Markevich

University of Warwick; New Economic School, Moscow

11 May 2012

At the start of the 1920s, Russia's economy suffered the greatest economic catastrophe of a turbulent 20th century. This column argues that measuring this experience yields lessons for the relationship between state capacity, government policies, and economic development.

In 1914, Russia joined in the First World War. With the Bolshevik Revolution of 1917 Russia's part in that war came to an end. A civil war soon began, that continued with varying intensity until 1920. It was followed immediately by a famine in 1921. Economic recovery began, but by 1928 the Russian economy had been caught up in Stalin's drive to "catch up and overtake" the West through forced-march industrialisation.

During these years we have the opportunity to observe the Russian economy going through several critical transitions, including some of the worst things that can happen to a country. There was war and civil war. The economy suffered economic disintegration, isolation, and famine. There was a collapse of state capacity; then, authority was recentralised in the hands of a new state that pursued interventionism on an unprecedented scale.

Russia's experience in these years has rich potential for lessons concerning the relationship between state capacity, government policy, and economic development. Russian economists worked on these issues until prevented by censorship and repression (Prokopovich 1917; Gukhman 1925; Groman 1927; Varzar 1955; Vainshtein 1960; Litoshenko 2001; Poletaev 1998 provides a survey). In the West, economic and social historians have studied particular events, institutions, regions, and sectors (Zaleski 1970; Malle 1985; Figes 1989; Davies 1990; Lih 1990; Adamets 2003; Gatrell 2005). But the lack of reliable, consistent, and temporally complete national accounts has limited our understanding.Most European countries today have historical national accounts on a real GDP (final goods and services) basis stretching back through the 19th century or even earlier. Russia's go back to 1885 but, as Table 1 shows, a gap has

remained between 1913 and 1928.

Table 1. Sources for Russia's national income, 1885-1990

Period	Coverage	Source
1885 to 1913	Annual	Gregory (1982)
1913	Benchmark	Falkus (1968)
1913 and 1928	Benchmarks	Gregory (1990)
1928 to 1960, selected years	Benchmarks	Bergson (1961)
1928 to 1940; 1946 to 1962	Annual	Moorsteen and Powell (1966)
1940 to 1945	Annual	Harrison (1996)
1950 to 1980	Annual	CIA (1982)
1950 to 1987	Annual	CIA (1990)
1960 to 1990	Annual	Ponomarenko (2002)

In a recent paper, Andrei Markevich and I build the first consistent annual measures of real national income in the territories of the Russian Empire (from 1913 to 1917) and the interwar Soviet Union (from 1913 to 1928) at 1913 prices (Markevich and Harrison 2011). We combine the outputs of agriculture, large and small industry, transport and construction, civilian and military services. Underlying data are plentiful and were mostly published at the time with much regional disaggregation. Their quality and coverage are uneven, however – some sectors (particularly construction and civilian services), some regions, and some years (particularly 1918) are badly served. Agricultural statistics are subject to many known biases. Everything is complicated by boundary changes. Between 1913 and 1922, Russia gave up 3% of its territory, mainly in the densely settled western borderlands; this meant the departure of one fifth of its pre-war population.

The population figures matter in their own right and as the denominator of real national income per head. Russia's demographic accounting is complicated not only by border changes but also by pre-war and wartime migrations. Pre-war rural-urban migration added complexity because the migrants were double-counted in their places of origin and destination, leading to overstatement of the total. Wartime migration interacted with border changes to increase somewhat the post-war population within Soviet frontiers. Everyone knows about the 'white' Russians who emigrated after the Revolution. Less well known is the larger flight from the contested borderlands of the Russian Empire to the interior; after the war, when the borderlands had won independence, the migrants remained

on Soviet territory. After stripping out these complications, we estimate that Russia suffered 13 million premature deaths from conflict and famine. This was one in ten of the population living within the future Soviet borders in 1913.

Our work lets us observe the Russian economy collapsing and recovering from year to year between these two dates. Figure 1 shows our results (in solid red) for national income per head in the context of previously existing estimates (in dotted blue) of Russia's economic growth from 1885 to the present day.

Figure 1. The Real GDP per head of Russia and the Soviet Union, 1885-2006
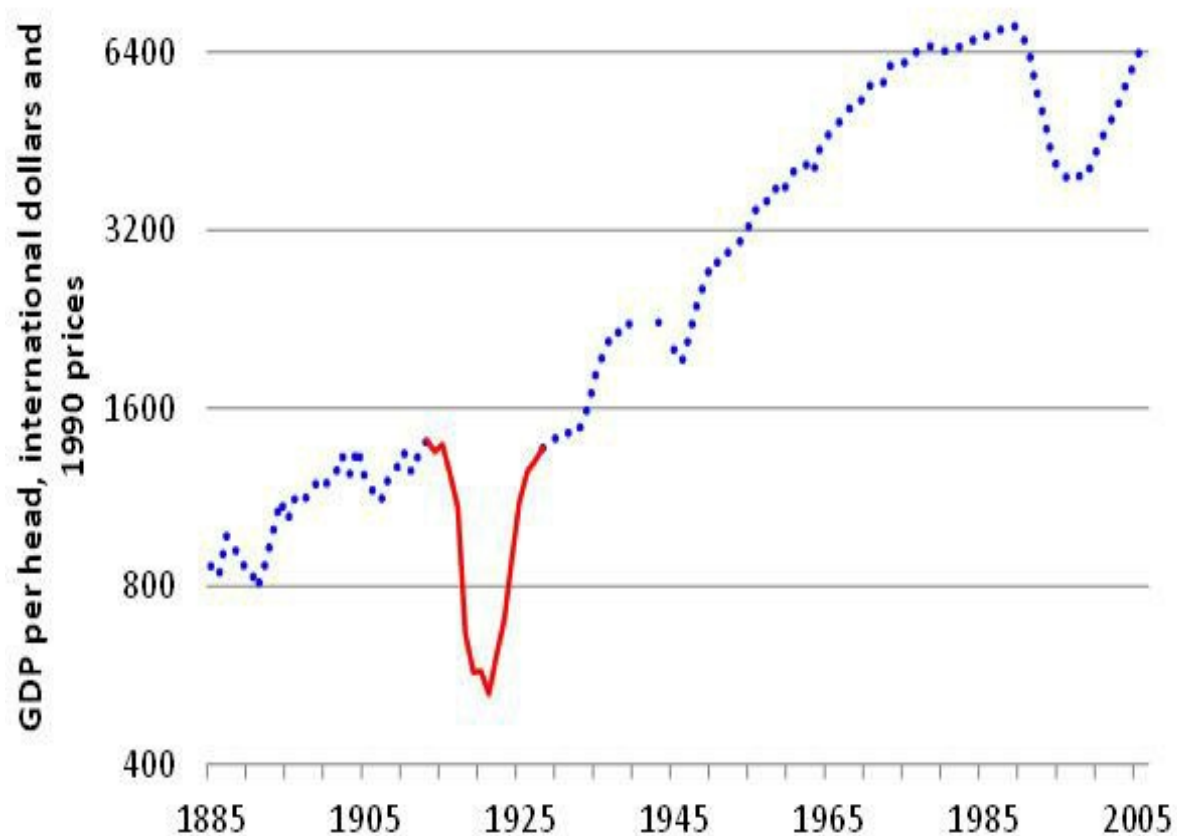
Onto the changes in economic activity we can now map the changes in conflict (Russian defeat in World War I, then Bolshevik victory in the Civil War), state capacity (the Russian Empire collapsed and was replaced by a communist state), and the policy regime (the Russian imperial state tried to regulate the war economy rather ineffectively; the communists quickly turned to violent methods of mass mobilisation, were eventually forced to draw back, permitted the revival of a regulated market economy,

and then returned to extreme coercion).

Our paper looks first at the impact of the First World War, in which Russia fought against Germany and Austria-Hungary. Initially, the war went well for Russia because Germany found itself unexpectedly tied down on the western front. Even so, Germany quickly turned back the initial Russian offensive and would have defeated Russia altogether but for its inability to concentrate forces there.

During the war nearly all the major European economies declined; Britain was the exception. The main reason was that the strains of mobilisation began to pull them apart, with the industrialised cities going in one direction and the countryside going in the other way. In that context, we find that Russia's economic performance was better than has been thought. Our study shows that until the year of the 1917, Revolution Russia's economy was declining, but by no more than any other continental power. While wartime economic trends shed some light on the causes of the Russian Revolution, they certainly do not support an economically deterministic story; if anything, our account leaves more room for political agency than previous studies.

In the two years following the Revolution, there was an economic catastrophe. By 1919, average incomes in Soviet Russia had fallen to less than 600 international dollars at 1990 prices. Less than half that of 1913, this level is experienced today only in the very poorest countries of the world, and had not been seen in Eastern Europe since the 17th century (Maddison 2001). Worse was to come. After a run of disastrous harvests, famine conditions began to appear in the summer of 1920 (in some regions perhaps as early as 1919). In Petrograd in the spring of 1919, an average worker's daily intake was below 1,600 calories, about half the level before the war. Spreading hunger coincided with a wave of deaths from typhus, typhoid, dysentery and cholera. In 1921, the grain harvest collapsed further, particularly in the southern and eastern grain-farming regions. More than five million people may have died prematurely at this time from hunger and disease.

Because we have shown that the level of the Russian economy in 1917 was higher than previously thought, we find that the subsequent collapse was correspondingly deeper. What explains this collapse? It is natural to think of the Russian Civil War, which is usually dated from 1918 to 1920. However, we doubt that this is a sufficient explanation.

- First, although economically damaging, armed conflict between the two sides was geographically and temporally sporadic. The economic decline was most rapid in 1918; fighting was widespread only in 1919.
- Second, there are signs that Bolshevik policies of economic mobilisation and class warfare acted independently to spread chaos and decline. These policies were continued and intensified as the civil war drew to a close during 1920, and clearly contributed to the famine of 1921.

Because of the famine, economic recovery did not begin until 1922. At first, recovery was very rapid, promoted by pro-market reforms, but it slowed markedly as the Soviet government began to revert to mobilisation policies of the civil war type. We confirm that Russian incomes in 1928 were still somewhat below the level of 1913, and that recovery was lagging by international standards. For this reason, we regard the somewhat favourable view of the mobilisation policies that Allen (2003) has put forward as unduly optimistic. Moreover, some of the economic growth achieved subsequently under Stalin's five-year plans should be attributed to delayed restoration of pre-revolutionary economic capacity.

Concluding our study, we reflect on state capacity. When the state has the right amount of capacity there is honest administration within the law; the state regulates and also protects private property and the freedom of contract. When there is too little state capacity, the economic order disintegrates into robbery and violence and security ends up being privatised by gangs and warlords. When the state has too much capacity, there is still armed robbery but it is organised by the state. Somewhere between these two extremes is the right amount.

In Russian history the state has usually had either too much capacity or too little. In the short period of our study, we see Russia flipping between the two extremes. In the First World War the state did not have enough capacity to regulate the war economy and it was eventually pulled apart by competing factions. In the Civil War and again during the 1920s the state grabbed capacity back and gained powers to mobilise, build economic and military power, and starve and kill without restraint. This period shows us both the extremes of state capacity and their devastating consequences.

References

Adamets, S (2003), "Guerre civile et famine en Russie: Le pouvoir

bolchévique et la population face à la catastrophe démographique de 1917-1923", Paris, Institute d'études slaves.

Allen, R C (2003), *Farm to Factory: A Reinterpretation of the Soviet Industrial Revolution*, Princeton University Press.

Bergson, A (1961), *The Real National Income of Soviet Russia since 1928*, Harvard University Press.

Central Intelligence Agency (1982), "USSR: Measures of economic growth and development, 1950-1980", a study prepared for the use of the Joint Economic Committee of the United States, US Government Printing Office, Washington DC.

Central Intelligence Agency (1990), "Measures of Soviet gross national product in 1982 prices", a study prepared for the use of the Joint Economic Committee of the United States, US Government Printing Office, Washington DC.

Davies, R W (ed.) (1990), *From Tsarism to the New Economic Policy: Continuity and Change in the Economy of the USSR*, Macmillan.

Falkus, M E (1968), "Russia's National Income, 1913: A Revaluation", *Economica*, 35(137):52-73.

Figes, O (1989), *Peasant Russia, Civil War: The Volga Countryside in revolution, 1917-1921*, Oxford University Press.

Gatrell, P (2005), *Russia's First World War: An Economic and Social History*, Pearson Longman.

Gregory, P R (1990), "National Income", in RW Davies (ed.), *From Tsarism to the New Economic Policy: continuity and change in the economy of the USSR*, Macmillan.

Gregory, P R (1982), *Russian National Income, 1885-1913*, Cambridge University Press.

Groman, V G (1927), *Narodnoe khoziaistvo SSSR*, Moscow, Gosizdat.

Gukhman, B A (1925), *Produktsiia i potreblenie SSSR*, First edition, Moscow, Gosplan.

Harrison, M (1996), *Accounting for War: Soviet Production, Employment, and the Defence Burden, 1940-1945*, Cambridge University Press.

Lih, L T (1990), *Bread and Authority in Russia, 1914-1921*, University of California Press.

Litoshenko, L N (2001), *Sotsializatsiia zemli v Rossii*, Novosibirsk,

Sibirskii khronograph.

Maddison, A (2001), *The World Economy: A Millennial Perspective*, OECD.

Markevich, A and M Harrison (2011), "Great War, Civil War, and Recovery: Russia's National Income, 1913 to 1928", *Journal of Economic History*, 71(3):672-703.

Moorsteen, R and R P Powell (1966), *The Soviet Capital Stock, 1928-1962*, Harvard University Press.

Poletaev, A V (1998), "Ekonomicheskie krizisy v Rossii v XX veke (statisticheskoe issledovanie)", in Ia I Kuz'monov (ed.), *Istoki. Voprosy istorii narodnogo khoziaistva i ekonomicheskoi mysli*, 3:186-256.

Ponomarenko, A N (2002), *Retrospektivye national'nye scheta Rossii: 1961-1990*, Moscow: Finansy i statistika.

Prokopovich, S N (1917), *Voina i narodnoe khoziaistvo*, Moscow: Delo.

Varzar, V E (1955), "Indeks fizicheskogo ob'ema potrebleniia v SSSR", in PP Maslov (ed.), *Kriticheskii analiz burzhuaznykh statisticheskikh publikatsii*, Moscow, Akademii nauk SSSR. (First published 1929.)

Vainshtein, AL (1960), *Narodnoe bogatstvo i narodnokhoziaistvennoe nakoplenie predrevoliutsionnoi Rossii*. Moscow: Gosstatizdat.

Zaleski, E (1970), P*lanning for Economic Growth in the Soviet Union, 1918-1932*, University of North Carolina Press.

Chapter 4 The Monetary System: What It Is, and How It Works

Introducing a new eReport: Reforming the International Monetary System

Emmanuel Farhi, Pierre-Olivier Gourinchas and Hélène Rey

Harvard University and CEPR; University of California, Berkeley and CEPR; London Business School and CEPR

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Some prominent economists argue that failures in the international monetary system are the root cause of the global crisis. This column introduces a new eReport arguing that, at the very least, the international monetary system is inefficient and destabilising for the global economy. It proposes a number of reforms, the common thread of which is to increase the conditional supply of liquidity and reduce its unconditional demand.

On the face of things, the ad hoc international monetary system seems to be working well enough. The US dollar dominates international financial transactions, and one asset class (US Treasuries) serves as a global reserve or safe asset. This system, however, has its weaknesses.

- When the financial storm erupted in autumn 2008, investors worldwide steered their portfolios towards the safe havens – US dollars and US government debt.
- This surge would have had severe adverse consequences for currency prices, interest rates, and asset markets worldwide, had it not been accompanied by an unprecedented level of cooperation and coordination among major central banks.

This collaboration allowed the large-scale provision of US dollar liquidity to the broader markets via various swap lines the Fed set up with selected central banks (Goldberg et al 2011). The situation was also improved by the broadening of collateral criteria, and a substantial increase in the resources at the disposal of the IMF. This temporary provision of liquidity in a time of severe financial stress restored confidence in markets and helped stop a potentially damaging deleveraging process.

Deep fault lines

This success, however, revealed deep fault lines in the system.

- What drives the demand for safe assets in more normal times and in stress times?
- Who supplies global reserve assets, and why?
- Could the international monetary system also be, in some indirect way, partly responsible for the financial fragility of the world economy?

In a recent CEPR report (Farhi et al 2011), we argue that the optimal provision of global liquidity is a central feature of any well-functioning international monetary system.

Because few countries can offer truly safe assets, and the availability of liquidity in times of crisis is not guaranteed, we argue that there are severe distortions in the demand for safe assets even in normal times, distortions that can accentuate financial fragilities and exacerbate economic volatility.

In short, the main structuring idea that guides our report is that the world economy is characterised by a chronic and severe shortage of reserve assets –or, with some abuse of language, 'safe assets'.

The principal characteristics that determine the reserve potential of a financial asset are its safety and its liquidity; investors must be assured that the asset will not lose its value and that this value can be quickly realised. This is a rare characteristic, since the conditions that lead a country to liquidate part of its reserves are often associated with periods of economic stress and of low liquidity in world markets.

The unmistakable sign of this shortage of safe assets is a persistently low level of world real interest rates, and of the yields of the different classes of safe assets, be they sovereign debt of fiscally responsible countries, highly rated corporate bonds, or highly rated tranches of securitised products.

- Our diagnosis is that the current functioning of the international monetary system is not only inefficient, but that it also has a number of perverse effects that undermine the stability of the world economy.
- We propose a number of reforms. The common thread of these proposals is to increase the conditional supply of liquidity and reduce its unconditional demand.

Two key levers are 1) encouraging the transition to a more multi-polar international monetary system, and 2) improving the global management of liquidity.

Problems

The global shortage of safe assets arises from factors both on the demand side and on the supply side. A significant fraction of the global demand for reserve assets is due to precautionary strategies. This is a form of self-insurance against macroeconomic shocks through the accumulation of a buffer or risk-free assets.

However, this is an imperfect form of insurance which amounts to accumulating non-contingent assets. If financial markets were complete, a portfolio of financial assets would improve over self-insurance.

Of course, in practice, financial markets are not complete.[1] Without insurance contracts or complete markets, self-insurance through precautionary savings is the only alternative.

This desire to self-insure makes perfect sense at the level of a country, but it can lead to excessive aggregate saving and excessively low interest rates.

This inefficiency is the result of a market imperfection – a pecuniary externality –and it can be the source of macroeconomic inefficiencies. Low interest rates encourage leverage, which often leads to fragility and instability, especially in the financial sector. Excessively low interest rates can spark off perverse risk-taking phenomena often referred to as the 'search for yield'. Environments characterised by low interest rates are also prone to speculative bubbles – for instance, in housing or commodity markets. Such bubbles are, by their very nature, fragile. Their emergence and disappearance create excess macroeconomic volatility, which reinforces precautionary saving behaviours and thus creates a vicious cycle.

There are also market imperfections associated with the supply of safe assets.

The supply of reserve assets

A strong demand for reserves generates an incentive to *create* safe assets. Thus, the scarcity of safe assets puts the financial sector under pressure. The recent expansion of the securitisation industry can be viewed as a collective attempt to create safe assets via the pooling and tranching of risk. Similarly, some governments responded to this pressure by relaxing

fiscal discipline. This process leads to the creation of quasi-safe assets. Yet the sudden realisation that such assets are not actually safe induces violent market adjustments, which increase macroeconomic volatility.

The incentive to create safe assets affects more than the issuance and structuring of financial assets; it also has an impact on the issuance and structuring of the *liabilities* of financial institutions. Indeed, it enhances the attractiveness of short-term, risk-free debt because the demand for such a safe asset is strong. The problem with short-term debt is that it weakens balance sheets and increases the risk of financial distress and gives rise to fire-sale externalities.

Finally, the decline in real interest rates increases the probability of a liquidity trap, with depressive effects on the global economy.

To reduce – or eliminate – the shortage of reserve assets, it is possible to influence both the supply and the demand for these assets.

Solutions: Multipolar world

The dollar and US treasuries still play a central role in the international monetary system – they are the reserve assets *par excellence*. Our diagnosis of shortage of safe assets indicates the emergence of a modern version of the celebrated Triffin dilemma.[2] There is a growing asymmetry today between the fiscal capacity of the US (the 'backing' of US Treasury bills) and the stock of reserve assets held abroad – in other words, the US external debt.

Therefore, it can only be a matter of time before the world becomes multipolar. The emergence of this multipolar world is in itself a source of stabilisation for the world economy. By increasing the supply of reserve assets, a multipolar world naturally solves the Triffin dilemma.

It is also important to recognise that the development, liquidity, and openness of emerging countries' financial markets will naturally lead to an increase in the global supply of reserve assets. This evolution towards a multipolar world is inevitable and must be encouraged. To this end, it is also crucial for the currencies of emerging countries to become freely convertible (eventually), so that assets denominated in these currencies may be considered truly liquid.

Improving the global management of liquidity

Self-insuring reserve accumulation is inefficient. It would be more efficient to establish a form of insurance contract between countries at the

global level. Doing so would help alleviate the world's chronic shortage of safe assets and preclude the associated negative consequences.

One may wonder why such insurance arrangements do not already exist. The explanation likely involves agency problems and the costs associated with market infrastructures. For this reason, an international agency such as the IMF would have a clear comparative advantage in the management of agency problems. It would also be able to catalyse the coordination required to create a large-scale insurance infrastructure, and would have the financial strength and credibility to perform the insurance functions, collect insurance premiums, and to discipline the resulting moral hazard.

There are several possible ways to achieve partial or full realisation of this objective.

- **Proposal 1**. Systematise and sustain the provision of international liquidity in the form of swap agreements between central banks.

A possibility would be to 'multilateralise' swap lines by centralising the organisation of swap lines at the IMF. Doing so would replace a complex network of bilateral swaps with a star-shaped structure. The IMF would be at the centre of this system and would enter into swap agreements with the central banks of participating countries. The IMF could then redistribute the liquidity to countries in need during crises by simultaneously entering into a swap agreements with a liquidity-issuing country and with a country in need of liquidity.

- **Proposal 2**. Strengthen and expand the facilities of the IMF – including the Flexible Credit Lines, Precautionary Credit Lines, and Global Stabilisation Mechanism – and extend IMF financing mechanisms, such as the New Arrangements to Borrow, so that the IMF can borrow directly from the markets.
- **Proposal 3**. Develop deposit facilities in foreign exchange reserves with the IMF (reserve pooling arrangements) that will serve participating countries better than self-insurance.

Let us close by saying a few words on special drawing rights (SDRs).

The SDR debate

According to our analysis, the global provision of liquidity need not involve the issuance of SDRs; nor does it require 'anchoring' the system

through coordination of foreign exchange policies. Special drawing rights are complex and poorly adapted to the liquidity needs of the global economy. Their use – which can be justified under certain limited conditions – would not, in itself, cure the structural inefficiencies of the international monetary system. And a monetary anchor assumes that the priorities of monetary policy (economic and financial stability, including stable prices) can be changed in favour of external objectives. However, such an evolution is neither feasible nor clearly desirable. Nevertheless, SDRs could be an indirect way of moving certain currencies towards convertibility.

- **Proposal 4**. Include the yuan in the SDR basket to facilitate emergence of a private market for SDRs, and allow the IMF to issue SDR-denominated debt.

References

Farhi, Emmanuel, Pierre-Olivier Gourinchas, and Hélène Rey (2011), *Reforming the International Monetary System*, Centre for Economic Policy Research, September.

Linda S. Goldberg, Craig Kennedy, and Jason Miu (2011), "Central Bank Dollar Swap Lines and Overseas Dollar Funding Costs", FRBNY, *Economic Policy Review*, May.

[1] There are multiple reasons. Some of them involve agency problems. Others arise from the costs of creating market infrastructures for financial instruments.

[2] As Obstfeld (2011) puts it: "A Triffin dilemma arises any time increasing demand for a reserve asset strains the ability of the issuer to supply sufficient amounts while still credibly guaranteeing or stabilising the asset's value in terms of an acceptable numeraire" (see "the International Monetary System : Living with Asymmetry", mimeo, August).

The international monetary system: If it ain't broke, don't fix it

Uri Dadush and Vera Eidelman

Carnegie Endowment for International Peace

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Reform of the international monetary system tops France's agenda as G20 chair. But what is it about the international monetary system that needs to change? This column says that the exchange-rate system is in relatively good shape.

Reform of the international monetary system tops France's agenda as G20 chair. French policymakers are not the first to be scrutinising the international monetary system (see for example <u>Dooley and Gaber 2009</u> and <u>Vines 2010</u>), but the question remains: What about the international monetary system needs to change? A review of its core – the exchange-rate system – and how it functioned during the financial crisis suggests that the answer is: Not much. Instead, currency tensions point to the need for changes in the policies of the major economies.

Today's monetary system

The international monetary system, a cooperative arrangement between sovereign nations, is composed of five main elements:

- a set of rules for setting exchange rates;
- a lender or lenders of last resort;
- instruments for providing liquidity and reserves (such as swap facilities among central banks and the special drawing right, an international reserve asset created by the IMF);
- provisions for surveillance;
- and a reserve currency or currencies.

Since 1945, the IMF – recently revitalised and recapitalised to deal with the crisis – has played an important role in managing various elements of the system.

Unlike previous systems – the pre-war gold standard and the Bretton

Woods dollar standard – today's arrangement is characterised by the pronounced tendency of countries to tailor their exchange-rate regime to their own needs. Most importantly, countries decide whether to float or peg their currency, and to what currency or mix of currencies they should peg. They also choose what combination of currencies and gold to use as reserves. Because central banks want to hold reserves in currencies that are widely used in transactions, markets largely determine which currencies are used as reserves (see Beattie).[1]

A minority of countries – 68 of the 188 countries classified by the IMF – have chosen to float their currency. However, this group includes nearly all of the advanced economies and several of the large developing countries, such as Brazil, Mexico, India, and South Africa; together, the group accounts for almost 80% of world GDP and 76% of world trade. Thus, in terms of economic weight, today's exchange-rate system is overwhelmingly a floating system.

Of the 120 countries that elect to peg their currencies (or heavily manage them, according to the IMF classification), only seven countries account for more than 0.5% of world GDP – China, Russia, Saudi Arabia, Taiwan, Iran, Denmark, and Venezuela. China stands out in this group. With 9.3% of world GDP and more exports and foreign exchange reserves ($2.85 trillion at the end of 2010) than any other country, it is alone among the large economies to peg its currency, although it recently resumed gradually increasing the flexibility of the renminbi.

The system's performance during the Great Recession

In previous briefs, we have reviewed the stability of the overall exchange-rate system during the crisis and found that, unlike previous systems – whose rigidity contributed to balance-of-payments crises and descents into protectionism, as during the Great Depression – the current system facilitated orderly adjustments during a historic downturn. The dollar retained its safe-haven status and most currencies followed a common path against it (depreciating during the worst of the crisis and appreciating thereafter). In addition, exchange-rate volatility was less pronounced than during the periods that preceded the gold and dollar standard collapses. Moreover, there is little sign of major new misalignments. Only seven of the 40 largest economies – four of which have strong current-account surpluses – saw their real exchange rates appreciate by more than 10% from their pre-crisis ten-year averages (see Dadush and Eidelman 2010a).

However, the crisis also confirmed a lesson from past currency regimes.

That is, the smooth functioning of the international monetary system rests on the soundness of the economies at the core (see Dadush and Eidelman 2010b). With confidence down in the policies and financial systems of the US and the Eurozone, and with the core's adoption of unprecedented expansionary monetary policies, all countries have become more sensitive to their exchange rate levels. China's undervalued exchange rate and increasing economic role has only exacerbated these tensions.

Here, we turn from overall system stability to another aspect of the system's crisis performance; the choice of currency regime by individual countries. We ask: How did countries perform during the Great Recession under different currency regimes? Will they need to alter their approach, and should the international monetary system be modified accordingly? We distinguish between financially integrated countries, which were hit by the full force of the financial shock, and those that were relatively insulated by closed capital accounts.

Financially integrated countries

Currently, 105 countries – including nearly all of the advanced countries and representing more than 80% of world GDP – have open capital accounts according to the Chinn-Ito Index.[2] These economies can only use their monetary policy to affect domestic activity if they allow their exchange rate to float.[3] As it turns out, about half choose that course and the other half opt to peg their currencies.

During the crisis, developing countries that float their currencies outperformed those that fix them. Over 2008 and 2009, average annual GDP growth was nearly 1 percentage point higher in floaters than in fixers, and floaters gained 0.2% of world export share compared to zero for fixers. Though average annual inflation was 1.3% higher in floaters than in fixers, it remained moderate in both groups.[4]

Figure 1. Financially integrated developing countries

Note: GDP growth and inflation represent annual 2008 - 2009 average.
Export share gain represents change in share of world exports from 2007 to 2009.
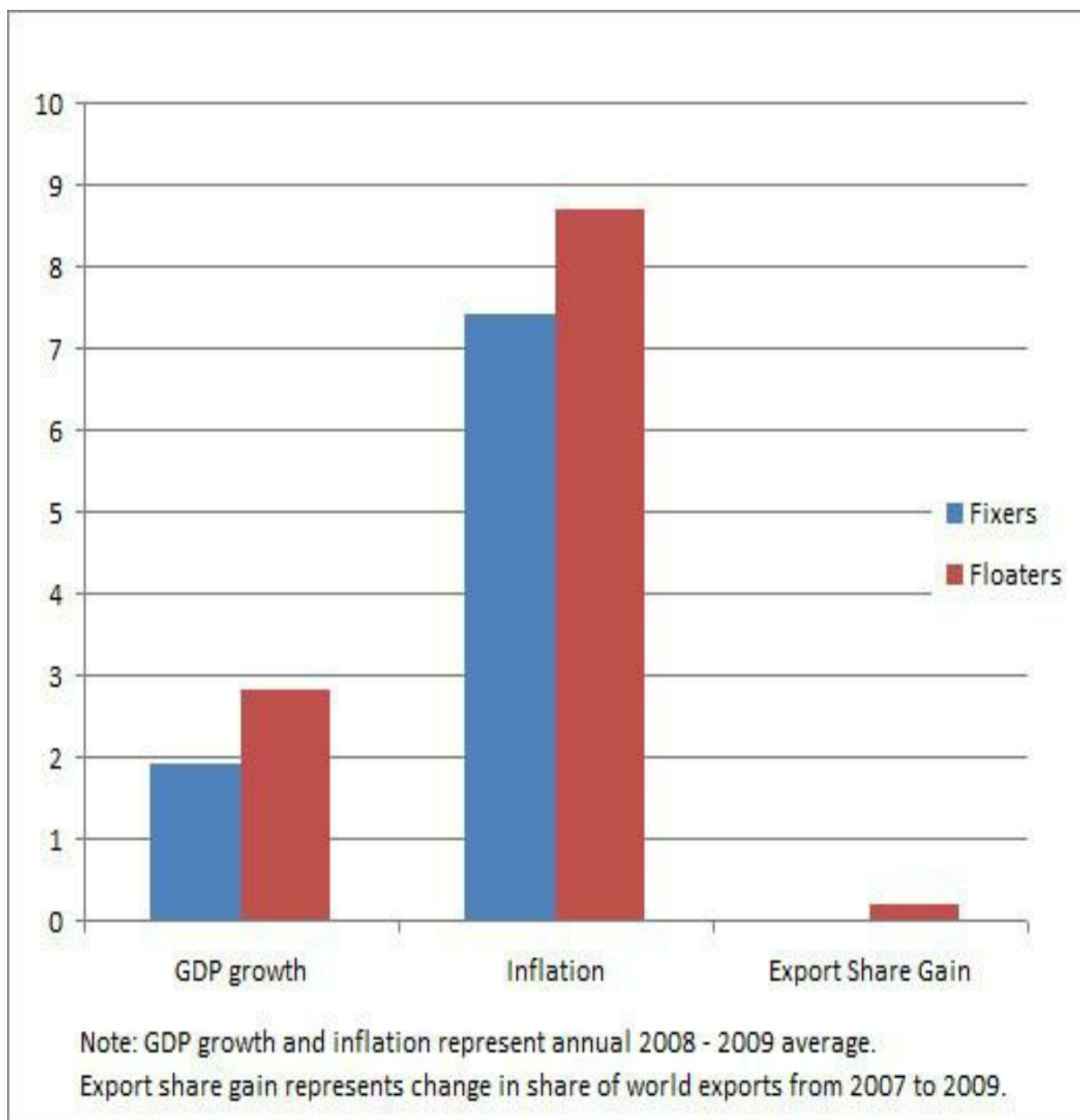
Financially closed countries

Not surprisingly, given the vehemence of the global credit crunch, the 83 economies with closed capital accounts at the start of the crisis outperformed their financially integrated counterparts, irrespective of currency regime. They grew faster, gained more global export share, and saw moderate, though somewhat higher, inflation.

These economies include China, India, and Russia, but are for the most part small, open, developing economies[5] and are typically attracted to a stable exchange rate. Being relatively insulated from global financial markets, they can retain control of their monetary policy if they "sterilise" the effect of their exchange-rate interventions on the domestic money

supply by selling government bonds or changing banks' reserve requirements. Accordingly, 59 countries in this group chose to peg their exchange rate and only 14 countries opted to float it.[6]

Interestingly, even among this group, the floaters outperformed the fixers during the crisis – their average annual GDP was higher and inflation was lower, though the fixers gained more export share.

Figure 2. Financially closed developing countries
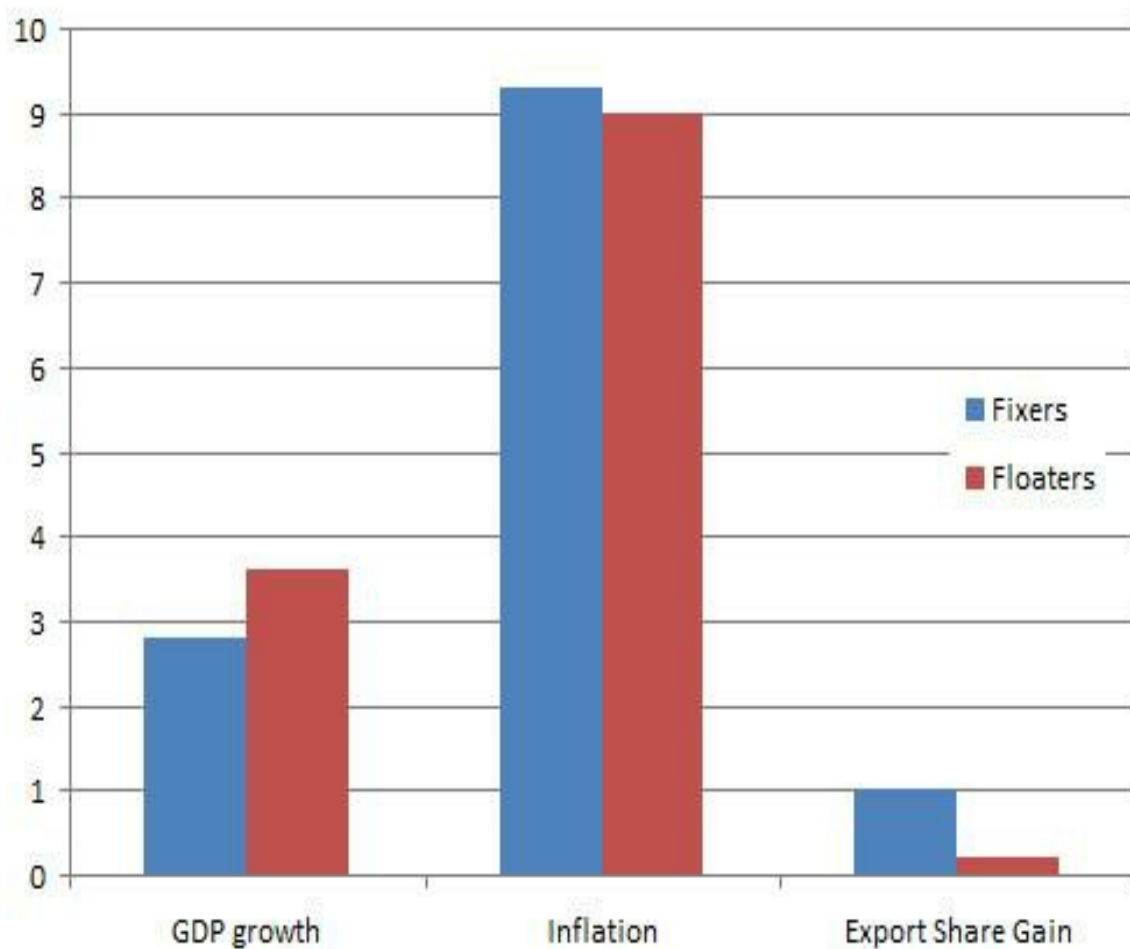
Note: GDP growth and inflation represent annual 2008 - 2009 average.
Export share gain represents change in share of world exports from 2007 to 2009.

These findings suggest that different exchange rate regimes helped account for modest – but not huge – differences in performances during the crisis.

- First, and not surprisingly (given the nature of the crisis), countries with closed capital accounts fared somewhat better, irrespective of

currency regime.

- Second, developing countries with flexible currency regimes performed somewhat better than fixers, irrespective of their level of financial integration. In fact, nearly 20% of fixers switched to a float system between the onset of the crisis and spring 2009, opting for more monetary policy control when they needed it most (see Tsangarides 2010). Several countries have switched back to a pegged exchange rate since.[7]

Perhaps the greater lesson is that today's international monetary system is remarkably resilient. The system maintained order even in the middle of a massive crisis, and it enabled countries to respond to their particular circumstances, including by temporarily or permanently adopting a more flexible exchange-rate regime.

Going forward

But can the international monetary system work even better? The answer is almost certainly yes, though we find no evidence for a major overhaul rather than incremental change. For example, increasing the IMF's firepower as the lender of last resort through periodic new special drawing right issuance or other means, as well as further bolstering its surveillance role – as the G20 intends to do – are steps in the right direction.

But the policy changes that would make a real difference have little to do with shortcomings of the system as a whole. Rather, they are related to the policies adopted by the largest players.

To begin with, China could accelerate reforms to increase the flexibility and convertibility of the renminbi and to deepen and globalise its financial markets. Such reforms would allow the renminbi to play a greater role in reserves, including the special drawing right basket, and induce faster appreciation, relieving a major source of tension with other countries. If these reforms are done too quickly and endanger the country's financial stability and orderly growth, however, the cure may be worse than the disease, both for China and the global economy.

Most important for the international monetary system is that the US and the Eurozone return to a sustainable and fiscally-sound growth path. Over time, this will allow international interest rates to return to normal levels, alleviate fears of carry trades and hot-money inflows in emerging markets, and restore confidence in the main reserve currencies – precisely the changes needed to ensure that the international monetary system function

smoothly.

References

Aizenman, J, Chinn M and H Ito (2010). "The Financial Crisis, Rethinking of the Global Financial Architecture, and the Trilemma", ADBI Working Paper.

Beattie, A (2011), "Strength in reserve", *Financial Times*, 9 February.

Chinn, M and H Ito (2010), "The Chinn-Ito Financial Openness Index", 5 August.

Dooley, M and P Garber (2009), "Global imbalances and the crisis: A solution in search of a problem", VoxEU.org, 21 March.

Dadush, U and V Eidelman (2010a), "Currency Tensions: What Historical Parallels Teach", VoxEU.org, 20 December.

Dadush, U and V Eidelman (2010b), "How to Avoid a Currency War", International Economic Bulletin, Carnegie Endowment for International Peace, 14 October.

Tsangarides, C (2010). "Crisis and Recovery: Role of the Exchange Rate Regime in Emerging Market Countries", IMF.

Vines, D (2010), "European financial vulnerability and the need for a rules-based international monetary system", VoxEU.org, 4 June.

1 Today, 61% of the world's reserves are held in dollars and 27% in euros. Sterling and yen each account for 4% of total reserves, and a variety of other currencies comprise the remaining 4%.

2 We consider a country to have no capital controls if it ranks above zero on the most recent (2008) Chinn-Ito Index and to have capital controls if it ranks below zero.

3 As described by the Impossible Trio, it is impossible for any economy to achieve the following three desirable goals simultaneously: exchange rate stability, capital market integration, and monetary policy autonomy. Any two of the goals are achievable with a given exchange rate regime, but at the expense of the third.

4 Interestingly, among the advanced countries, the five fixers – Hong Kong, Malta, Cyprus, Denmark, and the Slovak Republic, all small open economies with relatively sound financial systems (with the possible exception of Denmark) – clearly outperformed the 28 floaters. Their GDP contraction was smaller, their exports gained more global share than did that of floaters, and their inflation rose by more but remained moderate.

5 Only four other countries in this group – Turkey, South Africa, Argentina, and Thailand – represent more than 0.5% of global GDP.

6 Several of these countries, such as Argentina and Thailand, may be imposing lessons from past crises, while others may be preparing for capital control liberalization; still others may simply prefer the insulation of a double-safety approach.

7 Twenty-three developing countries that were floating in 2007 had fixed exchange rate regimes in 2010. This is in keeping with the general tendency of developing countries to shift toward more

stable regimes following crises (see Aizenmann et al. 2010).

Chapter 5 Inflation: Its Causes, Effects, and Social Costs

The case for 4% inflation

Laurence Ball

Johns Hopkins University

24 May 2013

Since the double-digit inflation of the 1970s, central banks have sought to reduce inflation and keep it low. This column argues that recent history teaches us that inflation has fallen too low. Raising inflation targets to 4% would have little cost, and it would make it easier for central banks to end future recessions.

Many central banks have adopted a common policy – an inflation target near 2%. These central banks include the Fed (which calls it a 'long run goal'), the ECB (which targets inflation 'below, but close to 2%') and the central banks of most other advanced economies.

A number of economists, such as Blanchard et al. (2010), have suggested a higher inflation target – typically 4%. Yet this idea is anathema to central bankers. According to Ben Bernanke (2010a), the Federal Open Market Committee unanimously opposes an increase in its inflation goal, which 'would likely entail much greater costs than benefits'.

I examine the case for a 4% inflation target in a recent essay (Ball 2013) and reach the opposite conclusions to those of Chairman Bernanke:

- A 4% target would ease the constraints on monetary policy arising from the zero bound on interest rates, with the result that economic downturns would be less severe.
- This important benefit would come at minimal cost, because 4% inflation does not harm an economy significantly.

A lesson from the Great Recession

Recent history has demonstrated the problem of the zero bound. In response to the US financial crisis and recession, the Fed reduced its target for the federal funds rate from 5.25% in August 2007 to a range of 0 to 0.25% in December 2008. The target remains in that range today. Yet this sharp monetary easing has not restored full employment. The unemployment rate peaked at 10% in 2009 and then stayed high; in April 2013, it was 7.6%. Unemployment of 5% – widely considered the natural

rate just a few years ago – is nowhere in sight.

During past recessions, the Fed has reduced interest rates and kept reducing them until unemployment fell to an acceptable level. But cutting interest rates has not been feasible since 2008. With nominal rates already near zero, they cannot fall farther. Nobody would lend at a negative interest rate because one can do better by holding cash.

As the US recession spread around the world, many other central banks reduced interest rates to 1% or less. Like the US, their economies are stuck in the 'liquidity trap' described by Keynes (1936). Unemployment is high and policymakers cannot reduce it with interest-rate cuts.

In general, a higher inflation target reduces the zero-bound problem. In long run equilibrium, a higher inflation rate implies that nominal-interest rates are also higher – the Fisher effect. When a recession occurs, rates can fall by more before hitting zero, making it more likely that policymakers can restore full employment.

Suppose that central banks had been targeting 4% inflation in the early 2000s rather than 2%. Nominal-interest rates would have been two percentage points higher, allowing rates to fall by an extra two points before hitting zero. I estimate that this extra stimulus would have reduced average unemployment over 2010-2013 by two percentage points (Ball 2013).

Future risks from the zero bound

Looking forward, the case for a higher inflation target depends on the risk that interest rates will hit zero in future recessions. Some economists believe that this risk is low. Mishkin (2011), for example, argues:

"Although [the zero bound] has surely been a major problem in this recent episode, it must be remembered that episodes like this do not come very often. Indeed, we have not experienced a negative shock to the economy of this magnitude for over seventy years. If shocks of this magnitude are rare, then the benefits to a higher inflation target will not be very large because the benefits will only be available infrequently."

In my view, Mishkin understates the risk of the zero bound. If we look beyond the US, the crisis of 2007-2009 is not unique in recent history. A completely separate financial crisis pushed Japanese interest rates to zero in 1997. It was only around 1990 that central banks began to target inflation rates of 2% or less. The two largest economies that adopted this policy both hit the zero bound within 20 years.

More generally, history suggests that the zero bound is dangerous if central banks target 2% inflation. In my paper, I make this point by examining the eight US recessions since 1960.

We can divide these recessions into two groups:

☛ First, recessions with low initial inflation.

Three of the eight recessions began with inflation rates between two and three percent. These episodes provide the most direct evidence on the zero-bound problem at low inflation rates. One of the three is the Great Recession of 2008-09, when the zero bound constrained monetary policy severely. Based on the Taylor rule that fits policy before 2008, Rudebusch (2009) finds that the optimal federal funds rate, ignoring the zero bound, fell to -5% in 2009.

The other two recessions that began with 2-3% inflation are the first one in the sample, which occurred in 1960-61, and the last one before the Great Recession, in 2001. These two recessions were milder than most: their peak levels of unemployment were only 7.1% and 6.3%. In both cases, the federal funds rate did not hit zero, but it came close. The funds rate fell to 1.2% following the 1960-61 recession and 1.0% following the 2001 recession.

We have seen that, with low inflation, a severe recession reduces the optimal federal funds rate to -5% and mild recessions reduce it to about +1%. Comparing these cases, it seems likely that a recession of average severity would push the optimal rate below zero.

☛ Second, recessions with high initial inflation.

In five of the eight recessions since 1960, inflation began above 4%. With high inflation, nominal-interest rates were also high, so the Fed could cut them sharply without approaching zero. But what would have happened if inflation had started at 2%?

We can get an idea by examining real interest rates. If the nominal-interest rate, i, cannot fall below zero, then the real rate, $r=i-\pi$, cannot fall below -π . One way to interpret the danger of low inflation is that it raises the lower bound on the real interest rate.

If inflation is 2% when a recession begins, the bound on the real rate is -2% at that point. However, the recession is likely to push inflation down

somewhat. In the three recessions that actually started with 2-3% inflation, the inflation rate fell to about 1% before the economy recovered. History suggests, therefore, that initial inflation of 2% will produce a bound of -1% on the real interest rate.

For the recessions that started with inflation above 4%, we can gauge the relevance of a real-interest-rate bound by examining the lowest value reached by the real rate during the recession and subsequent recovery. In two of the five cases – the recessions of 1973-75 and 1980 – the real rate fell below -4%. In these episodes, a lower bound of -1% would have severely distorted monetary policy. For the recession of 1969-70, the real rate fell to a minimum of -2.3%. For the recession of 1990-91, the minimum was -0.6%; this episode would have been a near-miss with a lower bound of -1%. Only in one case, the recession of 1981-82, was the minimum real rate above zero.

To summarise, history suggests that, with a 2% inflation target, the lower bound on interest rates is likely to bind in a large fraction of recessions.

Opposition to higher inflation

Would 4% inflation hurt the economy? Economists have suggested various costs of inflation, such as variability in relative prices and distortions of the tax system. But research has not shown that these effects are quantitatively important for moderate inflation. As Krugman (1997) puts it: "one of the dirty little secrets of economic analysis is that even though inflation is universally regarded as a terrible scourge, efforts to measure its costs come up with embarrassingly small numbers".

Some central bankers acknowledge that 4% inflation does not greatly harm the economy. Nonetheless, they oppose adoption of a 4% target because they think this action may actually cause inflation to rise above 4%, or at least create expectations of that outcome.

Bernanke (2010a), for example, asserts that "inflation would be higher and probably more volatile" with a 4% target and "inflation expectations would also likely become significantly less stable". According to Bernanke (2010b):

"The Fed, over a long period of time, has established a great deal of credibility in terms of keeping inflation low, around 2%... If we were to go to 4% and say we're going to 4%, we would risk a lot of that hard-won credibility, because folks would say, well, if we go to 4%, why not go to 6%? It'd be very difficult to tie down expectations at 4%."

Mishkin (2011) makes a similar argument, asserting that "when inflation rises above the 3% level, it tends to keep on rising".

The addictive theory of inflation

We might call this view 'the addictive theory of inflation'. Like an alcoholic's first drink, 4% inflation may not do great harm by itself, but it is the first step in a dangerous process.

The rationale for this view is not clear. In other contexts, Bernanke and Mishkin argue that a central bank should determine its optimal policy, explain this policy to the public, and carry it out. Why can't policymakers explain that the zero-bound problem makes 4% inflation desirable, raise inflation to 4%, and keep it there? Mishkin points to the 1960s, when inflation rose to 4% and the Fed let it keep rising, but why must policymakers repeat that mistake?

History does not suggest that it would be "difficult to tie down expectations" if inflation rises modestly. Inflation expectations, as measured by surveys, have generally followed actual inflation with a lag. They followed inflation up during the 1960s and 70s, and after that they followed inflation down. If inflation rises to 4%, it seems unlikely that expectations will overshoot this level.

Conclusion

Since the double-digit inflation of the 1970s, central banks have sought to reduce inflation and keep it low. Recent history teaches us that inflation has fallen too low. Raising inflation targets to 4% would have little cost, and it would make it easier for central banks to end future recessions.

References

Ball, Laurence (2013), "The Case for 4% Inflation", *Central Bank Review* (Central Bank of the Republic of Turkey), May.

Bernanke, Ben S (2010a), "The Economic Outlook and Monetary Policy", Jackson Hole Symposium, 27 August.

Bernanke, Ben S (2010b), "Testimony before the Joint Economic Committee of Congress", 14 April.

Blanchard, Olivier, Giovanni Dell'Ariccia and Paolo Mauro (2010), "Rethinking Macroeconomic Policy", IMF Staff Position Note SPN/10/03.

Keynes, John M (1936), *The General Theory of Employment, Interest and Money*, Macmillan.

Krugman, Paul R (1997), *The Age of Diminished Expectations: US Economic Policy in the 1990s*, MIT Press.

Mishkin, Frederic S (2011), "Monetary Policy Strategy: Lessons from the Crisis", NBER Working Paper #16755.

Rudebusch, Glenn D (2009), "The Fed's Monetary Policy Response to the Current Crisis", FRBSF Economic Letter 2009-17.

How are inflation targets set?

Roman Horváth and Jakub Mateju

Charles University; CERGE-EI and Czech National Bank

How are inflation targets set and why do they differ from country to country? This column suggests that macroeconomic characteristics such as inflation, inflation volatility, GDP growth, and foreign inflation matter for the process of inflation target setting. It also argues that central bank credibility is important but that the role of central bank independence and government political orientation is limited.

In the last 20 years, inflation targeting has become the monetary policy of choice in about 30 industrialised and emerging economies. Inflation targeting is characterised by an explicit numerical target for inflation and the fluctuation band for inflation. Many commentators have focused on various aspects of inflation targeting; most notably, whether inflation targeting represents a successful monetary policy regime and whether inflation targeting should be modified after the recent financial crisis in a way to reflect greater financial stability considerations (Walsh 2009, Blanchard et al. 2010, Svensson 2011).

Still, very little attention has been given to the process of inflation target setting. Although the vast majority of policymakers believe that the inflation target for year-on-year inflation should be about 2%, inflation targets differ from country to country (see Figure 1) and are often revised.

Figure 1 Inflation targets for selected countries, as of 2010
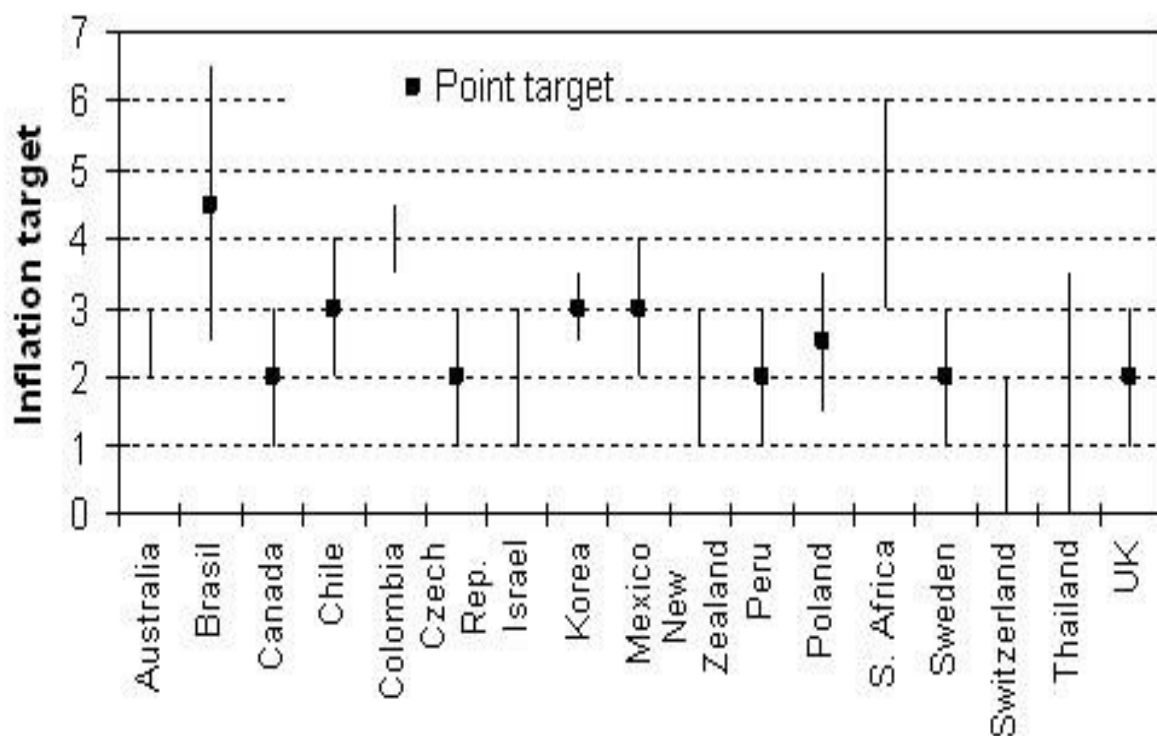
Source: Horváth and Mateju (2011).

An important question is which authority is responsible for setting the target; is it the central bank itself, the government, or both? In addition, there is very little systematic evidence on which factors matter for inflation target setting. In recent research (Horváth and Mateju 2011), we gather evidence on these two issues from official central bank and government publications, and from a questionnaire that we sent to about 20 inflation-targeting central banks.

We find that the most common practice is that inflation targets are set jointly by the government and the central bank. However, the practice when only one authority is responsible for setting the target is not rare. Government is solely responsible for setting the target in the UK and Israel, while the responsibility to set the target in the Czech Republic or Sweden belong to their central banks (see Table 1).

Although it is typically claimed that inflation targeting is characterised by a high degree of transparency, the amount of information about the process of inflation target setting and about the factors that authorities deem important differs largely from country to country. Some authorities only enumerate the benefits of low inflation, while other authorities discuss the inflation target determinants in great detail. Overall, the evidence suggests

that the authorities seem to consider many factors when they decide about the inflation target. Inflation and economic growth are among the most frequently stated factors. Measurement error of CPI inflation, deflation risk, foreign inflation and the zero interest rate lower bound are the often mentioned reasons for targeting low but positive inflation, as Table 1 documents.

Table 1 Inflation target setting and its determinants

Country	Who sets the target?	Determinants of inflation targets
Australia	Central bank and government jointly	Business cycle fluctuations
Brazil	Central bank and government jointly	n.a.
Canada	Central bank and government jointly	Costs of inflation, measurement error, wage rigidities, zero interest rate bound
Chile	Central bank	Deflation risk
Colombia	Central bank and government jointly	n.a.
Czech Republic	Central bank	Past inflation, inflation expectations, price convergence, wage rigidities, zero interest rate bound, measurement error
Finland	Central bank and government jointly	n.a.
Israel	Government	Measurement error, wage and price rigidities, zero interest rate bound
Mexico	Central bank	Foreign inflation
New Zealand	Central bank and government jointly	Past inflation, foreign inflation, target expectations
Peru	Central bank and government jointly	n.a.
Poland	Central bank and government jointly	Economic growth, Maastricht inflation criterion for euro adoption
South Africa	Central bank	n.a.
South Korea	Central bank and government jointly	Past inflation, economic fundamentals, monetary policy flexibility
Spain	Central bank and government jointly	n.a.
Sweden	Central bank	Past inflation, costs of inflation, risks of deflation, measurement error
Switzerland	Central bank	Measurement error

Thailand	Central bank and government jointly	Foreign inflation, economic growth
UK	Government	Sustainable growth

Source: Horvath and Mateju (2011).

Although surveying official publications and analysing the responses from the questionnaire is supposedly good to start with, there may be more factors that play a role in inflation target setting. These factors may be predominantly of institutional or political nature such as central bank credibility or central bank independence. And, in the case of less independent central banks, it might be that government party orientation influences inflation target setting.

An important issue for econometric analysis is to account for the fact that

- inflation targets are typically set as a range rather than as a point, and that
- not only do macroeconomic and other factors influence the inflation target, but also vice versa.

Accounting for these two issues, our results suggest that both a higher level and higher variability of inflation are associated with higher targets. The importance of inflation volatility highlights the concerns about the risk of deflation and the preference for higher inflation targets. Our results also show that policymakers consider economic growth important for setting the target. This somewhat contradicts the claims that the adoption of inflation targeting may be associated with increased output volatility and suggests that it is more reasonable to assume that actual inflation targeting is, in fact, flexible rather that strict. Finally, foreign inflation is positively associated with higher inflation targets, which supports the hypothesis that domestic inflation is largely driven by global forces. Our results also suggest that policymakers establish a wider target range for the inflation rate when the macroeconomic environment is less stable.

As regards the institutional factors, more credible central banks are found to set lower inflation targets. This is probably because they are more confident about maintaining the low inflation environment. We do not find that central bank independence and government party orientation help to explain the variation in inflation targets, possibly because inflation targeting central banks are already granted a sufficient degree of

independence from government's potential pressures.

To summarise, our research suggests that both the level and the range of inflation target correspond to domestic and foreign macroeconomic fundamentals and also that central bank credibility is vital for delivering low inflation.

References

Blanchard, O, G Dell'Ariccia, and P Mauro (2010), "Rethinking Macroeconomic Policy", *Journal of Money, Credit and Banking*, 42(s1):199-215.

Horváth, R and J Mateju (2011), "How Are Inflation Targets Set?", *International Finance*, forthcoming.

Svensson, L (2011), "Inflation Targeting", in BM Friedman and M Woodford (eds.), *Handbook of Monetary Economics*, Volume 3.

Walsh CE (2009), "Inflation Targeting: What Have We Learned?", *International Finance*, 12:195-233.

The impact of low-income economies on US inflation

Raphael Auer and Andreas Fischer

Swiss National Bank

13 June 2008

Research using a novel empirical technique suggests that import competition from low-wage countries dampens US producer price inflation for manufactured goods by more than 2 percentage points annually.

Have cheap imports from low-wage nations held down inflation in rich economies? Contrary to what customers at Wal-Mart, Toys"R"Us, or Best Buy observe every day, the academic literature has found surprisingly little evidence that trade with China and other poor, yet rapidly industrializing nations have had a large impact on prices in the rest of the world.

Is China exporting deflation?

In an influential study, Stephen Kamin, Mario Marazzi, and John Schindler (2006) ask whether China is "exporting deflation" to the United States, a question answered with a definitive no. Imports from China, they find, have a much smaller effect on US import prices than expected and no detectable impact on US producer prices. Related studies for Austria, Norway, Japan, the United Kingdom, and other countries report similar findings.

Identifying the effect of import competition on prices is difficult, however, due to the problem of distinguishing supply and demand shocks. For example, winter jackets in US got cheaper when quotas on imports from China and India were removed. Nevertheless, if demand was simultaneously increased by a cold winter, the equilibrium price would not necessarily decrease. Yet it is exactly the supply side that we must identify if we want to know how much dearer jackets would have been without the cheap imports. Because current studies cannot identify the supply and demand shocks that cause changes in trade flows, they cannot establish the true effect of import competition on prices and inflation.

The empirical literature of international trade is well aware of the simultaneity of supply and demand and, therefore, utilizes one-time tariff reductions to identify the causal effect of trade; see for example Daniel

Trefler's (2004) work on the effect of NAFTA on Canadian industry. Unfortunately, large tariff reductions are rare and the literature has yet to find a suitable event that led to a substantial increase of imports from low-cost producers.[1]

Figure 1: U.S. Imports Originating from Low-Income Countries
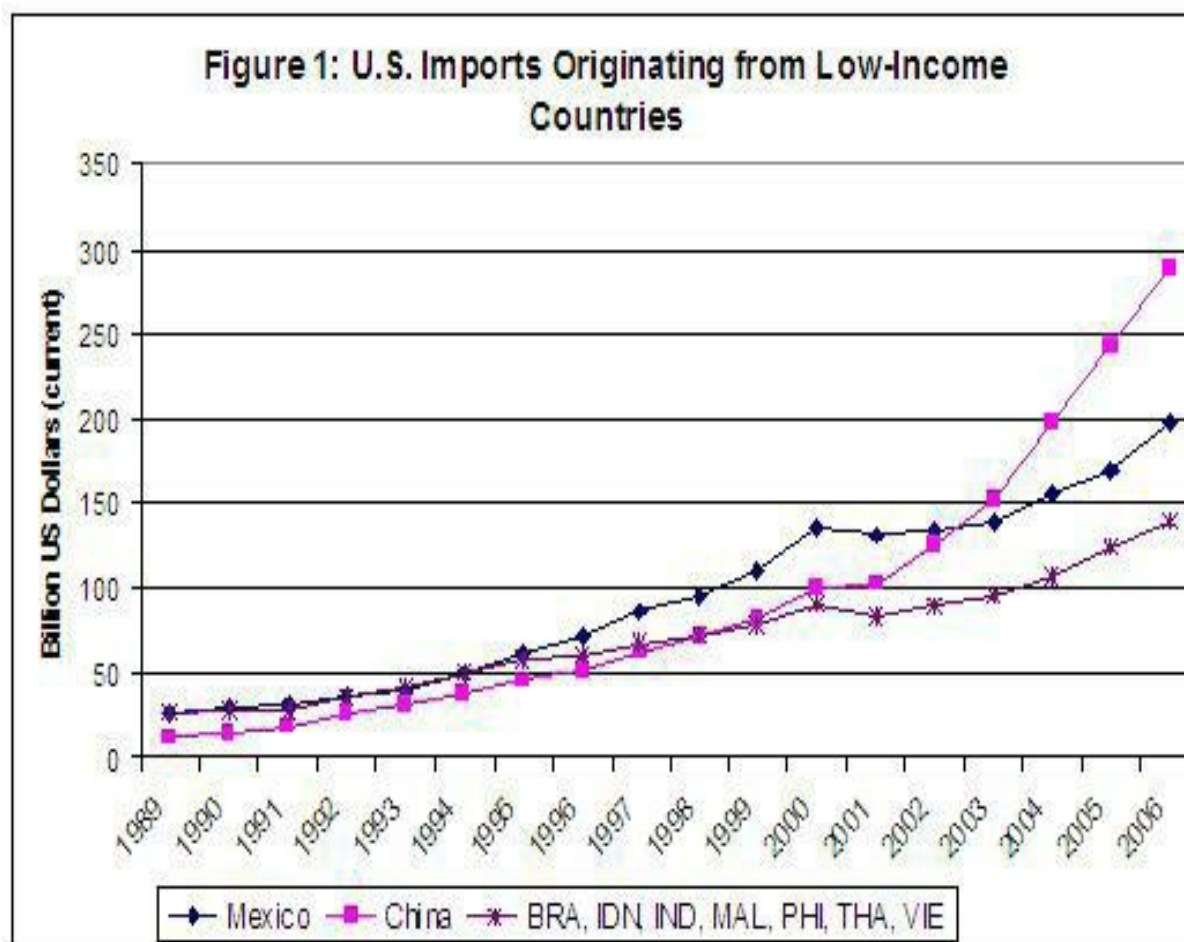
In a recent study, we develop a new methodology to establish the causal effect of imports from nine low-income countries on US inflation (Auer and Fischer 2008). The nine countries we examine are China, Brazil, Indonesia, India, Malaysia, Mexico, Philippines, Thailand, and Vietnam. In 2006, these nine low-income countries accounted for imports worth more than 600 billion dollars, equivalent to one third of all US imports or 5.5% of US GDP (see Figure 1).

Identifying the effect of import competition

At the heart of our argument lies the simple observation that when labour abundant nations grow, their exports tend to increase most in sectors that intensively use labour as a factor of production. US imports originating from low-income countries are highly concentrated in labour intensive

sectors such as textiles or toys (see Figure 2).[2] In our study, we document that this relation also holds in terms of changes. If a low-income country's output capacity grows, its exports increase most in labour intensive sectors.

This observation gives us an empirical lever on supply-side changes that does not depend upon the price. With this lever, we can separate out the supply and demand effects (i.e. it gives us an instrumental variable).

Figure 2: Low-Income Country Import Share in 84 U.S. Industries (4-Digit NAICS Industries)
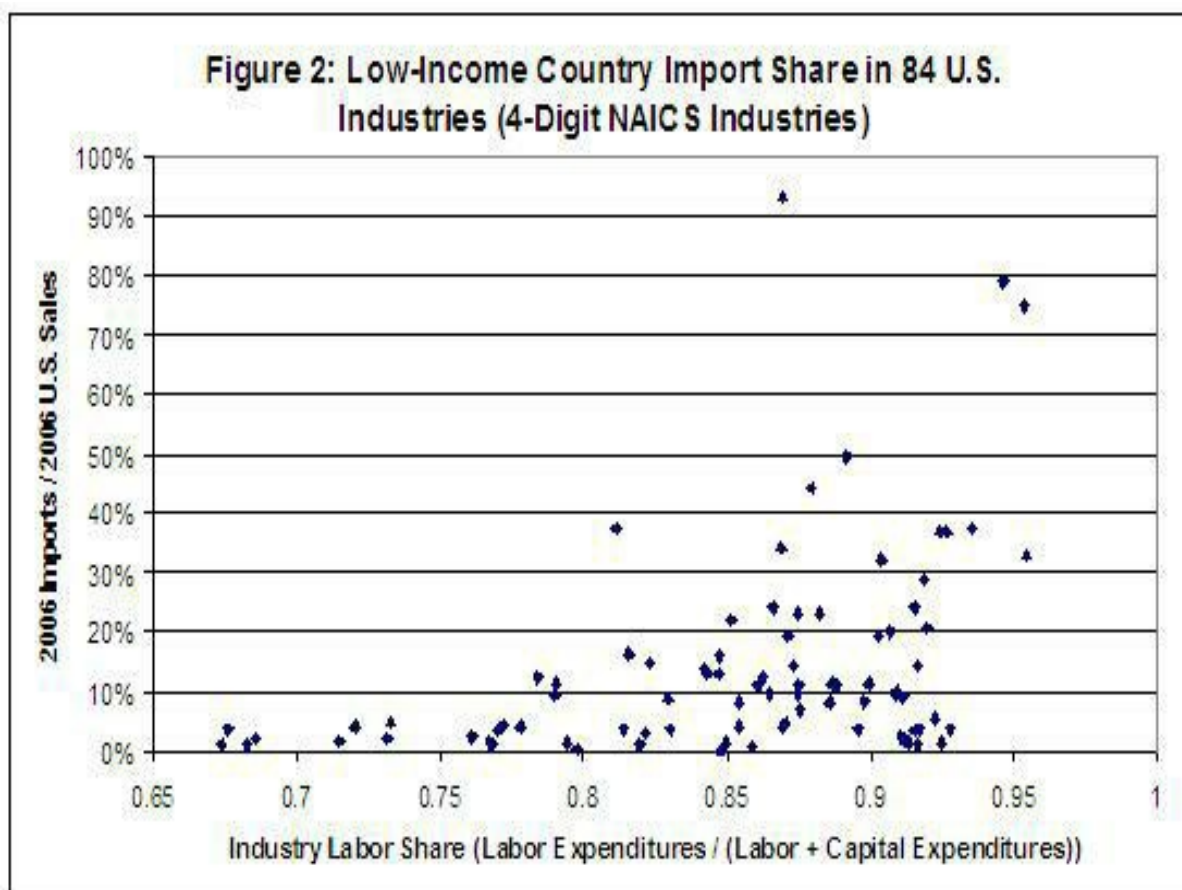
Building on the fact that the change in imports at the sector level is related to the sector's labour intensity, we then estimate the effect of import competition from low-wage countries on US producer prices in a framework that controls for both sector-specific trends and aggregate shocks. When the nine low-income countries grow above trend, US imports in labour intensive sectors increase relative to US imports in capital intensive sectors. This difference in the reaction of sectoral import volume to low-income country growth is utilized to establish the effect of import volume on US prices.

In a panel covering 325 manufacturing industries from 1997 to 2006, we find that trade with low-income countries has had a profound impact on

US relative prices. For example, we find that if the US market share of low-income countries increases by 1%, prices in the sector decrease by between 2% and 3%. We next decompose this price-dampening effect of imports into the contributions stemming from productivity growth, mark-up reductions, and cost changes.

Cheap imports' impact on productivity

By and large, the dominant channel through which imports have affected US industry is via inducing sectoral productivity growth. In our estimations, a one percentage point increase in the US market share of low-income economies is associated with an increase in productivity by around two percentage points. Decreasing mark-ups can explain the remainder of the drop in prices. Surprisingly, we do not find any evidence that imports affect the cost of intermediate goods used in production or reduce the wages of unskilled workers.

From changes in relative prices to inflation

The conclusion of our study is that globalization has had a more profound impact on US relative prices and productivity than is commonly assumed. Our results, however, have to be interpreted with care when making statements on the effect of low-income countries on aggregate US inflation and productivity. Due to the difference-in-difference type identification, our methodology abstracts from factors such as the increase in global raw material prices that growth in emerging economies has brought about. Given these limitations, a rough estimate is that from 1997 to 2006, imports from low-income countries reduced the US PPI inflation rate in the manufacturing sector by about two percentage points (each year). China accounts for over half of the total effect.

While manufacturing prices make up only a fraction of the PPI inflation index and producer price inflation is passed through only imperfectly to consumer prices, the effect of imports from emerging economies should not be neglected and needs to be addressed in monetary policy decisions.

What lies ahead

The overall effect of relative price shocks on aggregate inflation ultimately depends on the response of the central bank (see for example Mishkin 2007 or Trichet 2008). Imports from low-income countries had a dampening effect on inflation in the booming US economy of the last decade, thus allowing - among other factors - monetary policy to be relatively loose. At this juncture, core inflation has finally caught up and

may stay elevated for a prolonged period: monetary tightening will crowd out cheap imports from low income countries and, consequently, have a smaller effect on inflation than would be the case in the absence of trade.

References

Auer, R and A M Fischer (2008), "The Effect of Trade with Low-Income Countries on US Industry", CEPR Discussion Paper 6819.

Kamin, S B, M Marazzi and J W Schindler (2006), "The Impact of Chinese Exports on Global Import Prices", *Review of International Economics* 14(2), pp. 179-201.

Mishkin, F S (2007), "Globalization, Macroeconomic Performance, and Monetary Policy", Held at the Domestic Prices in an Integrated World Economy Conference, Board of Governors of the Federal Reserve System, Washington, D.C.

Trefler, D (2004), "The Long and Short of the Canada-US Free Trade Agreement", *American Economic Review* 94(4), pp. 870-895.

Trichet, J-C (2008), "Globalization, Inflation and ECB Monetary Policy", Speech held at the Barcelona Graduate School of Economics, Barcelona, 14 February 2008.

1 Although the accession of Mexico to NAFTA had a sizeable effect on Mexico, it did not affect the much larger United States to an extent measurable in nationwide data. Similarly, China's accession to the WTO in 2001 reduced average tariffs by less than two percentage points and did not result in a significant effect on the US economy.

2 In Figure 2, labour intensity is defined as average total expenditures for labour during 1997-2006 divided by average total expenditures for capital and labour during the same period. Low-income country market share is defined as imports from the nine economies in a given sector divided by total US sales in the respective sector.

What is inflation targeting?

Stephen Cecchetti

Bank for International Settlements

1 July 2006

Inflation targeting is best practice in 21st-century monetary policymaking. With some of its key academic proponents – Messrs. Bernanke and Mishkin – at the US Fed, there is some hope that the US will join the ranks of explicit inflation targeters.

Last week's announcement that Frederic Mishkin will join the Federal Reserve Board chaired by Ben Bernanke marks a turning point in US monetary policy. We can expect to see improvements in both the internal decision-making and external communication of the Federal Open Market Committee. The result will, I believe, be increased clarity and improved performance.

Together, Messrs. Bernanke and Mishkin have provided much of the intellectual foundation for a monetary policy framework called "inflation targeting". Begun in New Zealand nearly 20 years ago, and now used in two dozen countries, including Australia and Mexico, this bypasses intermediate targets and focuses directly on the objective of low inflation. Experience with inflation targeting is universally positive. No country that has adopted the framework has turned back. It has weathered the test of financial sector shocks, commodity price shocks, big exchange rate movements and more. Importantly, different types of disturbances require different responses and inflation targeting has shown it can accommodate this.

Inflation targeting does not ignore fluctuations in such things as growth, employment and long-term interest rates. As Mervyn King, governor of the Bank of England and one of the earliest proponents of inflation targeting, said some years ago, any successful monetary policy framework must combine an inflation objective with a response to shock. The question is: following a disturbance to the economy, how fast should policymakers bring inflation back to its long-term objective? The faster they go, the more aggressive the interest rate reactions, the larger the fluctuations in growth and employment. The rate of response depends on both societal preferences for inflation versus output stability and the type of disturbance. Importantly, because the economic landscape is constantly

changing, inflation targeting does not lead to a hard-and-fast rule for interest-rate setting - a substantial element of judgment is involved.

Inflation targeting enhances long-term economic performance for a host of reasons. First, an agreed and publicly announced objective focuses the monetary policy committee's internal debate. It is clearly easier to make a decision when everyone agrees on the objective. Second, by providing a natural language to explain monetary policy actions, inflation targeting enhances communication with politicians, financial market participants and the public at large. Third, and most importantly, it creates an environment in which everyone believes policymakers will keep inflation low, anchoring long-term inflation expectations. This means wage increases remain contained and a vicious cycle from higher prices to higher wages to yet higher prices cannot get started.

My guess is that Mr. Bernanke sits in his office thinking that if only he had an explicit inflation objective, there would be much less concern over his inflation-fighting credentials. Alan Greenspan, his predecessor, was successful with only a clear but implicit commitment. But the transition to a new Fed chairman, coinciding with energy price increases and dollar depreciation, has created unnecessary uncertainty. The touchstone of an explicit medium-term inflation target would give Mr. Bernanke and his FOMC colleagues a natural vocabulary for communicating their actions. They could make clear, for example, their belief that inflation is likely to return to their objective in the next year or two, thereby avoiding tightening policy just to appear credible.

An explicit objective combined with statements about economic analysis would, as Mr King noted in a speech last month, make guidance about the near-term path of the policy-controlled interest rate less necessary. While central bankers need a sense of what policy is "neutral", and an estimate of how long it will take to get there, their month-to-month decisions are driven by data as they arrive. By contrast, the decisions of individuals and companies rely not on the exact short-term interest-rate path but on the expectation that policymakers will meet their long-term inflation objective.

Inflation targeting is best practice in 21st-century monetary policymaking. It is my hope that chairman Bernanke, governor-designate Mishkin and their Federal Reserve colleagues can convince Congress that low and stable inflation provides the foundation for maximum sustainable growth and employment, and in doing so join the growing ranks of inflation-targeting central banks.

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Chapter 6 The Open Economy

Equilibrium exchange rates

William R. Cline, John Williamson

Peterson Institute for International Economics

18 June 2009

Large external imbalances persist and remain a significant concern. This column estimates a set of medium-run "fundamental equilibrium exchange rates" compatible with moderating external imbalances that might guide international policy efforts. It says that the US dollar is overvalued and the Chinese renminbi is undervalued.

Most writing about exchange rates forecasts how exchange rates are about to change. Most of these writings are not worth the paper they are written on – short-run exchange rate movements are, to a good approximation, a random walk (Meese and Rogoff 1983). We believe it to be socially more valuable to attempt to evaluate what exchange rates could help to support a viable medium-run equilibrium position for the real economy. That is the purpose of the estimates of "fundamental equilibrium exchange rates" we prepare (of which the latest are in Cline and Williamson 2009).

Assumptions

In undertaking such an exercise, one needs to make assumptions both about the course that external balances would take if policy did not attempt to address these disequilibria, and assumptions about the objectives that should be sought by policy (as well as assumptions built into the model deployed). In our most recent work we have employed as a frame of reference most of the assumptions reflected in the IMF's latest World Economic Outlook for 2012. Unfortunately we think the IMF is too complacent in forecasting that at the exchange rates of last March the US current account deficit would basically stabilise at 3% of GDP (the forecast for this year) rather than suffer a new deterioration, and that the oil price would stabilise next year at a real level of $62.50. We therefore modified the 2012 current account forecasts of the IMF model in two respects – by adding to the IMF forecast for each country other than the US a sum equal to their proportionate share of the increased US deficit that would materialise under Cline's forecast, and the impact of the higher oil price. After adjustment to secure international consistency, this gave us forecasts of actual current imbalances.

The key assumption regarding objectives is what current account target should be pursued by each country. We employed two rules to determine these, based on the philosophy that countries should be left alone except where their decisions either impinge on the rights of others or jeopardise their own stability. In general we argued that countries should strive to keep imbalances (surpluses and deficits) under 3% of GDP. Reflecting the philosophy, countries with smaller forecast adjusted imbalances were assumed to be within the target range and require no adjustment. However, we recognised that countries with large inherited stocks of foreign assets or liabilities might have difficulty in achieving this aim, so countries with a forecast imbalance in excess of an absolute 3% of GDP were treated as also within the target range provided that the a larger imbalance did not threaten to further increase the absolute ratio of net foreign assets to GDP. This gave figures for presumed desired current imbalances (see Table A at the end of this column). The gap between each country's forecast current account balance and the target limit (either 3% of GDP or net foreign assets-based) constituted the desired change in current account balance to be accomplished.

The model employed to translate assumptions about the difference between forecasts and desirable outcomes into exchange-rate estimates was Cline's work, notably his estimates of impact parameters (which measure the impact of a change in real exchange rates on current account outcomes) and his Symmetric Matrix Inversion Model (SMIM) (Cline 2005, 2008). The desirable changes in current account outcomes and the impact parameters gave desired changes in real effective exchange rates.[1] The purpose of the SMIM is to convert the set of desired changes in real effective exchange rates into a set of changes in dollar exchange rates.

Dollar overvaluation, renminbi undervaluation

The table shows the results of these exercises for the 29 countries for which we formed estimates.[2] The target changes in the real effective exchange rate are against the March 2009 base used in the IMF forecasts. Because the dollar has declined significantly since then (by about 5% on a trade-weighted basis), in some cases the extent of correction needed now is considerably smaller, and some currencies have even overshot.

The euro area and even the UK are still found to be marginally undervalued against the dollar, though both are slightly overvalued on a multilateral basis. The same is true for Japan and indeed a majority of the small currencies. Both of the immediate neighbours of the US, Canada and

Mexico, are now estimated to be somewhat overvalued against the dollar, even though in March the Canadian dollar was undervalued. The only other currencies found to be more than marginally overvalued against the US dollar are the Australian dollar and the South African rand.

The main counterpart to the overvalued dollar is the undervaluation of the Chinese renminbi, along with a few of the smaller Asian currencies. We are somewhat nervous because our estimate (based on the figure of RMB 4.88 to the dollar) of Chinese undervaluation is even larger than it was a year ago (RMB 5.81 to the dollar), despite the fact that the RMB rode the dollar up by 14% in effective terms in the intervening year. It may be that our estimate is now too large because the IMF's projection of the Chinese surplus seems not to have declined despite the RMB's real appreciation, although the fall in commodity prices in the past year has presumably worked in China's favour. But all the other potential biases, notably the way of formulating the Chinese current account target as a substantial surplus rather than the deficit suggested by the FDI inflow, are in the direction of minimising estimated undervaluation. Our analysis is one more piece of evidence that the major macroeconomic imbalance in the world today stems from China's exchange-rate policy.

Moderating external imbalances

Whatever one thought about the importance of moderating external imbalances a year or two ago, one's concern about the importance of reducing imbalances should be greater today. We are not among those who argue that the primary cause of the financial crisis was a savings glut in Asia – China's surpluses did not force the quants to invent asset-backed securities, the rating agencies to overrate mortgage-backed securities, AIG to take a position on only one side of collateralised debt swaps, nor Lehman and others to leverage at 30 to 1.

But the system is far more fragile than we had thought two years ago. Large external imbalances can only aggravate, not moderate, fragility in the financial system. One sign of that fragility is Chinese nervousness about whether it should continue to build up US Treasury securities. Moreover, in a world economy fighting global recession, it is especially important to avoid the competitive devaluations that spurred increasing conflict and protection between the two world wars and led to the Bretton Woods system of fixed exchange rates. A meaningful pursuit of reduction in international imbalances and corrective movement in exchange rates has been on the international agenda for some time now, including in the

IMF's mandate to provide multilateral surveillance. It is in this context, then, that we prepared this second set of "fundamental equilibrium exchange rates" estimates, and we hope that they will provide a useful input into international policy efforts toward reducing imbalances.

References

Cline, William R. (2005). *The United States as a Debtor Nation.* Washington: Institute for International Economics.

Cline, William R. (2008). Estimating Consistent Fundamental Equilibrium Exchange Rates. Working Paper 08-6. Washington: Peterson Institute for International Economics.

Cline, William R., and John Williamson. (2009). 2009 Estimates of Fundamental Equilibrium Exchange Rates. PB09-10. Washington: Peterson Institute for International Economics.

Meese, R.A., and K. Rogoff (1983). "Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample?" *Journal of International Economics* 14, 3-24.

Appendix

Table A Key results

	Target CA (as percent of GDP)	Target Change in REER From March 2009 base (percent)	Recent Dollar Exchange Rates		
			FEER equivalent	Average of June 2-June 8[a]	Percent change needed
Pacific					
Australia[b]	-3.1	-12.2	0.73	0.80	-9.5
New Zealand[b]	-5.1	-0.7	0.62	0.64	-2.8
Asia					
China	4.2	21.2	4.88	6.84	40.3
Hong Kong	7.3	-0.3	6.06	7.75	27.9
India	-2.8	-5.2	44.8	47.4	5.9
Indonesia	-1.1	-0.6	9707	10114	4.2
Japan	1.6	-1.5	82	97	18.1
Korea	2.1	-0.5	1197	1251	4.5
Malaysia	3.2	17.7	2.63	3.50	33.2
Philippines	0.2	-0.4	40.0	47.3	18.2
Singapore	7.5	10.3	1.15	1.45	26.3
Taiwan	7.5	13.6	25.2	32.6	29.4
Thailand	-1.0	-0.4	29.5	34.4	16.7
Middle East/Africa					
Israel	0.5	-0.5	3.69	3.93	6.7
South Africa	-2.8	-13.4	9.48	8.06	-15.0
Europe					
Czech Republic	-2.8	-0.4	17.9	19.1	6.9
Euro area[b]	-1.0	-1.2	1.53	1.41	8.3
Hungary	-2.6	-0.4	198	202	2.0
Poland	-2.9	-3.6	3.10	3.20	3.0
Sweden	3.2	12.4	6.62	7.64	15.3
Switzerland	5.4	12.6	0.90	1.07	19.8
Turkey	-2.8	-0.6	1.46	1.54	5.5
United Kingdom[b]	-0.5	-0.7	1.65	1.62	1.5
Western Hemisphere					
Argentina	2.6	-0.7	3.17	3.76	18.4
Brazil	-1.2	-1.1	2.02	1.97	-2.4
Canada	3.2	2.3	1.18	1.10	-6.2
Chile	-2.8	-6.4	549	576	4.8
Colombia	-1.0	-0.9	2255	2126	-5.8
Mexico	2.2	-0.7	14.0	13.3	-5.5
United States	-2.8	-17.7	1.00	1.00	0.0

Notes:
a: Data are Daily Averages
b: Exchange rates are dollars per currency. All others are currency per dollar.

1 The current account targets and the changes in real effective exchange rates relate to the period for which the IMF made forecasts, which was March of this year. But from this we calculated "fundamental equilibrium exchange rates"-consistent dollar exchange rates which (since this is

not an age of high inflation) can be assumed to have remained constant, thus permitting the comparisons with recent market exchange rates in the final columns of the table.

2 Four oil-exporting countries – Norway, Russia, Saudi Arabia, and Venezuela – are included in the analysis, but "fundamental equilibrium exchange rates" were not estimated since these depend critically upon savings strategies and the oil price and we have no credible forecasts of these variables. The rest of the world was forced to have zero change in its current balance, but there is no corresponding currency.

Is China's currency undervalued?

Helmut Reisen

OECD

16 April 2010

Many economists cite the undervalued renminbi as a major cause of global imbalances and a contributing factor to the global crisis. This column says the undervaluation results mainly from the Balassa-Samuelson effect and that a rebalancing of the world economy will need reforms in China's social, pension and family policies rather than currency appreciation.

Most economists agree that allowing global current account imbalances, notably the US deficit and the Chinese surplus, and their accompanying capital flows to accumulate contributed to the over-leveraging and under-pricing of risk that triggered the crisis. This was recognised at the Pittsburgh Summit in September 2009 where the G20 leaders announced the creation of a new framework to coordinate and monitor national economic policies in order to reduce global imbalances and prevent them from building up in the future.

Finding the right exit door from excessive global imbalances – and defining the appropriate policy responses – will require clear understanding of their causes. If the causes were essentially monetary, then exchange rate policy responses (such as appreciation of the renminbi) will be appropriate. If, in contrast, the global imbalances were primarily structural in nature, then structural policy responses, such as obliging state enterprises to pay taxes or dividends, will be required.

The current debate over "global imbalances" essentially reflects the surpluses in the current accounts of around a hundred countries, most of them classified as developing or emerging, that have grown up in response to the US current-account deficit – the excess of US domestic investment over US national savings. The position is summarised in Figure 1.

Figure 1 Global imbalances in the current account
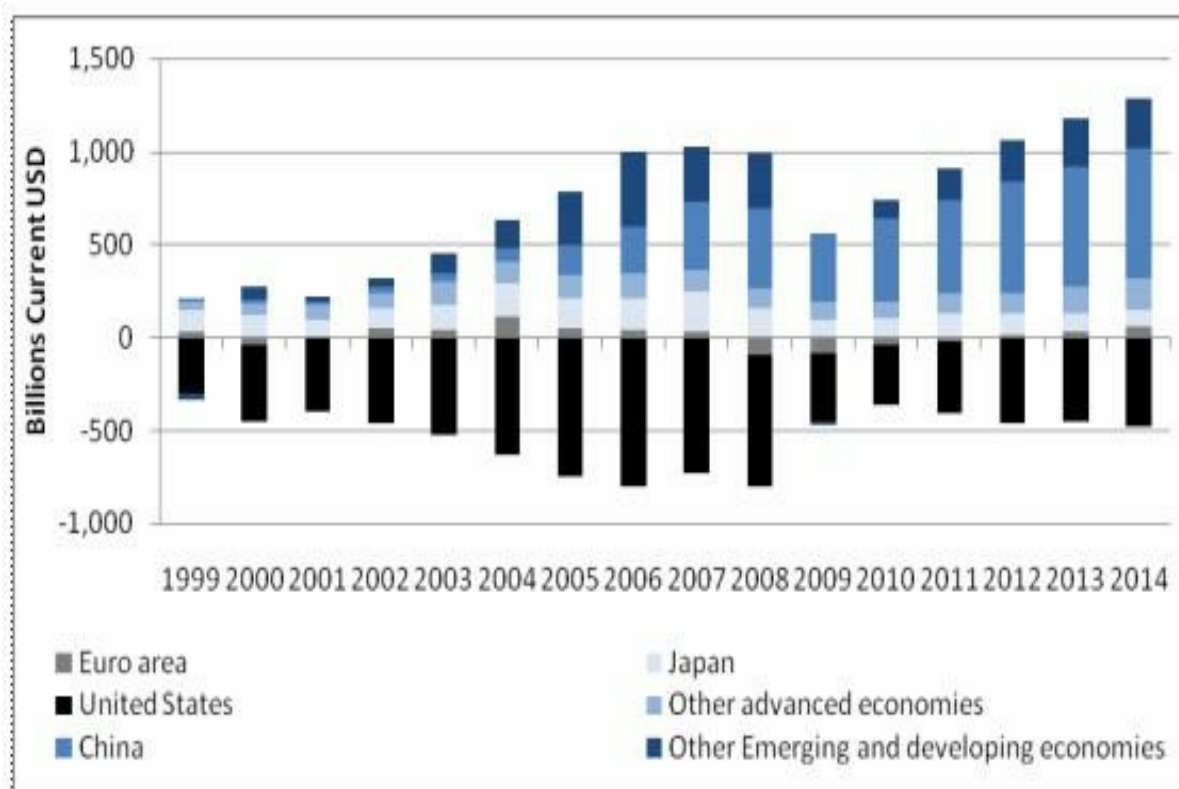
The world is bigger than China and the US

The US outspent its national income by an accumulated $4.7 trillion – equivalent to 47.3% of GDP – from 2000 to 2008. Over the same period, China's accumulated surplus was $1.4 trillion. That is huge by any measure, but by itself only enough to fund some 30% of the US deficit. To fill the gap the US was absorbing three-quarters of world's savings until the collapse of 2008. Another sizeable imbalance has been the current-account surpluses of oil exporters, notably in the Gulf region, where the effect on oil prices of the voracious appetites of the Asian giants has created a second wave of asset build-up.

There is a clear political focus on the bilateral US-Chinese trade balance, but bilateral imbalances are of no economic interest – there are more than two countries in the world. Even if analysed as a bilateral transfer problem between the US and China, the exchange-rate adjustment needed to produce sustainable current account balances may be limited. The US is unlikely to face a secondary transfer problem in terms of pressured export prices, as it is broadly the only debtor country to "affect the transfer".

How much to revalue – if at all?

Generally, the required scope of dollar devaluation relative to the renminbi will depend on the degree to which lowered absorption in the US and higher absorption in China result in decreases and increases, respectively, in the demand for the same goods. The rising middle class in China and other emerging markets will gradually add to global consumption, presumably along similar preferences as in the advanced countries (Kharas 2010).

China's surpluses and growing official reserves have raised the volume of calls for China to let its exchange rate appreciate in order to rebalance the world economy. For example, Cline and Williamson (2009) have recently estimated "fundamental equilibrium exchange rates" compatible with moderating external imbalances. They estimate that the required appreciation for the renminbi is more than 20% in real effective terms and 40% relative to the dollar. Ferguson and Schularick (2009) use unit manufacturing wage costs to estimate the degree of undervaluation of the renminbi relative to the dollar and come up with figures between 30% and 50%.

The OECD (2010) has recently recommended a resumption of greater exchange-rate flexibility in order to stimulate consumption and strengthen inflation targeting, acknowledging that more flexibility would translate in practice into renminbi appreciation. The fact that the People's Bank of China has consistently intervened in the foreign-exchange market – as evidenced by its accumulation of foreign exchange reserves – suggests that the pressure on the renminbi is upward. In addition, capital outflows remain restricted both legally, by regulation, and practically, by expectations of future appreciation.

Uncertain effect

It is far from assured, however, that an appreciation of the renminbi would impact current account imbalances. Using a large data set, spanning 170 countries and the period 1971-2005, Chinn and Wei (2008) find no robust evidence that the speed of current-account adjustment rises with the degree of flexibility of an exchange-rate regime. Indeed, as Figure 2 shows, over the past decade China's real effective exchange rate has moved broadly in line with the four other BIICS countries (Brazil, India, Indonesia, and South Africa). Except China (which had a surplus of 9.8% of GDP in 2008), no other BIICS country has run a large surplus on the current account of its balance of payments; indeed, South Africa booked important deficits, 7.4% of GDP in 2008.

Figure 2 BIICS real effective exchange rates (2000 = base 100)
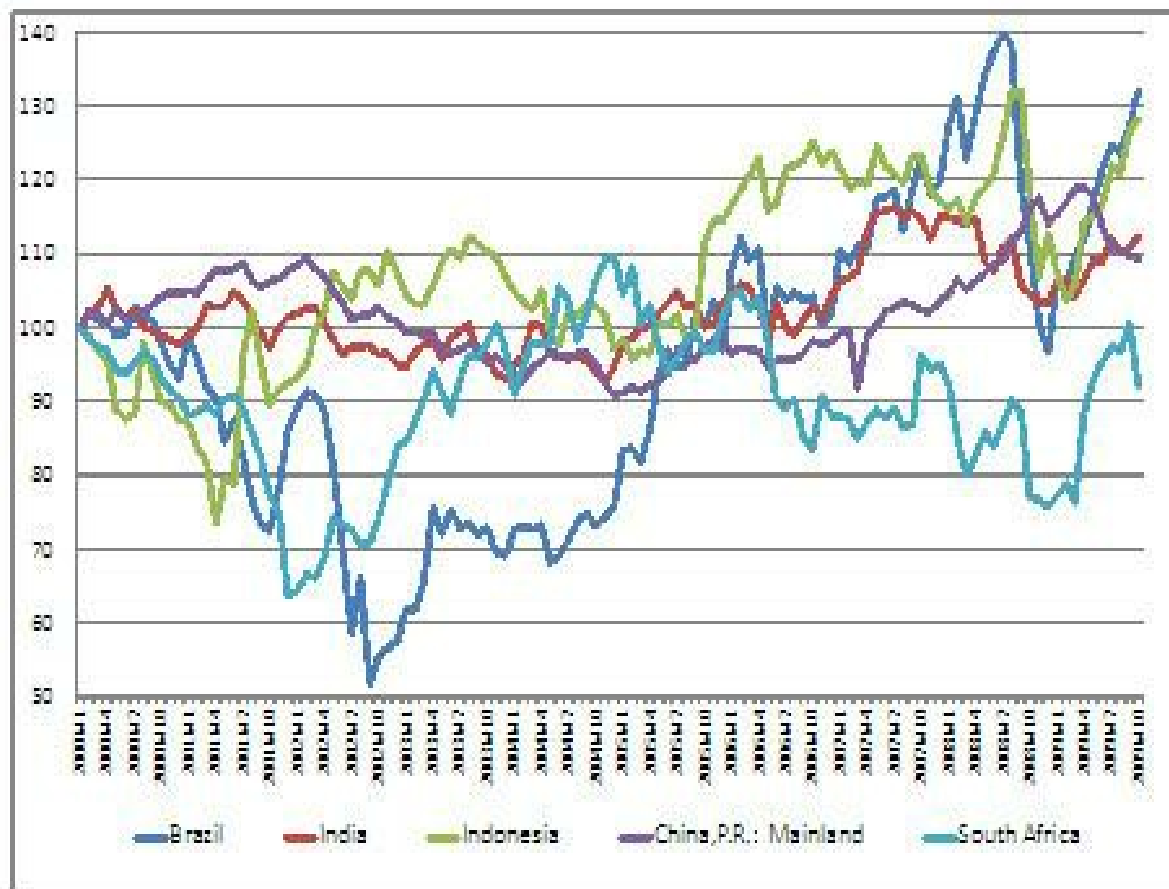
Appreciation is forthcoming

To be sure, poor-country currencies are normally undervalued in terms of purchasing power parity. In fact, poorer countries do have undervalued exchange rates (due to the Balassa-Samuelson effect), and convergence will imply considerable correction of that undervaluation. Services (and wages) are cheap in poor countries and expensive in rich countries, while prices for internationally traded goods are roughly equalised in a common currency. When the productivity in traded goods rises (while productivity growth for haircuts and other services are very limited), more income is generated and spent on services. The price ratio of non-traded to traded goods will rise. In other words, the real exchange rate will appreciate. Hence, part of the undervaluation ascribed to China's currency results from market forces that make non-traded goods relatively cheap in poor countries, rather than from deliberate currency manipulation by China's authorities.

While growing and converging fast, China is still poor. Its per capita income in 2008 was 6.2% of the US's at market rates and 12.8% at purchasing power parity (PPP)-adjusted rates, according to the latest World Development Indicator data. Figure 3 relates the log of real per capita GDP as a fraction of the US level and the deviations of current market exchange rates per dollar from PPP rates for the year 2008. It shows strong support for the Balassa-Samuelson effect and suggests a well-determined elasticity (0.2) by which the undervaluation of the currency will be eroded during the catch-up toward the US per capita income level. Real exchange rates can thus be expected to appreciate as economies grow, approaching PPP exchange rates as economies converge with US living standards, as posited by the Balassa-Samuelson effect.

This analysis suggests that while (in 2008) the renminbi was undervalued by about 60% in PPP terms, the undervaluation in 2008 was only 12% against the regression-fitted value for China's income level. The undervaluation of the renminbi widened by roughly 3 percentage points in 2009 as a result of further rapid convergence of China's per capita income growth relative to the US. Both India and South Africa (which had a current-account deficit) were more undervalued in 2008 – by 16% and 20% respectively, according to the Balassa-Samuelson benchmark.

Figure 3 Per capita income convergence and real exchange-rate appreciation
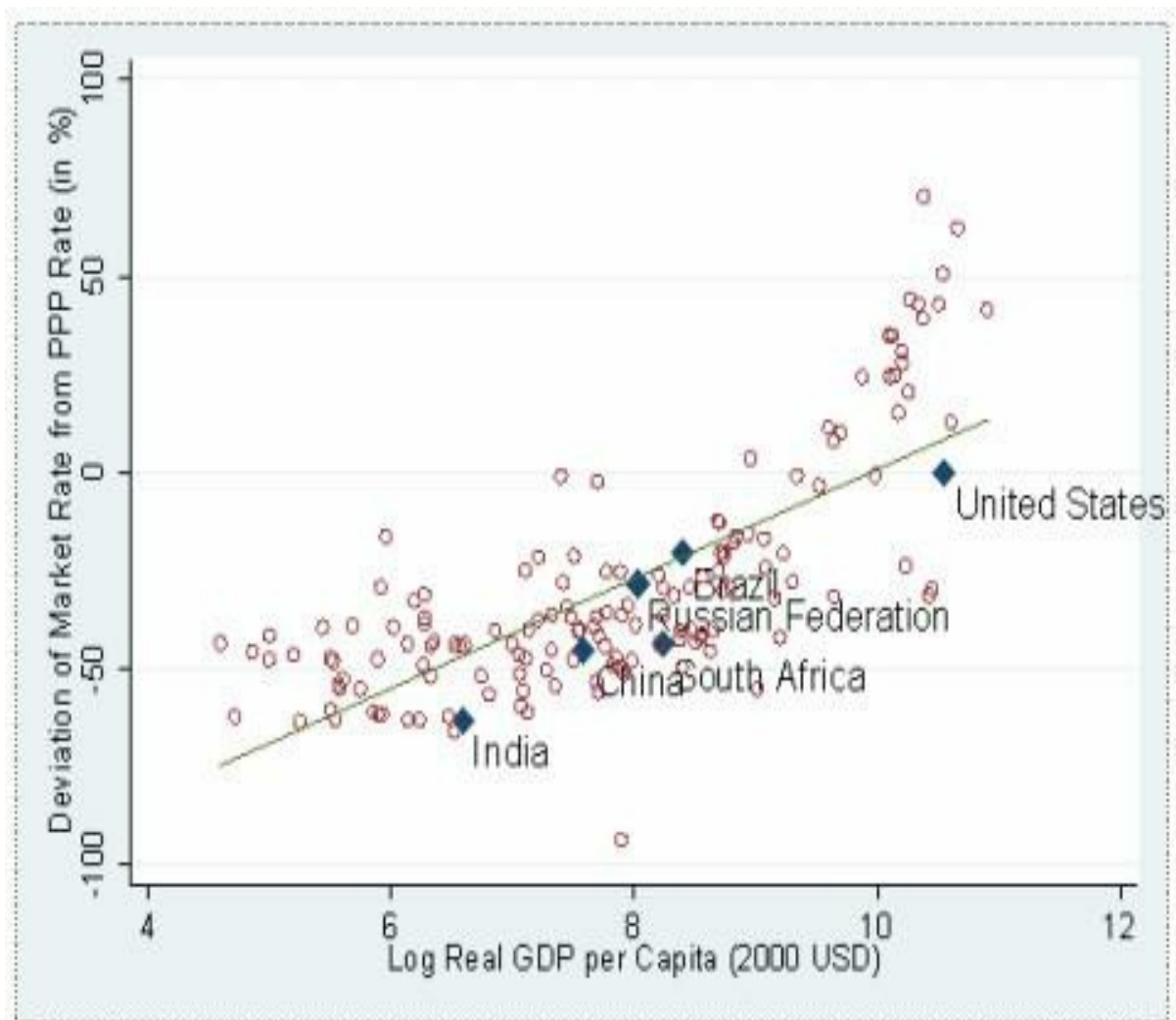
Source: OECD Development Centre

Policy implications

While the Balassa-Samuelson effect ignores the extent of current-account imbalances and net foreign asset positions, it points to several policy implications for China and the world economy:

- The major part of the undervaluation ascribed to China's currency results from market forces that make non-traded goods relatively cheap, rather than from the currency-management policies of the Chinese authorities alone;
- A rapid convergence of per capita income to rich-country levels will maintain pressures for a real effective currency appreciation either through nominal exchange-rate upward adjustments or through positive inflation differentials with rich-country trade partners. Put simply, the Balassa-Samuelson effect suggests nominal upward

flexibility for the renminbi in line with income convergence if inflationary pressures and asset bubbles are to be contained;

- Any resulting real currency appreciation implies valuation losses on official foreign-exchange reserves in renminbi terms since these are overwhelmingly held in rich-country currencies. China is an "immature" lender in that it cannot yet lend renminbi on the international markets. It therefore has an interest in an orderly reduction of the total level of its foreign exchange reserves through enhancing policies which further encourage outward investment and diversification into non-financial assets

An array of socio-structural explanations for China's saving surplus (and thus its impact on global surplus and deficits) points to the insufficiency of monetary tools to redress global or bilateral imbalances:

- The Governor of the People's Bank of China, Zhou Xiaochuan (2009), explains that following the reforms during the 1990s, China's "iron-bowl" system (promising lifetime employment and welfare) no longer existed and state-owned enterprises stopped providing free pensions and housing. Costs and risk were therefore transferred to households since no effective social security system was available. As the real cost of labour takes time to be reflected in the cost-base of an enterprise, the state-owned enterprises sector became highly profitable and increased its savings while decreasing its contribution to social security1. Corporate savings were further bolstered by the fact that until recently the state-owned enterprises did not have to pay dividends or taxes.
- Wei and Zhang (2009) and Wei (2010) for instance highlight the increasing imbalance between the numbers of male and female children born in China. For every 100 girls born today there are 122 boys, presumably as a result of the "one-child policy", pre-natal ultrasound screening possibilities and the reduction in fertility. A skewed sex ratio is, it seems, fuelling a highly competitive "marriage market", pushing up the savings rate for all households (since even those not competing in the marriage market must compete to buy housing and make other significant purchases), driving up China's savings rate and with it global imbalances.
- The relative importance of the various drivers for savings has recently been tested empirically. Ma and Haiwen (2009) measured the relative importance of a range of variables on the evolution of

China's net foreign asset position – a result of its accumulated net saving surplus – over the period 1985-2007. The estimated coefficients for the real effective exchange rate of the renminbi and for financial development are both insignificant. By contrast, the ratio of domestic and external government debt to GDP and the youth dependency ratio (the proportion of the population under 15) are both highly significant.

Rather than focusing on, say, renminbi appreciation a structural rebalancing of the world economy will need reforms in China's social, pension and family policies with the motive of raising China's consumption rate. As emphasised recently by the OECD (2010), overcoming labour market segmentation, unifying pension rights, education and land rights , health care reforms and more fiscal solidarity are China's prime policy challenges.

References

Chinn, Menzie and Shang-Jin Wei (2008) "A Faith-based Initiative: Does a Flexible Exchange Rate Regime Really Facilitate Current Account Adjustment?," NBER Working Paper 14420.

Cline, William and John Williamson (2009), "Equilibrium Exchange Rates", VoxEU.org, 18 June.

Ferguson, Niall and Moritz Schularick (2009), "The End of Chimerica", Harvard Business School Working Paper 10-037.

Kharas, Homi (2010), "The Emerging Middle Class in Developing Countries", OECD Development Centre Working Paper. 285.

Ma, Guonan, and Haiwen Zhou (2009), "China's evolving external creditor wealth and rising creditor position", BIS Working Papers 286, BIS: Basel.

OECD (2010), *OECD Economic Surveys: China*, OECD, Paris.

Wei, Shang-Jin. and Xiaobo Zhang (2009), "The Competitive Saving Motive: Evidence from Rising Sex Ratios and Savings Rates in China", NBER Working Paper 15093.

Wei, Shang-Jin (2010), "The mystery of Chinese savings", VoxEU.org, 6 February.

Zhou, Xiaochuan (2009), "On Savings Ratio", Keynote address at the High Level Conference hosted by the Central Bank of Malaysia, Kuala

Lumpur, 10 February.

The real exchange rate and export growth: Are services different?

Barry Eichengreen and Poonam Gupta

University of California, Berkeley and CEPR; National Institute of Public Finance and Policy, Delhi

18 January 2013

Increasingly, services form a larger and larger share a country's exports. Do exchange rates matter as much for services and they do for goods exports? This column argues that they do. Distinguishing between traditional services (such as trade and transport, tourism, financial services and insurance) and modern services (such as communications, computers, information services) suggests that the effect of the real exchange rate is especially large for exports of modern services.

The role of exports in economic growth and, in turn, of the real exchange rate in export promotion features prominently in literature on development and globalisation (Rodrik 2009, Haddad and Pancaro 2010). Much of this literature dates, however, from an era when 'exports' meant 'exports of merchandise'. Today, 'exports' increasingly means 'exports of services'. This raises the question of whether the emphasis in the earlier literature on the importance of a competitively valued exchange rate for promoting exports carries over to this new environment.

In recent research, we find it does (Eichengreen and Gupta 2012). When we distinguish traditional services (trade and transport, tourism, financial services and insurance) from modern services (communications, computer, information and other related services), the effect of the real exchange rate is especially large for exports of modern services. We find that the effect of real exchange rate changes on exports of modern services is 30 to 50% larger than that on merchandise and traditional services.

The real exchange rate and service exports

We analyse the determinants of the growth of exports of merchandise and services using data for 66 countries for which significant runs of data on exports of services are available in 1980-2009. Of these 66 countries, nine are low-income countries, 15 are low middle-income, 20 are high middle-income and 22 are high-income. The independent variables include the log

per capita income (over the previous five-year period), country and time-fixed effects and the real exchange rate, where we consider four different measures of the real exchange.[1]

Our empirical results confirm the importance of the real exchange rate for export growth. In addition, we find that the effect of the real exchange rate is even stronger for exports of services than exports of merchandise. Indeed, it is largest for modern services (see Eichengreen and Gupta 2012).

Why does the real exchange rate impact exports of services so powerfully? It could be that services, and especially modern services, use fewer imports. It could be that these sectors have lower fixed costs of entry, making for a more elastic supply response. It could be that demand for these exports is more price elastic. Or it could be a combination of all of the above.

We obtain similar results with alternative measures of the real exchange rate. The effect of the real exchange rate on the growth of exports is broadly similar for developing and for developed countries.

Export surges

We also focus on periods when the growth of exports accelerated significantly ('export surges'). As Freund and Pierola (2012) have shown, surges provide additional identification. They are instances when export performance and their determinants are changing radically. They are when countries are overcoming obstacles that previously hindered export growth.

We identify surges using the Bai-Perron structural break technique. We define a surge when a pair of breaks points first to a significant acceleration and then to a significant deceleration of exports. In addition, we require the export growth rate to be at least 2% a year for three consecutive years. So defined, the surge lasts until the growth rate falls below 2% or until another structural break is identified.

We identified 81 episodes of surges in the exports of merchandise, 100 episodes of surges of traditional services and 80 episodes of surges in exports of modern services.[2] Typically, surges last four to five years.

We see in Figure 1 that surges in exports of services, both modern and traditional, tend to be preceded by real exchange rate depreciations, especially in developing countries.

Figure 1. RER and export surges in traditional and modern services
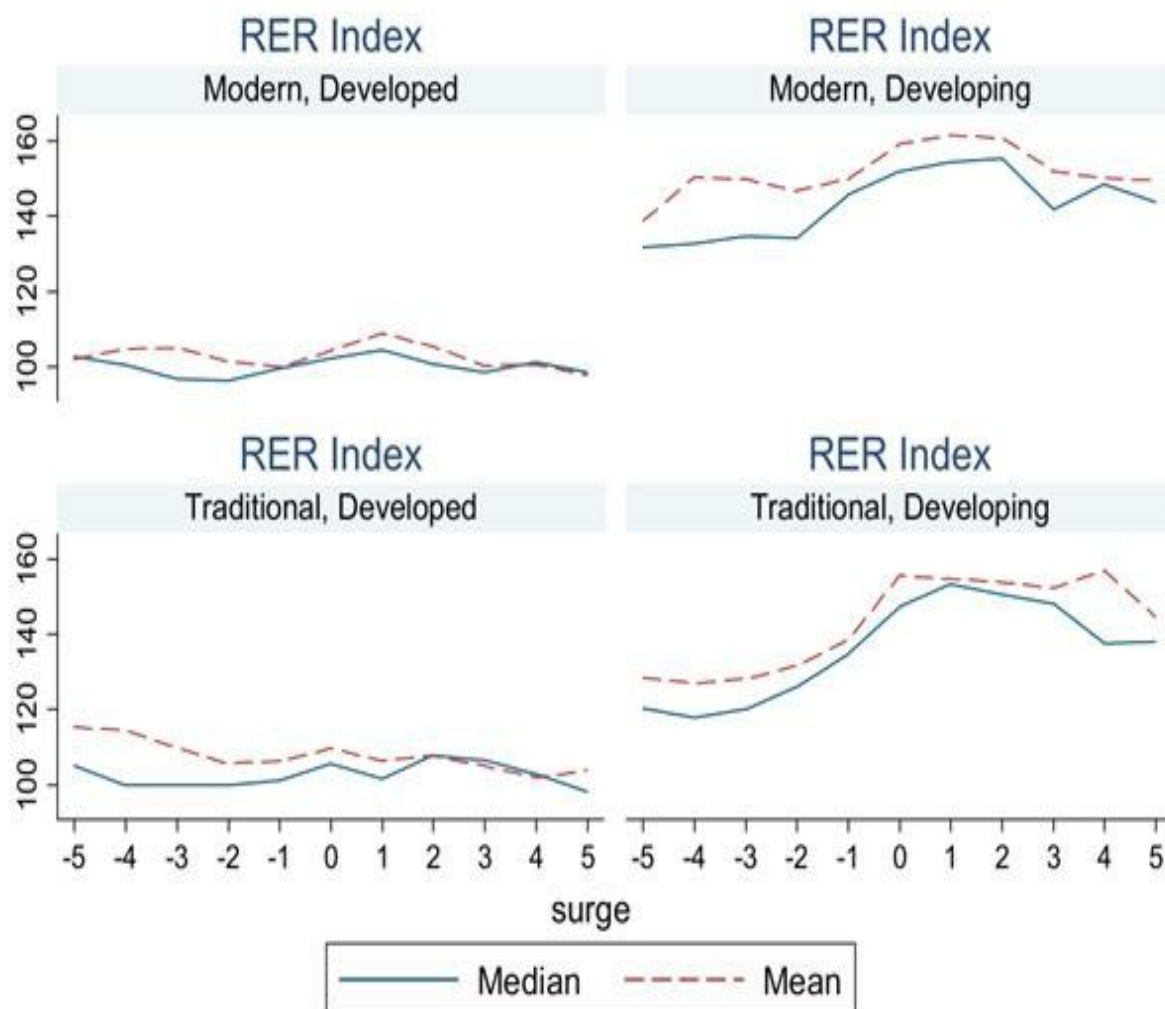
Using an approach similar to Hausmann, Pritchett, and Rodrik (2005) we estimate regressions of the determinants of the timing of a surge in the exports of merchandise, traditional and modern services, focusing again on the real exchange rate. Consistent with our earlier analysis, we find real exchange rate depreciation has a positive and significant effect on the probability of a surge of both merchandise and services. Including other controls does not make much of a difference to the results.

Results also show that the volatility of the real exchange rate has a negative effect on the probability of an export surge. We also estimate Tobit regressions which make fuller use of the data, in the sense of distinguishing larger and smaller surges. We find a larger impact of the real exchange rate on exports of modern services than on traditional

services and on traditional services than on merchandise (the coefficient of real exchange rate is about 50% larger for modern services).

Lessons for developing countries

Our results suggest that as developing countries shift from exporting primarily commodities and merchandise to exporting traditional and modern services, appropriate policies toward the real exchange rate become even more important.

This said, relying on an undervalued exchange rate to encourage the growth of exports of services, as of merchandise, has its limitations.

- Eichengreen (2008) and Haddad and Pancaro (2010) caution that depreciation/undervaluation can be deployed as a policy tool to spur growth only in the short term, because a country cannot maintain a depreciated real exchange rate indefinitely.
- Potential costs include tensions with other countries, accumulation of foreign-exchange reserves on which capital losses may occur, and the fact that adjustment, when it occurs, may come in the form of inflation.

For a competitive real exchange rate to succeed in boosting exports it will have to be accompanied by strong institutions, sound macroeconomic policies, a disciplined labour force, high savings rates or other policies conducive to attracting foreign capital. Finally, for benefits to exceed costs, countries using real exchange rate depreciation to jumpstart exports and growth should have an exit strategy in mind and, ideally, in place.

References

Bai, Jushan and Pierre Perron (2003), "Computation and Analysis of Multiple Structural Change Models," *Journal of Applied Econometrics* 18, 1–22.

Eichengreen, Barry (2008), "The Real Exchange Rate and Economic Growth," Working Paper 4, World Bank PREM Network, Commission on Growth and Development.

Eichengreen, Barry and Poonam Gupta (2012), The Real Exchange Rate and Export Growth: Are Services Different? NIPFP Working Paper 112.

Freund, Caroline and Martha Denisse Pierola (2012), "Export Surges," *Journal of Development Economics* 97, 387-395.

Haddad, Mona and Cosimo Pancaro (2010), "Can Real Exchange Rate Undervaluation Boost Exports and Growth in Developing Countries? Yes, But Not for Long," *Economic Premise* 20, World Bank PREM Network, June.

Hausmann, Ricardo, Lant Pritchett, and Dani Rodrik (2005), "Growth Accelerations," *Journal of Economic Growth* 10, 303-329.

Rodrik, Dani (2009), "The Real Exchange Rate and Economic Growth," *Brookings Papers on Economic Activity* 1, 365-412.

Servén, Luis (2003), "Real Exchange Rate Uncertainty and Private Investment in LDCs," Review of Economics and Statistics 85, 492-492.

[1] The first is the real exchange rate in purchasing-power-parity terms, from Penn World Tables, calculated in bilateral terms vis-a-vis the US. Second is exchange rate misalignment adjusted for the Balasa-Samuelson effect (as in Rodrik 2009). Third, we construct the bilateral real exchange rate vis-a-vis the US using data from the IMF's International Financial Statistics (IFS) on nominal exchange rates vis-a-vis the US dollar and the consumer price index for the US and other countries. Finally, we obtain an estimate of the real effective exchange rate from IFS and the World Development Indicators of the World Bank. This measure has the advantage of being multilateral rather than bilateral, but its country coverage is more limited.

[2] The average growth rate of merchandise exports is about 15% per annum during surges. In the year before the surge it is 0.4%, and it turns negative after the surge. The pattern of growth of exports of traditional services during surge episodes is quite similar to that of merchandise exports. Surges in exports of modern services are most pronounced, with the exports of modern services growing at roughly 25% per annum during the surge period. In the years before the surge, in contrast, the growth of modern service exports is less than 3 percent, and it turns negative after the surge.

US monetary policy and the saving glut

Heleen Mees

New York University

24 March 2011

Is US easy monetary policy in the early 2000s to blame for the global saving glut? This column argues that the Federal Reserve's policy triggered the refinancing boom and ensuing spending spree, which spurred economic growth and savings in China. The prolonged decline in long-term interest rates in the mid-2000s is largely to blame for the housing boom in the US.

At the Paris G20 meeting on 18 February 2011, Federal Reserve Chairman Ben Bernanke squarely laid the blame for the financial crisis and ensuing economic crisis on global imbalances, or the so-called global saving glut (for a review of the arguments see Suominen 2010). What the Chairman failed to mention is that the Fed's easy monetary policy in the early 2000s played a crucial role in bringing about the global saving glut.

The loosening of monetary policy

Following the bursting of the dot-com bubble in late 2000 and the subsequent recession in the US, the Federal Open Market Committee (FOMC) began to lower the target for the overnight fed funds rate, the monetary policy rate. Rates fell from 6.5% in late 2000 to 1.75% in December 2001 and to 1% in June 2003. The target rate was left at 1% for a year. At the time, the historically low fed funds rate resulted in a negative real fed funds rate from November 2002 to August 2005. Though the FOMC stuck to a monetary-policy rule similar to the classic Taylor rule using inflation forecasts instead of current values, it changed its preferred measure of inflation twice in the early 2000s (from headline Consumer Price Index (CPI) to headline Personal Consumption Expenditures (PCE) in January 2000 and from headline PCE to core PCE in June 2003) without a countervailing change in the parameters, thereby effectively loosening the monetary-policy rule considerably.

In recent research (Mees 2011), I show that the Fed's easy monetary policy, rather than the housing boom, as asserted by Taylor (2007), sparked the refinancing boom. While mortgages for purchase do not respond significantly to changes in the fed funds rate but instead to

changes in long-term interest rates, I find that mortgages for refinance are significantly responsive to both changes in the fed funds rate and changes in long-term interest rates, especially so in the period 2000 – 2008. Between Q1 2003 and Q2 2004, the time when the FOMC held the fed funds rate steady at 1%, two-thirds of all mortgage originations were for home refinance.

Figure 1 Mortgages for purchase and refinance ($ billions)
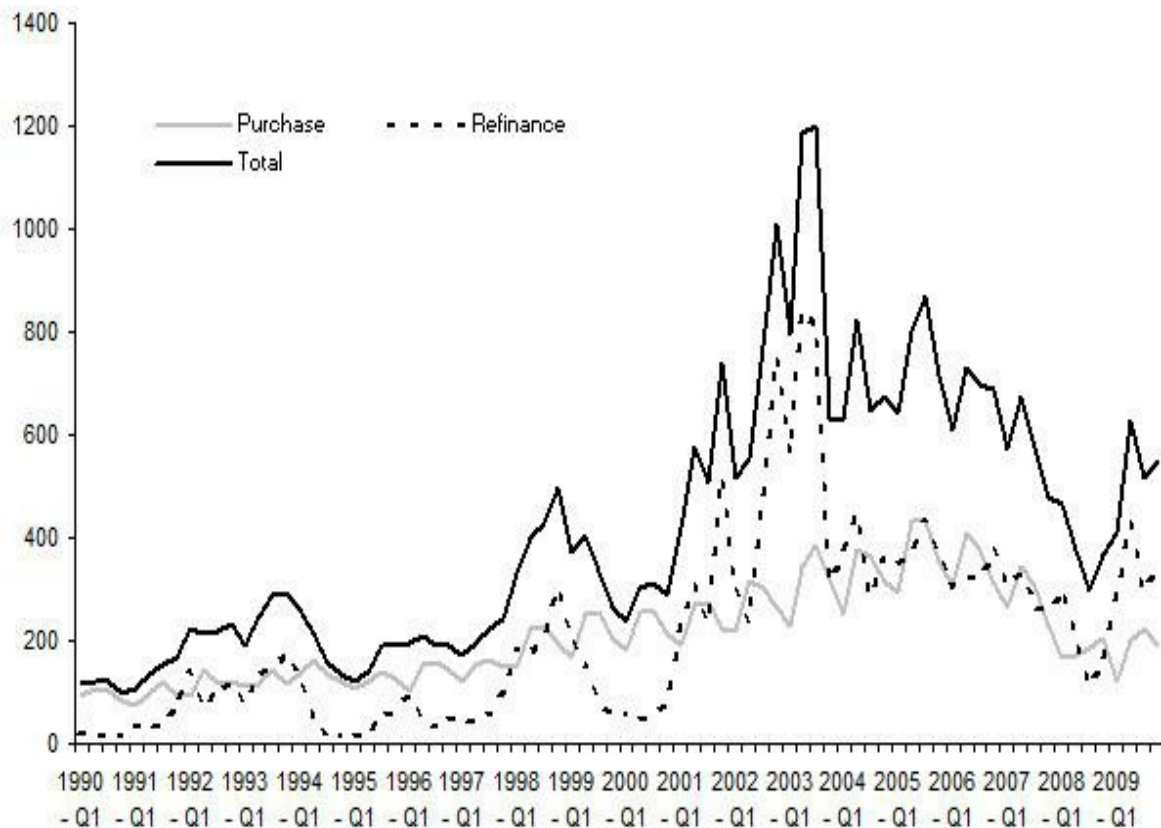
Source: Mortgage Bankers Association

Figure 2 Fed funds rate, 10-year treasury and 30-year mortgage rate (%)
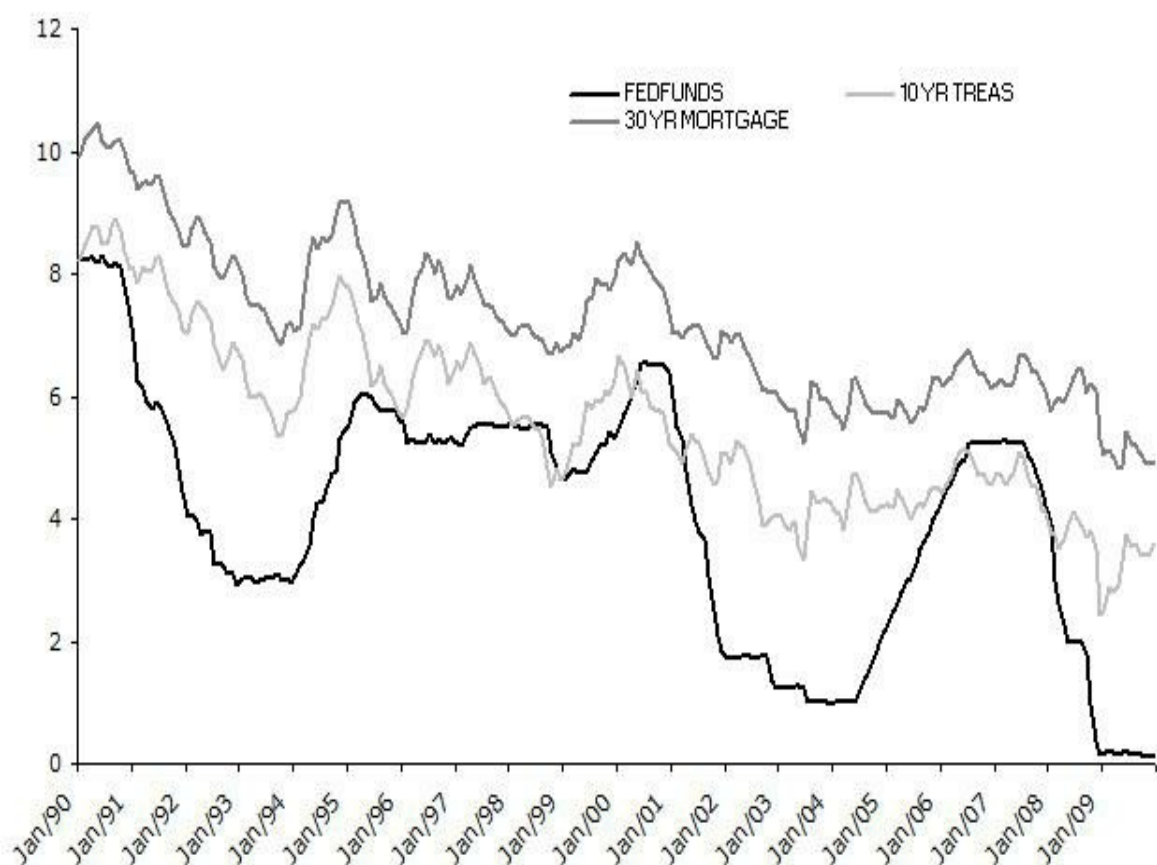
Source: Federal Reserve, Freddie Mac

Spending money that had been raised through home equity extraction – or remortgaging – amounted to more than 4% of GDP in 2005. From the FOMC transcripts in 2003 and 2004, it emerges that the FOMC in general looked favourably upon home equity extraction as a source of personal consumption expenditure. In his 2005 Sandridge lecture, Bernanke boasted of the depth and sophistication of the country's financial markets that allowed households easy access to rising housing wealth. The possibility that the housing boom could one day turn to bust, leaving many homeowners in negative equity, seems not to have set off any alarm bells at the Federal Reserve. At the end of 2009 almost 25%, or 11.4 million, of all residential properties with mortgages in the US were in negative equity – or "underwater". More than half of these mortgages were the result of home refinancing, given the scale of refinancing/home equity extraction in the years preceding the financial crisis.

Figure 3 Spending out of home equity extraction (% GDP)

PCE + ccd + home impr. as % GDP
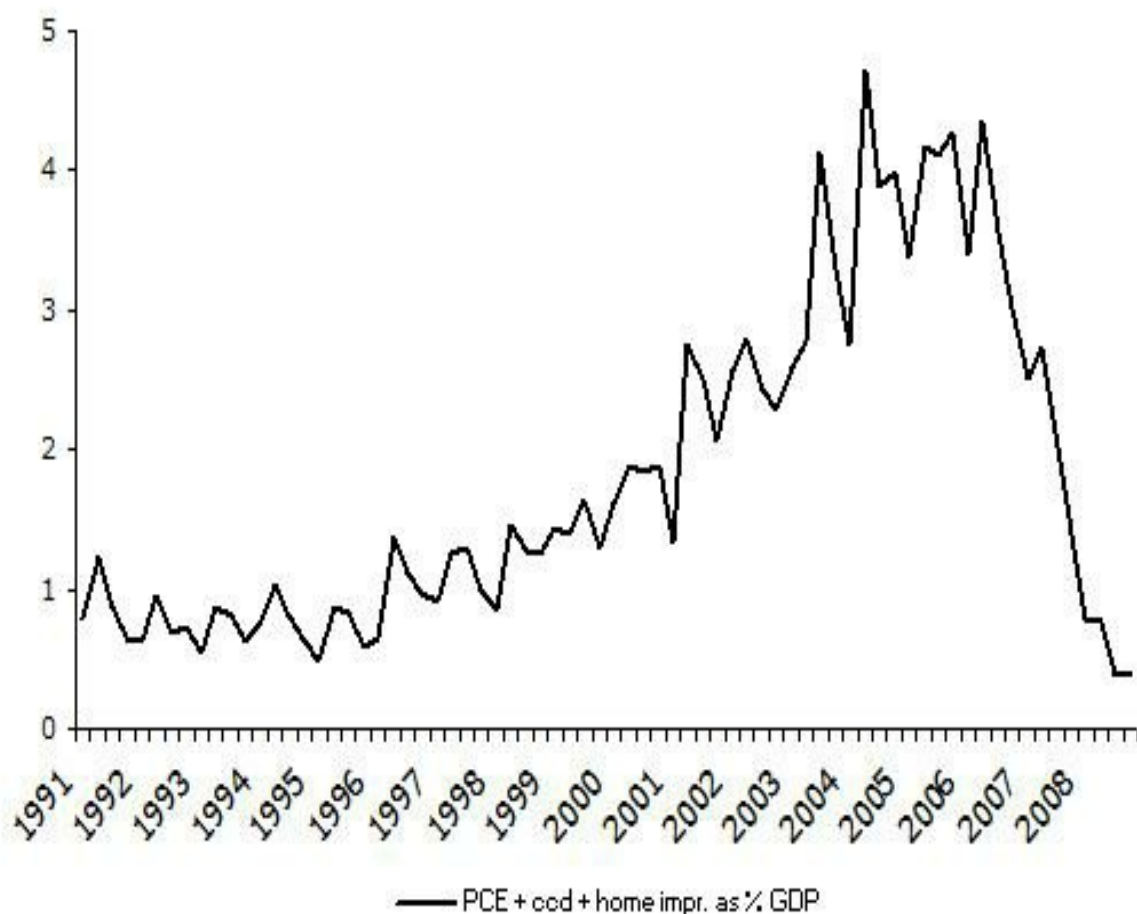
In addition to home equity extraction, consumer credit also rose in the years leading up to the financial crisis – albeit at a more moderate pace of about 1% of GDP per year as many households used home loans to pay off credit card debt. Beyond home equity extraction and consumer credit, the US economy also received stimulus from incremental government spending on the wars in Afghanistan and Iraq, and from the Bush tax cuts, which effectively transformed sovereign debt into consumer credit. Despite all this effort, the benefit US economy was a disappointment. The sum of tax cuts, war spending, consumer credit, and spending out of home equity extraction was in the range of 4% to 8% of GDP from 2002 to 2008. Nominal GDP growth was on average about two percentage points lower than the overall stimulus, even though the economy was operating below potential and experienced an unemployment gap and output gap during most of those years.

As real GDP growth in the US declined from 4.1% in 2004 to 1.3% in 2007, China experienced consecutive years of double-digit economic

growth. And while the US saving rate hovered around 15%, China's saving rate increased from 38% of GDP in 2000 to 54% of GDP in 2006. Rising enterprise savings, instead of household savings, accounts for the increase in China's saving rate in the 2000s. Chinese household savings actually declined as a percentage of GDP.

In February 2005, the then Chairman of the Federal Reserve Alan Greenspan first raised the spectre of the interest conundrum: "[T]he broadly unanticipated behaviour of world bond markets remains a conundrum." In a speech to the International Monetary Conference in Beijing (via satellite) on June 6, 2005, Greenspan elaborated further on the interest conundrum: "The pronounced decline in US Treasury long-term interest rates over the past year despite a 200-basis-point increase in our fed funds rate is clearly without recent precedent. (…) The unusual behaviour of long-term rates first became apparent almost a year ago."

In March 2005 Ben Bernanke, who was Fed governor at the time, in the Sandridge lecture advanced the theory of a global saving glut. He argued that there was an excess of world savings – a global savings glut – and that the US acted as the consumer of last resort. Maurice Obstfeld and Kenneth Rogoff (2010) pointed out that the global saving rate was actually low in the 2002-2004 period. According to Obstfeld and Rogoff the increase in global saving plays out largely after 2004. However, by focusing solely on the global saving rate, Obstfeld and Rogoff overlook the changing composition of world savings. In 2000 advanced economies accounted for 78% of global savings. By 2008 the share of emerging economies in global savings had doubled to 44%, while advanced economies accounted for a much more modest 56% of global savings (see Figure 4).

Figure 4 Advanced, emerging economies and global savings (% world GDP)
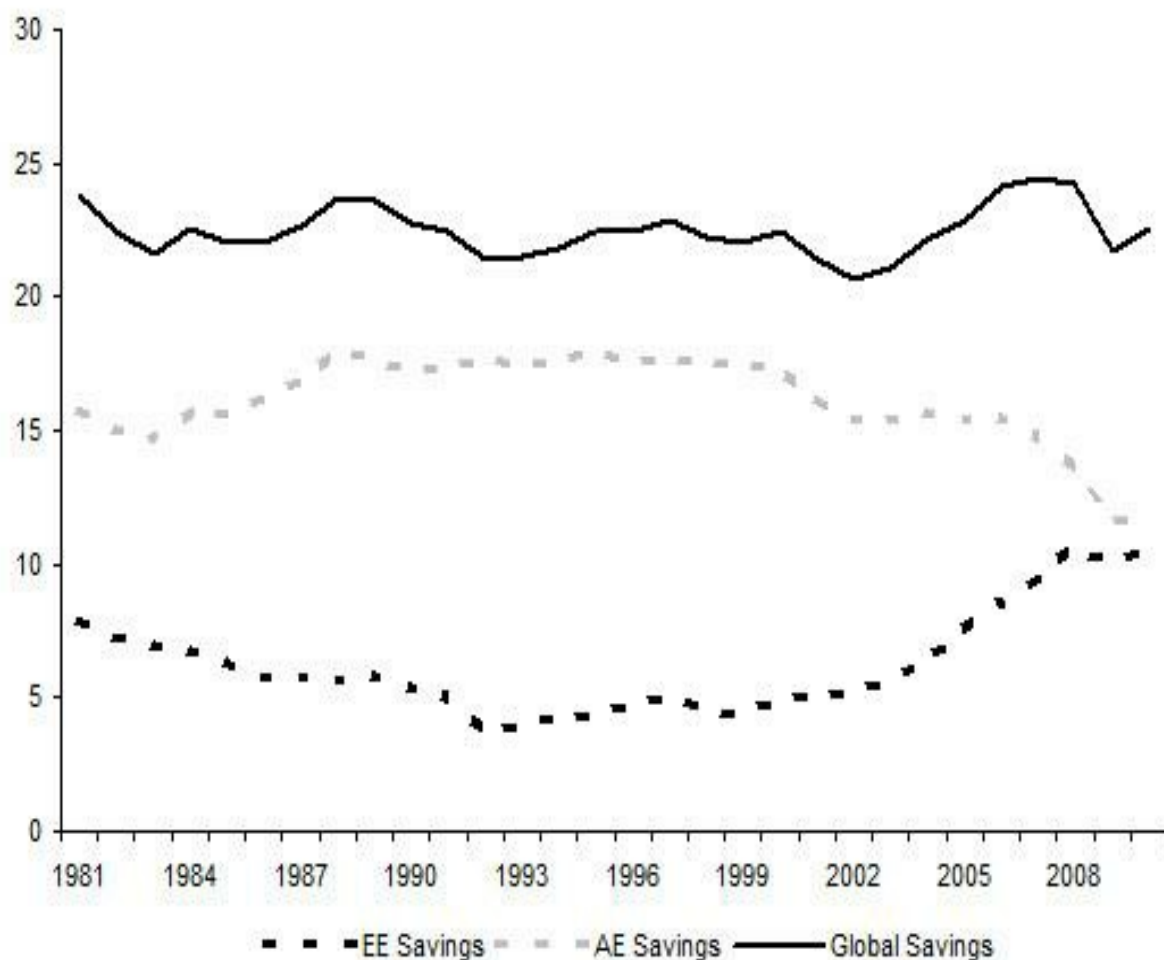
Emerging economies' savings are heavily skewed towards fixed income assets. We see total debt securities outstanding rising at a higher rate from 2002 onward, despite the fact that the global saving rate was relatively low at the time (Figure 5). This coincides with a quickening in China's savings. It corroborates Greenspan's statement in June 2005 that "the unusual behaviour of long-term rates first became apparent almost a year ago".

Figure 5 Total debt securities outstanding ($ billions)
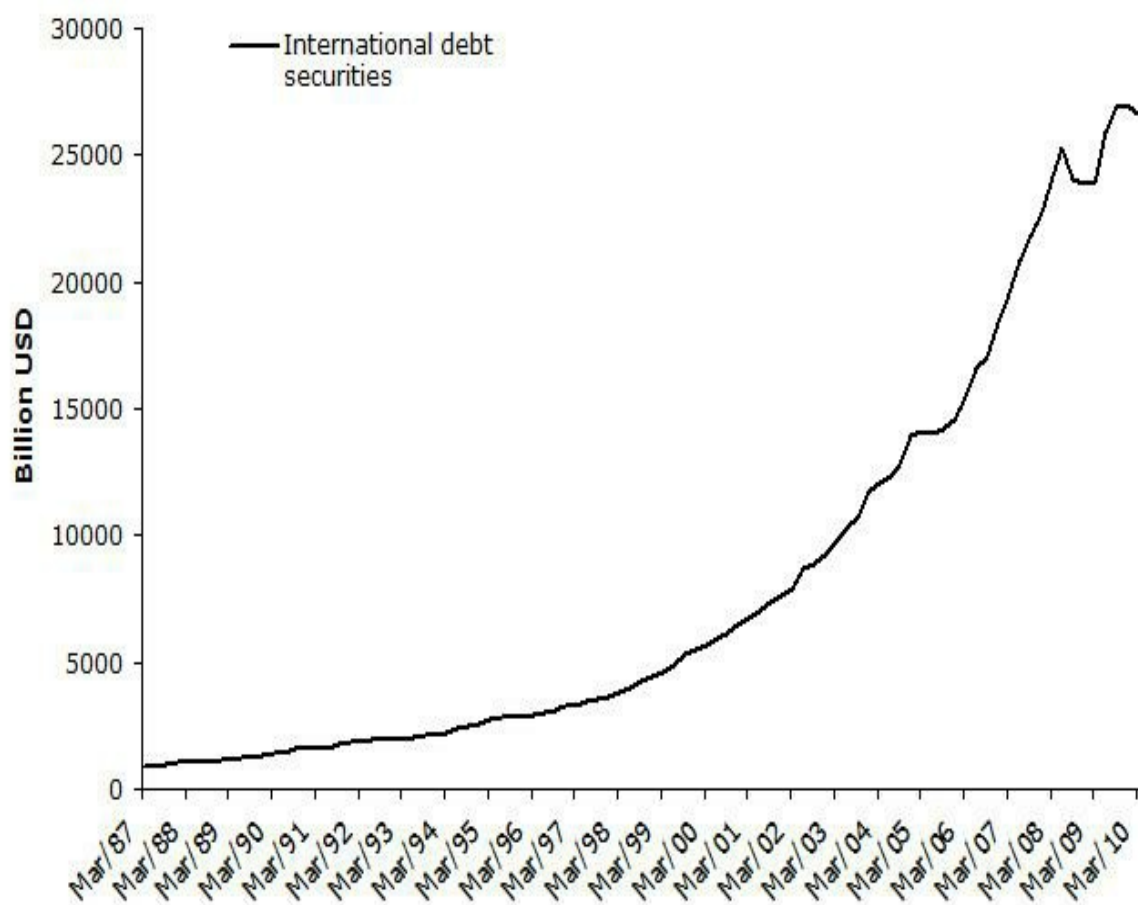
I perform an OLS-regression identical to the one in Warnock and Warnock (2009), which includes inflation expectations, interest rate risk premium, expected real GDP growth and the structural budget deficit. We find that total debt securities outstanding explain the 10-year Treasury yield considerably better than foreign purchases of US government bonds.

Our study shows that in the early 2000s US long-term interest rates largely delinked from the Fed's monetary policy. At first, in 2001- 2003, interest rates did not come down as much as was to be expected based on the experience in the past two decades. Subsequently, in 2004-2005, the 200-basis point rise in the fed funds rate failed to lift long-term interest rates. We see a similar outcome in the UK, and to a lesser extent in Germany, where the term structure was not as stable to begin with. We show that total debt securities outstanding, instead of foreign flows into US Treasury and agency bonds, account for the interest conundrum in the US.

The Fed's easy monetary policy in the early 2000s did not trigger so much the housing boom, as asserted by John Taylor, but rather the refinancing

boom and ensuing spending spree that spurred economic growth (and savings) in China (and oil-exporting nations). The most important factor driving housing demand is long-term interest rates. Hence, the prolonged decline in long-term interest rates in the mid-2000s is largely to blame for the housing boom in the U.S. Despite popular belief, the proliferation of exotic mortgage products can hardly be faulted for the housing boom and eventual bust. As a share of total mortgage originations, mortgages with exotic features are less than five percent of total mortgages until and including 2004, and only slightly above five percent of total mortgages in 2005 and 2006 (respectively 5.6 and 7.7 percent of total mortgage originations).

References

Bernanke, Ben S (2005), "The Global Saving Glut and the US Current Account Deficit", The Sandridge Lecture.

Bernanke, Ben S (2011), "Global Imbalances: Links to Economic and Financial Stability".

Greenspan, Alan (2010), "The Crisis".

Mees, Heleen (2011), "US Monetary Policy and the Interest Conundrum".

Obstfeld, Maurice and Kenneth S Rogoff (2010), "Global Imbalances and the Financial Crisis: Products of Common Causes".

Suominen, Kati (2010), "Did global imbalances cause the crisis?", VoxEU.org, 14 June.

Taylor, John B. (2007), "Housing and Monetary Policy", NBER Working Paper Series 13682.

Warnock, Francis E and Veronica Cacdac Warnock (2009), "International capital flows and US interest rates", Journal of International Money and Finance, 28:903-919.

Capital controls in the 21st century

Barry Eichengreen, Andrew K Rose

University of California, Berkeley and CEPR

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Since the global financial crisis of 2008–2009, opposition to the use of capital controls has weakened, and some economists have advocated their use as a macroprudential policy instrument. This column shows that capital controls have rarely been used in this way in the past. Rather than moving with short-term macroeconomic variables, capital controls have tended to vary with financial, political, and institutional development. This may be because governments have other macroeconomic policy instruments at their disposal, or because suddenly imposing capital controls would send a bad signal.

Capital controls are back. The IMF (2012) has softened its earlier opposition to their use. Some emerging markets – Brazil, for example – have made renewed use of controls since the global financial crisis of 2008–2009. A number of distinguished economists have now suggested tightening and loosening controls in response to a range of economic and financial issues and problems. While the rationales vary, they tend to have in common the assumption that first-best policies are unavailable and that capital controls can be thought of as a second-best intervention. One set of studies considers a setting in which output fluctuates because nominal wages are rigid and monetary policy is not available to manipulate the price level (Schmitt-Grohe and Uribe 2012a, 2012b, Farhi and Werning 2012). A second strand characterises capital controls as a device for optimally manipulating the international terms of trade (De Paoli and Lipinska 2013). A final strand argues for the flexible use of capital controls to buttress financial stability (Ostry et al. 2012, Forbes et al. 2013).

However intriguing the arguments, the approach they recommend is one with which we have little experience. As we show in a new CEPR Policy Insight, governments have rarely imposed or removed capital controls in response to short-term fluctuations in output, the terms of trade, or financial-stability considerations. Once imposed, controls stay in place for long periods. Once removed, they are rarely restored. Rather than fluctuating at a business cycle frequency, the intensity of controls tends to

evolve over long periods in line with variables like domestic financial depth and development, the strength of democratic checks and balances, and the quality of regulatory institutions, which similarly evolve slowly over time.

We as a profession simply have little knowledge of how the economy will operate if capital controls are adjusted at high frequency, since controls have historically been adjusted infrequently.

Persistence

In 1996, 169 countries and territories provided the IMF data concerning controls on capital market securities; 127 of these had restrictions.[1] That is to say, these controls were pervasive. Of those same 127 countries, some 116 (91.3%) still had such controls in 2012. That is, controls were *persistent*. And, as shown in Table 1, what was true of controls on capital market securities was true of other capital control measures as well.

Table 1 Percentage of 1996 controls persisting in 2012

IMF AREAER Control	Controls in 2012/Controls in 1996 (percentage)
Capital Market Securities	116/127=91.3%
Money Market Instruments	94/111=84.7%
Collective Investment Securities	89/105=84.8%
Derivatives and other Instruments	52/78=66.7%
Commercial Credits	72/103=69.9%
Financial Credits	87/112=77.7%
Guarantees, Sureties, Fin'l Backup Facilities	52/82=63.4%
Direct Investment	128/144=88.9%
Liquidation of Direct Investment	32/54=54%
Real Estate Transactions (1997, series start)	105/119=88.2%
Personal Capital Movements	47/64=73.4%
Commercial Bank, other Credit Institutions	129/133=96.7%
Institutional Investors	57/60=95%

Figure 1 contains a series of histograms showing the length of spells of different types of capital controls. The top-left graph presents the length of spells for controls on capital market securities. A subset of countries had no such controls between 1996 and 2012; these countries make up the peak at the left of the graph. As the eye moves to the right, the line falls – few countries had controls in place for periods of one, two, three or more years – until one arrives at the extreme right of the graph where the series ends with a spike. Fully 98 countries had capital market security controls in place for all seventeen years between 1996 and 2012. And controls on capital market securities are typical of the other types of controls. In the bottom row, second panel from the left, the different kinds of controls are

aggregated, and the resulting aggregate displays the same pattern.

Figure 1 Histograms of capital control duration
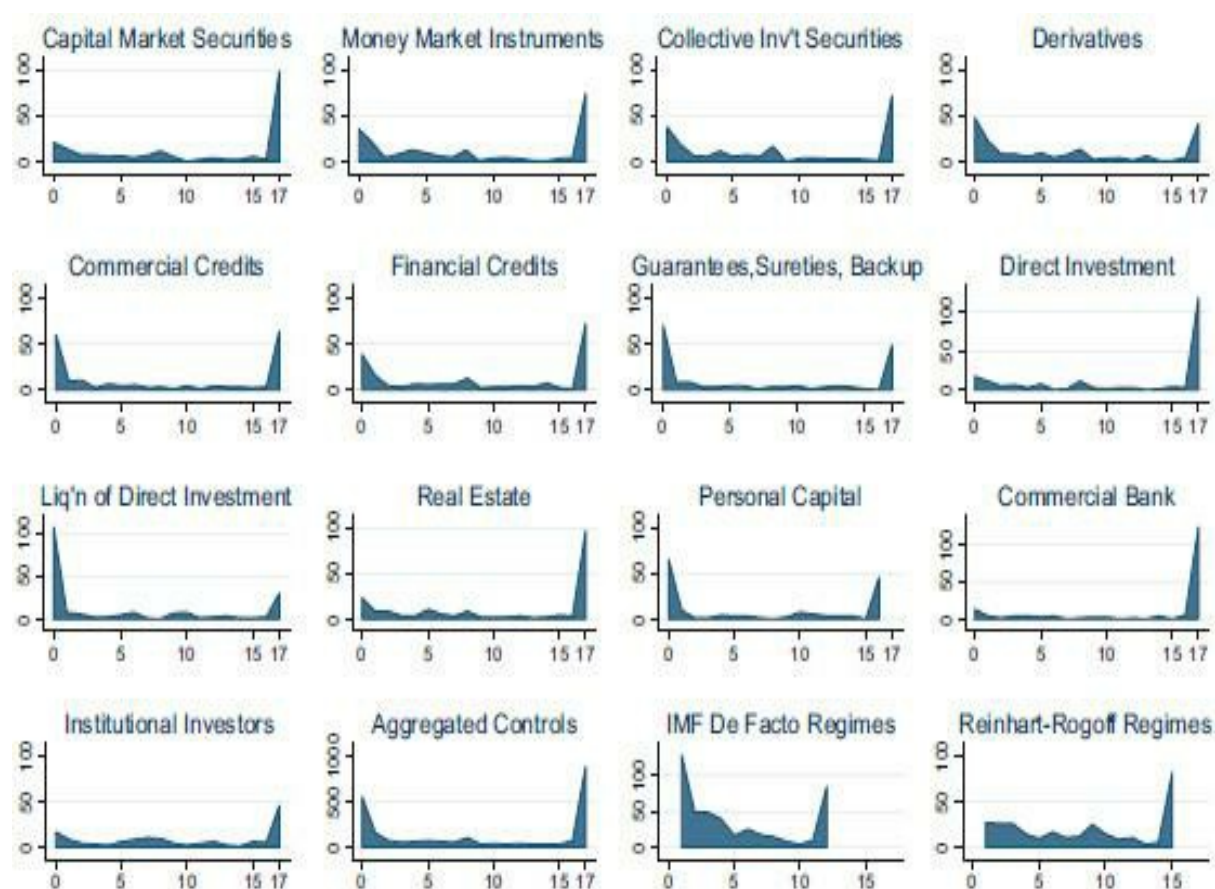
Exchange-rate regimes and financial crises

What determines the prevalence of controls? Two natural variables to examine are the country's exchange-rate regime and susceptibility to financial crises; both are linked in theory and accepted wisdom to the incidence of controls. But in practice, exchange-rate regimes are only weakly correlated with controls (for details, see Table 2 in the appendix below). Results using financial crises instead of exchange-rate regimes are similar. What is striking is the infrequency of significant correlations between things that we think might matter and capital controls.

Macroeconomic, financial, and institutional correlates

Although recent theoretical literature points to the possibility that governments may adjust controls in response to cyclical developments and macro-prudential considerations, we are skeptical of the empirical relevance of these arguments. It seems difficult to understand the sluggish

nature of capital controls with cyclic macroeconomic and financial phenomena. Still, these are testable hypotheses. In our work, we have attempted to link the incidence of capital controls to inflation, GDP growth, the terms of trade, the lagged capital account as a percentage of GDP, and domestic credit growth adjusted for inflation. In practice we find little sign that governments impose or remove controls in response to changes in these variables. One partial exception is domestic credit growth, where there appears to be some tendency for governments to loosen or remove controls when credit growth accelerates – the opposite of what the macro-prudential rationale would imply.

Since controls move slowly, it seems more plausible to attempt to relate them to country characteristics like financial depth and development, the strength of democratic checks and balances, and the quality of regulatory institutions, that are themselves slow-moving. In our new paper, we present some evidence suggesting that these factors could indeed be responsible for the movements in controls. In particular, we find a robust, statistically significant negative correlation between the incidence of controls, on the one hand, and these measures of financial development, political development, and institutional development, on the other. The same is true for almost all measures of capital controls considered.

Exceptions

A handful of countries have succeeded in adjusting their capital controls counter-cyclically – tightening them when large amounts of foreign capital are flowing in and loosening them when the surge subsides. Sometimes the aim is to insulate asset prices and domestic credit extension from the effects of the inflow, other times to prevent the real exchange rate from appreciating undesirably, and still other times for a combination of these reasons. Brazil is a prominent case in point, having repeatedly tightened and loosened its controls with the ebb and flow of capital movements. A few other examples – Indonesia, Thailand, and South Korea – can similarly be cited. But, as our evidence shows, they are exceptions.

This reluctance to adjust controls at a cyclical frequency has two explanations. First, imposing controls in a country with no recent history of them runs the risk of sending a negative signal (Bartolini and Drazen 1997). It reflects the presumption that first-best policies are unavailable. Resorting to controls to damp down the inflation associated with capital inflows may be taken as an indication that more conventional instruments, such as a tighter monetary policy, are not available because of, inter alia,

the adverse impact on a fragile banking system. Resorting to controls to limit real exchange rate appreciation may be taken as an indication that the political system lacks the capacity to implement a more conventional tightening of fiscal policy. This adverse signal will be absent or at least weaker for a country that regularly uses controls and has adjusted them previously.

Second, adjusting controls at a cyclical frequency will be easier, from a technical standpoint, for a country with some form of controls already in place. It will possess the relevant bureaucracy, obviating the need to set up a new one. It will have systems for monitoring financial transactions, which is more convenient than having to establish entirely new ones. Brazil, for example, had a long history of capital controls, most of which it finally removed by the middle of the last decade, at which point it had an all but fully open capital account.

Conclusion

Recent years have seen a reassessment of capital controls as instruments of macroeconomic and macro-prudential management. While this reassessment is welcome, resort to these instruments for the purposes of macroeconomic and macro-prudential management identified in these recent papers is rare. Any new policy initiative mandating frequent shifts in controls is based on theory rather than data-driven experience.

We have pointed to several explanations for this disjuncture.

- First, policymakers continue to attempt to implement first-best policy responses where possible, using conventional monetary and fiscal policies in response to macroeconomic cycles and conventional regulatory instruments at the domestic level in response to financial risks.

Bhagwati and Ramaswami (1963) famously made the argument in the context of trade policy that, when there exists a domestic distortion, intervening with the first-best domestic intervention beats responding with a second-best tariff or quota. That argument applies in the current context as well.

- Second, governments are reluctant to resort to controls where a control apparatus is not already in place.

Doing so may send an adverse signal. It may be taken as an indication that the first-best policies on which policymakers previously relied are not available. Enforcement is difficult where the relevant bureaucratic apparatus has been dismantled. The lesson here is that countries anticipating having to resort to controls for purposes related to macroeconomic or macro-prudential management should hesitate before dismantling their control apparatus. Having done so and moved all the way to capital account convertibility, it can be difficult and costly to go back.

References

Bartolini, Leonardo and Allan Drazen (1997), "Capital-Account Liberalization as a Signal", *The American Economic Review*, 87(1): 138–154.

Bhagwati, Jagdish and V K Ramaswami (1963), "Domestic Distortions, Tariffs and the Theory of the Optimum Subsidy", *Journal of Political Economy*, 71: 44–50.

De Paoli, Bianca and Anna Lipinska (2013), "Capital Controls: A Normative Analysis", Federal Reserve Bank of New York Staff Report 600.

Farhi, Emmanuel and Ivan Werning (2012), "Dealing with the Trilemma: Optimal Capital Controls with Fixed Exchange Rates", NBER Working Paper 18280.

Forbes, Kristen, Marcel Fratzscher, and Roland Straub (2013), "Capital Controls and Macro-prudential Measures: What are They Good For?", DIW Berlin Discussion Paper 1343.

International Monetary Fund (2012), "The Liberalization and Management of Capital Flows: An Institutional View", Washington, DC: IMF.

Jongwanich, Juthathip and Archanun Kohpaiboon (2012), "Effectiveness of Capital Controls: Evidence from Thailand", *Asian Development Review*, 29: 50–93.

Ostry, Jonathan, Atish Ghosh, Marcos Chamon, and Mahvash Qureshi (2012), "Tools for Managing Financial-Stability Risks from Capital Inflows", *Journal of International Economics*, 88: 407–421.

Schmitt-Grohe and Uribe (2012a), "Managing Currency Pegs", *American Economic Association Papers and Proceedings*, 102: 192–197.

Schmitt-Grohe and Uribe (2012b), "Prudential Policy for Peggers", NBER Working Paper 18031.

Appendix 1. Exchange-rate regimes and capital controls

Table 2 shows the connection. Each row shows coefficient estimates from a regression of a particular capital control (listed in the left column) on dummy variables for hard fixes and floats, of the form:

$$CapControl_{it} = \{\alpha_i\} + \{\beta_t\} + \gamma ERR_{it} + \varepsilon_{it}$$

where $CapControl_{it}$ is a particular type of capital control present in country i at time t, $\{\alpha_i\}$ and $\{\beta_t\}$ are mutually exclusive and jointly exhaustive sets of fixed country- and time-specific effects, ERR denote dummy variables for hard fix and floating exchange-rate regimes, and ε denotes a composite disturbance. The vector of coefficients of interest γ should be interpreted as deviations from the omitted intermediate regime of managed-floating. Of the 26 coefficients, just two are significantly different from zero at the 5% confidence level. Clearly, variation in the exchange-rate regime explains little of the persistence of capital controls.[2]

Table 2 Controls and exchange-rate regimes

IMF *AREAER* Control	Hard Fix	Float
Capital Market Securities	.01 (.02)	.00 (.03)
Money Market Instruments	-.03 (.03)	-.00 (.04)
Collective Investment Securities	-.03 (.03)	-.00 (.04)
Derivatives and other Instruments	-.04 (.04)	-.01 (.04)
Commercial Credits	.00 (.02)	-.03 (.03)
Financial Credits	-.03 (.03)	.06 (.03)
Guarantees, Sureties, Fin'l Backup Facilities	.03 (.03)	.03 (.03)
Direct Investment	-.05* (.02)	-.04 (.03)
Liquidation of Direct Investment	.02 (.03)	-.01 (.02)
Real Estate Transactions (1997, series start)	.01 (.03)	.01 (.03)
Personal Capital Movements	-.03 (.03)	-.04 (.03)
Commercial Bank, other Credit Institutions	-.01 (.02)	.00 (.02)
Institutional Investors	.07 (.04)	-.08* (.04)

Notes: IMF de facto definition of exchange-rate regime (from 2001), backfilled with Reinhart-Rogoff (to 1996). Least squares panel regressions with fixed country and time effects; robust standard errors in parentheses. One (two) asterisk(s) indicate significantly different from zero at .05 (.01) significance level. Omitted variable is intermediate exchange-rate regime.

Table 3 presents analogous results but using financial crises instead of exchange-rate regimes. Again, what is striking is the infrequency of significant correlations.

Table 3 Controls and financial crises

IMF AREAER Control	Banking	Currency	Inflation	Sovereign, Domestic	Sovereign, External	Stock Market
Capital Market Securities	.09 (.05)	-.00 (.03)	.15 (.10)	-.11* (.04)	.08 (.05)	.00 (.04)
Money Market Instruments	.05 (.06)	.02 (.03)	.21* (.09)	-.06 (.11)	.00 (.05)	.02 (.04)
Collective Investment Securities	.15* (.06)	.05 (.03)	.24 (.12)	-.20* (.08)	.04 (.05)	.01 (.03)
Derivatives and other Instruments	.15* (.08)	.08 (.05)	.11 (.14)	-.19 (.13)	-.03 (.07)	-.01 (.03)
Commercial Credits	.04 (.05)	.01 (.03)	.26* (.11)	-.09 (.14)	.01 (.06)	.01 (.02)
Financial Credits	.13* (.06)	-.01 (.05)	.29* (.11)	.08 (.23)	-.06 (.06)	.00 (.03)
Guarantees, Sureties, Fin'l Backup Facilities	-.03 (.07)	.03 (.04)	.14 (.13)	.12 (.16)	.09 (.11)	-.04 (.03)
Direct Investment	.11* (.05)	.02 (.03)	.10 (.12)	-.08 (.06)	.04 (.07)	.02 (.03)
Liquidation of Direct Investment	-.05 (.04)	-.02 (.02)	.02 (.07)	.07 (.18)	.05 (.06)	.03 (.03)
Real Estate Transactions (1997, series start)	.01 (.06)	.03 (.04)	.07 (.11)	-.07 (.04)	.07 (.07)	-.01 (.03)
Personal Capital Movements	-.02 (.06)	.03 (.04)	.22 (.13)	.02 (.26)	-.05 (.08)	.00 (.02)
Commercial Bank, other Credit Institutions	.01 (.05)	.02 (.02)	-.01 (.02)	-.00 (.01)	-.01 (.01)	-.02 (.03)
Institutional Investors	.01 (.05)	.02 (.03)	.08 (.09)	.02 (.10)	-.07 (.16)	-.01 (.03)

Notes: Reinhart-Rogoff crises. Least squares panel regressions with fixed country and time effects; robust standard errors in parentheses. One (two) asterisk(s) indicate significantly different from zero at .05 (.01) significance level.

1 We begin in 1996 following a switch by the IMF in the way these data are collected.

2 These regressions can be changed in different ways. For instance, since the regressand is a set of dummy variables, panel logit or probit can be used. Also, one can use lags of the regressors

rather than simply contemporary values. We have experimented with such perturbations, and they seem to make little difference in practice.

Chapter 7 Unemployment

Youth unemployment in Europe: More complicated than it looks

Jacob Funk Kirkegaard

Peterson Institute for International Economics

13 October 2012

Youth unemployment in the Eurozone looks like a social and economic disaster in the making – 30%, 40%, even 50% of young people sitting on their hands instead of building skills and experience. This column argues the headline numbers are misleading. While youth unemployment is a serious problem, a large share of EZ youth are not in the labour force, so the headline figures overstate the labour-market 'scar tissue' that will be left over from the crisis.

Hardly a day goes by without a reminder of youth unemployment rates in excess of 50% in Greece, Spain, Italy, and other parts of the European periphery. Sometimes the reminders are in the form of rants by economists or pundits about the moral deficiency of EZ demands for austerity and the risks of a lost generation of young people. The challenge for Europe's youth is stark, and demands for government action are long overdue, especially in liberalising the insider biases that make it hard for outsiders to get jobs.

The situation is illustrated in Figure 1, which shows youth unemployment rates in the 15- to 24-year age group in the OECD countries in Q1 2011, compared with the latest available data.[1]

Figure 1. OECD Harmonised Youth Unemployment Rates, 15-24y
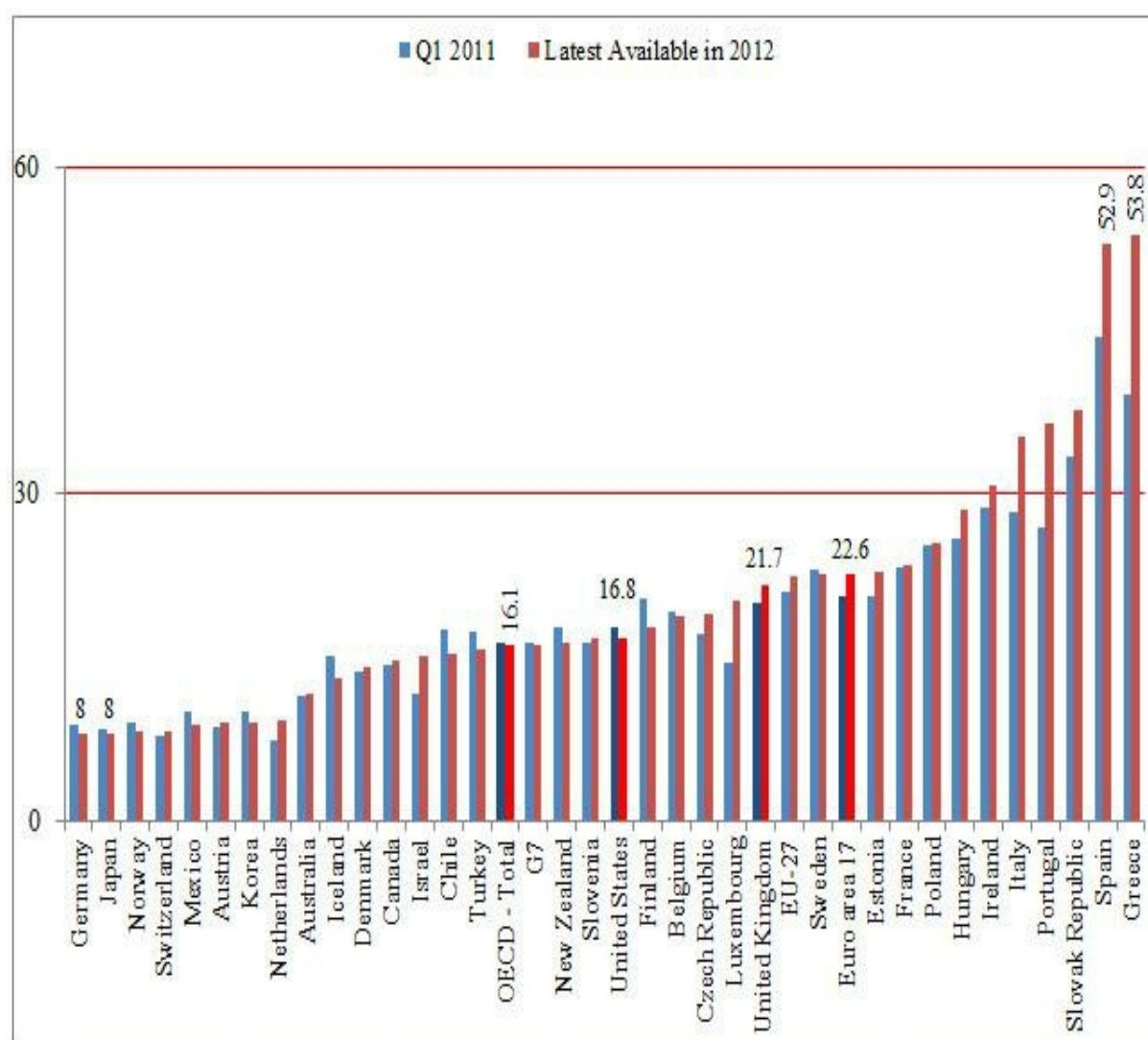
Source: OECD Labour Market Statistics.

The current OECD average is 16%, with the US average marginally higher at 16.8%, while the UK and the EZ average lies around 22%. Meanwhile, the intra-EZ range is remarkable, with Germany at just 8%, the lowest youth unemployment rate in the OECD, and Spain and Greece exceeding 50% in the latest data. Moreover, youth unemployment rates have increased in the last 18 months in the OECD, and in the four 'Club Med' EZ countries of Italy, Portugal, Spain and Greece. With these remarkable youth unemployment rates, it is striking how limited the social unrest has been.

But as pointed out by Steven Hill in the *Financial Times* earlier this year, youth unemployment rates are a flawed basis for outrage because of their methodological shortcomings (Hill 2012).

- Unemployment rates are calculated as the share of people in the labour force (i.e. employed or looking for work).
- A large share of the youthful cohort is still in school and hence not in the labour force, at least in industrialised countries where educational opportunities are widely available.
- This means that the actual percentage of unemployed people is lower than it appears.

For example, if 70% of the age group from 15-24 years in Spain and Greece are enrolled in education,[2] and just 30% is employed or actively looking for work, a 50% unemployment rate would be estimated as 50% of the 30% in the labour force, or a 15% share of the total. That is not healthy by any means, it is a lot better than suggested by a 50% headline number. It also helps explain why there has not been more social unrest since 2010.

Less than the headlines but still a major problem

Despite the 'true level' of youth unemployment in a given country, the poor job opportunities for youth in many countries is still a serious concern, because of the negative impact on lifetime earnings and career paths that an early spell of unemployment might inflict on affected young people (the so-called 'scarring effect' in economic jargon).

At the same time, it is important to note that there are several dynamics that can affect the true impact of a severe crisis on an entire generation of young people. In countries with ample and affordable educational and training options available and which before the crisis went through a cyclical boom, one would for instance expect a high movement from the workforce back into education/retraining after the crisis hit, causing a significant decline in the size of the youth workforce. In general, a decline in the size of a country's workforce is a bad economic development. But if large numbers of young people go from relatively low-skilled jobs into education, the long-term effects are harder to predict. Higher skills could lead to better future career paths and a school offers a chance to sit the recession out in a safe place.

To better calculate the true idleness and 'wasted youth' phenomenon in advanced economies, the OECD calculates the share of youth 'not in employment, education or training' among the total in the 15-24 age group.[3] This is the so-called NEET ratio, which comprises 'idle youth' both in the labour force (looking for work, but unable to find it) and outside the labour force (inactive). Figure 2 shows the developments in the

NEET ratio for available OECD countries from pre-crisis Q1 2007 to the latest available data from Q1 2011.[4]

Figure 2. OECD NEET Ratios, 15-24y
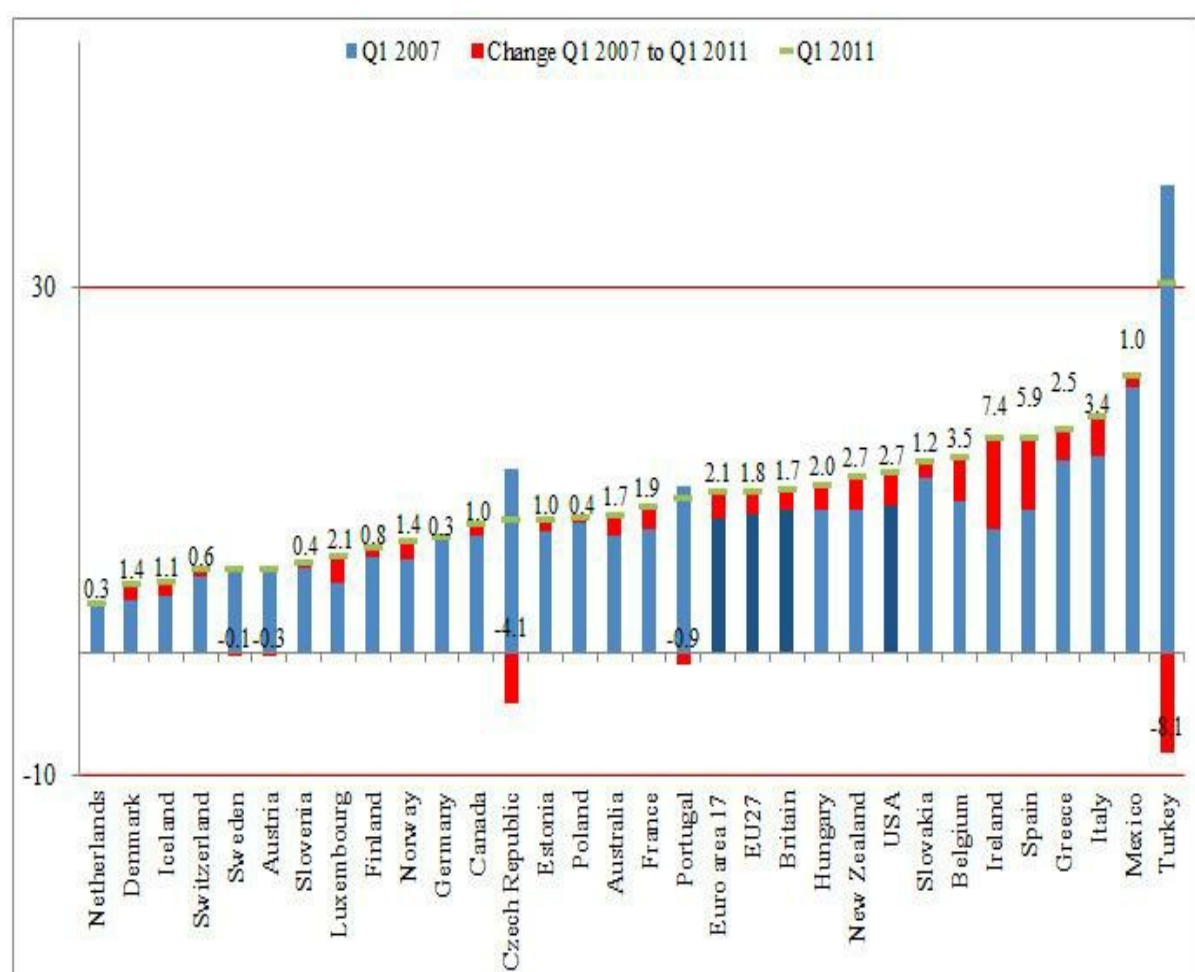
Figure 2 illustrates several important trends. The range within the OECD for NEET ratios ranges from less than 5% in the Netherlands in Q1 2011 to 30% in Turkey, even after Turkey (likely as a result of its economic boom and better access to education) saw an 8% decline in its NEET ratio from Q1 2007. In almost all OECD countries, the NEET ratio has gone up as a result of the crisis. The increases have been most pronounced in some Eurozone peripheral countries – Ireland at a 7.4 percentage point increase, Spain a 5.9%, Italy 3.4%, and Greece 2.5 percentage points.[5] Remarkably, however, Portugal's NEET ratio has dropped by 0.9 percentage points during the crisis, which probably indicates a substantial increase in young Portuguese people going back into education.

It is also clear from Figure 2 that measured on this more genuine measure

of 'idle youth' with associated potential detrimental long-term 'scarring effects', the EZ periphery countries look relatively less bad than other OECD countries. Yes, there have been significant increases in Ireland and Spain during the crisis, but thenQ1 2011 NEET ratio of these two countries was still only 2.8 percentage points higher at 17.6% than the corresponding 14.8% in the US. It is indeed noteworthy that the US NEET ratio is in Q1 2011 higher than in the EZ aggregate, the 27 members of the EU aggregate, and the UK ratio. With an increase of 2.7 percentage points over the crisis, the US rate has increased more than these countries.

In the aggregate, therefore, American youth is today idler and worse affected by the crisis than their EZ and UK counterparts. This result probably reflects both the depth of the labour market contraction in the US (which has been worse than the EZ and UK aggregate) and the fact that many American youth have fewer education and training opportunities than in Europe – especially following the dramatic cuts to US state and local government education budgets during the crisis.

Too bad that neither President Obama nor Mitt Romney wanted to discuss this outrage in their first debate.

References

Hill, S (2012), "Youth employment is bad but not as bad as we're told", *Financial Times,* 24 June.

OECD (2012a), *Education at a Glance.*

OECD (2012b), *Employment Outlook.*

1 Data available at the OECD website here.

2 According to the OECD Education at a Glance 2012, table C5.4a, the actual educational enrollment rates for Spain and Greece in 2010 were 83% and 89% for the 15-19 year old age group respectively and 39% and 47% for the 20-24 year olds. Education at a Glance 2012 can be downloaded here.

3 The NEET ratio is estimated by the OECD to track the success of the transition from school to employment, as discussed in OECD Education at a Glance 2012, Indicator C5, available here.

4 Data available in the OECD Employment Outlook 2012 see here.

5 Note that Figure 1 shows that only in the EZ periphery countries have youth unemployment increased/decreased markedly since Q1 2011, meaning that it is only in these countries that one might expect the NEET ratio to have increased between Q1 2011 and today.

Why have Spanish and French unemployment rates differed so much during the Great Recession?

Samuel Bentolila, Pierre Cahuc, Juan Dolado and Thomas Le Barbanchon

CEMFI and CEPR; École Polytechnique, Paris and CEPR; Universidad Carlos III de Madrid and CEPR; École Polytechnique, Paris

Since the global crisis, unemployment in Spain has soared to 20%, double the EU average. This column compares Spanish unemployment with that of France and argues that differences in employment protection legislation account for nearly half of the dramatic rise in unemployment in Spain. Its findings add further support to calls for a single labour contract in the country.

The Great Recession stands out among previous recessions for its depth and scale, yet for Spain's unemployment, the story has an eerily familiar feel. To follow Spain's unemployment is to go on a "wild ride" (Blanchard et al. 1995, Bentolila and Jimeno 2006). Compare Spain with France; both share similar labour market institutions (employment protection legislation, unemployment benefits, wage bargaining, etc.) and exhibited almost identical unemployment rates, around 8%, just before the crisis. But while the French unemployment rate has only risen to 10% during the slump, Spanish unemployment has surged to 20% (Figure 1).

Figure 1. French and Spanish unemployment
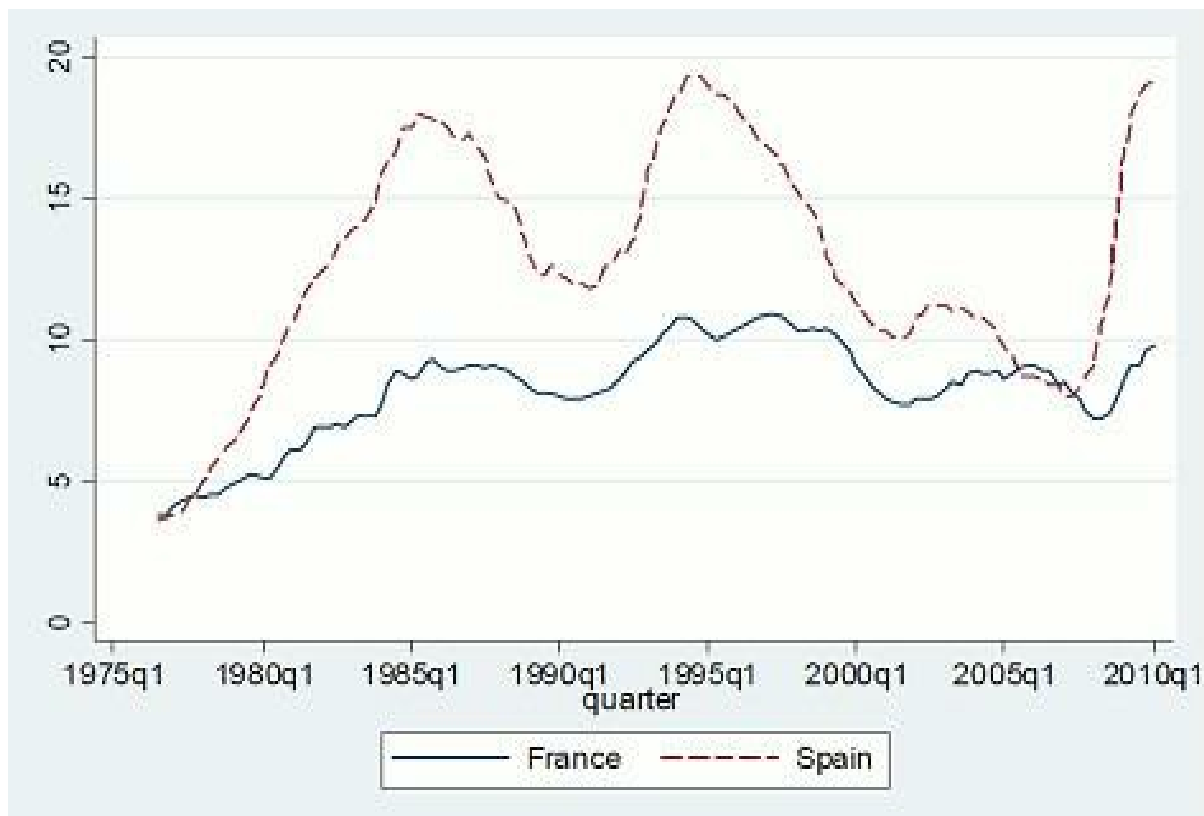
France and Spain are among those European economies which most directly promoted temporary contracts in the past in order to achieve flexibility at the margin. However, temporary employment is much more important in Spain than in France. In Spain, historically, 33% of all employees are temporary, falling to 25.6% nowadays following the destruction of 1.44 million temporary jobs since autumn 2007. France meanwhile has only 15% temporary workers..

With this in mind, in recent research (Bentolila et al. 2010) we ask how much this difference in the portion of temporary workers can explain the different levels of unemployment during the Great Recession, once other potential determinants are considered – like the much higher weight of the construction industry sector in Spain.

Why are France and Spain so different?

Behind their apparently similar employment protection legislation (EPL) we detect two main differences often ignored in cross-country comparisons:

- Spain has a larger gap between the firing costs of workers with permanent and temporary contracts, and

- a much laxer regulation on the use of temporary contracts.

We find that the combination of these two differences, labelled as the "EPL gap" in what follows, could explain a sizeable fraction (45%) of the much higher rise of Spanish unemployment.[1]

To explore this issue, we develop a model in which firms may hire under both permanent and temporary contracts. The latter can be transformed into permanent contracts at their expiration, the rest being terminated at little or no cost at all. By contrast, dismissal of permanent workers entails high severance pay and takes time due to advance notice periods and the settlement of legal disputes.

It is now well understood that facilitating the creation of temporary jobs leads to an ambiguous effect on unemployment since it increases both job creation and job destruction. However, one novel result that we highlight in our work is that, if the EPL gap is high enough, the increase in job destruction will dominate. The insight is that the higher this gap, the lower the proportion of temporary jobs that are transformed into permanent jobs, because the much larger firing costs for the latter induce employers to use temporary jobs in sequence, especially if restrictions on their use are mild, rather than converting them into long-term contracts. As a result, a higher EPL gap is likely to raise unemployment during downturns. This is precisely the case of Spain, a country which inherited rigid provisions from the industrial relations prevailing under Franco's dictatorship, when jobs were highly protected in exchange for low wages and the absence of free collective bargaining. While the last two features disappeared upon the arrival of democracy in the late 1970s, the first one remained unchanged until 1984, when the use of temporary contracts with very low dismissal costs was extended to the hiring of employees performing regular activities.

Mind the EPL gap

According to the widely used OECD (2004) index of the strictness of EPL, which ranges from 0 to 6, the overall EPL score is 3.0 for France and 3.1 for Spain (where the US has the lowest value, 0.7, and Portugal and Turkey the highest, 4.3). Hence, Spain appears only slightly more regulated than France. However, there are good reasons to think that this average EPL index, based on legal regulations and not on their implementation, does not capture Spanish EPL satisfactorily. Indeed, de facto EPL of temporary jobs is much weaker in Spain than in France,

whereas the opposite holds for EPL of permanent jobs.

Considering only red-tape firing costs generated by third agents, such as labour courts and labour authorities, which cannot be compensated for in wage bargaining (since they are not a transfer from the firm to the worker), we find that the gap between both types of contracts is 50% higher gap in Spain than in France.

Further, the use of temporary contracts is rather more limited in France than in Spain. In both countries they can only be used in specific cases (e.g., for temporary replacement, seasonal activities, training, etc.) and they may last up to 24 months. There are however, much fewer de facto restrictions in Spain; for instance, uncertain-completion jobs (e.g., in the construction industry) could lawfully last for an indeterminate period (until the June 2010 labour market reform).

The effects of the EPL gap on mismatch

Another dimension in which these two economies differed before the Great Recession was the much stronger Spanish dependence on the construction industry since the late 1990s (11.9% of GDP and 13.3% of employment in 2007, against 6.3% and 6.9% in France). We claim that this industrial specialisation in Spain is closely related to its strong dual labour market. In effect, as a result of Spain's higher inflation, real interest rates fell by 6 percentage points when the euro was introduced, against 1.5 percentage points in France. This fuelled a strong investment boom in the Spanish construction industry for at least two reasons.

- First, the very rigid permanent contracts in Spain would have been inadequate to specialise in more innovative industries, since higher labour flexibility is required to accommodate their larger risks (Saint-Paul 1997).
- Second, there was a large increase in the relative endowment of unskilled labour in Spain over that period. The higher availability of low-skilled jobs through very flexible contracts fostered a very high dropout rate from compulsory education (from 18% in 1987 to 32% in 1997) and subsequently to a huge inflow of low-skilled immigrants. Thus, most firms, especially the small and middle-sized ones, adopted technologies which where complementary with low-skilled labour. The outcome was a huge housing bubble.

The subsequent destruction of more than 35% of unskilled jobs in the

Spanish construction industry as a result of the bursting of the bubble – together with very low interregional labour mobility induced by an underdeveloped rental market and job insecurity – has been a source of much greater mismatch in Spain than in France, via the slow reallocation process of workers from this rapid declining industry to other sectors. High mismatch is evident in the huge outward shift during in the Spanish Beveridge curve during the Great Recession (see Figure 2): there are now many more unemployed workers for each job vacancy.

Figure 2. Spanish Beveridge curve (1994-2010)
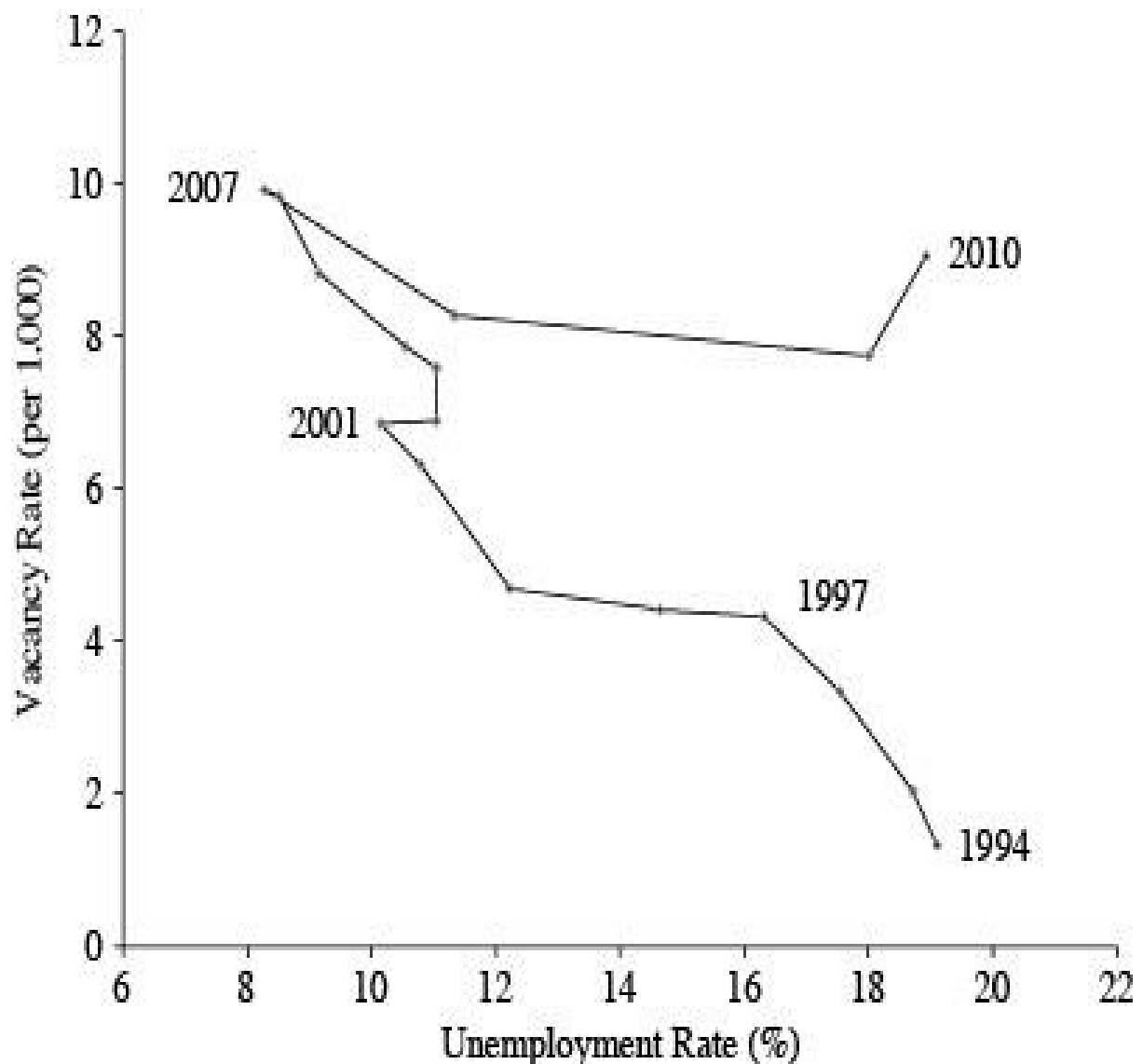
What if Spain had French legislation?

To quantify the impact of EPL on unemployment we find empirical

counterparts for the parameters of the above-mentioned model to match a set of labour market variables in both countries – the unemployment rate, the share of temporary jobs, and the destruction rate of permanent jobs – both during the expansionary period (2005-2007) and during the Great Recession (2008-2009). The impact of the crisis is captured through an adverse aggregate productivity shock and greater mismatch. In line with the preceding discussion, we find that, while a negative aggregate shock (of about 10% in productivity) suffices to match French target variables during the slump, a reduction of about 40% in matching efficiency, on top of a similar aggregate shock to that in France, is required to match Spanish target variables in this period.

Once the model performs well in both periods, we run counterfactual simulations to address the issue of what would have been the increase in Spanish unemployment during the Great Recession had Spain adopted French EPL right before the slump started. Imputing the French-economy levels of the EPL gap to the Spanish economy yields a robust result: the unemployment rate would have increased by about 45% less than the observed rise, had Spain adopted the lower French EPL gap before the crisis (i.e., a rise of 4.1 percentage points in the unemployment rate rather than the 7.5 percentage point increase observed between 2005-07 and 2008-2009).

Finally, the dynamics indicate that, in the short run (during the first six months or so) the reduction in the unemployment rise would be lower (about 2 percentage points less) than in the longer run (after one and half year or so), since a reduction in the EPL gap exacerbates job destruction at the beginning of the recession by making lay-offs less expensive. However, this short-run effect is later offset by a much larger job creation, so that the differential in the unemployment increase achieves the above-mentioned 3.4 percentage points.

Conclusions

Recently there have been several policy initiatives in Europe defending the idea of eliminating the EPL gap through the introduction of a single labour contract (see Bentolila et al. 2010). All these proposals highlight the negative effects induced by the permanent-temporary contract divide. As a result, they all advocate the elimination of most temporary contracts and the introduction of a single labour contract with severance pay that is increasing with seniority in the job. We interpret our results as providing some support for these proposals.

References

Bentolila, S, T Boeri, and P Cahuc (2010), "Ending the Scourge of Dual Labour Markets in Europe", VoxEU.org, 12 July.

Bentolila, S, P Cahuc, J Dolado, and T Le Barbanchon (2010), "Two-Tier Labor Markets in the Great Recession: France vs. Spain", CEPR DP 8152.

Bentolila, S and JF Jimeno (2006), "Spanish Unemployment: The End of the Wild Ride?", in M Werding (ed.), *Structural Unemployment in Western Europe: Reasons and Remedies*, MIT Press.

Blanchard, OJ et al. (1995), "Spanish Unemployment: Is There a Solution?", CEPR Report.

Blanchard, OJ and A Landier (2002), "The Perverse Effects of Partial Labor Market Reform: Fixed Duration Contracts in France", *Economic Journal* 112: 214-244.

Cahuc, P and F Postel-Vinay (2002), "Temporary Jobs, Employment Protection and Labor Market Performance", *Labor Economics*, 9:63-91.

Mortensen, DT and CA Pissarides (1994), "Job Creation and Job Destruction in the Theory of Unemployment", *Review of Economic Studies*, 61:397-415.

Saint-Paul, G (1997), "Is Labour Rigidity Harming Europe's Competitiveness? The Effect of Job Protection on the Pattern of Trade and Welfare", *European Economic Review*, 41:499-506.

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[1] It is a search and matching model with endogenous job destruction à la Mortensen-Pissarides (1994) which extends the models of Blanchard and Landier (2002) and Cahuc and Postel-Vinay (2002).

High home ownership as a driver of high unemployment

Andrew J Oswald

Warwick University

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Unemployment is once again the bane of the US and Europe. This column highlights an intriguing association between home ownership and high unemployment using US state-level data. Given the heavy subsidisation of and rise in home ownership, this association merits more attention from economists.

Unemployment matters. It is a major source of unhappiness, mental ill-health, and lost income. Yet after a century of economic research the determinants of unemployment are still imperfectly understood, and jobless levels in the industrialised nations are currently around 10%, with some over 20%.

If you search for 'unemployment' in the Web of Science, within the Social Science Citation Index a list of around 21,000 articles appears. For economics journals alone, there are approximately 10,000. The most prominent among these are:

- The Shapiro-Stiglitz model of unemployment as a worker discipline device.
- The Harris-Todaro paper on migration and unemployment.
- The original Phillips curve article.

Newer literatures such as from the models created by Mortensen and Pissarides and empirical work on the unhappiness from unemployment – are also strongly represented in the list.

A paradox emerges from this bibliometric search:

- Economics articles presenting clear empirical evidence on the causes of our high unemployment are less prominent than might be expected.

One intellectual strand that does stand out is are articles such as Nickell 1997 and Meyer 1990, both of which boil down to the same broad notion: the key to an understanding of the causes of unemployment is to think about labour-market 'rigidities' and the generosity of unemployment benefits.

Deeper causes?

Let's consider a different way of thinking about unemployment. Remembering that an economy is a general-equilibrium system, say we imagine the possibility that, as in the case of certain illnesses of the human body (which is another general equilibrium system), a symptom can be the result of a deeper problem – one that lies far away from the source of the observed symptom. Perhaps other markets matter more than unemployment and labour researchers have appreciated.

My colleague David G Blanchflower and I provide evidence in a new paper that the high rate of home ownership in the western world may be an important reason for the high unemployment that we all see around us (2013).

- We begin by pointing out that an elementary scatter plot for the industrialised nations reveals a strong correlation between home ownership and unemployment.

Famously, Switzerland has 3% unemployment and 30% home ownership, while Spain has 25% unemployment and 80% home ownership.

Simple correlations of this kind do not count as (remotely) persuasive causal evidence. They are open to the objection, in particular, that they do not difference out country fixed effects.

So, in our paper we take many decades of data from US states, which as a federally organised nation state, offers a useful spatial mini-laboratory for econometric work on unemployment rates, and we then estimate state panel unemployment equations. We adjust for state fixed effects, for year dummies, and for the demographic and educational composition of the people who live in the different states.

The effect estimated on US state data

When this is done, we find that the lagged home-ownership rate acts as a strong predictor of the unemployment rate. The size of the estimated effect is startling:

- A doubling of home ownership is associated with more than a doubling of the long-run unemployment rate.

As a check, we show that this result is holds up against splitting the data set into different sub-periods and into different areas (such as North and South) within the US. We also show that the patterns are – very probably – not because home owners themselves are disproportionately unemployed. Our work chimes with forthcoming recent research by Jani-Petri Laamanen, who studies a natural experiment in Finland (2013).

We are not sure what explains our correlation. But we show, using various micro data sets, that higher home ownership leads to lower labour mobility, greater commute-to-work times, and a lower rate of business formation. Our hunch, on which further work will be needed, is that the housing market exerts powerful externalities upon the labour market. This would not have surprised Milton Friedman, who, in his writings on the natural rate of unemployment, emphasised the need for labour mobility in an efficient economy.

Conclusions

For those unaware of it, the previous century saw a huge rise in home ownership across the world. Tax breaks offered by many governments acted to destroy large parts of the early 20th century private rental housing market. If we are right, these kind of tax breaks have worrying consequences.

We believe these issues merit more attention from economists.

Figure 1. 50-year changes (1950-2000) in home-ownership rates and 60-year changes in unemployment rates (1950-2010)

Change in unemployment rates (percentage points) vs Changes in home-ownership rates

California, North Dakota, Oregon, Washington, Wisconsin average rise in home owenership rates= +1%

Alabama, Georgia, Mississippi, South Carolina, West Virginia average rise in home ownership rates =+23%

Lowest five states — Highest five states
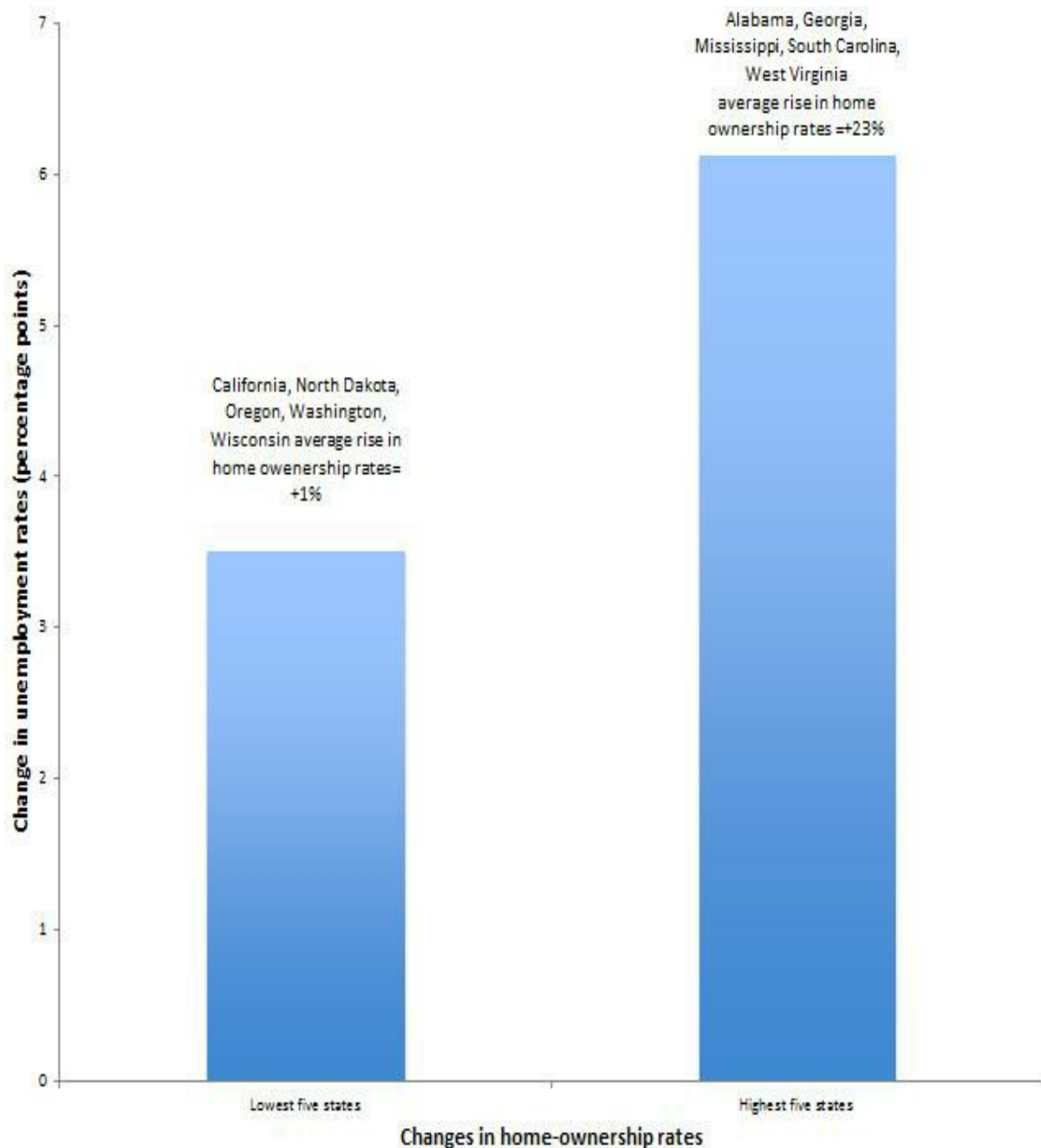
References

Blanchflower, D G and A J Oswald (2013), "Does high home-ownership impair the labor market?", NBER Working Paper #19073.

Harris, J R and M P Todaro (1970), "Migration, unemployment and development: A 2-sector analysis", *The American Economic Review*, 60(1), 126-142.

Laamanen, J-P (2013), "Home-ownership and the labour market: Evidence from rental housing market deregulation", Tampere Economic Working

Papers Net Series, 89, May.

Meyer, B D (1990), "Unemployment insurance and unemployment spells", *Econometrica* 58(4), 757-782, DOI: 10.2307/2938349.

Nickell, S (1997), "Unemployment and labor market rigidities: Europe versus North America", *Journal of Economic Perspectives*, 11(3), 55-74.

Phillips, A W (1958), "The relation between unemployment and the rate of change of money wage rates in the UK, 1861-1957", *Economica*, 25, 100, DOI: 10.2307/2550759.

Shapiro, C and J E Stiglitz (1984), "Equilibrium unemployment as a worker discipline device", *The American Economic Review* 74(3), 433-444.

The allocation of time over the business cycle

Erik Hurst, Loukas Karabarbounis and Mark Aguiar

Princeton University; University of Chicago; University of Chicago

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When jobs are scarce, what else is there to do? This column looks at data from the American Time Use Survey (ATUS) and finds that roughly 30% to 40% of time not spent working is put towards increased "home" production, 30% of time is allocated to increased sleep time and increased television watching, while other leisure activities make up a further 20% of the foregone market work hours.

After years of steady growth, the global economy has turned and so too has the interest in unemployment (see recent examples on this site Smith 2011 and Cingano and Rosolia 2011). The rising levels of unemployment around the world bring up some key questions:

- How do households allocate their time when someone loses a job?
- Do households allocate their foregone market production to home production?
- How much of the foregone market work hours are allocated to job search?

While answering these questions is important for calculating the welfare costs of recessions and for interpreting the cyclical co-movement of macroeconomic aggregates, up to now such an analysis was not possible given that there was no dataset that had a large enough sample to measure how households allocate their time over the business cycle.

In a recent working paper (Aguiar et al. 2011), we fill this gap. We use newly released data from the American Time Use Survey (ATUS) to document how the allocation of time evolves over the business cycle. The ATUS samples a large cross-section of Americans in every year between 2003 and 2010. According to the Bureau of Labour Statistics, between 2008 and 2010 the US unemployment rate increased from 5.8% to 9.6% and aggregate market-work hours fell by roughly 7%. The ATUS data

shows a similar increase of unemployment and a similar decrease of market work hours between 2008 and 2010.

Our analysis starts by segmenting households' time endowment into several mutually exclusive time categories.

- *Market work* includes all time spent working in the market sector on main jobs, second jobs, and overtime, including any time spent commuting to or from work and time spent on work related meals and activities. We separate from market work the time spent on job search and the time spent on income-generating activities outside the formal sector. This allows us to study the extent to which households spend time looking for employment or substitute time from the formal to the informal sector.

- *Non-market work* (home production) consists of four sub-categories: core home production (e.g. meal preparation and cleanup, doing laundry, ironing, dusting, vacuuming, indoor household cleaning, cleaning or repairing vehicles and furniture, etc.), activities related to home ownership (e.g. time spent on household repairs, time spent on exterior cleaning and improvements, time spent on the garden, etc.), obtaining goods and services (e.g. grocery shopping, shopping for other household items, comparison shopping, coupon clipping, going to the bank, going to a barber, going to the post office, obtaining government services, etc.), and care of other adults (e.g. shopping for other adults, helping other adults around the house with cleaning and maintenance, transporting other adults to doctors offices and grocery stores, etc.).

- We analyse separately *childcare* (all time spent caring for, educating or playing with children) from total non-market work. While there is a well developed market for goods that households are willing to purchase instead of spending time caring for their children (which would make childcare a component of non-market production), childcare may also offer direct utility to parents (which would make childcare a component of leisure).

- *Leisure* includes activities for which time and expenditure are complements as opposed to substitutes. Examples include time spent watching television, time spent socialising, time spent exercising and on sports, time spent on entertainment and hobbies, and all other similar activities. We also include in our leisure measure activities that provide direct utility but may also be viewed

as intermediate inputs such as time spent sleeping, eating, and personal care.

- Finally, we examine how households allocate their time to *other investments* over the business cycle, such as education, civic and religious activities, and own medical and healthcare.

Given the short time series covered in the survey, looking at the time series patterns may not be very informative for the time-use behaviour of households over the business cycle. This is because the time series patterns combine both low-frequency trends as well as any potential business cycle variation. This is particularly important for the trends in time use for both non-market work and leisure. During the non-recessionary period 2003-2008, home production time was falling and leisure time was increasing. These patterns are extensions of the well-documented trends in aggregate home production time and aggregate leisure time that started in the 1960s (Aguiar and Hurst 2007 and Ramey and Francis 2009). As a result, a naive comparison of the time spent on various activities before and during the recent recession confounds the effect of the recession on time use.

For instance, a comparison of the average time use over 2006-2008 with the average time use over 2009-2010 would lead one to conclude that about 80% of the foregone market hours were reallocated to leisure and essentially none to non-market work.[1] Such a comparison is misleading. The correct comparison is what various time-use categories would have been in 2009 and 2010 absent the recession compared to what they actually are during 2009 and 2010. Figure 1 shows the year-to-year estimates for average market work, leisure and non-market work and their linear trends. Specifically, we calculate a linear trend for each time use category based on the 2003-2008 period and then we extrapolate linearly to periods 2009 and 2010. For example, this calculation suggests that in the absence of the recession market work would have increased from 32.31 hours in 2008 to 32.57 hours in 2010. If we used these linear trends as counterfactuals, we would have found that 45% of the 2.09 hours per week decrease of market work between 2006-2008 and 2009-2010 would have been allocated to non-market work and 51% to leisure. This is a dramatically different estimate that the estimate one would obtain without controlling for low-frequency trends in time use.

Figure 1. Trends in market work, leisure and non-market work
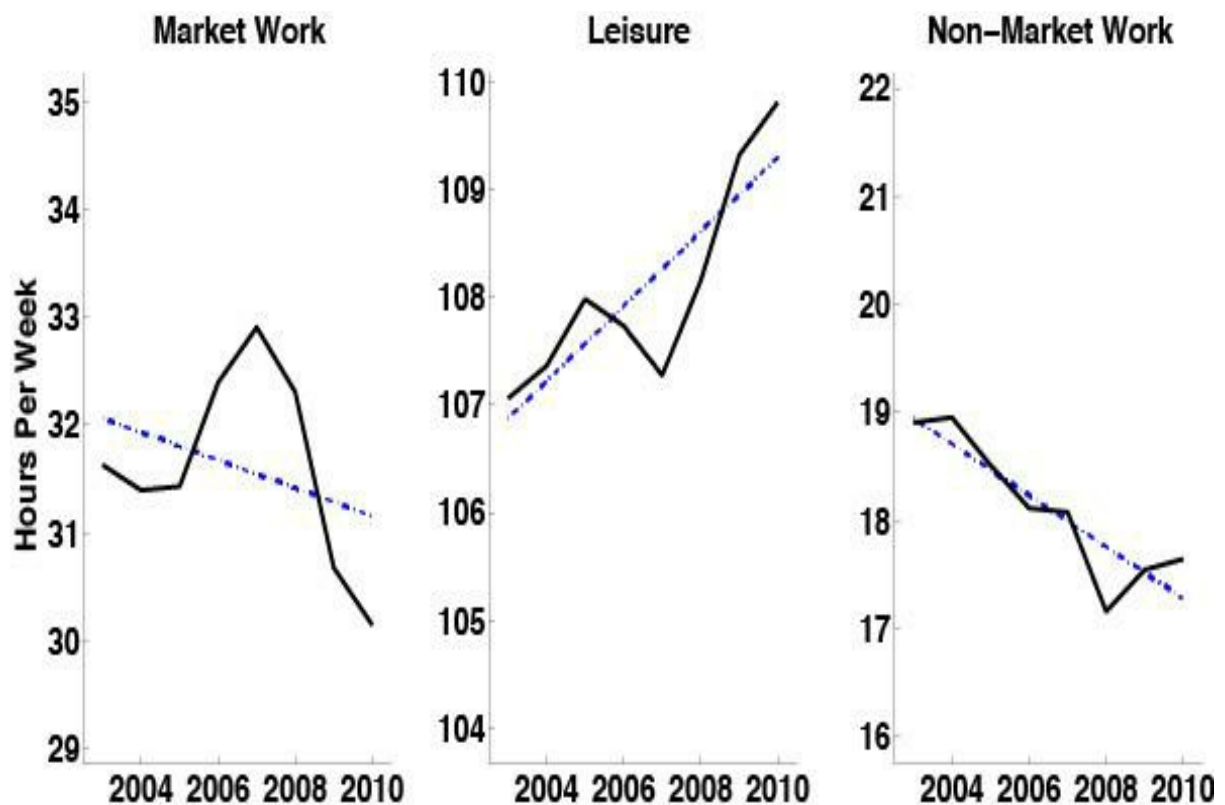
The above analysis suggests that the interpretation of changes in time allocation during a recession depends on how we control for low-frequency trends. This is what necessitates our alternate approach of using the variation of business cycles across US states to remove these aggregate trends. Specifically, we use the substantial cross-state variation of changes in market work in the ATUS data to identify how foregone market work hours are reallocated to other time-use categories. As one would expect given the low-frequency trends that we described above, we find that the simple time series analysis overestimates the substitution of foregone market work hours to leisure and underestimates the substitution of foregone market work hours to non-market work.

Figures 2 and 3 show the simple scatter plots of the changes in market work hours against the changes in leisure time and the changes in non-market work time using our US states sample. The weighted least squares regression line fitting the data in the scatter plot is also shown. As seen from the two figures, 30% of foregone market work hours are allocated to non-market work and 51% of foregone market work hours are allocated to leisure. Additionally, childcare (which is not included in non-market work) absorbs another 6% of the foregone market work hours. Given that non-market work accounts for only about 11% of the total time endowment, whereas leisure occupies 65% of the total time endowment, our results

imply that non-market work is a much more elastic margin of substitution than leisure at business cycle frequencies. We also note that the leisure categories absorbing the largest fraction of foregone market work hours is sleep (roughly 20%) and television watching (roughly 12%). As we discuss in more detail in the working paper, our findings from these simple scatter plots extend to a number of robustness exercises and more formal statistical tests.

Figure 2. Changes in market work vs. changes in leisure across US states (2003-2010)
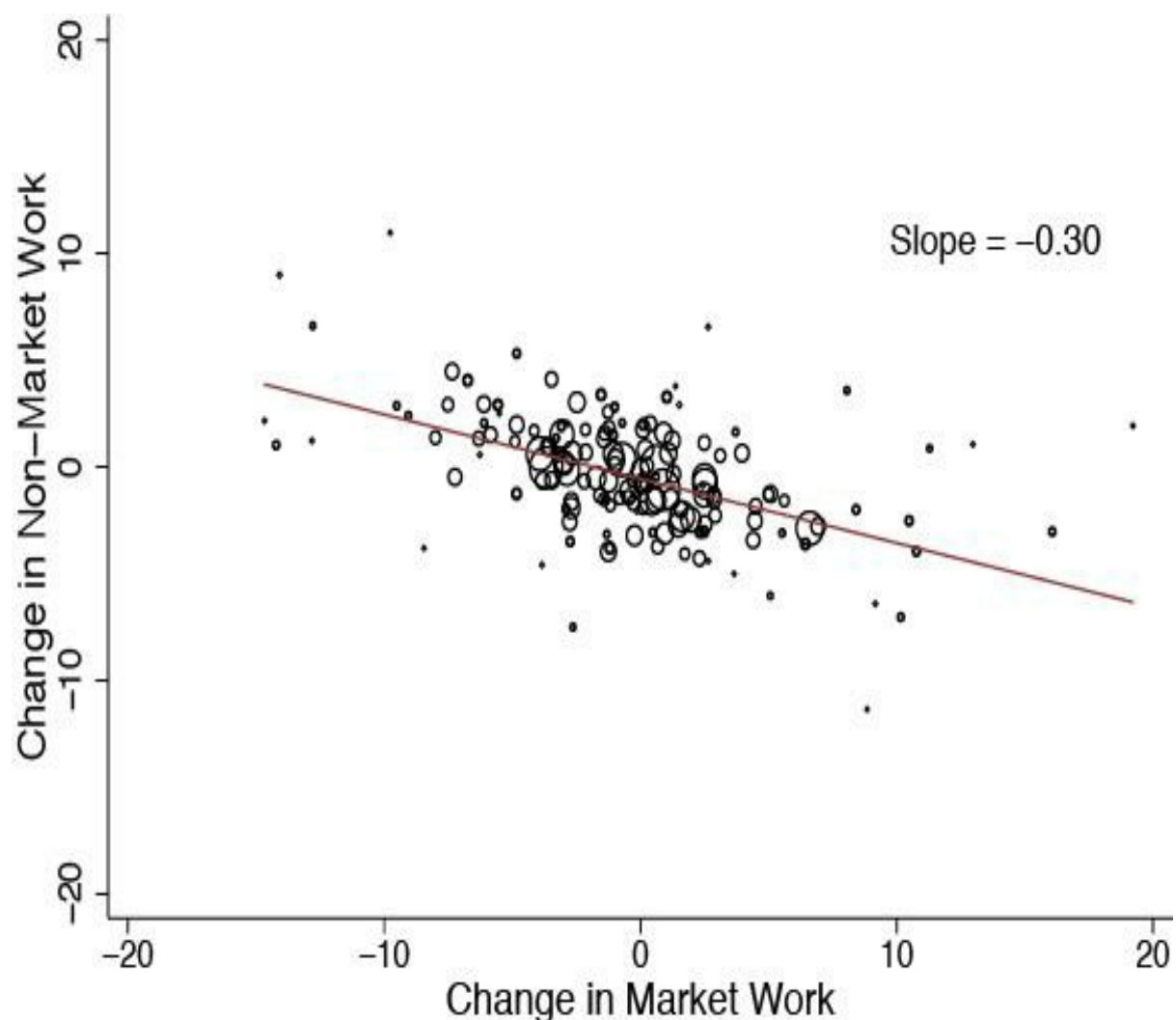
Figure 3. Changes in market work vs. changes in non-market work across US states (2003-2010)

Slope = −0.51

Change in Leisure (y-axis)

Change in Market Work (x-axis)
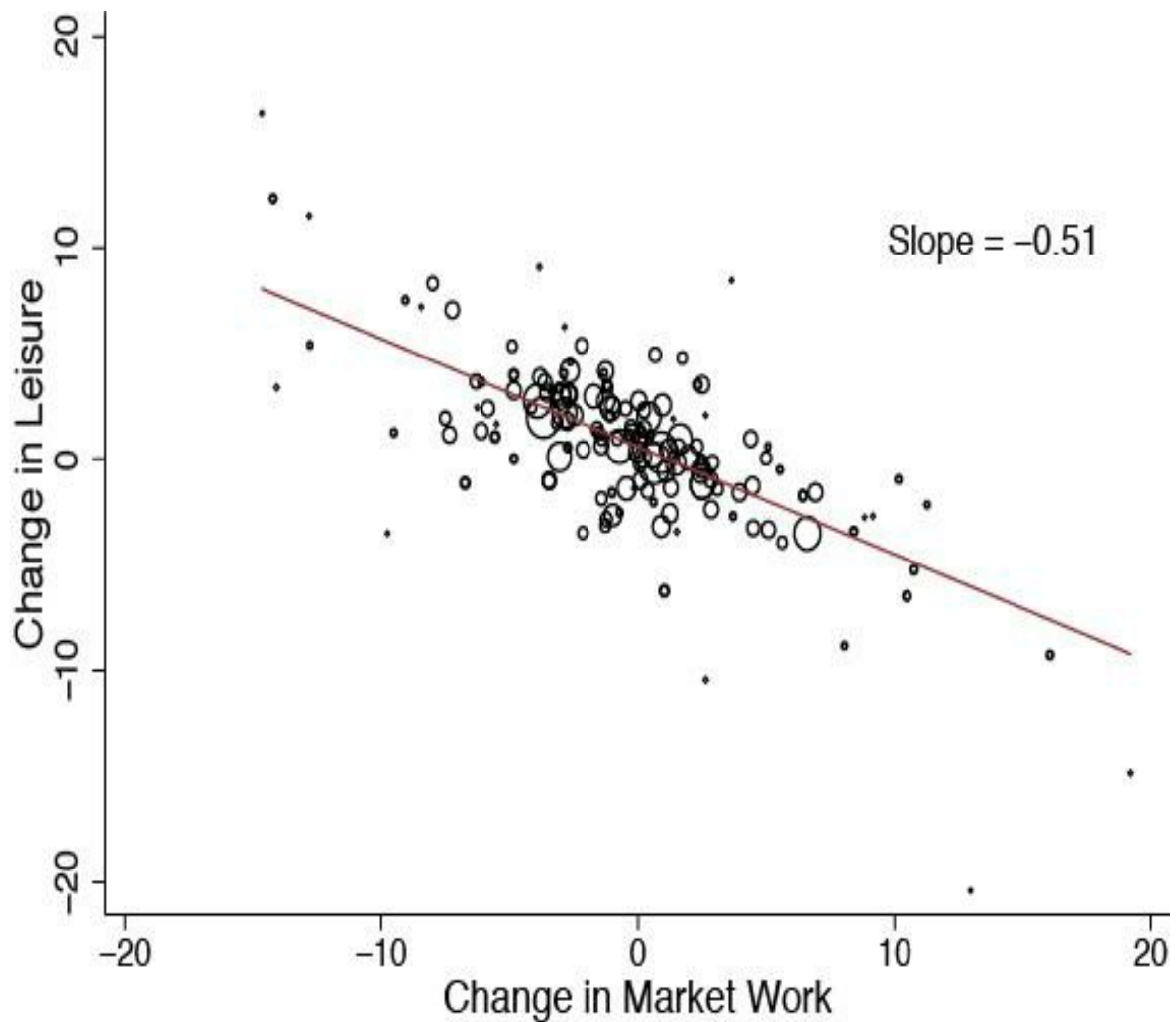
Moreover, restricting our analysis only to the recent recession sample (2007-2010) implies an even larger substitution towards home production and a smaller substitution towards leisure. Specifically, we find that about 45% of foregone market hours are reallocated to increased non-market work and to increased childcare when we examine only the recent recession sample.

We also find that less than 1% of the foregone market work hours are allocated to job search. However, this represents a fairly large percentage increase given how little time unemployed workers allocate to job search (Krueger and Mueller 2010). We show that individuals increase their time investments in their own health care, their own education, and civic activities. Specifically, around 12% of foregone market hours are allocated to these investments. Given how sizable these reallocations are, our results suggest that it is important to understand whether these are new investments that would not have occurred absent the recession or whether

these are investments that would have occurred at some point in the future that are instead moved forward to recessionary times when the opportunity cost of time is low. This distinction is important for understanding the welfare costs of business cycles.

More generally, given the prominence of non-market work as a margin of substitution over the business cycle, it is important to incorporate a home sector both when computing the welfare costs of recessions and when constructing business cycle models. In particular, our results are supportive of workhorse macroeconomic models with home production (Benhabib et al. 1991; Greenwood and Hercowitz 1991). Despite the theoretical importance of these models, the empirical analysis of the business cycle properties of these models was not previously possible because of data limitations.

References

Aguiar, Mark and Erik Hurst (2007), "Measuring Trends in Leisure: The Allocation of Time over Five Decades", Quarterly Journal of Economics, 122(3):969-1006.

Aguiar, Mark, Erik Hurst, and Loukas Karabarbounis (2011), "Time Use During Recessions", NBER Working Paper 17259.

Benhabib, Jess, Richard Rogerson, and Randall Wright (1991), "Homework in Macroeconomics: Household Production and Aggregate Fluctuations", Journal of Political Economy, 99(6):1166-1187.

Cingano, Federico and Alfonso Rosolia (2011), "Where are the jobs? Out there, somewhere. Perhaps.", VoxEU.org, 17 July.

Greenwood, Jeremy, and Zvi Hercowitz (1991), "The Allocation of Capital and Time over the Business Cycle", Journal of Political Economy, 99(6):1188-1214.

Krueger, Alan and Andreas Mueller (2010), "Job search and unemployment insurance: New evidence from time use data", Journal of Public Economics, 94(3-4): 298-307.

Ramey, Valerie and Neville Francis (2009), "A Century of Work and Leisure'', American Economic Journal: Macroeconomics, 1(2):189-224.

Smith, Jennifer (2011), "Unemployment ins and outs: Evidence from the UK", VoxEU.org, 18 July.

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1 For such an analysis using the ATUS data see, for example, the Wall Street Journal article "What

Would You Do with an Extra Hour?" published on 23 June 2010.

Part III: Growth Theory: The Economy in the Very Long Run

Chapter 8 Economic Growth I: Capital Accumulation and Population Growth

Eurozone: Looking for growth

Laurence Boone, Céline Renucci, Ruben Segura-Cayuela

BofA Merrill Lynch

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What happens after the crisis ends? This column estimates the long-term effects of the current cyclical downturn on Eurozone economies. In the absence of any real impetus for bold reform, estimates show that the damage will indeed be long lasting, permanently impairing growth for an ageing population that requires higher growth capacity more than ever before.

The financial crisis that erupted in 2008, prolonged by a sovereign crisis in the Eurozone, led to a massive contraction in trade, as well as in investment in physical and human capital; thus undermining the foundations of future growth. This may well continue as growth will not rapidly rebound while deleveraging slowly proceeds across Eurozone economies. Empirical evidence suggests deleveraging episodes accompanied by a housing crisis will take on average five and a half years across high-income OECD countries (or seven years when accompanied by a banking crisis (Aspachs-Bracon et al. 2011, IMF 2012).

Little resolution of banking-sector difficulties in the Eurozone suggests that deleveraging and credit will probably remain slow and impaired for much longer than previously thought. Recoveries that happen without credit are, on average, a third longer than recovery episodes with credit (Darvas 2013). Eurozone policymakers have withdrawn support for a policy mix – in the form of rapid attempts at fiscal tightening, monetary easing providing liquidity to banks and not to end users – at a time when a large proportion of Eurozone governments (especially the most fragile ones) had engaged in structural reforms that deliver higher growth in the future but tend to dampen it in recession (Bouis et al. 2012).

All of this is compounded by very challenging trends in demographic changes that will prove a major headwind for long-term growth (Nuño et al 2012).

Damages to long-term growth

Damages to trend growth are notoriously difficult to assess, as methods of measuring trend growth tend to produce estimates that are heavily

influenced by the estimation method itself (see OECD 2009). In addition, observed GDP growth tends to be revised until several years after the first estimate. The OECD (2009) shows that such revisions to trend growth and to the output gap can in fact be equivalent to several percentage points, thus making these exercises highly fragile. Empirical evidence shows that trend growth was, on average, overestimated prior to the crisis, but underestimated following the crisis (Borio 2012).

We draw simple scenarios in order to assess the extent of the crisis's effect on damages to trend growth, and the scope for policy to reverse these damages. Our work is based on a simple Solow growth-accounting methodology. To take into account the impact of the crisis, we distinguish three time periods:

- The run-up into the crisis (1995-2007).
- The crisis period (which we estimate ends in 2014, in line with most international organisations implicit forecasts assumptions).
- The post-crisis period.

Thus we can compare the evolution of the three underlying sources of growth prior to and during the crisis, and make simple transparent assumptions on how they can evolve, post-crisis.

Trend growth before the crisis

Results prior to the crisis are in line with most estimates (Figure 1): Spain had the highest trend growth (3.7% per annum, thanks to an inflated rise of capital and low qualified labour); followed by France; with Germany and Italy in the lowest positions because of subdued labour contribution in the former, and poor productivity in the latter (see Table 1).

Table 1. Trend growth breakdown (1995-2007)

	FR	SP	IT	DE
Labour quantity	0.3	2.1	0.6	-0.1
Labour quality	0.3	0.4	0.2	0.0
Capital	0.8	1.5	0.7	0.5
TFP	0.7	-0.3	0.0	1.1
Trend growth	**2.2**	**3.7**	**1.5**	**1.6**

Source: BofAML Global Research.

Figure 1. Trend growth estimates (1995-2007)
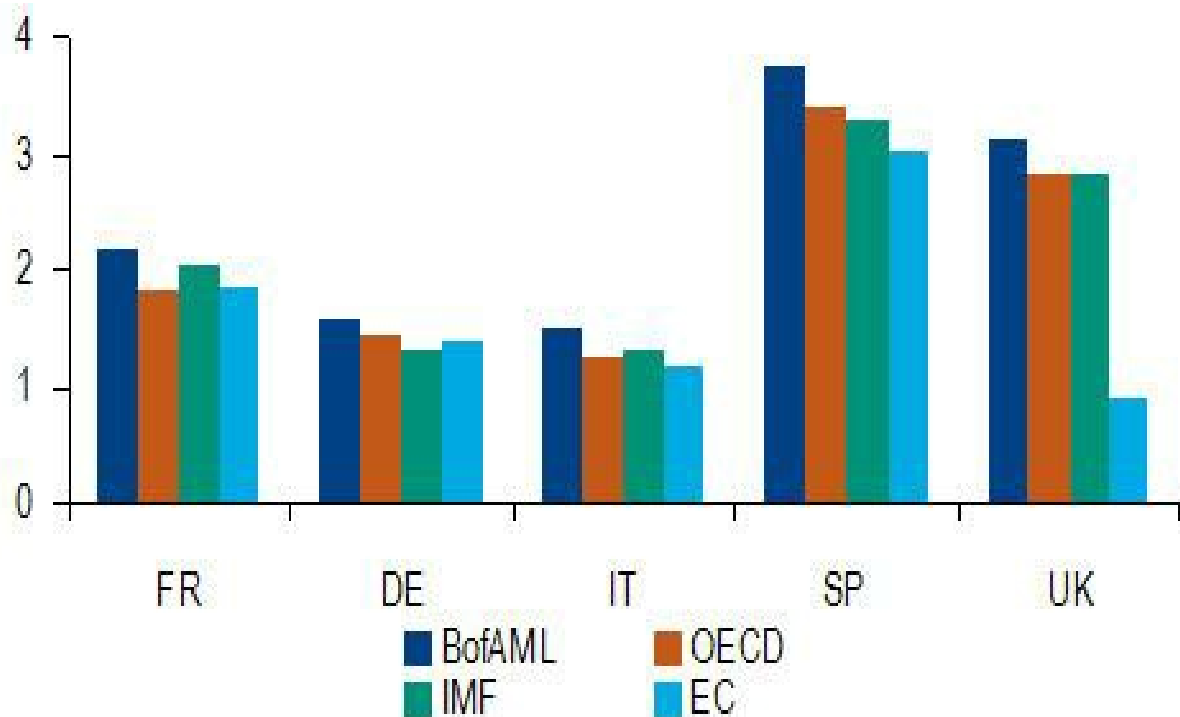
Source: BofAML Global Research.

Whereas capital and productivity growth lifted GDP growth in northern Eurozone countries, with little contribution from labour growth, the opposite occurred in Spain and Italy (OECD Sources of Growth 2013). Productivity was flat in Italy and negative in Spain (as can be expected when growth comes from low-technology content sectors), but capital and

labour growth, especially the quantity of labour, inflated GDP growth.

Trend growth during the crisis

Results for the crisis period are also similar to other 'standard' analyses, because we assume an end year of 2014 for the crisis. We proceed in a similar way to the European Commission by assuming that the output gap is close to closing in on pre-crisis levels by the end 2014 (see AMECO). For GDP inputs, we use AMECO projections, using total factor productivity as the adjusting residual.

Based on these assumptions, growth accounting provides us with an estimate of the extent of the damages caused by the crisis and the magnitude of the drop in growth over this period (see Table 2). A common feature of all economies is a collapse in productivity, which is typical of a big recession. In addition, Spain and Italy also underwent a very sharp labour contraction.

Table 2. Trend growth breakdown (2008-14)

	FR	SP	IT	DE
Labour quantity	0.0	-1.3	-0.6	0.3
Labour quality	0.2	0.3	0.1	0.1
Capital	0.6	0.6	0.2	0.4
TFP	-0.5	-0.2	-0.6	0.2
Trend growth	0.3	-0.7	-0.9	1.0

Source: BofAML Global Research.

Trend growth after the crisis

The post-crisis exercise is more interesting, though more perilous in terms of measurement, because we need to project the evolution of fundamentals – investment, labour inputs and total factor productivity. We run several scenarios for each of the three input factors in order to span a wide range of scenarios, and provide a framework for assessing:

- Long-lasting damages from the crisis.
- The additional effect of ageing.
- Some benchmarks for the capacity of economic policy to lift growth.

We also assume several things about capital and productivity:

- Regarding physical capital, we assume that the investment growth rate returns to its pre-crisis level by 2020.

A downside risk is that investment growth does not recover fully (for example, because banks fail to provide the necessary funding). In this case, we assume investment growth is only half what it was before the onset of economic turmoil. An upside risk to our estimates would be if investment were to bounce back by 2020 to the level that would have prevailed had the financial crisis not occurred.

- Regarding human capital, we use the UN's working-age population projections for taking account of demographics and run two scenarios for the unemployment rate.

One where we assume strong hysteresis and that the working-age levels stay at the European Commission's 2014 estimates (i.e. permanently higher than before the crisis), and another where unemployment rate steadily declines (using IMF projections) on the back of the ongoing, albeit slow, recovery.

- We assume that productivity was likely over-estimated pre-crisis but collapsed to an unusually low level during the crisis.

As a result, we filter total factor productivity over the whole historical period (1995-14) and use this value for the projection period (2015-20). We also estimate productivity through a convergence equation, which would slightly lift productivity in peripheral countries in the future. In that case, we use the framework of a standard convergence equation with a large sample of countries, controlling for country-specific effects, which allows speed of catch-up to vary with the distance to the technology frontier and the initial level of human capital. To this effect, we estimate

total factor productivity through a Nelson-Phelps technology diffusion model similar to Foure et al. (2010).

This exercise suggests that in the absence of policy reforms, trend growth will have been damaged significantly, by at least one percentage point, post-crisis, compared with pre-crisis levels, although our range of estimates is quite large depending on the set of assumptions being used. However, under the most favourable set of assumptions which would assume significant policy reforms (investment recovers to pre-crisis growth levels, rapid decline in the unemployment, rapid catch-up with the technology leader), trend growth would be in line with pre-crisis levels and could even be higher in Italy and Germany which had the lowest trend growth prior to the crisis.

- Our central scenario requires the most agnostic assumptions: permanent loss in the level of capital, but the growth rate recovers; unemployment improves in line with previous recoveries; productivity growth remains in line with historical average.

Under that scenario, trend growth for the four main Eurozone countries lies between little less than 1% and slightly less than 2%, post-crisis, with trend growth highest in Spain and France; and the lowest for Italy and Germany. Ageing explains a large part of this variation (see Table 3). Lower productivity and employment are the main reasons for the drop in trend growth compared to pre-crisis levels. The evolution of investment is the more sensitive assumption in determining trend growth in our set of scenarios, though the impact is not uniform across countries.

Table 3. Weak trend growth in a central scenario

	FR	DE	SP	IT	Av.
1995-2007	2.2	1.6	3.7	1.5	2.2
2008-2014	0.3	1.0	-0.7	-0.9	0.1
2015-2020	1.4	1.1	1.8	0.7	1.3

In the event that investment fails to recover quickly – perhaps because bank health takes too long to restore and transmission mechanisms of monetary policy remain impaired – or unemployment levels take longer to fall than in previous recovery episodes, then trend growth would be significantly lower for longer. Trend growth might well remain negative in Spain and Italy, and may fail to increase for Germany or France. Conversely, should economic policy support a faster investment recovery and swifter return to work of the unemployed, trend growth would return to something closer to that of pre-crisis levels. Allowing for convergence in productivity would also offer some pick up in productivity growth in periphery countries.

Figure 2. Trend growth predictions
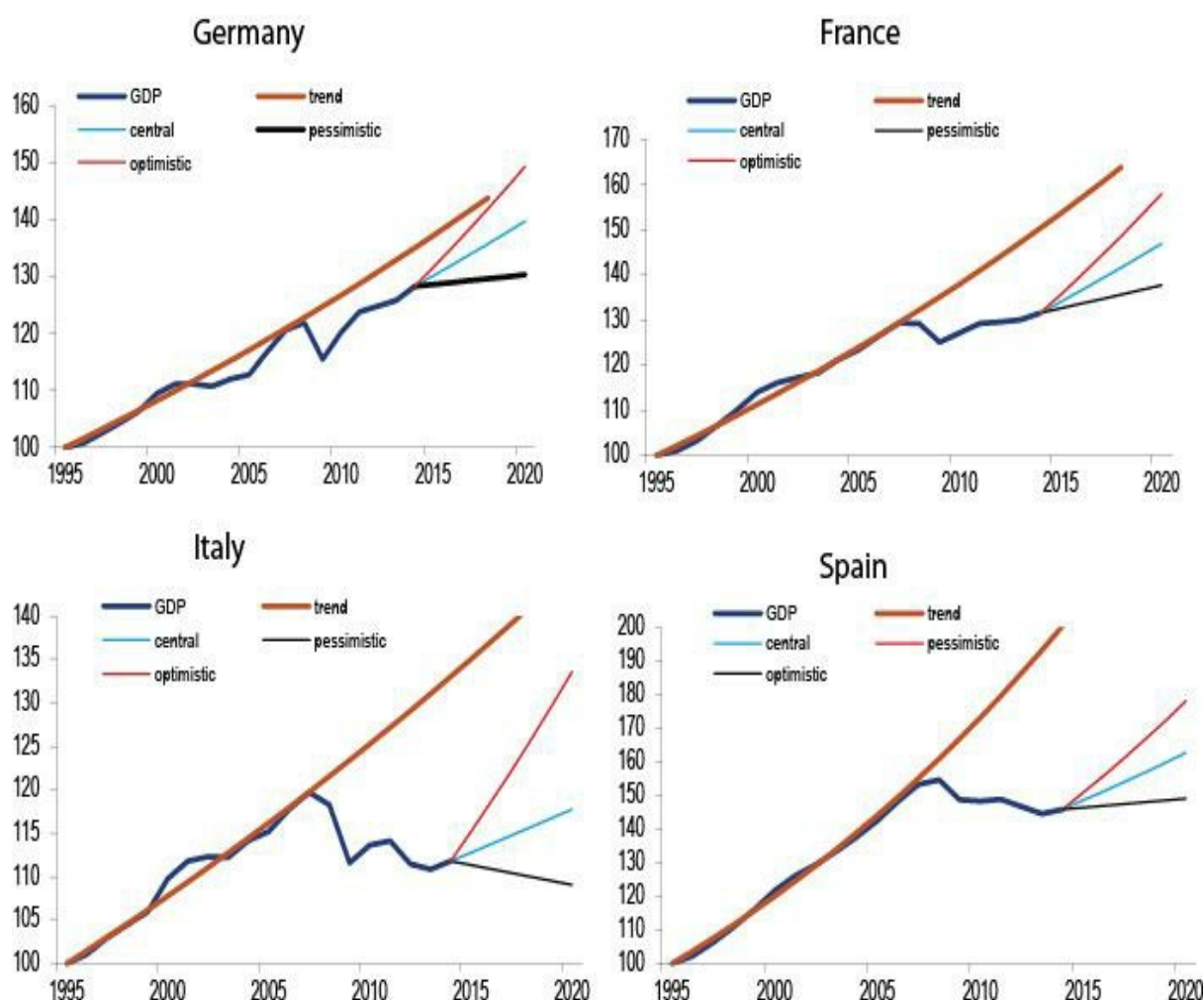
Conclusion

With a simple Solow framework, we assess to what extent the cyclical

downturn has damaged European economies in the long run. In the absence of impetus for bold reform, this exercise shows the damage will indeed be long lasting, permanently impairing growth in a context of an ageing population that needs higher growth capacity than ever before.

References

Aspachs-Bracon, O J, Jodar-Rosell and J Gual (2011), "Perspectives de desapalancamiento en Espana", *Documentos de economia*, La Caixa, No 23.

Boone, L, and R Segura-Cayuela (2013), "Europe: when will growth return?", *BofAML European Economic Viewpoint*, February.

Borio, C (2012), "The financial cycle and macroeconomics: What have we learnt?", BIS Working Papers 395, Bank for International Settlements.

Bouis, R, O Causa, L Demmou, R Duval and A Zdzienicka (2012), "The Short-Term Effects of Structural Reforms: An Empirical Analysis", OECD Economics Department Working Papers 949, OECD Publishing.

Darvas, Z (2013), "Can Europe recover without credit", February, Bruegel Policy Contribution.

Foure, J, A Benassy-Quere and L Fontagne (2010), "The world economy in 2050: a tentative picture", WP 2010-27, CEPII.

IMF (2012), *World Economic Outlook*, October.

Nuno, G, C Pulido and R Segura-Cayuela (2012), "Long-Run Growth and Demographic Prospects in Advanced Economies", Banco de España Occasional Paper No. 1206.

OECD (2010), *OECD Economic Outlook*, 2009/2, OECD Publishing.

OECD (2012), *Economic Surveys*, Spain, November.

OECD (2013), *Economic Policy Reforms, Going for growth*.

OECD (2014), *Economic Outlook*, December.

China's economic growth 'miracle' and its outlook by 2020

Yuhan Zhang

Carnegie Endowment for International Peace

13 November 2011

China's growth since the 1980s has been phenomenally high. This column argues that it has been driven not by exports, as widely believed, but by investment. It adds that this strategy makes China's economy unsustainable as it creates significant overcapacity in a range of sectors and leads to increasing debt. China's road towards more consumption-driven growth will be far from smooth.

China's economy has taken off since Deng Xiaoping's economic reforms in 1978. Contrary to the conventional wisdom that China's economic growth has been driven by exports, it is investment that actually contributes the most. China's fixed capital formation and inventories jumped from 30% of GDP in 1980 to around 47.5% in 2010. Fixed capital formation, which corresponds to infrastructure such as factories, roads, and housing, had risen to the unprecedented high of 18.2 trillion renminbi at the end of 2010. And it is still rising.

Continued high national savings fully finances Chinese investment and sustains it at a very high level. High profits of state-owned enterprises re-invested into capital-intensive projects could keep the ball rolling for quite a long time. It is noteworthy that foreign direct investment (FDI) also plays a proactive role in the Chinese economy, particularly in coastal regions. FDI not only provides the coast with capital but also with technology and know-how, which help the development of more productive projects (Naughton 2007 and Huang 2010).

Of course, the export boom has been spectacular. But it is only a recent phenomenon dating back to around 2003 (Horn et al 2010). China's rapid urbanisation is the key source of its supply of cheap labour that flows from agriculture to industry. With China's integration into the world economy after WTO accession and huge external demand, low-priced manufactured products poured into foreign countries and created China's economic 'miracle'.

China's productivity fallacy

Most economists argue that total-factor productivity's (TFP) average annual growth – 3% in1978–94 and 2.7% in 1995–2009 – explains much of China's rapid economic growth (Kuijs 2009). However, according to Harry Wu's calculations, average TFP growth was only 0.3% a year and negative in 1984–2001 (Green 2011). The numbers suggest China's growth in the past three decades was generally TFP-poor, with underlying inefficiencies in the growth model.

Over-reliance on investment and exports makes China's economy very unbalanced, vulnerable, and unsustainable. Prolonged investment on a massive scale creates significant overcapacity in a range of sectors such as steel and solar heating, which diminishes productivity improvements. Additionally, huge investment including the 4 trillion renminbi stimulus plan leads to increasing debt. Much of the medium- and long-term bank lending for infrastructure flows to local quasi-government agencies. At the end of 2009, local debt incurred by China's investment reached to 6 trillion renminbi (Lardy 2010) and now stands at 10.7 trillion or even more (New York Times 2011 and Wang and Hu 2011). It is not likely that those local quasi-government agencies will go bankrupt, because local governments repay the debt through household wealth transfers. Too much dependence on exports is also risky for China, as the West may start to save and consume much less. During the global economic crisis, the depression penetrated China's 31 provinces, and in the fourth quarter of 2008, millions of migrant workers lost their jobs.

Bumpy road ahead

The road towards more consumption-driven growth will be bumpy. With the stimulus package that has poured a huge portion of the country's GDP in financial resources into the state sectors, the momentum of investment will continue for several years. In the meantime, China has the fiscal resources to spur another round of massive investment in the seven emerging strategic industries, although in light of current inflation and local debt a new stimulus package will not be introduced soon. FDI, as a minor part of the story, is also expected to grow as a consequence of openness of interior city clusters, continued global economic recovery, very low interest rates in developed economies, as well as renminbi appreciation (Wang and Hu 2011). As such, investment growth will remain high and its share of GDP will be reluctant to pick up sharply until rebalancing measures become more effective in the medium term.

China is diversifying its export markets, yet most of its exports are manufactured products. In the next two to three years, exports may rebound strongly and current-account surpluses will continue. After the mid-2010s, exports might face more challenges as a result of smaller supply of young skilled labour and China's move towards higher value-added and technology-intensive industries in central and western areas. On balance, imports are likely to rise faster than exports, reflecting strong demand and the higher price of oil, commodities, and capital goods (Consonery et al 2011).

Spurring private consumption and leveraging its share to 50% will also be a challenge. In 2012, private consumption will grow faster than GDP, supported by solid employment and wage growth and increased government social expenditures on pensions and healthcare (Wang and Hu 2011). But the Chinese stimulus programme and ongoing massive investment in the emerging strategic industries have already led to overcapacity and huge nonperforming loans, which will ultimately be paid off by Chinese households. Chinese private consumption will be hampered (Pettis 2011). In the past two decades, China's consumer confidence index and consumer expectation index have trended downward overall. Future improvement depends on systemic reform.

In 2011–20, China's economy will become even bigger, but its growth rate will somehow wane down. China's average investment growth will be around 10%, private consumption growth around 9%, government expenditure growth 12%, and net exports growth at -1%. In 2020, after gradual structural changes, China's investment, private consumption, government expenditure, and net exports as share of GDP will possibly to be 40%, 42%, 15%, and 3%, respectively. The nation's GDP is thus expected to reach 78.4 trillion renminbi with an average growth rate at 7.8% per annum.

References

Consonery, N, E Feigenbaum, D Ma, M Meidan and H Hoyle (2011), "China's Great Rebalancing Act," Eurasia Group, August.

Green, S (2011), "China – Masterclass – The Next 5,000 Years," *Global Research Report*, Standard Chartered,May.

Horn, J, V Singer and J Woetzel (2010), "A Truer Picture of China's Export Machine," *McKinsey Quarterly*, September and personal conversation with Jonathan Woetzel on China's Exports and Economy, 26 September.

Huang, Y (2010), "Reinterpreting China's Success Through the New Economic Geography," Carnegie Paper, November.

Kuijs, L (2009), "China Through 2020 – A Macroeconomic Scenario", World Bank Research Work Paper No.9, June.

Lardy, N (2010), "The Sustainability of China's Recovery from the Global Recession," Policy Brief, Peterson Institute for international Economics, March.

New York Times (2011), "Moody's Sees Much Bigger Local Debt in China", 5 July.

Naughton, B (2007), *The Chinese Economy: Transitions and Growth*. Massachusetts, MIT Press.

Pettis, M (2009), "Sharing the Pain: The Global Struggle Over Savings", Policy Brief, the Carnegie Endowment for International Peace, November.

Wang, T and H Hu (2011), "China By the Numbers", *UBS Investment Research*, August.

When Iceland was Ghana

Thorvaldur Gylfason

University of Iceland and CEPR

25 January 2008

Are some African economies poised for prolonged growth and human development? This article assesses African development prospects using Iceland's economic ascent over the last century as a benchmark.

Believe it or not: in 1901, Iceland's per capita national output was about the same as that of Ghana today. Today, Iceland occupies first place in the United Nations' ranking of material success according to the Human Development Index that reflects longevity, adult literacy, and schooling as well as the purchasing power of peoples' incomes. Can Iceland's rags-to-riches story be replicated in Africa and elsewhere in the developing world? If so, what would it take?

Grandmother-verifiable statistics

In 1901, my grandmother was twenty-four. She had six children, as was common in Iceland at the time, even if the average number of births per woman had decreased from almost six in the early 1850s to four around 1900, like in today's Ghana. In fact, the number of births per woman in Iceland was four in 1960, so Iceland and Ghana are separated in this respect by a half-century or less. It took Ghana less than fifty years, from 1960 to date, to reduce the number of births per woman by three, from almost seven to four. It took Iceland a century and a half, from the late 1850s to date, to reduce the number of births per woman by three, from five to two (or 2.1 to be precise, the critical number that keeps the population unchanged in the absence of net immigration).

True, Ghana has made more rapid progress on the population front than many other African nations. The average number of births per woman in Sub-Saharan Africa has decreased from 6.7 in 1960, as in Ghana, to 5.3 in 2005. These averages, however, mask a wide dispersion in fertility across countries. Mauritius is down to two births per woman compared with almost six in 1960. Botswana is down to three, from seven in 1960. The women of Kenya, Tanzania, and Uganda now have five, six, and seven children each on average compared with eight, seven, and seven in 1960.[1]

Goodbye to short lives in large families

The point of this comparison of demographic statistics is that social indicators often provide a clearer view than economic indicators of important aspects of economic development. Moreover, several social indicators of health and education – fertility, life expectancy, literacy, and such – are readily available for most countries and in some cases reach farther back in time than many economic statistics. Fertility matters because most families with many children cannot afford to send them all to school and empower them to make the most of their lives. Families with fewer children – say, two or three – have a better shot at being able to offer a good education to every child, thus opening doors and windows that otherwise might remain shut. Reducing family size, therefore, is one of the keys to more and better education and higher standards of life. As Hans Rosling has pointed out very vividly, short lives in large families are no longer a common denominator in developing countries.[2]

Around the globe, including in many parts of Africa, there is a clear trend toward smaller families and longer lives. In Ghana, for example, life expectancy at birth has increased by more than three months per year since 1960, from 46 years in 1960 to 58 years in 2005. In Sub-Saharan Africa on average, all 48 countries included, life expectancy increased less rapidly, from 41 years in 1960 to 47 years in 2005. Average life expectancy is now on the rise again in Africa, having reached a peak of 50 years in the late 1980s and then decreased mostly on account of the HIV/AIDS epidemic.

Iceland's economic history through African eyes

Let us now return to Iceland and briefly trace its economic history since 1901 through African eyes, as it were. In 1901, Iceland's Gross Domestic Product (GDP) per capita was about the same as that of Ghana today, measured in international dollars at purchasing power parity. This observation, illustrated in Figure 1, follows from two simple facts:

Iceland's per capita GDP has increased by a factor of fifteen since 1901, a mechanical consequence of an average rate of per capita output growth of 2.6% per year from 1901 to 2006;
In 2006, at USD 2,640 at purchasing power parity, Ghana's per capita GDP was about one-fourteenth of Iceland's per capita GDP of USD 36,560.

Figure 1. Through African Eyes: Iceland's per capita output, 1901-2006 (2000 = 100)
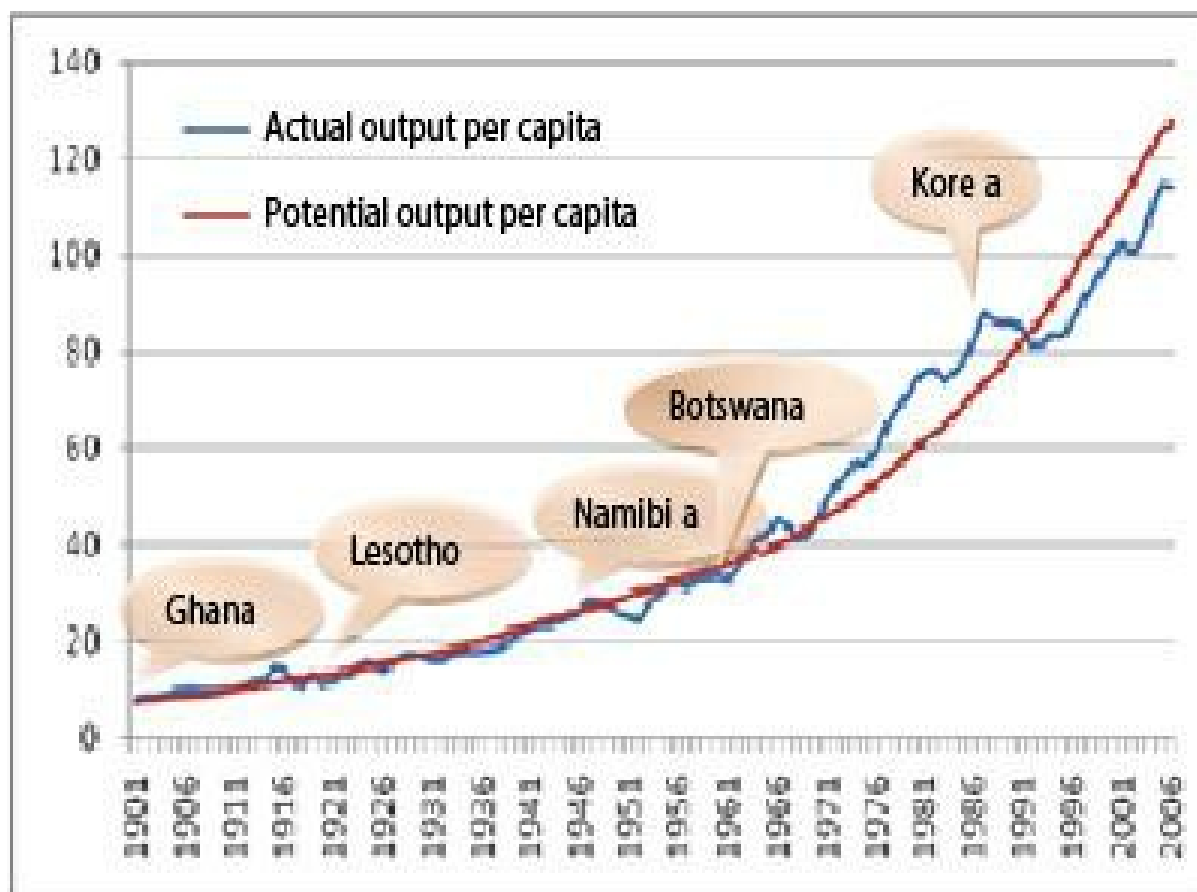
With the passage of time, Iceland's economy grew. The uneven trajectory in the figure traces the ups and downs of Iceland's actual per capita GDP, whereas the smooth one shows Iceland's potential per capita output, conventionally estimated by a simple regression of actual per capita GDP on time, thus abstracting from business cycles. By 1920, Iceland's per capita GDP had reached the level of today's Lesotho. By 1945, Iceland had become Namibia and by 1960, Botswana. By 2006, Botswana's per capita GDP had climbed to USD 12,250, one third of Iceland's. Put differently, Iceland's per capita GDP in 1960 was one third of what it is today, and its annual growth rate of 2.6% per year tripled the level of per capita GDP from 1960 to 2006. By 1985, leaving Africa behind, Iceland had become South Korea.

Piling up capital (and books)

How did Iceland do it? To make a long story short, upon achieving Home Rule in 1904, Iceland accumulated capital at a fairly rapid pace, all kinds of capital, for this is what capitalism in a mixed market economy is all about, plus hard work: physical capital through saving and investment, human capital through education and training, foreign capital through

trade, financial capital through banking, and social capital by means of democracy, institution building, and equality. Natural capital also played a role, first rich fishing grounds offshore and later hydro power and geothermal energy, but the key to the successful harnessing of the country's natural capital was its earlier accumulation of human capital. And human capital is probably the single most important key to Iceland´s growth performance, due to smaller families and steadily longer lives.

When Home Rule was achieved in 1904, most of Iceland's impoverished population was already literate because literacy had been near universal since the end of the 18th century. Thus, Icelanders were well prepared for the modern age into which they were catapulted at the beginning of the 20th century. Not only is the general level of education made possible by near-universal literacy good for growth, but the social conditions – law abidance, for example – that make near-universal literacy possible are almost surely also good for growth. Exact measures of literacy in Iceland in 1900 are unavailable, but statistical information on the number of books published is available. In 1906, the number of books in Icelandic published per one thousand inhabitants was 1.6, which is more than in today's Norway and Sweden. By 1966, the number of books published in Icelandic per one thousand inhabitants had climbed to 2.7, the current level in Denmark and Finland. By 2000, the figure for Iceland had risen to seven books published per one thousand inhabitants. It is possible that, with small editions of each book, small countries such as Iceland (population 300,000) have room for more titles. Nonetheless, these are impressive figures, and reading is good for growth.[3]

Closing the gap

At the beginning of the 21st century, African societies face a twofold challenge. First, they must achieve near-universal literacy because education is the key to the accumulation of human capital as well as other types of capital and the key to growth-friendly management of natural capital. In 1970, 28% of adults in Sub-Saharan Africa knew how to read and write. By 1990, Africa's literacy rate had increased to 51% and by 2006, to 61%. Youth literacy – that is, literacy among those between the ages of 15 and 24 – had risen to 73% in 2006. The literacy gap must be closed as quickly as possible, with no child left behind. With near-universal literacy, Ghana should be able increase its per capita GDP by a factor of fifteen – why not? – in three generations, or less, as Iceland did by practicing democracy and piling up capital of all kinds through education, trade, and investment. Other African countries should as well,

though most have further to go than Ghana, whose per capita GDP in 2006 was twice that of Kenya and almost four times that of Malawi.

By now, fourteen out of 48 Sub-Saharan African countries have managed to reduce the number of births per woman below 4.3, Iceland's 1960 figure. Some distances are shorter than they might seem.

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1 All figures on output, fertility, and literacy cited in the text are taken from the World Bank's World Development Indicators 2007 except the historical figures on Iceland that are obtained from Statistics Iceland.

2 See the opening minutes of Rosling's 2007 TED presentation, available at http://www.gapminder.org/video/talks/ted-2007---the-seemingly-impossible-is-possible.html

3 Canoy, Marcel F. M., Jan C. van Ours, and Frederick van der Ploeg, "The Economics of Books," Chapter 21 in V. Ginsburgh and D. Throsby (eds.), Handbook of the Economics of Art and Culture, 2006, North-Holland, Amsterdam. Also available as CEPR Discussion Paper No. 4892, February 2005.

Chapter 9 Economic Growth II: Technology, Empirics, and Policy

Global growth generators: Moving beyond emerging markets and BRICs

Willem Buiter, Ebrahim Rahbari

Citigroup and CEPR; Citigroup

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Which countries will drive growth for the next 40 years? This column introduces a new Policy Insight in which Citi economists Willem Buiter and Ebrahim Rahbari investigate the likely future sources of global economic growth between 2010 and 2050. They come up with 11 global growth generators, i.e. 11 3Gs. Surprisingly, Brazil and Russia do not make the cut while two Africans countries are in.

The last wave of globalisation has been driven by technology and by the deliberate removal of man-made obstacles to cross-border movements of goods, services, capital, people, and ideas. It has been instrumental in spreading economic growth more widely than ever before (see for example Pinkovskiy and Sala-i-Martin 2010 on this site). But what will the next 40 years look like?

This column introduces a new Policy Insight (Buiter and Rahbari 2011) in which we investigate the likely future sources of global economic growth between 2010 and 2050. We identify who will be the global growth generators, i.e. 3Gs.

We don't want 3G to join the list of patronising acronyms or even the list of cute but uninformative and pointless ones (BRIC, Next Eleven, Seven Percent Club), although at one point we flirted with an intriguing label like the Magnificent Seven, the Nine Nazgûl or The 39 Steps. Instead we view it as a question. What are the generators of global growth and profitable investment opportunities or the next 40 years? This question requires an answer based on economic fundamentals and a replicable methodology.

Forecasting the next 40 years of global growth

We base our forecasts on three sources of information.

- A set of individual country forecasts of GDP (real GDP using PPP

exchange rates and dollar GDP using market exchange rates), per capita GDP, inflation, and market exchange rates for 58 countries accounting for 85% of global GDP prepared by the 50 economists on Citi's Economics team.

- Historical GDP data for the most recent 10-year period.
- A few centuries of economic research on the drivers of long-term growth.

Our reading of the historiography and cliometrics of secular economic growth also prompted us to construct a 3G index that aggregates some key growth drivers identified in this literature (see Barro and Sala-i-Martin 2003 for a useful survey). These are:

- gross fixed domestic capital formation (as a share of GDP),
- gross domestic saving (as a share of GDP),
- a measure of human capital, itself aggregating demographic, health and educational achievement indices,
- a measure of institutional quality,
- a measure of trade openness, and
- the initial level of per capita income.

One key insight was the distinction between growth at the technology frontier and catch-up or convergence growth. We use the local knowledge embodied in our economists' forecasts (including demographic projections), the historical per capita GDP growth rates for the most recent decade, and stylised facts of convergence (the US as the frontier technology country and the empirical regularity that historically the rate of convergence has been lower the smaller the productivity gap between the frontier nation and the converging nation) to put together our final published set of forecasts.

Our key projections – Who will be 3G?

We expect strong growth in the world economy until 2050 (see Figure 1), with real GDP growth at PPP exchange rates of 4.6% per annum until 2030 and 3.8% for the period 2030-2050. This would cause global real GDP at PPP exchange rates to rise from $73 trillion in 2010 to about $377 trillion in 2050.

Figure 1. World real GDP growth 2010-2050

(a) World GDP (USD trn) 2010-2050
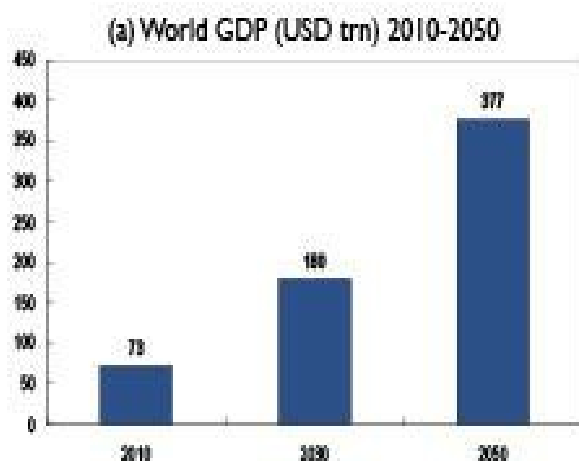
Note: In trillion 2009 PPP USD.
Source: Citi Investment Research and Analysis.

(a) World population (in billions)

Source: UN Population Statistics and Citi Investment Research and Analysis

Our 3G countries - there are 11 of them – comprise Bangladesh, China, Egypt, India, Indonesia, Iraq, Mongolia, Nigeria, Philippines, Sri Lanka, and Vietnam. They were selected on the basis of thei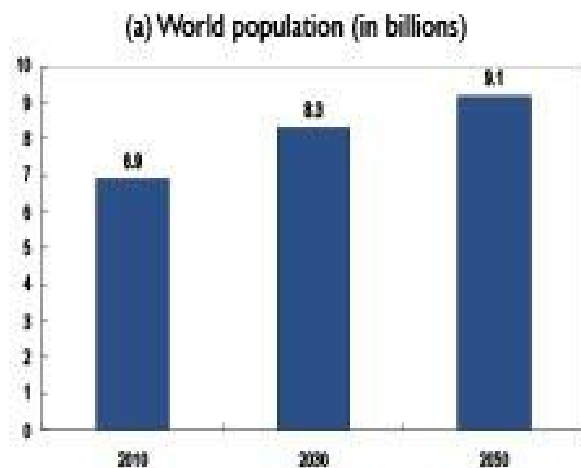r average real per-capita GDP growth over the period 2010-2050 – 5% or higher at PPP exchange rates. There was a distinct discontinuity of more than 0.5% in projected per-capita growth rates between the 11 3G countries and the fastest-growing country not included in the 3G category, which was Thailand.

Of the 11 countries we identify as global growth generators, nine are in emerging Asia. This is probably not surprising, but our next finding, that the other two are African nations may well be something of a surprise. We believe that this may well turn out to be Africa's century as well as Asia's century.

China will overtake the US to become the largest economy in the world by 2020 (at PPP exchange rates; it would take a decade longer at market exchange rates) and will itself be overtaken by India by 2050.

There are several reasons why two of the BRICs, Brazil and Russia, are not in the 3G category. One is that they are significantly richer than the 3G countries. A lot of catch-up has already occurred and most of the low-hanging fruit is gone. The second reason is their low investment rates. The third is that, for the later stages of the convergence process, the quality of institutions and policies matters more than for the early stages. Brazil and especially Russia have material weaknesses in the quality of their key economic institutions and policies which limit their growth prospects.

Conclusion: There's never been a better time for humanity

Projections and forecasts are smooth. Growth will not be smooth. Market economies and capitalism are characterised by alternating booms and busts, not by smooth growth. In addition, there will be occasional 'growth disasters', caused by very bad policies, internal or external conflicts or natural disasters. We know such growth disasters will occur, although we don't know which country or countries they will affect. It must be recognised, therefore, that because of our inability to forecast local growth disasters, our global growth estimates are bound to be somewhat optimistic.

Even allowing for that, however, we believe that there was never a better time for humanity, as regards the satisfaction of material wants, than the first half of the 21st century is likely to be. There is no secret to how to achieve high growth rates. Some of the necessary conditions are, however, not choices – even collective choices – that nations or regions can make. Others represent the result of choices that ought not to be made.

References

Barro, Robert J and Xavier Sala-i-Martin (2003), *Economic Growth*, 2nd Edition, McGraw-Hill

Buiter, Willem H. and Ebrahim Rahbari (2011), Global Growth Generators; Moving beyond 'Emerging Markets' and 'BRIC', *Citi Global Economics*, 21 February 2011.

Buiter, Willem H and Ebrahim Rahbari (2011), "Global growth generators: Moving beyond emerging markets and BRICs," *CEPR Policy Insight* No 55, 21 April.

Pinkovsky, Maxim and Xavier Sala-i-Martin (2010), "African povery is falling…much faster than you think", VoxEU.org, 6 December.

Is technological progress a thing of the past?

Joel Mokyr

Northwestern University

8 September 2013

Has technological progress slowed down? Have we really picked all the low-hanging fruit? This column argues that technological progress is in fact not a thing of the past. Far from it. There are myriad reasons why the future should bring more technological progress than ever before – perhaps the most important being that technological innovation itself creates questions and problems that need to be fixed through further technological progress. If we rethink how innovation happens, we have every reason to suspect that we ain't seen nothing yet.

Technological progress has been at the heart of economic growth for two centuries. Some authors, however, have suggested that product and process innovation are running out of steam:

- Robert J Gordon and Tyler Cowen, inter alia, have expressed the view that technological progress is slowing down (Gordon 2012, Cowen 2011).
- Jan Vijg has suggested that the industrialised West of the 21st century will resemble the declining Empires of late Rome and Qing China (Vijg 2011).

Their basic point is that technological dynamism is fizzling out. The low-hanging fruits that have improved our lives so much in the 20th century have all been picked. We should be ready for a more stagnant world in which living standards rise little if at all.

History and the future

History is always a bad guide to the future and economic historians should avoid making predictions. All the same, the historical records provide some insights into what makes societies technologically creative. Such insights, in turn can be used at the basis for looking ahead to assess how likely such a decline is to take place.

The answer is short and simple: we ain't seen nothin' yet, the best is still to come.

Supply and the demand sides of innovation

My argument concerns both the supply and the demand sides of innovation. Starting with supply, what is it that accounts for sustained technological progress? The relation between scientific progress and technology is a complex two-way street. For example, 19th-century energy-physics learned more from the steam engine than the other way around.

The historical record makes clear that science depends on technology in that it depends on the instruments and tools that are needed for science to advance. New instruments opened new horizons in what Derek Price called "artificial revelation", observations through instruments that allow us to see things that would otherwise be invisible.

Examples:

- The Scientific Revolution of the 17th century depended critically on the development of the telescope, the microscope, the barometer, the vacuum pump, and similar contraptions.
- The achromatic-lens microscope developed by Joseph J Lister (father of the famous surgeon) in the 1820s paved the way for the germ theory, the greatest breakthrough in medicine before 1900.

The same was true in physics, for instance:

- The equipment designed by Heinrich Hertz allowed him to detect electromagnetic radiation in the 1880s and Robert Millikan's ingenious oil-drop apparatus allowed him to measure the electric charge of an electron (1911).

In the twentieth century, the impact of instruments on progress is even more apparent. For example:

- X-ray crystallography, developed in 1912, was crucial forty years later in the discovery of the structure of DNA.

If tools and instruments are a key to further scientific progress, it is hard not to be impressed by the possibilities of the 21st century:

- DNA sequencing machines and cell analysis through flow cytometry (to mention but two) have revolutionised molecular microbiology.
- High-powered computers are helping research in every domain conceivable, from content analysis in novels to the (very hard) problems of turbulence.
- Astronomy, nanochemistry, and genetic engineering are all areas in which progress has been mind-boggling in the past few decades thanks to better tools.

To be sure, there is no automatic mechanism that turns better science into improved technology. But there is one reason to believe that in the near future it will do so better and more efficiently than ever before. The reason is access.

Inventors, engineers, applied chemists, and physicians all need access to best-practice science to answer an infinite list of questions about what can and cannot be done. Search engines were invented in the 18th century through encyclopaedias and compendia that arranged all available knowledge in alphabetical order, making it easy to find. Textbooks had indexes that did the same. Libraries developed cataloguing systems and other techniques that made scientific information findable.

But these search systems have their limitations. One might have feared that the explosion of scientific knowledge in the 20th century could outrun our ability to find what we are looking for. Yet the reverse has happened. The development of searchable databanks of massive sizes has even outrun our ability to generate scientific knowledge. Copying, storing, transmitting, and searching vast amounts of information today is fast, easy, and practically free. We no longer deal with megabytes or gigabytes. Instead terms like petabytes (a million gigabytes) and zettabytes (a million petabytes) are being bandied about. Scientists can now find the tiniest needles in data haystacks as large as Montana in a fraction of a second. And if science sometimes still proceeds by 'trying every bottle on the shelf' – as in some areas it still does – it can search with blinding speed over many more bottles, perhaps even peta-bottles.

Have all the low-hanging fruits been picked?

One answer is that the analogy is flawed. Science builds taller and taller ladders, so we can reach the upper branches, and then the branches above

them.

- A less obvious answer is that technological progress is fundamentally a dis-equilibrating process.

Whenever a technological solution is found for some human need, it creates a new problem. As Edward Tenner put it, technology 'bites back'. The new technique then needs a further 'technological fix', but that one in turn creates another problem, and so on. The notion that invention definitely 'solves' a human need, allowing us to move to pick the next piece of fruit on the tree is simply misleading.

- Each solution perturbs some other component in the system and sows the seed of more needs; the 'demand' for new technology is thus self-sustaining.

The most obvious example for such a dynamic is in our never-ending struggles with insects and harmful bacteria. In those wars, evolutionary mechanisms decree that after most battles we win, the enemy regroups by becoming resistant to whatever poison we throw at them. Drug-resistant bacteria are increasingly common and require novel approaches to new antibiotics. The search for novel antibiotics will resume with tools that Chain and Florey would never have dreamed of – but even such new antibiotics will eventually lead to adaptation.

In agriculture, the advance in fertiliser use has helped avert the Malthusian disasters that various doom-and-gloom authors predicted. But the vast increase in nitrate use following Fritz Haber's epochal invention of the nitrogen-fixing process before World War I has now led to serious environmental problems in aquifer pollution and algae blooms. Again, technology will provide us with a fix, possibly through genetic engineering in which more plants can fix their own nitrates rather than needing fertiliser or bacteria that convert nitrates into nitrogen at more efficient rates.

Another example is energy: For better or for worse, modern technology has relied heavily on fossil fuels: first coal, then oil, and now increasingly on natural gas. The bite-back here has been planetary in scope: climate change is no longer a prospect, it is a reality. Can new technology stop it? There is no doubt that it can, even if nobody can predict right now what shape that will take, and if collective action difficulties will actually make

it realistic.

What will the workers do?

Perhaps the biggest bite-back is what happens to human labour. If technology replaces workers, what will the role of people become? From Kurt Vonnegut to Erik Brynjolfsson, dystopias about an idle and vapid humanity in a robotised economy have worried people. There will be disruption and pain, but the new technology will also create new demand for workers, to perform tasks that a new technology creates.

- In 1914 who could have imagined occupations such as video game programmer or identity-theft security guard?
- Physical therapists, social media consultants, and TV sports commentators are all occupations created by new technology.

It seems plausible that the future, too, will create occupations we cannot imagine, let alone envisage. Furthermore, the task that 20th-century technology seems to have carried out the easiest is to create activities that fill the ever-growing leisure time that early retirement and shorter work-weeks have created. Technological creativity has responded to the growth of free time: a bewildering choice of programmes on TV, the rise of mass tourism, access at will to virtually every film made and opera written, and a vast pet industry are just some examples. The cockfights and eye-gouging contests with which working classes in the past entertained themselves have been replaced by a gigantic high-tech spectator-sports industrial complex, both local and global.

Keynes' vision

In his brief Economic Possibilities for our Grandchildren (1931) Keynes foresaw much of the future impact of technology. His insights may surprise those who regard him as the prophet of unemployment: "all this [technological change] means in the long run [is] that mankind is solving its economic problem" (italics in original). Contemplating a world in which work itself would become redundant thanks to science and capital (Keynes did not envisage robots, but they would have strengthened his case), he felt that this age of leisure and abundance was frightening people because "we have been trained too long to strive and not to enjoy".

References

Brynjolfsson, E and A McAfee (2011), *Race Against the Machine*, New

York, Digital Frontier Press.

Cowen, T (2011), *The Great Stagnation*, New York, Dutton.

Gordon, R J (2012), "Is US Economic Growth over? Faltering Innovation confronts the six Headwinds", NBER Working paper series, 18315, August.

Mokyr, J (2002), *The Gifts of Athena*, Princeton, Princeton University Press.

Price, D (1984a), "Notes towards a Philosophy of the Science/Technology Interaction" in Rachel Laudan (ed.) *The Nature of Knowledge: are Models of Scientific Change Relevant?*, Dordrecht, Kluwer.

Tenner, E (1996), *Why Things Bite Back: Technology and the Revenge of Unintended Consequences*, New York, Knopf.

Vijg, J (2011), *The American Technological Challenge: Stagnation and Decline in the 21st Century*, New York, Algora Publishing.

Vonnegut, K (1974), *Player Piano*, New York, Dell Paperbacks.

Unleashing growth: The decline of innovation-blocking institutions

Klaus Desmet, Stephen L. Parente

Universidad Carlos III and CEPR; University of Illinois

18 May 2013

Innovation is the beating heart of modern growth. This column argues that innovation-blocking institutions weaken when markets expand and competition intensifies. The rise and decline of medieval Italian crafts guilds offer valuable insights into this process. Policies that promote greater market integration and stronger competition are key steps in lowering the barriers to innovation.

Two hundred years ago, during the Napoleonic Wars, the Luddite movement rocked the English industrial landscape. Dissatisfied with falling wages and increased competition from mills employing cheap rural labour, the Luddites broke into factories at night, smashing spinning frames and power looms.

Of course, the Luddites were by no means the first group to try to block innovation in Europe; in the Middle Ages the craft guilds were more often than not at the forefront of resisting labour-saving technology and limiting competition. Nor were the Luddites the most successful, either. For all their notoriety, the Luddite conflict ended a mere six years after it started when the British government ordered 12,000 troops to put down the riots. In contrast, many of the craft guilds successfully blocked the diffusion of new technology for much of the medieval period.

Ironically, although the Luddites have become the poster child of those opposing technological change, they more appropriately symbolise the end of wide-scale resistance by the craft guilds. In effect, they mark the end of a long historical period where these groups had the ability to block technology and limit competition. About half a century before the Luddite riots, this ability had begun to wane in Britain and other parts of Europe when governments began to rule against the craft guilds in their legal challenges to prevent the use of new machines in a variety of industries. The use of troops to quell the Luddite uprising completed this shift in power and influence.

The existence of innovation-blocking institutions should of course not come as a surprise, but what makes such institutions prevalent and effective in some periods and not in others? Among economic historians there is a growing consensus that guilds in Europe lost their ability to block new technology once society realised that innovation had a beneficial effect on humanity, and was thus not a zero-sum game. This shift in societal attitudes, led by a handful of enlightened thinkers of the day, is what Mokyr (2005) labels the Great Enlightenment, Jacob (1981) the Radical Enlightenment, McCloskey (2010) the Bourgeois Revaluation, and Goldstone (2002) the Engineering Culture. According to these scholars, the deathlike grip guilds had held on innovation ended once enlightened individuals of the period educated society about the marvels of technology, and with this realisation, human history was changed forever.

Market size and competition

In recent work we challenge this consensus view and offer a different explanation for the demise, as well as the rise, of guilds (Desmet and Parente 2013). In particular, we argue that two conditions were necessary for specialised workers to form a guild: first, switching to a new technology must be profitable for a would-be adopter, and second, profits should be insufficient to cover the cost of overcoming workers' resistance. For small markets where competition is weak, firms have no desire to change their production process as profits from technology adoption are negative. Hence workers have no incentive to organise into guilds. For intermediate-sized markets with modest competition, technology adoption is profitable in the sense of covering any fixed research-and-development cost, but not sufficiently so to be able to break the resistance of workers. Hence, guilds appear and block the introduction of cost-saving technologies in their industries. For large markets with intense competition, profits from technology adoption are sufficiently large to give firms enough firepower to either defeat guilds on their own or influence government policy in their favour. Consequently, guilds disappeared and more productive technology diffuses throughout the economy.

Well before decrees abolishing guilds were implemented in the late 18th and early 19th centuries in Europe, there is evidence that guilds were less influential in larger markets. In Lille, a town in northern France, the textile industry, faced with greater domestic competition in the late 17th century from rural unguilded Flemish weavers, relaxed guild training regulations, thus liberalising the labour market and reducing costs (Ogilvie 1994). Often, greater openness was the reason for expanding markets, tougher

competition and the weakening of guilds. As in the case of the Luddites, the resistance to the scribbling machine in the west of England ended in 1795 in the wake of a trade boom (Randall 1991).

Evidence from Italian crafts guilds

A key implication of Desmet and Parente (2013) is that there exists a U-shaped relation between market size and technology-blocking institutions. This pattern is apparent in the data on Italian guilds that covers 55 cities from the 14th to the 19th century; Figure 1 plots the probability of having a guild as a function of city size (which is taken to be a proxy of market size). The blue dotted curve shows the predicted relation between market size and guild existence, whereas the small triangles show the actual shares of cities with guilds by size. Guilds were not likely to be present in either small or large cities.

Most of the Italian guilds were abolished by state decree. Whether guilds disbanded on their own accord or by legal means is not really important. The implementation of state-wide or national decrees outlawing guilds could simply have reflected the increasing societal cost of having guilds and the consequent expanding political and economic power of would-be adopters. What is important is that the overall benefits of innovation to society increase as the markets expand.

Figure 1. Relation between a city's population and the probability of it having a guild in Italy between 14th and 19th century

Probability of Having Guild
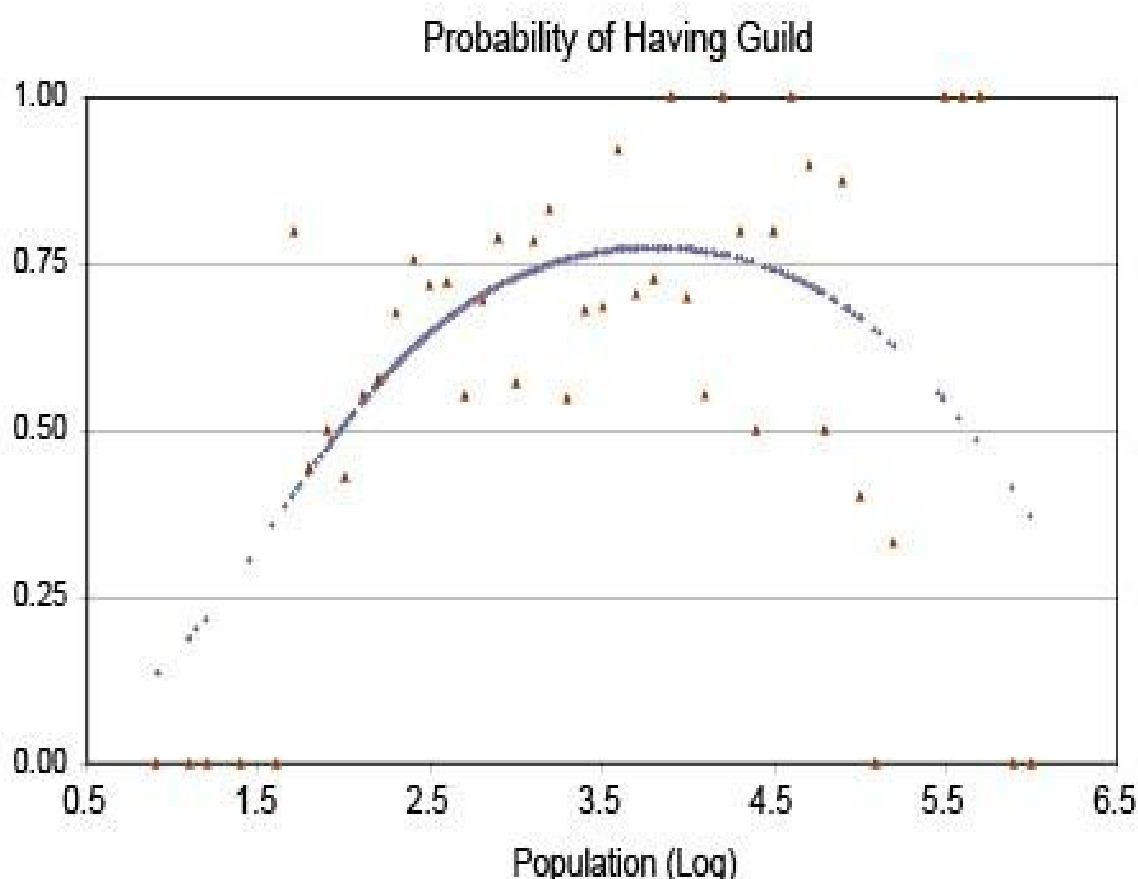
Policies to unleash growth and innovation

The existence of innovation-blocking groups has been and continues to be an important barrier to riches. Some governments, such as the one led by Margaret Thatcher in the 1980s, have been able to reduce these institutions' influence by tackling them head on, but this is not always easy, or common. A more indirect and pragmatic approach is to promote market integration, trade liberalisation and competition. Such policies are bound to endogenously weaken the influence of these groups, thus removing an important obstacle to innovation. What happened in the US iron-ore industry in recent decades is a case in point: after having suffered lacklustre growth in the 1970s and early 1980s, the US iron-ore industry rebounded when increased competition from Brazilian exporters led to concessions by unions in work practices, allowing productivity to take off (Schmitz 2005). Government of currently poor countries truly interested in improving their citizens' welfare should take note of this.

References

Desmet, K and Parente, S (2013), "Resistance to Technology Adoption: The Rise and Decline of Guilds", CEPR Discussion Paper 9439.

Epstein, S R (1998), "Craft Guilds, Apprenticeship, and Technological Change in Preindustrial Europe", *Journal of Economic History* 58, 684-713.

Goldstone, J (2002), "Efflorescences and Economic Growth in World History: Rethinking the 'Rise of the West' and the Industrial Revolution", *Journal of World History* 13, 323-89.

Jacob, MC (1981), *The Radical Enlightenment: Pantheists, Freemasons, and Republicans*, London, Allen and Unwin.

McCloskey, D (2010), *Bourgeois Dignity: Why Economics Can't Explain the Modern World*, Chicago and London, University of Chicago Press.

Mokyr, J (2005), "The Great Synergy: The European Enlightenment as a Factor in Modern Economic Growth", Meetings of the Society for Economic Dynamics.

Ogilvie, S (2004), "Guilds, Efficiency, and Social Capital: Evidence from German Proto-Industry", *Economic History Review* 57, 286-333.

Randall, A (1991), *Before the Luddites: Custom, Community, and Machinery in the English Woollen Industry, 1776-1809*, Cambridge, Cambridge University Press.

Schmitz, J A Jr (2005). "What Determines Productivity? Lessons from the Dramatic Recovery of the US and Canadian Iron Ore Industries Following Their Early 1980s Crisis", *Journal of Political Economy* 115, 582-625.

Does climate change affect economic growth?

Benjamin Jones, Benjamin Olken and Melissa Dell

Kellogg School of Management; MIT and CEPR; Harvard University

6 June 2009

Hot countries tend to be poorer, but debate continues over whether the temperature-income relationship is simply a happenstance association. This column uses within-country estimates to show that higher temperatures have large, negative effects on economic growth – but only in poor countries. The findings are big news for future global inequality.

Decision-makers readily perceive the economic costs of adopting bold climate policies such as strict cap-and-trade programmes. The opportunity cost of not adopting strict climate policies is much less apparent. It should, however, be equally important in rational decision making. If unchecked climate change will do a great deal of damage to the economy, then preventing those costs with proper climate policies should count as an economic benefit. Absent this information, setting appropriate policy to curtail greenhouse gas emissions, or other policy responses, is difficult at best and pure guesswork at worst. What does the evidence say?

One approach to this question looks at the historical relationship between climate and national economic performance. Here there is an old literature – and an old debate. One fact is clear. Hot countries tend to be poorer. Observations of this phenomenon date at least to Ibn Khaldun's 14th century *Muqaddimah,* appear in Montesquieu's 18th century *The Spirit of Laws* (which famously argued that an "excess of heat" made men "slothful and dispirited"), and have been confirmed in modern data (e.g. Nordhaus 2006).

Climate and income

Looking at a current cross-section of the world, national income per-capita falls 8.5% on average per degree Celsius rise in temperature (Dell, Jones, and Olken 2009), suggesting a simple method to calculate how warming might influence future standards of living. However, while the magnitude of this correlation is impressive, its interpretation is uncertain. Substantial debate continues over whether the temperature-income relationship is

simply a happenstance association, while other variables, such as a country's institutions or trade policy, drive prosperity in contemporary times (see, e.g., Sachs 2003; Acemoglu, Johnson and Robinson 2002; Rodrik, Subramanian and Trebbi 2004). These uncertainties cloud not just the historical debate over climate's role in economic development but also, by extension, current debates about the potential impact of future climate change.

A second approach to understanding the total economic effects of climate harnesses micro-evidence, quantifying various climatic effects and then aggregating these to produce a net effect on national income (see, e.g., Mendelsohn et al. 2000, Nordhaus and Boyer 2000, Tol 2002). This approach is favoured in the climate change literature and forms the basis of many current policy recommendations regarding greenhouse gas emissions. However, this approach, while useful, also faces difficult challenges. The set of mechanisms through which climate may influence economic outcomes is potentially enormous and, even if each mechanism could be enumerated and its operation understood, specifying how the micro-level effects interact and aggregate to shape macroeconomic outcomes poses additional difficulties. Indeed, the climate literature, at the micro level, suggests a wide array of potential climatic effects, including influences on agricultural productivity, mortality, cognitive performance, crime, and social unrest, among other outcomes, most of which do not feature in current implementations of these models.

Temperature within countries

In a recent paper, "Climate Shocks and Economic Growth: Evidence from the Last Half Century" (Dell, Jones, and Olken 2008), we take a third approach. Looking worldwide over the last 50 years, we use historical fluctuations in temperature within countries to identify temperature's effects on the path of national income. By examining aggregate outcomes directly, we avoid relying on numerous assumptions about what mechanisms to include and how they might operate, interact, and aggregate. By utilising fluctuations in temperature and precipitation, we isolate their effects from other country characteristics.

We find three main results. First, higher temperatures have large, negative effects on economic growth, but only in poor countries. In poor countries, we estimate that a 1ºC temperature increase in a given year reduced economic growth in that year by about 1.1 percentage points. In rich countries, changes in temperature had no discernable effect on growth.

Changes in precipitation had no substantial effects on aggregate output in either poor or rich countries. When we examine the impact of changes in average temperatures lasting a decade or more rather than annual changes, we find very similar results.

Second, one can distinguish two potential ways temperature could affect economic activity:

- influencing the level of output, for example by affecting agricultural yields, or
- influencing an economy's ability to grow, for example by affecting investments or institutions that influence productivity growth.

The difference between these two types of effects matters when one starts to contemplate permanent changes to temperature: would a 1ºC permanent increase in temperature reduce per-capita GDP by 1.1 percentage points, or would it reduce the growth rate by 1.1 percentage points year after year? We find that higher temperatures reduce the growth rate in poor countries, not simply the level of output. Since even small growth effects have large consequences over time, these growth effects – if they persist in the medium run – imply very large impacts of permanent temperature increases.

Third, we find that temperature affects numerous dimensions of poor countries' economies in ways consistent with an effect on the growth rate. While agricultural output contractions appear to be part of the story, we find adverse effects of hot years on industrial output and aggregate investment. Moreover, we document that poor countries produce fewer scientific publications in hot years, which suggests that higher temperatures may impede innovative activity. Higher temperatures lead to political instability in poor countries, as evidenced by irregular changes in national leaders. Many of these effects sit outside the primarily agricultural focus of much economic research on climate change and underscore the challenges in building aggregate estimates of climate impacts from a narrow set of channels. These broader relationships also help explain how temperature might affect growth rates in poor countries, not simply the level of output.

Climate change and future economic prospects

To the extent that responses to future climate change are similar to historical responses, our findings have implications for quantifying

potential future impacts of climate change. Even assuming that countries adapt fully after only a decade to temperature changes, if the future response follows our historically-driven estimates, the future effects of climate change for poor countries would be substantially more negative than those implied by existing models. For example, our estimates imply that global climate change would lower the median poor country's growth rate by 0.6 percentage points each year from now until 2099. Extrapolated over 90 years, the median poor country would then be about 40% poorer in 2099 than it would have been in the absence of climate change. While this estimated effect of higher temperatures is quite large, it is actually quite consistent with what one would predict just by looking at the cross-section of countries in the world today. Since we find no effects on rich countries, the results imply that future climate change may substantially widen income gaps between rich and poor countries.

Of course, the extent to which our historically-driven results can be used to assess the impact of climate change depends on whether historical responses to temperature shocks are good predictors of how economies will respond in the future. Very large changes in temperatures, beyond the range of recent historical experience, could produce nonlinear effects that are not captured by our estimates. Nevertheless the qualitative patterns we find – larger effects in poor than rich countries, growth effects rather than level effects, and impacts of temperature on economic and political activity – are important patterns that models of climate's economic impacts should be able to reproduce.

Our results also inform the older debate over climate's role in economic development. As noted above, climatic theories of development have a long history and have remained a subject of contemporary debate. Our estimates identify a substantial, contemporary effect of temperature on the development process, not just on important sub-channels but on the aggregate economy. It appears that Ibn Khaldun really was ahead of his time.

References

Acemoglu, D, S Johnson and J Robinson (2002), "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics* 117, 1231-1294.

Dell, M, B Jones and B Olken (2008), "Climate Shocks and Economic Growth: Evidence from the Last Half Century," NBER Working Paper 14132.

Dell, M, B Jones and B Olken (2009), "Temperature and Income: Reconciling New Cross-Sectional and Panel Estimates," *American Economic Review* Papers and Proceedings.

de Montesquieu, C (1750), *The Spirit of Laws*.

Mendelsohn, Robert, Wendy Morrison, Michael Schlesinger and Natalia Andronova. "Country-specific market impacts of climate change," *Climatic Change* 45(3-4): 553-569, 2000.

Nordhaus, W and J Boyer (2000), *Warming the World: The Economics of the Greenhouse Effect*, Cambridge, MA: MIT Press.

Nordhaus, W (2006), "Geography and Macroeconomics: New Data and Findings," *Proceedings of the National Academy of Science* 103, 3510-3517.

Rodrik, D, A Subramanian and F Trebbi (2004), "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development," *Journal of Economic Growth* 9, 131-165.

Sachs, J (2003), "Institutions Don't Rule: Direct Effects of Geography on Per-Capita Income," NBER working Paper 9490.

Tol, R (2002), "Estimates of the damage costs of climate change – part II: dynamic estimates," *Environmental and Resource Economics* 21, 135-160.

Is US economic growth over? Faltering innovation confronts the six headwinds

Robert J. Gordon

Northwestern University and CEPR

11 September 2012

Global growth is slowing – especially in advanced-technology economies. This column argues that regardless of cyclical trends, long-term economic growth may grind to a halt. Two and a half centuries of rising per-capita incomes could well turn out to be a unique episode in human history.

It is time to raise basic questions about the process of economic growth, especially the assumption – nearly universal since Solow's seminal contributions of the 1950s (Solow 1956) – that economic growth is a continuous process that will persist forever.

There was virtually no growth before 1750;

☛ There is no guarantee that growth will continue indefinitely.

This column introduces my CEPR Policy Insight, which argues in detail that the rapid progress made over the past 250 years could well turn out to be a unique episode in human history (Gordon 2012).

The data I use only concern the US and view the future from 2007 while pretending that the financial crisis did not happen. The focus is on per-capita real GDP growth in the frontier country since 1300, the UK until 1906 and the US afterwards. Growth in the frontier economy gradually accelerated after 1750, reached a peak in the middle of the 20th century, and has been slowing since. The paper is about 'how much further could the frontier growth rate decline?'

Growth: The long view

Figure 1 takes the history of economic growth back to the year 1300. Clearly there was almost no growth through 1700, then a gradually accelerating rate of growth. The blue line in Figure 1 represents growth in the frontier country – the US after 1906 and Britain before because 1906 seems to be the consensus of modern growth data for the cutover.

The key point is the big peak in US growth between 1928 and 1950, the years that span the Great Depression and WWII. Leaving aside the debate about what could have caused a concentration of economic growth in a period dislocated by depression and war, the remaining conclusion of Figure 1 is that growth has steadily declined in each interval plotted since 1950.

Figure 1 Growth in real GDP per capita, 1300-2100
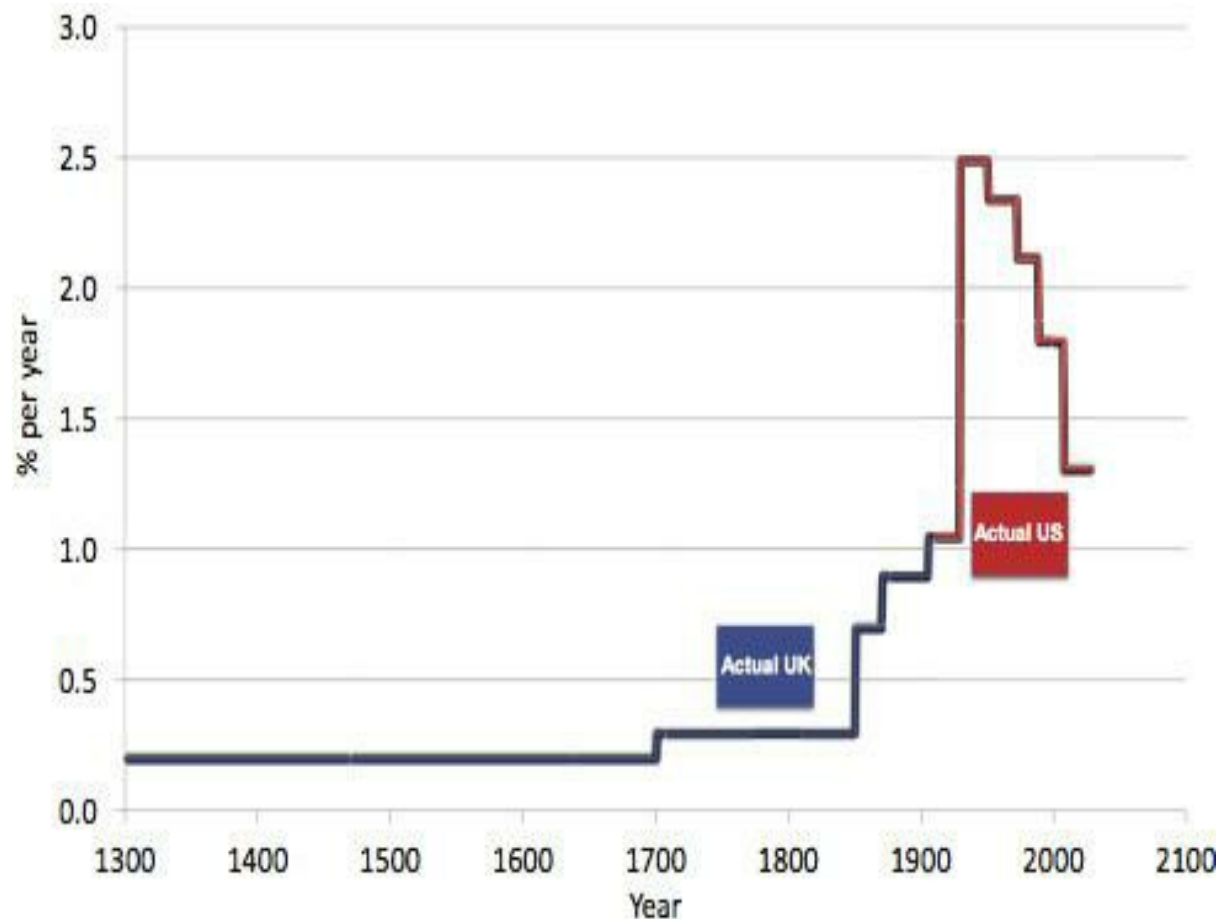
The paper is deliberately provocative and suggests not just that economic growth was a one-time thing centred on 1750-2050, but also that because there was no growth before 1750, there might conceivably be no growth after 2050 or 2100. The process of innovation may be battering its head against the wall of diminishing returns. Indeed, this is already evident in much of the innovation sector.

To taunt critics, Figure 2 superimposes on the actual growth record a green line that starts at zero growth in 1300, peaks in the middle of the 20th century, and then floats down to 0.2% by 2100. Figure 3 translates the growth rates into levels.

- Before 1800, it took centuries to double income per capita;
- Between 1929 and 1957, US incomes doubled in only 28 years;
- Between 1957 and 1988, doubling took 31 years.
- The pessimistic view adopted here suggests that it may take almost a century for income per capita to double between 2007 and 2100.

Figure 2 Growth in real GDP per capita, with actual and hypothetical paths

![Graph showing Percent per year on y-axis (0.0 to 3.0) and Year on x-axis (1300 to 2100), with Actual UK, Actual US, and Hypothetical Path curves](attachment)
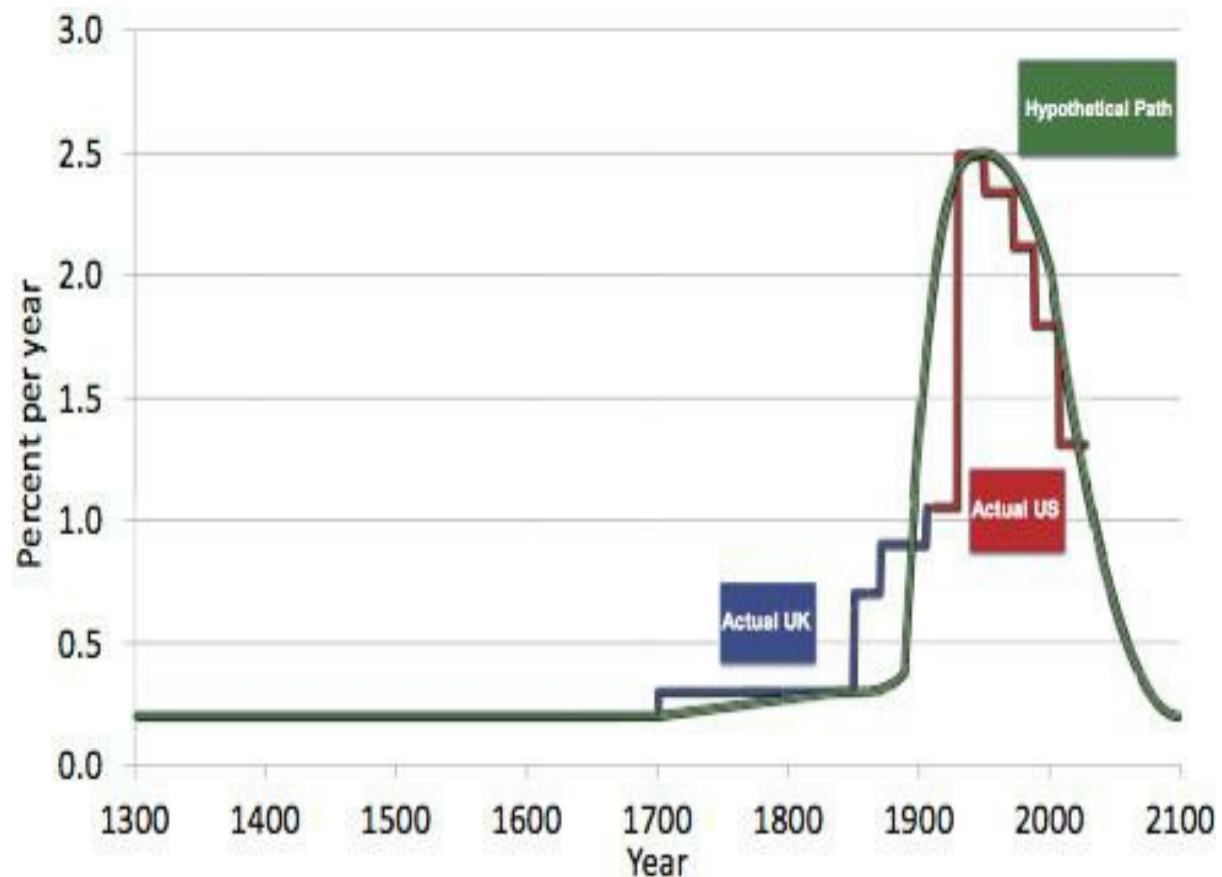
Figure 3 Actual and hypothetical levels of GDP per capita, 1300-2100
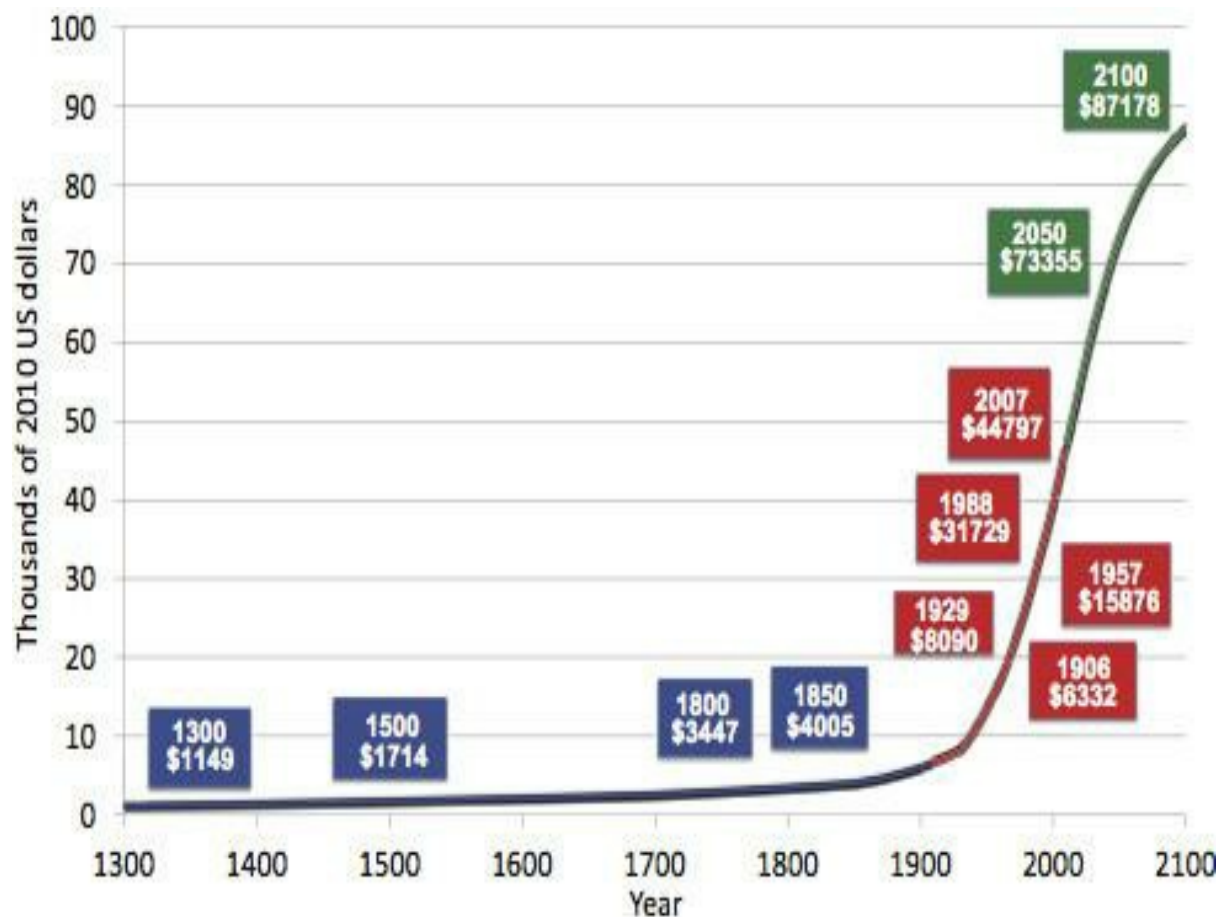
Phases of growth

The analysis in my paper links periods of slow and rapid growth to the timing of the three industrial revolutions:

- IR #1 (steam, railroads) from 1750 to 1830;
- IR #2 (electricity, internal combustion engine, running water, indoor toilets, communications, entertainment, chemicals, petroleum) from 1870 to 1900; and
- IR #3 (computers, the web, mobile phones) from 1960 to present.

It provides evidence that IR #2 was more important than the others and was largely responsible for 80 years of relatively rapid productivity growth between 1890 and 1972.

Once the spin-off inventions from IR #2 (airplanes, air conditioning, interstate highways) had run their course, productivity growth during 1972-96 was much slower than before. In contrast, IR #3 created only a short-lived growth revival between 1996 and 2004. Many of the original

and spin-off inventions of IR #2 could happen only once – urbanisation, transportation speed, the freedom of women from the drudgery of carrying tons of water per year, and the role of central heating and air conditioning in achieving a year-round constant temperature.

Figure 4 translates the abstraction about the three industrial revolutions into the data on US growth in labour productivity over selected intervals in the postwar era.

Figure 4 Average growth rates of US labour productivity over selected intervals, 1891-2012
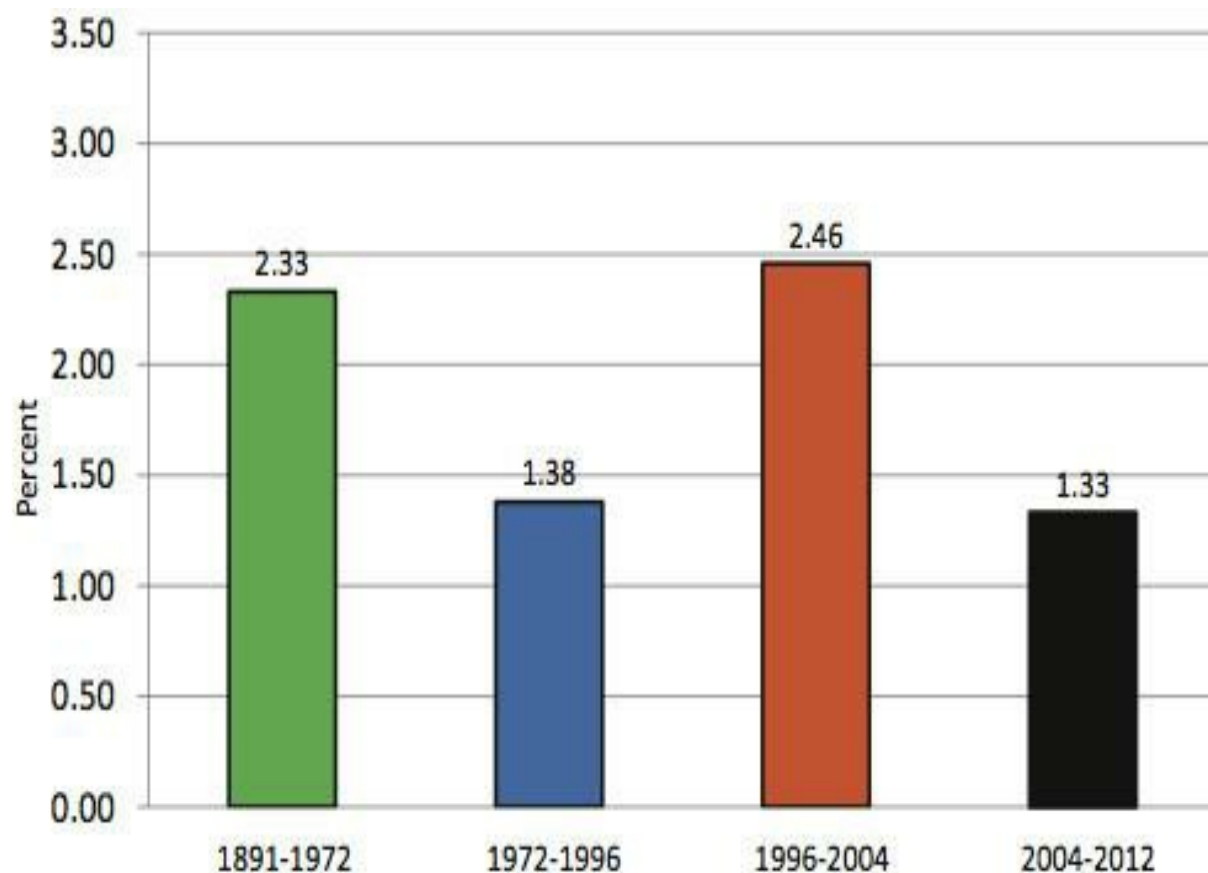
- The ongoing benefits of IR #2 maintained rapid productivity growth through 1972.

Then diminishing returns set in – air conditioning was here and the interstate highways had been largely completed. The US entered the "dismal age" of slow productivity growth between 1972 and 1996. After being the mysterious 'Missing in Action' component of growth, computers and their brethren the internet and world wide web, pushed the growth of productivity in Figure 4 upwards, but only for the eight years 1996-2004.

- IR #3 appears to have lasted only eight years, compared to the conjectural 100 years for IR #2.
- Since 2004 productivity growth has been almost as slow as in the previous dismal period of 1972-96.

Inventions are not all created equal

The paper explains this history by a simple proposition. The great inventions of IR #2 were just more important than anything that has happened since. The speed of transportation was increased from that of the 'hoof and sail' to the Boeing 707. The temperature of a room was wildly variable in the 19th century but by now is a uniform 70 degrees year round. The transition from rural to urban in the US could only happen once. Only once could electricity be invented and create rapid transit, machine tools, consumer appliances, and the entire electricity-dependent set of entertainment devices from the radio to the TV to the internet and its multiple spin-offs such as the iPod, iPhone, and iPad.

The loss of the impetus of IR #2 inventions makes a big difference in the future of human wellbeing. Figure 5 shows that if the 1948-72 productivity trend had continued, the level of productivity would have been 69% above what would have occurred if the 1972-96 trend had continued. The actual outcome shown in Figure 5 is that the benefits of actual productivity from the IR #3 internet revolution only closed 9% of the 69% gap created by the end of the IR #2 inventions.

Figure 5 US labour productivity from 1948 to 2012, with trend growth rates over selected intervals
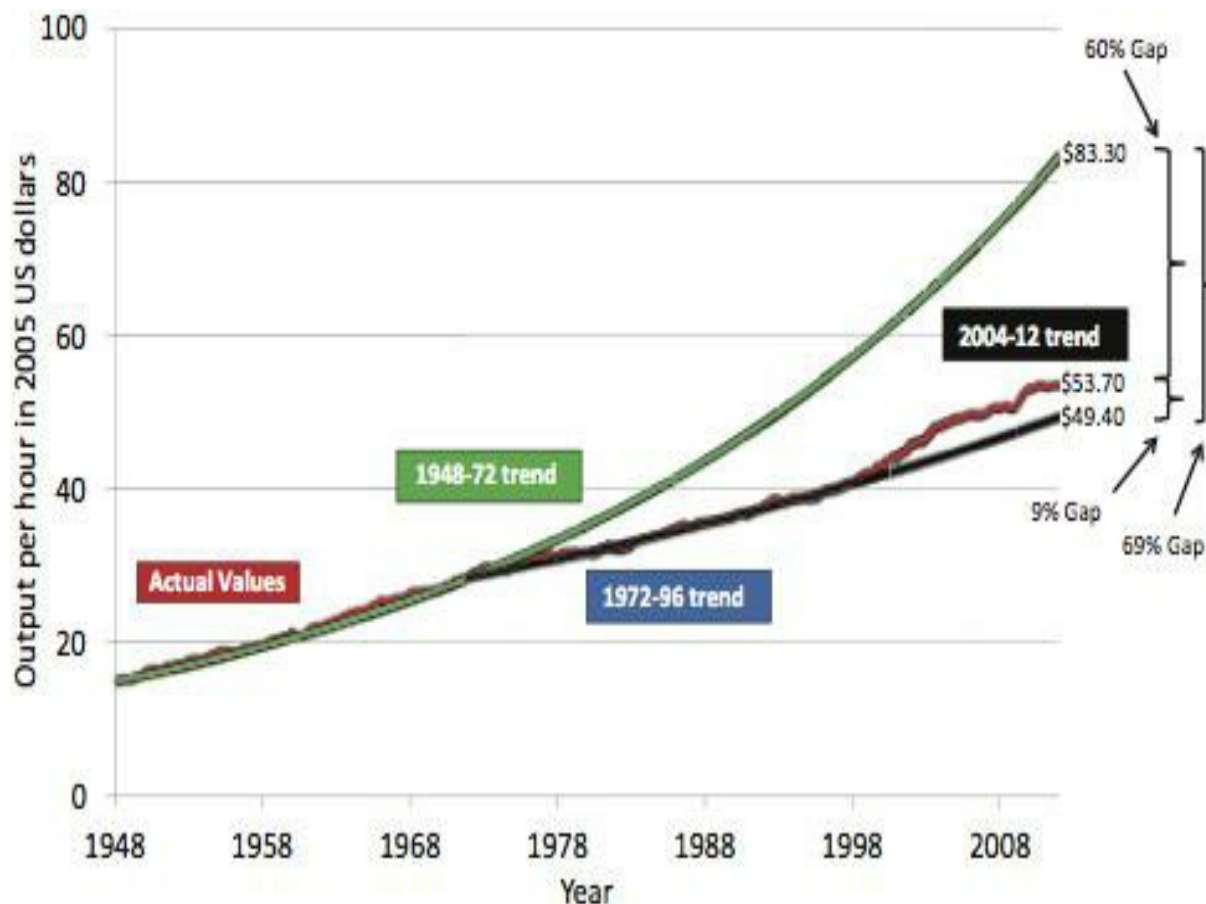
Even if innovation were to continue into the future at the rate of the two decades before 2007, the US faces six headwinds that are in the process of dragging long-term growth to half or less of the 1.9% annual rate experienced between 1860 and 2007. These include demography, education, inequality, globalisation, energy/environment, and the overhang of consumer and government debt. A provocative 'exercise in subtraction' suggests that future growth in consumption per capita for the bottom 99% of the income distribution could fall below 0.5% per year for an extended period of decades.

The exercise in subtraction is shown in Figure 6, but this is just a suggestion. All the numbers could be altered, but the big point is that each of these subtractions is a number, whether 0.05 or 0.1, or 0.2, that reduces the future growth of consumption per capita for the bottom 99% of US households.

Figure 6 Exercise in subtraction: Components of growth, from 1987 to 2007
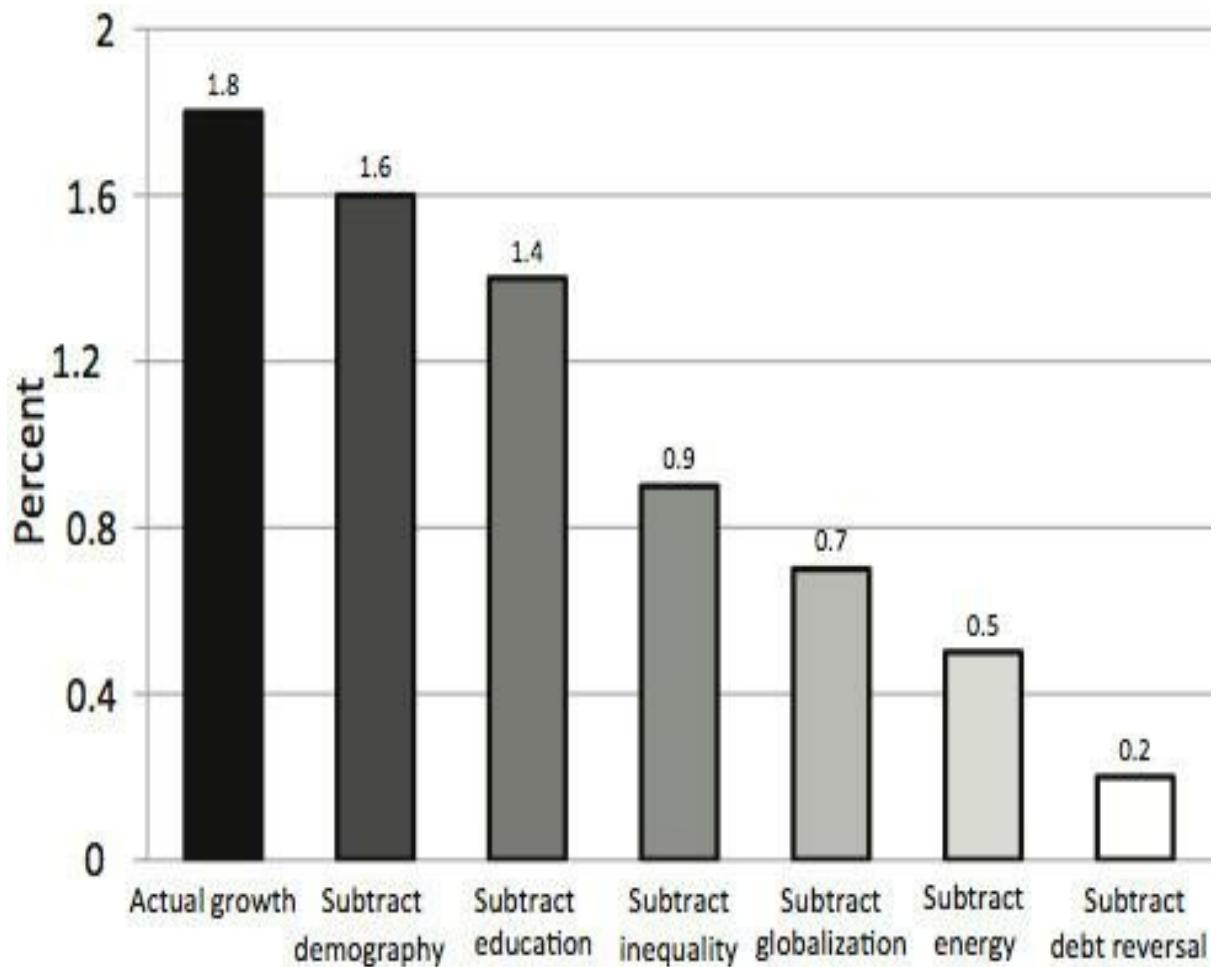
Concluding remarks

This paper is deliberately provocative. The numbers in the 'exercise in subtraction' have been chosen to reduce growth to that of the UK for 1300-1700. The outcome may turn out to be much better than that. But the point of this article is that it is likely to be much worse than any epoch of US growth since the civil war.

References

Gordon, Robert (2012). 'Is US economic growth over? Faltering innovation confronts the six headwinds', CEPR Policy Insight No 63.

Solow, Robert (1956). "A Contribution to the Theory of Economic Growth". *Quarterly Journal of Economics* 70 (1): 65–94 [3].

Part IV: Business Cycle Theory: The Economy in the Short Run

Chapter 10 Introduction to Economic Fluctuations

What's the use of economics?

Alan Kirman

Université Paul Cezanne and EHESS

29 October 2012

The economic crisis has thrown the inadequacies of macroeconomics into stark relief. This column argues that the narrow conception of the macroeconomy as a system in equilibrium is problematic. Economists should abandon entrenched theories and understand the macroeconomy as self-organising. It offers detailed suggestions on what alternative ideas economists can teach their future students that better reflect empirical evidence.

The simple question that was raised during a recent conference organised by Diane Coyle at the Bank of England was to what extent has - or should - the teaching of economics be modified in the light of the current economic crisis? The simple answer is that the economics profession is unlikely to change. Why would economists be willing to give up much of their human capital, painstakingly nurtured for over two centuries? For macroeconomists in particular, the reaction has been to suggest that modifications of existing models to take account of 'frictions' or 'imperfections' will be enough to account for the current evolution of the world economy. The idea is that once students have understood the basics, they can be introduced to these modifications.

A turning point in economics

However, other economists such as myself feel that we have finally reached the turning point in economics where we have to radically change the way we conceive of and model the economy. The crisis is an opportune occasion to carefully investigate new approaches. Paul Seabright hit the nail on the head; economists tend to inaccurately portray their work as a steady and relentless improvement of their models whereas, actually, economists tend to chase an empirical reality that is changing just as fast as their modelling. I would go further; rather than making steady progress towards explaining economic phenomena professional economists have been locked into a narrow vision of the economy. We constantly make more and more sophisticated models within that vision until, as Bob Solow put it, "the uninitiated peasant is left wondering what planet he or she is

on" (Solow 2006).

In this column, I will briefly outline some of the problems the discipline of economics faces; problems that have been shown up in stark relief during the current crisis. Then I will come back to what we should try to teach students of economics.

Entrenched views on theory and reality

The typical attitude of economists is epitomised by Mario Draghi, President of the European Central Bank. Regarding the Eurozone crisis, he said:

"The first thing that came to mind was something that people said many years ago and then stopped saying it: The euro is like a bumblebee. This is a mystery of nature because it shouldn't fly but instead it does. So the euro was a bumblebee that flew very well for several years. And now – and I think people ask 'how come?' – probably there was something in the atmosphere, in the air, that made the bumblebee fly. Now something must have changed in the air, and we know what after the financial crisis. The bumblebee would have to graduate to a real bee. And that's what it's doing" (Draghi 2012).

What Draghi is saying is that, according to our economic models, the Eurozone should not have flown. Entomologists (those who study insects) of old with more simple models came to the conclusion that bumble bees should not be able to fly. Their reaction was to later rethink their models in light of irrefutable evidence. Yet, the economist's instinct is to attempt to modify reality in order to fit a model that has been built on longstanding theory. Unfortunately, that very theory is itself based on shaky foundations.

Economic theory can mislead

Every student in economics is faced with the model of the isolated optimising individual who makes his choices within the constraints imposed by the market. Somehow, the axioms of rationality imposed on this individual are not very convincing, particularly to first time students. But the student is told that the aim of the exercise is to show that there is an equilibrium, there can be prices that will clear all markets simultaneously. And, furthermore, the student is taught that such an equilibrium has desirable welfare properties. Importantly, the student is told that since the 1970s it has been known that whilst such a system of equilibrium prices may exist, we cannot show that the economy would

ever reach an equilibrium nor that such an equilibrium is unique.

The student then moves on to macroeconomics and is told that the aggregate economy or market behaves just like the average individual she has just studied. She is not told that these general models in fact poorly reflect reality. For the macroeconomist, this is a boon since he can now analyse the aggregate allocations in an economy as though they were the result of the rational choices made by one individual. The student may find this even more difficult to swallow when she is aware that peoples' preferences, choices and forecasts are often influenced by those of the other participants in the economy. Students take a long time to accept the idea that the economy's choices can be assimilated to those of one individual.

A troubling choice for macroeconomists

Macroeconomists are faced with a stark choice: either move away from the idea that we can pursue our macroeconomic analysis whilst only making assumptions about isolated individuals, ignoring interaction; or avoid all the fundamental problems by assuming that the economy is always in equilibrium, forgetting about how it ever got there.

Exogenous shocks? Or a self-organising system?

Macroeconomists therefore worry about something that seems, to the uninformed outsider, paradoxical. How does the economy experience fluctuations or cycles whilst remaining in equilibrium? The basic macroeconomic idea is, of course, that the economy is in a steady state and that it is hit from time to time by exogenous shocks. Yet, this is entirely at variance with the idea that economists may be dealing with a system which self organises, experiencing sudden and large changes from time to time.

There are two reasons as to why the latter explanation is better than the former. First, it is very difficult to find significant events that we can point to in order to explain major turning points in the evolution of economies. Second, the idea that the economy is sailing on an equilibrium path but is from time to time buffeted by unexpected storms just does not pass what Bob Solow has called the 'smell test'. To quote Willem Buiter (2009),

"Those of us who worry about endogenous uncertainty arising from the interactions of boundedly rational market participants cannot but scratch our heads at the insistence of the mainline models that all uncertainty is exogenous and additive"

Some teaching suggestions

New thinking is imperative:

- We should spend more time insisting on the importance of coordination as the main problem of modern economies rather than efficiency. Our insistence on the latter has diverted attention from the former.

- We should cease to insist on the idea that the aggregation of the choices and actions of individuals who directly interact with each other can be captured by the idea of the aggregate acting as only one of these many individuals. The gap between micro- and macrobehaviour is worrying.

- We should recognise that some of the characteristics of aggregates are caused by aggregation itself. The continuous reaction of the aggregate may be the result of individuals making simple, binary discontinuous choices. For many phenomena, it is much more realistic to think of individuals as having thresholds - which cause them to react - rather than reacting in a smooth, gradual fashion to changes in their environment. Cournot had this idea, it is a pity that we have lost sight of it. Indeed, the aggregate itself may also have thresholds which cause it to react. When enough individuals make a particular choice, the whole of society may then move. When the number of individuals is smaller, there is no such movement. One has only to think of the results of voting.

- All students should be obliged to collect their own data about some economic phenomenon at least once in their career. They will then get a feeling for the importance of institutions and of the interaction between agents and its consequences. Perhaps, best of all, this will restore their enthusiasm for economics!

Some use for traditional theory

Does this mean that we should cease to teach 'standard' economic theory to our students? Surely not. If we did so, these students would not be able to follow the current economic debates. As Max Planck has said, "Physics is not about discovering the natural laws that govern the universe, it is what physicists do". For the moment, standard economics is what economists do. But we owe it to our students to point out difficulties with the structure and assumptions of our theory. Although we are still far from

a paradigm shift, in the longer run the paradigm will inevitably change. We would all do well to remember that current economic thought will one day be taught as history of economic thought.

References

Buiter, W (2009), "The unfortunate uselessness of most 'state of the art' academic monetary economics", *Financial Times* online, 3 March.

Coyle, D (2012) "What's the use of economics? Introduction to the Vox debate", VoxEu.org, 19 September.

Davies, H (2012), "Economics in Denial", *ProjectSyndicate.org*, 22 August.

Solow, R (2006), "Reflections on the Survey" in Colander, D., *The Making of an Economist*. Princeton, Princeton University Press.

Macroeconomics and the financial cycle: Hamlet without the Prince?

Claudio Borio

Bank for International Settlements

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Since the early 1980s, the financial cycle has re-emerged as a major force driving the macroeconomy, but economic analysis has not caught up. This column argues that macroeconomics without the financial cycle is like Hamlet without the Prince. Economic analysis and policies – monetary, fiscal, and prudential – should be adjusted to fully account for the financial cycles, but here more analytic work is needed. The question of how we address the bust and balance-sheet recession that follow the boom deserves special attention.

We thought we knew; we have since forgotten. It is high time we rediscovered the role of the financial cycle in macroeconomics. In the environment that has prevailed for at least three decades now, it is not possible to understand business fluctuations and the corresponding analytical and policy challenges without understanding the financial cycle. This perspective was largely taken for granted as far back as in the 19th century and all the way up to the Great Depression (Overstone 1857); it barely survived at the periphery of economics in the post-war period; and it has slowly been regaining ground, in modern guise, after the Great Financial Crisis. Yet, sadly, it is still far from becoming part of our intellectual furniture.1

The financial cycle: Key features

The financial cycle is best thought of as the self-reinforcing interactions between perceptions of value and risk, attitudes towards risk, and financing constraints, which translate into booms followed by busts (Borio 2012a). These interactions can amplify economic fluctuations and possibly lead to serious financial distress and economic dislocations.

A growing body of empirical work, not least that carried out at the BIS (Drehmann et al 2012), suggests that the financial cycle has several key properties.

- First, its most parsimonious description is in terms of the behaviour of private-sector credit and property prices.

Equity prices can be a distraction: they exhibit shorter cycles and tend to be more closely related to short-term fluctuations in GDP, which may leave the financial sector largely unscathed.

- Second, the financial cycle has a much lower frequency than the traditional business cycle.

Since financial liberalisation, its typical length is of the order of 16 to 20 years; by contrast, as generally conceived in academic and policy work, business-cycle frequencies are up to eight years. Figure 1 illustrates this with reference to the US, based on both frequency filters and peak-to-trough analysis.

Figure 1 The financial and business cycles in the US
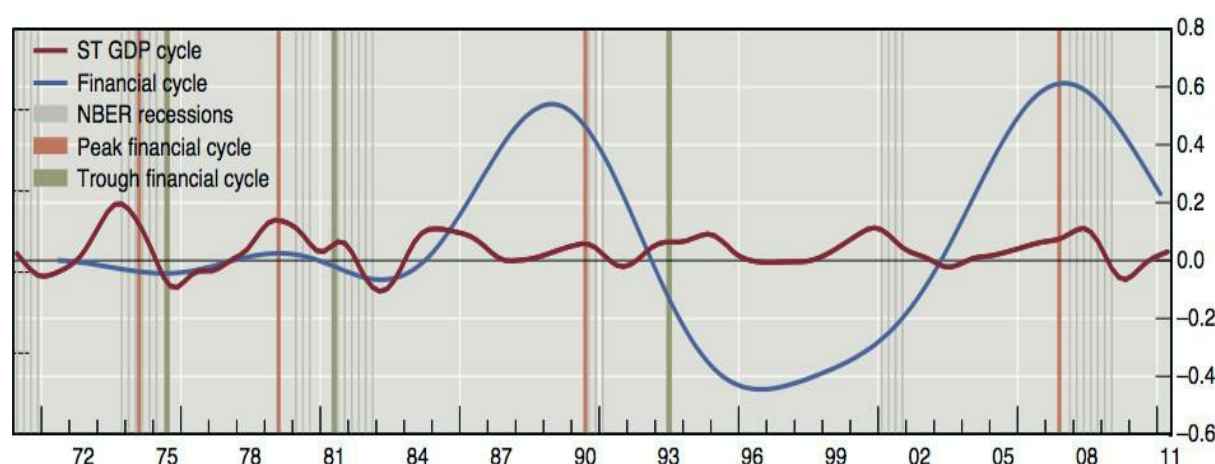
Notes: The orange and green bars indicate peaks and troughs of the financial cycle measured by the combined behaviour of the component series (credit, credit-to-GDP ratio and house prices) using the turning-point method. The blue line traces the financial cycle measured as the average of the medium-term cycle in the component series using frequency-based filters. The red line traces the GDP cycle identified by the traditional shorter-term frequency filter used to measure the business cycle.

Source: Drehmann et al (2012).

- Third, peaks in the financial cycle tend to coincide with episodes of systemic financial distress.

For example, in a sample of seven industrial countries (Australia, Germany, Japan, Norway, Sweden, the UK and the US), all post-financial liberalisation financial-cycle peaks are associated with either full-blown crises or serious financial strains. And those banking systems that

experienced stress away from the peak did so because they were exposed to cycles elsewhere (eg. Germany and Switzerland in 2008).

- Fourth, the financial-cycle regularities inform the construction of real-time leading indicators of banking crises that provide fairly reliable signals with quite a good lead – between two and four years, depending on the calibration (eg. Borio and Drehmann 2009).

Not surprisingly, such indicators are best based on the (private-sector) credit-to-GDP ratio and property prices jointly exceeding certain thresholds, which fall outside normal historical ranges. One can think of these indicators as proxies for the build-up of financial imbalances and as tools that help policymakers distinguish sustainable booms from unsustainable ones. The evidence also indicates that, during such credit booms, the cross-border component of credit tends to outpace the purely domestic one (eg. Borio et al 2011).

- Fifth, for much the same reasons, financial-cycle information also helps construct real-time estimates of sustainable output that, compared with traditional potential output estimates, are much more reliable in real time, and more statistically precise (Borio et al 2013).

Such estimates, for instance, would have shown that, during the boom that preceded the Great Financial Crisis, output in the US was growing well beyond sustainable levels. By contrast the more commonly used approaches, such as the production-function methodology, detected this pattern only well after the crisis took place, if at all.

- Finally, the financial cycle depends critically on policy regimes.

Financial liberalisation weakens financing constraints. Monetary-policy frameworks focused on short-term inflation control provide less resistance to the build-up of financial imbalances whenever inflation remains low and stable. And positive supply-side developments (eg. the globalisation of the real economy) fuel the financial boom while putting downward pressure on inflation. Not surprisingly, financial cycles have become twice as long since financial liberalisation in the early 1980s and have been especially virulent since the early 1990s (see Figure 1).

The financial cycle: Analytical challenges

Analytically, modelling the financial cycle requires capturing three key features.

- The booms should not just precede but cause the busts: busts are fundamentally endogenous, the result of the vulnerabilities and distortions built up during the boom.
- The busts should generate debt and capital stock overhangs – the natural legacy of the preceding unsustainable expansion.
- And potential output should not just be identified with non-inflationary output: as the previous evidence indicates, output may be on an unsustainable trajectory even if inflation is stable.

How could one best capture these features? Most likely, one would need to:

- Drop 'rational' (model-consistent) expectations.
- Allow for state-varying risk tolerance, ie. for attitudes towards risk that vary with the state of the economy, wealth, and balance sheets.
- And last but not least, capture more deeply the monetary nature of our economies: the banking sector does not just allocate given resources but creates purchasing power out of thin air. In all probability, all this may require us to rediscover the merits of disequilibrium analysis.2

The financial cycle: Policy challenges

Dealing with the financial crisis calls for policies that are more symmetrical across booms and busts. Policies need to lean against the booms and tackle the debt-asset quality problems head on during the bust. A medium-term focus is essential.

During the boom, the key question is how to address the build-up of financial imbalances.

- For prudential policy, it means containing the procyclicality of the financial system through macroprudential measures (Borio 2009).
- For fiscal policy, it means extra prudence, fully recognising the hugely flattering effect of financial booms on the fiscal accounts:

potential output and growth are overestimated; financial booms are tax revenue-rich; and large contingent liabilities are needed to address the bust.

- For monetary policy, it means leaning against the build-up of financial imbalances even if short-term inflation remains subdued.

During the bust, the key question is how to address the balance-sheet recession that follows, ie. how to prevent a stock problem from becoming a persistent and serious flow problem, in the form of anaemic output and expenditures. After having stabilised the system (crisis management phase), it is necessary to move swiftly to tackle the over-indebtedness and asset-quality problems head on (crisis resolution phase).

The crisis resolution phase is critical and less well understood.

For prudential policy, it means repairing banks' balance sheets aggressively through the full recognition of losses, asset disposals, recapitalisations subject to strict conditionality, and the reduction of operational excess capacity necessary for sustainable profitability. This is what the Nordic countries did and what Japan failed to do following the bust in their respective financial cycles in the early 1990s; it is what partly explains their subsequent divergent economic performance.

For fiscal policy, it means creating the fiscal space needed to use the sovereign's balance sheet to support private-sector balance-sheet repair while avoiding a sovereign crisis down the road. This can be done through bank recapitalisations, including via temporary public-sector ownership and selective debt relief for the non-financial sector (eg. households). In fact, contrary to received wisdom, pump-priming – where it can be afforded – may well be less effective in a balance-sheet recession, as agents tend to save the extra money to repay debt, resulting in a low multiplier. By contrast, by relieving debt burdens and asset-quality problems, the alternative use of fiscal space could set the basis for a self-sustaining recovery.

For monetary policy, it means recognising its limitations and avoiding overburdening it. Monetary tools are blunt when overindebted sectors are unwilling to borrow, and banking system strains impair the transmission chain. As a result, when policymakers press harder on the gas pedal, the engine revs up without traction. Over time, this enhances any side effects that policy may have. These include the possibility of delaying balance-

sheet adjustment, such as by facilitating evergreening; of undermining the profitability of banks, by compressing interest margins; of masking market signals; and of raising political-economy concerns, not least because of the quasi-fiscal nature of the large-scale deployment of central bank balance sheets.

The risk is that policies that do not address aggressively the balance-sheet problems can buy time but also make it easier to waste it. This can prolong weakness and delay a strong, self-sustaining recovery. Some new empirical evidence that carefully differentiates between the nature of recessions is broadly consistent with this picture (Bech et al 2012). It is as if the economy operated in a state of suspended animation.

The longer-term risk is that policies that fail to recognise the financial cycle will be too asymmetric and generate a serious bias over time. Failing to tighten policy in a financial boom but facing strong, if not overwhelming, incentives to loosen it during the bust would erode both the economy's defences and the authorities' room for manoeuvre. In the end, policymakers would be left with a much bigger problem on their hands and without the ammunition to deal with it – a new form of 'time inconsistency'. The root causes here are horizons that are too short and a failure to appreciate the cumulative impact of flows on stocks. This could entrench instability in the system over successive cycles (Borio 2012b).

Conclusion

Macroeconomics without the financial cycle is very much like Hamlet without the Prince: a play that has lost its main character. Post-crisis, both policymakers and academics are making efforts, to varying degrees, to understand and respond to the challenges the financial cycle poses. But these efforts are still falling short of the mark. The stakes are high; the road ahead a long one.

Editor's note: The views expressed are the author's own and not necessarily those of the Bank for International Settlements.

References

Adrian, T and H Shin (2010): "Financial intermediaries and monetary economics", in B Friedman and M Woodford (eds), *Handbook of Monetary Economics,* vol 3, Amsterdam: North Holland, pp 601–50.

Aikman, D, A Haldane and B Nelson (2010), "Curbing the credit cycle", paper presented at the Columbia University Center on Capitalism and Society Annual Conference, New York, November.

Bech, M, L Gambacorta and E Kharroubi (2012): "Monetary policy in a downturn: are financial crises special?", BIS Working Papers, no 388, September.

Bernanke, B, M Gertler and S Gilchrist (1999), "The financial accelerator in a quantitative business cycle framework", in J Taylor and M Woodford (eds), *Handbook of Macroeconomics*, Amsterdam, pp 1341–93.

Borio, C (2009), "We are all macroprudentialists now", VoxEU.org, 14 April.

Borio, C (2012a), "The financial cycle and macroeconomics: what have we learnt?", BIS Working Papers, no 395, December.

Borio, C (2012b), "On time, stocks and flows: understanding the global challenges", lecture at the Munich Seminar series, CESIfo-Group and Süddeutsche Zeitung, 15 October, BIS Speeches.

Borio, C and P Disyatat (2011), "Global imbalances and the financial crisis: link or no link?", BIS Working Papers, no 346, May.

Borio, C, P Disyatat and M Juselius (2013), "Rethinking potential output: embedding information about the financial cycle", BIS Working Papers, forthcoming.

Borio, C and M Drehmann (2009), "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp 29–46.

Borio, C, R McCauley, and P McGuire (2011), "Global credit and domestic credit booms", *BIS Quarterly Review*, September, pp 43–57.

Claessens, S, M Kose and M Terrones (2011), "Financial cycles: What? How? When?", IMF Working Paper no WP/11/76.

Drehmann, M, C Borio and K Tsatsaronis (2012), "Characterising the financial cycle: don't lose sight of the medium term!", BIS Working Papers, no 380, June.

Gertler, M and N Kiyotaki (2010), "Financial intermediation and credit policy in business cycle analysis", in B Friedman and M Woodford (eds), *Handbook of Monetary Economics*, vol 3, Amsterdam: North Holland, pp 547–99.

Hayek, F (1933), *Monetary theory and the trade cycle*, Clifton, New Jersey: Augustus M Kelly reprint 1966.

Kindleberger, C (2000), *Manias, panics and crashes*, Cambridge: Cambridge University Press, 4th edition.

Minsky, H (1982), "Can 'it' happen again?", *Essays on Instability and Finance*, Armonk: M E Sharpe.

Mises, L von (1912), *The theory of money and credit*, Foundation for Economic Education 1971, reprint, New York.

Overstone, Lord (1857), *Tracts and other publications on metallic and paper currency*, London: J R McCulloch. Reprinted in 1972, Clifton. N.J.: Augustus Kelley.

Reinhart, C and K Rogoff (2009): *This time is different: Eight centuries of financial folly,* Princeton University Press: Princeton.

Taylor, A (2012): "The Great Leveraging", BIS Working Papers, no 398, December.

Chapter 11 Aggregate Demand I: Building the IS-LM Model

Secular stagnation: Facts, causes, and cures – a new Vox eBook

Coen Teulings, Richard Baldwin

University of Cambridge; VoxEU Editor-in-Chief

Six years after the Crisis and the recovery is still anaemic despite years of zero interest rates. Is 'secular stagnation' to blame? This column introduces an eBook that gathers the views of leading economists including Summers, Krugman, Gordon, Blanchard, Koo, Eichengreen, Caballero, Glaeser, and a dozen others. It is too early to tell whether secular stagnation is really secular, but if it is, current policy tools will be obsolete. Policymakers should start thinking about potential solutions.

Economic growth is still anaemic despite years of zero interest rates.

- Is 'secular stagnation' to blame? What does secular stagnation really mean? And if it's for real, what must be done?

Today, VoxEU.org launches an eBook that gathers the views of leading economists including Summers, Krugman, Gordon, Blanchard, Koo, Eichengreen, Caballero, Glaeser and a dozen others (edited by Coen Teulings and me). Collectively, the chapters suggest that something historic is afoot.

Click here to download the eBook.

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The length of the Great Recession and the extraordinary measures necessary to combat it created a widespread, but 'ill-defined' sense that something had changed. 'Ill-defined' received a name when Larry Summers re-introduced the term 'secular stagnation' in late 2013.

But slow growth is hardly novel; why should calling it 'secular stagnation' change anything? What does secular stagnation really mean? What has changed? And if secular stagnation is for real, what should be done about it?

With these questions in mind, we asked a group of leading economists to share their views, and gathered them in a VoxEU.org eBook that we release today. Judging from the almost unbelievable response, it seems that the world's leading macroeconomists are worried that something historic is afoot.

- Larry Summers's chapter, which opens the volume, updates and refines his thinking. The 'new secular stagnation hypothesis', he writes, "suggests that macroeconomic policy as currently structured and operated may have difficulty maintaining a posture of full employment and production at potential, and that if these goals are attained there is likely to be a price paid in terms of financial stability."
- Paul Krugman states the case bluntly in his chapter: "The idea that the liquidity trap is temporary has shaped the analysis of both monetary and fiscal policy. … [T]he real possibility that we've entered an era of secular stagnation requires a major rethinking of macroeconomic policy."

To varying extents, Olivier Blanchard, Barry Eichengreen, Ricardo Caballero, Richard Koo, Nick Crafts, and a dozen other contributors to this eBook agree. But not all do.

Bob Gordon, in his chapter that updates his earlier thinking, writes: "Summers and I are talking about different aspects…My analysis suggests that the gap of actual performance below potential that concerns Summers is currently quite narrow and that the slow growth he observes is more a problem of slow potential growth than a remaining gap."

Key messages

Our authors are far from a homogenous group – they come from different continents and different schools of thought. Their contributions were uncoordinated and they do not entirely agree, but a fairly strong consensus has emerged on three points.

- First, a workable definition of secular stagnation is that negative real interest rates are needed to equate saving and investment with full employment.
- Second, the key worry is that secular stagnation makes it much harder to achieve full employment with low inflation and a zero lower bound on policy interest rates.
- Third, while it is too early to tell whether secular stagnation is going to materialise in the US and Europe, economists and policymakers should start thinking hard about what should be done if it does. Doing so is a no-regret option.

If stagnation will be really secular and the real interest rate remains low or even negative for long time, the old macroeconomic toolkit will be inadequate. And the extraordinary monetary and fiscal measures in place today may not be available next time.

Europe should be especially worried

A final point concerns the US–Europe imbalance in the secular stagnation debate. "Europeans should be much more afraid than Americans," Nick Craft notes. "The depressing effects of slower growth of productive potential will probably be felt more keenly in Europe." Juan Jimeno, Frank Smets, and Jonathan Yiangou also make similar arguments in their chapter. Europe's lack of market flexibility reduces investment demand. Its demographic prospects increase its supply of savings. Today's low

investment demand could therefore become persistent if Eurozone productivity and labour-market performances remain weak. However, the US should worry about its labour-force participation. Glaeser talks about "Eurosclerosis in the United States". He writes: "Today, the [participation] rate has fallen to 16%. ... [I]f past recoveries provide any guide, a greater share of prime aged males will be jobless at the end of the recovery than at the beginning of the recession."

Secular stagnation: What it is and why it matters

Seventy-six years ago, Alvin Hansen introduced the term 'secular stagnation' in a speech that was insightful, forward-looking, and entirely wrong. He worried that low birth rates and the end of America's farmland expansion would generate under-investment, deficient aggregate demand, and slow growth. The following 35 years catapulted the US to global economic dominance on the back of a baby boom, soaring investment, flourishing aggregate demand, and rapid growth.

With some temerity, Larry Summers resurrected the notion. Deceleration of growth's driving forces could produce chronic gaps between US potential and actual output – and do so in a way that standard monetary and fiscal policy would have difficulty addressing. "We may well need, in the years ahead," Summers said in 2013, "to think about how we manage an economy in which the zero nominal interest rate is a chronic and systemic inhibitor of economic activity, holding our economies back below their potential."

The term secular stagnation struck a chord. As Barry Eichengreen puts it in his perceptive contribution to this eBook: "The idea that America and the other advanced economies might be suffering from more than the hangover from a financial crisis resonated with many observers." The resonance did not produce harmony.

Secular stagnation – or SecStag for short – means different things to different people.

- To some, like Bob Gordon and Ed Glaeser, the real concern is slow growth for decades to come. Gordon writes: "[T]he source of the growth slowdown is a set of four headwinds, already blowing their gale-force to slow economic progress to that of the turtle. These four barriers to growth are demographics, education, inequality, and government debt."
- To others, like Ricardo Caballero and Emmanuel Farhi, it is a 'safety

trap'. Regulators force institutional investors to invest in triple-A assets, while the supply of these assets has gone down by 50% due to the financial crisis, pushing the real interest rate down. They refer to this as a safety trap to emphasise the similarity and difference with a conventional liquidity trap. Both involve severe asset shortages, zero nominal interest rates, wealth destruction, deficits in aggregate demand, and recessions.

But as mentioned above, most of our authors view secular stagnation as a situation where low real interest rates, low inflation, and the zero lower bound prevent authorities from maintaining the economy at its full-employment growth potential. Very low real interest rates are a key symptom.

Slow growth and the SecStag debate

Persistent slow growth and secular stagnation are intertwined. The point rests on two premises: (i) Macro 101 tells us that steady-state capital growth (investment demand) equals the sum of productivity and labour-input growth, and (ii) the supply of savings is fairly unresponsive to interest rates. Growth deceleration may thus require negative real rates until savings behaviour transits to the new low-growth reality (see the Eggertsson and Mehrotra chapter).

Prima facie case for secular stagnation

It will be difficult to know, in real time, that we are facing secular stagnation. One can believe either Gordon – claiming that the growth slowdown is structural – or Summers blaming aggregate demand – the low real interest rate should worry policymakers anyway. If the Eurozone economy stays long enough in the doldrums with zero policy rates, the case for SecStag will be convincing. But even another 5 years of anaemic growth might not be enough to convince key policymakers. Of course by then it will be too late. A generation of young Europeans will have had their careers and lifetime earnings damaged.

How can we tell SecStag has materialised?

- A key tell-tale is low real interest rates.

When real interest rates are very low in times of normal growth, even moderately adverse shocks can throw monetary policy up against the zero lower bound. Figure 1 shows the US and EZ real rates. From 1994 to

present, they have fluctuated but generally trended downwards (the lines show the peak-to-peak averages).

For recent years, the policy rates have been near zero, so the real rates are being driven by inflation rates. The start of a pernicious cycle – not unlike Japan's lost decade – can be seen in the EZ data. As inflation falls, at least in part due to the lacklustre growth, monetary policy becomes tight as the real rate rises. This in turn can slow growth and bring inflation down further.

Figure 1 Trends in real interest rates, US and EZ
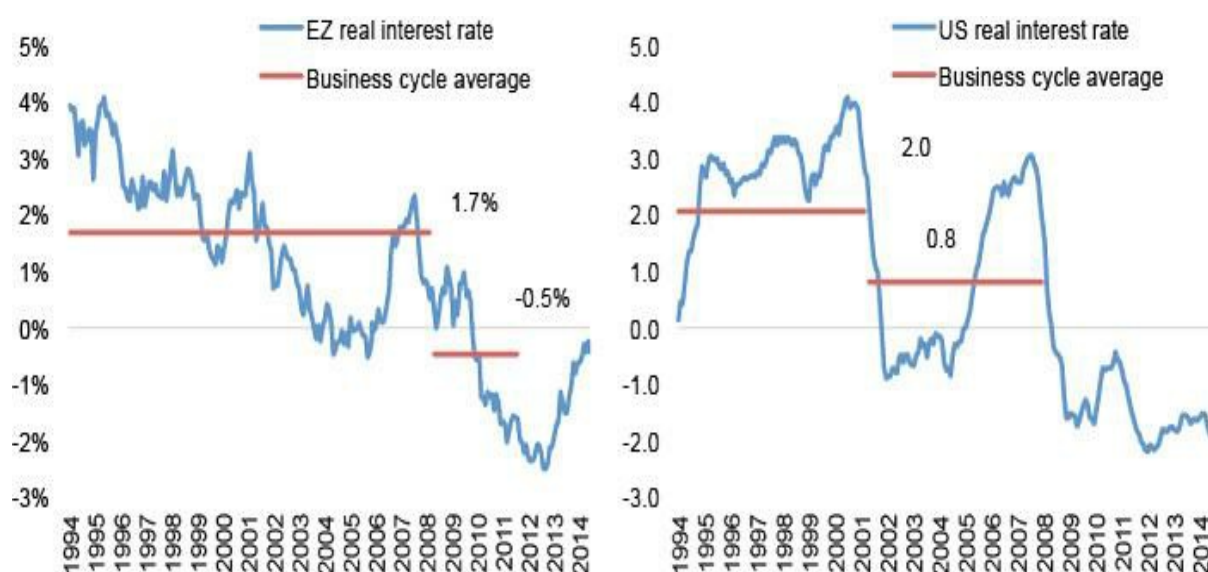
Sources: Eurostat and FRED online database. EONIA and Fed Funds minus core inflation.

But there are many reasons for real interest rates to be low. How do we know that these low rates are associated with secular trends in investment and savings? Unfortunately, the most obvious places to look for answers are not available. We cannot look for savings–investment imbalances since market forces tend to keep them in line year by year.

- What we need to do is look for quasi-exogenous factors that shift savings supply outwards, and/or shift investment demand inwards.

Standard macroeconomics views personal savings behaviour as driven by lifetime consumption smoothing. When deciding how much to save for retirement and kids, people think ahead about how long they'll work and how much they'll earn. Plainly, saving rises when the working life gets shorter as a share of total life. The age profile of the workforce also matters, since people save most in years when they earn the most. On all three counts, the facts on years at school, retirement age, and population

age-profiles suggest that the European savings schedule has shifted out and will continue to do so for years to come.

The numbers can be quite large. For instance, calculations in our introductory chapter suggest that the required stock of German savings rose by something like 75% of German GDP between 1990 and 2010. Similar numbers apply to other countries. That's a big outward shift in the savings supply curve.

On the investment demand side, standard macroeconomics focuses on the amount of new capital needed to equip workers. In the Solow growth model, for instance, the capital stock is expected to grow at the growth rate of labour productivity plus the growth rate of hours worked. Table 1 (which is extracted from Nick Crafts' chapter) shows that all the advanced economies face much slower employment growth (due to demographics) according to the OECD's projections. The OECD is more optimistic on the technology side – projecting that European innovation will take off while US and UK innovation slow down. At best, these productivity projections suggest what might happen if pro-growth reforms are implemented, or as Crafts puts it, the OECD seems to "favour hope over experience".

Taken together, these two quasi-exogenous factors suggest that Europe's investment demand schedule will shift in massively in the decades to come – and even more so without the pro-growth reforms that would be needed to raise productivity growth.

Table 1 Drivers of investment demand (%)

	Employment growth		Labour productivity growth	
	1995-2007	2014-2030	1995-2007	2014-2030
EZ	1.3	0.2	1.0	1.5
US	1.2	0.5	2.0	1.9
France	1.1	0.3	1.1	1.9
Germany	0.4	-0.5	1.2	1.6
UK	1.0	0.6	2.3	2.0

Sources: The Conference Board Total Economy Database and OECD.

What must be done?

Economists know how to beat secular stagnation. There are really two sorts of policies here according to Summers: prevention and cure.

- Policies that stimulate productivity growth and raise labour-force participation build in buffers against the zero lower bound by boosting persistent investment demand.

Such pro-growth policies are uncontroversial in the policymaker world, even if they are politically difficult to implement. The main cure is more controversial, even if it is logically obvious.

- If negative real interest rates will be needed frequently and policy rates are bound to the positive real line, why not raise the inflation target to, say, 4% as suggested by Krugman (2014) and Blanchard et al. (2010)?

Theory and evidence tell us that stable inflation is critical, but there is no clear reason why the inflation target should be 2% instead of 4%. And the spectre of the US and Europe suffering Japan-like lost decades argues strongly for a higher target rate.

The main argument against this cure is the German disgust of its 1923 hyperinflation. Reflecting a view held strongly in parts of the Eurozone, Wolff writes: "I would advise against changing the ECB's inflation target … such a step would severely undermine trust in a young institution … [and] would constitute a break in the contract under which Germany subscribed to the monetary union." Germany's respect for its own history has made the world a better place to live in. It should therefore not be denounced lightly. However, respect for history is something different from sound economic reasoning.

However, monetary policy alone is unlikely to 'cure' the problem.

- Conduct prolonged countercyclical fiscal policy.

As Richard Koo argues: "During [balance sheet recessions], monetary policy is largely ineffective because those with balance sheets underwater will not increase borrowing at any interest rate ... The government also cannot tell the private sector not to repair its balance sheets ... This means the only thing the government can do to offset the deflationary forces coming from private sector deleveraging is to do the opposite of the private sector, i.e., borrow and spend ..." Monetary policy alone can only solve the problem at the cost of bubbles and financial instability.

This conclusion leads almost automatically to a specific piece of policy

advice for the Eurozone:

- Revise the European Fiscal Stability Treaty.

The current version obliges countries to reduce their public debt below 60% of GDP in 20 years. In some countries, this would require a massive tightening in times of excess saving. The target for the structural deficit of 1% of GDP implies a public debt between 25% and 33% of GDP, assuming the nominal growth of GDP to be 3% to 4%. This low level would aggravate excess saving and lead to a shortage of safe assets.

Concluding remarks

Secular stagnation proved illusory after the Great Depression. It may well prove to be so after the Great Recession – it is still too early to tell. Uncertainty, however, is no excuse for inactivity. Most actions are no-regret policies anyway.

"If the US experiences secular stagnation, the condition will be self-inflicted," Eichengreen writes, making a point that applies equally to Europe. Secular stagnation would reflect a failure to address US infrastructure, education, and training needs. It would reflect a failure to repair the damage caused by the Great Recession in Europe's financial sector. And above all, it would reflect a failure to support aggregate demand. "These are concrete policy problems with concrete policy solutions," says Eichengreen, "It is important not to accept secular stagnation, but instead to take steps to avoid it."

Koo is not very optimistic that the most troubled part of the world economy, Europe, will succeed in a policy change: "On the political front, the unfortunate fact is that democracies are ill-equipped to handle such recessions. For a democracy to function properly, people must act based on a strong sense of personal responsibility and self-reliance. But this principle runs counter to the use of fiscal stimulus, which involves depending on 'big government' and waiting for a recovery." Whether one likes Koo's argument or not, it helps to explain why Europe is having difficulty dropping policies that are widely disapproved among economists. However, the EU has shown a remarkable capacity to re-emerge from deep crises. Hence, we might follow the OECD and favour hope over experience.

References

Blanchard, Olivier, Giovanni Dell'Ariccia, and Paolo Mauro (2010), "Rethinking Macroeconomic Policy", IMF Staff Position Note, SPN/10/03.

Gordon, Robert (2012), "Is US Economic Growth Over? Faltering Innovation Confronts the Six Headwinds", NBER Working Paper 18315.

Hansen, Alvin (1938), Speech published as A H Hansen (1939), "Economic Progress and Declining Population Growth", *American Economic Review*, 29: 1–15.

Krugman, Paul (2014), "Inflation Targets Reconsidered", Paper presented to ECB Forum, Sintra Portugal.

How large is the US tax multiplier?

Carlo Favero, Francesco Giavazzi

Bocconi University and CEPR

10 September 2009

Christina and David Romer have recently produced new estimates of the tax multiplier by using the narrative record to identify exogenous tax changes. This column says that their estimates assume that tax changes are orthogonal to shifts in other macroeconomic variables, such as productivity, taxes, and monetary policy. Relaxing that assumption yields much smaller estimates of the tax multiplier.

Tax cuts have been extensively used in the US and elsewhere as a measure to counter the impact of the financial crisis. The dimension of the tax multiplier (i.e. the percentage response of output growth to a given shift in the tax/GDP ratio) is a crucial magnitude to understand how appropriate the fiscal intervention has been.

So far the received-wisdom estimate is:

- The multiplier is 1.0, four quarters after the shift in taxes;
- The peak- level is slightly above 1.0 and comes after two years; after that the effect levels off.
- There is also evidence that such an effect is weaker over the period 1980-2006 than in the previous 25 years.

These estimates were typically obtained in the context of vector autoregressive (VAR) models applied to quarterly data (see, e.g. Blanchard and Perotti, 2002 and Perotti 2008).

In a recent paper Christina and David Romer (forthcoming) find a much larger multiplier. According to their estimates, a tax cut equivalent to 1% of US GDP raises output just over 1% within a year, but the magnitude amplifies in the following periods to reach an effect of nearly 3% after three years. The effect is highly statistically significant and stable over time.

Estimating tax multipliers: Three key issues

The most crucial issue in the estimation of tax multipliers is the

identification of truly exogenous shifts in taxes, thus excluding changes in government revenues that are not legislated at all, but occur automatically because the tax base varies with the overall level of income.

Romer and Romer solve this problem brilliantly, in a manner distinct from existing empirical papers. Applying to fiscal policy a method they have extensively applied to analyse the effects of shift in monetary policy, they identify exogenous shift in taxes analysing the narrative record. They use things like Presidential speeches and Congressional reports, which allows them to identify the size, timing, and principal motivation for all major post-war tax policy actions. This allows them to distinguish between legislated changes made for reasons related to prospective economic conditions and those adopted for more exogenous reasons – for instance for philosophical reasons or to reduce an inherited budget deficit. Their estimates of the effects on output of shifts in taxes use only these more exogenous changes. Thus they avoid the bias in measurement that would be generated by the use of aggregate measures of tax changes, many of which – as we said – are not legislated at all, but occur automatically because the tax base varies with the overall level of income, or because of changes in stock prices, inflation, and other non-policy forces.

Previous attempts to separate endogenous and exogenous policy shifts

Previous attempts at identifying exogenous shifts in taxes (Blanchard and Perotti, 2002, Perotti 2008, Mountford and Uhlig, 2002 Fatàs and Mihov, 2001) estimated reduced-form VAR models and mapping the innovations generated by such models into structural shocks using institutional information about the tax and transfer systems and the timing of tax collections. This procedure (which some authors also applied to spending) allowed the authors to identify the automatic response of taxes (and/or spending) to economic activity, and, by implication, to infer truly exogenous shifts in fiscal policy. The tax multipliers estimated using this procedure are much smaller than those found by Romer and Romer.

Romer and Romer suggest that these differences are the result of the failure of structural VARs to identify truly exogenous shifts in taxes.

The estimation of tax multipliers poses a second issue, however, beyond that of identification: the specification of the empirical model used to obtain such estimates. Traditional fiscal VARs were multiple equation models in which all the variables (output growth, government revenues and spending, inflation, nominal interest rates) relevant to determine the

effect on growth of a shift in taxes were jointly modelled. Romer and Romer instead evaluate the multiplier estimating a single equation in which growth is a function of contemporaneous and lagged shifts in taxes.

A third issue emerges when one starts thinking about the nature rather than the dimension of the empirical model that is most appropriate to estimate tax multipliers. Both the Romer and Romer model and the traditional fiscal VARs are linear in the relevant variables. However, there is a natural source of non-linearity among the variables included in a fiscal VAR, which arises from the government intertemporal budget constraint.

Whether the government budget constraint belongs in a fiscal VAR depends on whether the level of the debt-to-GDP ratio enters the model. Bohn (1998), using a century of US data, finds a positive correlation between the government surplus and the federal debt – a result that suggests that US fiscal policy reacts to the level of the debt ratio. But if fiscal variables respond to the level of the debt, then the estimation of tax multipliers should be conducted by explicitly recognising a role for debt and the for the stock-flow identity linking debt and deficits and thus describing how the debt ratio evolves over time following a fiscal shock.

Results: There is no conflict in our evidence on tax multipliers

In a recent paper (Favero and Giavazzi, 2009), we assess the robustness of the evidence of a large tax multiplier using the same measure of exogenous shifts in taxes constructed by Romer and Romer but a different econometric specification.

We show that the equation Romer and Romer estimate to compute the effects of a shift in taxes can be interpreted as the moving average representation of the equation for output growth in a traditional fiscal VAR which includes a larger set of variables – along with output growth, government revenues and spending, inflation, and nominal interest rates. This representation however is truncated along two dimensions: (i) the number of lags is finite and (ii) no other shocks than shifts in taxes are included. Such an approach relies on the assumption that tax shocks are not only orthogonal to each other, but that they are also orthogonal to any other macro shock – productivity shocks, shifts in government spending, in monetary policy, etc.

When we relax this assumption, we find a tax multiplier much smaller than that estimated by Romer and Romer and similar to the size of the

multiplier estimated in the traditional fiscal VARs. When we split the sample in two sub-samples (1950-1979 and 1980-2006) we find, before 1980, a multiplier whose size is never greater than one; after 1980 a multiplier not significantly different from zero.

We then extend the empirical model by explicitly recognising a role for debt and the stock-flow identity linking debt and deficits. In other words, we estimate the multiplier associated with the Romer and Romer tax shocks, keeping track of the effect that such shocks exert on the path of the debt ratio and allowing for a response of taxes, spending, output, and interest rates to the level of the debt. We find no major difference between a non-linear model with an explicit debt dynamics equation and a VAR that excludes debt and the debt dynamics equation. We suggest that the reason why overlooking this non-linearity does not appear to be important – or at least as important as overlooking the simultaneity between tax shocks and other macro shocks – may be that the variables entering the budget constraint already enter (albeit linearly) the equation of a fiscal VAR that excludes debt. Non-linearity, however, appears to make a difference whenever – as in happens in the US after 1980 – the response of fiscal variables to the level of the debt is particularly strong.

References

Blanchard, Olivier and R. Perotti (2002). "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output", *Quarterly Journal of Economics*.

Bohn, Henning (1998). "The Behaviour of US public debt and deficits", *Quarterly Journal of Economics*, 113, 949-963.

Fatàs, Antonio and I. Mihov (2001). "The Effects of Fiscal Policy on Consumption and Employment: Theory and Evidence", mimeo, INSEAD.

Favero C.A. and F.Giavazzi (2009] "How Large are the Effects of Tax Changes?" CEPR Discussion Paper 7439.

Mountford, Andrew and H. Uhlig (2002). "What Are the Effects of Fiscal Policy Shocks?" CEPR Discussion Paper 3338.

Perotti, Roberto (2008). "In Search of the Transmission Mechanism of Fiscal policy"; NBERMacroeconomic Annual.

Romer, Christina and David H. Romer (forthcoming). The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review*.

Another look at the 2001 income tax rebates

Paolo Surico, Kanishka Misra

London Business School

06 May 2011

What are the macroeconomic effects of a tax rebate? This column takes a novel approach by estimating the effects on a range of different individuals rather than just the typical person. Looking at the 2001 income tax rebates in the US, it finds evidence of a heterogeneous response to tax cuts and an economic effect $9 billion below what linear models suggest.

In the aftermath of the recent financial crisis, governments around the world have sought to support the economy through unprecedented fiscal interventions. Considerable uncertainty (and disagreement among economists) exists, however, around the impact of these policies. At the heart of this uncertainty lies the recognition that the effects of fiscal stimuli, such as income tax rebates, on the aggregate economy cannot be fully understood without explicit consideration of distributional dynamics. This important insight feeds into a growing theoretical literature in macroeconomics which explicitly recognises that consumers and entrepreneurs are inherently different in their access to financial markets, life-cycle positions, patience, risk propensity, earning ability, and other individual characteristics.

On the empirical side, a large number of studies surveyed by Jappelli and Pistaferri (2010) have used exogenous variation in household income data to test for the permanent income hypothesis. Parker (1999), Souleles (1999), Shapiro and Slemrod (2003), and Johnson et al. (2006) evaluate the impact of the 2001 (or earlier) tax rebates in the US and find that families spent 20% to 40% of their rebates during the quarter of arrival, and spend about 67% of the rebate over two quarters.

Despite the emphasis on heterogeneity placed by the theory, there is little evidence on whether the response to income tax rebates varies across households and, more importantly from a macroeconomic perspective, whether a heterogeneous response model may yield predictions for the aggregate impact of the fiscal stimulus which are different from the predictions of the commonly employed homogeneous response model.

Most of the available evidence, in fact, relies on restrictive parametric assumptions under which the estimates of a linear model can be interpreted as accurate measure of the average effect (across the entire population of tax filers) of the fiscal stimulus onto the real economy.

In a recent paper (Misra and Surico 2011), we estimate the heterogeneous responses to the 2001 income tax rebates across groups of American households endogenously determined within a sample of 13,066 families from the Consumption Expenditure Survey. We find that around 45% of the sample saved the entire value of the rebate. Another 20%, with low income and liquid wealth, spent a significant amount. The largest propensity to consume, however, was associated with the remaining 35% of households, with higher income or liquid wealth. As for the aggregate impact of the fiscal stimulus, the heterogeneous response model estimates that the income tax rebates added a 3.27% to aggregate non-durable consumption expenditure in the second half of 2001. The homogeneous response model, in contrast, predicts a 5.05% increase. This is a difference as large as $9 billion!

Beyond the representative agent model in empirical analysis

The Economic Growth and Tax Relief Reconciliation Act of 2001 approved to send income tax rebates, typically of $300 or $600 in value, to most US households in the second half of 2001. The main objective of these rebates was to increase household consumption and therefore stimulate the aggregate economy.
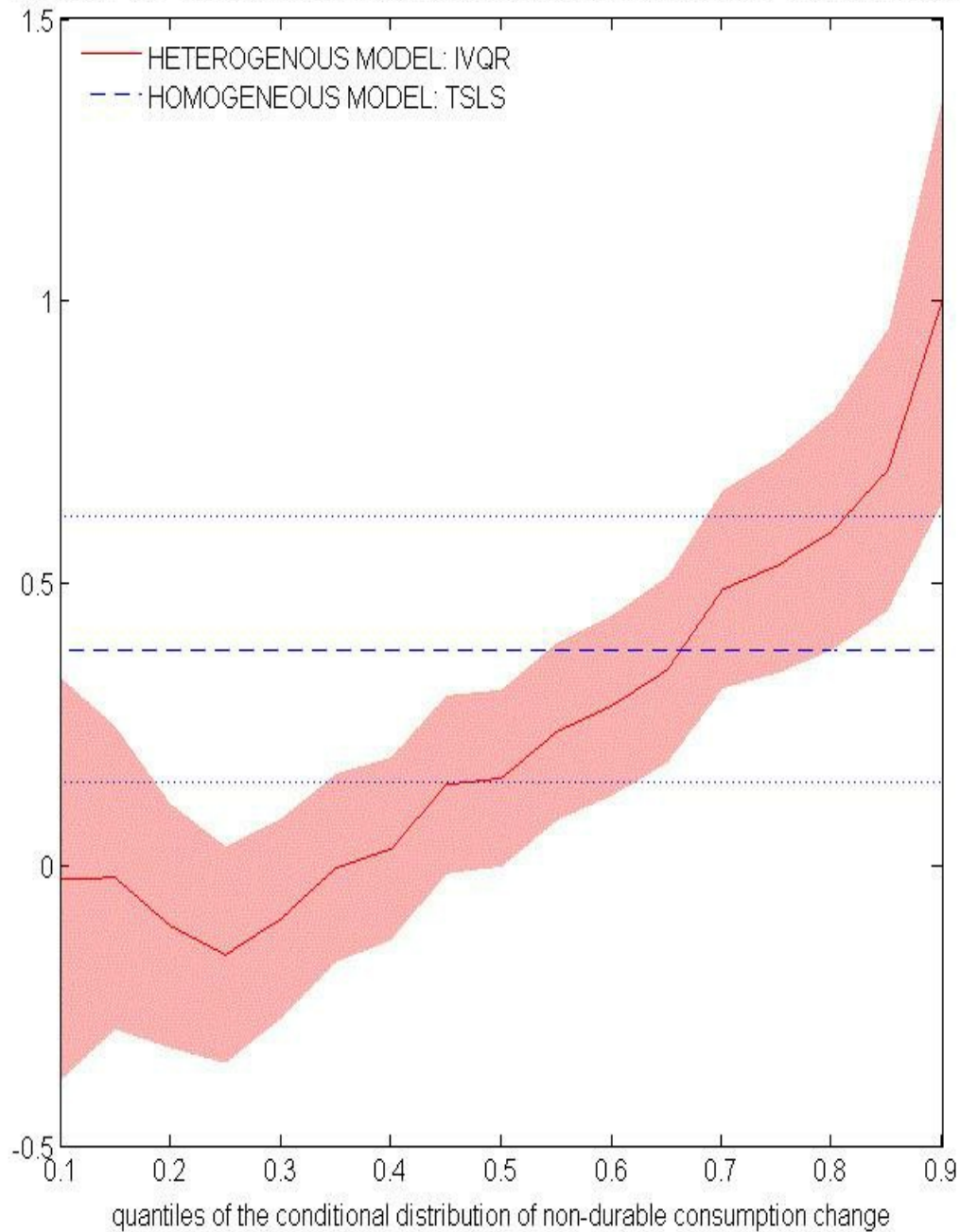
Several theoretical contributions have derived the conditions under which the aggregate implications of heterogeneous agent models may differ significantly from the predictions of representative agent models. Differences in the degree of access to credit markets, impatience, illiquid wealth and elasticity of intertemporal substitution may also be associated with differences in the expenditure response to a temporary tax cut.

To explore in the data the heterogeneity highlighted by the theory, we use quantile regression methods which are designed to estimate unobserved heterogeneity models. In particular, quantile regression methods yield a family of estimated marginal propensities to consume that vary across the conditional distribution of consumption changes. Furthermore, estimates are robust to non-normal distributions (e.g. fat tailed) of the error terms (Koenker 2005). This is an additional important advantage relative to least square methods, whose inference on the average effect is distorted by the presence of non-Gaussian disturbances.

The estimates of the heterogeneous model are reported in Figure 1. Here the vertical axis displays the within-quarter marginal propensity to consume (out of the tax rebate) and the horizontal axis shows the different quantiles of the consumption change distribution. The dotted blue line denotes the marginal propensity to consume (MPC) of 0.38 estimated using the homogenous response model (using two stage least square). The red line shows the estimates from the heterogeneous response model. The main finding is that there is indeed a large extent of heterogeneity in the responses to the tax rebates. In particular, around 45% of the sample saved the entire value of the rebate (MPC = 0), an additional 45% spent a significant amount (MPC > 0, MPC < 1) and the final 10% spent the entire value of the rebate (MPC = 1).

Figure 1 Evidence for heterogeneous response to 2001 tax rebates

IMPACT OF TAX REBATE ON NON-DURABLE CONSUMPTION CHANGE

HETEROGENOUS MODEL: IVQR
HOMOGENEOUS MODEL: TSLS

quantiles of the conditional distribution of non-durable consumption change

The evidence in favour of heterogeneity rises an important issue about what factors may be driving the diverse responses to the tax rebate. Figure 2 reports evidence along these lines. The top (bottom) panel reports the median value of income (liquid wealth) for each quantile of the estimated conditional distribution of changes in non-durable consumption expenditure. Two findings are worth emphasising.

- First, both variables tend to have higher values at the tails. Note the behaviour at the left end is consistent with Ricardian equivalence (MPC= 0). On the other hand, households with the highest impact (MPC = 1) at the right tail enjoyed higher income and liquid wealth.
- Second, households with low income or low liquid wealth are concentrated in the 45 to 65 percentiles. According to the MPC estimates, these households spend a significant portion of the rebate, between 10% and 40%, and therefore their behaviour is consistent with the presence of liquidity constraints for 20% of the full sample. This number is not inconsistent with the fraction of liquidity constrained American families estimated by Jappelli et al. (1998) and Dogra and Gorbachev (2010) using independent data from the Survey of Consumer Finance.

Figure 2 Median income and median liquid assets by rank-score quantile of the conditional distribution of non-durable expenditure

MEDIAN INCOME BY QUANTILE OF THE CONDITIONAL DISTRIBUTION OF NON-DURABLE EXPENDITURE
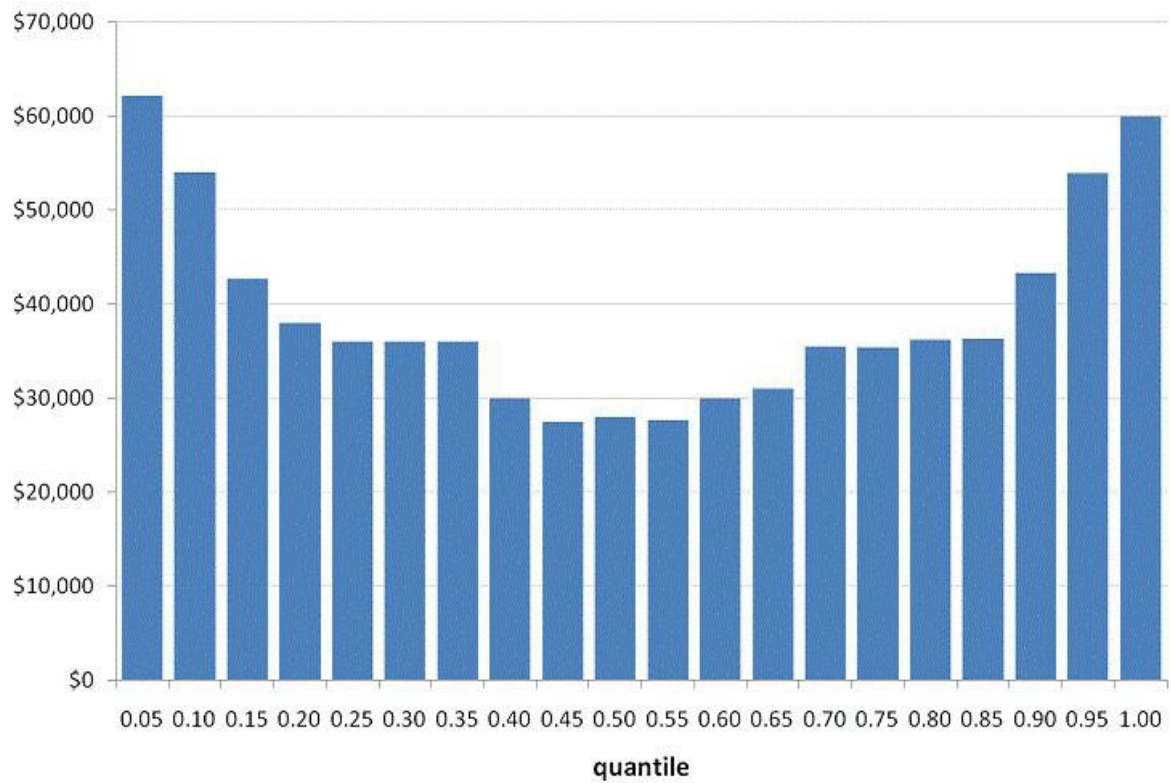
MEDIAN LIQUID ASSETS BY QUANTILE OF THE CONDITIONAL DISTRIBUTION OF NON-DURABLE EXPENDITURE
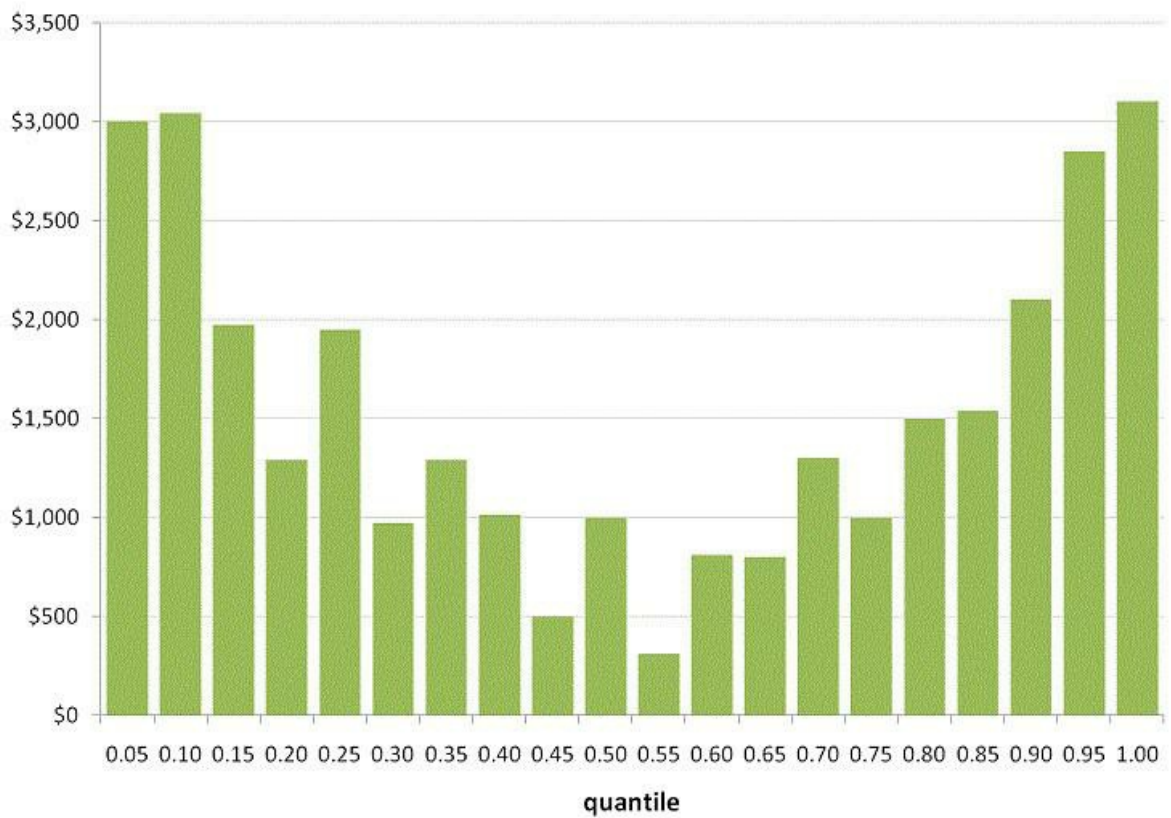
Revisiting the aggregate effects of fiscal policy

What are the implications of heterogeneity in the MPC for the aggregate effects of fiscal policy? Does the heterogeneous response model provide a different answer relative to the conventional homogeneous response model? To answer these questions, we follow Johnson et al. (2006) and measure the aggregate impact of the tax rebates on the US economy in the second half of 2001 using the fact that the total amount of disbursement, $38 billion, represented 7.5% of the aggregate non-durable consumption in the third quarter of 2001.

The estimates of the heterogeneous model indicate that the income tax rebates boosted aggregate expenditure on non-durable goods and services by a significant 3.27%. This should be compared with the 5.05% implied by the homogeneous model estimates, which are based on the restriction that all households shared the same MPC. This difference implies that the homogenous response model overestimates the impact of the 2001 income tax rebates by $9 billion. Furthermore, the estimates of the homogeneous response specification are surrounded by a degree of uncertainty which is three times larger than the uncertainty around the estimates of the heterogeneous response model.

Another way to appreciate the empirical results in our paper is to compute the marginal propensity to consume for the whole economy based on the two models. The heterogeneous response model estimates an aggregate MPC of 44%. This value is significantly lower than 67%, which is the point estimate associated with the homogeneous response model.

The findings reported in our research suggest that the heterogeneous response model may be an important vehicle for the accurate evaluation of the impact of fiscal stimulus packages on different groups of the society as well as on the aggregate economy.

References

Chernozhukov, Victor and Christian Hansen (2005), "An IV Model of Quantile Treatment Effects", *Econometrica*, 73:245-262.

Dogra, Keshav and Olga Gorbachev (2010), "The Effect of Changing Liquidity Constraints on Variability of Household Consumption", mimeo, Columbia University and University of Edinburgh.

Jappelli, Tullio, Jorn-Steffen Pischke, and Nicholas S Souleles (1998),

"Testing for Liquidity Constraints in Euler Equations with Complementary Data Sources", *The Review of Economics and Statistic*s, 80:251-262.

Jappelli, Tullio and Luigi Pistaferri (2010), "The Consumption Response to Income Changes", *Annual Review of Economics*, 2:479-506.

Johnson, David, Nicholas S Souleles and Jonathan A Parker (2006), "Household Expenditure and the Income Tax Rebates of 2001", *American Economic Review*, 96:1589-1610.

Koenker, Roger (2005), *Quantile Regression*, Cambridge University Press

Misra, Kanishka & Surico, Paolo (2011), "Heterogeneous Responses and Aggregate Impact of the 2001 Income Tax Rebates," CEPR Discussion Paper 8306

Parker, Jonathan (1999), "The Reaction of Household Consumption to Predictable Changes in Social Security Taxes", *American Economic Review*, 89:959-973.

Shapiro, Matthew and Joel Slemrod (2003), "Consumer Response to Tax Rebates", *American Economic Review*, 85:274-283.

Souleles, Nicholas (1999), "The Response of Household Consumption to Income Tax Refunds", *American Economic Review*, 89:947-958.

Durable consumption during recessions

David Berger, Joseph Vavra

Northwestern University; University of Chicago

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Various stimulus programmes have been implemented in a response to the decline in consumption of durables since the Recession. This column argues that standard analysis of such programmes could be overstating their effectiveness. Aggregate durable spending is much less responsive to stimulus during recessions. Microeconomic frictions lead households to adjust their durable holdings less frequently.

Over the course of the Great Recession, purchases of new vehicles and other consumer durables fell by $153 billion. Purchases of new homes and other forms of residential investments declined by more than $260 billion. All-told, declines in broadly defined durable spending accounted for more than half of the total decline in GDP during the Recession.

Various stimulus programs, such as the 'First-Time-Home-Buyers-Credit' and the 'Cash-for-Clunkers' programme were implemented in response to these declines in durable spending. How effective are these sorts of fiscal or monetary stimulus at propping up durable demand during recessions?

The simplest, but not free of flaws, way to answer this question is to regress changes in durable spending on changes in government spending. However, this will give a misleading answer because we know that government stimulus is more likely to occur when durable spending is falling, so a simple regression might lead one to the erroneous conclusion that government spending causes durable spending to fall. Thus, the standard approach for estimating the response of durable spending to fiscal or monetary stimulus is to use vector autoregression models (VARs). These methods look at the relationship between economic variables over long periods of time, and typically exploit differences in timing to isolate causal effects. See Bernanke and Gertler (1995) for an example of the effect of cuts in the FFR on durable spending.[1]

Spending not responsive to stimulus during recessions

A weakness of standard VAR models is that they assume the relationship between consumer spending and government spending is stable across time. In a recent paper, (Berger and Vavra 2014), we call this assumption

into question and argue that aggregate durable spending is much less responsive to economic stimulus during recessions. This is because microeconomic frictions lead households to adjust their durable holdings much less frequently during these times. Our results imply that standard VAR approaches substantially overstate the effectiveness of durable stimulus during recessions. Intuitively, if few households are buying or selling cars or houses during recessions, then the stimulus will have a dampened effect relative to the average.

Our paper begins by documenting the large declines in the frequency of durable adjustment during recessions. Figure 1 below shows the frequency of adjustment of different kinds of durable goods in the Panel Study of Income Dynamics (PSID). The green and red line show how often households change houses (the split in 1997 is driven by a change in sampling methodology), and the blue line shows the frequency of adjustment of a broad measure of durables (only available beginning in 1999). The gray bars represent the fraction of each year in recession. The decline in frequencies associated with these recessions is evident. Various formal regressions confirm the economic and statistical significance of these declines: Adjustment frequencies fall by 15-20% during recessions.

Figure 1 Frequencies of durable adjustment
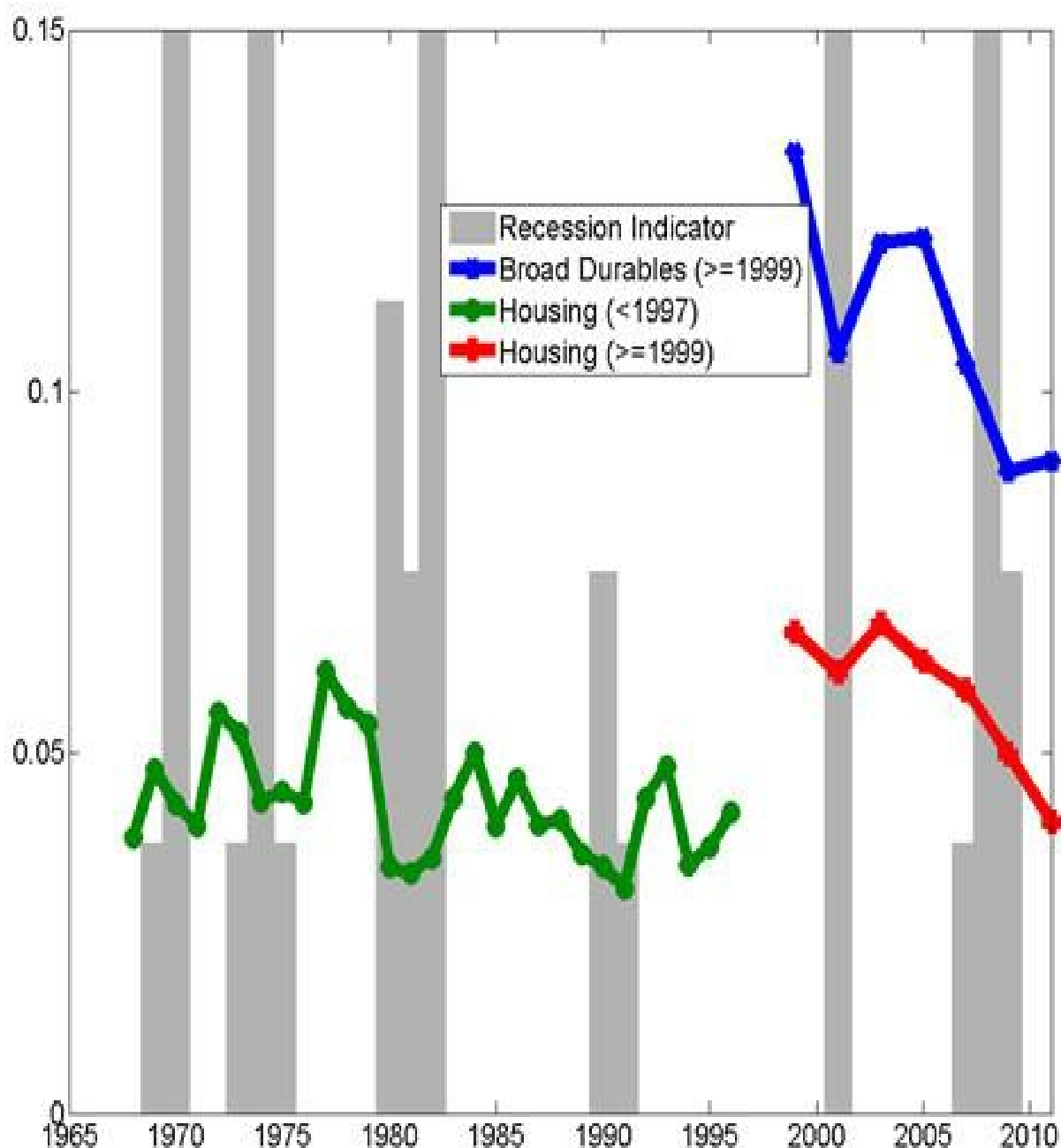
Note: We split the sample at 1999 as the PSID survey questions and sampling frequency changed. Broad measures of durable consumption are only available in the latter half of the sample.

We also show that other measures of durable turnover fall during recessions. Figure 2 displays the fraction of cars or automobiles that change hands each year. Again, this turnover plunges during recessions for both used and new durables.

Figure 2 How frequently does the durable stock change hands?

Housing Turnover Rate

Vehicle Turnover Rate

Legend: Recession Indicator; New; Used+New
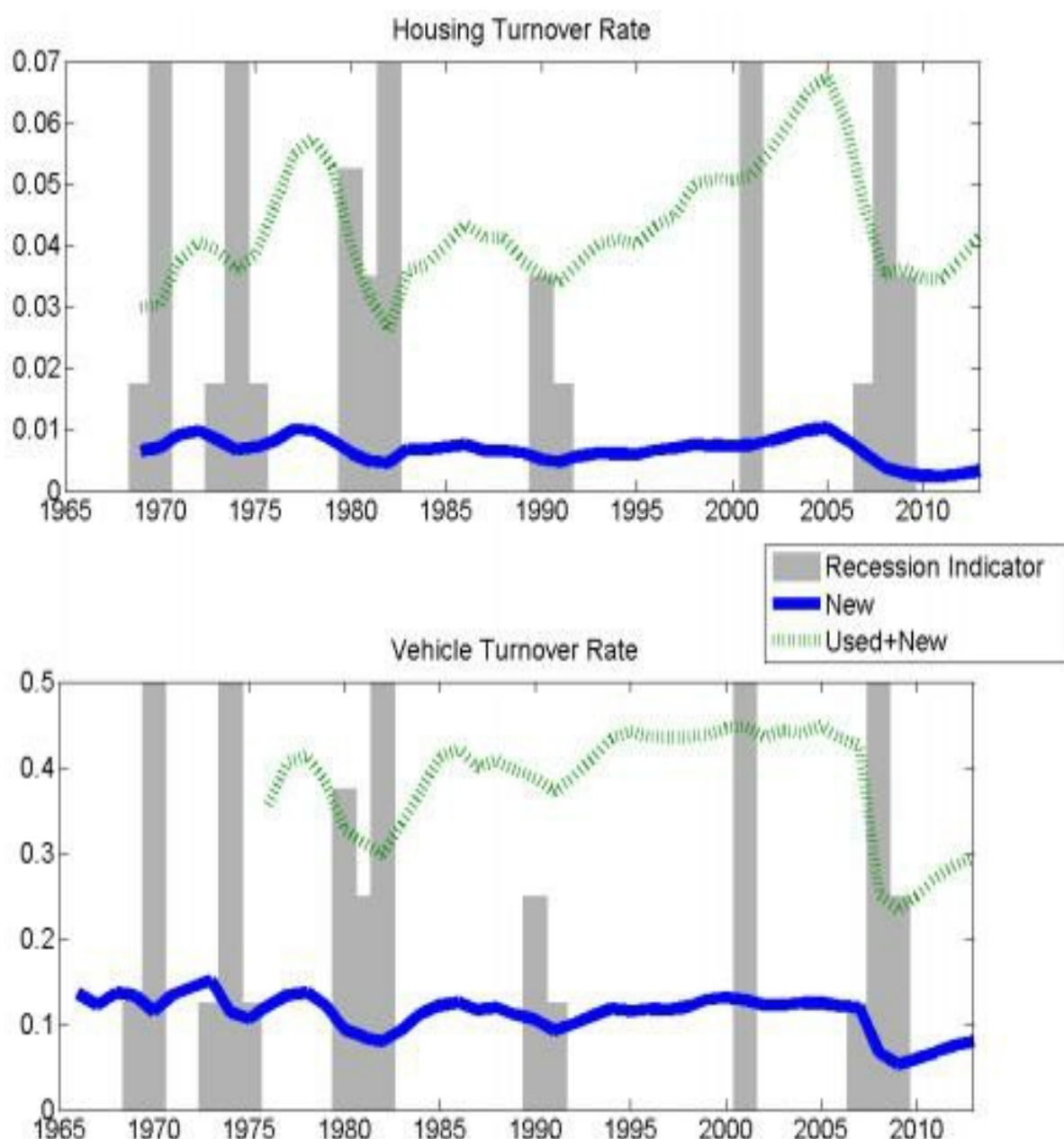
Notes: "New turnover each year is #Mew Homes (Light Vehicles)/#Homes (Light Vehicles) at start of year. "New+Existing" turnover adds used sales to the numerator. Sources for housing data: HUD and Census. Sources for auto data: CNW. Recession indicator is the fraction of year spent in recession.

# Predicting aggregate spending and its response to shocks

After documenting these patterns, we show that such procyclical frequency is exactly what is predicted by a model with realistic household level frictions. In particular, we build a quantitative model where individual households are subject to idiosyncratic labour income shocks, binding borrowing constraints, and purchase both durable and non-durable consumption goods. In the model, durable consumption goods are subject

to a fixed adjustment cost. These fixed costs imply that households pay some strictly positive financial cost even when adjusting their durable holdings by tiny amounts. These fixed costs proxy for, e.g., brokers' fees on housing transactions, transfer tax and titling fees for automobiles.

Fixed costs of adjustment naturally induce a 'gap' between a household's current durable holdings and those it would choose if it faced no adjustment costs. For small values of the gap, it is not worth paying the adjustment cost, so that the durable stock remains constant. In contrast, when the gap between a household's current durable holdings and its desired durable holdings is large, a household is more likely to adjust. Intuitively, households are more willing to pay adjustment costs when they are far from their optimum than when they are close to it.
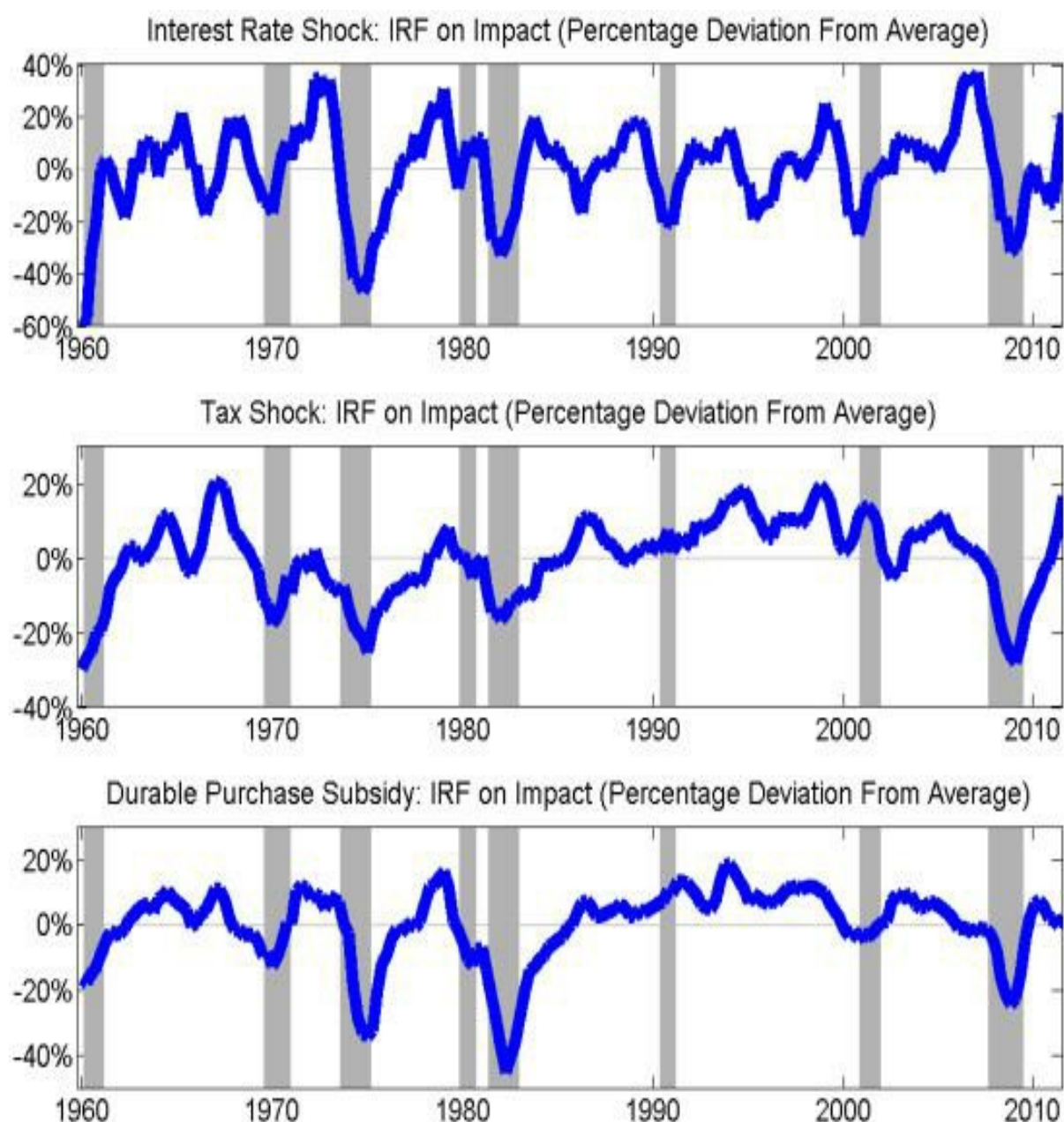
We estimate the extent of these transaction costs in the data, and show that our estimated model is able to explain well the actual durable adjustment in the PSID data. Figure 3 shows the probability of durable adjustment in the estimated model as a function of a household's durable gap, and compares this adjustment hazard to that in the data. Overall, more than 90% of the variation in empirical adjustment in the data is explained by our quantitative model.

Figure 3 Adjustment probabilities as functions of gaps
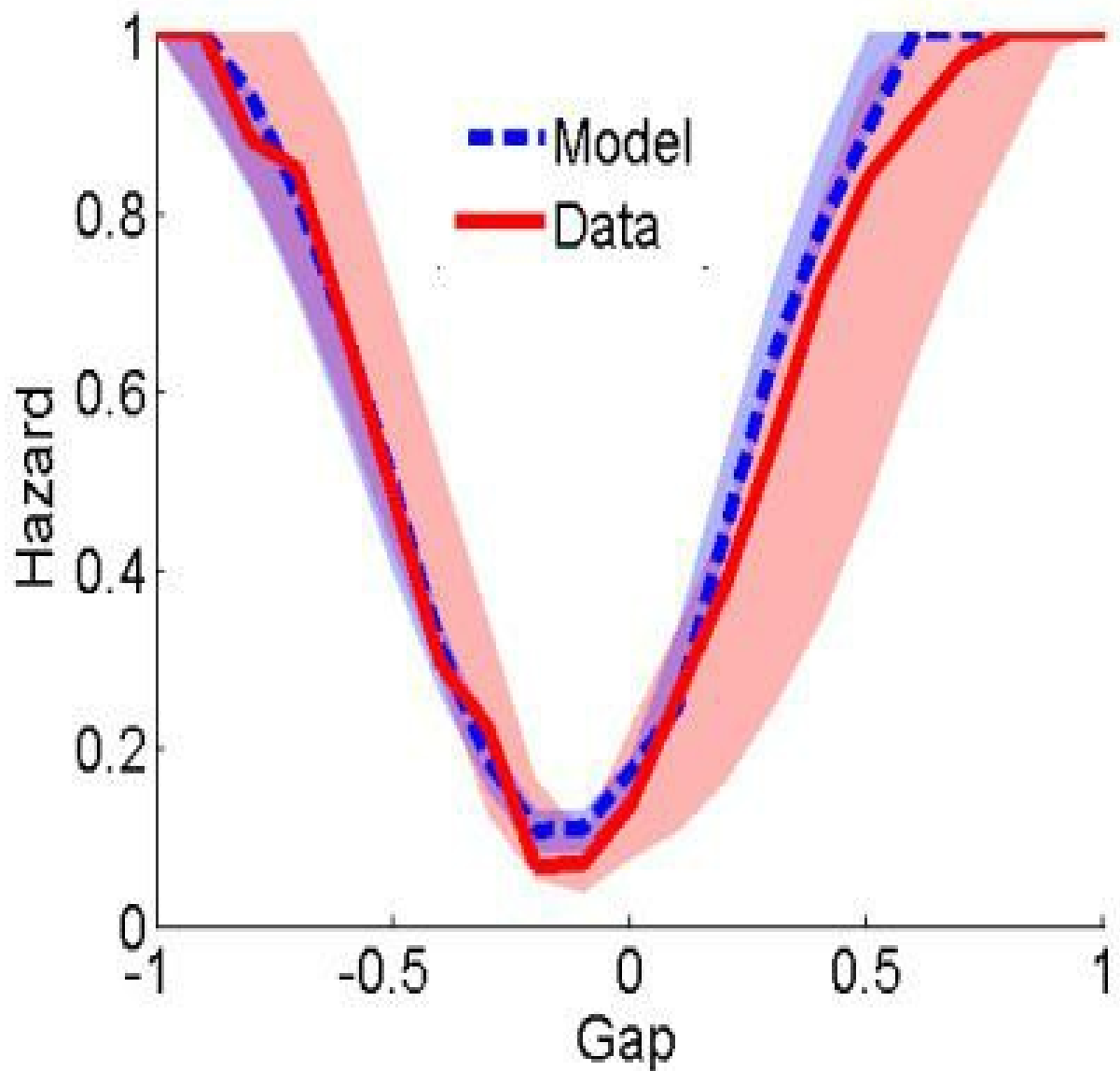
After estimating the quantitative model, we explore its macroeconomic implications. By introducing business cycle shocks into the model, we are able to explore how the response of aggregate spending to various policy shocks changes over the business cycle. Figure 4 shows the response of durable spending to various policy shocks in the model.

Figure 4 Response of durable spending to aggregate policy changes

Interest Rate Shock: IRF on Impact (Percentage Deviation From Average)

Tax Shock: IRF on Impact (Percentage Deviation From Average)

Durable Purchase Subsidy: IRF on Impact (Percentage Deviation From Average)

The response of durable spending to these shocks is strongly procyclical. The response of durable spending to a given change in policy is 40-50% smaller if the policy shock occurs in an NBER recession than if exactly the same policy is implemented during a boom. That is, our model implies that the response of durable spending to stimulus is not constant across time and is instead highly dependent on the state of the business cycle. This means that the assumption underlying simple VARs – that the response of durable spending to stimulus is stable across time – is strongly violated.

Why is the response of durable spending to changes in policy so procyclical? During recessions, households' desired level of durable holdings falls. In general, households can lower their durable holdings by

either selling durables, or by waiting around and letting them depreciate. In contrast, if a household wants to increase its durable holdings, it can only do so by actually purchasing durables. In a recession, fewer households want to purchase durables, and more households want to sell durables. However, the asymmetry induced by depreciation means that the frequency of purchases falls by much more than the frequency of sales rises, so that the total frequency of adjustment falls. As fewer households adjust their durable holdings in recessions, the response of durables spending to changes in policy falls. Intuitively, if no household purchases durables, then there is no margin along which to respond to policy.

Figure 5 illustrates how the distribution of gaps and adjustment probabilities varies across time in the PSID data. During the boom, the distribution of durable gaps shifts to the right as households desire larger durables, and adjustment becomes more likely.

Figure 5 Adjustment hazard and distribution of gaps at different dates
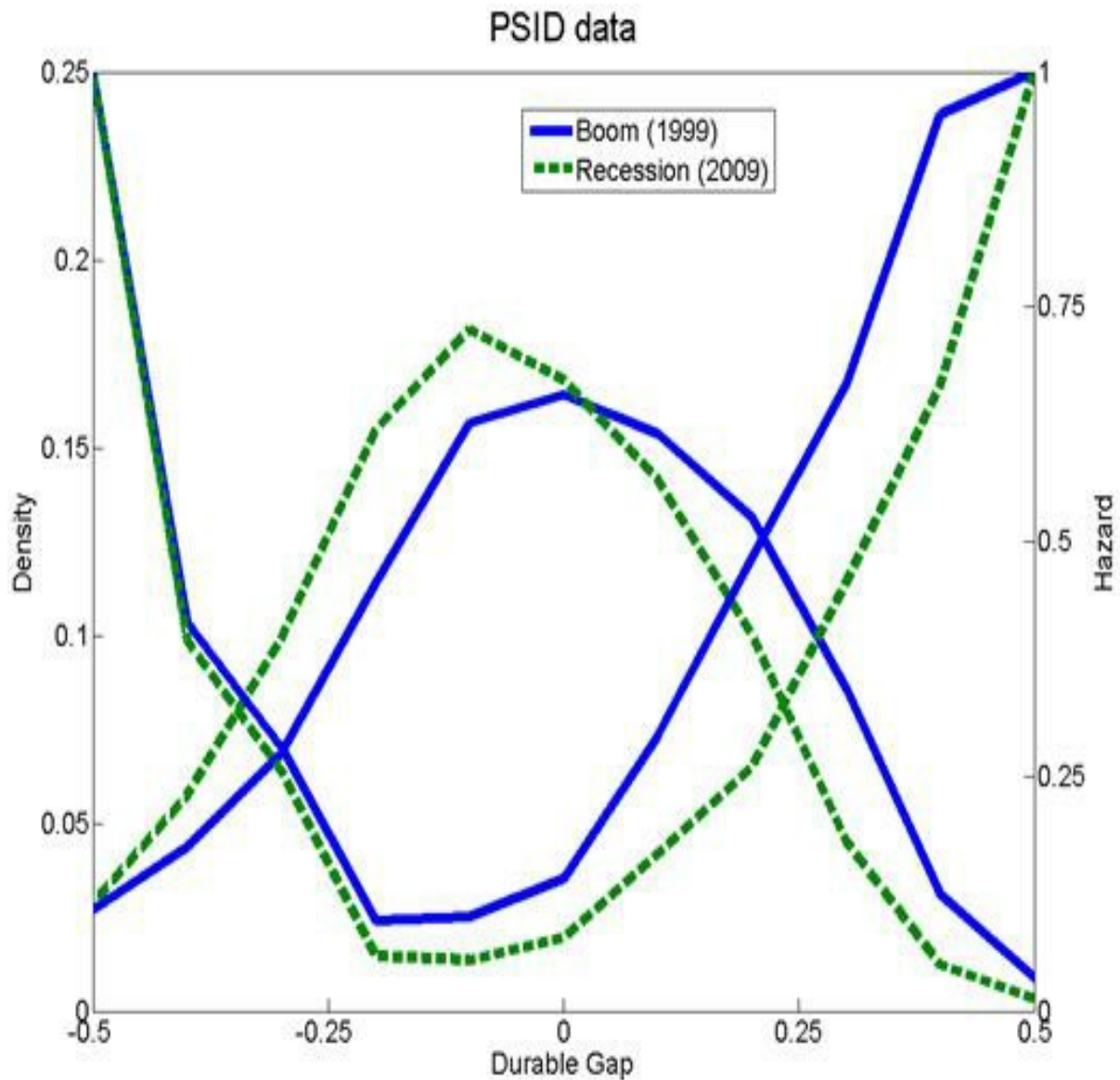
PSID data

Figure 6 shows the implications of these shifts in the data for how durable spending responds to policy shocks. In contrast to Figure 4, these implications come directly from PSID micro-data rather than from the quantitative model. However, the implications are nearly identical:

- During booms (such as 1999 or 2005), the response of durable spending to shocks is substantially larger than during recessions (such as 2001 or 2009).

Figure 6 Response to policy implied by PSID data

IRF on Impact (Percentage Deviation From Average)
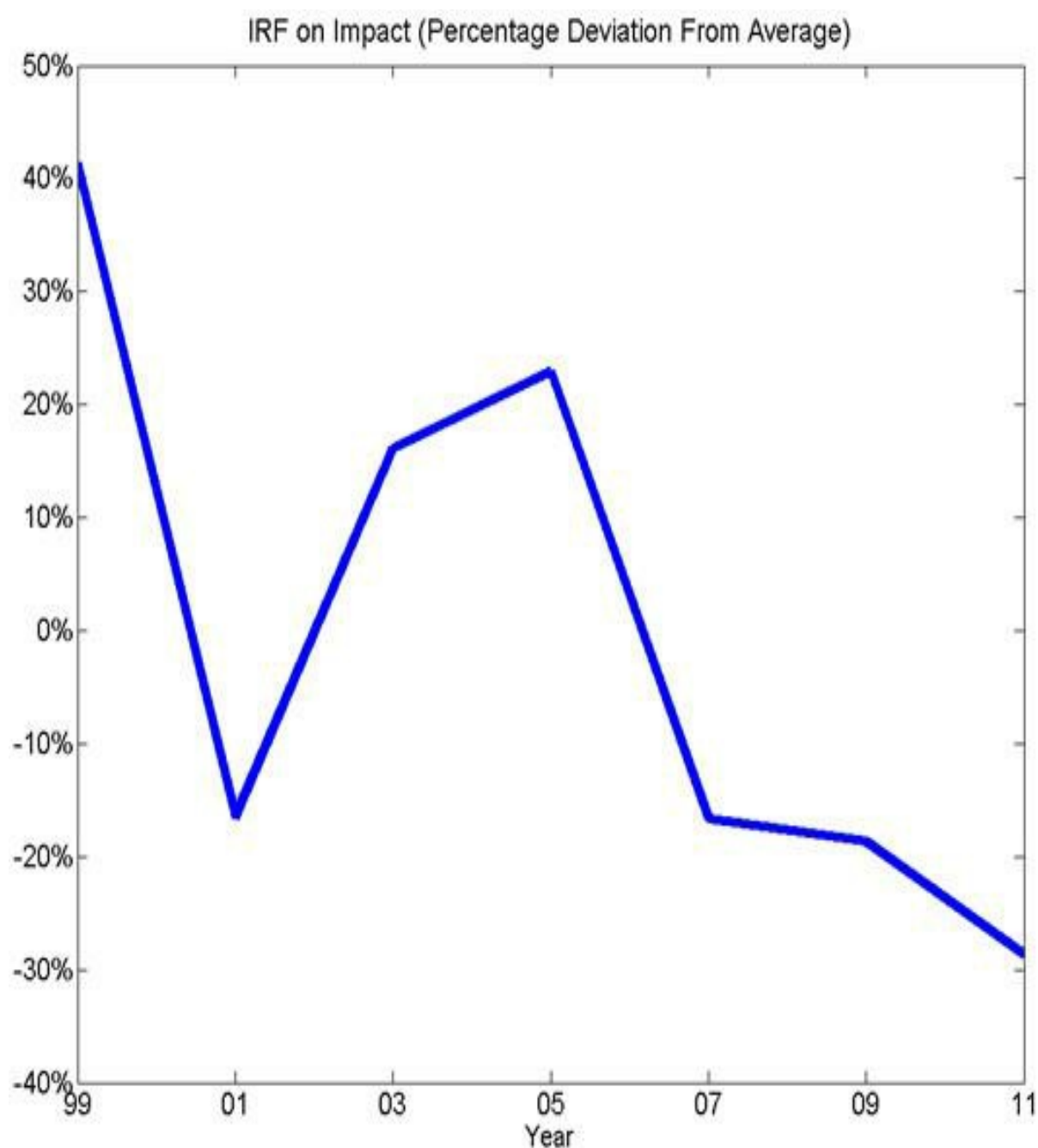
Conclusion

While standard analysis of stimulus policy abstracts from non-linearities and microeconomic frictions, infrequent and lumpy durable adjustment is an obvious feature of micro-data. Taking these microeconomic features of the world seriously shows that this abstraction matters for what one concludes about policy. Analysis of the effects of durable stimulus such as 'Cash-for-Clunkers' that is based on simple linear VARs is likely to be systematically biased. While this does not imply that such policies will not work, it does imply that traditional evidence for their effectiveness should

be viewed with scepticism. In general, policies aimed to prop up durable spending are likely to have a relatively low 'Bang-for-the-Buck' during recessions.

References

Barro and Redlick (2011), "Macroeconomic Effects from Government Purchases and Taxes", *Quarterly Journal of Economics*, Vol. 126, Issue 1.

Berger, D and J Vavra (2014), "Consumption Dynamics During Recessions", NBER Working Paper 20175.

Bernanke and Gertler (1995), "Inside the Black Box: The Credit Channel of Monetary Policy Transmission", *Journal of Economic Perspectives*, Vol. 9, Number 4.

Boivin, Kiley and Mishkin (2010), "How Has the Monetary Transmission Mechanism Evolved Over Time?" *Handbook of Monetary Economics*, Vol. 3.

[1] See Barro and Redlick (2011) for similar evidence for government spending or Bovin et al.(2011) for evidence on the response of residential investment.

Chapter 12 Aggregate Demand II: Applying the IS-LM Model

Mr Keynes and the moderns

Paul Krugman

Princeton University and CEPR

21 June 2011

Keynes' General Theory is 75 years old. In this column, Paul Krugman argues that many of its insights and lessons are still relevant today, but many have been forgotten. A broad swath of macroeconomists and policymakers are applying old fallacies to today's crisis. As the nostrums being applied by the "pain caucus" are visibly failing, Keynesian ideas may yet make a comeback.

It's a great honour to be asked to give this talk, especially because I'm arguably not qualified to do so.[1] I am, after all, not a Keynes scholar, nor any kind of serious intellectual historian. Nor have I spent most of my career doing macroeconomics. Until the late 1990s my contributions to that field were limited to international issues; although I kept up with macro research, I avoided getting into the frontline theoretical and empirical disputes. By contrast I probably do have a better sense than most technically competent economists of the arguments that actually drive political discourse and policy. And this discourse currently involves many of the same issues Keynes grappled with 75 years ago. We are – frustratingly – retracing much of the same ground covered in the 1930s. The Treasury view is back; liquidationism is once again in full flower. We're having to relearn the seeming paradox of liquidity-preference versus loanable-funds models of interest rates.

What I want to do in this lecture is talk first, briefly, about how to read Keynes – or rather about how I like to read him. I'll talk next about what Keynes accomplished in *The General Theory*, and how some current disputes recapitulate old arguments that Keynes actually settled. I'll follow with a discussion of some crucial aspects of our situation now – and arguably our situation 75 years ago – that are *not* in the General Theory, or at least barely mentioned. And finally, I'll reflect on the troubled path that has led us to forget so much of what Keynes taught us.

On reading Keynes

What did Keynes really intend to be the key message of the *General Theory*? My answer is, that's a question for the biographers and the

intellectual historians. I won't quite say I don't care, but it's surely not the most important thing. There's an old story about a museum visitor who examined a portrait of George Washington and asked a guard whether he really looked like that. The guard answered, "That's the way he looks now." That's more or less how I feel about Keynes. What matters is what we make of Keynes, not what he "really" meant.

I'd divide Keynes readers into two types: Chapter 12ers and Book 1ers. Chapter 12 is, of course, the wonderful, brilliant chapter on long-term expectations, with its acute observations on investor psychology, its analogies to beauty contests, and more. Its essential message is that investment decisions must be made in the face of radical uncertainty to which there is no rational answer, and that the conventions men use to pretend that they know what they are doing are subject to occasional drastic revisions, giving rise to economic instability. What Chapter 12ers insist is that this is the real message of Keynes, that all those who have invoked the great man's name on behalf of quasi-equilibrium models that push this insight into the background – from John Hicks to Paul Samuelson to Mike Woodford – have violated his true legacy.

Part 1ers, by contrast, see Keynesian economics as being essentially about the refutation of Say's Law – the possibility of a general shortfall in demand. And they generally find it easiest to think about demand failures in terms of quasi-equilibrium models in which some things, including wages and the state of long-term expectations in Keynes's sense, are held fixed while others adjust toward a conditional equilibrium of sorts. They draw inspiration from Keynes's exposition of the principle of effective demand in Chapter 3, which is, indeed, stated as a quasi-equilibrium concept: "The value of D at the point of the aggregate demand function, where it is intersected by the aggregate supply function, will be called the effective demand".

So who's right about how to read the *General Theory*? Keynes himself weighed in, in his 1937 QJE article (Keynes 1937), and in effect declared himself a Chapter12er. But so what? Keynes was a great man, but only a man, and our goal now is not to be faithful to his original intentions, but rather to enlist his help in dealing with the world as best we can.

For what it's worth, I'm basically a Part 1er, with a lot of Chapters 13 and 14 in there too, of which more shortly. Chapter 12 is a wonderful read, and a very useful check on the common tendency of economists to assume that markets are sensible and rational. But what I'm always looking for in economics is 'intuition pumps' – ways to think about an economic

situation that let you get beyond wordplay and prejudice, that seem to grant some deeper insight. And quasi-equilibrium stories are powerful intuition pumps, in a way that deep thoughts about fundamental uncertainty are not. The trick, always, is not to take your equilibrium stories too seriously, to understand that they're aids to insight, not Truths; given that, I don't believe that there's anything wrong with using equilibrium analysis.

And as it turns out, Keynes-as-equilibrium-theorist – whether or not that's the "real" Keynes – has a lot to teach us to this day. The struggle to liberate ourselves from Say's Law, to refute the "Treasury view" and all that, may have seemed like ancient history not long ago, but now that we're faced with an economic scene reminiscent of the 1930s and we're having to fight those intellectual battles all over again. And the distinction between loanable funds and liquidity preference theories of the rate of interest – or, rather, the ability to see how both can be true at once, and the implications of that insight – seem to have been utterly forgotten by a large fraction of economists and those commenting on economics.

Old fallacies in new battles

When you read dismissals of Keynes by economists who don't get what he was all about – which means many of our colleagues – you fairly often hear his contribution minimised as amounting to no more than the notion that wages are sticky, so that fluctuations in nominal demand affect real output. Here's Robert Barro (2009): "John Maynard Keynes thought that the problem lay with wages and prices that were stuck at excessive levels. But this problem could be readily fixed by expansionary monetary policy, enough of which will mean that wages and prices do not have to fall."And if that's all that it was about, the *General Theory* would have been no big deal.

But of course, it wasn't just about that. Keynes's critique of the classical economists was that they had failed to grasp how everything changes when you allow for the fact that output may be demand-constrained. They mistook accounting identities for causal relationships, believing in particular that because spending must equal income, supply creates its own demand and desired savings are automatically invested. And they had a theory of interest that thought solely in terms of the supply and demand for funds, failing to realise that savings in particular depend on the level of income, and that once you take this into account you need something else – liquidity preference – to complete the story.

I know that there's dispute about whether Keynes was fair in characterizing the classical economists in this way. But I'm inclined to believe that he was right. Why? Because you can see modern economists and economic commentators who don't know their Keynes falling into the very same fallacies.

There's no way for me to make this point without citing specific examples, which means naming names. So, on the first point, here's Chicago's John Cochrane (2009):

"First, if money is not going to be printed, it has to come from somewhere. If the government borrows a dollar from you, that is a dollar that you do not spend, or that you do not lend to a company to spend on new investment. Every dollar of increased government spending must correspond to one less dollar of private spending. Jobs created by stimulus spending are offset by jobs lost from the decline in private spending. We can build roads instead of factories, but fiscal stimulus can't help us to build more of both. This is just accounting, and does not need a complex argument about "crowding out.""

That's precisely the position Keynes attributed to classical economists – "the notion that if people do not spend their money in one way they will spend it in another." And as Keynes said, this misguided notion derives its plausibility from its superficial resemblance to the accounting identity which says that total spending must equal total income.

All it takes to dispel this fallacy is the hoary old Samuelson cross (Figure 1), in which the schedules E1 and E2 represent desired spending as a function of income. Equilibrium – or, if you like, quasi-equilibrium – is at the point where the spending schedule crosses the 45-degree line, so spending does equal income. But this accounting identity by no means implies that an increase in desired spending, whether by the government or a private actor, cannot affect actual spending. Yes, I said a private actor. As some of us have pointed out, the argument that deficit spending by the government cannot raise income also implies that a decision by a private business to spend more must crowd out an equal amount of spending elsewhere in the economy. Needless to say, in the political debate this point isn't appreciated; conservatives tend to insist both that fiscal policy can't work and that improving business confidence is crucial. But that's politics.

Figure 1.

Expenditure

Y=E

E₂

E₁
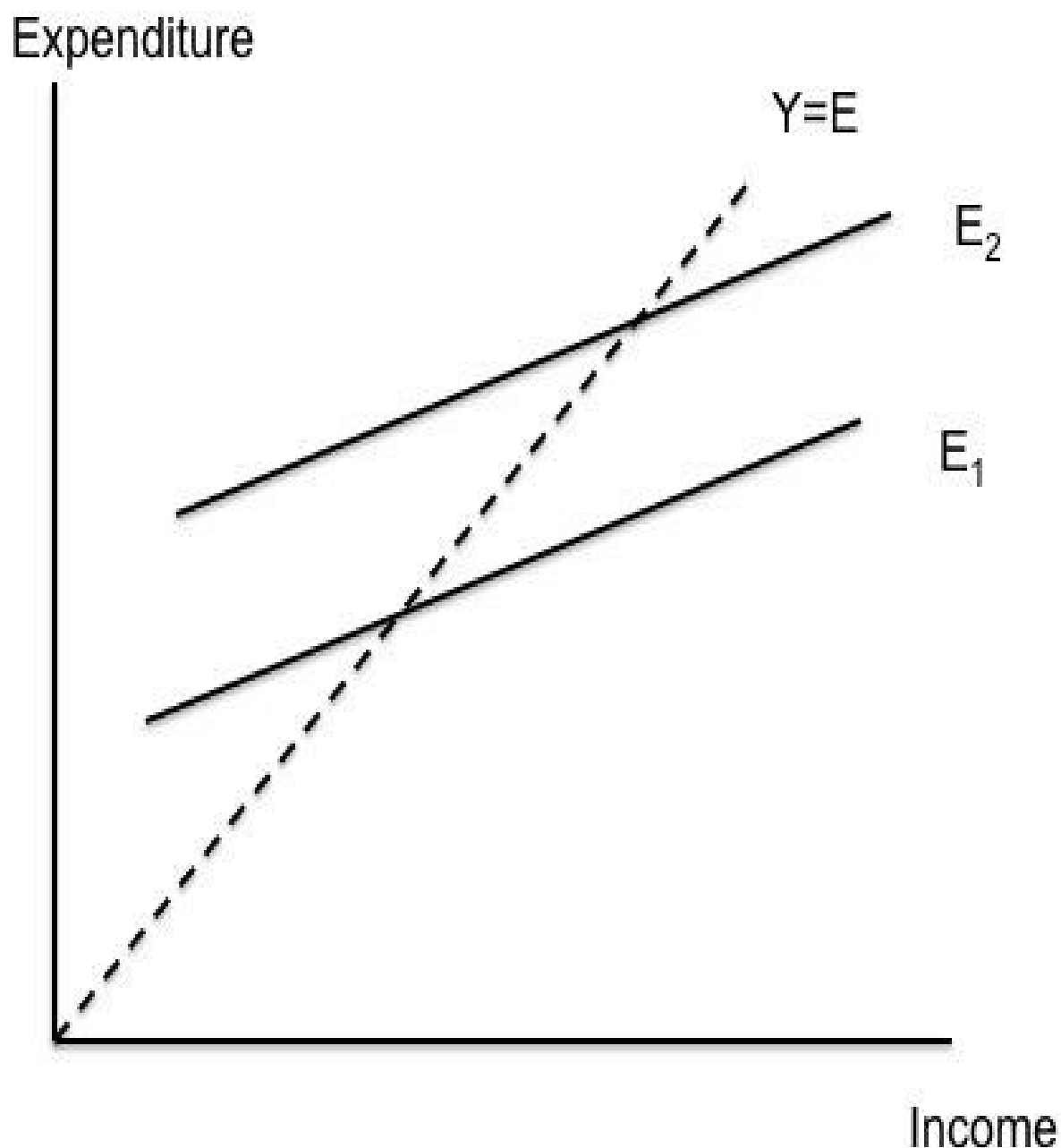
Income

On the contrary, as the Samuelson cross shows, a rise in desired spending will normally translate into a rise in income.

But you can see right away part of our problem. Who teaches the Samuelson cross these days? In particular, who teaches it in graduate school? It's regarded as too crude, too old-fashioned to be even worth mentioning. Yet it conveys a basic point that is more sophisticated than what a lot of reputable economists are saying – in fact, if they had ever learned this crude construct it would have saved them from falling into a naïve fallacy. And while it's possible to convey the same point in terms of

more elaborate New Keynesian models, such models, by their very complexity, fail to make the point as forcefully as the good old 45-degree diagram.

What about interest rates?

Keynes's discussion of interest rate determination in Chapter 13 and 14 of the General Theory is much more profound than, I think, most readers realise (perhaps because it's also rather badly written). The proof of its profundity lies in the way so many people – including highly reputable economists – keep falling into the fallacies Keynes laid out, both in discussions of fiscal policy and in discussions of international capital flows.

Figure 2.
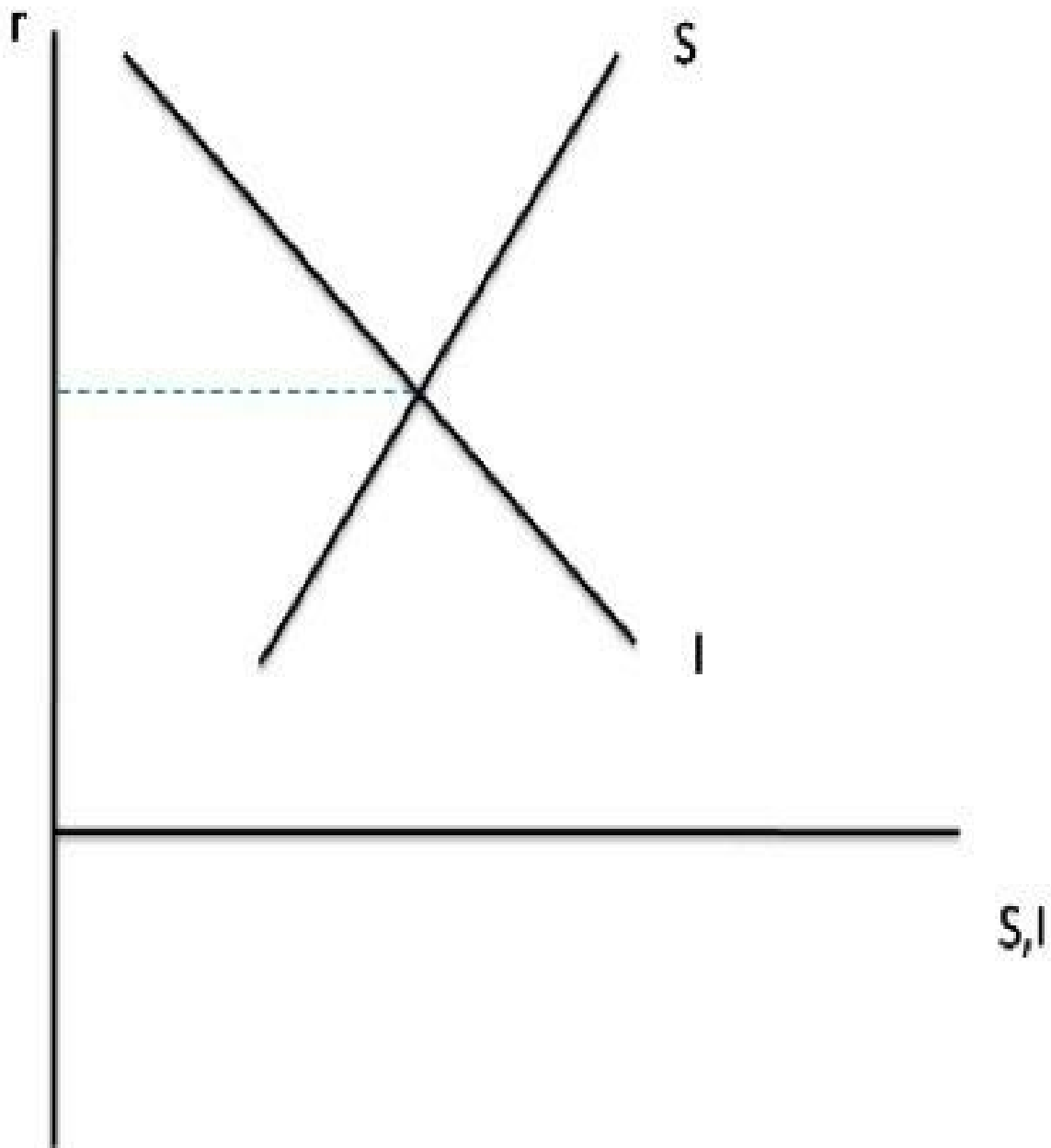
The natural inclination of practical men – who are not necessarily slaves of defunct economists since there are plenty of live and kicking economists ready to aid and abet their misconceptions – is to think of the interest rate as being determined by the supply and demand for loanable funds, as in Figure 2. When you think in those terms, it's only natural to suppose that any increase in the demand for or fall in the supply of loanable funds must drive up interest rates; and it's easy to imagine that this, in turn, would hurt prospects for economic recovery.

Again, I need to name names to assure you that I'm not inventing straw men. So here's Niall Ferguson (in Soros et al 2009):

"Now we're in the therapy phase. And what therapy are we using? Well, it's very interesting because we're using two quite contradictory courses of therapy. One is the prescription of Dr Friedman – Friedman, that is – which is being administered by the Federal Reserve: massive injections of liquidity to avert the kind of banking crisis that caused the Great Depression of the early 1930s. I'm fine with that. That's the right thing to do. But there is another course of therapy that is simultaneously being administered, which is the therapy prescribed by Dr Keynes – John Maynard Keynes—and that therapy involves the running of massive fiscal deficits in excess of 12% of gross domestic product this year, and the issuance therefore of vast quantities of freshly minted bonds.

"There is a clear contradiction between these two policies, and we're trying to have it both ways. You can't be a monetarist and a Keynesian simultaneously – at least I can't see how you can, because if the aim of the monetarist policy is to keep interest rates down, to keep liquidity high, the effect of the Keynesian policy must be to drive interest rates up.

"After all, $1.75 trillion is an awful lot of freshly minted treasuries to land on the bond market at a time of recession, and I still don't quite know who is going to buy them. It's certainly not going to be the Chinese. That worked fine in the good times, but what I call "Chimerica", the marriage between China and America, is coming to an end. Maybe it's going to end in a messy divorce."

What's wrong with this line of reasoning? It's exactly the logical hole Keynes pointed out, namely that the schedules showing the supply and demand for funds can only be drawn on the assumption of a given level of income. Allow for the possibility of a rise in income, and you get Figure 3 – which is Keynes's own figure, and a horrible drawing it is.
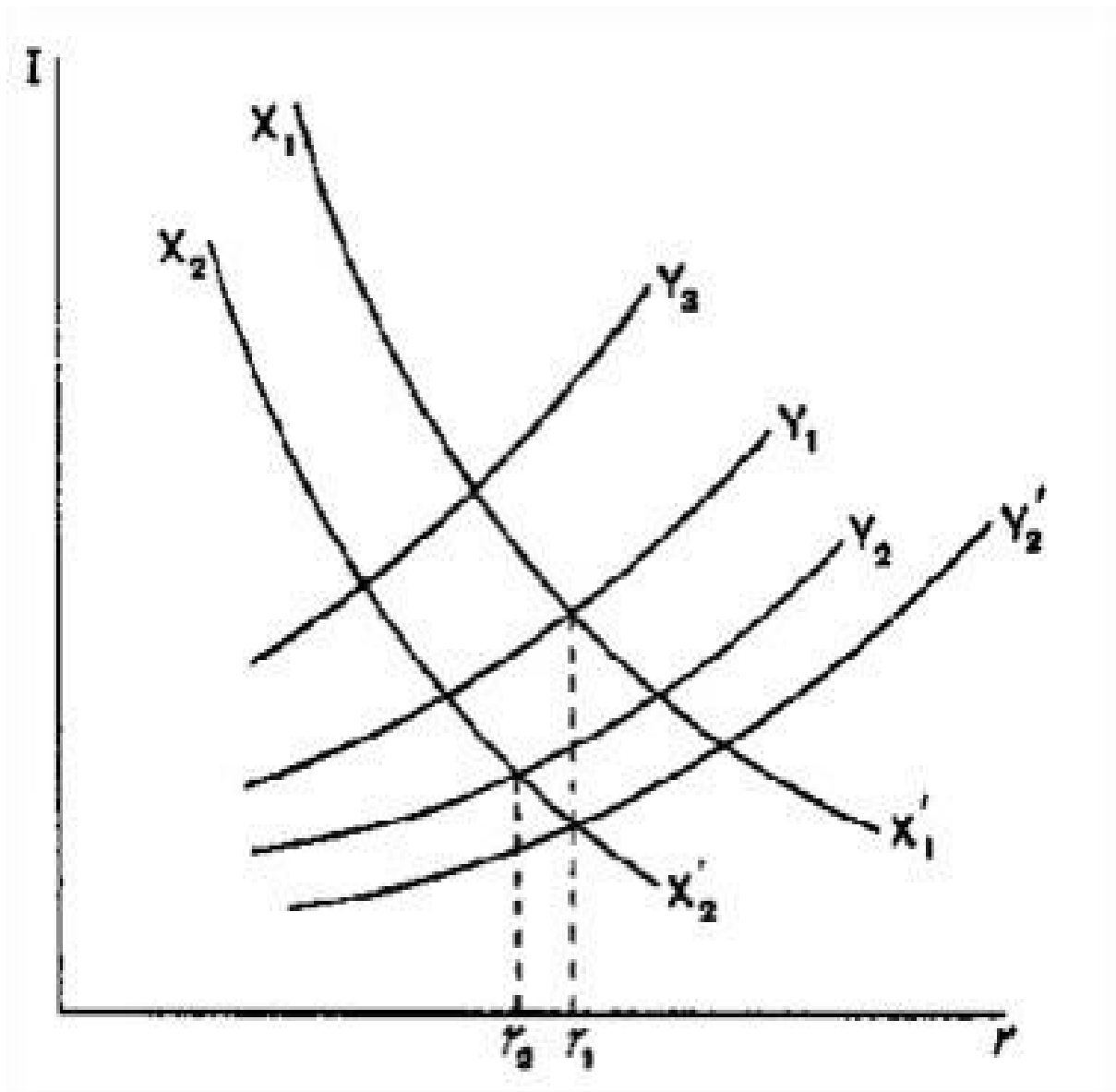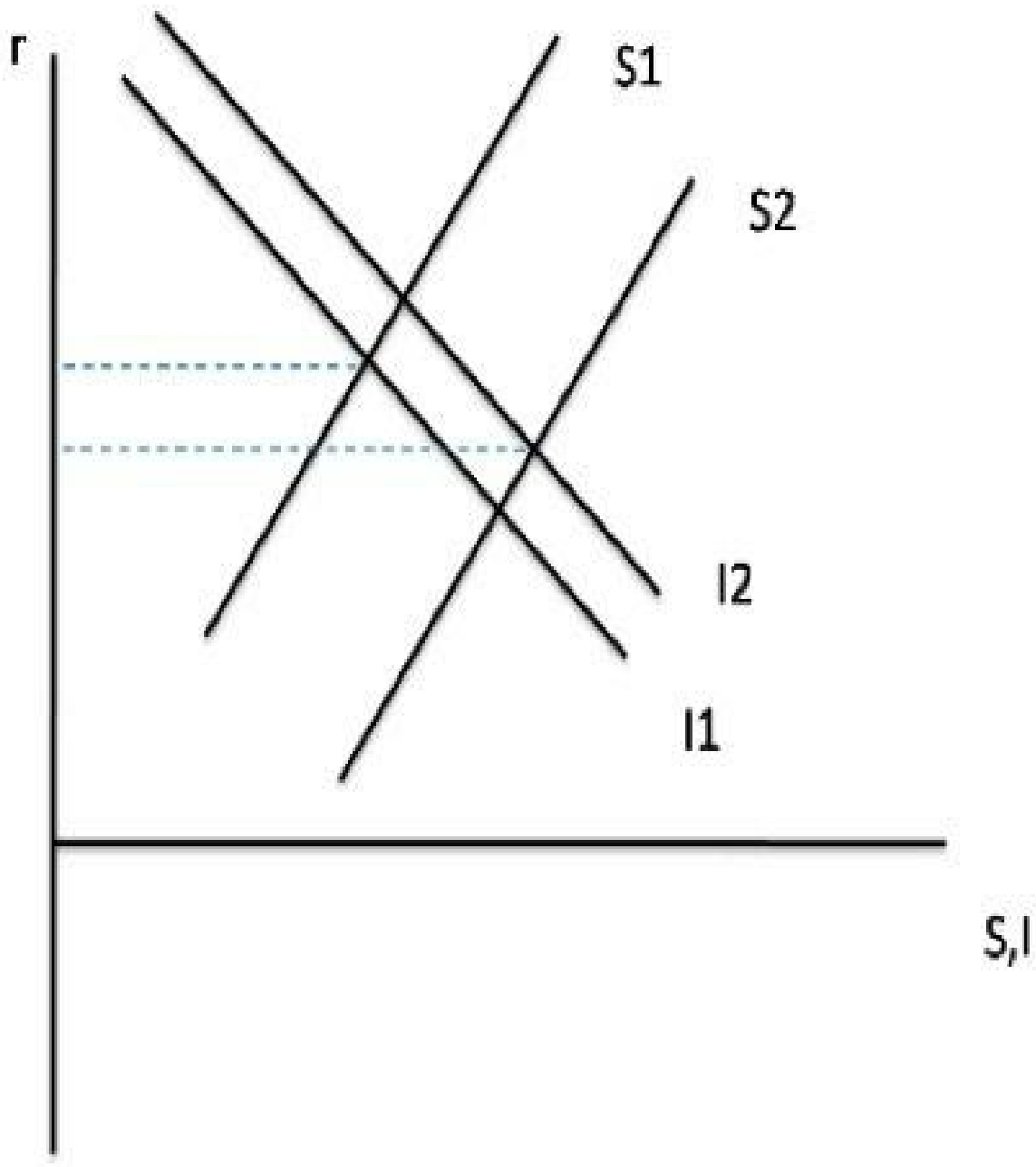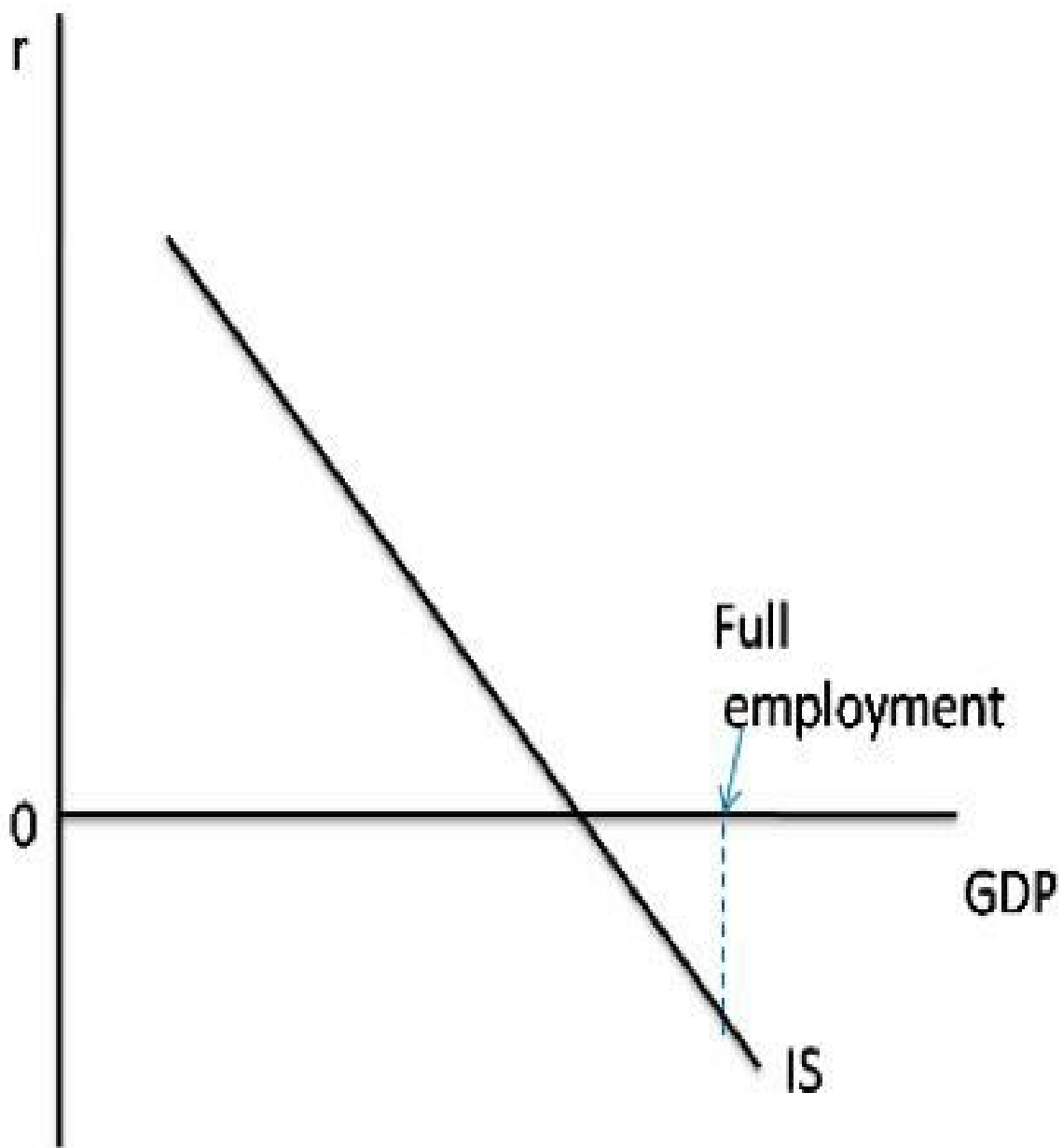
Figure 3.

Figure 4 is my own version, very much along Hicks's lines: we imagine that a rise in GDP shifts the savings schedule out from S1 to S2, also shifts the investment schedule, and, as drawn, reduces the equilibrium interest rate in the market for loanable funds.

Figure 4.

As Hicks told us – and as Keynes himself says in Chapter 14 – what the supply and demand for funds really give us is a schedule telling us what the level of income will be for a given rate of interest. That is, it gives us the IS curve of Figure 5; this tells us where the central bank must set the interest rate so as to achieve a given level of output and employment. Of course, as the figure indicates, it's possible that the interest rate required to achieve full employment is negative, in which case monetary policy is up against the zero lower bound, that is, we're in a liquidity trap. That's where America and Britain were in the 1930s – and we're back there again.
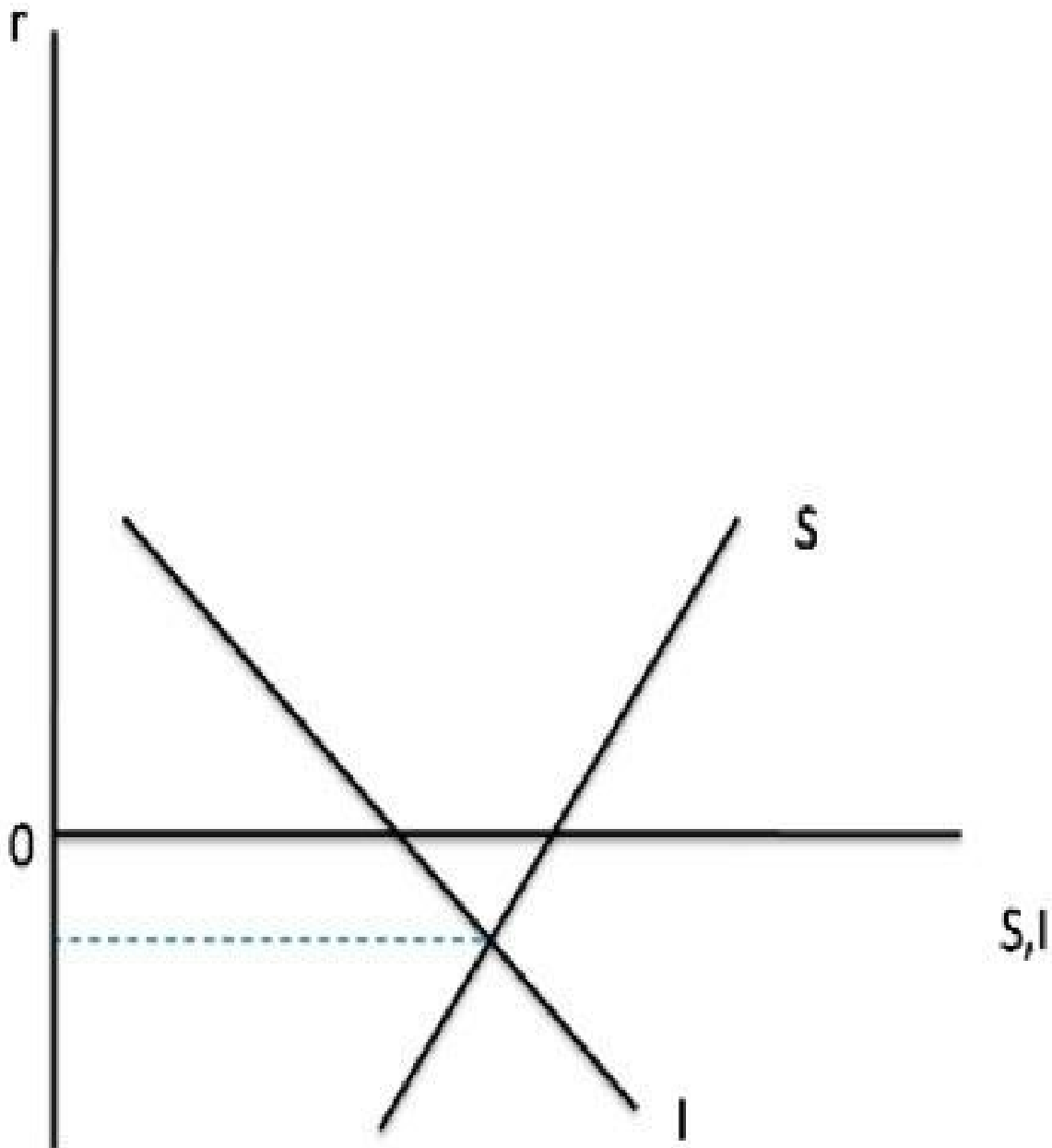
Figure 5.

One way to think about this situation is to draw the supply and demand for loanable funds that would prevail if we were at full employment, as in Figure 6. The point then is that there's an excess supply of desired savings at the zero interest rate that's the lowest achievable. A zero-lower-bound economy is, fundamentally, an economy suffering from an excess of desired saving over desired investment.

Which brings me back to the argument that government borrowing under current conditions will drive up interest rates and impede recovery. What anyone who understood Keynes should realise is that as long as output is

depressed, there is no reason increased government borrowing need drive rates up; it's just making use of some of those excess potential savings – and it therefore helps the economy recover. To be sure, sufficiently large government borrowing could use up all the excess savings, and push rates up – but to do that the government borrowing would have to be large enough to restore full employment!

Figure 6.

But what of those who cling to the view that government borrowing must drive up rates, never mind all this hocus-pocus? Well, we've has as close

to a controlled experiment as you ever get in macroeconomics. Figure 7 shows U.S. federal debt held by the public, which has risen around $4 trillion since the economy entered liquidity-trap conditions. And Figure 8 shows 10-year interest rates, which have actually declined. (Long rates aren't zero because the market expects the Fed funds rate to rise at some point, although that date keeps being pushed further into the future.)
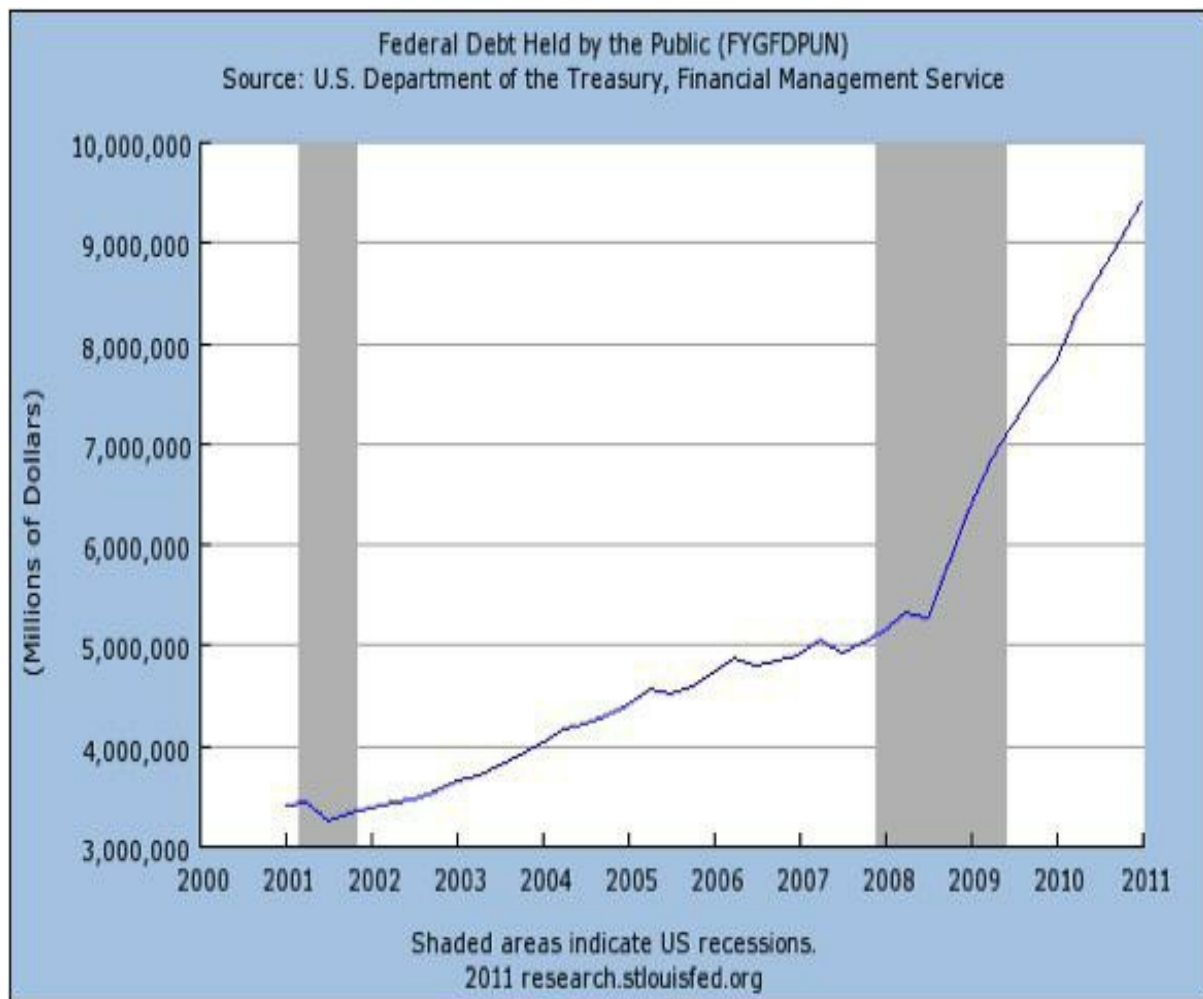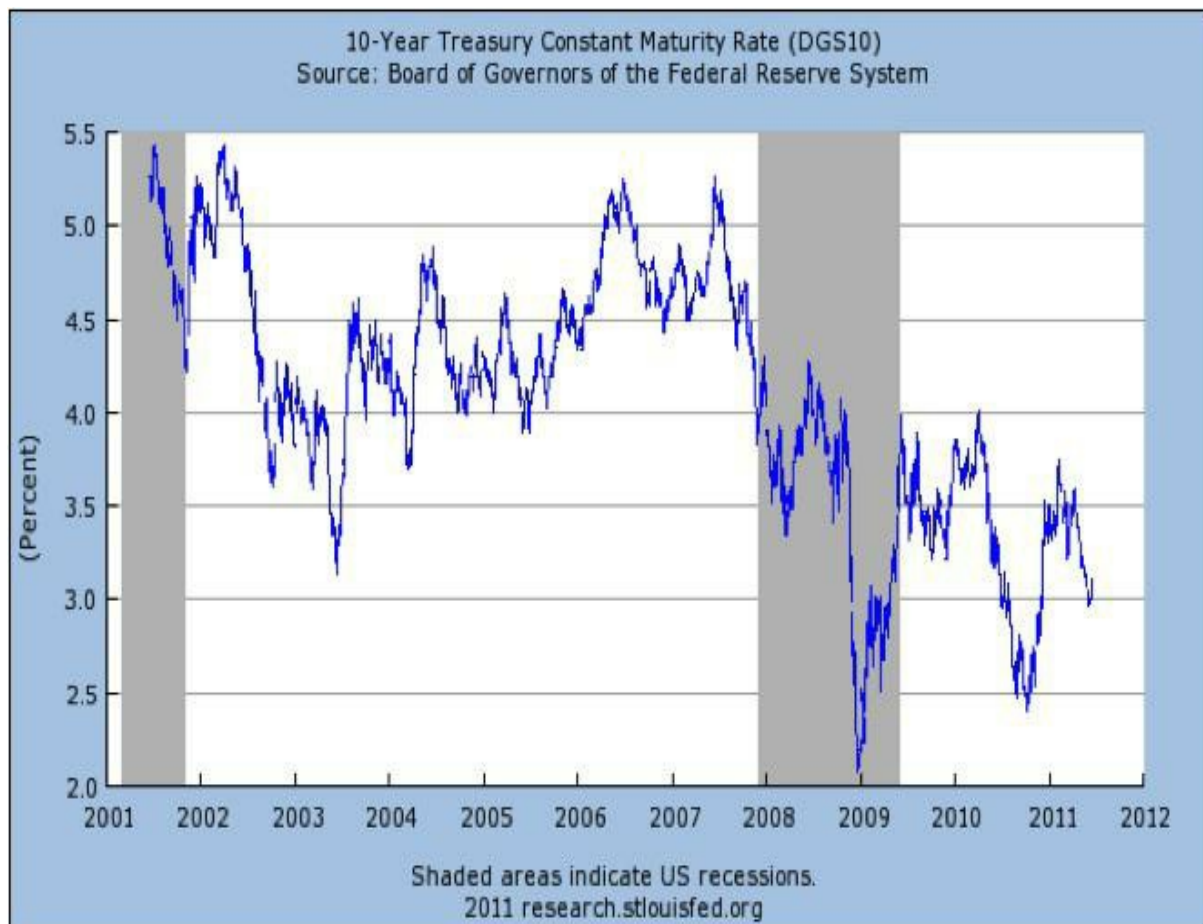
Figure 7.

Federal Debt Held by the Public (FYGFDPUN)
Source: U.S. Department of the Treasury, Financial Management Service

Shaded areas indicate US recessions.
2011 research.stlouisfed.org

Figure 8.

10-Year Treasury Constant Maturity Rate (DGS10)
Source: Board of Governors of the Federal Reserve System

Shaded areas indicate US recessions.
2011 research.stlouisfed.org

So those who were absolutely certain that large borrowing would push up interest rates even in the face of a depressed economy fell into the very fallacy Keynes went to great lengths to refute. And once again, I've made that point using very old-fashioned analysis – the kind of analysis many economist no longer learn. New Keynesian models, properly understood, could with greater difficulty get you to the same result. But how many people properly understand these models?

I'm not quite done here. If much of our public debate over fiscal policy has involved reinventing the same fallacies Keynes refuted in 1936, the same can be said of debates over international financial policy. Consider the claim, made by almost everyone, that given its large budget deficits the US desperately needs continuing inflows of capital from China and other emerging markets. Even very good economists fall into this trap. Just last week Ken Rogoff declared that "loans from emerging economies are keeping the debt-challenged US economy on life support."

Um, no: inflows of capital from other nations simply add to the already excessive supply of U.S. savings relative to investment demand. These inflows of capital have as their counterpart a trade deficit that makes

America worse off, not better off; if the Chinese, in a huff, stopped buying Treasuries they would be doing us a favour. And the fact that top officials and highly regarded economists don't get this, 75 years after the *General Theory*, represents a sad case of intellectual regression.

I'll have more to say about that intellectual regression later. But first let's talk about key features of our current situation that aren't in Keynes.

What wasn't in the General Theory: Banks and debt

Perhaps the most surprising omission in the *General Theory* – and the one that has so far generated the most soul-searching among those macroeconomists who had not forgotten basic Keynesian concepts – is the book's failure to discuss banking crises. There's basically no financial sector in the *General Theory*; textbook macroeconomics ever since has more or less discussed money and banking off to the side, giving it no central role in business cycle analysis.

I'd be curious to hear what Keynes scholars have to say about this omission. Keynes was certainly aware of the possibility of banking problems; his 1931 essay "The Consequences to the Banks of the Collapse of Money Values" is a razor-sharp analysis of just how deflation could produce a banking crisis, as indeed it did in the US.

But not in Britain, which may be one reason Keynes left the subject out of the General Theory. Beyond that, Keynes was – or at least that's how it seems to a Part 1er – primarily concerned with freeing minds from Say's Law and the notion that, if there was any demand problem, it could be solved simply by increasing the money supply. A prolonged focus on banking issues could have distracted from that central point. Indeed, I would argue that something very like that kind of distraction occurred in economic discussion of Japan in the 1990s. All too many analyses focused on zombie banks and all that, and too few people realised that Japan's liquidity trap was both more fundamental and more ominous in its implications for economic policy elsewhere than one would recognise if it was diagnosed solely as a banking problem.

This time around, of course, there was no mistaking the crucial role of the financial sector in creating a terrifying economic crisis. You can use any of a number of indicators of financial stress to track the recent crisis. In Figure 9 I use the spread between Baa-rated corporate debt and long-term federal debt ("spread1" is against the long-term rate on federal debt, "spread2" against the 10-year constant maturity Treasury yield), which has the advantage both of being a measure one can track over a very long

history and of being a measure stressed by a fellow named Ben Bernanke in his analyses of the onset of the Great Depression. As you can see, there have been two great financial disruptions in modern American history, the first associated with the banking crisis of 1930-31, the second with the shadow banking crisis of 2008.

Figure 9.
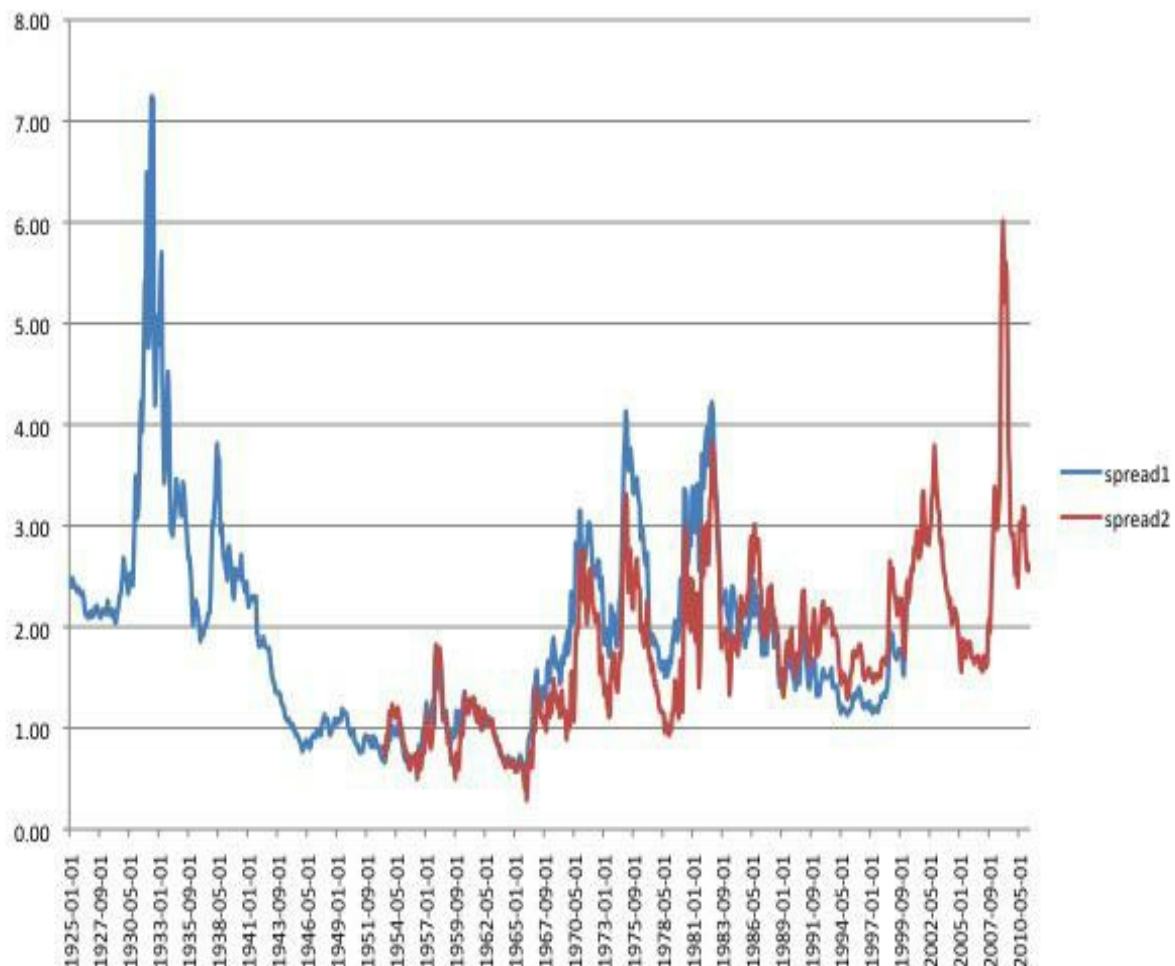
Nobody can doubt that these financial crises played a key role in the onset both of the Great Depression and of our recent travails, which Brad DeLong has taken to calling the Little Depression. And yet I am increasingly convinced that it's a mistake to think of our problems as being entirely or even mainly a financial-sector issue. As you can see from Figure 9 the financial disruptions of 2008 and early 2009 have largely gone away. Yet while the economy's freefall has ended, we've hardly had a full recovery. Something else must be holding the economy down.

Like many others, I've turned to debt levels as a key part of the story – specifically, the surge in household debt that began in the early 1980s,

accelerated drastically after 2002, and finally went into reverse after the financial crisis struck.

In recent work I've done with Gauti Eggertsson (Eggertsson and Krugman 2010), we've tried to put debt into a New Keynesian framework. The key insight is that while debt does not make the world poorer – one person's liability is another person's asset – it can be a source of contractionary pressure if there's an abrupt tightening of credit standards, i.e. if levels of leverage that were considered acceptable in the past are suddenly deemed unacceptable thanks to some kind of shock such as, well, a financial crisis. In that case debtors are faced with the necessity of deleveraging. This forces them to slash spending while creditors face no comparable need to spend more. Such a situation can push an economy up against the zero lower-bound and keep it there for an extended period.

I can't quite find this story in the *General Theory*, although the idea of a sudden revision of conventional views about how much debt is safe certainly fits the spirit of Chapter 12. In any case, however, Keynes was definitely aware of the implications of debt and the constraints it puts on debtors for other macroeconomic questions. In the *General Theory* – and in reality – debt is a crucial reason why the notion expressed by Barro – that it's just about nominal wages being too high – not only misses the point but even gets the direction of effect wrong.

In textbook macroeconomics we draw a downward-sloping aggregate demand curve, and in that framework it does look as if a fall in nominal wages, which shifts the aggregate supply curve down, would raise employment. The argument for expansionary policy is then one of practicality: it's easier to push AD up using monetary policy than to push wages down. Indeed, in simple post-Keynesian models it does all boil down to M/w, the ratio of the money supply to the wage rate.

But this presupposes, first, that a rise in the real quantity of money is actually expansionary, which is normally true, but highly dubious if an economy is up against the zero lower bound. If changes in M/P don't matter, then the aggregate demand curve becomes vertical – or worse.

For if there are spending-constrained debtors with debts specified in nominal terms – as there are in today's world – a fall in wages, leading to a fall in the general price level, worsens the real burden of debt and actually has a contractionary effect on the economy. This is a point of which Keynes was well aware, although it got largely lost even in the relatively Keynesian literature of the 40s and 50s.

When does the need for deficit spending end?

There's something else worth pointing out about an analysis that stresses the role of debtors forced into rapid deleveraging. It helps solve a problem Keynes never addressed, namely, when does the need for deficit spending end?

The reason this is relevant is concern about rising public debt. I constantly encounter the argument that our crisis was brought on by too much debt – which is largely my view as well – followed by the insistence that the solution can't possibly involve even more debt.

Once you think about this argument, however, you realise that it implicitly assumes that debt is debt – that it doesn't matter who owes the money. Yet that can't be right; if it were, we wouldn't have a problem in the first place. After all, the overall level of debt makes no difference to aggregate net worth – one person's liability is another person's asset.

It follows that the level of debt matters only if the distribution of net worth matters, if highly indebted players face different constraints from players with low debt. And this means that all debt isn't created equal – which is why borrowing by some actors now can help cure problems created by excess borrowing by other actors in the past.

Suppose, in particular, that the government can borrow for a while, using the borrowed money to buy useful things like infrastructure. The true social cost of these things will be very low, because the spending will be putting resources that would otherwise be unemployed to work. And government spending will also make it easier for highly indebted players to pay down their debt. If the spending is sufficiently sustained, it can bring the debtors to the point where they're no longer so severely balance-sheet constrained, and further deficit spending is no longer required to achieve full employment.

Yes, private debt will in part have been replaced by public debt – but the point is that debt will have been shifted away from severely balance-sheet-constrained players, so that the economy's problems will have been reduced even if the overall level of debt hasn't fallen.

The bottom line, then, is that the plausible-sounding argument that debt can't cure debt is just wrong. On the contrary, it can – and the alternative is a prolonged period of economic weakness that actually makes the debt problem harder to resolve.

And it seems to me that thinking explicitly about the role of debt, not just

with regard to the usefulness or lack thereof of wage flexibility, but as a key causal factor behind slumps, improves Keynes's argument. In the long run we are, indeed, all dead, but it's helpful to have a story about why expansionary fiscal policy need not be maintained forever.

The strange death of Keynesian policy: Instability of the Samuelsonian synthesis

So far I've argued that Keynesian analysis – or at least what Keynesian analysis looks like now, whatever Keynes may "really" have meant – is an excellent tool for understanding the mess we're in. Where simple Keynesian models seem to conflict with common sense, with the wisdom of practical men, the Keynesian models are right and the wisdom of the practical men entirely wrong.

So why are we making so little use of Keynesian insights now that we're living in an economy that, in many respects, resembles the economy of the 1930s? Why are we having to have the old arguments all over again? For it does seem as if all the old fallacies are new again.

By all means let us condemn famous men. There is no excuse for the timidity of Barack Obama, the wishful thinking of Jean-Claude Trichet, and the determined ignorance of almost everyone in the Republican Party. But watching the failure of policy over the past three years, I find myself believing, more and more, that this failure has deep roots – that we were in some sense doomed to go through this. Specifically, I now suspect that the kind of moderate economic policy regime economists in general used to support – a regime that by and large lets markets work, but in which the government is ready both to rein in excesses and fight slumps – is inherently unstable. It's something that can last for a generation or so, but not much longer.

By "unstable" I don't just mean Minsky-type financial instability, although that's part of it. Equally crucial are the regime's intellectual and political instability.

Let me start with the intellectual instability.

The brand of economics I use in my daily work – the brand that I still consider by far the most reasonable approach out there – was largely established by Paul Samuelson back in 1948, when he published the first edition of his classic textbook. It's an approach that combines the grand tradition of microeconomics, with its emphasis on how the invisible hand leads to generally desirable outcomes, with Keynesian macroeconomics,

which emphasises the way the economy can develop what Keynes called "magneto trouble", requiring policy intervention. In the Samuelsonian synthesis, one must count on the government to ensure more or less full employment; only once that can be taken as given do the usual virtues of free markets come to the fore.

It's a deeply reasonable approach – but it's also intellectually unstable. For it requires some strategic inconsistency in how you think about the economy. When you're doing micro, you assume rational individuals and rapidly clearing markets; when you're doing macro, frictions and ad hoc behavioural assumptions are essential.

So what? Inconsistency in the pursuit of useful guidance is no vice. The map is not the territory, and it's OK to use different kinds of maps depending on what you're trying to accomplish. If you're driving, a road map suffices. If you're going hiking, you really need a topographic survey.

But economists were bound to push at the dividing line between micro and macro – which in practice has meant trying to make macro more like micro, basing more and more of it on optimisation and market-clearing. And if the attempts to provide "microfoundations" fell short? Well, given human propensities, plus the law of diminishing disciples, it was probably inevitable that a substantial part of the economics profession would simply assume away the realities of the business cycle, because they didn't fit the models.

The result was what I've called the Dark Age of macroeconomics, in which large numbers of economists literally knew nothing of the hard-won insights of the 30s and 40s – and, of course, went into spasms of rage when their ignorance was pointed out.

To this intellectual instability, add political instability.

It's possible to be both a conservative and a Keynesian; after all, Keynes himself described his work as "moderately conservative in its implications." But in practice, conservatives have always tended to view the assertion that government has any useful role in the economy as the thin edge of a socialist wedge. When William Buckley wrote God and Man at Yale, one of his key complaints was that the Yale faculty taught – horrors! – Keynesian economics.

I've always considered monetarism to be, in effect, an attempt to assuage conservative political prejudices without denying macroeconomic realities. What Friedman was saying was, in effect, yes, we need policy to stabilise the economy – but we can make that policy technical and largely

mechanical, we can cordon it off from everything else. Just tell the central bank to stabilise M2, and aside from that, let freedom ring!

When monetarism failed – fighting words, but you know, it really did — it was replaced by the cult of the independent central bank. Put a bunch of bankerly men in charge of the monetary base, insulate them from political pressure, and let them deal with the business cycle; meanwhile, everything else can be conducted on free-market principles.

And this worked for a while – roughly speaking from 1985 to 2007, the era of the Great Moderation. It worked in part because the political insulation of central banks also gave them more than a bit of intellectual insulation, too. If we're living in a Dark Age of macroeconomics, central banks have been its monasteries, hoarding and studying the ancient texts lost to the rest of the world. Even as the real business cycle people took over the professional journals, to the point where it became very hard to publish models in which monetary policy, let alone fiscal policy, matters, the research departments of the Fed system continued to study counter-cyclical policy in a relatively realistic way.

But this, too, was unstable. For one thing, there was bound to be a shock, sooner or later, too big for the central bankers to handle without help from broader fiscal policy. Also, sooner or later the barbarians were going to go after the monasteries too; and as the current furore over quantitative easing shows, the invading hordes have arrived.

Last but not least, there is financial instability. As I see it, the very success of central-bank-led stabilization, combined with financial deregulation – itself a by-product of the revival of free-market fundamentalism – set the stage for a crisis too big for the central bankers to handle. This is Minskyism: the long period of relative stability led to greater risk-taking, greater leverage, and, finally, a huge deleveraging shock. And Milton Friedman was wrong: in the face of a really big shock, which pushes the economy into a liquidity trap, the central bank can't prevent a depression.

And by the time that big shock arrived, the descent into an intellectual Dark Age combined with the rejection of policy activism on political grounds had left us unable to agree on a wider response.

So the era of the Samuelsonian synthesis was, I suspect, doomed to come to a nasty end. And the result is the wreckage we see all around us.

Dangerous ideas

The *General Theory* famously ends with a stirring ode to the power of

ideas, which, Keynes asserted, are "dangerous for good or evil." Generations of economists have taken that ringing conclusion as justification for believing that their work matters – that good ideas will eventually translate into good policy. But how much of that hope can survive now, when both policy makers and many of our colleagues have fallen right back into the fallacies that Keynes exposed?

The best answer I can give is that steady upward progress was probably too much to expect, especially in a field where interests and prejudices run as strong as they do in economics. And there may yet be scope for Keynesian ideas even in the current crisis; after all, the crisis shows no sign of ending soon, and the policies of what I call the pain caucus are visibly failing as we speak. There may be another chance to return to the ideas that should have been governing policy all along.

So since I'm in England, here's my advice to economists (and policy makers) frustrated – as I am – by the inadequacy of policy responses and the intellectual regression of too much of our profession: Keep calm and carry on. History will vindicate your persistence.

References

Barro, Robert (2009), "Government spending is no free lunch", *Wall Street Journal,* January 22.

Cochrane, John (2009), "Fiscal stimulus, fiscal inflation, or fiscal fallacies?", mimeo.

Eggertsson and Krugman (2010), "Debt, deleveraging, and the liquidity trap", mimeo.

Keynes, J.M. (1936). *The General Theory of Employment, Interest, and Money*. New York: Harcourt, Brace and Company.

Keynes, J.M. (1937), "The general theory of employment", *Quarterly Journal of Economics.*

George Soros, Niall Ferguson, Paul Krugman, Robin Wells, and Bill Bradley, et al. (2009), "The crisis and how to deal with it", *New York Review of Books,* June 11.

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[1] Prepared for the Cambridge conference commemorating the 75th anniversary of the publication of The General Theory of Employment, Interest, and Money.

Fiscal policy and consumption

Tullio Jappelli, Luigi Pistaferri

University of Naples Federico II and CEPR; Stanford University

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Crisis-stricken governments have enacted large stimulus packages to counteract the recent recession. But how are these financed, and are consumers responding? This column argues that we must understand marginal propensity to consume in order to optimally design fiscal policy, outlining new research on how to get the best measurements. Through several policy simulations, it's clear how important it is to truly understand the relationship between stimulus packages and marginal propensities to consume.

Governments on both sides of the Atlantic have enacted large fiscal stimulus packages to counteract the Great Recession. The effectiveness of these interventions crucially depends on:

- How consumers respond to fiscal policies;
- How governments finance stimulus packages.

The key question for policymakers is whether debt-financed fiscal packages are more or less effective than redistributive programmes that maintain the public deficit unchanged.

For instance, fiscal reforms that increase the tax burden of the rich are often advocated as a way to finance the extension of unemployment insurance schemes or other welfare programmes during high-unemployment periods. On the other hand, there is strong political opposition to raising taxes during recessions.

In standard macroeconomic models, revenue-neutral redistributive policies produce no consumption effects in the aggregate because of homogeneity in the marginal propensity to consume. In these models, the consumption of the rich is no more than a scaled-up version of the consumption of the poor, and any increase in the latter's consumption is matched exactly by a decline in the consumption of the former.

However, more realistic models with precautionary savings or liquidity constraints feature heterogeneity in marginal propensities to consume.

These suggest that consumers respond differently to changes in their economic resources. For example:

- The marginal propensity of prudent individuals falls with household resources; and
- Liquidity-constrained consumers exhibit higher marginal propensities than households who can access credit markets to smooth consumption.

In addition to these level effects, the composition of household resources may also matter.

Households burdened with a large amount of debt might react to a positive change in income by reducing their debt rather than spending. Moreover, if most of the wealth is locked into illiquid assets, households must cut consumption even in the face of a negative transitory-income shock. Since aggregate consumption depends on the distribution of marginal propensities to consume within the population, redistributive fiscal policy might potentially boost national income.

What all this means is that knowing marginal propensities is a key first step to the design of optimal fiscal-stimulus packages.

## Estimating marginal propensities to consume

A major problem in estimating marginal propensities is identifying shocks that affect consumption via changes in income, rather than directly – say through shifts in preferences or wealth. This is necessary since otherwise we cannot be sure we have isolated the impact of income on consumption per se. In other words, we have to isolate the exogenous shocks to income which can be used to track consumption behaviour after a shock.

In recent research we show how this can be overcome by using recent survey data alongside information on how much consumers would spend due to an unexpected windfall gain (Jappelli and Pistaferri 2013). The 2010 Italian Survey of Household Income and Wealth is designed to elicit information on how much people would consume or save were they unexpectedly to receive a reimbursement equal to their average monthly income. The survey question we use is the following: "Imagine you unexpectedly receive a reimbursement equal to the amount your household earns in a month. How much of it would you save and how much would you spend? Please give the percentage you would save and the percentage you would spend". The responses to this question provide a distribution of

the marginal propensity to consume that we can relate to observable characteristics and, most importantly, compare with the predictions of intertemporal consumption models.

In our sample, we find that the average marginal propensity to consume is 48%, at the high end of current estimates based on survey data. But most importantly, as shown in Figure 1, we find substantial heterogeneity in people's responses. The marginal propensity to consume declines sharply with cash-on-hand, from around 65% in the lowest cash-on-hand percentiles to some 30% for the richest households. Hence, households with low cash-on-hand (or low income and wealth) exhibit a much higher marginal propensity to consume than affluent households.

Figure 1 Average marginal propensity to consume by cash-on-hand percentiles
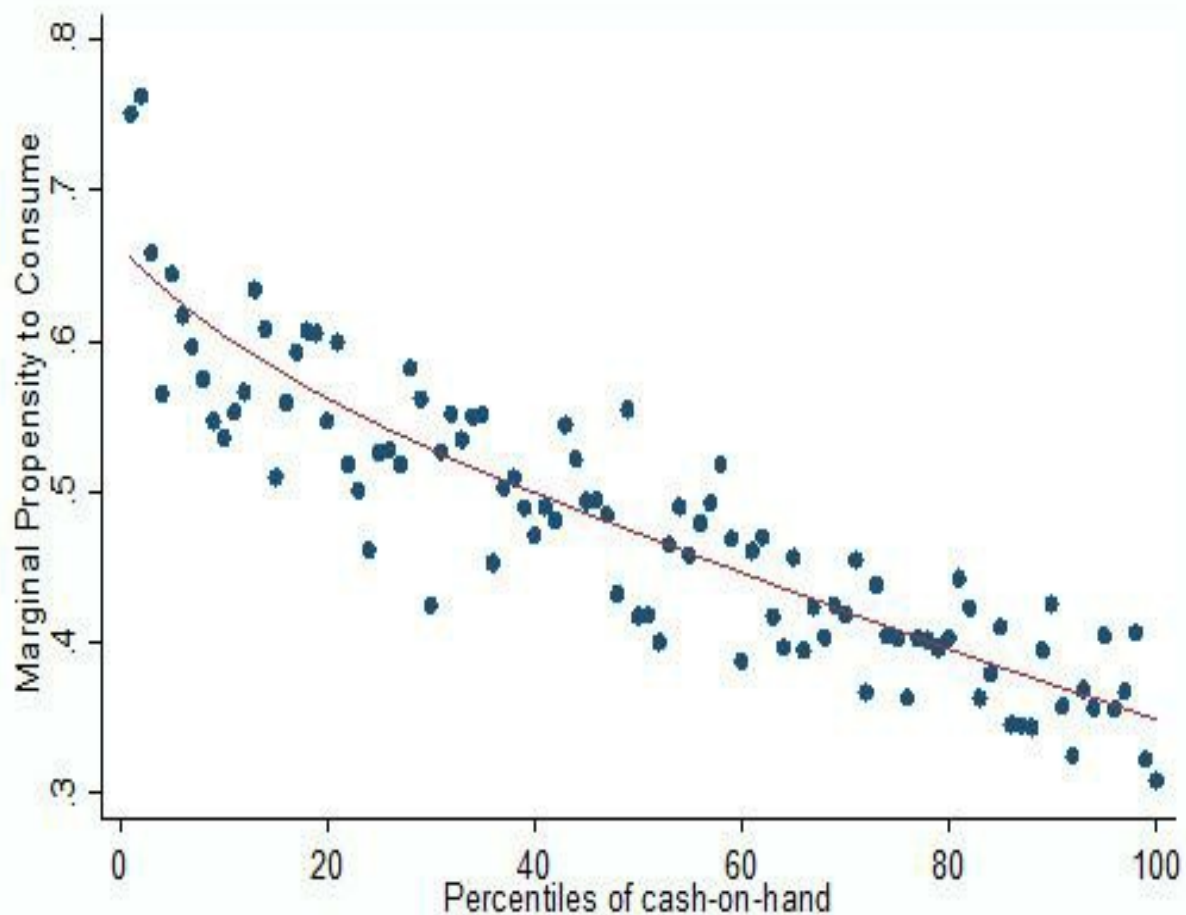
The empirical distribution of the marginal propensity to consume can be used to perform some simple policy simulations designed to predict the consumption response to tax interventions. We consider the cases of both government enacting a transfer policy financed by issuing debt and

government redistributing income from rich to poor in a revenue-neutral scheme. We find that the response of aggregate consumption to these policies is substantially higher than in a benchmark case when the marginal propensity to consume is assumed to be the same for each household.

We consider several experiments. In the first experiment, we assume that the government enacts a transfer policy financed by issuing debt (no taxes are levied). In particular, we study a policy in which government transfers 1% of national disposable income equally among all individuals in the bottom 10% of the income distribution. This policy is equivalent to a transfer of €3,308 (120% of average monthly income).

We next consider two scenarios: in one, marginal propensity to consume is 0.48 for all individuals (the sample average), and in the other, the marginal propensity to consume is heterogeneous (and equal to the individual marginal propensity to consume as elicited in the survey). In the homogeneous case, the aggregate marginal propensity to consume is obviously equal to 0.48, and aggregate consumption increases by 0.62%. If the marginal propensity to consume is heterogeneous, targeting transfers at the bottom 10% of the population results in a higher aggregate marginal propensity to consume (0.62) and higher aggregate consumption growth (0.82%). The difference between the two cases is explained by the higher marginal propensity to consume prevailing in the bottom part of the cash-on-hand distribution.

Another experiment we consider is to transfer 1% of national disposable income equally among all households with at least one unemployed member (14% of the sample). This is equivalent to an unemployment bonus of €2,400 (about 87% of average monthly income), roughly equal to three months of the unemployment insurance received by blue-collar workers. The quantitative impact of this policy is to boost aggregate consumption by 0.76%, with an estimated aggregate marginal propensity to consume of 0.58. The reason why this policy has effects similar to those of a transfer to the bottom 10% of the income distribution is that households with unemployed members are mostly concentrated among the poor.

A different type of experiment is a balanced-budget redistributive policy whereby the government finances a transfer to the poor by taxing the top 10% of the income distribution. With a homogeneous marginal propensity to consume, a pure redistributive policy has no effect on aggregate consumption. However, with a heterogeneous marginal propensity to

consume, the effect is positive and highest if the programme targets the very poor. For instance, a transfer to the bottom 10% of the income distribution would raise aggregate consumption by 0.08%; if the same programme targets people with below-median income, the boost in consumption would be around 0.05%.

One important caveat is that our calculations of the aggregate effects of fiscal policy are performed assuming that fiscal policy does not affect asset prices and that tax changes have no effect on labour supply. Hence, our calculations are likely to be an upper bound to the true effects of fiscal policy.

References

Agarwal, Sumit, Chunlin Liu, and Nicholas S Souleles (2007), "The Reaction of Consumer Spending and Debt to Tax Rebates-Evidence from Consumer Credit Data", *Journal of Political Economy*, 115, 986-1019.

Dynan, Karen, Jonathan Skinner, and Stephen P Zeldes (2004), "Do the Rich Save More?", *Journal of Political Economy*, 112, 397-444.

Johnson, David S, Jonathan A Parker, and Nicholas S Souleles (2006), "Household Expenditure and the Income Tax Rebates of 2001", *The American Economic Review* 96, 1589-1610.

Jappelli, Tullio, and Luigi Pistaferri (2013), "Fiscal Policy and MPC Heterogeneity", CEPR Discussion Paper No. 9333

Parker, Jonathan A (1999), "The Reaction of Household Consumption to Predictable Changes in Social Security Taxes", *The American Economic Review*, 89, 959-7

Parker, Jonathan A, Nicholas S Souleles, David S Johnson and Robert McClelland (2011), "Consumer Spending and the Economic Stimulus Payments of 2008", NBER Working Papers No. 16684.

Sahm, CR, Shapiro Matthew D, Slemrod Joel (2009), "Household Response to the 2008 Tax Rebate: Survey Evidence and Aggregate Implications", NBER Working Paper No. 15421.

Shapiro Matthew D, Slemrod Joel (1995), "Consumer Response to the Timing of Income: Evidence from a Change in Tax Withholding", *The American Economic Review* 85, 274-283.

Shapiro Matthew D, Slemrod Joel (2003), "Did the 2001 Tax Rebate Stimulate Spending? Evidence from Taxpayer Surveys", in James M. Poterba (ed.) *Tax Policy and the Economy* 17, Cambridge, MA, MIT

Press.

Souleles Nicholas S (1999), "The Response of Household Consumption to Income Tax Refunds", *The American Economic Review* 89, 947-958.

Souleles Nicholas S (2002), "Consumer Response to the Reagan Tax Cuts", *Journal of Public Economics* 85, 99-120.

Reconciling Hayek's and Keynes' views of recessions

Paul Beaudry, Dana Galizia, Franck Portier

Vancouver School of Economics; University of British Columbia; Toulouse School of Economics and CEPR

Hayek viewed recessions as working out excessive investments; Keynes viewed them as demand shortages. This column argues that they may not be as mutually exclusive as many think. Recessions may reflect periods of liquidation but this may be associated with inefficient adjustment involving unemployment and precautionary savings. Stimulative policy may be desirable even if it delays the full recovery.

There remains considerable debate regarding the causes and consequences of recessions. Two views that are often presented as opposing, and which created controversy in the recent recession and its aftermath, are:

- The liquidation perspective of Hayek; and
- The aggregate demand perspective of Keynes.[1]

The Hayekian perspective is generally associated with viewing recessions as a necessary evil. According to this view, recessions mainly reflect periods of liquidation resulting from past over-accumulation of capital goods. Some refer to this view as the *hangover theory* of recessions (see Paul Krugman 1998). In a situation where it is widely recognised that the economy has over-accumulated capital in the past, it is not hard to see why this can lead to depressed spending on investment and consumption by individuals.

The more controversial aspect of the Hayekian perspective is to argue that government spending aimed at stimulating activity is not warranted in such a situation since it would mainly delay the needed adjustment process and thereby postpone the recovery. US Secretary of the Treasury A. Mellon held a variant of this view during the great depression.[2] Some considered this to be an appropriate description of the Asian crisis of 1997 and of the two most recent US recessions.

In contrast, the Keynesian view suggests that recessions reflect periods of

deficient aggregate demand. Here, the economy is not effectively exploiting the gains from trade between individuals. According to this view, policy interventions aimed at increasing investment and consumption are generally desirable, as they favour the resumption of mutually beneficial trade between individuals.

Not as different as you might imagine

In a recent research paper (CEPR discussion paper No. 9966), we argue that those two views may not be as conflicting as they first appear. They may simply reflect two sides of the same coin.

To motivate this discussion, we begin by documenting that over the last 70 years US recessions have generally been longer and more severe when they have been preceded by periods of particularly high accumulation of physical capital goods, durable goods, or houses. This is illustrated in Figure 1, where we plot two measures of the severity of a recession against a measure of capital 'over-accumulation' prior to the recession.

Figure 1 Depth of recession and length of recovery vs. cumulated investment
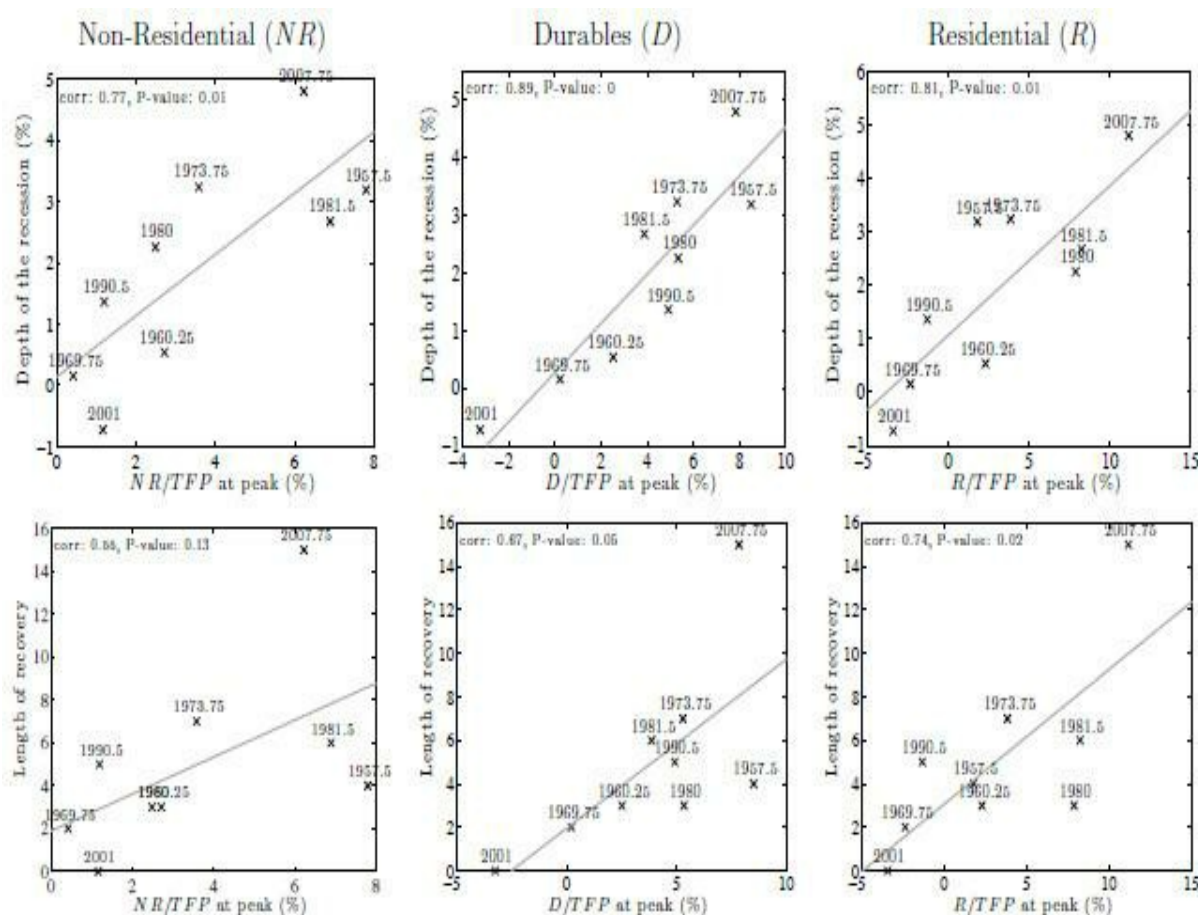
As can be seen in this figure:

- There is a very strong positive correlation between our measure of capital over-accumulation prior to a recession and either of our two measures of the subsequent severity of the recession.

This evidence provides support to the first premise of the liquidationist view. It shows that severe recessions have generally been preceded by periods of very high investment relative to the economy's needs, as measure by the economy's level of productivity (TFP).

- Severe recessions were generally preceded by high accumulation of all three classes of capital: housing, durables, and physical capital.

This pattern would be consistent, for example, with over-accumulation caused by periods of excessively lax credit. However, these 'Hayekian' facts do not necessarily imply that liquidation without public intervention is desirable.

We believe that the process of liquidation has a natural tendency to put the economy into a 'Keynesian' regime, characterised by excessive unemployment and deficient aggregate demand. It is in this sense that we view the liquidation and aggregate demand perspectives as closely linked.

Our approach

To reconcile the Hayekian and Keynesian perspectives, we focus on how the economy adjusts when it inherits from the past an excessive amount of capital goods, which could be in the form of houses, durable goods, or productive capital. The main starting part of our analysis is the recognition that in a market economy not all relevant trades are conducted simultaneously. Instead, economic participants often have to bear the risk of not being able to trade in a subsequent market. For example, someone may be required to make a consumption decision before knowing whether he will keep his job or be unemployed. Hence, if he perceives unemployment risk to be high, he may refrain from consuming, which will depress aggregate demand, which in turn can increase unemployment risk.

In this analysis, we do not focus on the question of why the economy may have over-accumulated in the past, but instead concentrate on understanding how it reacts to an over-accumulation once it is realised.[3] As suggested by Hayek, such a situation can readily lead to a recession as less economic activity is generally warranted when agents want to deplete past over-accumulation. However, we argue that the liquidation process has the side effect of igniting unemployment risk and inducing excessive precautionary savings behaviour. As a result:

- The size and duration of the recession induced by the need for liquidation is generally not socially optimal.
- The reduced desire to trade during a liquidation period creates a multiplier process that leads to an excessive reduction in economic activity.

Although prices are free to adjust, the liquidation process creates a period of deficient aggregate demand where economic activity is too low because people spend too cautiously due to increased unemployment risk.

To understand the argument, it is helpful to divide the process into rounds.

- In a first round, individual spending is lowered because economic agents need to liquidate their excess stock of capital, durable goods, or houses.

This first round is an efficient response to the past over-accumulation, and the Hayekian view generally stops here.

- In the second round, now that spending is low, this increases the risk of being unemployed, which boosts precautionary savings and further reduces demand.

This second round, and similar subsequent rounds of adjustment, are inefficient and lead to an excessive fall in economic activity. This reflects a type of multiplier process associated with Keynesianism.

In this sense, we argue that liquidation and deficient aggregate demand should not be viewed as alternative theories of recessions, but instead should be seen as complements, where past over-accumulation may be the key driver of later periods of deficient aggregate demand.

Trade-offs faced by policy

Our perspective highlights the trade-offs faced by policy. In particular, a policymaker in our environment faces an unpleasant trade-off between the prescriptions emphasised by Keynes and Hayek.

- On the one hand, a policymaker would want to stimulate economic activity during a liquidation-induced recession because precautionary saving is excessively high.
- On the other hand, the policymaker also needs to recognise that intervention will likely postpone recovery, since it slows down the needed depletion of excess capital. In our framework, both of these forces are present and can be compared.

Although it is not a priori clear why one force would always dominate, we find that during liquidation periods, stimulative aggregate demand policies are generally socially optimal, as the laissez-faire economy produces a recession that is excessively deep and painful. However, the cost of this intervention is that it prolongs the recession, as suggested by Hayek, rather than stimulating a quick recovery, as some Keynesians may want to believe.

Given this reasoning, one should not be surprised that full recovery is delayed as a result of intervention during a liquidation-driven recession, but that does not mean that the intervention was undesirable. In fact, the intervention is desirable precisely because the laissez-faire economy will tend to liquidate too much and too quickly.

Secular stagnation

This research also sheds some light on the recent debate on secular stagnation, as put forward by Lawrence Summers. The type of decentralised market economy that we consider functions quite efficiently in growth periods when it is far below its balanced growth path, while simultaneously functioning particularly inefficiently when it is near its balanced growth path.

- When the economy is far below its balanced growth path level of capital, demand for capital is very strong and unemployment risk is therefore minimal.
- When the economy is close to its balanced growth path, it will generally be in an unemployment zone because investment demand

will be low.

The associated unemployment risk then causes households to increase precautionary savings, which in turn sustains excessive unemployment, giving rise to a permanent paradox of thrift situation in which abundance creates scarcity.

Concluding remarks

While the main mechanism in our theory has many precursors in the literature,[4] we believe that our setup illustrates most clearly:

- Why recessions may reflect periods of liquidation;
- Why liquidations may be associated with an inefficient adjustment process induced by unemployment risk and precautionary savings; and
- Why policy aimed at stimulating the economy during a recession may be desirable even if it delays the full recovery.

References

Beaudry P, D Galizia and F Portier (2014), "Reconciling Hayek's and Keynes' views of recessions", CEPR Discussion Paper 9966, NBER Working Paper 20101.

Beaudry, P and F Portier (2004), "An exploration into Pigou's theory of cycles," *Journal of Monetary Economics*, 51(6), 1183–1216.

Bordo, M D and J Landon-Lane (2013), "Does Expansionary Monetary Policy Cause Asset Price Booms; Some Historical and Empirical Evidence," NBER Working Papers 19585, National Bureau of Economic Research, Inc.

Guerrieri, V and G Lorenzoni (2009), "Liquidity and Trading Dynamics," *Econometrica*, 77(6), 1751–1790.

Heathcote, J and F Perri (2012), "Wealth and Volatility," Meeting Papers 914, Society for Economic Dynamics.

Krugman, P (1998), "The Hangover Theory", *Slate*, December.

Mian, A and A Sufi (2010), "The Great Recession: Lessons from Microeconomic Data," *The American Economic Review*, 100(2), 51–56.

Mian A, A Sufi and F Trebbi (2010), "The Political Economy of the US Mortgage Default Crisis," *The American Economic Review*, 100(5), 1967–

98.

Wapshott, N (2012), *Keynes Hayek, The Clash that Defined Modern Economics*, W. W. Norton & Co.

1 See Wapshott (2012) for a popular account of the Hayek-Keynes controversy.

2 Andrew W. Mellon is famous for his policy advice to President Hoover: "liquidate labour, liquidate stocks, liquidate the farmers, liquidate real estate…. It will purge the rottenness out of the system."

3 There are several reasons why an economy may over-accumulate capital. For example, agents may have had overly optimistic expectations about future expected economic growth that did not materialize, as in Beaudry and Portier (2004), or it could have been the case that credit supply was unduly subsidised either through explicit policy, as argued in Mian and Sufi (2010) and Mian, Sufi, and Trebbi (2010), or as a by-product of monetary policy, as studied by Bordo and Landon-Lane (2013).

4 Our model structure is closely related to that presented in Guerrieri and Lorenzoni (2009), and also shares many features with Heathcote and Perri (2012).

Fiscal policy for the Crisis

Antonio Spilimbergo, Steven Symansky, Olivier Blanchard, Carlo Cottarelli

IMF

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The global crisis demands bold initiatives to i) rescue the financial sector, and ii) boost aggregate demand, with early resolution of financial sector problems being a necessary condition for the stimulus to work. Since monetary policy is at the end of its rope, early, strong, and carefully thought-out fiscal policies are urgently needed. Time and action are of the essence if we are to avoid a contraction larger than any we've seen since the 1930s.

The output decline in the current crisis could be larger than any since the Great Depression. Successful policy responses by governments should address both the financial crisis and the fall in aggregate demand, however in this crisis the macro policy options are limited. While each single country can adopt an export-led recovery strategy, this is clearly not an option open to the world as a whole. Likewise, the financial nature of the crisis weakens the traditional monetary transmission mechanism and the room to further lower central bank policy rates is limited.

Given these limits, this column focuses on fiscal stimulus, basing the analysis on the work in our recent IMF Staff Position Note, (Spilimbergo et al 2008).

Features of optimal fiscal stimulus packages

A fiscal stimulus should be:

- timely (as there is an urgent need for action),
- large (because the drop in demand is large),
- lasting (as the recession will likely last for some time),
- diversified (as there is uncertainty regarding which measures will be most effective),
- contingent (to indicate that further action will be taken, if needed),
- collective (all countries that have the fiscal space should use it given the severity and global nature of the downturn), and

- sustainable (to avoid debt explosion in the long run and adverse effects in the short run).

The challenge is to provide the right balance between these sometimes competing goals -- particularly, large and lasting actions versus fiscal sustainability.

Fiscal Policy in Financial Crises -- Lessons From History

A survey of the countries that have experienced severe systemic financial crises shows that these episodes are typically associated with severe economic downturns and that countries have reacted to these downturns quite differently, depending on economic and political constraints (See Chapter 4, World Economic Outlook, October 2008). The list of countries that have experienced both financial and economic crises includes some well known cases:

- Korea in 1997,
- Japan in the 1990s,
- the Nordic countries in the early 1990s,
- the Great Depression in the 1930s, and
- the US during the Savings and Loans crisis in the 1980s.

Several lessons can be drawn from these case studies.

- First, successful resolution of the financial crisis is a precondition for achieving sustained growth; delaying action led to a worsening of macroeconomic conditions, resulting in higher fiscal costs later on.

Prompt and sizeable support to the financial sector by the Korean authorities limited the duration of the macroeconomic consequences thus limiting the need for other fiscal action.

- Second, the solution to the financial crisis always precedes the solution to the macroeconomic crisis.
- Third, a fiscal stimulus is highly useful (almost necessary) when the financial crisis spills over to the corporate and household sectors with a resulting worsening of the balance sheets.
- Fourth, the fiscal response can have a larger effect on aggregate

demand if its composition takes into account the specific features of the crisis.

In this regard, some of the tax and transfer policies implemented early in the Nordic crises did little to stimulate output. Fixing the financial system and supporting aggregate demand are, thus, both critical. This note focuses only on the fiscal component.

Composition of a fiscal stimulus in a long, unusual recession

Two features of the current crisis are particularly relevant in defining the appropriate composition of the fiscal stimulus.

First, as the current crisis will last at least for several more quarters, the argument that implementation lags for spending are long is less relevant when facing the current risk of a more prolonged downturn. Furthermore, given the highly uncertain response of households and firms to an increase in their income through taxes and transfers, expenditure measures may have an advantage by directly raising aggregate demand.

Second, since the current crises is characterized by a number of events and conditions not experienced in recent decades, existing estimates of fiscal multipliers are less reliable in informing policymakers about which measures will be relatively effective in supporting demand. This provides a strong argument for policy diversification ─ not relying on a single tool to support demand. (See Appendix I of Spilimbergo et al (2008) on the pros and cons of some specific spending and revenue measures.)

Public spending on goods and services

In theory, public spending on goods and services has a direct demand effect than those related to transfers or tax cuts. In practice, the appropriate increase in public spending is constrained by the need to avoid waste. What are the key prescriptions?

First, governments should make sure that existing programs are not cut for lack of resources. Governments facing balanced budget rules may be forced to suspend various spending programs (or to raise revenue). Measures should be taken to counteract the procyclicality built into these rules. For sub-national entities, this can be mitigated through transfers from the central government.

Second, spending programs, from repair and maintenance, to investment projects delayed, interrupted or rejected for lack of funding or macroeconomic considerations, can be (re)started quickly. A few high

profile programs, with good long-run justification and strong externalities, can also help, directly and through expectations. Given the higher degree of risk facing firms at the current juncture, the state could also take a larger share in private-public partnerships for valuable projects that would otherwise be suspended for lack of private capital.

Public sector wage increases should be avoided as they are not well targeted, difficult to reverse, and similar to transfers in their effectiveness. But a temporary increase in public sector employment associated with some of new programs and policies may be needed.

Fiscal stimulus aimed at consumers

The support of consumer spending also needs to take the present exceptional conditions into account, specifically: i) decreases in wealth; ii) tighter credit constraints; and iii) high uncertainty. These three factors have different implications for the marginal propensity to consume out of transitory tax cuts or transfers. The first and the third suggest low marginal propensities to consume, the second a high one. Assessing the relative importance of the three is hard, but suggests two broad recommendations:

The first is to target tax cuts or transfers towards those consumers who are most likely to be credit or liquidity constrained. Measures along these lines include the greater provision of unemployment benefits, increases in earned income tax credits, and the expansion of safety nets in countries where they are limited. Where relevant, support for homeowners facing foreclosures using public resources supports aggregate demand and improves conditions in the financial sector. The second is that clarity of policy together with a strong commitment by policy makers to take whatever action may be needed to avoid the tail risk of a depression, are likely to reduce uncertainty, and lead consumers to decrease precautionary saving.

Some countries are considering broad based tax cuts. But, the marginal propensity to consume out of such tax cuts may be quite low. Some countries have introduced temporary decreases in the VAT. If the termination date is credible, the intertemporal incentives implied by such a measure are attractive. However, the degree of pass-through to consumers is uncertain, its unwinding can contribute to a further downturn, and it is questionable whether decreases of just a few percentage points are salient enough to lead consumers to shift the timing of their purchases. Possibly, larger, but more focused incentives, such as cash transfers for purchases of specific goods may attract more attention from consumers and have larger

effects on demand.

Fiscal stimulus aimed at firms

In this uncertain environment, firms are also taking a wait-and-see attitude with respect to their investment decisions. Subsidies or measures to lower the tax-adjusted user cost of capital (such as reductions in capital gains and corporate tax rates) are unlikely to have much effect. Rather, the key challenge for policy-makers is ensure that firms do not reduce current operations for lack of financing. While this is primarily the job of monetary policy, there is also some scope for governments to support firms that could survive restructuring, but find it difficult to receive the necessary financing from dysfunctional credit markets. In particular, there is an argument for combining restructuring procedures with government guarantees on new credit.

It has been argued that governments should provide support to entire high-visibility sectors of the economy because of the potential effect that bankruptcies in these sectors may have on expectations. While there is some validity in this argument, its inherent arbitrariness, and risk of political capture, would make implementation difficult. Direct subsidies to domestic sectors could lead to an uneven playing field with respect to foreign corporations, and result in trade retaliation. An important principle of support should be to minimize interference with operational decisions. Credit guarantee to firms (not sectors) may be needed as long as the credit markets remain dysfunctional.

Sustainability concerns

It is essential for governments to indicate from the start that the extent of the fiscal expansion will be contingent on the state of the economy. Sizable upfront stimulus is needed, but policy makers must commit to doing more if needed. This should be announced at the start, so later increases do not look like acts of desperation.

At the same time, fiscal stimulus must not be seen as calling into question medium-term fiscal sustainability; questions about debt sustainability would undercut the near-term effectiveness of policy through adverse effects on financial markets, interest rates, and consumer spending.

Although some widening of borrowing costs within the euro zone may reflect sustainability concerns, financial markets do not seem overly concerned about medium-term sustainability. But markets often react late and abruptly. Thus, a fiscally unsustainable path can eventually lead to

sharp adjustments in real interest rates, which in turn can destabilize financial markets and undercut recovery prospects.

Fiscal packages with the following features would help:

- implementing measures that are reversible or that have clear sunset clauses, or pre-committing to identified future corrective measures (e.g. future increases in upper income tax rates as part of the U.K. package);
- implementing policies that eliminate distortions (e.g., financial transaction taxes);
- increasing the scope of automatic stabilizers that, by their nature, are countercyclical and temporary;
- providing more robust medium-term fiscal frameworks should provide confidence that increases in public debt resulting are eventually offset;
- strengthening fiscal governance through independent fiscal councils that could help monitor fiscal developments, and also provide policy advice to reduce the public's perception of possible political biases; and
- improving expenditure procedures to ensure that stepped-up public works spending is well directed to raise long-term growth (and tax-raising) potential.

It is also worth putting this into perspective. The main threat to the long-term viability of public finances in rapidly-aging countries comes from the net cost of publicly funded pension and health entitlements, whose net present values far exceed the magnitude of conceivable fiscal stimulus packages.

Finally, it should be noted that should spending will boost growth and thus tax revenues in the future. Many countries have succeeded in reducing their public debt burden through growth. A credible commitment to address these long-term issues can go a long way in reassuring markets about fiscal sustainability.

Some proposals for discussion

The gravity and singularity of the current crisis may require new solutions, which address specifically the issues of financial disintermediation and loss in confidence. Some proposals that could be considered are:

- Greater role of the public sector in financial intermediation

With the extreme shift in investors' preferences towards liquid T-bills and away from private assets, the state is in a better position than private investors to buy and hold these private assets, and partly replace the private sector in financial intermediation.

Although the public sector does not have a comparative advantage in evaluating credit risk, nor in administering a diverse portfolio of assets, the management of the banking activities could be outsourced to a private entity.

- Provision of insurance by the public sector against large recessions

In the present environment of extreme uncertainty, the government could provide insurance against extreme recessions by offering contracts, with payment, contingent on GDP growth falling below some threshold level.

Banks could condition loan approvals on firms having purchased such insurance from the government. Widespread use of such contracts would provide an additional automatic stabilizer because payments would be made when they are most needed, namely in bad times. An obvious worry about such a scheme is that the government may not be able or willing to honor its obligations.

A collective international effort

The international dimension of the crisis calls for a collective approach. There are several spillovers that could limit the effectiveness of actions taken by individual countries, or create adverse externalities across borders.

Countries with a high degree of trade openness may be discouraged from fiscal stimulus since it will benefit less from a domestic demand expansion. The flip side of these spillovers is that if all countries act, the amount of stimulus needed by each country is reduced (and provides a political economy argument for a collective fiscal effort). At the same time, this collective fiscal effort must be tailored to country circumstances.

Some interventions currently discussed such as subsidies to troubled industries may be perceived as industrial policy by trading partners. The history of the Great Depression shows that, as the crisis deepens, there is

increasing pressure to raise trade barriers. Such a race would bring significant costs in terms of efficiency.

All these factors point to the need for a concerted effort by the international community, and stricter coordination among countries with closer economic and institutional ties. Recent announcements by the EU recommending a 1.5% of GDP stimulus and the decision to finance some of the national expenditures from the EU budget are steps in this direction.

The most recent data are pointing more and more to a worldwide growth slowdown suggesting that the action should be widespread to maximize its effectiveness.

The IMF has called for a sizable fiscal response at the global level. Its precise magnitude should depend on several factors including the expected decline in private sector demand. Moreover, not all countries have sufficient fiscal space to implement expansionary fiscal policy since it may threaten the sustainability of fiscal finances. In particular, many low income and emerging market countries, but also some advanced countries, face additional constraints such as volatile capital flows, high public and foreign indebtedness, and large risk premia.

The fact that some countries cannot engage in fiscal stimulus makes it all the more important that others, including some large emerging economies, do their part. Also the policies should be tailored to those actions that are likely to provide the largest multipliers. In the United States, that is likely to be investment, other spending on goods and services, and some targeted transfers. In Europe, with its relatively large automatic stabilizers, the additional fiscal impulse can probably be somewhat less than in the United States.

Conclusion

The solution to the current financial and macroeconomic crisis requires bold initiatives aimed at rescuing the financial sector and increasing demand. The early resolution of financial sector problems is critical. But early, strong, and carefully thought out, fiscal responses are also important. Time and action are of the essence.

References

Spilimbergo, Antonio, Steve Symansky, Olivier Blanchard, and Carlo Cottarelli (2008). "Fiscal Policy for the Crisis," IMF Staff Position Note, December 29, 2008, SPN/08/

The evolving effectiveness of UK's monetary policy

Colin Ellis, Haroon Mumtaz, Pawel Zabczyk

Moody's Investors Service; Queen Mary University of London; Bank of England

06 August 2014

This column reports on empirical evidence showing that monetary policy shocks in the UK had a bigger impact on inflation, equity prices, and the exchange rate during the inflation targeting period. Related changes in the transmission of policy shocks to bond yields point to more efficient management of long run inflation expectations.

Over the past five decades, major industrialised economies underwent deep structural changes. These typically included dramatic shifts in macroeconomic policy and globalisation-induced changes in competition, technological advances, and financial innovation. This raises several concerns for policymakers, including whether the channels through which monetary policy affects the economy have changed over time, and what that might mean for how policy should be conducted.

## Accounting for changes in the transmission mechanism

While a number of studies (Boivin and Giannoni 2002, 2006, Gali et al. 2003, Primicieri 2006, Canova and Gambetti 2009, Gambetti and Gali 2009) have analysed the stability of various facets of US monetary policy transmission, no clear consensus has been reached. The arguments in Bernanke et al. (2005) and Hansen and Sargent (1991) suggest that the conflicting evidence may be due to simple empirical models missing data necessary to correctly identify structural shocks. Boivin et al. (2010) additionally claim that the split-sample estimation strategy used in some of the US studies could be another factor responsible for the lack of consensus. This is because such a procedure may fail to allow for sufficiently rich dynamics of changes in the monetary policy transmission mechanism.

Ample evidence of widespread changes in the UK economy (Benati 2004, Mumtaz and Surico 2012) meant that in Ellis et al. (2014) – where we studied the UK transmission mechanism – we had to tackle both of these issues head on. To avoid relying on a limited set of data, we therefore

followed Bernanke et al. (2005) and Boivin et al. (2010) and augmented our model with factors extracted from 350 data series. To further allow for the possibility of changes in the way various types of disturbances are transmitted, we additionally extended Bernanke et al. (2005) by allowing for time-varying coefficients in the vector autoregressive (VAR) transition equation and for heteroscedasticity in shocks, capable of accommodating variations in the volatility of the underlying series.

In our study, we identified unanticipated changes (so-called 'shocks') in UK's demand, supply, and monetary policy, with Figure 1 plotting their respective volatilities.

**Figure 1** Volatility of identified structural shocks
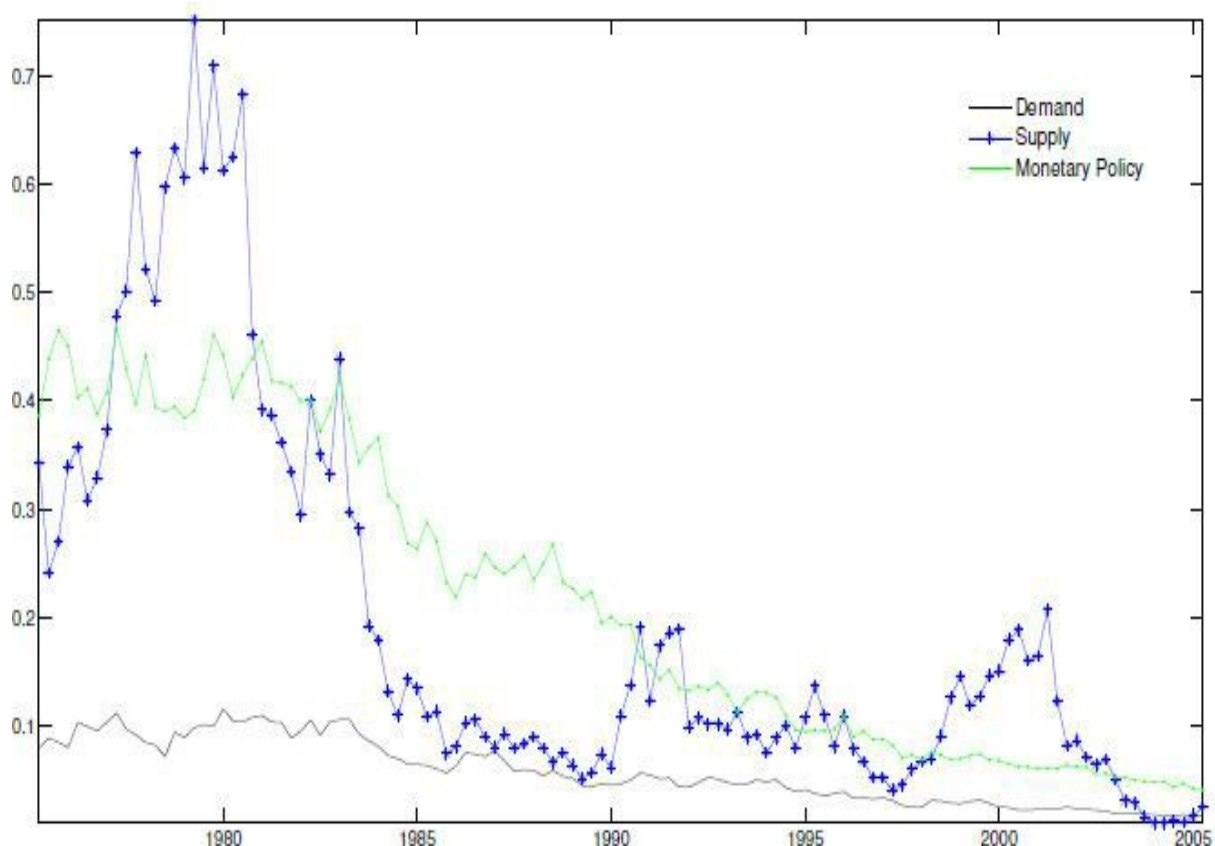
In terms of historical context, Thatcher's disinflation – launched in 1979 – and the experiment with monetary targeting (ultimately abandoned in 1985), appear to have coincided with dramatic falls in the volatility of supply shocks. And although the volatility of monetary policy and demand shocks continued to decrease until the end of our sample period, supply shocks do seem to have become temporarily more volatile around the landslide Labour party election victory in 1997, which preceded the granting of operational independence to the Bank of England. Importantly,

the fact that all three volatilities appear markedly lower in the 1990s than in the 1970s, serves as another illustration of what is often termed the 'Great Moderation'.

Enhanced effectiveness of UK's monetary policy: New evidence

The time-varying impulse responses to monetary policy shocks (normalised to increase the Bank Rate by 100 basis points on impact) reported in Figure 2 provide evidence that prior to 1992, there was hardly any impact on various measures of inflation from policy becoming unexpectedly tighter. Since that time, however, the response of inflation to the same policy tightening has become more negative and persistent. Importantly, the 1992 threshold, which broadly coincides with the introduction of inflation targeting, is not hard-wired into the model, but naturally emerges as one consequence of allowing for time-variation in a flexible fashion.

Figure 2 Impulse response of inflation to a monetary policy shock
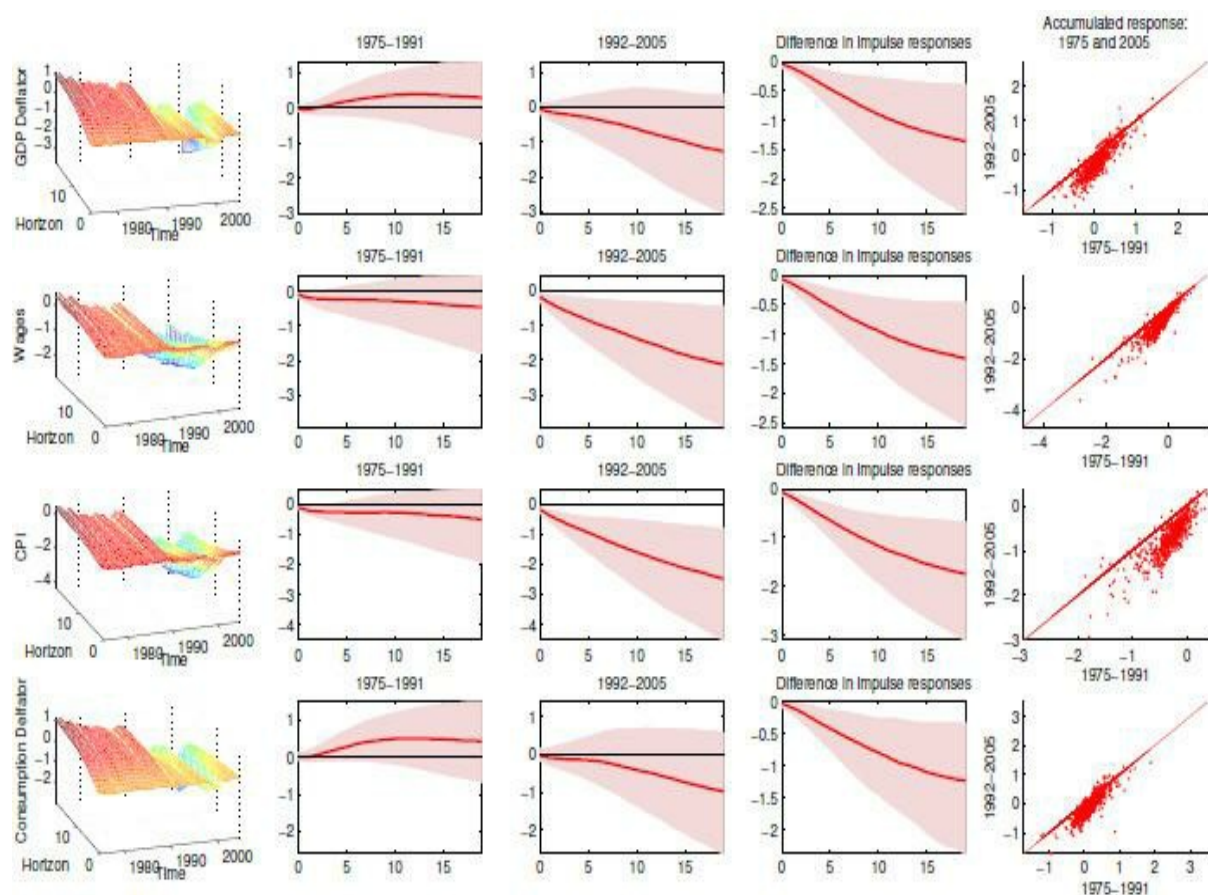
Note: The left panels present the time-varying median cumulated impulse response. The three central panels show the average impulse response functions (IRFs) in the pre- and post-1992 periods as well as their difference, while the right panel shows the joint distribution of the

cumulated response at the one-year horizon in the pre- and post-1992 periods.

The natural question then is: What do these impulse responses imply about changes in the transmission of monetary policy? To help identify the channels through which the increased efficacy of policy shocks on prices may have occurred, we inspected changes in the corresponding IRFs of asset prices (Figure 3). Using the response of yields on a 10-year government bond as a measure of the responsiveness of inflation expectations to policy, we found that long-term yields clearly responded by more post-1992 (fourth chart in the bottom row of Figure 3), which appears consistent with policy becoming better at exploiting the expectations channel.

Equity prices are important for two channels of monetary policy transmission.

- First, as in the classic q theory, lower prices would imply that capital replacement costs are high relative to the market value of firms, with negative implications for investment. Furthermore, lower equity prices push down on the net worth of firms, potentially exacerbating adverse selection and moral hazard problems, and may lead to a decline in lending, spending, and aggregate demand (as discussed in Boivin et al. 2010).

While the FTSE does respond in line with the theory, the upper bound on the median difference is close to zero, suggesting little reason to expect considerably greater impact of policy on demand via either of these channels.

One of the more interesting pieces of evidence on changes in monetary policy transmission can be found in the first row of Figure 3.

- On the one hand, expectations can have an important effect on the cost of capital and housing spending, suggesting that house prices should contract by more in response to negative policy shocks after 1992.
- On the other hand, demutualisation of many building societies in the 1990s, coupled with new financial produces, may have helped to insulate consumers from the immediate impact of changes in prices.

Our results point to no change in the response of house prices to policy shocks, suggesting that these factors may have had offsetting effects.

Figure 3 Impulse response of asset prices to a monetary policy shock
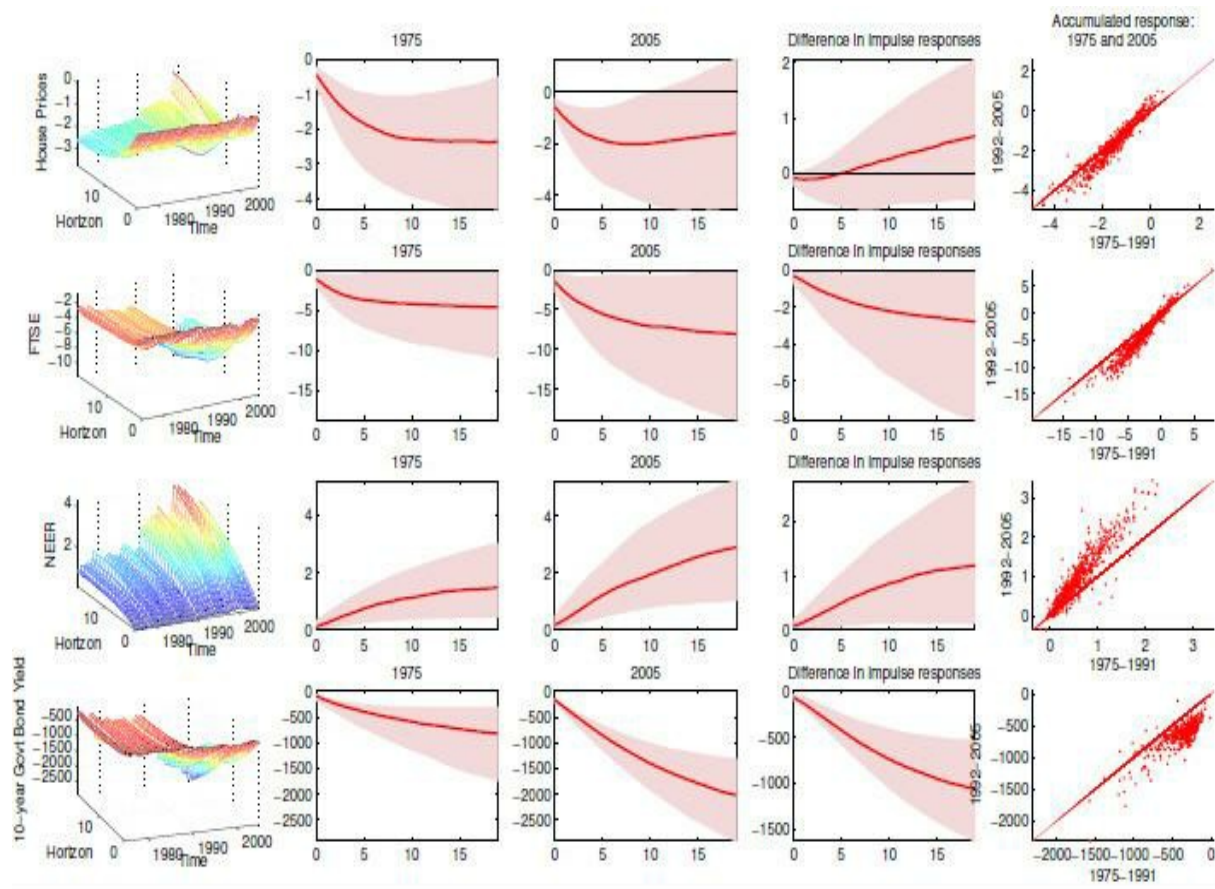
In Ellis et al. (2014) we also report the response of real activity to policy shocks. In line with the US-based evidence of Boivin et al. (2010), who report 'modest' short-run elasticities, we find that the response of UK's investment to policy shocks is imprecisely estimated and displays no sign of changes over time. Additionally, and in contrast to the aggregate inflation series, the responses of consumption, industrial production, and real GDP appear relatively similar pre- and post-1992, with the intervals around the IRFs consistent with no time variation.

Implications for policy and conclusion

Both our main result and the way we interpret it are worth putting in context. First, unlike Boivin and Giannoni (2006), we do not augment the analysis by using a dynamic stochastic general equilibrium (DSGE) model built to match aspects of the VAR-based evidence. While this reduces the risk of contaminating the conclusions through misspecification of either of

the two models, it also means that we can only focus on unanticipated changes in monetary policy. Alternatively, we have no direct evidence on potentially very important changes in the systematic component of policy, and we proceed by equating policy surprises with discretionary deviation from some underlying and possibly time-varying policy rule.

Interestingly, the findings we report in Ellis et al. (2014) suggest that the widespread practice of ignoring time-variation doesn't necessarily lead to wrong conclusions. Specifically, there appears to be little evidence of the transmission of demand or supply shocks changing over time. Crucially, however, this does not appear to be the case for unanticipated changes in monetary policy, suggesting that central bankers do need to take account of how economic relationships change over time, or risk making significant policy errors.

On the whole, our results reinforce the view that credible monetary policy has a clear role to play in anchoring the economy. The fact that since the advent of inflation targeting, unanticipated changes in policy started having a stronger impact on underlying inflationary pressures is particularly encouraging as containing these pressures – rather than short-lived relative price shocks – should be the key focus for policymakers.

As discussed, our findings are consistent with the main impact of UK's inflation targeting having been transmitted via the anchoring of inflation expectations, which reduced the costs associated with achieving low and stable inflation rates. This anchoring may have been particularly important in recent years, as households have endured the painful reduction in real wages associated with the financial crisis. These tangible benefits suggest that policy should respond very strongly if there are any signs that the credibility of the inflation target is starting to erode.

References

Benati, L (2004), "Evolving post-World War II U.K. economic performance", *Journal of Money Credit and Banking*, vol. 36(4), pp. 691-717.

Bernanke, B, Boivin, J and Eliasz, P S (2005), "Measuring the effects of monetary policy: A factor-augmented vector autoregressive (FAVAR) approach", *The Quarterly Journal of Economics*, vol. 120(1), pp. 387-422.

Boivin, J and Giannoni, M (2002), "Assessing changes in the monetary transmission mechanism: A VAR approach", *Economic Policy Review*, (May), pp. 97-111.

Boivin, J and Giannoni, M P (2006), "Has monetary policy become more effective?", *The Review of Economics and Statistics,* vol. 88(3), pp. 445-462.

Boivin, J, Kiley, M T and Mishkin, F S (2010), "How has the monetary transmission mechanism evolved over time?", in (B.M. Friedman and M.Woodford, eds), *Handbook of Monetary Economics,* vol.3, pp.369-422, San Diego: Elsevier.

Canova, F and Gambetti, L (2009), "Structural changes in the US economy: Is there a role for monetary policy?", *Journal of Economic Dynamics and Control,* vol. 33(2), pp. 477-490.

Ellis, C, Mumtaz, J and Zabczyk, P (2014), "What lies beneath? A time-varying FAVAR model for the UK transmission mechanism", *Economic Journal,* vol.124(576), pp.668-699.

Gambetti, L and Gali, J (2009), "On the sources of the Great Moderation", *American Economic Journal: Macroeconomics,* vol. 1(1), pp. 26-57.

Gali, J, Lopez-Salido, J D and Valles, J (2003), "Technology shocks and monetary policy: assessing the Fed's performance", *Journal of Monetary Economics,* vol. 50(4), pp. 723-743.

Hansen, L P and Sargent, T J (1991), "Two problems in interpreting vector autoregressions", in (R.E. Lucas and T.J. Sargent, eds.), *Rational Expectations Econometrics,* Boulder: Westview.

Mumtaz, H and Surico, P (2012), "Evolving international inflation dynamics: World and country-specific factors", *Journal of the European Economic Association,* vol.10(4), pp. 716-734.

Primiceri, G (2006), "Why inflation rose and fell: Policymakers' beliefs and U.S. postwar stabilization policy", *The Quarterly Journal of Economics,* vol. 121(3), pp. 867-901.

A case for balanced-budget stimulus

Pontus Rendahl

University of Cambridge

26 April 2012

Many developed economies are in a liquidity trap with interest rates at or near zero. Many also have high unemployment that looks set to persist. This column argues that it is times like these when governments should be spending more, not less – they just have to be careful how they do it.

With debt-levels hitting record highs and growth running low on steam, European policymakers have found themselves facing a grim dilemma: should government spending be increased at the risk of reawakening the wrath of the sovereign bond markets? Or should austerity instead assume the political mantra with the hope of merely muddling through?

True, substantial theoretical and empirical evidence lend support to the idea that a deficit-financed expansion in public spending may raise output and speed up the recovery. And the most recent experience in Europe has shown with terrifying clarity that high levels of debt may provoke yet another round of sovereign debt crises. But there is little, if any, support in the current macroeconomic literature for the view that expansionary fiscal policy must come at the price of ramping up debt. In fact, contemporaneously tax-financed spending might do the trick equally well. And inasmuch as a 'balanced-budget stimulus' can set the economy on a steeper recovery path, the long-run sustainability of debt may well improve, and not deteriorate (DeLong and Summers 2012).

The reasoning underlying these ideas is known as Ricardian equivalence (Barro 1974). Yes, the same theorem that allegedly bears responsibility for putting a "nail in the coffin" of the Keynesian multiplier (Cochrane 2009) also suggests that spending will have the same effect independently of its source of financing. Ricardian equivalence states that, under certain conditions, financing a given level of spending through debt (ie future taxes), or through current taxes, is irrelevant.

Yet while Ricardian equivalence might have put a nail in the coffin of the Keynesian multiplier, it has certainly not pre-empted the underlying idea: that an increase in government spending may provoke a kickback in output many times the amount initially spent. Indeed, a body of recent research

suggests that the fiscal multiplier may be very large, independently of the foresightedness of consumers (Christiano et al 2011, Eggertson 2010). And in a recent study of mine (Rendahl 2012), I identify three crucial conditions under which the fiscal multiplier can easily exceed 1 irrespective of the mode of financing. These conditions, I argue, are met in the current economic situation.

Three conditions for a large balanced-budget multiplier

Condition 1. The economy is in a liquidity trap …

When interest rates are near, or at, zero, cash and bonds are considered perfect substitutes. As the intertemporal price of money fails to adjust further, a disequilibrium emerges in which the demand for assets exceeds the supply. A dollar lent is no longer a dollar borrowed, and cash is instead hoarded. Figure 1 illustrates the evolution of US banks' cash reserves held at the Federal Reserve from 2003 until today. While money, of course, is a very elusive concept, the skyrocketing rise of bank cash reserves suggests that liquid means are being pulled out of circulation.

Figure 1
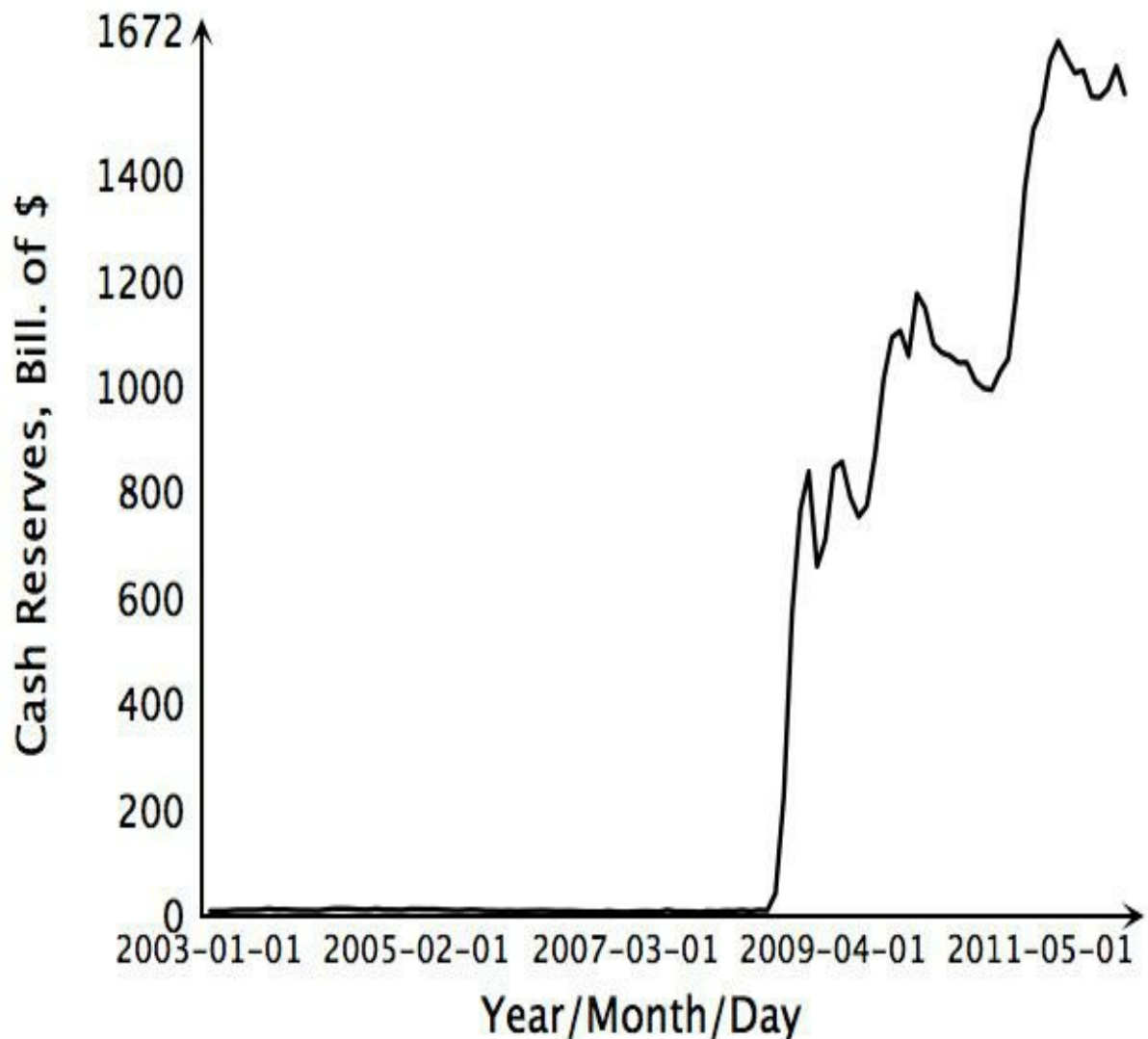
Under these peculiar circumstances the laws of macroeconomics change. A dollar spent by the government is no longer a dollar less spent elsewhere. Instead, it's a dollar less kept in the mattress. And the logic underpinning Say's law – the idea that the supply of one commodity must add to the immediate demand for another – is broken. In a liquidity trap, the supply of one commodity (eg labour) may rather add to the immediate demand for cash, and not to any other real commodity per se (Mill 1874). From merely being a means of payment, cash turns into a means of storage.

Condition 2. … with high unemployment …

So while a dollar spent by the government is not a dollar less spent elsewhere, it is not immediate, nor obvious, whether this implies that government spending will raise output. The second criterion therefore concerns the degree of slack in the economy.

If unemployment is close to, or at, its natural rate, an increase in spending is unlikely to translate to a substantial rise in output. Labour is costly and firms may find it difficult to recruit the workforce needed to expand production. An increase in public demand may just raise prices and therefore offset any spending plans by the private sector.

But at a high rate of unemployment, the story is likely to be different. The large pool of idle workers facilitates recruitment, and firms may cheaply expand business. An increase in public demand may plausibly give rise to an immediate increase in production, with negligible effects on prices. Crowding-out is, under these circumstances, not an imminent threat.

Combining the ideas emerging from Conditions 1 and 2 implies that the fiscal multiplier – irrespective of the source of financing – may be close to 1 (cf Haavelmo 1945).

Condition 3. … which is persistent

But if unemployment is persistent, these ideas take yet another turn. A tax-financed rise in government spending raises output, and lowers the unemployment rate both in the present and in the future. As a consequence, the increase in public demand steepens the entire path of recovery, and the future appears less disconcerting. With Ricardian or forward-looking consumers, a brighter outlook provokes a rise in contemporaneous private demand, and output takes yet another leap. Thus, with persistent unemployment, a tax-financed increase in government purchases sets off a snowballing motion in which spending begets spending.

Where does this process stop? In a stylised framework in which there are no capacity constraints and unemployment displays (pure) hysteresis, I show that the fiscal multiplier is equal to the inverse of the elasticity of intertemporal substitution, a parameter commonly estimated to be around 0.5 or lower. Under such conditions, the fiscal multiplier is therefore likely to lie around 2 or thereabout.

Collecting arguments

To provide more solid grounds to these arguments, I construct a simple DSGE model with a frictional labour market. A crisis is triggered by an unanticipated (and pessimistic) news shock regarding future labour productivity. As forward-looking agents desire to smooth consumption over time, such a shock encourages agents to save rather than to spend, and the economy falls into a liquidity trap. In similarity to the

aforementioned virtuous cycle, a vicious cycle emerges in which thrift reinforces thrift, and unemployment rates are sent soaring. Figure 2 illustrates the associated fiscal multiplier (y-axis) under a range of news shocks, stretching from a 7% decline in labour productivity to a 3% increase. The unemployment rate is given in brackets.

Figure 2

Percent change in productivity (Unemployment rate in brackets)
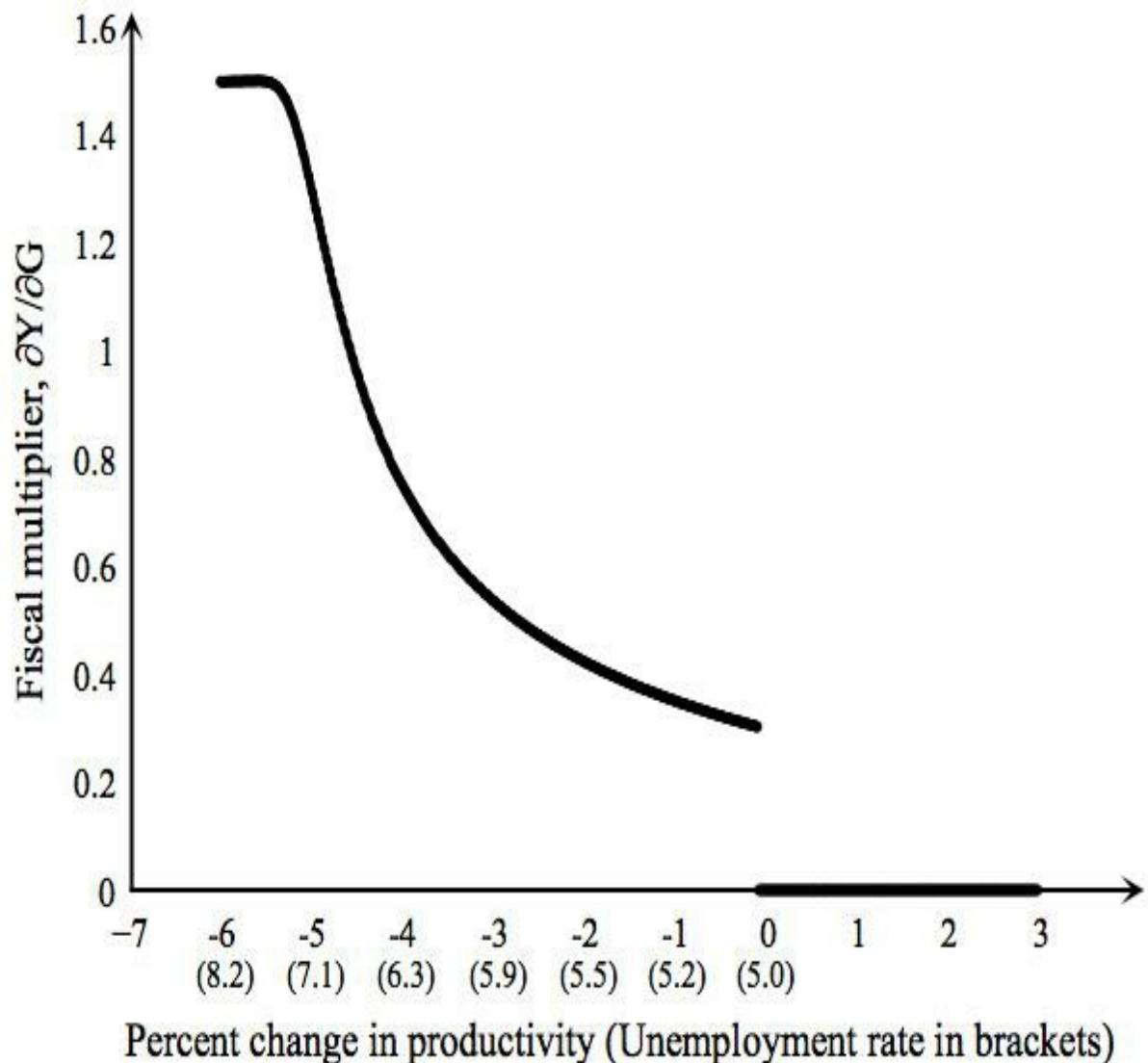
There are three important messages to take away from this graph.

- First, for positive or small negative values of the news shock, the multiplier is zero. The reason is straightforward: With only moderately pessimistic news, the nominal interest rate aptly adjusts to avert a possible liquidity trap, and a dollar spent by the government is simply a dollar less spent by someone else.

- Second, however, once the news is ominous enough, the economy falls into a liquidity trap. The multiplier takes a discrete jump up, and public spending unambiguously raises output. Yet, in a moderate crisis with an unemployment rate of 7% or less, private consumption is at least partly crowded-out.
- Lastly, however, in a more severe recession with an unemployment rate of around 8% or more, the multiplier rises to, and plateaus at, around 1.5. Government spending now raises both output and private consumption, and unambiguously improves welfare.

Conclusions

Pessimism and uncertainty about the future fuels fear, and fear is, as we know, a powerful thing.

- A gruesome outlook can set the economy on a downward spiral in which fear reinforces fear; thrift reinforces thrift; and unemployment rates are sent soaring.

But the same mechanisms that may cause a vicious circle can also be turned to our advantage.

- A tax- or debt-financed expansion in government spending raises output and sets the economy on a steeper path to recovery.

Pessimism is replaced by optimism and spending begets spending.

But these times are also fragile. Without a credible plan for financing, an increase in government spending will come at the price of debt. And a rise in debt may contribute to further rounds of pessimistic expectations. To be successful, therefore, the tax and spending policy advocated in this column must not magnify people's insecurities.

References

Barro, Robert (1974), "Are Government Bonds Net Wealth?", *Journal of Political Economy*, 82(6).

Christiano, Lawrence, Martin Eichenbaum, and Sergio Rebelo (2011), "When is the Government Spending Multiplier Large?", *Journal of Political Economy*, 119(1).

Cochrane, John (2009), "Are We All Keynesians Now?", *The Economist*.

DeLong, Bradford, and Lawrence Summers (2012), "Fiscal Policy in a Depressed Economy." Brookings, March.

Eggertson, Gauti B (2010), "What Fiscal Policy is Effective at Zero Interest Rates?", *NBER Macroeconomics Annual*, 25(1).

Federal Reserve Economic Data (FRED), Data, http://research.stlouisfed.org/fred2/

Haavelmo, Trygve (1945), "Multiplier Effects of a Balanced Budget", *Econometrica*, 13(4).

Mill, John S (1874), *Some Unsettled Questions of Political Economy*, London: Longmans, Green, Reader and Dyer.

Rendahl, Pontus (2012), "Fiscal Policy in an Unemployment Crisis", University of Cambridge Working Paper, February.

Chapter 13 The Open Economy Revisited: The Mundell-Fleming Model and the Exchange-Rate Regime

Fixed versus flexible exchange-rate regimes: Do they matter for real exchange-rate persistence?

Paul Bergin, Reuven Glick, Jyh-lin Wu

University of California at Davis; Federal Reserve Bank of San Francisco; National Sun-yat Sen University

For many observers, one central flaw of the Eurozone is that countries lose the ability to manipulate their exchange rates to suit their needs. But this article argues that flexible exchange rates are often more likely to make things worse than make things better.

Flexible exchange rates have been praised in economic theory as a mechanism for helping relative prices adjust between countries in response to shocks to relative supply and demand (Friedman 1953). In this view, fluctuations in the real exchange rate, measuring the relative cost of living across countries, are a welcome thing. However, an alternative explanation for fluctuations in the real exchange rate is the presence of shocks arising in the financial market that move the nominal exchange rate, which then are passed on to the real exchange rate due to sticky prices. Such real exchange-rate fluctuations would not promote economic adjustment to real economic shocks, but could instead be a source of economic disruption. In a classic contribution to the literature, Mussa (1986) offered evidence supporting this second view, documenting that the variance of the real as well as nominal exchange rate rose steeply after the Bretton Woods system of fixed exchange rates ended. Mussa used this evidence that short-run real exchange-rate volatility is affected by the nominal exchange-rate regime to argue in favour of nominal shocks as an important driver of real exchange rates. For if real exchange-rate fluctuations primarily reflect real shocks to economic fundamentals, then one might ask why a change in the nominal exchange-rate regime would raise its volatility.

Our latest paper provides a modern makeover for the empirical evidence of Mussa (Bergin et al. 2012). Recent research on real exchange rates has tended to focus on long-run dynamics, rather than the short–run volatility discussed by Mussa. In particular, a large body of literature has found that

it takes a remarkably long time for the real exchange rate to recover from a shock and return to its long run value. Estimates of the half-life of real exchange-rate adjustment typically range from three to five years for the flexible exchange-rate period since 1973. The combination of high real exchange-rate volatility and high persistence is referred to as the 'Purchasing-Power Parity Puzzle'.

The exchange-rate regime matters

Bergin et al. (2012) compare fixed versus flexible exchange-rate regimes in terms of their implications for the long run dynamics of the real exchange rate. Using data for twenty industrialized countries, we estimate the half-life of the real exchange rate in data during the fixed exchange period of Bretton Woods and the post-Bretton Woods period of flexible exchange rates. The paper finds that the puzzle of a long half-life found in previous studies for the flexible exchange-rate period does not apply to the fixed exchange-rate period. The half-life is roughly half as long as under the flexible exchange-rate regime.

This is illustrated by Figure 1 which shows the estimated impulse responses to a one standard deviation shock to the real exchange rate during the fixed and flexible regime periods. (This graph is computed using annual data and a specification with two lags.) A half-life can be computed as the amount of time it takes for the impulse response to decay to half of the maximum impact. The half-life rises from 2.7 years for fixed exchange rates up to 4.3 years for flexible exchange rates; for an alternative specification with one lag (not shown in the graph) the half-life rises from 2.3 years to 4.3. This finding reiterates the question of Mussa: if real exchange-rate fluctuations reflect real shocks to economic fundamentals, why would a change in the nominal exchange-rate regime raise its persistence?

Figure 1. Adjustment of the real exchange rate to a one std. dev shock
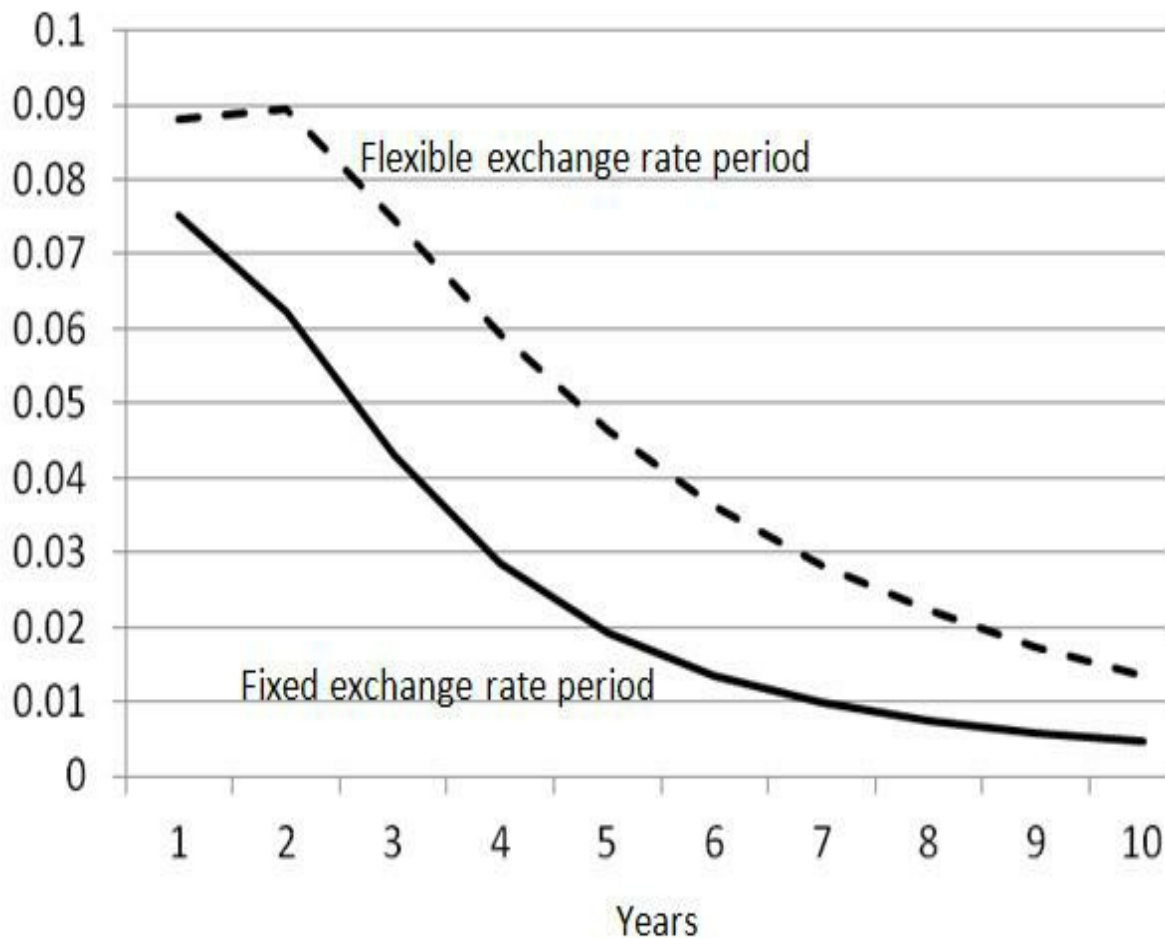
This finding also suggests a reinterpretation of the original finding of Mussa regarding volatility. The variance of the real exchange-rate data can be broken up into two components – the volatility of exogenous shocks and the persistence in the rate at which the effects of shocks die out. The finding indicates that approximately two thirds of the rise in variance as our sample countries moved from a fixed exchange-rate regime to the more flexible rate regimes can be attributed to a rise in the persistence at which shocks die out, rather than a rise in the variance of exogenous shocks, themselves. This finding underscores the importance of studying long-run dynamics and not just short-run volatility in isolation.

The finding also offers a way to reconcile the two parts of the longstanding PPP puzzle. Monetary models with sticky prices are good at explaining real exchange-rate volatility but not its persistence, whereas real models are good at explaining real exchange-rate persistence but not volatility. However the finding above indicates that the two facts are best viewed as complementary: a high level of persistence helps create a high level of variance in observed real exchange-rate data.

An explanation

Further analysis suggests an explanation for the finding that the persistence of real exchange-rate changes rises with a more flexible exchange-rate regime. Decomposing the real exchange rate into its two components – the nominal exchange rate and the ratio of domestic and foreign prices, Cheung et al. (2001) showed that shocks to the nominal exchange rate tend to be longer-lived than those to goods prices. In the present context, this suggests that when Bretton Woods ended and permitted exchange-rate shocks to become more prevalent, this changed the composition of shocks driving the real exchange rate, and raised the average level of persistence. We verify this interpretation of the data by estimating a two-variable panel vector error correction model of nominal exchange rate and relative prices. Price shocks are identified as movements in the price ratio not associated with a contemporaneous movement in the nominal exchange rate. The estimated half-lives become much more similar across regimes when conditioning on the nature of shocks: the half-live of real exchange-rate changes conditional on price shocks is 0.6 of a year for the Bretton Woods period and 0.5 year for the floating period; the half-live conditional on exchange-rate shocks is 2.4 for Bretton Woods and 3.6 for the floating period. Thus the higher average half-life of the real exchange rate observed since 1973 is attributable to the fact that exchange-rate shocks are more persistent than price shocks, and these shocks became more prevalent during the floating rate period.

Overall, one may conclude that the exchange-rate regime chosen by policymakers does matter. But policymakers may wish to worry more about exchange rates as a damaging source of disruption rather than a helpful mechanism of adjustment.

References

Bergin, Paul, Reuen Glick, and Jyh-li Wu (2012), "Mussa Redux and Conditional PPP", NBER Working Paper 18331.

Bergin, Paul, Reuven Glick, and Jyh-lin Wu (forthcoming), "The Micro-Macro Disconnect of Purchasing Power Parity", *Review of Economics and Statistics.*

Cheung, Yin-Wong, Kon Lai, and Michael Bergman (2004), "Dissecting the PPP Puzzle: The Unconventional Roles of Nominal Exchange Rate and Price Adjustments", *Journal of International Economics,* 64(1):135-150.

Friedman, Milton (1953), Essays in Positive Economics, University of

Chicago Press.

Mussa, Michael (1986), "Nominal Exchange Rate Regimes and the Behavior of Real Exchange Rates: Evidence and Implications", *Carnegie-Rochester Conference Series on Public Policy,* 25(1):117-214.

How will the new exchange rate regime affect the Chinese economy?

Barry Eichengreen, Andrew K Rose

University of California, Berkeley and CEPR

21 June 2010

China's announcement of greater renminbi flexibility was welcomed by US and European leaders. This column discusses new empirical research on what happens to economies when they exit exchange rate pegs that are resisting appreciation. Data from 27 cases suggest that growth slows but only modestly, and there is no evidence of economic and financial damage as a result – certainly nothing like the fears that China's next decade could look like Japan's lost decade.

China's announcement on 19 June that it will abandon its currency peg to the dollar and henceforth manage the renminbi more flexibly against a basket of currencies will have implications for the world economy, but most of all it will have implications for China (Evenett 2010). Assume that Beijing now allows the renminbi to appreciate. How will this affect the Chinese economy?

Some warn that there could be a sharp slowdown in Chinese growth, with adverse effects on the export sector and financial markets. They point to the appreciation of the yen in the 1970s and again in the 1980s, followed first by a sharp slowdown in Japanese growth and then a lost decade.

Others say that these fears are overblown. They note that the renminbi's appreciation in 2005-8 had little visible impact on Chinese exports and economic growth. The rebuttal here is that the currency's appreciation was so limited in duration and magnitude – the renminbi rose against the dollar by only 7% a year and even that was halted after 12 quarters – that it is not possible to draw general conclusions from this experience.

Moreover, the backdrop to the 2005 episode was special. The world economy was booming, and the Chinese economy itself was in an exceptionally strong position. This episode, it is objected, was *sui generis*.

It would be nice if we had a larger sample of analogous episodes from which to infer.

New research: Evidence from 27 upward peg exits

In a new paper, we ask what can be learned from other times and places about the likely effects of China now exiting its *de facto* pegged exchange rate regime in favour of renewed currency appreciation. It turns out that it is possible to construct a sample of other "exits up," although the resulting data set is relatively small.

We have identified 27 instances where a fixed peg was abandoned and the currency appreciated over the subsequent year either against the dollar or Special Drawing Rights. Many of these are clustered around the end of the Bretton Woods System in the early 1970s, although there are also a number of other episodes ranging from Equatorial Guinea in 1979 to Mozambique in 2004 and Malaysia in 2005. The average rate of appreciation in the first year is not too different from China's 2005-8 average of 7% (Eichengreen and Rose 2010).

What do we find?

The average annual rate of GDP growth slows by 1 percentage point between the five years preceding the exit and the five years following. But there is no growth collapse. Exiting up does not doom the economy to a Japanese-style lost decade.

More generally, we find little evidence of economic and financial damage as a result of exits up.

- There is no increase in the incidence of banking and financial crises.
- There is no evidence of significant stock market declines.
- There is no evidence of a significant deterioration in the current account.
- There is no evidence of a significant fall in the investment rate.

A variety of other economic and financial variables are similarly unaffected.

- While the rate of export growth slows from 9.5% to 5.5% per annum, the rate of import growth slows by nearly the same amount.

Because countries that exit up were growing faster than other countries in the five years preceding the policy change – by 1.5 percentage points per annum on average – it is hard to say whether the slowdown is a healthy

correction that avoids overheating or something more. One bit of evidence is that countries that exit up were also running higher inflation than other countries in that preceding period, consistent with the overheating view. Their inflation rate is about 5 percentage points higher, too big a difference to be explained away on Balassa-Samuelson grounds.

Why the growth slowdown?

So what accounts for the growth slowdown in a proximate sense? Since the rates of growth of exports and imports slow by the same amount, the answer is not the contribution of net exports. Nor are there significant changes in the rate of growth of investment and government spending. Rather, there is a significant slowdown in the growth of household consumption. With the country now exporting less, there is a decline in consumption of both imports and domestically-produced goods (all relative to their prior rates of growth). Again, this could be a healthy adjustment to more sustainable growth rates that avoids overheating. Or it could be that the slowdown could have been avoided entirely had the government boosted public consumption and taken measures, such as liberalising financial markets and developing the social safety net, to encourage household consumption.

What are the implications for China?

The experience of other countries gives little reason to think that an exit up will have seriously adverse consequences for the economy. But it points to the possibility of economic growth slowing. If the authorities wish to limit the risk of an excessive slowdown, they can maintain the level of public spending and redouble their efforts to foster the growth of private consumption. If more domestic spending means more spending on, among other things, imported goods, this will represent a Chinese contribution to global rebalancing.

References

Eichengreen, Barry and Andrew Rose (2010). "27 Up: The Implications for China of Abandoning its Dollar Peg," UC-Berkeley mimeo.

Evenett, Simon (ed) (2010). *The US-Sino Currency Dispute: New Insights from Economics, Politics and Law*, VoxEU.org eBook.

Don't over-sell the benefits of a change in the Chinese exchange-rate policy

Shang-Jin Wei

Graduate School of Business, Columbia University

29 October 2007

Those urging China to adopt a more flexible exchange-rate regime sell the policy advice on the ground that it will substantially speed up the adjustment of global current accounts and that it will also substantially enhance the effectiveness of China's domestic macroeconomic policies. Both supposed benefits may be exaggerated.

The Chinese renminbi (RMB) has come under intense scrutiny in the last four years, and calls for greater flexibility of its exchange rate have found receptive audiences amongst economists, politicians and the popular press. Many have advocated that China move to a more flexible exchange rate in order to alleviate global imbalances and improve its own macroeconomic management. But the benefits of an exchange-rate regime change for China and for the world may have been over-sold in policy circles. I say so on two grounds. First, the role of a flexible exchange-rate regime in facilitating current account adjustment may be vastly exaggerated. Second, the virtue of a flexible RMB exchange-rate regime in enhancing the effectiveness of China's macroeconomic stability may also be overrated.

Would a flexible exchange rate really speed up current account adjustment?

I ask this question not just due to the fact that a country's current account imbalance is the difference between its national savings and national investment, that the large US current account deficit is a reflection of its large saving deficit, and that the US bilateral deficit with China is only part of its overall deficit with the rest of the world. All these are true.

Beyond these, many economists and policy wonks take it as self-evident that a flexible exchange-rate regime must deliver a faster current account adjustment. Many IMF statements also reflect this supposition. There is in fact no systematic evidence supporting it. I call this a faith-based initiative, something widely assumed to be true and actively peddled to countries as

policy advice, but with little solid supportive evidence.

In a systematic analysis of this issue, Menzie Chinn and I find absolutely no support in the data for the notion that countries on a de facto flexible exchange-rate regime exhibit faster convergence of their current account to the long run equilibrium.1 This is true when we control for trade and financial openness; and this is true when we separate large and small countries.

To be sure, the current account does have a tendency to revert to its long-run steady state. This is clearly reflected in our empirical work. However, the speed of adjustment is not systematically related to the degree of flexibility of a country's nominal exchange-rate regime.

Should we be surprised by this finding? Perhaps not. The current account responds to the real exchange rate, not the nominal exchange rate. If the real exchange rate adjustment does not depend very much on the nominal exchange-rate regime, then the current account adjustment would not depend very much on the nominal exchange-rate regime either. Menzie Chinn and I therefore go on to check whether the nature of a country's nominal exchange-rate regime significantly affects the adjustment process of its real exchange rate. After looking at enough regressions, we conclude that the answer is no: the real exchange-rate adjustment is not systematically related to how flexible a country's nominal exchange-rate regime is. If anything, there is slight, but not very robust evidence that less flexible nominal exchange-rate regimes sometimes exhibit faster real exchange-rate adjustment.

Just to be clear, if one could engineer a real appreciation of the renminbi, it could have some effect on China's trade or current account balance. Indeed, in a separate research project that I am doing with Caroline Freund and Chang Hong, using China's bilateral trade data and separating processing from non-processing trade, we find evidence that bilateral trade volume clearly responds to changes in bilateral real exchange rate, especially for non-processing trade.2 But a more flexible exchange rate does not promise a faster current account adjustment or resolution of global current account imbalances.

If China does opt for a more flexible exchange-rate regime today, its real exchange rate will most likely appreciate on impact. However, given China's still-shaky financial sector and the credit crunch in advanced economies, it is certainly possible for the real exchange rate to go the other direction the day after tomorrow. After all, today's expectation of an RMB

undervaluation is a relatively recent phenomenon, emerging in late 2003. As clearly shown in Figure 1, taken from a paper with Jeffrey Frankel, until October 2003, the market actually expected a RMB depreciation, as measured by the non-deliverable forward rate.3 But the expectation shifted in late 2003 when US officialdom and scholars at prominent think tanks started to up the volume in the call for an RMB revaluation.

Figure 1 Spot and forward rates of USD/RMB

Spot and Forward Rates of USD/RMB
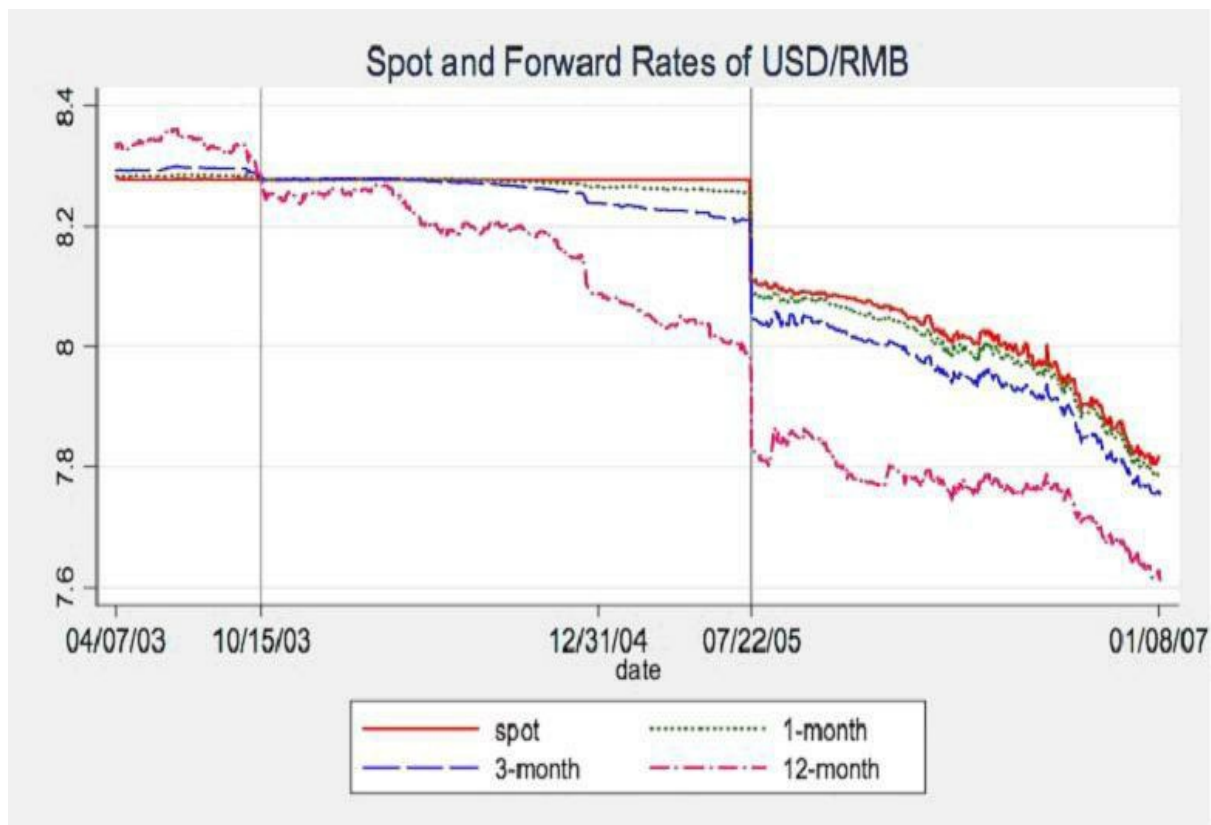
The very high speed of China's foreign reserve accumulation really took off within the last four years, as seen in Figure 2. It may very well be responding to a shift in market expectation on the RMB movement, or at least the reserve accumulation and the exchange rate speculation feed on each other. However, if it took only four years for China's FX reserve to triple in value, it may take only another four years for it to lose 60% of the value once the exchange rate expectation starts to reverse itself. Economic history books are full of examples of seemingly sudden shifts in market sentiment. A tight credit market in developed countries, such as the one we are seeing today, has in the past engendered a reversal of global capital flows, and a concomitant shift in the valuation of emerging market currencies.

Figure 2 China's current account and foreign reserves, 1985-2006 (%

GDP)

China's Current Account and Foreign Reserve, 1985-2006 (% GDP)
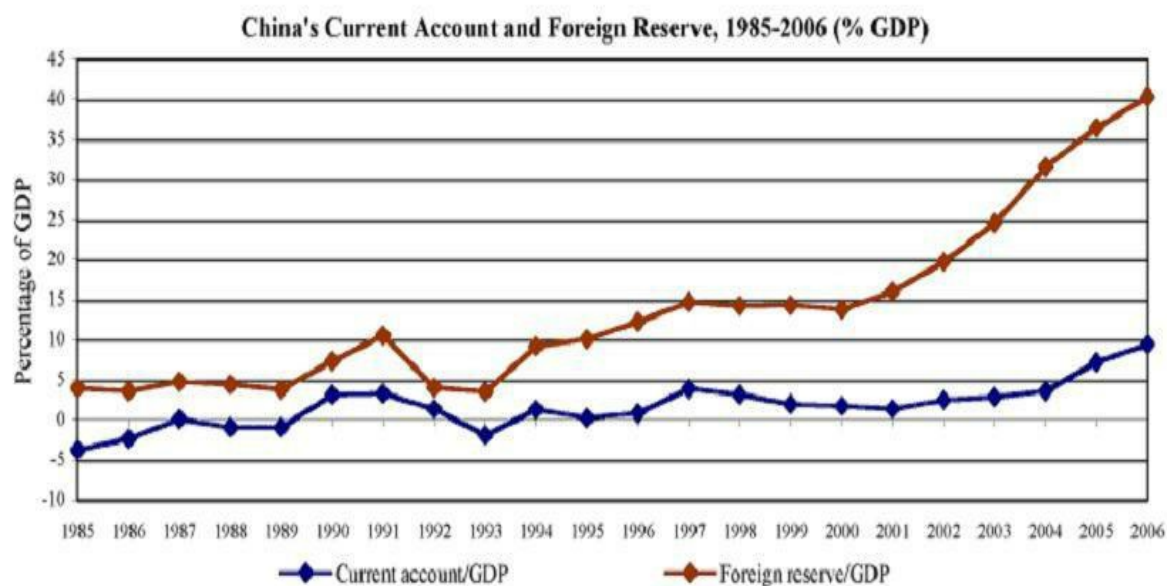
Would a flexible regime vastly improve the effectiveness of China's macro policies?

To appeal to China's self-interest, advocates of a more flexible exchange-rate regime say it will greatly enhance the effectiveness of China's domestic macroeconomic policy. A more flexible regime, as the logic goes, would free the domestic interest rate to serve as an instrument for domestic macroeconomic stability, and may benefit other policy objectives as well, such as financial reform and addressing future shocks. While I agree that a shift to a more flexible exchange-rate regime is a net positive for China, I would caution that the benefits of doing so for China should not be overrated.

First, China's current monetary policy still has room for maneuver. Fundamentally, China's capital controls, while leaky, are binding at the margin. The gap between lending and deposit rates can be widened further. The required reserve ratio might also be raised if desired.

Second, China's fiscal policy still has room for maneuver. True, there are a lot of contingent liabilities that should and may show up on the country's balance sheet. On the other hand, state-owned firms collectively are making a profit that is not currently counted in the government budget. The state may require these firms to pay up more dividends to augment existing fiscal management tools.

Third, to the extent that the de facto dollar peg constrains the conduct of

China's monetary policy, it may not be a bad thing. The most important goal of a good monetary policy is to maintain price stability. The de facto peg to the US dollar has served China well – beyond its role in promoting exports – as it has provided an anchor for its monetary policy. Once the country switches to a substantially more flexible exchange-rate regime, it will by definition lose this nominal anchor. One might prescribe an inflation targeting framework. But one could question how faithfully China will follow such a framework.

China's recent monetary history has clear bouts of double-digit inflation, as shown in Figure 3. So resisting political pressure to deviate from maintaining price stability isn't necessarily a strong suit for the central bank. The current leadership at the Central Bank, Governor Zhou Xiaochuan and his deputies, happens to be superb. But leadership at the central bank could change, and a look at the recent history doesn't inspire absolute confidence that an inflation-targeting framework will be faithfully followed. So a less stable domestic price is a risk that cannot be easily ruled out if and when the country shifts to a more flexible exchange-rate regime.

Figure 3 China's CPI inflation, 1987-2006
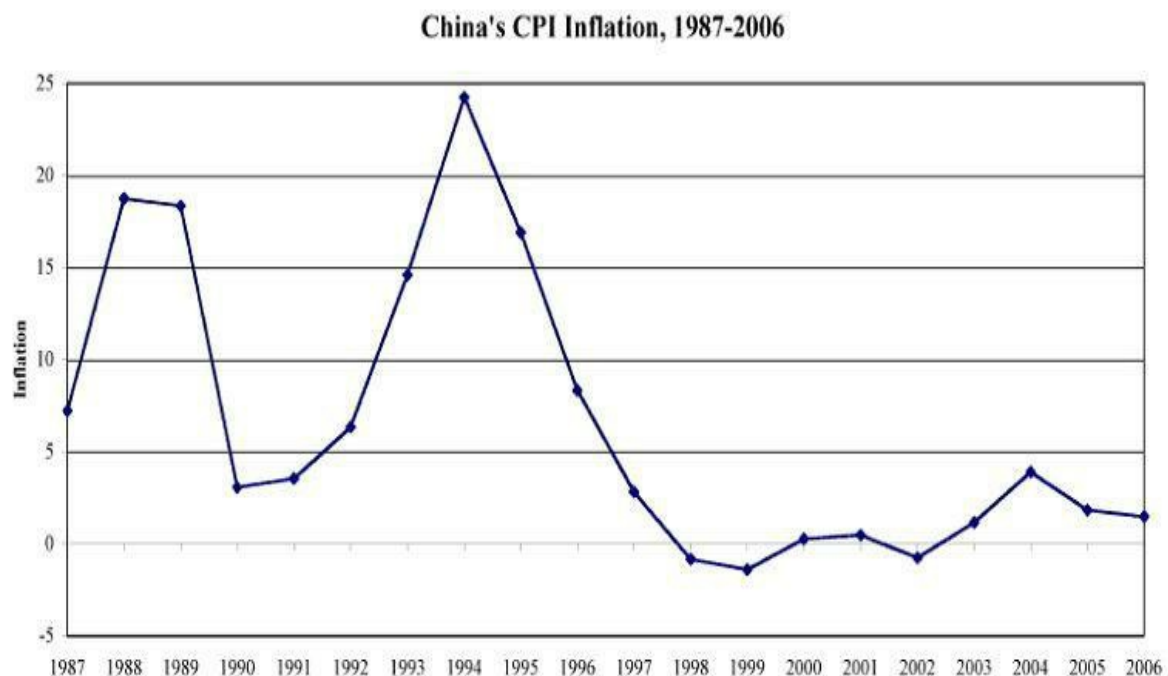
Conclusion

I have stressed two points. First, the notion that a flexible exchange-rate

regime would facilitate a faster current account adjustment is in fact not well supported by empirical evidence. Second, the virtue of a flexible exchange-rate regime in enhancing the effectiveness of China's macroeconomic policy may also be overrated.

I still think that the benefits of moving to a more flexible exchange-rate regime likely outweigh the costs for China. On the other hand, China faces many challenges in its economy, including environmental degradation, rising income inequality, pervasive corruption, mining production safety, food production safety, and a constant threat of massive unemployment, to name just a few. In the grand scheme of things, when ranking all the reforms to do on the basis of benefit to cost ratio, how much priority this particular reform – the shift of the exchange-rate regime - should be given is a separate question.

References

Chinn, Menzie and Shang-Jin Wei (2007), "Faith-based Initiative: Do We Really Know that a Flexible Exchange Rate Regime Facilitate Current Account Adjustment?" University of Wisconsin, Madison and Columbia University.

Freund, Caroline, Chang Hong, and Shang-Jin Wei (2007), "Bilateral Exchange Rates and Bilateral Trade Balance," International Monetary Fund and Columbia University.

Frankel, Jeffrey, and Shang-Jin Wei (2007), "Assessing China's Exchange Rate Regime," *Economic Policy*. A longer version is available as NBER Working Paper 13100 (May 2007).

Chapter 14 Aggregate Supply and the Short-run Tradeoff Between Inflation and Unemployment

Farewell to the natural rate: Why unemployment persists

Roger E. A. Farmer

UCLA, Bank of England and CEPR

6 January 2010

Most policymakers subscribe to the existence of a natural rate of unemployment. This column provides a visual history of unemployment, vacancies, and inflation in the US and says there is no natural rate. It suggests the economy can rest in any equilibrium on the Beveridge curve, as decided by the confidence of households and firms that pins down asset values.

Is the new-Keynesian approach (Clarida, Galí, and Gertler 2000) right? Here I suggest that US data on inflation, unemployment, and vacancies is best viewed through the lens of old-Keynesian theory.

A dynamic (literally) description of the data

Here I provide a video of data that illustrates how events unfolded in real time. I proceed to connect these data with three strands of research.

- Empirical work with Andreas Beyer (Beyer and Farmer 2007) on the non-existence of a natural rate of unemployment.
- Theoretical models (Farmer 1988a, 1988b) in which I showed that layoffs are more likely when firms hold less cash.
- Recent work (Farmer 2010a, 2010b) that provides theoretical models in which there is a continuum of equilibrium unemployment rates.

The history of unemployment, vacancies, and inflation in the US

There have been ten recessions in the US since WWII. Most of them lasted for less than a year. The average post-war expansion lasted for five years. In some of the post-war expansions, unemployment returned to its previous trough well before the end of five years, but in others it never fully recovered. The evidence suggests that recessions have permanent

effects on the unemployment rate. Without exception, every post-war recession was ended by government action as the Fed lowered the interest rate to stimulate demand.

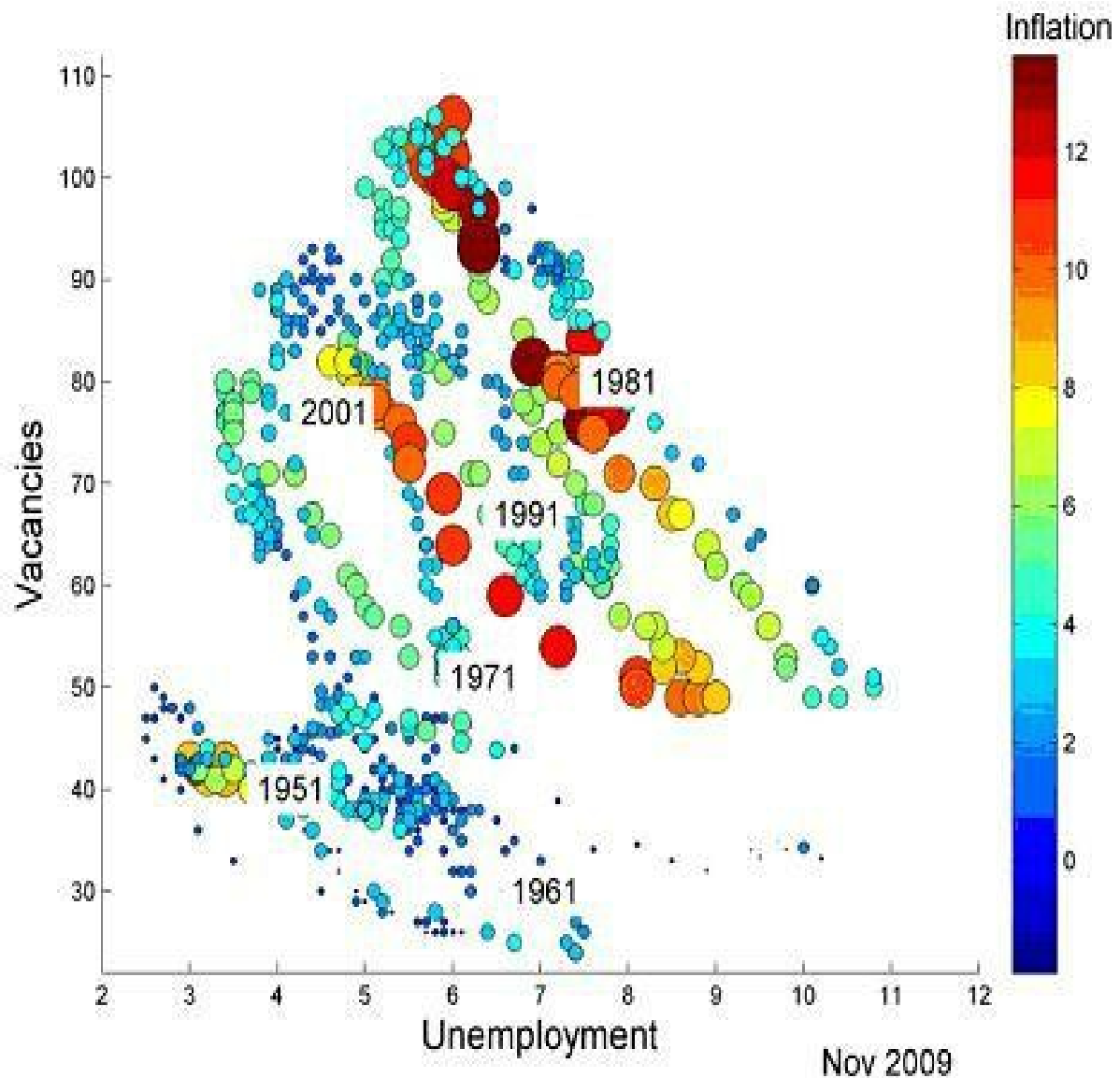**Figure 1.** US unemployment and vacancies, 1951 – 2009

Figure 1 shows the relationship between unemployment and vacancies in the US from January 1951 through November of 2009 – the so-called "Beveridge curve". It also represents inflation in each month by the size and colour of each point. A large red circle represents high inflation; a small blue dot is low inflation. The colour bar on the right of the graph represents inflation rates from -1% to +13% by intensity of colour from dark blue to deep red. Click here to watch the data's evolution over time.

Notice that between 1951 and 1980, the Beveridge curve shifted out to the

right. During this same period, inflation built up, peaking in the early 1980s at 13%. In August of 1979, Paul Volcker took over as chairman of the Fed, and US monetary policy changed dramatically. The Fed moved to a policy of targeting the rate of growth of the money supply, narrowly defined, and the interest rate shot up overnight.

The effect was to induce a severe recession that brought inflation under control. The Beveridge curve drifted back slowly down and to the left and by November of 2009, the trade-off between vacancies and unemployment was close to where it had been in the 1950s.

Is there a natural rate of unemployment?

In a joint paper with Andreas Beyer, we studied the behaviour of unemployment, inflation, and the interest rate in US data before and after 1980 (Beyer and Farmer 2007). In that study we found evidence that, once these data are transformed by mapping them into an unbounded interval, they are each individually non-stationary. The data are connected by two co-integrating relationships that differ before and after 1980.

One co-integrating relationship is stable over the two sub-periods. It is an upward sloping relationship between unemployment and inflation – a Phillips curve. The second breaks in 1980. It is a relationship between unemployment, inflation, and the interest rate that we interpreted in that paper as a policy rule.

Our finding of an upward-sloping Phillips curve at low frequencies is reflected in Figure 1 by the outward drift of the Beveridge curve as inflation increases and the backward shift as it falls. Our finding of different low frequency relationships between inflation, the interest rate, and unemployment before and after 1980 confirms the findings of Clarida et. al. (2000), Lubik (2000), and Schorfheide (2004), who also interpret these relationships as a shifting policy rule.

Why did the Beveridge Curve shift?

The data from Figure 1 suggest that the relationship between unemployment and inflation is more complicated than that suggested by simple new-Keynesian models that incorporate a "natural rate" of unemployment.

The most prominent theory of the natural rate of unemployment is that of search theory. According to this theory, the process by which a worker finds a job can be represented by a technology that uses resources. The search technology uses two inputs. The first is the time spent looking for a

job by an unemployed worker. The second is the resources spent by a firm posting a vacancy. Figure 1 suggests that there is a third input.

Variations in the inflation rate change the real trade-off between vacancies and unemployment. When inflation is high, it takes more unemployment and more vacancies to fill a job. The obvious candidate for the missing input is liquidity, represented by holdings of cash balances by firms. In two articles in 1988 (Farmer 1988a, 1988b) I showed that, when firms have cash on hand, they are less likely to need to lay off workers. When inflation increases, it becomes more costly to keep liquid assets, and, as a consequence, firms are more likely to lay off workers when demand falls.

Keynesian economics redux

In two forthcoming books, *Expectations Employment and Prices* (2010a) and *How the Economy Works* (2010b), I provide a theory that explains these data. I argue that there is no natural rate of unemployment and that the economy can come to rest in a stationary equilibrium at any point on the Beveridge curve. Which equilibrium persists, is decided by the confidence of households and firms that pins down asset values as reflected in housing wealth and the value of the stock market.

When households feel wealthy, that belief is self-fulfilling. Consumers spend a lot, firms hire workers, and the economy comes to rest at a point on the Beveridge curve with low unemployment and high vacancies. When the values of houses, factories, and machines fall, households spend less, firms lay off workers, and the economy comes to rest at a point on the Beveridge curve with high unemployment and low vacancies. Both situations – and anything in between – are zero-profit equilibria. High inflation makes the trade-off between unemployment and vacancies less favourable, and in the steady state, any inflation rate is consistent with any unemployment rate.

Policy implications

Most policymakers subscribe to the theory of the existence of a natural rate of unemployment. The data suggest that this theory is unconfirmed at best. To make the theory consistent with data, one must posit that the natural rate changes between recessions in unpredictable ways. This version of natural rate theory is difficult or impossible to refute. It is religion, not science.

For more than fifty years policy makers have been trying to hit two targets, unemployment and inflation, with one instrument, the interest rate.

Recently, central bankers have discovered a second instrument – quantitative easing. I believe that quantitative easing works by influencing the value of real assets as reflected in housing wealth and the stock market and that it was successfully deployed by central banks in 2009 to maintain aggregate demand. In my two forthcoming books, I argue that quantitative easing should permanently enter the lexicon of central banking as a second instrument of monetary policy and that it will prove to be a more effective and flexible tool than fiscal policy for restoring and maintaining full employment.

References

Beyer, Andreas and Roger E. A. Farmer, (2007). "Natural Rate Doubts," *Journal of Economic Dynamics and Control*, 31, pp. 727—825.

Clarida, Richard, Jordi Galí and Mark Gertler (2000). "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics* 115, pp 147—180.

Lubik, Thomas A. and Frank Schorfheide, (2004). "Testing for Indeterminacy: An Application to U.S. Monetary Policy," *American Economic Review* 94, pp. 190—219.

Farmer, Roger E. A., (1988a). "What is a Liquidity Crisis," *Journal of Economic Theory*, vol. 46 # 1, pp. 1–15.

Farmer, Roger E. A., (1988b). "Money and Contracts," *Review of Economic Studies*, vol. 55 pp 431–446.

Farmer, Roger E. A., (2010a). *Expectations Employment and Prices*, Oxford University Press, Oxford.

Farmer, Roger E. A., (2010b). *How the Economy Works: Confidence, Crashes and Self-Fulfilling Prophecies*, Oxford University Press, Oxford.

# Immigrants help improve the output-inflation trade-off

Samuel Bentolila, Juan Dolado and Juan Francisco Jimeno

CEMFI and CEPR; Universidad Carlos III de Madrid and CEPR; Bank of Spain and CEPR

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Spain's inflation-less drop in unemployment is due in large part to its immigration boom. If immigrants' labour-supply behaviour comes closer to that of natives and inflation remains above target, a deeper slowdown or increasing immigration flows will be needed to bring it down.

Until the mid-1990s, Spain was seen as the paradigm of high unemployment among developed countries. But things have changed considerably. From 1995 to 2006, the unemployment rate has fallen by 15 percentage points, from 22% to 8%, while inflation remained subdued around 3.5%. Thus, as depicted in Figure 1, there have been remarkable changes in the Spanish Phillips curve, which has shifted dramatically inwards while becoming almost flat. It is well known that these trends have been shared by other economies, notably the US, in the context of what Chairman Bernanke has termed the "Great Moderation". However, the fall in Spanish unemployment has been much more pronounced than elsewhere – 12.5 points larger than the average 2.5 percentage-point drop in the Euro area – while inflation has remained stable being one percentage point higher than the Euro-area average.
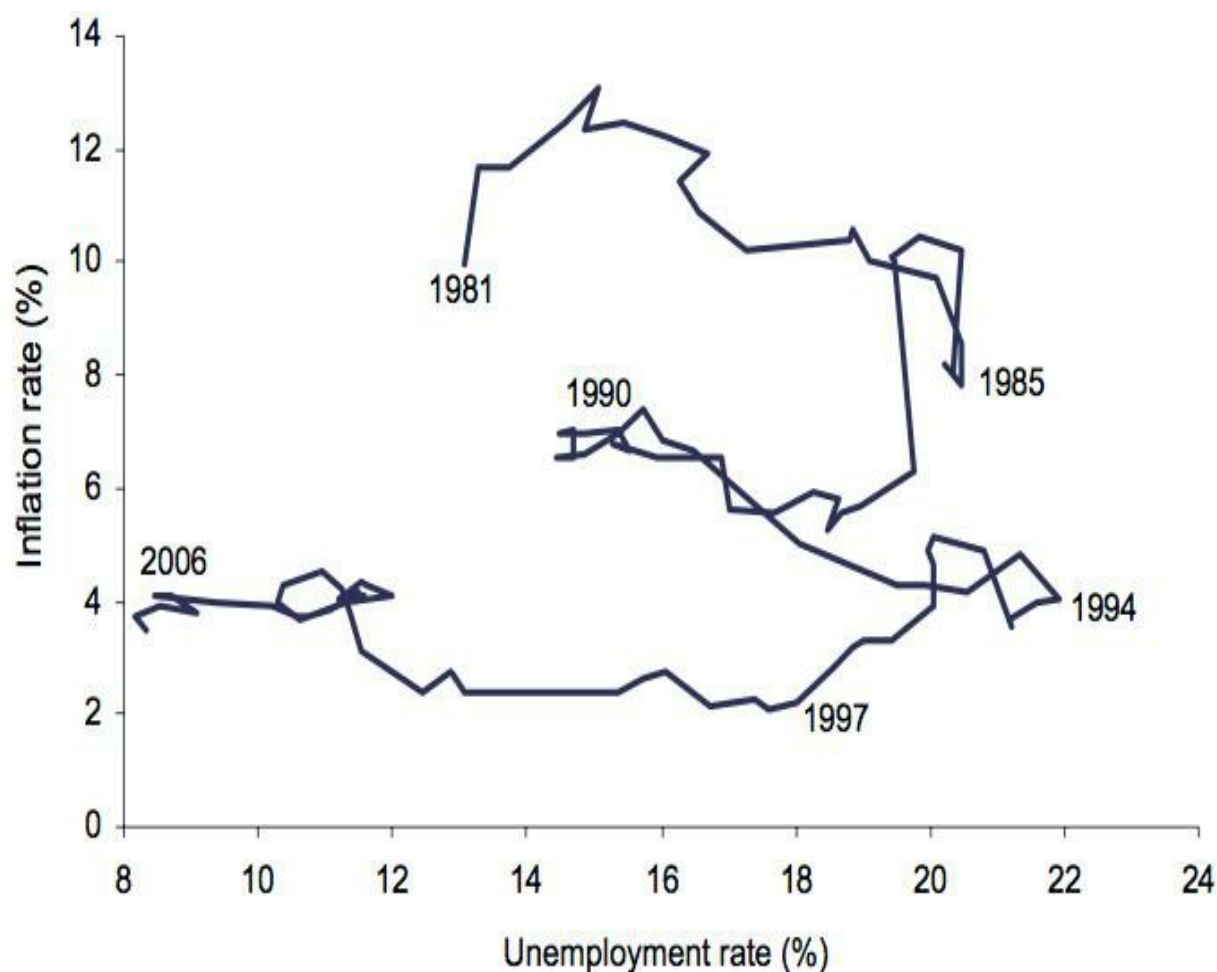
Most of the standard stories proposed to explain the shifts of the Phillips curve in other countries do not fare well when analysing the Spanish case. First, while structural unemployment (the NAIRU) has clearly fallen, it is difficult to identify key labour or product market reforms, relative to those implemented in other economies, which could explain such a favourable evolution. Next, one of the most popular explanations for the improved inflation-unemployment tradeoff in the US – namely a rise in productivity growth when workers have backward-looking real-wage aspirations (Ball and Moffitt, 2002) – does not fit the Spanish experience either. Indeed, over the last decade, productivity growth has fallen in Spain, being among the lowest in the EU. Likewise, arguments based on the effects of increasing trade openness are unable to explain why equally large shifts in the Phillips curve have not taken place in other EU countries subject to the same trade integration and global competition patterns. Finally, a common monetary policy probably has contributed to the flattening of the Phillips curve, as low inflation expectations became better anchored. Still, why inflation did not surge vis-à-vis the Euro area in the face of such a large reduction in unemployment remains puzzling.

Somewhat surprisingly, none of the available studies dealing with the evolution of the Spanish Phillips curve have addressed the role played by the most fundamental change affecting the Spanish labour market during this period, namely the immigration boom that has taken place since the mid-1990s. As explained in a recent Vox column by one of us, while the proportions of foreigners in the Spanish population and labour force hardly reached 1% in 1995, they have since soared to about 10% and 14%, respectively. [1]Thus, it seems worthwhile exploring whether this phenomenon can provide the missing piece in the puzzle.

In a recent CEPR Discussion Paper, we analyse the consequences of immigration for the joint behaviour of unemployment and inflation.[2] So far, this topic has drawn little attention in the literature on the Phillips curve, the exceptions being the theoretical contributions by Razin and Binyamini (2007) and Engler (2007), where it is shown that higher migration flows can induce a flatter Phillips curve by changing both the aggregate labour supply and labour demand elasticities. Our approach stresses several labour-market channels through which immigration can affect inflation. In effect, to the extent that wages are differently determined for natives and immigrants –for instance, if immigrants are less well represented by unions than natives– or insofar as the marginal rate of substitution between consumption and leisure is different for each group – immigrants tend to be more mobile and more willing to take low-paid jobs than natives – expected real marginal costs of producing output can fall as immigration increases, leading to lower inflation for a given unemployment rate than in the absence of foreign workers.

In the seminal work by Galí and Gertler (1997) on the foundations of the so-called New Keynesian Phillips curve, when firms can only reset prices infrequently, the present discounted value of future real marginal costs faced by price-setting firms is the key determinant of inflation. In a competitive labour market, this effect is captured by the expected evolution of the labour share of GDP. However, this does not describe the Spanish labour market, where real wage rigidities are present in the wage-setting process through indexation. By considering a New Keynesian Phillips curve where real wages are sluggish, as in Blanchard and Galí (2007), we find that the conventional specification of the expectations-augmented Phillips curve (where current inflation depends on future and lagged inflation plus the unemployment rate and imported inflation) can be recovered. By distinguishing between native and immigrant workers – which are assumed to be imperfect substitutes with different preferences

towards consumption and leisure, and different bargaining power (lower for immigrants) in non-competitive labour markets – two new variables play a role in explaining the short-run inflation-unemployment trade-off: the gap between the unemployment rates of the two types of workers and the immigration rate in employment.

The intuition behind these effects is as follows. First, insofar as the unemployment rate of immigrants is higher than that of natives (a realistic assumption supported by the evidence, see Figure 2) and as long as the former have a more inelastic labour supply than the latter (immigrants have higher participation rates), immigration reduces the expected real marginal cost faced by firms. Think of a negative labour demand shift: wages will fall more the less elastic labour supply is, leading to lower inflationary pressure. Further, given a lower bargaining power than natives, a higher unemployment rate among immigrants leads to lower wage markups. Of course, the opposite would happen if, in the future, the unemployment rate of immigrants fell below that of natives, as long as their labour supply remained less elastic. Finally, it can be shown that the size of these two effects hinges on the immigration rate in the economy: the higher the immigration rate, the larger the inflation reduction brought about by the unemployment rate gap. In other words, these effects on the real marginal cost will be larger in economies with rapidly increasing immigration rates, as in Spain.

Unemployment rate of natives (%) ——— Unemployment rate of immigrants (%)
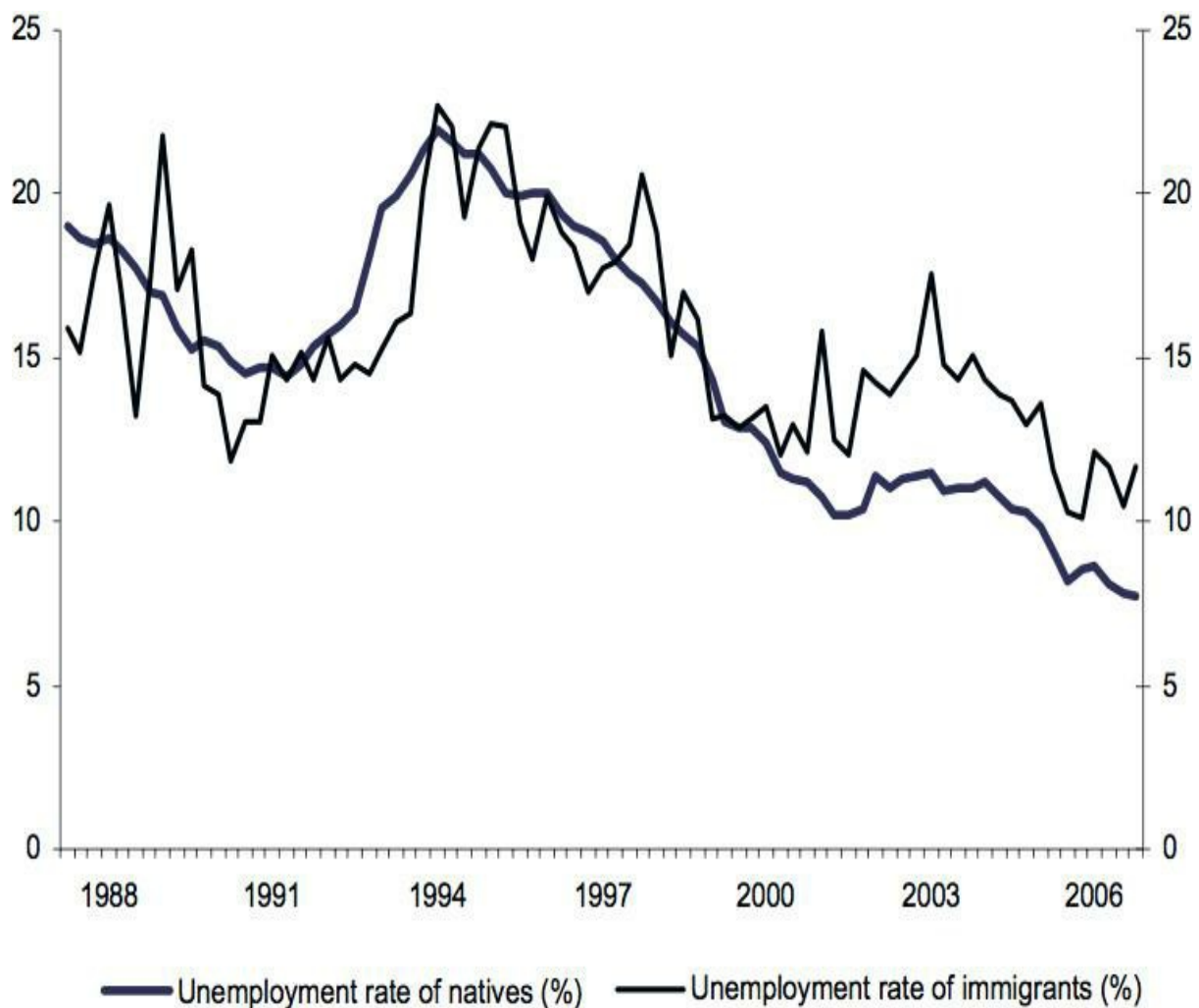
Taking this new specification of the New Keynesian Phillips curve to the Spanish data, we find both an excellent fit and sensible results in terms of the size and the sign of the effects associated to the determinants of inflation –much better than with the standard specification. We calibrate alternative counterfactual scenarios to examine what would have happened if the immigration boom had not existed. Our results are striking: (i) the slope of the Phillips curve would have been almost four times steeper; (ii) the intercept would have been higher by about half a percentage point per year, and (iii) the average annual inflation rate would have been 2.2 percentage points higher. To these labour market effects, one could add the moderating effects of immigrants on inflation through their direct effect on product markets, as recently shown by Lach (2007), who stresses their role as "new consumers" with higher price elasticities and lower search costs than natives.

Overall, these results reveal that the inward shift and the flattening of the Phillips curve due to immigration imply that demand shocks and policy

mistakes do not show up in large movements of inflation as long as immigrants take time to integrate. Although it is too early to detect such evolution in the case of Spain, if immigrants' labour supply comes closer to that of natives and inflation remains above target, a deeper slowdown or increasing immigration flows will be needed to bring it down.

References

Ball, L. and R. Moffitt (2002), "Productivity Growth and the Phillips Curve", in A. Kruger and R. Solow (eds.) *The Roaring Nineties: Can Full Employment Be Sustained?,* Russell Sage Foundation.

Blanchard, O. and J. Galí (2007), "Real Wage Rigidities and the New Keynesian Model", *Journal of Money, Credit, and Banking* (forthcoming).

Engler, P. (2007), "Gains from Migration in a New-Keynesian Framework", mimeo, Free University of Berlin.

Galí, J. and M. Gertler (1999), "Inflation Dynamics: A Structural Econometric Analysis", *Journal of Monetary Economics* 44, 195-222.

Lach, S. (2007), "Immigration and Prices," *Journal of Political Economy* 115, 548-587.

Razin, A. and Binyamini (2007), "Flattening of the Short-run Trade-off between Inflation and Domestic Activity: The Analytics of the Effects of Globalization", mimeo, Tel Aviv University.

2 Bentolila, S., Dolado, J. and JF Jimeno (2007) "Does immigration affect the Phillips Curve?. Some Evidence from Spain" CEPR. DP. 6604

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[1] Juan Dolado, "The Spanish approach to immigration", http://www.voxeu.org/index.php?q=node/332.

[2] Bentolila, S., Dolado, J. and JF Jimeno (2007) "Does immigration affect the Phillips Curve?. Some Evidence from Spain" CEPR. DP. 6604.

Part V: Topics in Macroeconomic Theory

Chapter 15 A Dynamic Model of Aggregate Demand and Aggregate Supply

Is the Phillips curve alive and well after all? Inflation expectations and the missing disinflation

Olivier Coibion, Yuriy Gorodnichenko

UT Austin; University of California, Berkeley

During the Great Recession, advanced economies have not experienced the disinflation that has historically been associated with high unemployment. This column shows that using consumers' (as opposed to forecasters') inflation expectations restores the traditional Phillips curve relationship for recent years. Consumers' inflation expectations are more responsive to oil prices than those of professional forecasters. The increase in oil prices between 2009 and 2012 may in fact have prevented the onset of pernicious deflationary dynamics.

"*Prior to the recent deep worldwide recession, macroeconomists of all schools took a negative relation between slack and declining inflation as an axiom. Few seem to have awakened to the recent experience as a contradiction to the axiom.*" (Bob Hall, 2013.)

"*The surprise [about inflation] is that it's fallen so little, given the depth and duration of the recent downturn. Based on the experience of past severe recessions, I would have expected inflation to fall by twice as much as it has.*" (John Williams, 2010.)
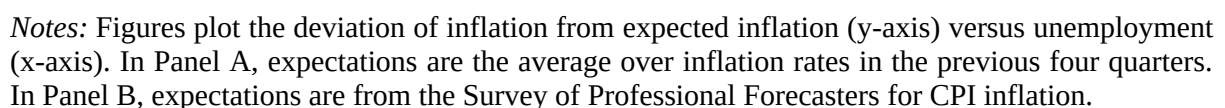
According to the Phillips Curve, which links inflation and unemployment, advanced economies should have experienced severe disinflation – perhaps even deflation – in recent years. Such an outcome would not have been unprecedented.

- During the Great Depression, the US experienced devastating levels of deflation – more than 10% per year in 1932.
- Japan was mired in borderline deflation territory from the mid-1990s to the mid-2000s after its real-estate and stock-market bubbles popped in the early 1990s.

However, advanced economies have experienced little decline in inflation since the financial crisis of 2008–2009. Is the Phillips curve (Phillips

1958) broken?

Panel A of Figure 1 documents this 'missing disinflation' using an expectations-augmented Phillips curve, by plotting quarterly unemployment rates against the deviation of inflation from expected inflation, where the latter are modelled as 'backward-looking' – an average over the last four quarters' inflation rates. The period from 2009 to 2011 stands out relative to the 1960–2007 pattern, with deviations of inflation from expected inflation being systematically higher over the recent period than one would have expected given the high levels of unemployment.

Figure 1 The missing disinflation in the US

Notes: Figures plot the deviation of inflation from expected inflation (y-axis) versus unemployment (x-axis). In Panel A, expectations are the average over inflation rates in the previous four quarters. In Panel B, expectations are from the Survey of Professional Forecasters for CPI inflation.

Explanations

Economists have proposed a number of explanations, but we argue that none are sufficient to explain the full extent of the inflation experience (Coibion and Gorodnichenko 2013). For example, the 'anchored expectations' hypothesis of Bernanke (2010) – that is, the credibility of modern central banks has convinced people that neither high inflation nor deflation are likely outcomes, thereby stabilising actual inflation outcomes through expectational effects – can only go some way in accounting for the absence of more significant disinflation between 2009 and 2011. Panel B of Figure 1 above, for example, illustrates that the missing disinflation is still present even when we condition on the 'anchored' expectations of

professional forecasters.

Explanations based on the long-term unemployed having smaller effects on wages (Llaudes 2005) or downward wage rigidity preventing wages from falling as much as in prior downturns (Daly et al. 2012) imply that the missing disinflation in prices should have been accompanied by a missing disinflation in wages – a feature which we show is noticeably absent in the data.

Others have pointed to a flattening Phillips curve (IMF 2013), but no structural changes in the economy can account for large changes in the slope of the Phillips curve, and the quantitative effects of the estimated changes in the slope are themselves insufficient to account for much of the missing disinflation. This inability to explain the missing disinflation within the context of the Phillips curve has led some to conclude that this framework may have outlived its usefulness.

New research

We propose a novel explanation for the missing disinflation that remains fully within the context of traditional Phillips curve analysis (Coibion and Gorodnichenko 2013). We show that an expectations-augmented Phillips curve – using household inflation expectations as measured by the Michigan Survey of Consumers – can account for the absence of strong disinflationary pressures since 2009.

The primary reason for the success of a household inflation expectation-augmented Phillips curve is simple:

- Household inflation expectations experienced a sharp increase starting in 2009, rising from a low of 2.5% to around 4% in 2013;
- Other measures of inflation expectations, such as those from financial markets or professional forecasters, have hovered in the neighbourhood of 2% over the same period.

We illustrate these facts in Figure 2 below. Panel A plots the evolution of household inflation expectations, which experienced unusual increases relative to professional forecasts of inflation and inflation forecasts from asset markets during each run-up in oil prices – from 2003 to 2008, and again from 2009 to 2012. Panel B plots the expectations-augmented Phillips curve using household inflation expectations – the slope of the Phillips curve is stable over time, and the rise in household expectations since 2009 can fully account for the missing disinflation.

Figure 2 Household inflation expectations and the missing disinflation
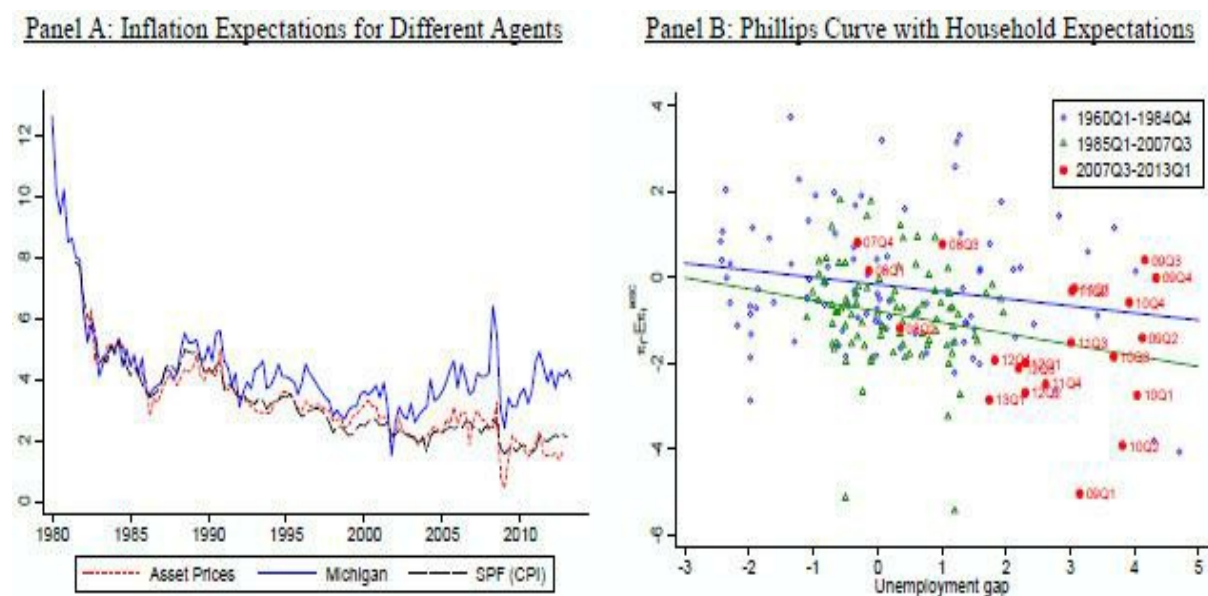
Notes: Panel A plots inflation forecasts from the Michigan Survey of Consumers and inflation forecasts from asset prices and the Survey of Professional Forecasters. Panel B plots the expectations-augmented Phillips curve with household inflation expectations – deviation of CPI inflation from expected inflation (y-axis) vs. deviation of unemployment from CBO estimate of natural rate (x-axis).

Why focus on the expectations of households in the context of the Phillips curve, since the latter is meant to capture the pricing decisions – and therefore expectations – of firms?

- First, there is no quantitative measure of firm inflation expectations available in the US.

This means the question of how firms form their inflation expectations – and what may be the best proxy for them – is ex-ante ambiguous.

- Second, we present new empirical evidence from estimated Phillips curves in the pre-Great Recession period that household forecasts are likely to be a better proxy for firm forecasts than either professional or backward-looking forecasts.

Regressions which include both household and professional forecasts systematically point to a larger role for household forecasts than other measures of inflation expectations.

- Third, we present preliminary results from an ongoing survey of

firms' inflation expectations in New Zealand, and show that their properties resemble those of households more than professional forecasts – with relatively high levels of forecasted inflation and very high dispersion of forecasts across firms.

Thus, the available evidence is consistent with the use of household inflation forecasts as a proxy for firm forecasts of inflation in the Phillips curve.

The salience of oil prices

We then consider the source of the rise in household inflation expectations relative to the forecasts of professional forecasters since 2009, which is the main feature of the data which accounts for the missing disinflation. More than half of the historical differences in inflation forecasts between households and professionals can be accounted for by the level of oil prices, and the rise in oil prices since 2009 can fully account for the increase in household inflation expectations since then.

Why would households adjust their inflation forecasts more in response to oil price changes than professional forecasters? With gasoline prices being among the most visible prices to consumers, a natural explanation is that households pay particular attention to them when formulating their expectations of other prices. Consistent with this notion, we document using micro-data from the Michigan Survey of Consumers that individuals who spend more money on gasoline (in dollar terms) – and therefore frequent gas stations more often – adjust their inflation forecasts more in response to oil-price changes than do individuals who spend less money on gasoline.

Our suggested explanation for the missing disinflation has several appealing properties.

- First, it fits naturally within the Phillips curve framework.
- Second, it is quantitatively successful in explaining the missing disinflation.
- Third, we present new econometric and survey evidence consistent with firms' inflation expectations being similar to those of households.
- Fourth, the difference in household inflation expectations and those of professional forecasters since 2009 can readily be accounted for by the evolution of oil prices during this period.

- Fifth, our explanation is consistent with the absence of strong deflationary pressures across a wide range of advanced economies since the recent financial crisis.

Implications of our explanation

One unusual implication of our explanation is that the absence of more pronounced disinflation – or even deflation – in advanced economies following the Great Recession likely reflected a unique set of factors (e.g. rapid recoveries in developing economies like China spurring global demand for commodities) which policymakers should not necessarily expect to be repeated in future crises.

To the extent that this rise in inflationary expectations may have prevented the onset of pernicious deflationary dynamics, the rise in oil prices could be interpreted as a lucky break – generating the very rise in inflationary expectations which policymakers have only recently begun to push aggressively toward in the form of forward guidance.

A second unusual feature of this interpretation is that – contrary to Bernanke's 'anchored expectations' hypothesis – we show that household expectations have not been fully anchored, and continue to respond strongly to commodity price changes.

If our explanation is correct, anchored expectations on the part of households and firms would likely have delivered much worse economic outcomes through more pronounced disinflationary dynamics. So while anchored expectations likely remain a desirable outcome in most circumstances, the experience since 2009 presents a cautionary example of the potential downside of fully anchored expectations.

References

Bernanke, Ben (2010), "The Economic Outlook and Monetary Policy", speech delivered at the Federal Reserve Bank of Kansas City Economic Symposium, Jackson Hole, Wyoming, 27 August.

Coibion, Olivier, and Yuriy Gorodnichenko (2013), "Is the Phillips Curve Alive and Well After All? Inflation Expectations and the Missing Disinflation", manuscript.

Daly, Mary, Bart Hobijn, and Brian Lucking (2012), "Why Has Wage Growth Stayed Strong?", Federal Reserve Bank of San Fransisco Economic Letter 2012-10, 2 April.

Dotsey, Michael, Robert G King, Alexander L Wolman (1999), "State-Dependent Pricing and the General Equilibrium Dynamics of Money and Output", *Quarterly Journal of Economics* 114(2): 655–690.

International Monetary Fund (2013), "The Dog That Didn't Bark: Has Inflation Been Muzzled or Was It Just Sleeping?", Chapter 3 in *World Economic Outlook*, April.

Llaudes, Ricardo (2005), "The Phillips Curve and Long Term Unemployment", ECB Working Paper 441.

Phillips, A W (1958), "The Relationship between Unemployment and the Rate of Change of Money Wages in the United Kingdom 1861–1957", *Economica* 25(100): 283–299.

Dynamic stochastic general equilibrium models and their forecasts

Refet S. Gürkaynak, Rochelle M Edge

Bilkent University and CEPR; Federal Reserve Board

28 February 2011

Studies have shown that the forecasts from dynamic stochastic general equilibrium models perform better than central banks' judgemental forecasts as well as forecasts based on statistical analysis but without a theoretical foundation. This column shows that performing better is hardly good performance given how badly all three forecasts compare with reality.

Dynamic stochastic general equilibrium (DSGE) models represent a major strand of the modern macroeconomics literature and are an important tool for policy analysis at central banks. This was not always the case. At their inception DSGE models were built as descriptive devices, able to provide internally consistent and Lucas-critique proof answers to counterfactual policy experiments. The canonical three-equation new Keynesian model was extensively used in the academic literature but carried much less influence at central banks, where its limited ability to quantitatively explain macroeconomic fluctuations left it viewed as far too simple to be used in policymaking.

The limited applicability of DSGE models to the analyses undertaken at central banks changed dramatically with two milestone papers.

- First, Christiano et al. (2005) developed a DSGE model with a much richer structure – called a medium-scale model – that fit the monetary policy impulse-responses particularly well when estimated with minimum distance methods.
- Second, Smets and Wouters (2007) estimated a variant of the cumulative effects of error model using Bayesian methods and documented the "good" forecasting ability of this model, where good meant competitive with atheoretical Bayesian VAR forecasts.

The theoretical rigour of DSGE models, combined with their documented connection to the data, made them very appealing tools for central-bank

analysis and it was not long after these papers that similar models began to be developed and employed for policy analysis and forecasting at central banks. The forecasting performance of central bank DSGE models remained an important concern and research comparing the model forecasts to purely statistical forecasts or central banks' official forecasts consistently documented the competitive and sometimes even superior forecasting performance of these models.[1] The success of the DSGE model-based forecasts relative to other methods was viewed as evidence in favour of DSGE models' reliably capturing the dynamics in the data.

As part of our ongoing research (Edge and Gürkaynak 2010), we study the DSGE model forecast performance in detail, using out of sample forecasts with real time US data. Our finding is that – consistent with the earlier research – the model performs comparably to or better than a statistical forecast (a Bayesian VAR) and the Fed's judgemental Greenbook forecasts. Figure 1 shows, for inflation, the root mean square forecast errors of the model relative to alternative forecasting methods for different horizons, where observations below one mean the model has a lower root mean square error (RMSE).

Figure 1 DSGE inflation forecast relative RMSE

Figure 1: DSGE Inflation Forecast Relative RMSEs
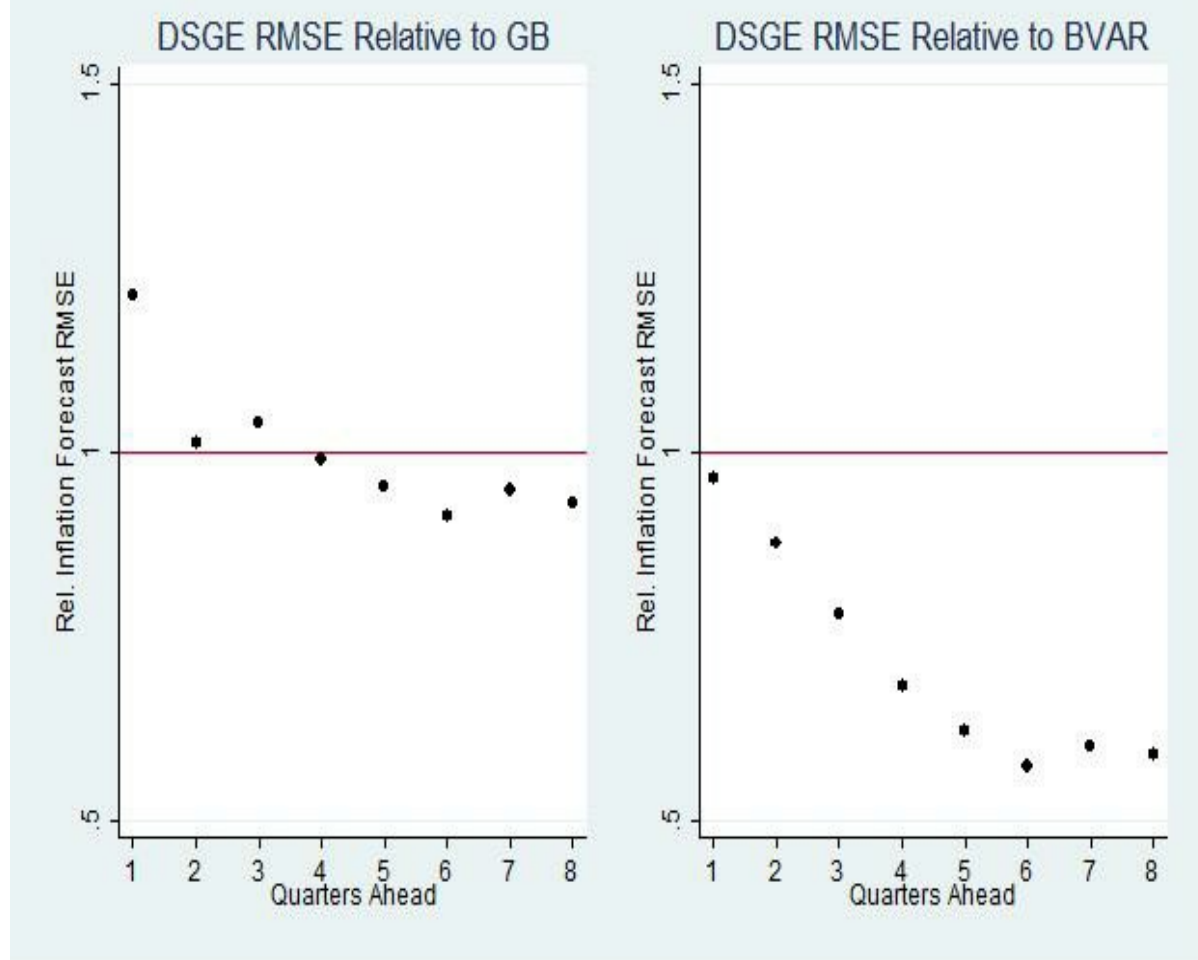
This figure hides as much as it reveals. In particular, relative forecast performance does not distinguish between comparing good forecasts to each other and comparing poor forecasts to each other. To see the absolute forecasting ability of the DSGE model, we run a series of standard forecast efficiency tests, where the realised inflation is regressed on forecasts made at different times in the past. A good forecast should have a zero intercept and unit slope as well as a high R-squared. Table 1 shows the efficiency tests for DSGE model forecasts of inflation at different maturities and demonstrates clearly that the forecasts are very poor. R-squareds at all horizons are essentially zero, implying no forecasting ability. All Figure 1 is therefore telling us is that all other forecasting methods perform just as poorly.[2]

Table 1 DSGE model inflation forecast accuracy

	1Q Ahead	2Q Ahead	3Q Ahead	4Q Ahead	5Q Ahead	6Q Ahead

Slope	0.451**	0.089	0.031	0.209	0.167	0.134
	(0.108)	(0.149)	(0.250)	(0.261)	(0.216)	(0.174)
Intercept	0.261**	0.421**	0.446**	0.363**	0.386**	0.398**
	(0.051)	(0.082)	(0.122)	(0.128)	(0.112)	(0.112)
R2	0.13	0.00	0.00	0.02	0.01	0.01
Obs	104	104	104	104	104	104

Note: Dependent variable is realized inflation, independent variables are inflation forecasts of the DSGE model.

What do we learn from this? That over the post-1992 time-period, which we use to evaluate the DSGE model, inflation has been essentially unforecastable. (Other papers use similar sample periods.) This is in line with the finding of Stock and Watson (2007), who showed that inflation since the Great Moderation is characterised by a diminished persistent (forecastable) component and a larger transitory (unforecastable) component.

But what does that say about the use of DSGE models in central banks; both as a tool for policy analysis as well as a tool for forecast generation? We argue that in both cases the answer is "nothing". The finding that inflation is not forecastable over the Great Moderation period is consistent with the predictions of the DSGE model given the strong monetary policy rule estimated for this period. Specifically, since under this rule the policymaker will alter the interest rate to counter forecastable deviations of inflation from the target, the rule will eliminate forecastable movements in inflation and leave only unforecastable shocks to drive fluctuations. Thus, our finding of low forecast performance is not necessarily evidence against the validity of the model.

That said, a model in which inflation and the output gap are uncorrelated statistical processes that are independent both of each other and the interest rate, will also imply unforecastable model variables, which is why we argue that forecasting ability for inflation in the Great Moderation period is not a useful test of the validity of the DSGE model. Indeed, in a regime in which most key macroeconomic variables are either unforecastable or close to unforecastable relative forecast accuracy is far less relevant for evaluating the usefulness of forecasts and the criteria for judging usefulness becomes more subtle.

The interesting question is whether the conditional forecasts of the DSGE model are sensible. That is, whether the model can reasonably accurately answer questions along the lines of "what would inflation do if the interest

rates were kept constant for a year?" It is entirely possible that the model will predict the path of inflation under the counterfactual policy path quite well, while having a poor unconditional forecast record as it is the internal dynamics that imply unforecastable inflation.

To conclude, then, we think the debate on the usefulness of DSGE models in the forecasting process is ill served by using its forecasting performance in the Great Moderation period as a test. We have shown that the model forecasts inflation very poorly, which we have argued is consistent with the baseline New Keynesian DSGE model, but is also consistent with many other models.

References

Adolfson, Malin, Michael K Andersson, Jesper Lindé, Mattias Villani, and Anders Vredin (2007), "Modern Forecasting Models in Action: Improving Macroeconomic Analyses at Central Banks", *International Journal of Central Banking* 3(4):111-144.

Christiano, Lawrence J, Martin Eichenbaum, and Charles L Evans (2005), "Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy", *Journal of Political Economy*, 113, 1:1-45.

Christoffel, Kai, Günter Coenen, and Anders Warne (forthcoming), "Forecasting with DSGE Models", in M Clements and D Hendry, *Handbook of Forecasting*, Oxford University Press.

Edge, Rochelle M, Michael T Kiley, and Jean-Philippe Laforte (2010), "A Comparison of Forecast Performance between Federal Reserve Staff Forecasts, Simple Reduced-Form Models, and a DSGE Model", *Journal of Applied Econometrics*, 25:720-754.

Lees, Kirdan, Troy Matheson, and Christie Smith (2007), "Open Economy DSGE-VAR Forecasting and Policy Analysis: Head to Head with the RBNZ Published Forecasts", Discussion Paper 2007/01, Reserve Bank of New Zealand.

Smets, Frank, and Raf Wouters (2007), "Shocks and Frictions in US Business Cycles: A Bayesian DSGE Approach", *American Economic Review* 97(3):586-606.

Stock, James H, and Mark W Watson (2007), "Why Has US Inflation Become Harder to Forecast?", *Journal of Money, Credit and Banking*, 39(1):3-33.

[1] Examples include, Adolfson et al. (2007) for the Riksbank's DSGE model, Lees et al. (2007) for the RBNZ's DSGE model and Edge et al. (2010) for the FRB's DSGE model. In addition,

Adolfson and others (2006) and Christoffel et al. (forthcoming) examine out-of-sample forecast performance for DSGE models of the Eurozone, although the focus of these papers is much more on technical aspects of model evaluation.

2 Results for real GDP growth, reported in our paper, are similar.

Why DSGEs crash during crises

David F. Hendry, Grayham E. Mizon

Oxford University

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Many central banks rely on dynamic stochastic general equilibrium models – known as DSGEs to cognoscenti. This column – which is more technical than most Vox columns – argues that the models' mathematical basis fails when crises shift the underlying distributions of shocks. Specifically, the linchpin 'law of iterated expectations' fails, so economic analyses involving conditional expectations and inter-temporal derivations also fail. Like a fire station that automatically burns down whenever a big fire starts, DSGEs become unreliable when they are most needed.

In most aspects of their lives humans must plan forwards. They take decisions today that affect their future in complex interactions with the decisions of others. When taking such decisions, the available information is only ever a subset of the universe of past and present information, as no individual or group of individuals can be aware of all the relevant information. Hence, views or expectations about the future, relevant for their decisions, use a partial information set, formally expressed as a conditional expectation given the available information.

Moreover, all such views are predicated on there being no unanticipated future changes in the environment pertinent to the decision. This is formally captured in the concept of 'stationarity'. Without stationarity, good outcomes based on conditional expectations could not be achieved consistently. Fortunately, there are periods of stability when insights into the way that past events unfolded can assist in planning for the future.

The world, however, is far from completely stationary. Unanticipated events occur, and they cannot be dealt with using standard data-transformation techniques such as differencing, or by taking linear combinations, or ratios. In particular, 'extrinsic unpredictability' – unpredicted shifts of the distributions of economic variables at unanticipated times – is common. As we shall illustrate, extrinsic unpredictability has dramatic consequences for the standard macroeconomic forecasting models used by governments around the world – models known as 'dynamic stochastic general equilibrium' models – or DSGE models.

DSGE models

DSGE models play a prominent role in the suites of models used by many central banks (e.g. Bank of England 1999, Smets and Wouters 2003, and Burgess et al. 2013). The supposedly 'structural' Bank of England's Quarterly Model (BEQM) broke down during the Financial Crisis, and has since been replaced by another system built along similar lines where the "behaviour of the central organising model should be consistent with the theory underpinning policymakers' views of the monetary transmission mechanism (Burgess et al. 2013, p.6)", a variant of the claimed "trade-off between 'empirical coherence' and 'theoretical coherence'" in Pagan (2003).

Many of the theoretical equations in DSGE models take a form in which a variable today, say incomes (denoted as y_t), depends inter alia on its 'expected future value'. (In formal terms, this is written as $E_t y_{t+1}$], where the 't' after the 'E' indicates the date at which the expectation is formed, and the 't+1' after the 'y' indicates the date of the variable). For example, y_t may be the log-difference between a de-trended level and its steady-state value. Implicitly, such a formulation assumes some form of stationarity is achieved by de-trending.[1]

Unfortunately, in most economies, the underlying distributions can shift unexpectedly. This vitiates any assumption of stationarity. The consequences for DSGEs are profound. As we explain below, the mathematical basis of a DSGE model fails when distributions shift (Hendry and Mizon 2014). This would be like a fire station automatically burning down at every outbreak of a fire. Economic agents are affected by, and notice such shifts. They consequently change their plans, and perhaps the way they form their expectations. When they do so, they violate the key assumptions on which DSGEs are built.

The key is the difference between intrinsic and extrinsic unpredictability. Intrinsic unpredictability is the standard economic randomness – a random draw from a known distribution. Extrinsic unpredictability is an 'unknown unknown' so that the conditional and unconditional probabilities of outcomes cannot be accurately calculated in advance.2

Extrinsic unpredictability and location shifts

Extrinsic unpredictability derives from unanticipated shifts of the distributions of economic variables at unpredicted times. Of these, location shifts (changes in the means of distributions) have the most pernicious

effects. The reason is that they lead to systematically biased expectations and forecast failure. Figure 1 records UK unemployment over 1860–2011, with some of the major historical shifts highlighted.

**Figure 1** Location shifts over 1860–2011 in UK unemployment, with major historical events
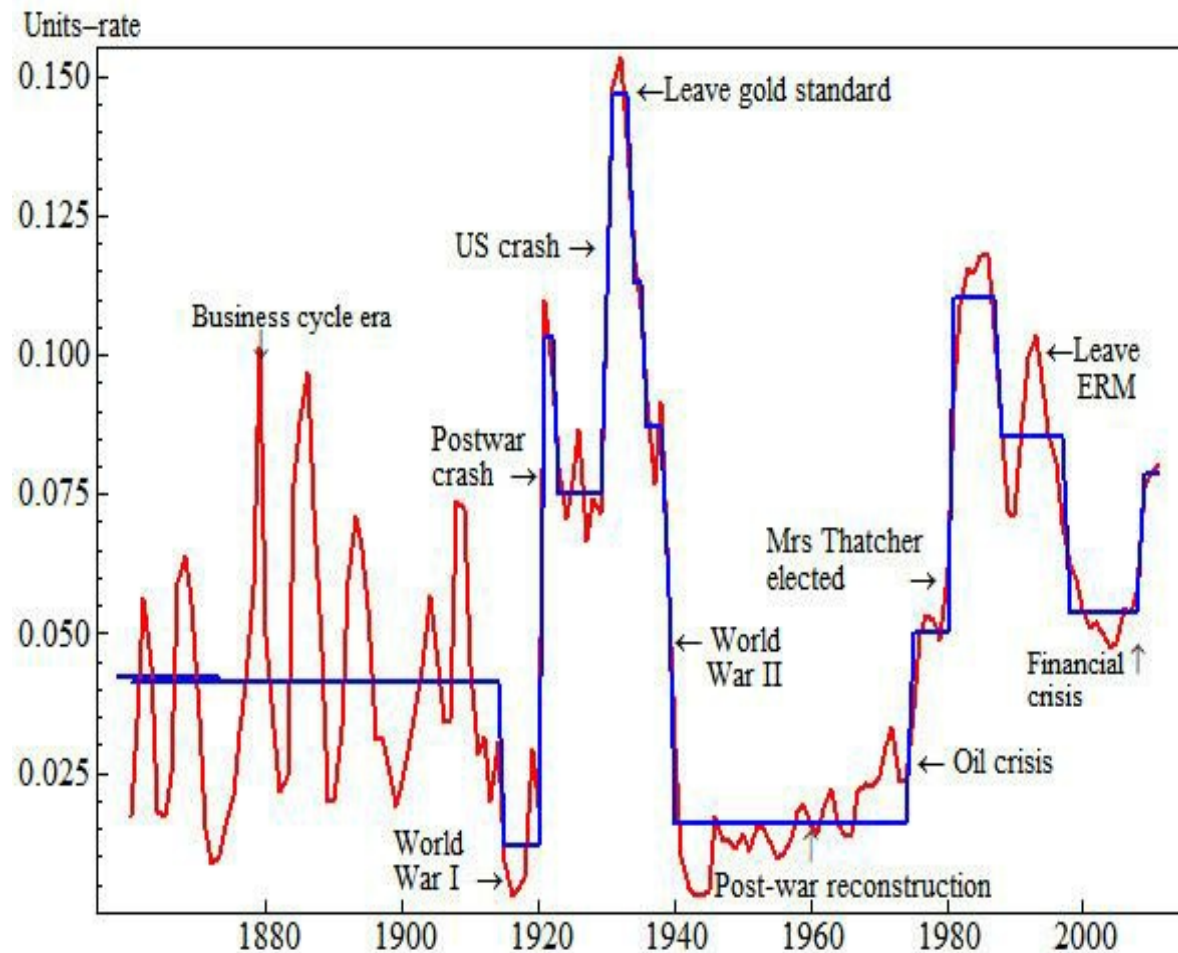
Four main epochs can be easily discerned in Figure 1:

- A business-cycle era over 1860–1914
- World War I and the inter-war period to 1939 with much higher unemployment
- World War II and post-war reconstruction till 1979 with historically low levels
- A more turbulent period since, with much higher and more persistent unemployment levels

As Figure 2, panel (a) confirms for histograms and non-parametric

densities, both the means and variances have shifted markedly across these epochs. Panel b shows distributional shifts in UK price inflation over the same time periods. Most macroeconomic variables have experienced abrupt shifts, of which the Financial Crisis and Great Recession are just the latest exemplars.

Figure 2 Density shifts over four epochs in UK unemployment and price inflation
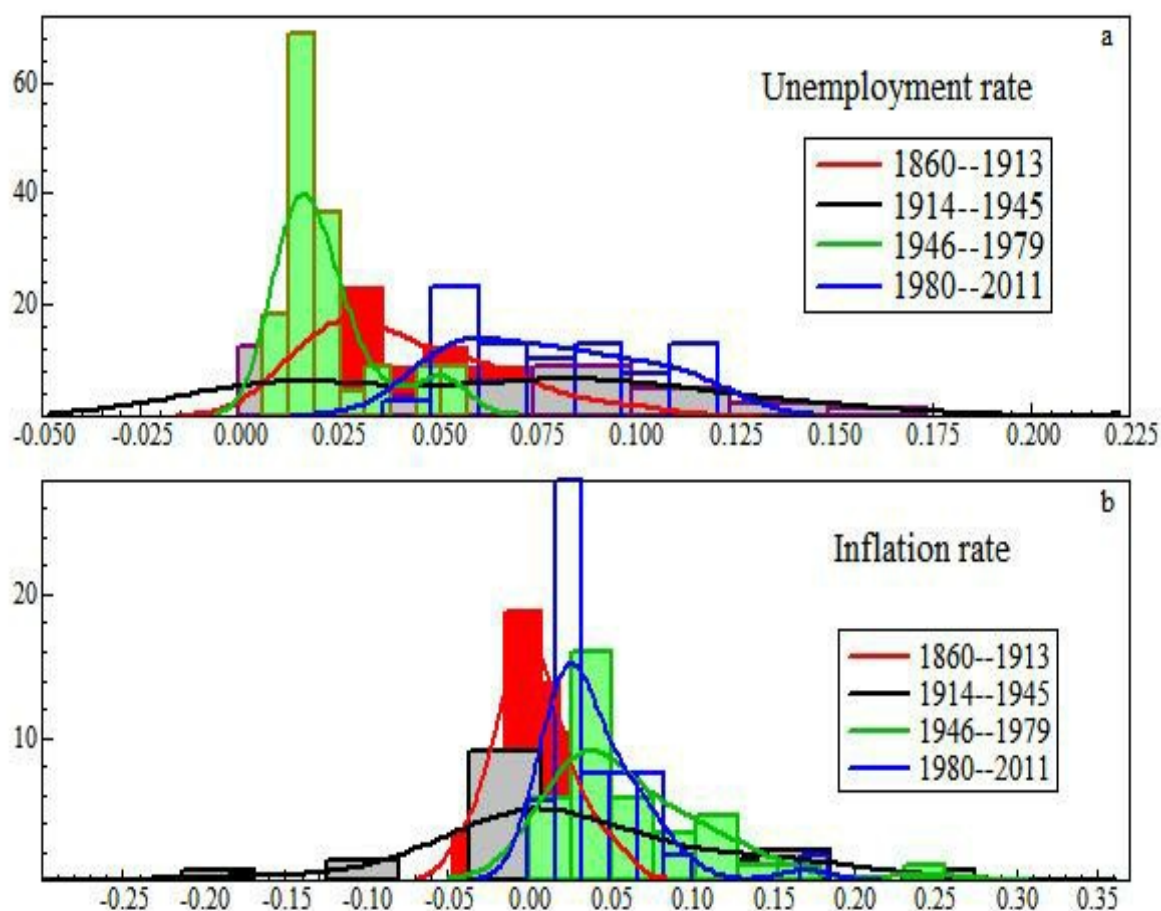
Extrinsic unpredictability and economic analyses

Due to shifts in the underlying distributions, all expectations operators must be three-way time dated: one way for the time the expectation was formed, one for the time of the probability distribution being used, and the third for the information set being used. We write this sort of expectation as $ED\varepsilon_t [\varepsilon_{t+1}|I_{t-1}]$, where ε_{t+1} is the random variable we care about, $D\varepsilon_t (\cdot)$ is the distribution agents use when forming the expectation, and I_{t-1} is the information set available when the expectation is formed. This more general formulation allows for a random variable being unpredictable in its

mean or variance due to unanticipated shifts in its conditional distribution.

Conditional expectations

The importance of three-way dating can be seen by looking at how one can fall into a trap by ignoring it. For example, conditional expectations are sometimes 'proved' to be unbiased by arguments like the following. Start with the assertion that next quarter's income equals expected future income plus an error term whose value is not known until next quarter. By definition of a conditional expectation, the mean of the error must be zero. (Formally the expectation is denoted as $E[y_{t+1}|I_t]$ where I_t is the information set available today.)

Econometric models of inflation – such as the new-Keynesian Phillips curve in Galí and Gertler (1999) – typically involve unknown expectations like $E[y_{t+1}|I_t]$. The common procedure is to replace them by the actual outcome y_{t+1} – using the argument above to assert that the actual and expected can only differ by random shocks that have means of zero. The problem is that this deduction assumes that there has been no shift in the distribution of shocks. In short, the analysis suffers from the lack of a date on the expectations operator related to the distribution (Castle, Doornik, Hendry and Nymoen 2014).

The basic point is simple. We say an error term is intrinsically unpredictable if it is drawn from, for example, a normal distribution with mean μ_t and a known variance. If the mean of the distribution cannot be established in advance, then we say the error is also extrinsically unpredictable. In this case, the conditional expectation of the shock needs not have mean zero for the outcome at t+1. The forecast is being made with the 'wrong' distribution – a distribution with mean μt, when in fact the mean is μ_{t+1}. Naturally, the conditional expectation formed at t is not an unbiased predictor of the outcome at t +1.

Implications for DSGE models

It seems unlikely that economic agents are any more successful than professional economists in foreseeing when breaks will occur, or divining their properties from one or two observations after they have happened. That link with forecast failure has important implications for economic theories about agents' expectations formation in a world with extrinsic unpredictability. General equilibrium theories rely heavily on ceteris paribus assumptions – especially the assumption that equilibria do not shift

unexpectedly. The standard response to this is called the law of iterated expectations. Unfortunately, as we now show, the law of iterated expectations does not apply inter-temporally when the distributions on which the expectations are based change over time.

The law of iterated expectations facing unanticipated shifts

To explain the law of iterated expectations, consider a very simple example – flipping a coin. The conditional probability of getting a head tomorrow is 50%. The law of iterated expectations says that one's current expectation of tomorrow's probability is just tomorrow's expectation, i.e. 50%. In short, nothing unusual happens when forming expectations of future expectations. The key step in proving the law is forming the joint distribution from the product of the conditional and marginal distributions, and then integrating to deliver the expectation.

The critical point is that none of these distributions is indexed by time. This implicitly requires them to be constant. The law of iterated expectations need not hold when the distributions shift. To return to the simple example, the expectation today of tomorrow's probability of a head will not be 50% if the coin is changed from a fair coin to a trick coin that has, say, a 60% probability of a head.

In macroeconomics, there are two sources of updating the distribution.

- The first concerns conditional distributions where new information shifts the conditional expectation (i.e., $E_{yt}[y_{t+1}|y_{t-1}]$ shifts to $E_{yt}[y_{t+1}|y_t]$).

Much of the economics literature (e.g. Campbell and Shiller 1987) assumes that such shifts are intrinsically unpredictable since they depend upon the random innovation to information that becomes known only one period later.[2]

The second occurs when the distribution used to form today's expectation $E_{yt}[.]$ shifts before tomorrow's expectation $E_{yt+1}[.]$ is formed.

The point is that the new distributional form has to be learned over time, and may have shifted again in the meantime.[3] The mean of the current and future distributions (μ_t and μ_{t+1}) need to be estimated. This is a nearly intractable task for agents – or econometricians – when distributions are shifting.

Using artificial data from a bivariate generating process where the

parameters are known, Figure 3, panels a–c, show essentially that the same V-shape can be created by changing many different combinations of the parameters for the dynamics, the intercepts, and the causal links in the two equations, where panel d shows their similarity to the annualized % change in UK GDP over the Great Recession.

For example, the intercept in the equation for the variable shown in panel a was unchanged, but was changed 10-fold in panel c. A macro economy can shift from many different changes, and as in Figure 3, economic agents cannot tell which shifted till long afterwards, even if another shift has not occurred in the meantime.

Figure 3 Near-identical location shifts despite changes in many different parameter combinations
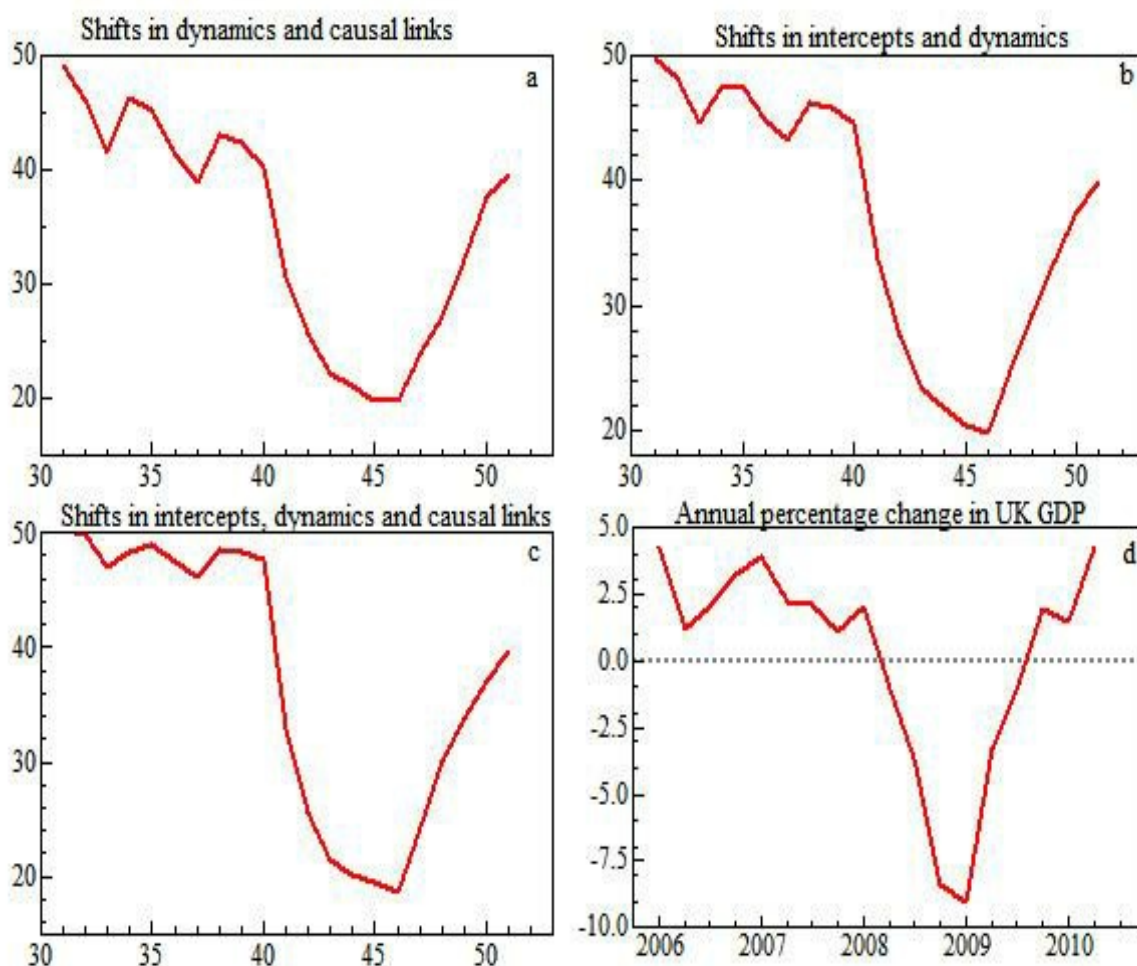
The derivation of a martingale difference sequence from 'no arbitrage' in, for example, Jensen and Nielsen (1996) also explicitly requires no shifts in the underlying probability distributions. Once that is assumed, one can deduce the intrinsic unpredictability of equity price changes and hence

market (informational) efficiency. Unanticipated shifts also imply unpredictability, but need not entail efficiency. Informational efficiency does not follow from unpredictability per se, when the source is extrinsic rather than intrinsic. Distributional shifts occur in financial markets, as illustrated by the changing market-implied probability distributions of the S&P500 in the Bank of England Financial Stability Report (June 2010).

In other arenas, 'location shifts' (i.e. shifts in the distribution's mean) can play a positive role in clarifying both causality, as demonstrated in White and Kennedy (2009), and testing 'super exogeneity' before policy interventions (Hendry and Santos 2010). Also, White (2006) considers estimating the effects of natural experiments, many of which involve large location shifts. Thus, while more general theories of the behaviour of economic agents and their methods of expectations formation are required under extrinsic unpredictability, and forecasting becomes prone to failure, large shifts can also help reveal the linkages between variables.

Conclusions

Unanticipated changes in underlying probability distributions – so-called location shifts – have long been the source of forecast failure. Here, we have established their detrimental impact on economic analyses involving conditional expectations and inter-temporal derivations. As a consequence, dynamic stochastic general equilibrium models are inherently non-structural; their mathematical basis fails when substantive distributional shifts occur.

References

Bank of England (1999). *Economic Models at the Bank of England*. London: Bank of England.

Burgess, S., Fernandez-Corugedo, E., Groth, C., Harrison, R., Monti, F., Theodoridis, K., and Waldron, M. (2013), "The Bank of England's forecasting platform: COMPASS, MAPS, EASE and the suite of models", Working paper no. 471 and appendices, Bank of England, London.

Campbell, J. Y., and Shiller, R. J. (1987), "Cointegration and Tests of Present Value Models", *Journal of Political Economy*, 95(5), 1062–1088.

Castle, J. L., Doornik, J. A., Hendry, D. F., and Nymoen, R. (2014), "Mis-specification testing: Non-invariance of expectations models of inflation", *Econometric Reviews*, 33, 553–574.

Galí, J., and Gertler, M. (1999), "Inflation dynamics: A structural

econometric analysis", Journal of Monetary Economics, 44, 195–222.

Hendry, D. F., and Mizon, G. E. (2014), "Unpredictability in economic analysis, econometric modelling and forecasting", Journal of Econometrics, 182, 186–195.

Hendry, D. F., and Santos, C. (2010), "An automatic test of super exogeneity", In Watson, M. W., Bollerslev, T., and Russell, J. (eds.), *Volatility and Time Series Econometrics*, pp. 164–193. Oxford: Oxford University Press.

Jensen, B. A., and Nielsen, J. A. (1996), "Pricing by no arbitrage", In Cox, D. R., Hinkley, D. V., and Barndorff-Nielsen, O. E. (eds.), Time Series Models: In *Econometrics, Finance and other Fields*, pp. 179–225. London: Chapman and Hall.

Knight, F. H. (1921). *Risk, Uncertainty, and Profit* 1st edn. Boston, MA: Houghton Mifflin.

Pagan, A. R. (2003), "Report on modelling and forecasting at the Bank of England", *Bank of England Quarterly Bulletin*, Spring.

Smets, F., and Wouters, R. (2003), "An estimated stochastic dynamic general equilibrium model of the Euro Area", *Journal of the European Economic Association,* 1, 1123–1175.

White, H. (2006), "Time series estimation of the effects of natural experiments", *Journal of Econometrics*, 135, 527–566.

White, H., and Kennedy, P. (2009), "Retrospective estimation of causal effects through time", In Castle, J. L., and Shephard, N. (eds.), *The Methodology and Practice of Econometrics*, pp. 59–87. Oxford: Oxford University Press.

[1] Burgess et al. (2013, p.A1) assert that this results in 'detrended, stationary equations', though no evidence is provided for stationarity. Technically, while the 't' in the operator E_t usually denotes the period when the expectation is formed, it also sometimes indicates the date of information available when the expectation was formed. The distribution over which the expectation is formed is implicitly timeless – the 't' does not refer to the date of some time-varying underlying probability distribution.

[2] To give a practical example, consider an unknown pupil who takes a series of maths tests. While the score on the first test is an unbiased predictor of future scores, the teacher learns about the pupil's inherent ability with each test. The teacher's expectations of future test performance will almost surely change in one direction or the other. After the first test, however, one doesn't know whether expectations will rise or fall.

[3] Even if the distribution, denoted $f_{t+1}(y_{t+1}|y_t)$, became known one period later, the issue arises since: $E_{y_{t+1}}[y_{t+1}|\ y_t] - E_{y_t}[y_{t+1}|\ y_{t-1}]$ equals $E_{y_{t+1}}[y_{t+1}|y_t] - E_{y_{t+1}}[y_{t+1}|y_{t-1}] + (E_{y_{t+1}}[y_{t+1}|y_{t-1}] - E_{y_t}[y_{t+1}|y_{t-1}])$ which equals $v_t + (\mu_{t+1} - \mu_t)$.

Default and DSGE models

Charles A.E. Goodhart, Dimitri Tsomocos

London School of Economics; Oxford University

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Standard DSGE models do not include the possibility of default. This column says that makes them useless for analysing financial crises. It proposes explicitly incorporating default and money into the microfoundations of DSGE models so as to offer a new framework for monetary and regulatory policy analysis.

Martin Shubik described money as an "institutionalised symbol of trust", and Nobu Kiyotaki and John Moore coined a nice phrase, "Evil is the root of all money". And they are correct in this. If everyone always repaid all their debts with certainty, then there would be no need for money, most financial instruments, nor intermediaries like banks. All that would be needed to complete a transaction would be a handshake and the acknowledgement that the buyer is indebted to the seller. Of course, the good that the seller would like to receive at some future date would not necessarily be what the buyer could offer, but that discrepancy could easily be resolved in complete financial markets.

This proposition already indicates one problem with the assumption that no one defaults, which is that it must imply, as a corollary, a complete set of financial markets. But, as is already well known, a complete set of financial markets not only does not exist but would allow for an Arrow/Debreu Walrasian general equilibrium in which all transactions could be established at time zero. That would prevent default arising as a result of future bad outcomes, since all such potential outcomes could be hedged in the complete financial markets.

Perhaps even more importantly, a no default assumption would require all agents to be completely and perfectly moral, in the sense that they never take advantage of an opportunity not to repay the debt that they owe. Thus, if you were to take a taxi, even though you would certainly never meet that taxi driver again, you would always pay him (oddly, it's almost always a him). This latter assumption really stretches credulity too far. If the ordinary person could get out of repaying her due debt with impunity, then she would!

The shortcomings of standard DSGE models

Unfortunately, the standard dynamic stochastic general equilibrium (DSGE) macro models that are used everywhere actually incorporate this assumption of no default. It arises specifically as part of the transversality condition, but it also stems from the fact that there is no real trade and no bargaining in most DSGE models. This has two important implications. First, DSGE models are not properly micro-founded, in that their basic assumptions are totally at odds with human behaviour in this respect. Second, it means that there is no real role for money or banks in any DSGE model. There is no need for cash in advance if you can always be trusted to repay your debts in full, and liquidity plays no role whatsoever. And the idea of money in the utility function is just laughable. By the same token, there is no need for banks; nor do they generally exist in such DSGE models.

It follows that the standard DSGE model has been completely useless as a guide to the recent financial crisis, which has, of course, been characterised by default and sharply increasing risk premia driven by concerns about the rising probability of default. One way of trying to rescue such DSGE models has been to incorporate such enhanced risk premia, but this has usually been done as if such premia were entirely exogenous, whereas of course they arise from concern with default and, consequently, are determined in equilibrium. Including such risk premia in models without explaining their relationship with default represents a failure of basic analysis and theory. Put differently, liquidity and default are endogenous variables, and it is an oxymoron to conduct analysis when we are treating them as exogenous!

Incorporating default into the DSGE framework

In our view, the essential way forward from this unfortunate state of affairs is to include the potential for default in our macro models. This would also have the side-benefit of restoring a union between macro theory and finance, since the probability of default is a prime element within finance. While we in finance are not wedded to DSGE models (and tend to prefer the rational inattention theory to rational expectations), such DSGE models represent a useful discipline and framework and are also the workhorse of most macro modelling. So, our priority in our current research exercise is to see how far we can embed an analytical approach to default within an otherwise standard DSGE model. Doing so has the great advantage that it provides a rationale for the use of money. If you think that the buyer of

your product may not meet his resultant debt, you will ask him to pay on the nail, i.e. it provides a rationale for the cash in advance requirement. Similarly, the main role for banks is to be able to assess probabilities of default better than you or I. So we need them in order to be able to reduce risk premia and lower the spread between bid and ask rates. Thus banks become an essential element of any model incorporating default.

Nevertheless, incorporating default into a DSGE model makes the analytical exercise significantly more complex. In particular, one can no longer use the representative agent model, because only a (small) proportion of agents default at any time. The inclusion of heterogeneous agents, banks, and default greatly increases the scale of parameterisation and the dimension of such models. Nevertheless, such an extended model would at least be micro-founded, whereas current DSGE models are not. Moreover, it would have the benefit of having a proper foundation for the inclusion of money and financial intermediaries within the system. Of course, during normal times when default is low and constant, one can ignore money and banks as an inessential veil; but that would not help under those circumstances when default probability becomes prominent.

We have constructed (with Carolina Osorio) a first shot at a DSGE model with default as a key feature. We can show how the working of the system changes, first just to take account of heterogeneous agents, and then to take account of the existence of potential default. Heterogeneous agents affect outcomes because of much more extensive distributional effects. In many simulations, some agents gain and others lose, and that makes it much more difficult to assess the welfare implications of various economic developments. When we incorporate the effect of default on our system, it has significant effects on how the economy responds to various stimuli, with some notable differences from the results of models, especially in the short and medium term, in which default is assumed away, e.g. by the transversality condition. Moreover, default enables the proper assessment of the importance of collateral and the emergence of leverage cycles. Finally, incomplete financial markets allow for an active role for policy.

Of course, such a model is quite complex and cannot be reduced to the three-equation-reduced form guise in which most DSGE models are now presented. Moreover, we do realise that the addition of a credit risk premium into the output equation enables the three-equation-reduced form to remain in disturbed times. However, such a stratagem completely undermines the assertion that such a model has proper theoretical micro-foundations. If one wants to understand what has been happening to our

economies over the last few years, we do not think that there is any alternative to a modelling strategy in which both default and money are essential attributes of the working of the macro-economy. Such a new paradigm would offer an integrated framework to address both monetary and regulatory policy.

References

Goodhart, C. A.E., C. Osorio, and D.P. Tsomocos (2009), "Analysis of Monetary Policy and Financial Stability: A New Paradigm", University of Oxford mimeo, October.

Macroeconomic model comparisons and forecast competitions

Volker Wieland, Maik Wolters

Goethe University Frankfurt

Where were economists when the global recession hit? Or rather, where were their forecasts in the years before? This column argues that clearly some of the models were at fault. To correct this, it proposes a 'comparative approach' to macroeconomic analysis where models compete for the right to be taken seriously.

The failure of economists to predict the Great Recession of 2008–09 has rightly come under attack. The areas receiving most criticism have been economic forecasting and macroeconomic modelling. Distinguished economists – among them Nobel Prize winner Paul Krugman – have blamed developments in macroeconomic modelling over the last 30 years and particularly the use of dynamic stochastic general equilibrium (DSGE) models for this failure.

Key policymakers take a more pragmatic view, namely that there is no alternative to the use of simplified models, but that the development of complementary tools to improve the robustness of policy decisions is required. For example, former ECB President Jean-Claude Trichet said in late 2010:

"The key lesson I would draw from our experience is the danger of relying on a single tool, methodology or paradigm. Policymakers need to have input from various theoretical perspectives and from a range of empirical approaches... We do not need to throw out our DSGE and asset-pricing models: rather we need to develop complementary tools to improve the robustness of our overall framework" (Trichet 2010).

Against this backdrop, we present a new paper (Wieland et al 2012) in which we propose a comparative approach to macroeconomic policy analysis that is open to competing modelling paradigms. We have developed a database of macroeconomic models that enables a systematic comparative approach to macroeconomic modelling with the objective of identifying policy recommendations that are robust to model uncertainty. This comparative approach enables individual researchers to conduct

model comparisons easily, frequently, at low cost, and on a large scale.

The macroeconomic model database is available to download from www.macromodelbase.com and includes over 50 models. We have included models that are used at policy institutions like the IMF, the ECB, the Fed, and in academia. The database includes models of the US economy, the Eurozone, and several multi-country models. Some of the models are fairly small and focus on explaining output, inflation, and interest-rate dynamics. Many others are of medium scale and cover many key macroeconomic aggregates.

This database can be used to compare the implications of specific economic policies across models, but it can also serve as a testing ground for new models. New modelling approaches may offer more sophisticated explanations of the sources of the financial crisis and carry the promise of improved forecasting performance. This promise should be put to a test rather than presumed (see Wieland and Wolters 2011 for details).

In recent years, researchers such as Smets and Wouters (2004), Adolfson et al (2007) and Edge et al (2010) have reported on the strong forecasting performance of DSGE models. However, the existing papers are based on samples with long periods of average volatility and therefore can not address specifically how well DSGE model-based forecasts perform during recessions and recoveries. With this in mind, we analyse the forecasting performance of models and experts around the five most recent NBER-defined recessions. Turning points pose the greatest challenge for economic forecasters, are of most importance for policymakers, and can help us to understand current limitations of economic forecasting, especially with respect to the recent financial crisis.

We use two small micro-founded New Keynesian models, two medium-size state-of-the-art New Keynesian business-cycle models – often referred to as DSGE models – and for comparison purposes an earlier-generation New Keynesian model (also with rational expectations and nominal rigidities but less strict microeconomic foundations) and a Bayesian VAR model. For each forecast we re-estimate all five models using exactly the data as they were available for professional forecasters when they submitted their forecasts to the SPF. Using these historical data vintages is crucial to ensure comparability to historical forecasts by professionals. We compute successive quarter-by-quarters forecasts up to five quarters ahead for all models.

Predicting the recession of 2008–09

Figure 1 shows forecasts for annualised quarterly real output growth for the recent financial crisis. The black line shows real-time data until the forecast starting point and revised data afterwards. The grey lines show forecasts collected in the SPF and the green line shows their mean. Model forecasts are shown in red. While data for real GDP become available with a lag of one quarter, professional forecasters can use within-quarter information from data series with a higher frequency. In contrast the models can process only quarterly data. To put the models on an equal footing in terms of information with the forecasts of experts, we condition their forecasts on the mean estimate of the current state of the economy from the SPF.

Figure 1.
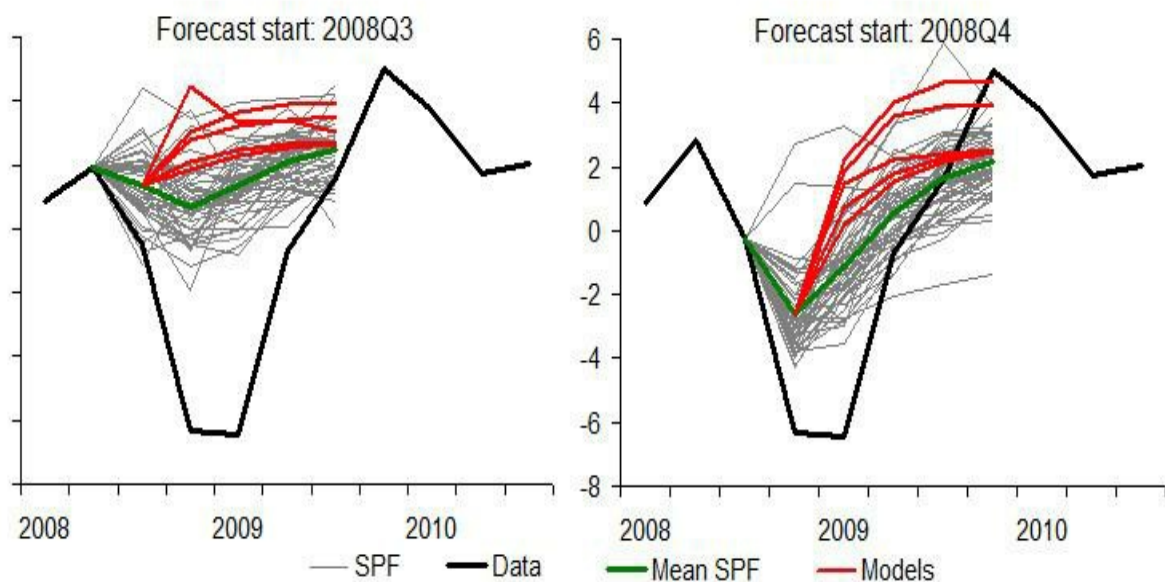
Notes: Solid black line shows annualised quarterly output growth (real-time data vintage until forecast starting point and revised data afterwards), grey lines show forecasts from the SPF, green line shows mean forecast from the SPF, red lines show model forecasts conditional on the mean nowcast from the SPF.

The forecasts shown in the left graph start in the third quarter 2008 and have been computed before the collapse of Lehman brothers. It is apparent that all professional forecasters failed to foresee the downturn. The mean SPF forecast indicates a slowdown of growth in the fourth quarter of 2008 followed by a return to higher growth in the first quarter of 2009. The model-based forecasts would not have performed any better and predict even higher growth rates than most professional forecasters. The graph on the right shows that in the fourth quarter of 2008, following the Lehman debacle, professional forecasters drastically revised their assessments of

the current state of the economy downwards. Still, growth turned out to be even much lower than estimated. Professional forecasters as well as model forecasts wrongly predicted that the trough had already been reached. While the models predict positive growth rates one quarter ahead, some of the professional forecasters were somewhat more pessimistic. The model-based predictions and the professional forecasters are, however, far from predicting an extreme downturn of as much as 6% output growth.

Given this failure to predict the recession and its length and depth, the widespread criticism of the state of economic forecasting before and during the financial crisis applies to business forecasting experts as well as modern and older macroeconomic models. Professional forecasters, who are able to use information from hundreds of data series including information about financial market conditions and all kinds of different forecasting tools and thus have clear advantage over purely model-based forecasts, were not able to predict the Great Recession either. Thus, there is no reason to single out DSGE models, and favour more traditional Keynesian-style models that may still be more popular among business experts. In particular, Paul Krugman's proposal to rely on such models for policy analysis in the financial crisis and disregard three decades of economic research is misplaced.

Is there any hope left for economic forecasting and the use of modern structural models in this endeavour?

Figure 2 shows professional and model-based forecasts starting in the first and the second quarter of 2009. Professional forecasters continued to revise their estimated nowcast downwards for the first quarter of 2009 and predict an increase of growth rates afterwards. Interestingly, from the first quarter of 2009 onwards the model-based forecasts perform quite well in predicting the recovery of the US economy. Three-quarters-ahead model-based forecasts dominate expert forecasts in several cases.

Figure 2.

Forecast Start: 2009Q1 | Forecast Start: 2009Q2

SPF — Data — Mean SPF — Models
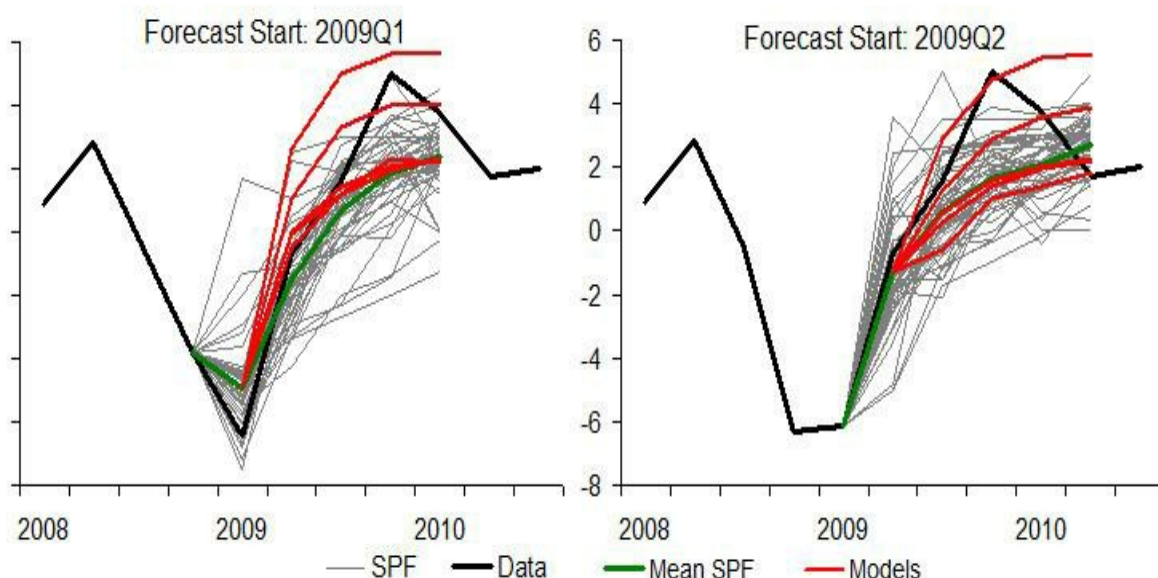
Comparing the forecasting accuracy of professional and model-based forecasts

The model forecasts are on average less accurate than the mean SPF forecasts (see Wieland and Wolters 2011 for detailed results). Of course, taking the mean of all forecasts collected in the SPF can increase the forecasting accuracy compared to individual forecasts. Looking at individual forecasts from the SPF we observe that the precision of the different model forecasts is well in line with the precision range of forecasts from professionals.

Computing the mean forecast of all models we obtain a robust forecast that is close to the accuracy of the forecast from the best model. Conditioning the model forecasts on the nowcast of professional forecasters (reported in the paper) can further increase the accuracy of model-based forecasts. Overall, model-based forecasts still exhibit somewhat greater errors than expert forecasts, but this difference is surprisingly small considering that the models only take into account few economic variables and incorporate theoretical restrictions that are essential for evaluations of the impact of alternative policies but often considered a hindrance for effective forecasting.

Conclusion

Both model forecasts and professional forecasts failed to predict the financial crisis. At the current state of knowledge about macroeconomics and the limitations to use all this knowledge in simplified models, large

recessions might just be difficult to forecast.

By comparing the forecasts from different models we can hedge against outliers and find predictions that are robust across several models. Our macroeconomic model database provides a testing ground for macroeconomists to compare new models to a large range of existing benchmarks. We thus provide the tools for a comparison with established benchmarks and current forecasting practice as documented in the SPF. It is important to base discussions about competing modelling approaches on a solid basis. In our research we show how such a comparison of different models can be pursued.

References

Adolfson, M, MK Andersson, J Linde, M Villani, A Vredin (2005), "Modern forecasting models in action: Improving macroeconomic analyses at central banks", Sveriges Riksbank Working Paper No 190.

Del Negro, M and F Schorfheide (2004), "Priors from general equilibrium models for VARs", *International Economic Review*, 45(2),643–73.

Edge, RM, MT Kiley, and JP Laforte (2008), "Natural rate measures in an estimated DSGE model of the US economy", *Journal of Economic Dynamics and Control*, 32:2512–35.

Edge, RM, MT Kiley, and J-P Laforte (2010), "A comparison of forecast performance between Federal Reserve staff forecasts, simple reduced form models, and a DSGE model", *Journal of Applied Econometrics*, 25(4):720–54.

Smets, F and R Wouters (2004), "Forecasting with a Bayesian DSGE model: An application to the euro area", *Journal of Common Market Studies*, 42(4):841–67.

Smets F and R Wouters (2007), "Shocks and frictions in US business cycles: A Bayesian DSGE approach", *The American Economic Review*, 97(3):586–606.

Taylor, J and V Wieland (2011), "Surprising Comparative Properties of Monetary Models: Results from a New Monetary Model Base", *Review of Economics and Statistics*, forthcoming.

Trichet, Jean-Claude (2010), "Reflections on the nature of monetary policy non-standard measures and finance theory", speech given on the occasion of the ECB Central Banking Conference Frankfurt, 18 November.

Wieland, V, T Cwik, GJ Müller, S Schmidt, MH Wolters (2012), "A new

comparative approach to macroeconomic modelling and policy analysis", Manuscript, Center for Financial Studies, Frankfurt.

Wieland, V and MH Wolters (2011), "The Diversity of Forecasts from Macroeconomic Models of the US Economy", *Economic Theory*, 47(2-3):247-292. Also available as CEPR Discussion Paper 7870.

Can optimal policy projections in DSGE models be useful for policymakers?

Jesper Lindé, Lars E.O. Svensson, Stefan Laséen, Malin Adolfson

Sveriges Riksbank; Stockholm School of Economics; Sveriges Riksbank; Sveriges Riksbank

Over the last couple of years, central banks have started to build and estimate dynamic stochastic general equilibrium models. In this column, Lars Svensson, Deputy Governor of Sweden's central bank, and coauthors discuss what needs to be taken into account when using such models for policy analysis and forecasting.

Over the last couple of years many central banks, for instance the ECB, the Federal Reserve Board, and Sveriges Riksbank, have started to build and estimate dynamic stochastic general equilibrium (DSGE) models, following the work by Christiano, Eichenbaum, and Evans (2005), and Smets and Wouters (2003). Sveriges Riksbank incorporated its open economy DSGE model, Ramses, into the daily process of forecasting and policy analysis in 2005; see Adolfson, Laséen, Lindé, and Villani (ALLV) (2007). Since Ramses is a structural model it can be used for policy analysis and policy simulation, but it also has good forecasting properties (ALLV 2008). In this column we discuss some practical policy considerations that need to be taken into account when using a DSGE model as a tool for policy analysis and forecasting.

Optimal policy projections

The way monetary policy is described in these modern DSGE models is often by a simple Taylor-type instrument rule (Taylor 1993), setting the instrument rate as a linear function of inflation and the output gap. The simple rule is then estimated (together with the rest of the model) based on historical data and hence for the historical conduct of monetary policy. However, policymakers may be more interested in knowing optimal policy projections of the future interest rate path rather than the path forecast from their predecessors' handling of policy.

By optimal policy projections, we mean projections of the target variables (inflation and the output gap) and the instrument rate that minimise an intertemporal loss function corresponding to flexible inflation targeting,

that is, a quadratic loss function of the gap between inflation and the inflation target and the gap between output and potential output (the loss function may or may not also include a term representing a preference for instrument-rate smoothing). Under optimal policy, the central bank responds to all relevant state variables and shocks, whereas with a simple rule the central bank only responds to a few key variables, such as inflation and the output gap. Therefore, optimal policy can more efficiently stabilise both inflation around the inflation target and the resource utilisation of the real economy, measured as the output gap.

Optimal policy consequently provides the efficient policy trade-offs between inflation and output-gap stabilisation that the policymaker faces. By varying the relative weight on output-gap stabilisation in the loss function, one obtains the set of efficient policy choices that the policymaker can choose between, which can give them useful advice for their decisions.

In our recent CEPR discussion paper, we provide a detailed analysis on how to do optimal policy projections in a linear-quadratic model with forward-looking variables. With these tools, we show that optimal policy projections can be carried out also in medium-sized DSGE models, like Ramses, and that this kind of analysis can now be applied in real-time policy processes.

Potential output

An important issue under flexible inflation targeting is which measure of the output gap policymakers should try to stabilise. In practice, central banks may look at different output gaps that measure deviations of actual output from different assessments of potential output. Stabilising different measures of potential output may result in different projections of the instrument rate.

In our paper we study several alternative definitions of potential output (and thereby the output gap) in our model. We define potential output as (i) trend output, the output level in a stochastic steady state or (ii) flexprice output, the hypothetical level of output that would prevail in the economy if nominal prices and wages were completely flexible. The second concept of potential output provides an important (equilibrium) benchmark to policy since it measures the level achievable if the central bank neutralises all nominal frictions in the economy. It differs from conventional (atheoretical) output-gap measures often used in empirical analysis, where potential output is computed using a smooth trend, for example, from a

Hodrick-Prescott (HP) filter.

Furthermore, flexprice potential output can be defined in different ways depending on the assumption about the existing predetermined variables, such as the capital stock. We look at two different definitions: unconditional potential output is not contingent upon the current predetermined variables (the current state of the economy) but defined as the hypothetical output level that would result if prices and wages were completely flexible and had been so forever, whereas conditional potential output is conditional on the current state of the economy and is thus defined as the hypothetical output level that would arise if prices and wages suddenly became flexible in the current period and remained flexible in the future. In the first case, potential output depends on, for example, the hypothetical capital stock that would exist if prices and wages had been flexible forever; in the second case, potential output depends on the current capital stock (and therefore, to the extent the current capital stock depends on past policy, also on past policy).

Policy implications

In Figure 1 we compare the various output gaps generated from the estimated DSGE model with an HP-filtered output gap in the data. We see that the historical development of the output gaps differ quite a bit. In certain years, such as 2006, the HP output gap and the trend output gap can even be of different sign than the two flexprice output gaps. This is because the model estimates a high temporary productivity shock during this year. This temporary productivity shock increases output but not trend potential output (since trend potential output is only affected by permanent (unit-root) shocks). Hence, the temporary productivity shock increases the trend output gap. In contrast, the temporary productivity shock increases the flexprice potential output, so since it increases both output and flexprice potential output, it will not increase the flexprice output gap. The different developments of the different output gaps will have policy implications. A central bank that stabilises the trend output gap will, for a positive temporary productivity shock, end up trying to reduce employment, but a central bank that stabilises the flexprice output gap will not.

Figure 1 Output gaps from the model and the data.
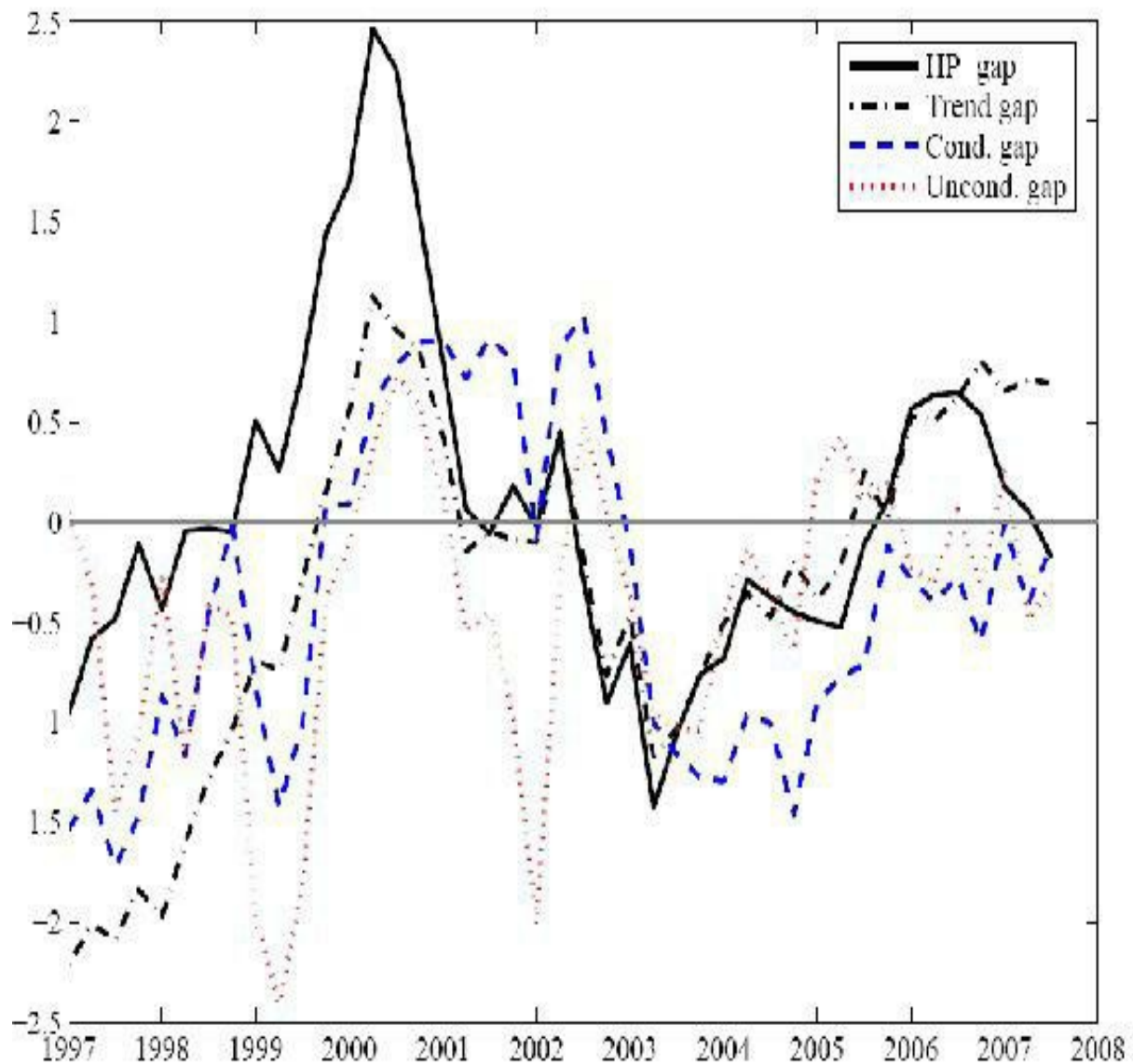
In our paper, we illustrate this by comparing optimal policy projections for different output gaps in the loss function and contrasting these with projections under the estimated instrument rule. We find that even if the response coefficients in the simple instrument rule and the parameters in the loss function are both estimated to reflect the historical behaviour of Sveriges Riksbank, the simple instrument rule and the optimal policy can generate quite different projections for inflation, output, and the instrument rate. The simple instrument rule is not at all as successful in keeping inflation close to the inflation target as the optimal policy. However, this does not necessarily require that monetary policy is always tighter under the optimal policy than under the simple instrument rule; this depends on the initial state of the economy. We also find that in situations when productivity is temporarily high, the optimal policy projections differ

substantially depending on whether it is the flexprice or trend output gap that enters the loss function.

Model developments

Most of the DSGE models currently at use have a rather rudimentary description of the financial sector at work. This is also the case in our CEPR discussion paper. There is much recent research that can be used to incorporate various financial frictions (such as the role of collateral and borrowing constraints) into these models. It is not yet known whether this would improve the DSGE's forecasting performance and how important financial factors are for replicating macroeconomic data and which role financial markets play in understanding business-cycle fluctuations.

Still, there are empirical indications that the current generation of DSGE models are misspecified (see, for example, Del Negro, Schorfheide, Smets and Wouters, 2007; ALLV 2008). This introduces another important challenge on how to formulate optimal monetary policy under model uncertainty.

Another field of criticism is that the contemporary DSGEs are linear rational-expectations models. Admittedly such models may be less suitable for describing financial crises or bubbles. Nevertheless, this type of DSGE model seems to be able to explain and forecast data quite well, which is essential for doing policy analysis. Having said that, there is promising work on DSGEs departing from the rational expectations assumption, for example, with agents updating their beliefs through learning (see Milani, 2007).

References

Adolfson, Malin, Stefan Laséen, Jesper Lindé, and Lars E.O. Svensson (2008), "Optimal Monetary Policy in an Operational Medium-Sized Model", CEPR Discussion Paper No. 6907.

Adolfson, Malin, Stefan Laséen, Jesper Lindé, and Lars E.O. Svensson (2008), "Optimal Monetary Policy in an Operational Medium-Sized Model: Technical Appendix,"

Adolfson, Malin, Stefan Laséen, Jesper Lindé, and Mattias Villani (2007), "RAMSES — A New General Equilibrium Model for Monetary Policy Analysis," *Sveriges Riksbank Economic Review* 2007:2, 5—39.

Adolfson, Malin, Stefan Laséen, Jesper Lindé, and Mattias Villani (2008), "Evaluating an Estimated New Keynesian Small Open Economy Model,"

Journal of Economic Dynamics and Control 32, 2690—2721.

Christiano, Lawrence, Martin Eichenbaum, and Charles Evans (2005), "Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy", *Journal of Political Economy* 113(1), 1—45.

Del Negro Marco, Frank Schorfheide, Frank Smets, and Raf Wouters (2007), "On the Fit and Forecasting Performance of New Keynesian Models", *Journal of Business and Economic Statistics* 25, 123-143.

Milani, Fabio (2007), "Expectations Learning and Macroeconomic Persistence", *Journal of Monetary Economics* 54(7), 2065-2082.

Smets, Frank, and Raf Wouters (2003), "An Estimated Stochastic Dynamic General Equilibrium Model of the Euro Area", *Journal of the European Economic Association,* 1(5), 1123-1175.

Taylor, John (1993), "Discretion Versus Policy Rules in Practice" Carnegie-Rochester Series on Public Policy, North-Holland, 39, 195—214.

Chapter 16 Consumption

The consumption response to income changes

Tullio Jappelli, Luigi Pistaferri

University of Naples Federico II and CEPR; Stanford University

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How does consumption respond to a change in income – whether expected or unexpected, temporary or permanent? This column reviews evidence from diverse sources and suggests that if financial market arrangements and liquidity constraints are binding, even changes in income that are predictable can have a significant effect on consumption. This supports the idea that tax changes can have a considerable impact on expenditure.

With the recovery underway, the consumption-income link is back in the spotlight. While there is a long tradition of studying the connection, many questions lack definitive answers:

- How does household consumption respond to changes in economic resources?
- Does the response depend on the nature and duration of the changes?
- Do anticipated income changes have a different consumption impact than unanticipated shocks?
- Do transitory income shocks have a lower impact than permanent ones?
- What about small changes compared with large ones?

These questions are crucial for understanding consumers' behaviour and to evaluate fiscal policy changes that impacts households' resources. Indeed, in virtually all countries, consumption represents more than two thirds of GDP, and knowledge of how consumers respond to income shocks is crucial for evaluating the macroeconomic impact of fiscal packages implemented in response to the financial crisis.

Economists have taken different empirical approaches to estimate these important policy parameters. To put matters in perspective, Figure 1 provides a roadmap to the main links between consumption and income

changes. The main distinction that we draw is between the effect of anticipated and unanticipated income changes. The Modigliani and Brumberg (1954) and Friedman (1957) celebrated life-cycle and permanent income models posit that people use savings to smooth income fluctuations, and that they should respond little – if at all – to changes in income that are predictable.

Figure 1 A roadmap of the response of consumption to income changes
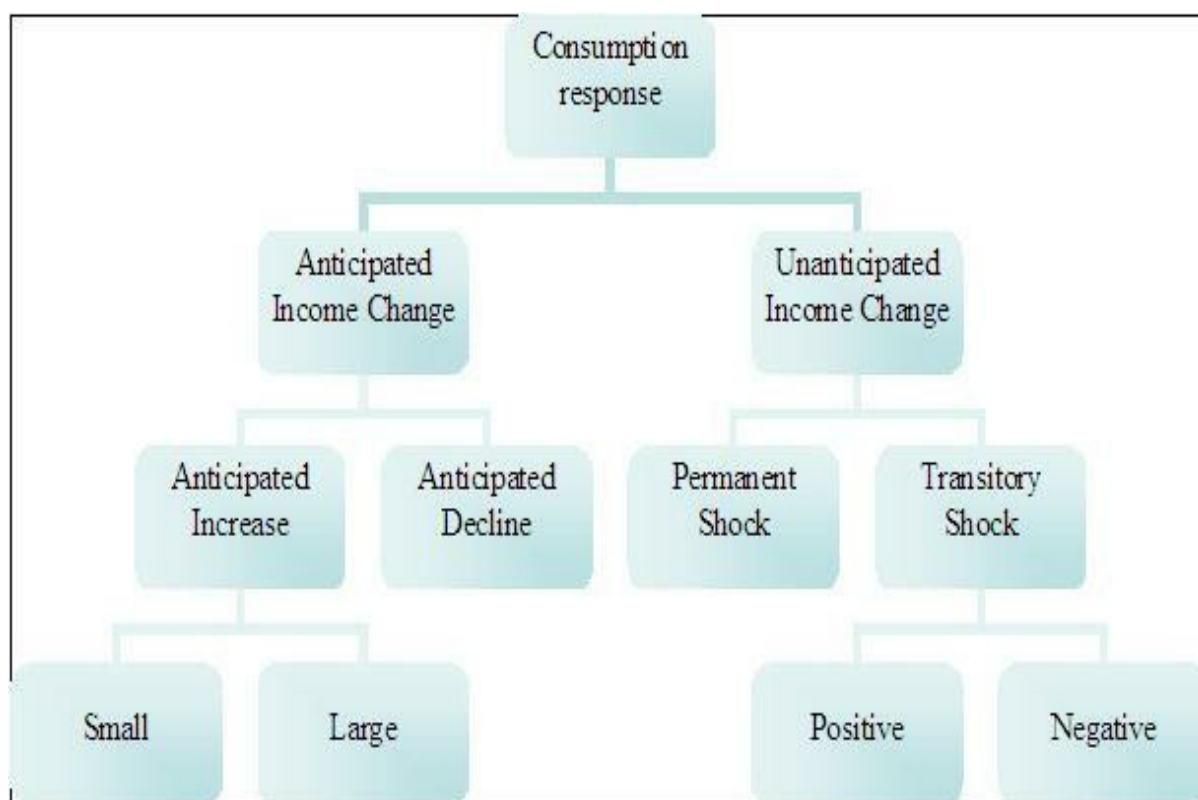
More recently, the literature has sought to gain further insights by distinguishing between situations in which consumers expect an income decline or an income increase. A further distinction that has proven to be useful is between large and small expected income changes, as consumers might may react mostly to the former and neglect the impact of the latter. The branch on the right-hand side of the figure focuses instead on the impact of unanticipated income shocks. The main distinction here is between transitory shocks, which should have a small impact on consumption, and permanent shocks, which should lead to major revisions in consumption. As with anticipated changes, the literature has sought to pin down the empirical estimates identifying positive and negative shocks.

Predictable income changes

A first group of researchers has tried to identify specific episodes in which

predicted income changes are observable by both the consumer and the econometrician. Such episodes can also be classified into expected income increases and expected income declines.

For instance, Shapiro and Slemrod (2009) use survey data to measure individual responses to actual or hypothetical tax policies, reporting that temporary tax changes could be moderately effective in increasing household spending. Parker (1999) considers the effect on consumption of the anticipated income increase induced by reaching the US social security payroll cap ($106,800 in 2009), and Souleles (2002) how consumption responded to the widely pre-announced tax cuts of the Reagan administration era.

Further insights from tax refunds is provided by Johnson et al. (2006), who study the large income tax rebate programme provided by the Economic Growth and Tax Relief Reconciliation Act of 2001. The authors find that the average household spent 20% to 40% of their 2001 tax rebate on non-durable goods during the three-month period in which the rebate was received. The authors also find that the expenditure responses are largest for households with relatively low liquid wealth and low income, which is consistent with the presence of liquidity constraints.

Expected income declines

A second group of authors considers the effect of expected income *declines* on consumption. The most important predictable decline in one's income occurs at retirement. One of the first papers to look at this issue is Banks et al. (1998) who found a remarkable drop in consumption after retirement, a finding that has been challenged by subsequent research (Hurd and Rohwedder 2006, and Aguiar and Hurst 2007).

Unanticipated income shocks

The approach taken by economists studying the impact of unanticipated income shocks is to compare households that are exposed to shocks with households that are not (or the same households before and after the shock), and to assume that the difference in consumption arises from the realisation of the shocks. The literature has looked at the economic consequences of illness, disability, unemployment, and, in the context of developing countries, weather shocks and crop losses. Some of these shocks are transitory (such as temporary job loss), and others are permanent (disability); some are positive (dividends pay-outs), others negative (illness).

A further approach to identify the consumption response to unanticipated income shocks makes specific statistical assumptions about the income process, and estimates the response of consumption to income shocks. Blundell et al. (2008) find that in the US consumption is nearly insensitive to transitory shocks, while the response of consumption to permanent shocks is about 0.65 (but lower for the college educated and those near retirement and higher for poor or less educated households). Jappelli and Pistaferri (2008) find a response to permanent shocks of about 1 in Italy.

Overall, there is by now considerable evidence that consumption appears to respond to anticipated income increases, over and above by what is implied by standard models of consumption smoothing. In Jappelli and Pistaferri (2010) we cite evidence from diverse sources, studies and countries. We find that, at least locally, financial markets' arrangements and liquidity constraints are an important culprit for this lack of consumption smoothing. Indeed, consumption appears much less responsive to anticipated income declines (for instance, after retirement), a case in which liquidity constraints have no bearing.

A second finding that emerges from the literature is that the consumption reaction to permanent shocks is much higher than that to transitory shocks. There is also evidence, at least in the US, that consumers do not revise their consumption fully in response to permanent shocks.

Concluding remarks

Taken together, these findings suggest that tax changes might have a considerable impact on consumption expenditures. However, the precise effect will depend on whether the policy is anticipated, whether taxes increase or decline, whether the change is perceived as temporary or permanent. The main challenge for empirical work evaluating fiscal packages is therefore to distinguish between different expectations and contexts in which tax programmes and fiscal packages are implemented.

References

Aguiar Mark, Erik Hurst (2007), "Life-Cycle Prices and Production", *American Economic Review*, 97: 1533-59.

Banks, James, Richard Blundell, Sarah Tanner (1998), "Is There a Retirement Savings-Puzzle?", *American Economic Review*, 88:769-88.

Blundell, Richard, Luigi Pistaferri, Ian P Preston (2008), "Consumption inequality and partial insurance", *American Economic Review*, 98:1887-1921.

Friedman, Milton (1957), *A Theory of the Consumption Function*, Princeton: Princeton University Press.

Gruber Jonathan (1997), "The Consumption Smoothing Benefits of Unemployment Insurance", *American Economic Review*, 87(1):192-205.

Hurd Michael D, Rohwedder Susann (2006), "Some answers to the Retirement Consumption Puzzle", NBER Working Paper 242.

Jappelli Tullio, Luigi Pistaferri (2008), "Financial Integration and Consumption Smoothing", CSEF Working Paper 200.

Jappelli Tullio, Luigi Pistaferri (2010), "The Response of Consumption to Income Changes", *Annual Review of Economics*, forthcoming.

Johnson David S, Jonathan A Parker, Nicholas S Souleles (2006), "Household Expenditure and the Income Tax Rebates of 2001", *American Economic Review*, 96: 1589-1610.

Modigliani Franco, Ricahrd Brumberg (1954), "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data", in Kenneth Kurihara (eds), *Post-Keynesians Economics*, New Brunswick: Rutgers University Press.

Parker Jonathan A (1999), "The Reaction of Household Consumption to Predictable Changes in Social Security Taxes", *American Economic Review*, 89:959-7.

Souleles Nicholas S (2002), "Consumer Response to the Reagan Tax Cuts", *Journal of Public Economics*, 85(1):99-120.

Shapiro Mathew D, Joel Slemrod (2009), "Did the 2008 Tax Rebates Stimulate Spending?", *American Economic Review, Papers and Proceedings* 99:374-79.

The $2 trillion dollar question: How about US demand and output?

Giancarlo Corsetti and Panagiotis Th. Konstantinou

University of Cambridge and CEPR; University of Macedonia

18 February 2009

The US net international investment position declined by an astounding magnitude in 2008. Does that imply a massive contraction in US consumption? This column provides empirical evidence that large swings in the US current account are driven by transitory shocks that don't significantly alter consumption.

In a recent Vox column, Gian Maria Milesi-Ferretti estimated that the US current account deteriorated by 15% of GDP in 2008. This record fall was driven by the $1.2-1.3 trillion losses on US-owned foreign assets, mostly equities and foreign direct investment. In previous years, capital gains had actually allowed the US to run a substantial trade deficit while leaving its foreign wealth essentially unaffected. Trade in international financial markets provides a country with opportunities to smooth consumption against shocks affecting domestic incomes and diversify risk. However, as long as markets remain incomplete, it also exposes a country to sizeable external financial shocks – a point implicitly stressed by the analysis of Milesi-Ferretti.

So, the question is – to what extent can such a huge and rapid deterioration of external wealth drive a contraction in US consumption and domestic demand? By the same token, how much of the low US saving in the past can be attributed to capital gains? In this column, we argue that the answer is – not much.

Output, foreign investments, and consumption

The results from our joint work recently published as a CEPR discussion paper can help shedding some light on the reason why. Namely, looking at the US for the past decades, we are able to quantify in an empirical manner the relative importance of permanent and temporary variations in US net output (net of government spending and investment) and US holdings of foreign assets and liabilities, all adjusted for capital gains and losses, and assess how these influence US consumption. The methodology builds on

Lettau and Ludgvison (2004).

In our study, we classify disturbances according to their persistence (permanent vs. transitory) and their incidence (net output vs. assets/returns). We should stress that, although our methodology does not allow us to identify shocks in a structural sense (we cannot say whether disturbances in our model originate in technology, expectations, government behaviour etc.), our permanent shock has a natural structural interpretation as a supply shock, as it raises net output in the long run.

A key finding in our analysis is that most of the variation in the stock of US foreign assets and liabilities is driven by *temporary* disturbances. This is true both at both short and long horizons. Looking at the forecast error one and four quarters ahead, 87% to 90% of its variance for gross assets and liabilities is explained by temporary shocks. This percentage is only slightly lower for horizons up to 20 quarters. It remains above 50% at a 40 quarters horizon. When we combine assets and liabilities as to obtain a proxy of the current account as the change in net foreign assets, it turn out that temporary shocks explain 95% of its variation at all horizons.

Net output is also driven by temporary shocks in a substantial way. However, most of the temporary disturbances to output occur at business cycle frequencies, between one and eight quarters ahead. In the long run (40 quarters), net output is almost exclusively driven by permanent shocks.

So, in light of our empirical results, the large swings in the US current account stressed by Milesi-Ferretti are to a large extent driven by *temporary disturbances* moving both US foreign assets and liabilities.

Temporary and permanent shocks

Not surprisingly, much of this variation is due to stochastic variations in returns. Figure 1 shows the transitory variations in US assets (upper panel) and liabilities (lower panel) we extract from our model, together with a four-quarter moving average of rates of return, calculated including capital gains and losses – the dataset we use is derived from the work of Lane and Milesi-Ferretti (2007) (but results are identical if we use the dataset by Gourinchas and Rey 2007). The blue broken line plots the transitory component of the stocks of asset and liabilities (please see our paper for details); the black line to returns. In the graph, we have made a normalisation such that, whenever gross positions are above trends, transitory components are positive.

Figure 1 Transitory variations in assets, liabilities, and returns
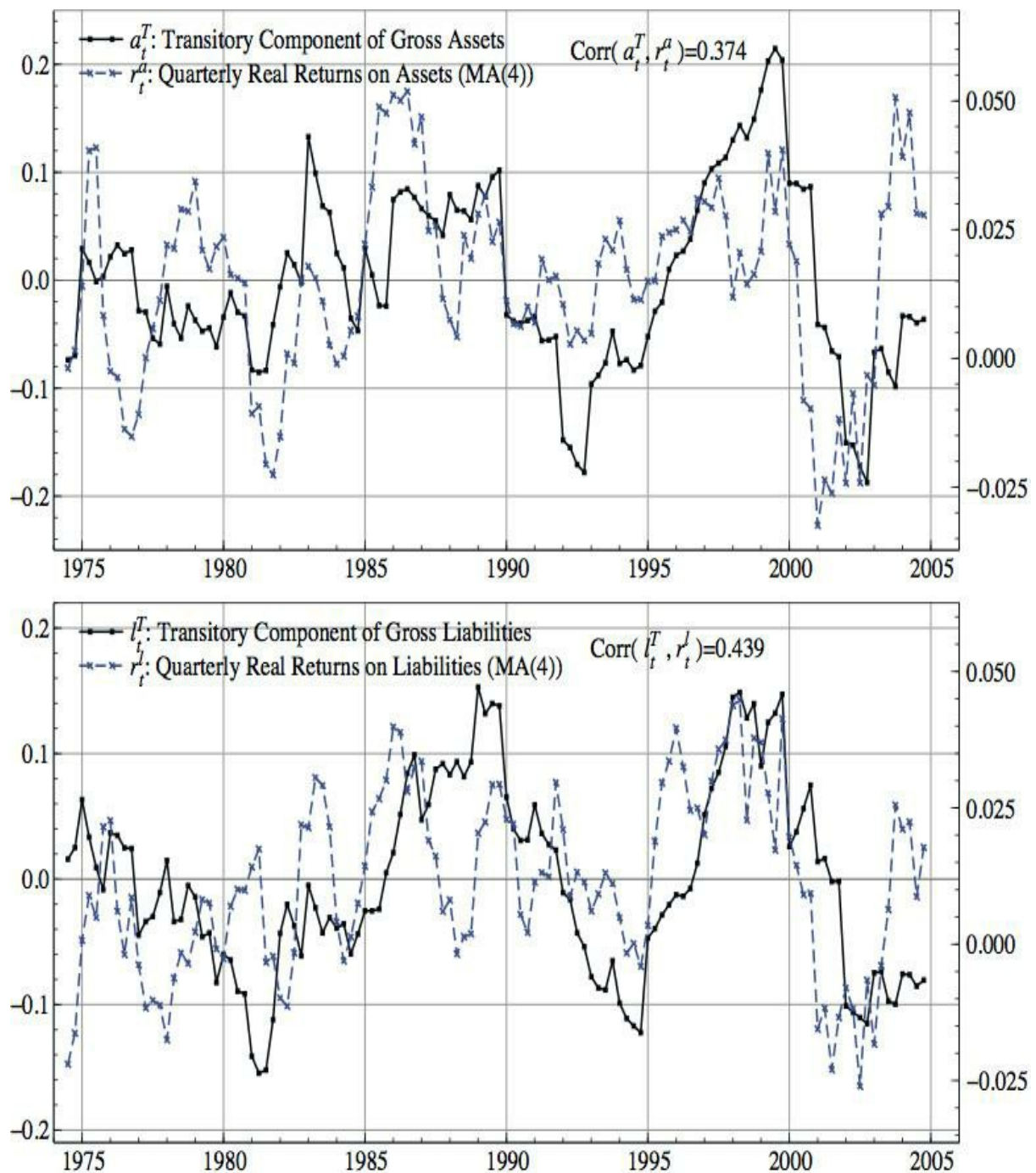
It is apparent that transitory swings in gross positions are persistent and large, especially during the 1990s. Periods in which foreign assets are above trend (e.g. 1994-1999) are followed by periods in which the opposite is true. At its peak in 1999, the transitory component of foreign assets was 2.15% of its permanent component. Translated into dollar amounts, this means that assets exceeded their long-run trend by as much as $56,729 dollars per person (in 1996 dollars), well above the median annual household income!

The cyclical components of assets and liabilities shown in the graph are clearly correlated with transitory movements in rates of return, which are equally large and persistence. The correlation coefficient is .37 and .44 for assets and liabilities, respectively. The correlation remains high at different time horizons, i.e. between returns today and assets one, two, three, and four quarters ahead, reflecting persistence.

What about consumption? The striking finding of our analysis is that US consumption only responds to permanent shocks – the above temporary fluctuations are completely smoothed, also thanks to foreign borrowing and lending. The following graph shows the response of consumption together with that of net output, assets, and liabilities, to the unique permanent shock we find in our four-variable system. A permanent shock that increases net output in the long run has a natural interpretation as a supply shock, possibly reflecting technology.

Figure 2 Responses to a permanent shock
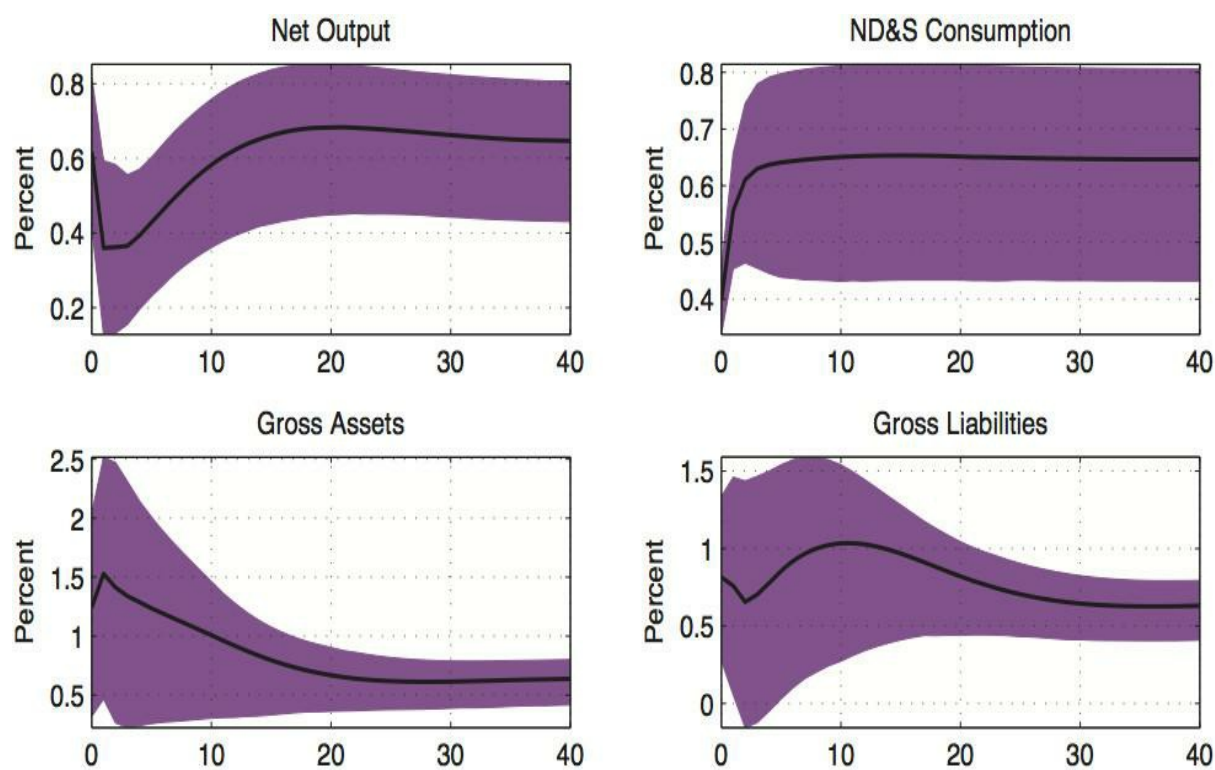
As shown by the graph, net output jumps initially and then grows smoothly. Consumption adjusts quite swiftly, in practice reaching its new long run level in four quarters. Both assets and liabilities increase, but the latter rise more than the former, so that a current account deficit results.

Conversely, consumption is essentially insulated from all temporary disturbances. Not only by those moving net output in the short run – to be

attributed to the business cycle – but also those moving returns on foreign assets, which have been significantly large well beyond business cycle frequencies.

Conclusion

Our results show that much of the movements in valuation-adjusted gross external positions by the US are of transitory nature, although these movements are quite persistent. This suggests that, while transitory build-up of assets and liabilities can be expected to revert to trend at some point in the future, the process may take quite some time. Yet, the process of adjustment to these shocks, no matter how long it lasts, is not relevant for US consumption. Large corrections of US demand required by external balance works mainly via changes in permanent income.

Editors' note: This column is a Lead Commentary on Vox's Global Crisis Debate where you can find further discussion, and where professional economists are welcome to contribute their own Commentaries on this and other crisis-linked topics.

References

Corsetti Giancarlo, Panagiotis Konstantinou (2008), "What Drives US Foreign Borrowing? Evidence on External Adjustment to Transitory and Permanent Shocks," CEPR Discussion Paper 7134.

Gourinchas, P.-O. and Rey, H. (2007), "International Financial Adjustment," *Journal of Political Economy,* 115, 665-703

Lane, P. R and Milesi-Ferretti, G.-M. (2007) "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities: 1970-2004," *Journal of International Economics,* 73, 223-250

Lettau, M. and Ludvigson, S. (2004) "Understanding Trend and Cycle in Asset Values: Reevaluating the Wealth Effect on Consumption," *American Economic Review,* 94, 276-299

Milesi-Ferretti Gianmaria, (2009), "A $2 trillion question," VoxEU, 28 January.

Chapter 17 Investment

Why is housing such a popular investment? A new psychological explanation

Thomas Alexander Stephens and Jean-Robert Tyran

University of Vienna; University of Vienna and CEPR

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Despite its meagre real returns in the long run, many people still think that investing in housing is a good idea. This column argues that a major reason for the tendency to buy houses is that it's rare to lose money. Recent research shows people's perceptions of housing transactions to be shaped by whether they gain or lose money – above and beyond the real returns.

In the wake of the economic crisis that began in 2007, homeowners in many countries have faced substantial losses. Prices have fallen in both nominal and real terms. In the US, for example, house prices in the first quarter of 2012 were down more than 40% in real terms from their peak (Shiller 2012). Nevertheless, housing remains a popular investment.[1] This popularity is surprising because, over the post-war period, US house prices have been essentially flat in real terms while the US stock markets have risen more than fourfold in real terms over the same period.[2]

House prices and psychology

The change in market value of the asset is of course only part of the overall return on investment – housing provides housing services and shares typically pay dividends.[3] Nevertheless, the market value is important, particularly in psychological terms, because of the possibility of losses. It is well established that losses loom larger in people's minds than corresponding gains (Kahneman and Tversky 1979), but the results of our study suggest a particular dislike of losing money – that is, an aversion to nominal losses.

When viewed in nominal rather than real terms, the capital gains from US housing look more appealing. From 1946 to 2012, nominal house prices showed a 12-fold increase. On an annual basis, housing investments have mostly resulted in gaining money (in 58 out of 66 years), while at the same

time producing real losses more often than not (in 36 v 30 years).[4]

Perceptions of investments

In a recent CEPR paper, we show that perceptions of housing transactions are shaped by gaining versus losing money, even when real losses are held constant. Our research builds on evidence from US housing markets showing that homeowners are reluctant to sell when facing nominal losses (Anenberg 2011, Engelhardt 2003, Genesove 2003, Genesove and Mayer 2001). Our survey experiment, with a large, heterogeneous sample, adds to these studies by relating evaluations to detailed information about decision makers and by clearly pinning down the role of nominal losses (as opposed to nominal changes more generally), using controlled variation of the environment.

The starting point of our paper is the fact that, in the presence of inflation, real and nominal losses need not coincide. To illustrate, imagine buying a house for $200,000 in cash, and selling it several years later for $170,000. Without inflation, the nominal and real losses will coincide at 15%, irrespective of the holding period. With even low, stable inflation, however, the nominal loss will rapidly disappear. If inflation is 2%, a real loss of 15% will become a nominal gain within nine years.

Measuring perceptions

To measure the effect of nominal gains vs. losses on perceptions, we present subjects with hypothetical housing transactions involving the purchase and subsequent sale of a house, and ask them to evaluate the advantageousness of these transactions. None of the transactions are in fact advantageous: they all involve smaller or larger real losses. However, each real transaction is presented twice (on separate screens); once with low inflation, so that it involves losing money (a nominal loss), and once with high inflation, so that it involves gaining money (a nominal gain).

We then take differences between evaluations of a given real loss when presented as a nominal gain and nominal loss, and average them. This gives us an index of nominal loss aversion – a number indicating the strength of a subject's dislike of losing money – for each subject.

Figure 1 shows the distribution of the nominal loss aversion index. A subject concerned solely with real gains or losses would have an index of zero, as indeed do 17% of our subjects. The rest, however, are heavily skewed towards positive values, with 73% of the index values being positive – indicating a dislike of losing money – against only 10% that are

negative. Treating the 10% as symmetrical noise, about 60% of our subjects prefer identical real losses when they gain rather than lose money.

Figure 1 Distribution of nominal loss aversion index
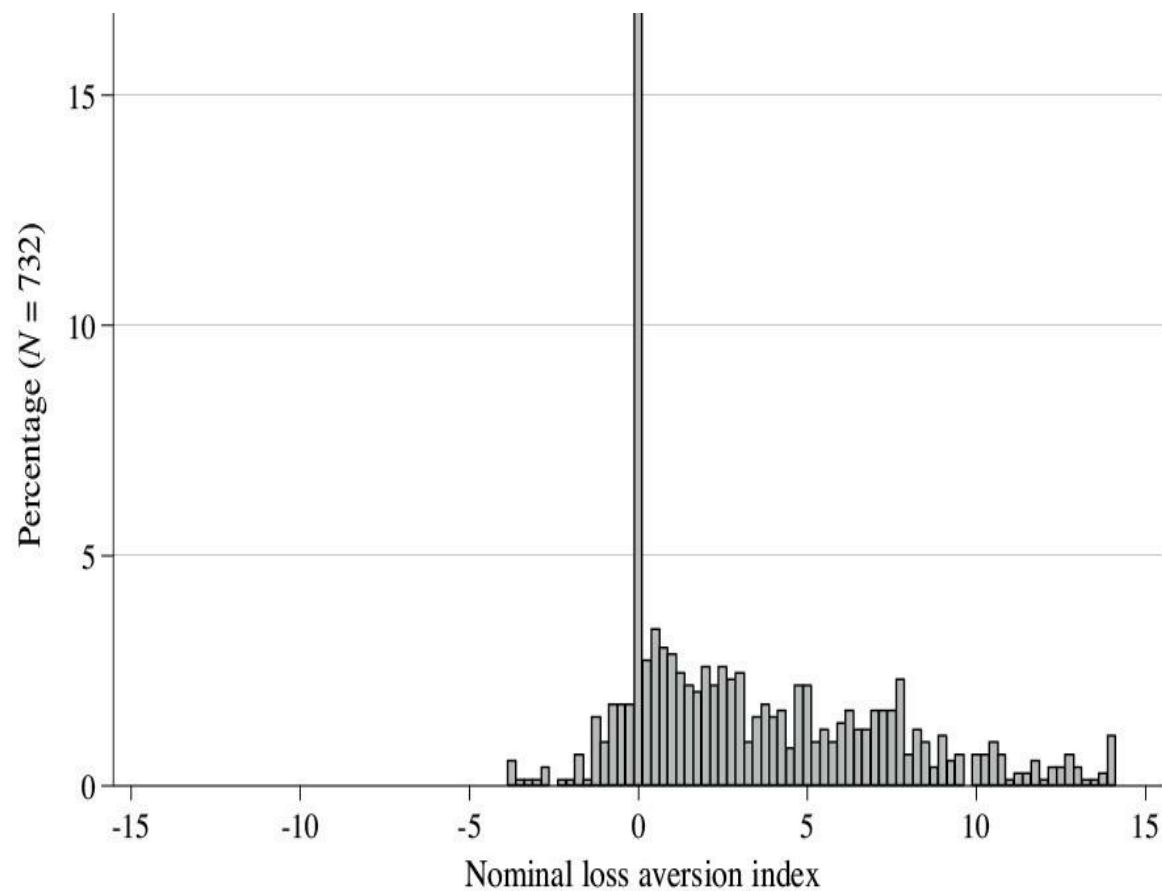
A unique advantage of our subject pool is the availability of detailed official socioeconomic data from the National Bureau of Statistics (Statistics Denmark), as well as the results of cognitive and personality tests. This data set allows us to identify which sorts of people are prone to nominal loss aversion.

Within our sample, we find that subjects with more education and higher incomes tend to be less likely to let monetary gains or losses influence their evaluations. At the same time, there is no significant difference between those who own property and those who do not, suggesting that this bias is not eliminated by experience.[5]

Cognitive measures are particularly strongly correlated with nominal loss aversion. Subjects with higher cognitive ability are far less likely to be influenced by purely nominal differences. The most important aspect of cognitive ability is not intelligence per se, but cognitive reflection

(Frederick 2005) – a tendency to rely on slower, more deliberative cognitive processes rather than rapid, intuitive ones. Taken together, our findings on education and cognitive reflection suggest that there may be scope for reducing nominal loss aversion through improvements in financial education.

Gaining or losing money is key

To separate a dislike of losing money from simple nominal thinking, we ran a second survey experiment with transactions involving both real losses and real gains. We duplicated the first experiment, but added a second treatment in which all of the real losses were changed to equivalent real gains. Struck by the powerful effect of nominal loss aversion observed in our first experiment, we were also curious to learn if the effect of nominal loss aversion would persist if the scenarios were presented to subjects in a highly transparent way, on a single screen. We find that it does.

Figure 2 shows average evaluations of the housing transactions in the second experiment. The two leftmost bars show the average evaluations of real losses, and the two rightmost bars show the average evaluations of real gains. The light bars represent transactions with low inflation, and the dark bars transactions with high inflation.

Figure 2 Evaluations of housing transactions at high vs. low inflation, real losses (left) v real gains (right)
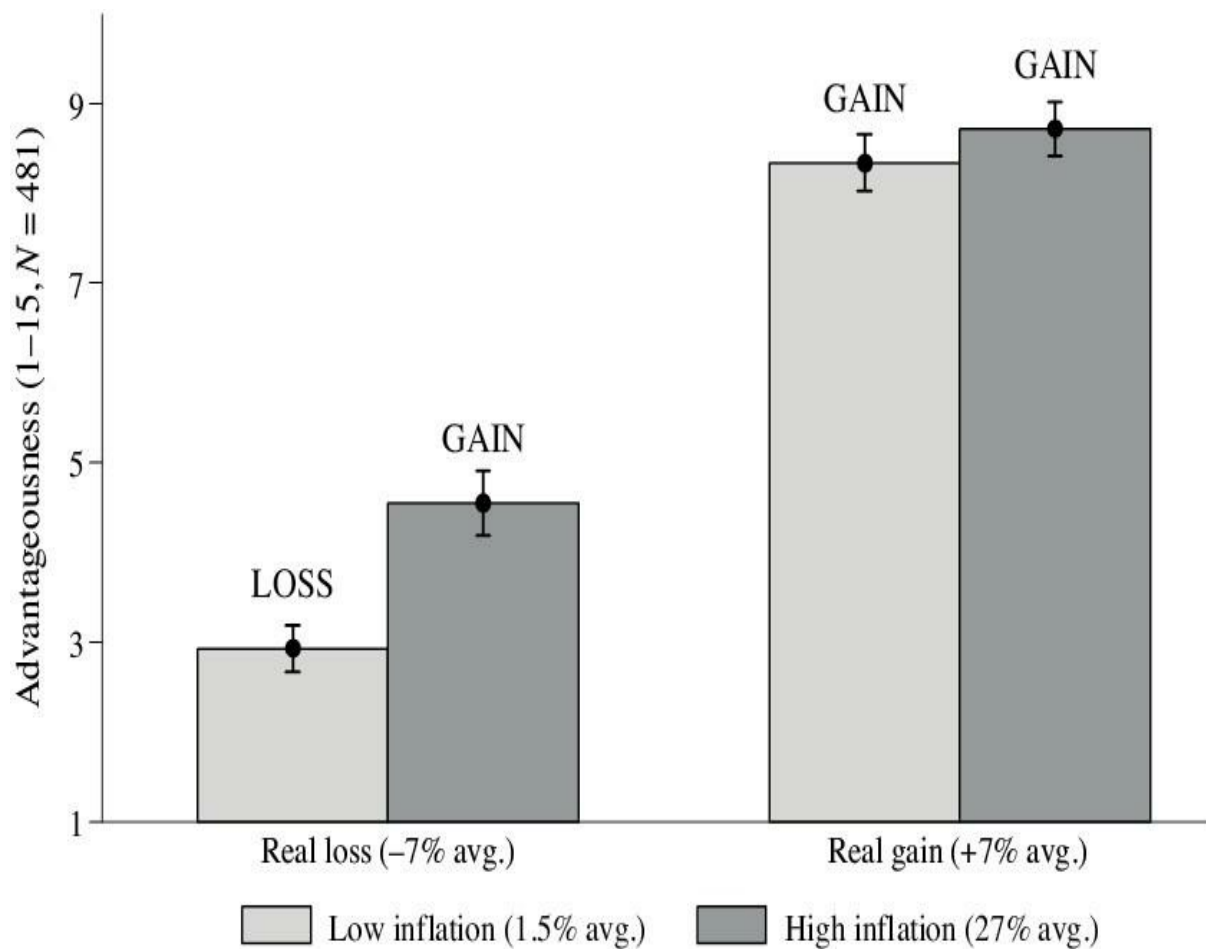
Comparing the two bars on the left with the two on the right, it is clear that real gains are viewed more favourably than real losses, as should be the case from the perspective of standard economics. At the same time, a comparison of the first two bars shows that evaluations of losses are shaped by gaining or losing money. Identical real losses are viewed more favourably when they involve gaining rather than losing money.

In contrast to real losses, higher inflation has essentially no effect on evaluations when holding real gains constant (compare the third and fourth bars). This contrast (the two bars on the left are different, the two on the right are not) shows that subjects are not simply thinking in nominal terms, but rather dislike losing money.

Conclusion

Many people view housing as an attractive investment with good potential, despite meagre real capital gains over the long run. We suggest nominal

loss aversion as a psychological mechanism that can help to explain the surprising popularity of housing as an investment. Using data from a survey experiment, we find that evaluations of housing transactions are shaped by gaining or losing money. We find no evidence that property ownership reduces this bias, but do find strong evidence that more education and greater cognitive reflection do. These results suggest that better financial education may reduce this bias towards overinvesting in housing.

References

Anenberg, E (2011), "Loss Aversion, Equity Constraints and Seller Behavior in the Real Estate Market", *Regional Science and Urban Economics*, 41(1), 67-76.

Engelhardt, G V (2003), "Nominal Loss Aversion, Housing Equity Constraints, and Household Mobility: Evidence from the United States", *Journal of Urban Economics*, 53(1), 171-195.

Fannie Mae (2012), "Fannie Mae National Housing Survey", First Quarter.

Frederick, S (2005), "Cognitive Reflection and Decision Making", *Journal of Economic Perspectives*, 19(4), 25-42.

Genesove, D (2003), "The Nominal Rigidity of Apartment Rents", *Review of Economics and Statistics*, 85(4), 844-853.

Genesove, D and C Mayer (2001), "Loss Aversion and Seller Behavior: Evidence from the Housing Market", *Quarterly Journal of Economics*, 116(4), 1233-1260.

Hasanov, F and D C Dacy (2009), "Yet Another View on Why a Home Is One's Castle", *Real Estate Economics*, 37(1), 23-41.

Kahneman, D and A Tversky (1979), "Prospect Theory: Analysis of Decision under Risk", *Econometrica*, 47(2), 263-291.

Shiller, R J (2012), Online data, accessed 4 November, http://www.econ.yale.edu/~shiller/data.htm.

Stephens, T A and , J-R Tyran (2012), "'At Least I Didn't Lose Money' – Nominal Loss Aversion Shapes Evaluations of Housing Transactions", CEPR Discussion Paper, DP9198.

[1] A survey by Fannie Mae (2012) in the first quarter of 2012 found that 58% of US citizens viewed housing as an investment with 'a lot of potential', and 65% viewed it as a 'safe' investment. By comparison, 55% viewed shares as an investment with 'a lot of potential', and only 15% viewed

them as 'safe'.

2 From 1946 to the start of 2012, US house prices increased in real terms by about 7% (Shiller 2012). The house price data refer to individual properties sold more than once, to control for changes in housing characteristics over time. The stock market figure is the Dow Jones Industrial Average (DJIA).

3 Other relevant differences include liquidity, transaction costs and taxation. See Hasanov and Dacy (2009) for a comparison of overall returns from 1952–2005.

4 Excluding the post-bubble price declines from 2006–2011, housing gained money, on average, in 57 of 60 years. The DJIA, in contrast, was more likely to provide positive than negative annual real capital gains (41 years v 25 years), but viewing these gains in nominal terms makes little difference (positive nominal gains in 47 years v negative in 19).

5 The lack of an experience effect is perhaps not surprising, since the number of transactions over a lifetime tends to be relatively low.

Chinese foreign direct investment: What's happening behind the headlines?

Lucian Cernat and Kay Parplies

European Commission

16 July 2010

While China is recognised as one of the world's leading destinations for inward foreign direct investment, outward investment by Chinese companies has also taken off in recent years. This column presents survey data suggesting that, similar to western firms, Chinese companies tend to invest in well-developed countries with a large market size and a favourable institutional environment.

At one point, most economists were interested in Chinese foreign direct investment (FDI) patterns as a route to understanding how western firms could operate in the Chinese market more effectively. Times have changed. When a line-up of top European economists meet at an EU-sponsored event at the Shanghai Expo next week they will be equally interested in understanding the motivations of Chinese firms that have been investing in Europe over the last decade, and their impact on the EU economy. The prospect of Chinese FDI in a range of infrastructure projects playing a major role in Greece's fiscal recovery efforts highlights the relevance of this research.

China as an FDI generator

While China is now firmly established as one of the world's most important destinations for inward FDI, outward FDI by Chinese companies has also taken off spectacularly. Outflows doubled from 2007 to 2008 and expanded fourteen-fold between 2003 and 2008 (see Figure 1).

Figure 1 Chinese outward FDI (€ billion)
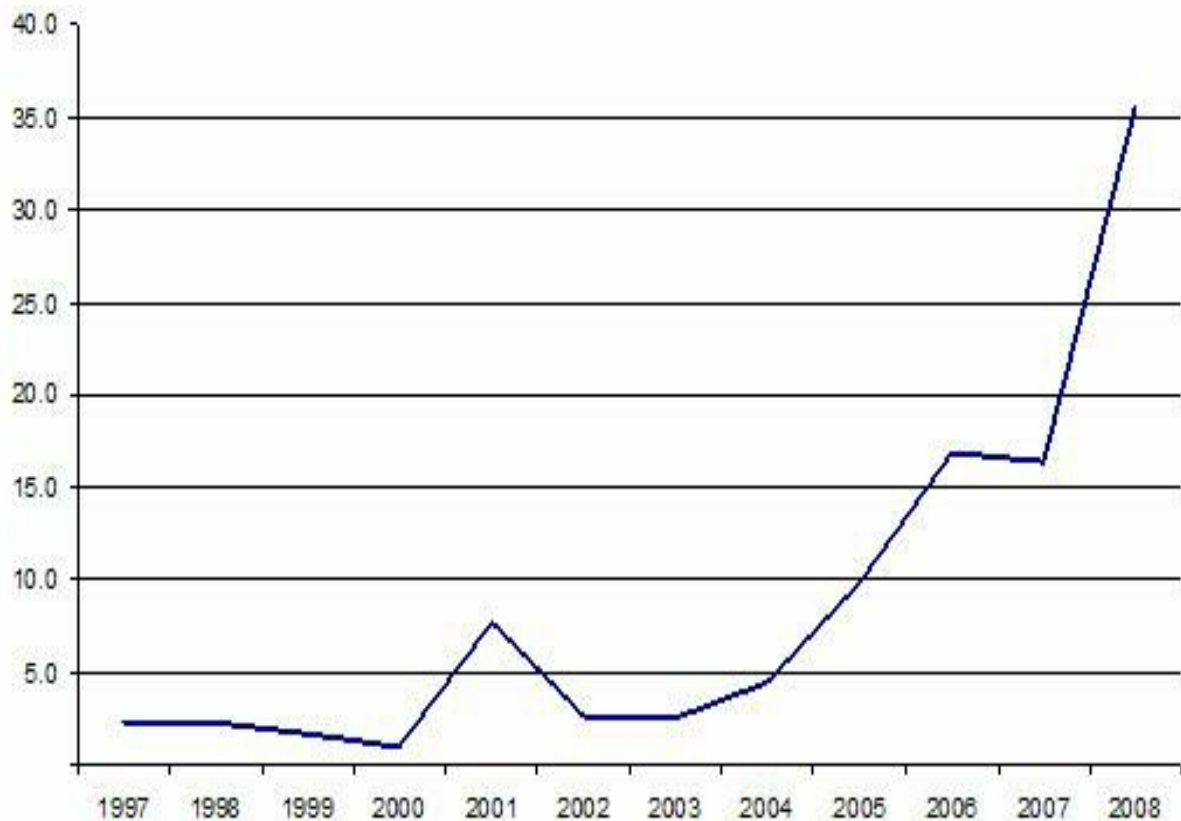
Despite the challenging economic environment, Chinese overseas investment continued to grow in 2009. According to data published by the Ministry of Commerce, outbound FDI by Chinese enterprises amounted to $43.3 billion in 2009, a year-on-year increase of 6.5%. This growth occurred against the backdrop of a decline in global FDI by up to 40% compared to 2008. Chinese overseas investment has thus proven remarkably resilient in the challenging conditions created by the financial crisis.

Much of the attention has been captured by large transactions, such as the take-over of Volvo by the Chinese carmaker Geely or Chinalco's bid for Anglo-Australian mining giant Rio Tinto. Yet a lot of activity takes place below the scale of these mega deals. A new study by the China Council for the Promotion of International Trade (2010), in co-operation with the European Commission's DG TRADE and CEPII research institute[1] provides a broad overview of Chinese outward FDI activity based on a detailed survey of 3,000 Chinese firms. This is the first time that firm-level information about Chinese FDI in Europe has been available at this level of detail. Thanks to the involvement of the China Council for the

Promotion of International Trade, nearly half (46%) of the contacted firms replied to the extensive questionnaire.

The results indicate that Chinese firms' overseas activities are still at an early stage of development.

- Chinese firms are motivated mainly by access to improved distribution networks and advanced technology.

Accordingly, most projects involve setting up distribution centres and sales offices. Meanwhile, access to natural resources is an important objective of investments in developing economies.

- One quarter of the Chinese companies covered by the survey have made some type of overseas investment, although most of them are relatively small scale investments.
- 61% of responding firms indicated that their overseas investments remained below $1 million, while more than 80% of investments are below $5 million.
- Only a few companies have been capable of making large scale overseas investments in excess of $100 million.
- In terms of investment projects, overseas representative offices and sales offices are the most frequent types of overseas expansion routes adopted by Chinese enterprises.
- Some large companies, especially state-owned enterprises, have made cross-border mergers & acquisitions (M&A). In firms' future investment plans, M&A figure more prominently than in the past and activity can therefore be expected to pick up.

What this evidence suggests is that the sunk costs of engaging in FDI activities in Europe for small- and medium-sized Chinese companies are relatively low. Unlike the argument put forward by the "new-new trade theory", inward Chinese FDI in Europe does not seem to be confined to the "happy few" multinational or large companies with strong expansion potential (see Mayer and Ottaviano 2008 and Melitz and Ottaviano 2008).

Where and in what?

The sectoral and geographical breakdown of Chinese FDI in Europe offers additional insights.

- Most Chinese outbound investors are active in manufacturing sectors, although the industry profile is becoming increasingly diversified.
- Within the manufacturing industry, the textile and machinery and equipment sectors figure most prominently, reflecting China's strong export performance in these industries.
- Whereas most outbound investment in Europe has been aimed at enhancing market access through distribution and sales offices, manufacturing investment has been more significant for investment in developing economies.
- Apart from the manufacturing industries, companies active in construction and wholesales and retail operations are among the most active foreign investors.

Overall, the investment profile of the companies covered by the survey reflects China's presence in its export markets.

The selection of the Chinese FDI destinations is mainly driven by their market potential, in addition to their proximity to the Chinese market. Perceived strengths of the EU include the integrated market, the single currency and the good regulatory environment. Meanwhile, China's "Going Global" policy seems to be an important push factor in firms' outbound FDI activity. The study indicates that investment barriers do not play a major role among the factors influencing Chinese investment in the EU.

The main destinations for the overseas investments of Chinese enterprises are Asia, followed by Europe and North America, while only a few respondents have overseas investments in other regions. Asia, especially the Southeast Asian region which has a similar economic structure and cultural tradition, as well as long-standing commercial relations with China, has become the preferred destination for Chinese enterprises. We believe this situation will not change significantly for some time.

It is noteworthy that Vietnam, following its economic reforms, is becoming an important destination for Chinese investment. In terms of future investment plans, African destinations are becoming more important. They are seen as nearly equally important as a future investment location as the EU and North America.

When Chinese companies invest in the EU, the size of the local market seems to matter greatly.

- They mainly locate in Germany, France, Italy and the UK. Respondents' future investment plans show the same geographic profile.
- Smaller EU member states continue to be perceived as less attractive destinations, although Chinese enterprises consider the fact that the EU is an integrated market, has a single currency and a good regulatory environment as the main advantages of investing in the region.
- The most promising sectors for investing in the EU are considered to be manufacturing and wholesale and retail trade.
- The US remains a very important destination for Chinese FDI.

Chinese enterprises view overseas investments as a long term development strategy and respondent firms indicate a strong resolve to view overseas investments in a medium and long term perspective. While the scale of the respondents' investments is generally small, over half of the respondent enterprises expressed an intention to increase overseas investments in the coming two to five years.

Impact of the crisis

As expected, the survey indicates that the overseas investments of most enterprises have been affected by the financial crisis. The financial crisis has caused economic recessions in many countries as well as a reduction in China's domestic demand growth, which has made overseas investments more difficult for many Chinese enterprises. Moreover, access to financing for overseas investment has become difficult due to the crisis, and trade protectionism is perceived to be on the rise in some destination markets (see Evenett 2010). By contrast, some respondents identified positive effects associated with the crisis, such as weakened overseas competitors and the availability of acquisition targets at more attractive prices.

Results from statistical analysis of the data

An augmented gravity analysis (see appendix) including a number of structural parameters describing the institutional environment prevailing in different markets (such as the World Bank Doing Business indicators and OECD employment protection indicators) confirms the pattern emerging from the descriptive survey data. The regressions confirm the more anecdotal finding that Chinese companies tend to invest in countries with a

large market size, a high level of economic development, and a favourable institutional environment.

Hence, the pattern emerging from the survey is that the behaviour of Chinese firms can be explained by much the same parameters as western firms' international activities. Perhaps the biggest surprise is that there are so few surprises in the data.

Yes, Chinese investors do mainly seek to build distribution channels for their exports and access to advanced technology. When they set up manufacturing activities they do so mainly in developing countries. African destinations are becoming increasingly important as a market for exports and for access to raw materials. The data thus reflect the overall level of development of the Chinese economy and its manufacturing enterprises.

From an EU perspective, encouraging findings include the fact that investment barriers are not perceived as a significant impediment to setting up operations in Europe. It is also heartening that Chinese investors seem to value a well-functioning institutional environment, including the integrated market.

What the survey of Chinese companies suggests is that Europe does have some strong selling points to promote in Shanghai. As Lao Tzu's famous saying goes, "a journey of a thousand miles begins with a single step". For those Chinese companies that have invested in Europe that journey has begun quite promisingly, despite the more subdued economic climate. And despite complaints from some European businesses in China that the operating environment has become more difficult for them recently, the benefits of FDI are clearly recognized. Enhanced cooperation between China and the EU should thus aim at ensuring a level playing field for both Chinese and European companies.

Disclaimer: The views expressed in this article are those of the authors and are not necessarily those of the European Commission.

References

China Council for the Promotion of International Trade (2010), "Survey on Current Conditions and Intention of Outbound Investment by Chinese Enterprises", April.

Evenett, Simon (2010), "Uneven compliance: The sixth report of the Global Trade Alert", VoxEU.org, 23 June.

Mayer, Thierry and Gianmarco Ottaviano (2008), "The Happy Few: The

Internationalisation of European Firms", *CEPR Policy Insight* 15

Melitz, Marc and Gianmarco Ottaviano (2008), "Market Size, Trade, and Productivity", *Review of Economic Studies*, (75):295-316

Appendix. Determinants of Chinese overseas investments

Dependent Variable: Number of Investments in Destination Country j				
	(1)	(2)	(3)	(4)
Ln Market Potential	0.357***	0.110***	0.0814**	0.176***
	(0.0177)	(0.0304)	(0.032)	(0.0370)
ln Distance	-0.0310	-0.304***	-0.287***	-0.433***
	(0.0609)	(0.0670)	(0.068)	(0.0719)
Ln GDP per capita		0.415***	0.389***	0.419***
		(0.0397)	(0.042)	(0.0434)
Ln (Ease of Doing Business)			-0.0790*	
			(0.042)	
Ln (Starting A Business)				-0.201***
				(0.0515)
Ln (Protection of investors)				-0.0455
				(0.0468)
Ln (Paying Taxes)				0.247***
				(0.0553)
Ln (Trading Across Borders)				0.143**
				(0.0609)
Observations	91	88	85	85
Pseudo R^2	0.279	0.359	0.365	0.400

Notes: All results are from ordinary poison regressions. Standard errors are in parenthesis. *,**,*** indicate respectively that coefficients are significant at 10%, 5% and 1%.

Source: CCPIT/ DG TRADE/ CEPII.

Investment banking

Charles A.E. Goodhart

London School of Economics

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As protestors occupy Wall Street and financial centres around the world, among the grievances are "socially useless" investment banks. This column argues, however, that investment banking is critical to any effective economy – the idea that policymakers can safeguard retail banking alone is not only tragically mistaken but also horribly dangerous.

Investment banking has attracted much vilification in recent years, being frequently described as "socially useless", or a "casino". Yet if its functions are not properly appreciated, the 'reforms' that are now being proposed could lead to further problems down the road ahead (see also the latest Vox eBook *The Future of Banking,* Beck 2011).

The historical roots of universal banking

Universal banking came into being on the continent of Europe in the late 19th century and in Japan in the early 20th century in order to connect banking with large-scale industry (steel, chemicals, pharmaceutical, electrical, cars, etc). With weak capital markets then, there was a need to channel retail savings into large-scale industry in order to promote industrialisation and growth.

The 'haus-bank' in Germany and Zaibatsu in Japan had close links with a stable of associated firms at the advisory, managerial, and equity ownership levels, as well as in the provision of loan finance. The contrast with the Anglo-Saxon tradition of "arms-length" banking, with no close involvement with associated firms, and bank lending supposed to be for temporary purposes, was often noted, frequently on the back of accusation that the British (retail-type) banks were not doing enough to support industrial development.

The other main root of investment banking was merchant banking. The growth of international trade, and the globalisation of supply chains, again largely carried out by large firms, rather than SMEs (small and medium-sized enterprises), led to a concomitant need for the provision of trade finance; and with that to a need for the development of an international information network on financial, especially foreign exchange,

commercial, industrial, legal, and political conditions in all the major countries involved. While bits of such information could be provided by specialist boutiques, there were obvious advantages of scale and scope in having large information networks in large financial institutions.

Banking in a world with sophisticated financial markets

The (often implicit) argument is made that such roles, in supporting large industry and international trade, have been superseded by the growth of efficient capital markets. These allow (big) industry, and other big borrowers, often in the public sector (eg subsidiary governmental bodies as well as sovereigns) to finance themselves directly, allowing banks to concentrate on lending to households and SMEs. Similarly trade finance can rely on efficient markets for foreign exchange, and various hedging derivatives. This judgement would be wrong (if made). The informational requirements needed to navigate oneself around the complexities of the current financial scene, especially international, are vast, and most corporations, local governments, large charities, and even central governments know that they do not have that ability.

On the other (buy-) side of financial intermediation, most household savings are now channelled through institutional investors, pension funds, and insurance companies. Many people probably think that these institutional investors do all their investment analysis in-house, simply sending instructions to complete deals (at the best available price) to whichever broker offers the best immediate price. The reality is different. Most institutional investors have close relationships with one or more investment banks that provide analytical, financial, administrative, and deal-execution support. Besides their contact with (real money) institutional investors, investment banks provide a crucial link between all the major buy-side institutions and the financial/capital markets.

Thus the investment banks provide the key intermediation role both for the big sell-side borrowers and big buy-side borrowers. Much of this can, and is, done without the need to use such banks' own balance sheet, eg analytical advice on mergers and acquisitions, etc, but much requires the need for at least temporary use of the balance sheet. Clients often want assured access to finance, and so investment banks have to be able to make markets without necessarily knowing in advance to whom and at what price they can offload such positions.

Investment banks as intermediaries between big borrowers and big lenders

So, investment banks are the main intermediaries between large-scale borrowers and lenders, and, as such, provide essential services in keeping wholesale capital markets functioning efficiently. Sometimes they even run such markets themselves, (eg dark-pools); more often they provide the channel through which almost all orders get transmitted to the market (eg derivatives markets). Such intermediation services are essential to the continued functioning of our complex modern economy. The chaos that occurred after the failure of Lehman Brothers, an investment bank without any retail banking involvement, is testimony to that. The idea that investment banks can be liquidated with far less social costs than 'pure' retail banks is incorrect, though alas common.

The temptation of knowledge

Investment banks, therefore, lie at the centre of informational and market networks, with 'inside' information of the positions and thinking of many of the big buyers and sellers. They have an informational advantage. There is an inevitable, indeed natural, tendency to exploit such informational advantage by taking positions for their own benefit, as well as – or instead of – for the benefit of the client. Moreover when such positions were 'wrong' for whatever reason, their size relative to the bank's own capital could often endanger, and in several cases has endangered, the continued viability of the bank.

There is no question but there have been failures in risk management in recent years in investment banking. There have been equivalent failures elsewhere, but it is evidence of the central importance of such banks that their failures figure so prominently on the front pages of newspapers.

It has been argued that risk management in the large investment banks has worsened because of size (top management cannot get a knowledgeable grip on everything) and incentives (the switch from a partnership to a limited liability governance mechanism). While there may be some validity in such criticisms, the informational economies of scope and scale make it hard to reverse past trends. The Volcker rules in the US attempt to ban position-taking by investment banks, but, while many prop-desks have been shut down, it is difficult to distinguish pure position-taking from operations on behalf of clients or from day-to-day Treasury functions to finance the normal operations of a bank, even a pure retail bank.

Markets get made by participants taking positions. No one objects to agents taking positions if they bear the loss themselves. Problems arise when there are major externalities to society from such losses. It is the

thesis of this note that the role of investment banks is so central to the efficient operation of our complex financial system that losses to such banks have major social externalities. The idea that, once you have carved out the 'socially valuable' parts of retail banking, ie the payments system and retail lending and deposit-taking, you can liquidate the rest without massive adverse effects is not only tragically mistaken but also horribly dangerous.

References

Beck, Thorsten (ed) (2011), *The Future of Banking*, A VoxEU.org eBook, 25 October.

Part VI: Topics in Macroeconomic Policy

Chapter 18 Stabilization Policy

Rethinking macro policy

Olivier Blanchard, Giovanni Dell'Ariccia and Paolo Mauro

IMF

The global crisis forced economic policymakers to react in ways not anticipated by the pre-crisis consensus on how macroeconomic policy should be conducted. Here the IMF's chief economist and colleagues (i) review the main elements of the pre-crisis consensus, (ii) identify the elements which turned out to be wrong, and (iii) take a tentative first pass at outlining the contours of a new macroeconomic policy framework.

The great moderation (Gali and Gambetti 2009) lulled macroeconomists and policymakers alike in the belief that we knew how to conduct macroeconomic policy. The crisis clearly forces us to question that assessment. In a recent IMF Staff Position Note (Blanchard, Dell'Ariccia and Mauro 2010, which includes a bibliography), we review the main elements of the pre-crisis consensus, we seek to identify what elements were wrong and what tenets of the pre-crisis framework still hold, and we take a tentative first pass at the contours of a new macroeconomic policy framework.

What we thought we knew

To caricature: we thought of monetary policy as having one target, inflation, and one instrument, the policy rate. So long as inflation was stable, the output gap was likely to be small and stable and monetary policy did its job. We thought of fiscal policy as playing a secondary role, with political constraints limiting its usefulness. And we thought of financial regulation as mostly outside the macroeconomic policy framework. Admittedly, these views were more closely held in academia; policymakers were more pragmatic. Nevertheless, the prevailing consensus played an important role in shaping policies and institutions.

One target: Inflation

Stable and low inflation was presented as the primary, if not exclusive, mandate of central banks. This resulted from the reputational need of central bankers to focus on inflation rather than activity and the intellectual support for inflation targeting provided by the New Keynesian model. In the benchmark version of that model, constant inflation is indeed the

optimal policy, delivering a zero output gap, which turns out to be the best possible outcome for activity given the imperfections present in the economy. This "divine coincidence" implied that, even if policymakers cared about activity, the best they could do was to maintain stable inflation. There was also consensus that inflation should be very low (most central banks targeted 2% inflation).

One instrument: The policy rate

Monetary policy focused on one instrument, the policy interest rate. Under the prevailing assumptions, one only needed to affect current and future expected short rates, and all other rates and prices would follow. The details of financial intermediation were seen as largely irrelevant. An exception was made for commercial banks, with an emphasis on the "credit channel." Moreover, the possibility of runs justified deposit insurance and the traditional role of central banks as lenders of last resort. The resulting distortions were the main justification for bank regulation and supervision. Little attention was paid, however, to the rest of the financial system from a macro standpoint.

A limited role for fiscal policy

Following its glory days of the Keynesian 1950s and 1960s, and the high inflation of the 1970s, fiscal policy took a backseat in the past two-three decades. The reasons included scepticism about the effects of fiscal policy, itself largely based on Ricardian equivalence arguments; concerns about lags and political influences in the design and implementation of fiscal policy; and the need to stabilize and reduce typically high debt levels. Automatic stabilizers could be left to play when they did not conflict with sustainability.

Financial regulation: Not a macroeconomic policy tool

Financial regulation and supervision focused on individual institutions and markets and largely ignored their macroeconomic implications. Financial regulation targeted the soundness of individual institutions and aimed at correcting market failures stemming from asymmetric information or limited liability. Given the enthusiasm for financial deregulation, the use of prudential regulation for cyclical purposes was considered improper mingling with the functioning of credit markets.

The Great Moderation

The decline in the variability of output and inflation led to greater

confidence that a coherent macro framework had been achieved. In addition, the successful responses to the 1987 stock market crash, the LTCM collapse, and the bursting of the tech bubble reinforced the view that monetary policy was also well equipped to deal with asset price busts. Thus, by the mid-2000s, it was not unreasonable to think that better macroeconomic policy could deliver, and had delivered, higher economic stability. Then the crisis came.

What we have learned from the crisis

● Macroeconomic fragilities may arise even when inflation is stable

Core inflation was stable in most advanced economies until the crisis started. Some have argued in retrospect that core inflation was not the right measure of inflation, and that the increase in oil or housing prices should have been taken into account. But no single index will do the trick. Moreover, core inflation may be stable and the output gap may nevertheless vary, leading to a trade-off between the two. Or, as in the case of the pre-crisis 2000s, both inflation and the output gap may be stable, but the behaviour of some asset prices and credit aggregates, or the composition of output, may be undesirable.

● Low inflation limits the scope of monetary policy in deflationary recessions

When the crisis started in earnest in 2008, and aggregate demand collapsed, most central banks quickly decreased their policy rate to close to zero. Had they been able to, they would have decreased the rate further. But the zero nominal interest rate bound prevented them from doing so. Had pre-crisis inflation (and consequently policy rates) been somewhat higher, the scope for reducing real interest rates would have been greater.

● Financial intermediation matters

Markets are segmented, with specialized investors operating in specific markets. Most of the time, they are well linked through arbitrage. However, when some investors withdraw (because of losses in other activities, cuts in access to funds, or internal agency issues) the effect on prices can be very large. When this happens, rates are no longer linked through arbitrage, and the policy rate is no longer a sufficient instrument.

Interventions, either through the acceptance of assets as collateral, or through their straight purchase by the central bank, can affect the rates on different classes of assets, for a given policy rate. In this sense, wholesale funding is not fundamentally different from demand deposits, and the demand for liquidity extends far beyond banks.

☛ Countercyclical fiscal policy is an important tool

The crisis has returned fiscal policy to centre stage for two main reasons. First, monetary policy had reached its limits. Second, from its early stages, the recession was expected to be long lasting, so that it was clear that fiscal stimulus would have ample time to yield a beneficial impact despite implementation lags. The aggressive fiscal response has been warranted given the exceptional circumstances, but it has further exposed some drawbacks of discretionary fiscal policy for more "normal" fluctuations – in particular lags in formulating, enacting, and implementing appropriate fiscal measures. The crisis has also shown the importance of having "fiscal space," as some economies that entered the crisis with high levels of government debt had limited ability to use fiscal policy.

☛ Regulation is not macroeconomically neutral

Financial regulation contributed to the amplification that transformed the decrease in US housing prices into a major world economic crisis. The limited perimeter of regulation gave incentives for banks to create off-balance-sheet entities to avoid some prudential rules and increase leverage. Regulatory arbitrage allowed some financial institutions to play by different rules from other financial intermediaries. Once the crisis started, rules aimed at guaranteeing the soundness of individual institutions worked against the stability of the system. Mark-to-market rules, coupled with constant regulatory capital ratios, forced financial institutions into fire sales and deleveraging.

Reinterpreting the Great Moderation

If the conceptual framework behind macroeconomic policy was so flawed, why did things look so good for so long? One reason is that policymakers had to deal with shocks for which policy was well adapted. For example, the lesson from the 1970s that, with respect to supply shocks, anchoring of expectations was of the essence was well understood when the price of oil increased again in the 2000s. Success in moderating fluctuations may even

have sown the seeds of this crisis. The Great Moderation led too many (including policymakers and regulators) to understate macroeconomic risk, ignore tail risks, and take positions (and relax rules) which were revealed to be much riskier after the fact.

Implications for policy design

The bad news is that the crisis has shown that macroeconomic policy must have many targets; the good news is that it has also reminded us that we have many instruments, from "exotic" monetary policy to fiscal instruments, to regulatory instruments. It will take some time, and substantial research, to decide which instruments to allocate to which targets. It is important to start by stating that the baby should not be thrown out with the bathwater. Most of the elements of the pre-crisis consensus still hold. Among them, the ultimate targets remain output and inflation stability. The natural rate hypothesis holds, at least to a good enough approximation, and policymakers should not assume that there is a long-term trade-off between inflation and unemployment. Stable and low inflation must remain a major goal of monetary policy. Fiscal sustainability is of the essence, not only for the long term, but also in affecting expectations in the short term.

The following are important questions for economists to work on.

Exactly how low should inflation targets be?

The crisis has shown that large adverse shocks do happen. Should policymakers aim for a higher target inflation rate in normal times, in order to increase the room for monetary policy to react to such shocks? Are the net costs of inflation much higher at, say, 4% than at 2%, the current target range? Is it more difficult to anchor expectations at 4% than at 2%? Achieving low inflation through central bank independence has been a historic accomplishment. Thus, answering these questions implies carefully revisiting the benefits and costs of inflation. A related question is whether, when the inflation rate becomes very low, policymakers should err on the side of a more lax monetary policy, so as to minimize the likelihood of deflation, even if this means incurring the risk of higher inflation in the event of an unexpectedly strong pickup in demand. This issue, which was on the mind of the Fed in the early 2000s, is one we must return to.

How should monetary and regulatory policy be combined?

Part of the debate about monetary policy, even before the crisis, was

whether the interest rate rule, implicit or explicit, should be extended to deal with asset prices. The crisis has added a number of candidates to the list, from leverage to measures of systemic risk. This seems like the wrong way of approaching the problem. The policy rate is a poor tool to deal with excess leverage, risk taking, or apparent deviations of asset prices from fundamentals. A higher policy rate also implies a larger output gap.

Other instruments are at the policymaker's disposal—call them cyclical regulatory tools. If leverage appears excessive, regulatory capital ratios can be increased; if liquidity appears too low, regulatory liquidity ratios can be introduced and, if needed, increased; to dampen housing prices, loan-to-value ratios can be decreased; to limit stock price increases, margin requirements can be increased. If monetary and regulatory tools are to be combined in this way, it follows that the traditional regulatory and prudential frameworks need to acquire a macroeconomic dimension. This raises the issue of how coordination is achieved between the monetary and the regulatory authorities. The increasing trend toward separation of the two may well have to be reversed. Central banks are an obvious candidate as macroprudential regulators.

Should liquidity be provided more broadly?

The crisis has forced central banks to extend the scope and scale of their traditional role as lenders of last resort. They extended their liquidity support to non-deposit-taking institutions and intervened directly (with purchases) or indirectly (through acceptance of the assets as collateral) in a broad range of asset markets. The argument for extending liquidity provision, even in normal times, seems compelling. If liquidity problems come from the disappearance of deep-pocket private investors from specific markets, or from the coordination problems of small investors as in traditional bank runs, the central authority is in a unique position to intervene.

How can we create more fiscal space in good times?

A key lesson from the crisis is the desirability of fiscal space to run larger fiscal deficits when needed. Going forward, the required degree of fiscal adjustment (after the recovery is securely under way) will be formidable, in light of the need to reduce debt while swimming against the tide of aging-related challenges in pensions and health care. Still, the lesson from the crisis is that target debt levels should be lower than those observed before the crisis. The policy implications for the next decade or two are that, when cyclical conditions permit, major fiscal adjustment is necessary

and, should economic growth recover rapidly, it should be used to reduce debt-to-GDP ratios substantially, rather than to finance expenditure increases or tax cuts. The recipe to ensure that economic booms translate into improved fiscal positions is not new, but it acquires greater relevance as a result of the crisis. Medium-term fiscal frameworks, credible commitments to reducing debt-to-GDP ratios, fiscal rules (with escape clauses for recessions), and transparent fiscal data can all help in this regard.

Can we design better automatic fiscal stabilizers?

Discretionary fiscal measures come too late to fight a standard recession. Can we strengthen and improve the automatic stabilizers? A distinction is needed here between truly automatic stabilizers – those that imply a decrease in transfers or increase in tax revenues when incomes rise – and rules that allow some transfers or taxes to vary based on pre-specified triggers tied to the state of the economy. The first type of automatic stabilizer comes from the combination of rigid government expenditures with an elasticity of revenues with respect to output of approximately one, from the existence of social insurance, and from the progressive nature of income taxes. The main ways to increase their macroeconomic effect would be to increase the size of government, make taxes more progressive, or to make social insurance more generous. However, these reforms would be warranted only if they were based on a broader set of equity and efficiency objectives. The second type of automatic stabilizer appears more promising. On the tax side, one can think of temporary tax policies targeted at low-income households, such as a flat, refundable tax rebate, a percentage reduction in a taxpayer's liability, or tax policies affecting firms, such as cyclical investment tax credits. On the expenditure side, one can think of temporary transfers targeted at low-income or liquidity-constrained households. These taxes or transfers would be triggered by the crossing of a threshold by a macro variable.

References

Blanchard, Olivier, Giovanni Dell'Ariccia and Paolo Mauro (2010). "Rethinking Macroeconomic Policy", IMF Staff Position Note, SPN/10/03, 12 February 12.

Gali, Jordi and Luca Gambetti (2009). "On the Sources of the Great Moderation," *American Economic Journal: Macroeconomics,* 1(1): 26–57.

The effectiveness of fiscal and monetary stimulus in depressions

Barry Eichengreen, Kevin Hjortshøj O'Rourke, Miguel Almunia, Agustín S. Bénétrix, Gisela Rua

University of California, Berkeley and CEPR; University of Oxford and CEPR; University of California, Berkeley; Trinity College Dublin; University of California, Berkeley

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There is one important source of information on the effectiveness of monetary and fiscal stimulus in an environment of near-zero interest rates, dysfunctional banking systems and heightened risk aversion that has not been fully exploited: the 1930s. This column gathers data on growth, budgets and central bank policy rates for 27 countries covering the period 1925-39 and shows that where fiscal policy was tried, it was effective.

The debate over the effectiveness of stimulus rages on (Barro and Redlick 2009). Fewer than two years of data – that being the amount of time since monetary and fiscal measures to counter the crisis were put in place – are not enough to pin down the effects. And different theoretical models, for better or worse, predict different results. Strongly held priors rule the roost.

There is, however, one important source of information on the effectiveness of monetary and fiscal stimulus in an environment of near-zero interest rates, dysfunctional banking systems and heightened risk aversion that has not been fully exploited: the 1930s. This column – based on a paper presented at the 50th *Economic Policy* Panel Meeting held in Tilburg on 23-24 October 2009 – draws out some of the lessons for today's crisis (Almunia et al. 2009).

Parallels: the Great Depression and the Great Recession

In previous columns, two of us documented the strong parallels between the early stages of the Great Depression and the early stages of our Great Recession. The causes of the two episodes were quite similar. In the earlier episode they included an unsustainable real estate boom (centred in Florida), lax supervision and regulation, and global imbalances (known then as "the transfer problem"). Similar circumstances suggest similar effects of policy, whether positive, negative or none.

The problem is that the policy response then was limited. The Keynesian

argument for expansionary fiscal policy – whether right or wrong – was not known in this pre-Keynesian era. Hence there was relatively little variation in fiscal stance, with conservative policies being the default option. The aggressive use of discretionary monetary policy was also relatively unusual, as central banks were wedded to gold-standard ideology.

But there were exceptions. Japan's aggressive use of monetary policy under Takahashi was one, Italy's large budget deficits under Mussolini another. And there were good – exogenous – reasons for this variation. Fiscal impulses were generally governed by forces other than immediate economic conditions; Italy's war in present-day Ethiopia, Hitler's rearmament, the approach of World War II. Who responded to the crisis with monetary stimulus depended heavily on prior monetary experience; counties that had suffered high inflation in the 1920s tended to be reluctant to abandon the gold standard in the 1930s.

New research

Cross-country comparisons can thus help us untie the Gordian Knot and move the debate from the realm of ideology to that of evidence. Our project therefore focuses on assembling annual data on growth, budgets and central bank policy rates, mainly from League of Nations sources, for 27 countries covering the period 1925-39.

This leaves the question of what model or empirical technique to apply. Rather than prejudging the answer, we employ a battery of empirical methods. We use panel vector autoregressions (VARs) with conventional assumptions about the "ordering" of the variables (whether a variable affects the others contemporaneously or only with a lag). We consider alternative orderings, and also run panel VARs with defence expenditure entering the equations as an exogenous variable. We run panel instrumental variables regressions using defence spending as an instrument for fiscal policy and gold standard membership as an instrument for monetary policy. And we run alternative panel regressions looking at the impact of fiscal and monetary shocks, the latter calculated by running simple autoregressions and extracting the residuals.

Where tried, fiscal policy was effective in the 1930s

The details of the results differ, but the overall conclusions do not. They show that where fiscal policy was tried, it was effective.

Our estimates of its short-run effects are at the upper end of those

estimated recently with modern data; the multiplier is as large as 2 in the first year, before declining significantly in subsequent years. (Figure 1 shows this in the case of the panel VAR estimates with the conventional ordering assumptions.) This is, in fact, what one should expect if one believes that the effectiveness of fiscal policy is greatest when interest rates are at the zero bound, leading to little crowding out of private spending. It is what one should expect when households are credit constrained by a dysfunctional banking system. Given similar circumstances in 2008, this underscores the advantages of using 1930s data as a source of evidence on the effects of current policy.

Figure 1 Impulse response functions, shock to defence spending (1% of GDP)
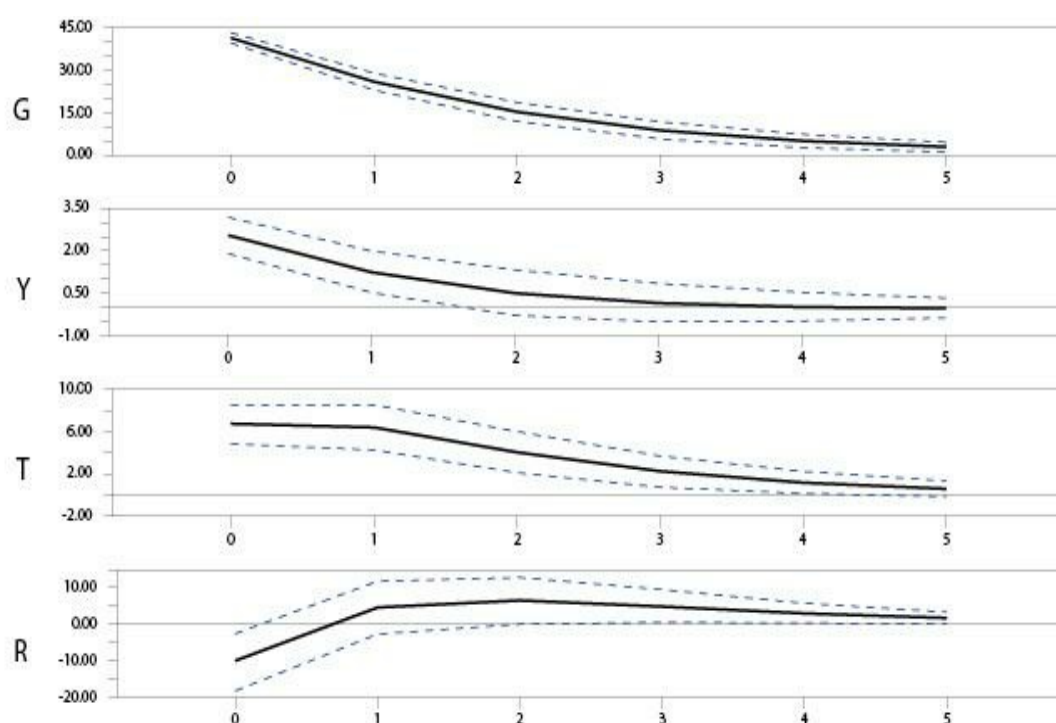
Note: Solid lines are the point estimates of the impulse-response mean. Dashed lines are the 16th and 84th percentiles from Monte Carlo simulations based on 1000 replications. Vertical axis indicates defence spending (G), GDP (Y), revenues (T) and central bank discount rate (R). Each equation in the system includes country fixed effects, country-specific linear trends and year dummies.

Other methodologies may yield somewhat smaller fiscal multipliers. But the message is the same.

Monetary policy in the 1930s was not powerless

The results for monetary policy are less robust but point in the same direction. A positive shock to the central bank discount rate leads to a fall

in GDP (Figure 2). The fall in output just misses statistical significance at conventional levels (that is, the confidence bands just barely span the horizontal line denoting no change.) Under alternative assumptions about the ordering of the variables, however (Figure 3), the direction of the effect is the same, and this time it is significant.

Figure 2 Impulse response functions, shock to discount rate
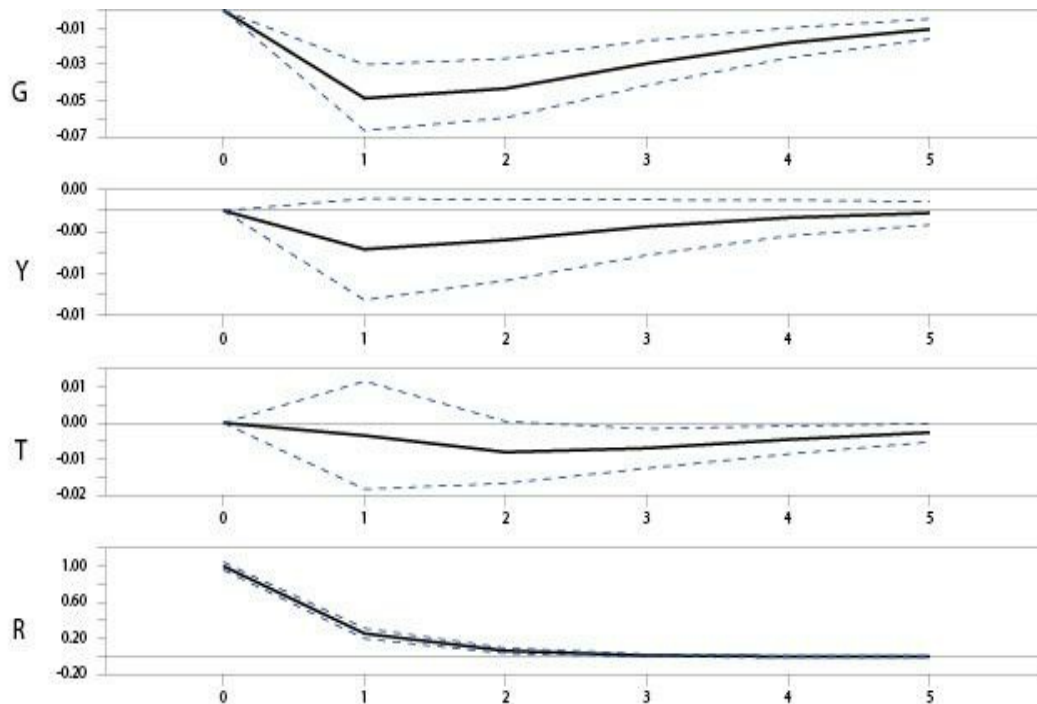
Note: Solid lines are the point estimates of the impulse-response mean. Dashed lines are the 16th and 84th percentiles from Monte Carlo simulations based on 1000 replications. Vertical axis indicates defence spending (G), GDP (Y), revenues (T) and central bank discount rate (R). Each equation in the system includes country fixed effects, country-specific linear trends and year dummies.

Figure 3 Impulse response functions, shock to discount rate (alternative ordering)
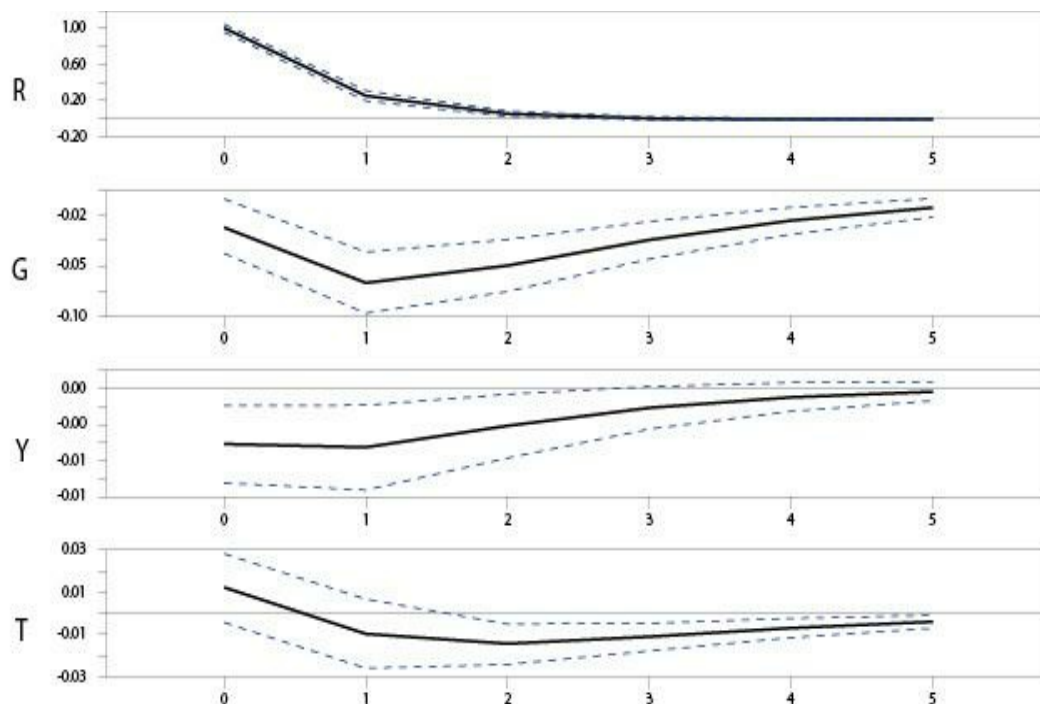
Note: Solid lines are the point estimates of the impulse-response mean. Dashed lines are the 16th and 84th percentiles from Monte Carlo simulations based on 1000 replications. Vertical axis indicates defence spending (G), GDP (Y), revenues (T) and central bank discount rate (R). Each equation in the system includes country fixed effects, country-specific linear trends and year dummies.

This result is notable, given the presumption, widespread in the literature, that monetary policy is ineffective in near-zero-interest-rate (liquidity trap) conditions. On the contrary, in the 1930s it appears that accommodating monetary policy helped, by transforming deflationary expectations (Temin and Wigmore 1990) and by helping to mend broken banking systems (Bernanke and James 1991). Given the prevalence of both problems circa 2008, we suspect that the results carry over.

For others with different priors, these results may sit less easily. But the time for priors is over. Policy should rest on an evidentiary basis. The evidence we have marshalled so far speaks clearly.

References

Almunia, Miguel, Agustín S. Bénétrix, Barry Eichengreen, Kevin H. O'Rourke, and Gisela Rua (2009), "From Great Depression to Great Credit Crisis: Similarities, Differences and Lessons", presented at the 50th *Economic Policy* Panel Meeting, 23-24 October.

Barro, Robert and Charles Redlick (2009) Design and effectiveness of fiscal-stimulus programmes, VoxEU.org, 30 October

Bernanke, Ben and Harold James (1991) The gold standard, deflation, and

financial crisis in the Great Depression: An International Comparison. In R. Glenn Hubbard (ed.), *Financial Markets and Financial Crises*. Chicago: University of Chicago Press.

Temin, Peter and Barrie A. Wigmore (1990) The end of one big deflation. *Explorations in Economic History* 27: 483-502.

The protectionist temptation: Lessons from the Great Depression for today

Barry Eichengreen and Douglas Irwin

University of California, Berkeley and CEPR; Dartmouth College

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What do we know about the spread of protectionism during the Great Depression and what are the implications for today's crisis? This column says the lesson is that countries should coordinate their fiscal and monetary measures. If some do and some don't, the trade policy consequences could once again be most unfortunate.

The Great Depression of the 1930s was marked by a severe outbreak of protectionism. Many fear that, unless policymakers are on guard, protectionist pressures could once again spin out of control. What do we know about the spread of protectionism then, and what are the implications for today?

While many aspects of the Great Depression continue to be debated, there is all-but-universal agreement that the adoption of restrictive trade policies was destructive and counterproductive and that similarly succumbing to protectionism in our current slump should be avoided at all cost. Lacking other instruments with which to support economic activity, governments erected tariff and nontariff barriers to trade in a desperate effort to direct spending to merchandise produced at home rather than abroad. But with other governments responding in kind, the distribution of demand across countries remained unchanged at the end of this round of global tariff hikes. The main effect was to destroy trade which, despite the economic recovery in most countries after 1933, failed to reach its 1929 peak, as measured by volume, by the end of the decade (Figure 1). The benefits of comparative advantage were lost. Recrimination over beggar-thy-neighbour trade policies made it more difficult to agree on other measures to halt the slump.

Figure 1 World trade and production, 1926-1938
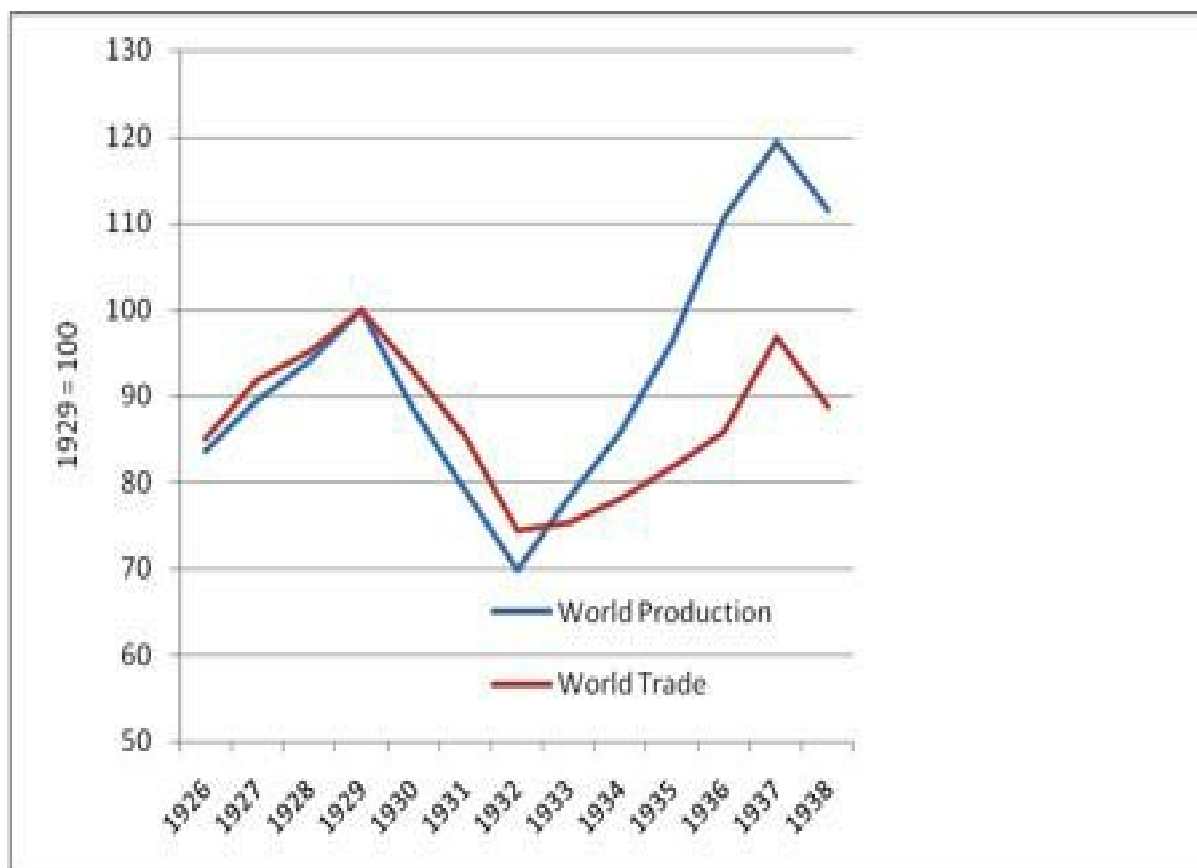
The impression one gleans from both contemporary and modern accounts is that trade policy was thrown into complete chaos, with every country scrambling to impose higher barriers. But, in fact, this was not exactly the case (Eichengreen and Irwin, forthcoming). Although recourse to trade restrictions was widespread, there was considerable variation in how far countries moved in this direction. Figure 2 illustrates this for tariffs. Tariff rates rose sharply in some countries but not others. The history of the 1930s would have been very different had other countries responded in the manner of, say, Denmark, Sweden and Japan. It is important to understand why they did not.

Figure 2 Average tariff on imports, 1928-1938, percentage
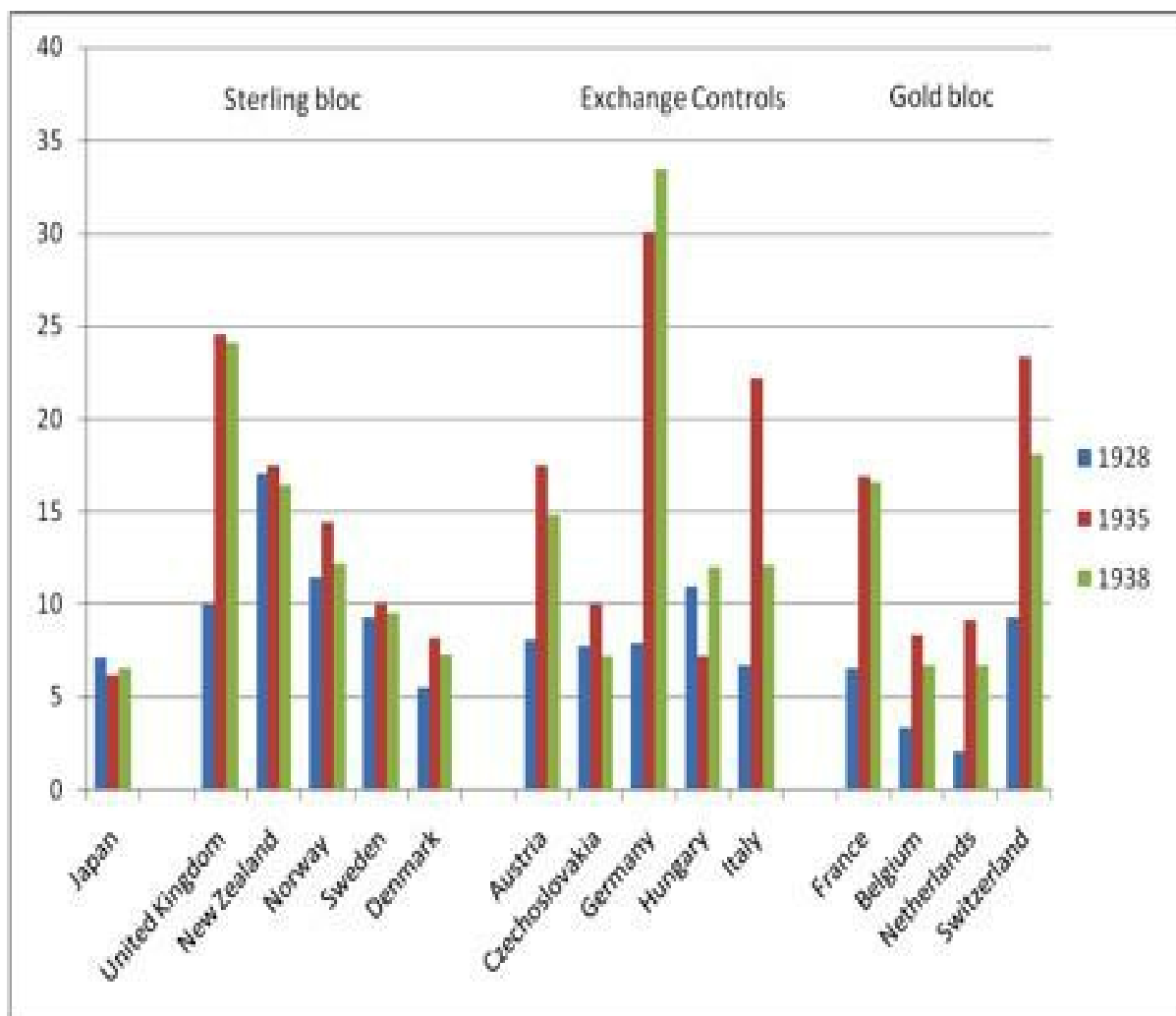
The answer, in a nutshell, is the exchange rate regime and the policies associated with it. Countries that remained on the gold standard, keeping their currencies fixed against gold, were more inclined to impose trade restrictions. With other countries devaluing and gaining competitiveness at their expense, they adopted restrictive policies to strengthen the balance of payments and fend off gold losses. Lacking other instruments with which to address the deepening slump, they used tariffs and similar measures to shift demand toward domestic production and thereby stem the rise in unemployment.

In contrast, countries abandoning the gold standard and allowing their currencies to depreciate saw their balances of payments strengthen. They gained gold rather than losing it. As importantly, they now had other instruments with which to address the unemployment problem. Cutting the currency loose from gold freed up monetary policy. Without a gold parity to defend, interest rates could be cut, and central banks No longer bound by the gold standard rules could act as lenders of last resort. They now

possessed other tools with which to ameliorate the Depression. These worked, as shown in Figure 3. As a result, governments were not forced to resort to trade protection.

Figure 3 Change in industrial production, by country group
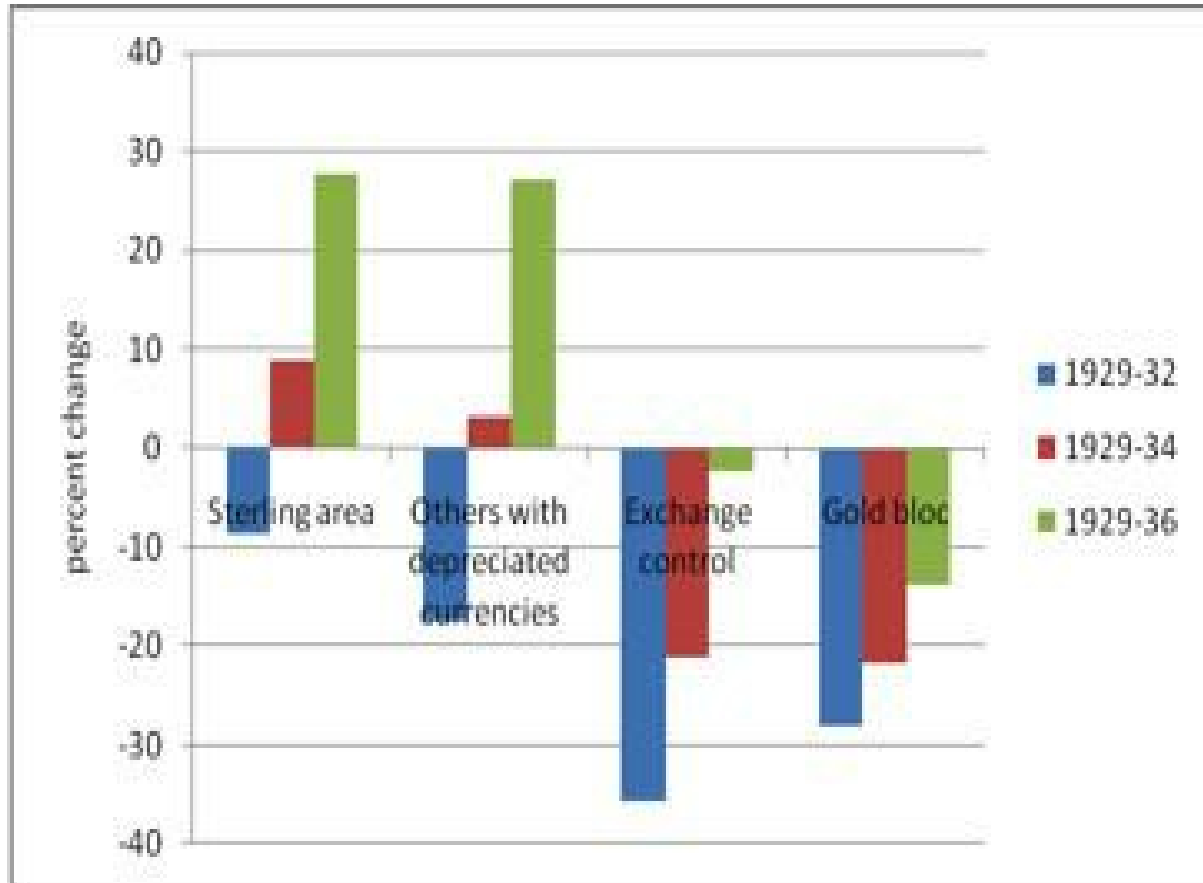
This relationship is quite general, as we show in Figure 4. It also carries over to non-tariff barriers to trade such as exchange controls and import quotas.

Figure 4 Exchange rate depreciation and the change in import tariffs, 1929-1935
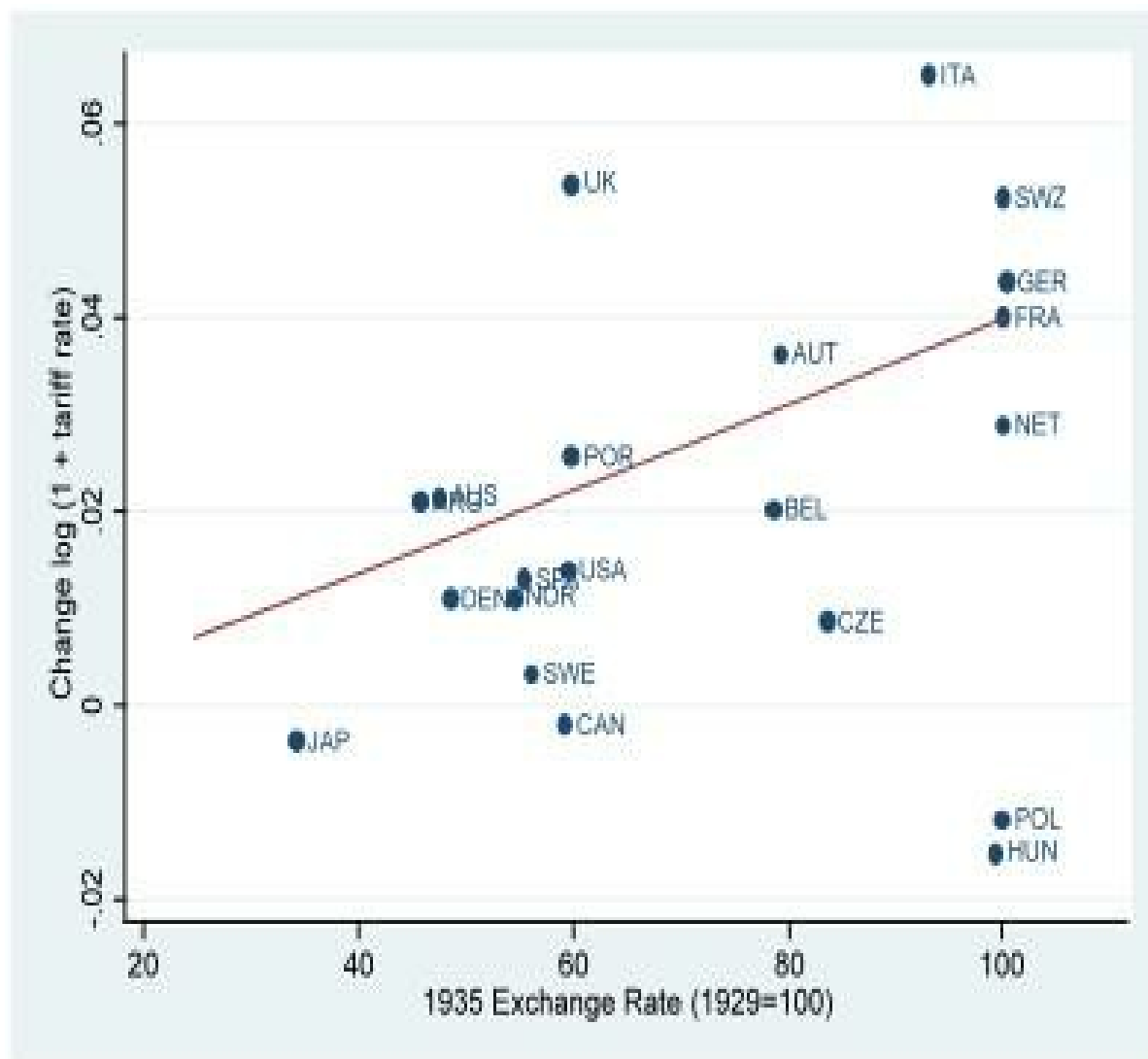
This finding has important implications for policy makers responding to the Great Recession of 2009. The message for today would appear to be "to avoid protectionism, stimulate." But how? In the 1930s, stimulus meant monetary stimulus. The case for fiscal stimulus was neither well understood nor generally accepted. Monetary stimulus benefited the initiating country but had a negative impact on its trading partners, as shown by Eichengreen and Sachs (1985). The positive impact on its neighbours of the faster growth induced by the shift to "cheap money" was dominated by the negative impact of the tendency for its currency to depreciate when it cut interest rates. Thus, stimulus in one country increased the pressure for its neighbours to respond in protectionist fashion.

Today the problem is different because the policy instruments are different. In addition to monetary stimulus, countries are applying fiscal

stimulus to counter the Great Recession. Fiscal stimulus in one country benefits its neighbours as well. The direct impact through faster growth and more import demand is positive, while the indirect impact via upward pressure on world interest rates that crowd out investment at home and abroad is negligible under current conditions. When a country applies fiscal stimulus, other countries are able to export more to it, so they have no reason to respond in a protectionist fashion.

The problem, to the contrary, is that the country applying the stimulus worries that benefits will spill out to its free-riding neighbours. Fiscal stimulus is not costless – it means incurring public debt that will have to be serviced by the children and grandchildren of the citizens of the country initiating the policy. Insofar as more spending includes more spending on imports, there is the temptation for that country to resort to "Buy America" provisions and their foreign equivalents. The protectionist danger is still there, in other words but, insofar as the policy response to this slump is fiscal rather than just monetary, it is the active country, not the passive one, that is subject to the temptation.

But if the details of the problem are different, the solution is the same. Now, as in the 1930s, countries need to coordinate their fiscal and monetary measures. If some do and some don't, the trade policy consequences could again be most unfortunate.

References

Barry Eichengreen and Douglas A. Irwin (2009), "The Great Depression and the Protectionist Temptation: Who Succumbed and Why?" (forthcoming).

Barry Eichengreen and Jeffrey Sachs (1985), "Exchange Rates and Economic Recovery in the 1930s," *Journal of Economic History* 45, 925-946.

The recession will be over sooner than you think

Nicholas Bloom and Max Floetotto

Stanford University

12 January 2009

A key source of the today's economic weakness is uncertainty that led firms to postpone investment and hiring decisions. This column, by the authors whose model forecast the recession as far back as June 2008, report that the key measures of uncertainty have dropped so rapidly that they believe growth will resume by mid-2009. This means any additional economic stimulus has to be enacted quickly. Delaying to the summer may mean the economic medicine is administered just as the patient is leave the hospital.

Many pundits (e.g. Krugman) are warning that a dire recession is in the offing. We would have agreed with them three months ago; indeed, we wrote a VoxEU column predicting a severe recession in 2009; based on the analysis of 16 previous economic shocks, we forecasted a 3% drop in GDP and a 3 million increase in unemployment in each of Europe and the US with these predictions made from VAR forecasts (see Bloom 2008 for details).

We also worried about a far worse outcome – Europe and the US slipping into another Great Depression due to damaging policy responses. Luckily, using the latest data on uncertainty measures, our model predicts that the worst has been avoided.

Good news: Great Depression II avoided and growth resumes mid-2009

Much like today, the Great Depression began with a stock-market crash and a melt-down of the financial system. Banks withdrew credit lines and the inter bank lending market froze-up. What turned this from a financial crisis into an economic disaster, however, was the compounding effect of terrible policy. The infamous Smoot-Hawley Tariff Act of 1930 was introduced by desperate US policymakers as a way of blocking imports to protect domestic jobs. Instead of helping workers, this worsened the situation by freezing world trade. At the same time policymakers were

encouraging firms to collude to keep prices up and encouraging workers to unionize to protect wages, exacerbating the situation by strangling free markets.

In fact economic uncertainty is now dropping so rapidly that we believe growth will resume by mid-2009.

Uncertainty is now falling

It now appears that the global policy response to the credit crunch has avoided repeating those mistakes. Instead, it has focused on delivering a massive dose of tax and interest rate cuts, and spending increases. Policies restricting free-markets have largely been avoided. This has calmed stock markets as the fears of an economic Armageddon have subsided. At the same time political uncertainty has dropped as world leaders have clarified their stimulus plans.

Figure 1 shows one measure of uncertainty – the implied volatility on the S&P 100 – commonly known as the financial "fear factor". This jumped over three fold after the dramatic collapse of Lehman's in September 2008. But it has fallen back by 50% over the last three weeks as both economic and political uncertainty has receded. Other measures of uncertainty have also fallen; this is even true for the frequency of the word "uncertain" in the press!

Figure 1 The financial "fear factor": Daily Us implied stock market volatility
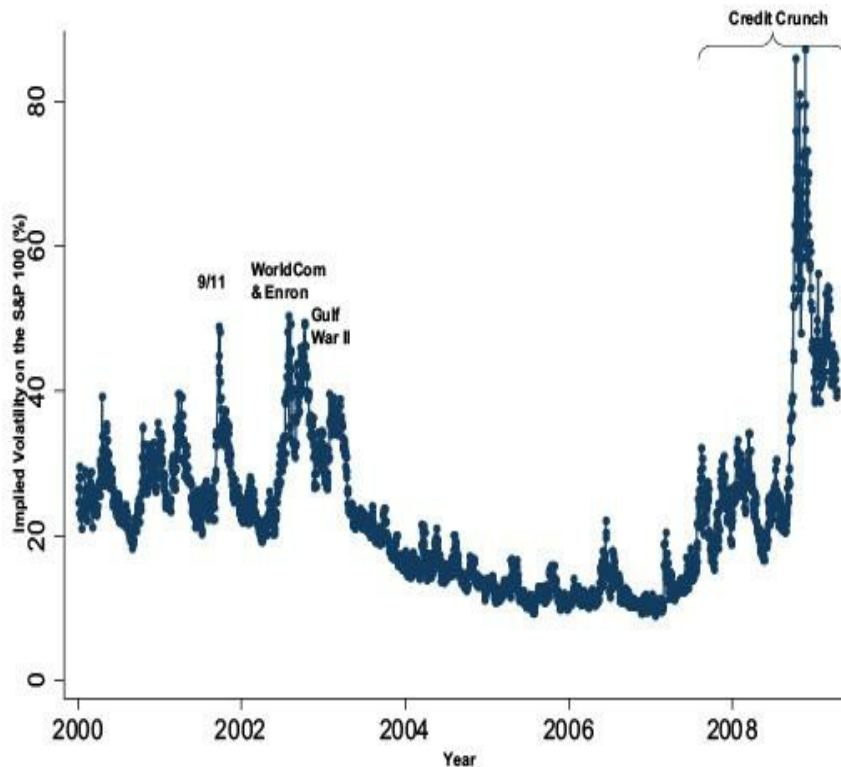
As uncertainty falls the economy will rebound

The heightened uncertainty after the credit crunch led firms to postpone investment and hiring decisions. Mistakes can be costly, so if conditions are unpredictable the best course of action is often to wait. Of course, if every firm in the economy waits, economic activity slows down.[1]

But now that uncertainty is falling back growth should start to rebound. Firms will start to invest and hire again to make up for lost time. Figure 2 shows our predicted impact of the spike in uncertainty following the credit crunch. This is based on our detailed analysis of 16 previous financial, economic and politically driven uncertainty shocks. After falling by 3% between October 2008 and June 2009, we forecast GDP will rapidly rebound from July 2009 onwards.

Figure 2 The estimated combined stock market levels and volatility impact of the credti crunch on GDP

Figure 2: The estimated combined stock market levels and volatility impact of the credit crunch on GDP
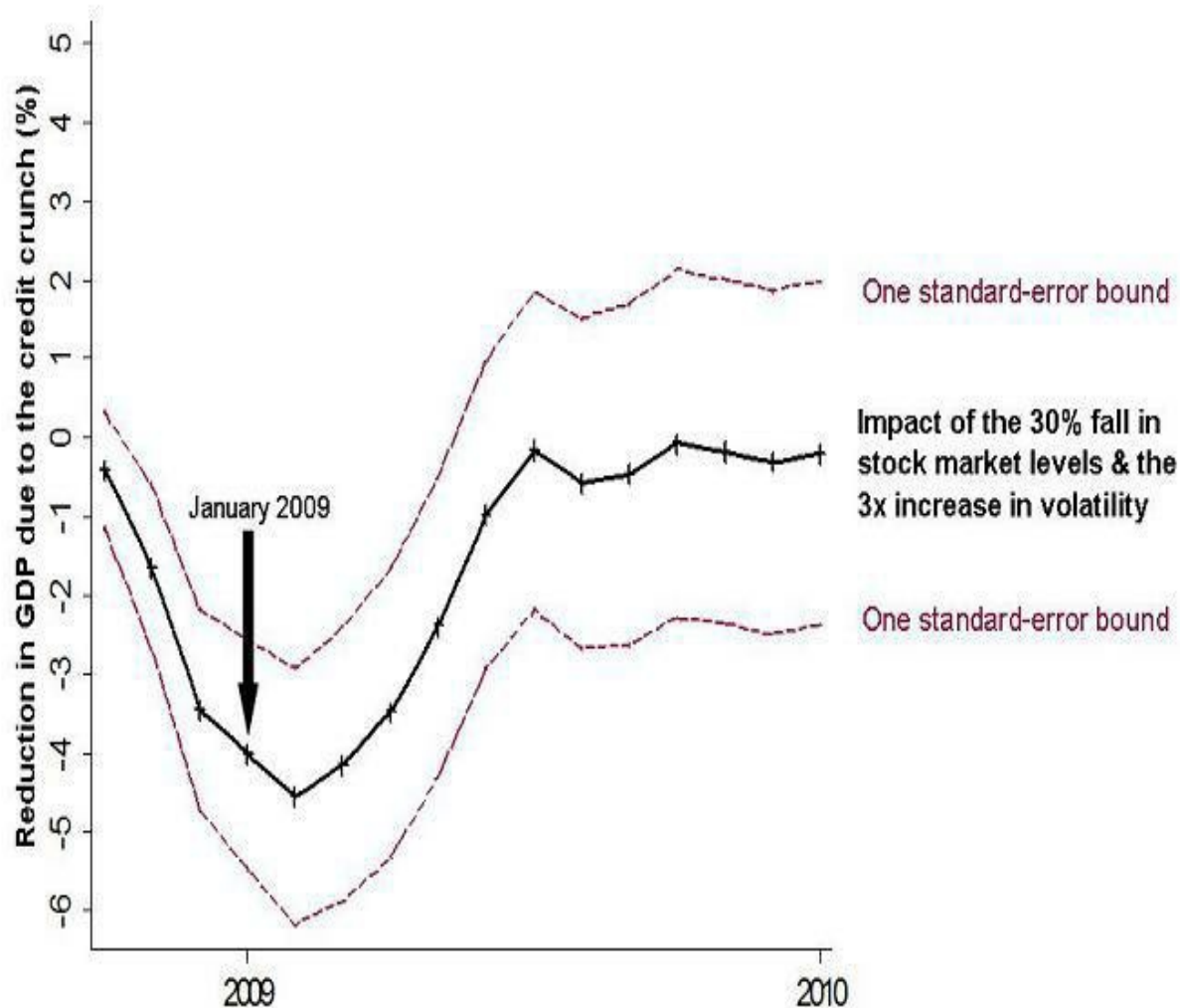
So it's now or never for expansionary policy

Many economists make the case for a stronger policy response. That might be right, but policy makers need to act fast. Any additional economic stimulus – be it a spending package, quantitative easing or a couple of rounds of liquidity injections – has to be enacted quickly. Dithering over different courses of policy will actually make things worse by adding uncertainty (see Caballero 2008). This is exactly what happened after 9/11 when the Federal Reserve Board criticized Congress for creating unnecessary uncertainty with its lengthy debates on investment tax credits.

Delaying the stimulus package until the summer may mean that it is too late. The economic medicine will be administered just as the patient is trying to leave the hospital!

References

Caballero, Ricardo (2008). "Normalcy is Just a Few Bold Policy Steps Away," December 17, 2008.

Bloom, Nick, Max Floetotto and Nir Jaimovich (2008). "Really Uncertain Business Cycles."

Bloom, Nick (2008). "The Impact of Uncertainty Shocks," Stanford mimeo, forthcoming *Econometrica*.

Krugman, Paul (2009). "Ideas for Obama," *New York Times*, 11 January 2009.

1 See "Really Uncertain Business Cycles" by Bloom, Floetotto and Jaimovich for a more detailed discussion ; here is the abstract from that paper: "This paper proposes uncertainty shocks as a new impulse driving business cycles. We first demonstrate that uncertainty, measured by a number of proxies, appears to be strongly countercyclical. When uncertainty is included in a standard vector-auto-regression, uncertainty shocks lead to a large drop and rebound in economic activity. Guided by this we build a stochastic dynamic general equilibrium model that extends the benchmark neoclassical growth model along two dimensions. It allows for heterogeneous firms with non-convex adjustment costs for both capital and labor, and time varying uncertainty defined as fluctuations in the variance of technology shocks. Increases in uncertainty lead to large drops in employment and investment. This occurs because uncertainty makes firms cautious, leading them to pausing hiring and investment. This freeze in activity also reduces the reallocation of capital and labor across firms, leading to a large fall in productivity growth. Taken together, the freeze in the hiring and investment, and the drop in relocation, lead to a business cycle sized drop and rebound in output, investment and productivity growth after a rise in uncertainty."

Chapter 19 Government Debt and Budget Deficits

Debt, deleveraging, and the liquidity trap

Paul Krugman

Princeton University and CEPR

18 November 2010

Debt is the crux of advanced economies' current policy debates. Some argue for fiscal expansion to avoid recession and deflation. Others claim that you can't solve a debt-created problem with more debt. This column explains the core logic of a new model by Eggertsson and Krugman in which debt shocks and policy reactions can be examined. Relying on heterogeneous agents, the model naturally produces the paradox of thrift but also finds new supply-side paradoxes, those of toil and flexibility. The model suggests that most economists have been misthinking the issues and that actual policy in the US and EU is misguided.

If there is a single word that appears most frequently in discussions of the economic problems now afflicting both the US and Europe, that word is surely "debt." Between 2000 and 2008, household debt rose from 96% of US personal income to 128%; meanwhile, in Britain it rose from 105% to 160%, and in Spain from 69% to 130%. Sharply rising debt, it's widely argued, set the stage for the crisis, and the overhang of debt continues to act as a drag on recovery.

The lack of formal theory

The current preoccupation with debt harks back to a long tradition in economic analysis, from Fisher's (1933) theory of debt deflation to Minsky's (1986) back-in-vogue work on financial instability to Koo's (2008) concept of balance-sheet recessions. Yet despite the prominence of debt in popular discussion of our current economic difficulties and the long tradition of invoking debt as a key factor in major economic contractions, there is a surprising lack of models – especially models of monetary and fiscal policy – of economic policy that correspond at all closely to the concerns about debt that dominate practical discourse. Even now, much analysis (including my own) is done in terms of representative-agent models, which by definition can't deal with the consequences of the fact that some people are debtors while others are creditors.

New work that I've done with Gauti Eggertsson (Eggertsson and Krugman 2010) seeks to provide a simple framework that remedies this failing. Minimal as the framework is, I believe that it yields important insights into the problems the world economy faces right now – and it suggests that much of the conventional wisdom governing actual policy is wrong-headed under current conditions.

The model's economic logic

We envision an economy very much along the lines of standard New Keynesian models – but instead of thinking in terms of a representative agent, we imagine that there are two kinds of people, "patient" and "impatient"; the impatient borrow from the patient. There is, however, a limit on any individual's debt, implicitly set by views about how much leverage is safe.

We can then model a crisis like the one we now face as the result of a "deleveraging shock." For whatever reason, there is a sudden downward revision of acceptable debt levels – a "Minsky moment." This forces debtors to sharply reduce their spending. If the economy is to avoid a slump, other agents must be induced to spend more, say by a fall in interest rates. But if the deleveraging shock is severe enough, even a zero interest rate may not be low enough. So a large deleveraging shock can easily push the economy into a liquidity trap.

Fisher's (1933) notion of debt deflation emerges immediately and naturally from this analysis. If debts are specified in nominal terms and a deleveraging shock leads to falling prices, the real burden of debt rises – and so does the forced decline in debtors' spending, reinforcing the original shock. One implication of the Fisher debt effect is that in the aftermath of a deleveraging shock the aggregate demand curve is likely to be upward, not downward-sloping. That is, a lower price level will actually reduce demand for goods and services.

More broadly, large deleveraging shocks land the economy in a world of topsy-turvy, where many of the usual rules no longer apply. The traditional but long-neglected paradox of thrift – in which attempts to save more end up reducing aggregate savings – is joined by the "paradox of toil" – in which increased potential output reduces actual output, and the "paradox of flexibility" – in which a greater willingness of workers to accept wage cuts actually increases unemployment.

Where our approach really seems to offer clarification, however, is in the analysis of fiscal policy.

Implications for fiscal policy

In the current policy debate, debt is often invoked as a reason to dismiss calls for expansionary fiscal policy as a response to unemployment; you can't solve a problem created by debt by running up even more debt, say the critics. Households borrowed too much, say many people; now you want the government to borrow even more?

What's wrong with that argument? It assumes, implicitly, that debt is debt – that it doesn't matter who owes the money. Yet that can't be right; if it were, debt wouldn't be a problem in the first place. After all, to a first approximation debt is money we owe to ourselves – yes, the US has debt to China etc., but that's not at the heart of the problem. Ignoring the foreign component, or looking at the world as a whole, the overall level of debt makes no difference to aggregate net worth – one person's liability is another person's asset.

It follows that the level of debt matters only because the distribution of that debt matters, because highly indebted players face different constraints from players with low debt. And this means that all debt isn't created equal – which is why borrowing by some actors now can help cure problems created by excess borrowing by other actors in the past. This becomes very clear in our analysis. In the model, deficit-financed government spending can, at least in principle, allow the economy to avoid unemployment and deflation while highly indebted private-sector agents repair their balance sheets, and the government can pay down its debts once the deleveraging crisis is past.

In short, one gains a much clearer view of the problems now facing the world, and their potential solutions, if one takes the role of debt and the constraints faced by debtors seriously. And yes, this analysis does suggest that the current conventional wisdom about what policymakers should be doing is almost completely wrong.

References

Eggertsson, Gauti and Krugman, Paul (2010), "Debt, Deleveraging, and the Liquidity Trap", mimeo

Fisher, Irving, (1933), "The Debt-Deflation Theory of Great Depressions," *Econometrica*, Vol. 1, no. 4.

Koo, Richard (2008), *The Holy Grail of Macroeconomics: Lessons from Japan's Great Recession*, Wiley.

Minsky, Hyman (1986), *Stabilizing an Unstable Economy*, New Haven: Yale University Press.

Public debt and economic growth, one more time

Ugo Panizza and Andrea F Presbitero

Graduate Institute, Geneva; Università Politecnica delle Marche

25 April 2013

The very public Rogoff-Reinhart kerfuffle has focused on what is not true. This column reviews the evidence on what is true. It suggests that the debt-growth link is more complex than commonly thought. While there is evidence that public debt is negatively correlated with economic growth, there is no study that makes a strong case for a causal relationship going from debt to growth.

Are high levels of public debt harmful for economic growth? The answer to this question is key for understanding whether expansionary fiscal policies that increase the level of debt will reduce our future standards of living.

In a series of influential articles, Carmen Reinhart and Kenneth Rogoff showed that high levels of public debt are negatively correlated with economic growth, but that there is no link between debt and growth when public debt is below 90% of GDP (Reinhart, Reinhart, and Rogoff 2012; Reinhart and Rogoff 2010). Reinhart and Rogoff were careful in stating that their results did not prove the existence of a causal relationship going from debt to growth. However, many commentators and policymakers did give a causal interpretation to their findings and used the debt-growth link as an argument in support of fiscal consolidation.

In a recent survey of the empirical literature, we summarise evidence on the links between public debt and economic growth in advanced economies (Panizza and Presbitero 2013).

The argument for a debt-to-growth link

Reinhart and Rogoff's findings sparked a new literature aimed at assessing whether their results were robust to allowing for:

- Non-arbitrary debt brackets.
- Control variables in a multivariate regression set-up.

- Reverse causality; and
- Cross-country heterogeneity.

The discussion on the relationship between debt and growth in advanced economies has become particularly animated after the publication of a recent article by Herndon, Ash, and Pollin (2013) that challenges some of Reinhart and Rogoff's findings. As the debate is still ongoing, we stay out of this controversy and assess what we knew about the relationship between debt and growth before Herndon, Ash, and Pollin.

Threshold effects

Instead of comparing growth across a set of pre-established brackets, Minea and Parent (2012) study the relationship between debt and growth by using a statistical technique that allows for a gradual change in the estimated relationship between debt and growth. They find complex non-linearity which may not be captured by models that use a set of exogenous thresholds. Egert (2012) uses a variant of the Reinhart and Rogoff dataset and finds that the presence and position of debt thresholds are not robust to small changes in country coverage, data frequency, and econometric specification. By using robust inference techniques, Baglan and Yoldas (2013) find a negative correlation between debt and growth in a subset of countries, but no evidence of a threshold effect.

Papers that study the relationship between debt and growth by controlling for a large set of covariates in a regression set-up find that there is a robust negative correlation between debt and growth in advanced economies (for references, see Panizza and Presbitero 2013). The point estimates are economically significant and suggest that a ten-percentage-point increase in the debt-to-GDP ratio is associated with an 18 basis points decrease in subsequent real-GDP growth. However, our reading of the existing literature suggests that these papers that control for covariate do not find threshold effects. The relationship between debt and growth is negative but fairly stable across different levels of debt.

Heterogeneity

The presence of cross-country heterogeneity may lead to large biases in the estimated relationship between debt and growth. Kourtellos, Stengos, and Tan (2012) relax the assumption that the relationship between debt and growth is either constant across countries or only varies with debt levels. They find that the estimated relationship between public debt and economic growth depends on institutional quality, but they do not find

evidence of debt thresholds.

Eberhardt and Presbitero (2013) apply new econometric techniques which deal explicitly with a variety of issues related to unobserved heterogeneity and cross-sectional dependence. Their findings cast doubt on the pooled modelling approach used by most papers that study the empirical relationship between debt and growth.

Causality

While there is evidence that public debt is negatively correlated with economic growth, correlation does not necessarily imply causality. The link between public debt and economic growth could be driven by the fact that it is low economic growth that leads to high levels of debt. Alternatively, the observed correlation between debt and growth could be due to a third factor that has a joint effect on these two variables.

In Panizza and Presbitero (2012a), we test for causality and do not find evidence in support of the hypothesis that debt causes economic growth. While we are aware that techniques for assessing causality are never watertight, we are confident in stating that, at this point, there is no paper that can make a strong case for a causal relationship from debt to growth. We hope that our work will stimulate more research aimed at uncovering possible causality.

What is public debt?

One issue that is rarely discussed in the empirical literature relates to the definition of public debt itself.

At the end of 2012, average gross debt in OECD countries was close to 110% of the group's GDP, but net debt was almost 40 percentage points lower (Panizza and Presbitero, 2013, Table 1). While net debt is usually much lower than gross debt, measures of debt that include government's future implicit liabilities would yield much higher debt ratios. Hagist, Moog, Raffelhuschen, and Vatter (2009) estimate the net present value of future government liabilities and revenues and find that the 'true' debt-to-GDP ratio is often twice as large as gross debt.

Should researchers focus on gross or net debt? Should they concentrate on explicit debt, or also consider the government's implicit liabilities? Should standard measures of public debt also include the expected value of the government's contingent liabilities (consider the sudden debt explosions in Iceland, Ireland, and Spain)?

Moreover, it is now recognised that macroeconomic and financial vulnerabilities depend on both debt levels and debt composition (Inter-American Development Bank 2006). Unfortunately, it is hard to find cross-country data on the composition of public debt in advanced and developing economies.

In sum

While there is evidence that public debt is negatively correlated with economic growth, there is no study that makes a strong case for a causal relationship going from debt to growth. Moreover, the presence of debt thresholds and, more generally, of a non-monotonic relationship between debt and growth is not robust to small changes in data coverage and empirical techniques.

Our findings should not be interpreted as suggesting that debt accumulation is not a relevant policy issue or that high debt levels are not a problem in general (for a discussion see Panizza and Presbitero 2012). However, we do think that an assessment of the complex relationship between debt and growth requires more research. In our view, this research should focus on causality and cross-country heterogeneity.

References

Baglan, Deniz and Emre Yoldas (2013), "Government debt and macroeconomic activity: a predictive analysis for advanced economies", Finance and Economics Discussion Series, n° 2013-05, Federal Reserve Board.

Eberhardt, Markus and Andrea F Presbitero (2013), "This time they are different: heterogeneity and nonlinearity in the relationship between debt and growth", manuscript.

Egert, Balazs (2012), "Public debt, economic growth and nonlinear effects: myth or reality?", OECD Economic Department working paper, n° 993.

Hagist, Christian, Stefan Moog, Bernd Raffelhuschen and Johannes Vatter (2009), "Public debt and demography – An international comparison using generational accounting", CESifo *DICE Report*, 7(4): 29-36.

Herndon, Thomas, Michael Ash and Robert Pollin (2013), "Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff", PERI working paper n° 322, April.

Inter-American Development Bank (2006), Living with Debt: How to Limit the Risks of Sovereign Finance, Harvard University Press,

Cambridge, MA.Kourtellos, Andros, Thanasis Stengos and Chih Ming Tan (2012), "The effect of public debt on growth in multiple regimes", RCEA working paper, n° 60_12.

Minea, Alexandru and Antoine Parent (2012), "Is high public debt always harmful to economic growth? Reinhart and Rogoff and some complex nonlinearities", CERDI working papers, n° 2012-18.

Panizza, Ugo and Andrea F Presbitero (2012a), "Public debt and economic growth: is there a causal effect?", MoFiR working papers, n° 65.

Panizza, Ugo and Andrea F Presbitero (2012b), "Is high public debt harmful for economic growth?", VoxEU.org, 22 April.

Panizza, Ugo and Andrea F Presbitero (2013), "Public debt and economic growth in advanced economies: A survey", *Swiss Journal of Economics and Statistics*, forthcoming.

Reinhart, Carmen M, Vincent R Reinhart and Kenneth S Rogoff (2012), "Public debt overhangs: Advanced-economy episodes since 1800", *Journal of Economic Perspectives*, 26(3): 69-86.

Reinhart, Carmen M and Kenneth S Rogoff (2010), "Debt and growth revisited", VoxEU.org, 11 August.

The long wave of government debt

Andrew Scott

London Business School and CEPR

11 March 2010

The high levels of government debt have raised concern among policymakers and commentators. But this column argues that markets have financed much larger levels of debt than are currently predicted for the UK and US. Given the enormous financial shock these economies have experienced, they might actually be better off with high debt for a long period of time.

One lasting impact of the global financial crisis is that government debt will remain high for decades to come. Forecasts suggest UK government debt will double to reach 94% by 2011 and US debt will rise to 96%. High debt is seen as a serious problem. As Adam Smith warned more than two centuries ago "the practice of funding has gradually enfeebled any state which has adopted it".

The difficulty with this alarmist view on government debt is that economics doesn't tell us what is a "high" level of debt. Economic theory only tells us that if the intertemporal budget constraint holds then the value of debt today equals the net present value of future primary surpluses. Without anything more definite it is impossible to say debt is too high or to announce that debt reduction should be an urgent short-term priority. It is true that such huge increases in government debt reflect serious economic problems. But given the enormous financial shock the economy has experienced, we might actually be better off with high debt for a long period of time.

In fact, although economics is quiet on the issue of what it means for debt to be too high it does tell us that in the face of large temporary shocks the optimal response is for debt to show large and long lasting swings. If bond markets are incomplete then we know from Barro (1979) and Aiyagari et al (2002) that debt should act as a buffer to help the government respond to shocks. Marcet and Scott (2009) go further and show that under these circumstances debt should show greater than unit root persistence and much greater persistence than any other variable. In other words, in response to large short term shocks government debt should show decade long shifts. Faraglia, Marcet and Scott (2008) show that these optimal

swings may even appear unsustainable for significant periods of time – even though, by design, they are not. Critically, debt is not "mean reverting" – it doesn't come back down to its previous level.

The logic is simple. The UK and US government have the ability to borrow long term and the option to roll over their borrowing. Rather than abruptly raise taxation and cut government expenditure, fiscal policy should adjust over the long term. Fiscal adjustment in the short run is not enough to produce a surplus and so debt rises for a significant period.

The potential magnitude and duration of these increases in debt can be substantial, but markets have financed much larger levels of debt than are predicted for the UK and US. The largest increases are related to war, but as Japan's recent experience shows this is not always the case. In the UK between 1918 and 1932 debt increased from 121% of GNP to 191%. It was not until 1960 that debt returned to its 1918 level.

If adjustment occurs over the long run the issue is how is this achieved? Giannitsarou and Scott (2007) study the G7 over the period 1965 to 2008 and find very little seems to be achieved through inflation. Measures of debt, deficit, or general fiscal imbalances have no role to play in forecasting inflation over any horizon. The adjustment instead comes from changes in the primary deficit (the deficit excluding interest payments). In Italy between 1972 and 1997 the average total deficit was 9.6% of GDP and was never below 6%. During this period the primary deficit fell from a high of 8.6% in 1975 to 3.3% by 1989 and to a surplus of 5.4% in 1997. In other words, adjustment is through the primary balance and over a very long time. In the interwar period the UK government only ran a total surplus in 5 years – and even then it was only small in magnitude. But every year between 1920 and 1938 saw a primary surplus that helped check the rise in debt and achieve longer run solvency.

Governments should of course look at long term fiscal solvency and articulate clearly how they intend to achieve debt stability. But forcing governments to achieve specific numerical targets by certain calendar dates is a mistake. If further shocks occur or the crisis continues it will optimal to revise these targets. Debt is the means by which governments accommodate shocks - making policy change to meet previously fixed fiscal targets puts the cart before the horse. Too much current debate takes the form of asserting that fiscal discipline is a good thing. Of course it is. But what markets, credit rating agencies and deficit hawks need to engage in is a realistic debate that recognises that government debt will and should remain at its elevated level for a very long time and the required

adjustment is for the long haul. Fiscal discipline and solvency is not inconsistent with decade long shifts in debt. As caustically noted by Macauley, "at every stage in the growth of debt it has been seriously asserted by wise men that bankruptcy and ruin were at hand. Yet still the debt went on growing, and still bankruptcy and ruin were as remote as ever"

Adam Smith may have warned that debt can enfeeble a nation but he also remarked in 1776 that "Great Britain seems to support with ease a debt burden which, half a century ago, nobody believed her capable of supporting". Debt rose even further in the decades after. Markets and governments in the UK and US have proven before they can support and maintain very elevated levels of debt and should be open to the possibility they can once again.

References

Aiyagari, S Rao, Albert Marcet, Thomas J Sargent, and Juha Seppälä (2002), "Optimal Taxation without State-Contingent Debt", *Journal of Political Economy*, 110:1220-1254.

Barro, Robert (1979), "On the Determination of Public Debt", *Journal of Political Economy*, 64: 93-110.

Faraglia, Elisa, Albert Marcet, and Andrew Scott (2008), "Fiscal Insurance and Debt Management in OECD Economies", *Economic Journal*.

Giannitsarou, Chryssi and Andrew Scott (2007), "Inflation Implications of Rising Government Debt," in: NBER International Seminar on Macroeconomics 2006, National Bureau of Economic Research, Inc.

Marcet, Albert and Andrew Scott (2009), "Debt and Deficit Fluctuations and the Structure of Bond Markets", *Journal of Economic Theory*.

Lessons from a century of large public debt reductions and build-ups

S. M. Ali Abbas, Nazim Belhocine, Asmaa El-Ganainy and Mark Horton

IMF

As policymakers continue to grapple with high debts and the troubles that come with them, this column looks at the lessons from data on public debt in 178 countries stretching back as far as 1880. It argues that when faced with an unsustainable debt burden, slow but steady adjustment is the way to go.

Empirical work on debt cycles and debt sustainability has been constrained by lack of public debt data on a large number of countries over a long time period. Existing studies are based on datasets that either cover short time periods (such as Jaimovich and Panizza 2010) or omit a large number of countries (such as Reinhart and Rogoff 2010). In our latest study (Abbas et al 2011), we compile a comprehensive historical public debt database covering 178 countries, starting from 1880 for G7 countries and a few other advanced and emerging economies, and from 1920 for additional advanced and emerging economies. For low-income countries, data coverage generally starts in 1970 (Abbas et al 2011).

Figure 1 Debt-to-GDP ratios across country groups, 1880–2009 (Group PPPGDP-weighted averages, in percent of GDP)
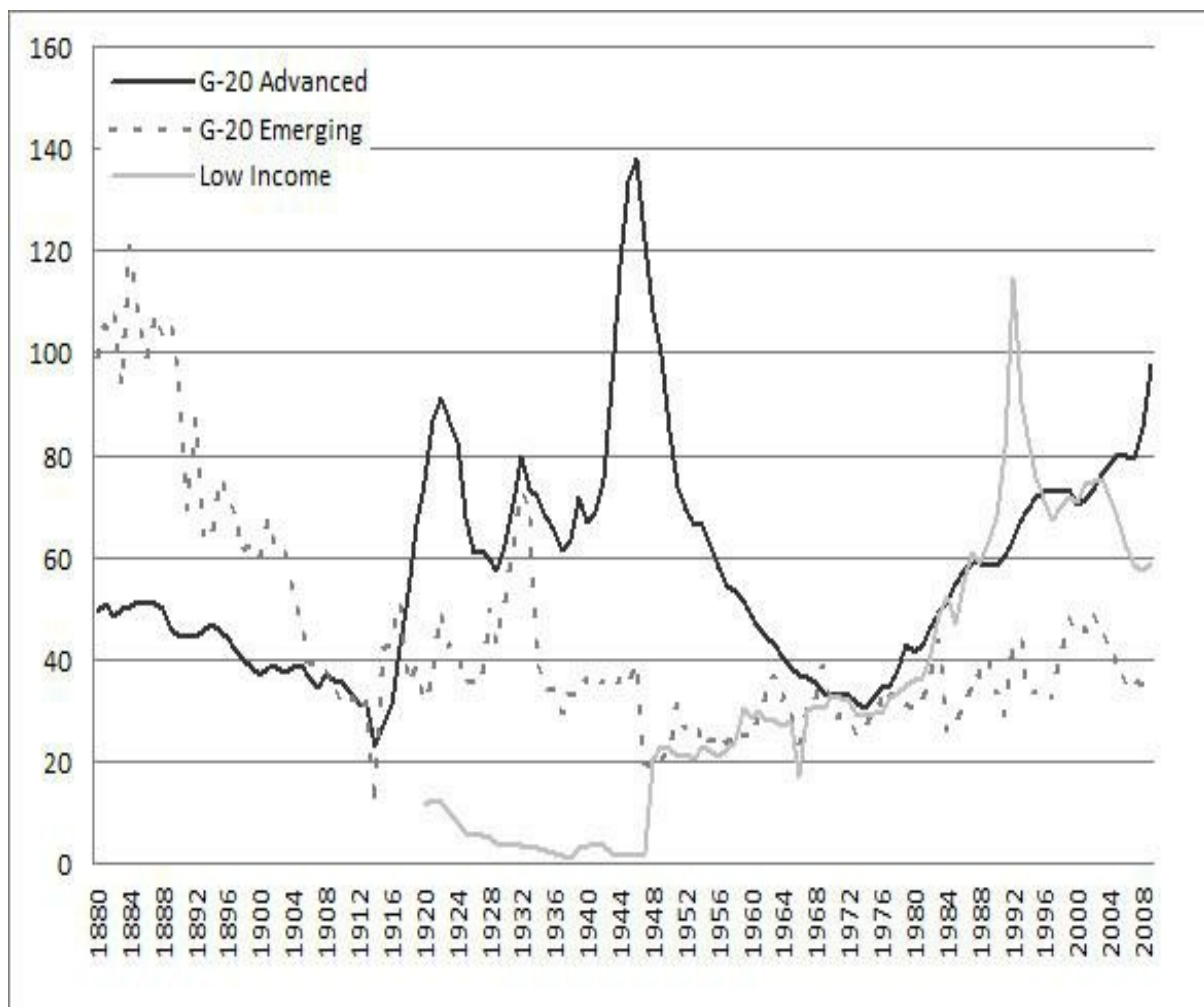
Figure 1 provides a broad historical perspective of debt developments in advanced, emerging, and low-income economies. Debt levels in advanced economies (now the G20) averaged 55% of GDP over 1880–2009, with a number of peaks and troughs that correspond with key historical events along the way.

- During the first era of financial globalisation (1880–1913), debt ratios trended down as public finances were, for the most part, under control, and growth was supported by an unprecedented level of gold standard-enabled financial and trade flows. Debt ratios reached their lowest level – 23% of GDP in advanced economies – in 1914, when the First World War began.
- But war and the fiscal crises that followed, the Great Depression (early 1930s), and World War II (1941–45) drove debts upward (to almost 150% of GDP in 1946).
- By 1960, however, debt ratios had declined to 50% of GDP on the

back of strong postwar reconstruction and in some cases moderate, high, or even hyper inflation.

- Debt ratios began to rise again starting in the mid-1970s, with the end of the Bretton Woods system of exchange rates and the two oil price shocks. Expanding welfare states, moderating growth, and higher interest rates all contributed to this seminal peacetime increase, which the present crisis has exacerbated.

Episodes of large debt reductions and build-ups in advanced economies

So much for aggregate trends; what about individual episodes? For a group of 19 advanced economies, we identify 68 debt declines (including seven defaults) and 60 debt increases sized greater than 10% of GDP (see Figures 2 and 3).[1] The 'non-default' debt declines averaged 38% of GDP, and were distributed roughly evenly across four periods: the pre-1914 gold standard era, the two World Wars and intervening decades, the Bretton Woods years from 1946–70, and the post-1970 period. Debt surges averaged 44% of GDP and were bunched around 1914–45 and the peacetime period of 1970–2007.

Figure 2 Identified episodes of debt-to-GDP Decreases (in percent of GDP)
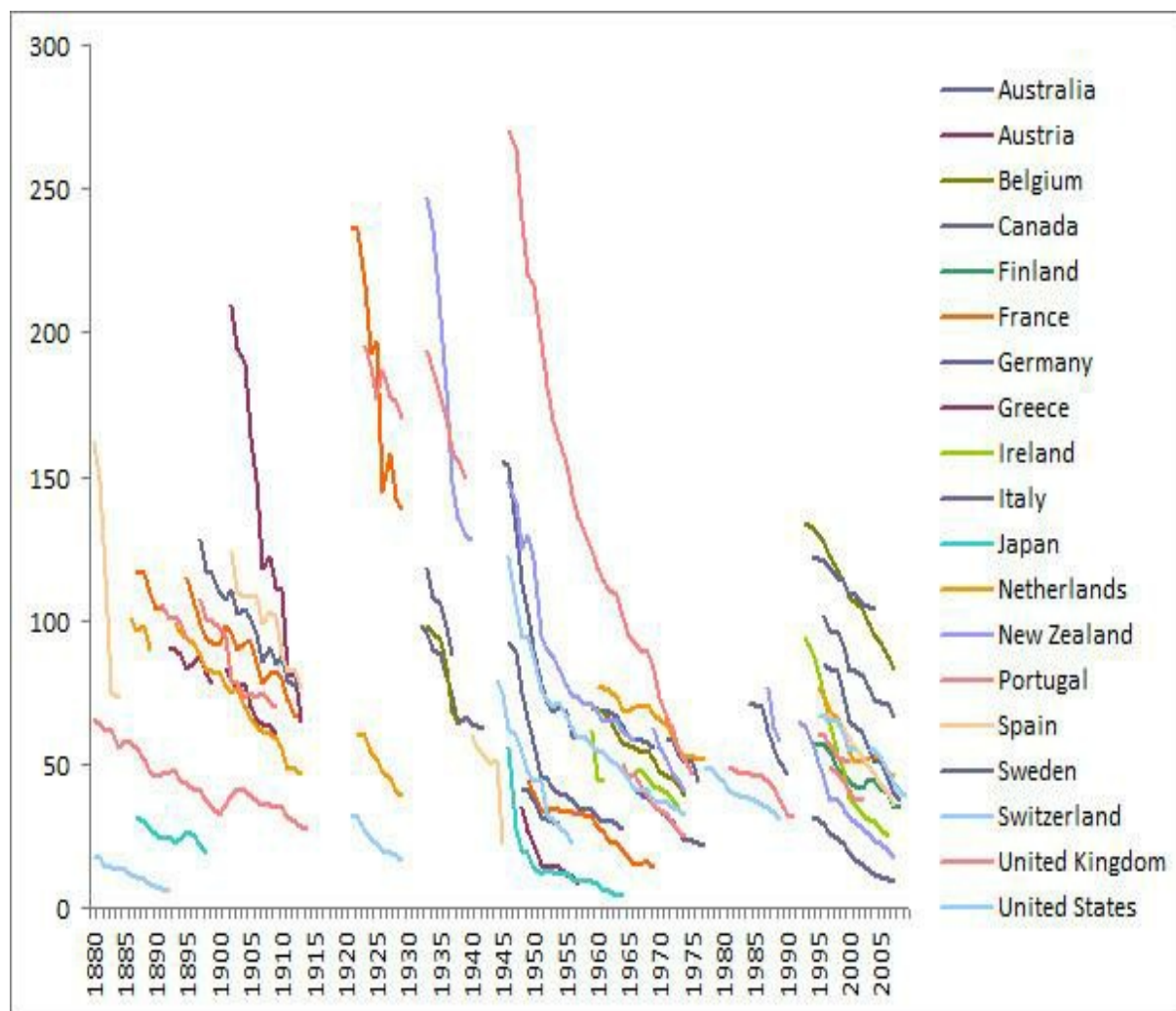
Figure 3 Identified episodes of debt-to-GDP increases (in percent of GDP)

Legend (right side of chart):
— Australia
— Austria
— Belgium
— Canada
— Finland
— France
— Germany
— Greece
— Ireland
— Italy
— Japan
— Netherlands
— New Zealand
— Portugal
— Spain
— Sweden
— Switzerland
— United Kingdom
— United States
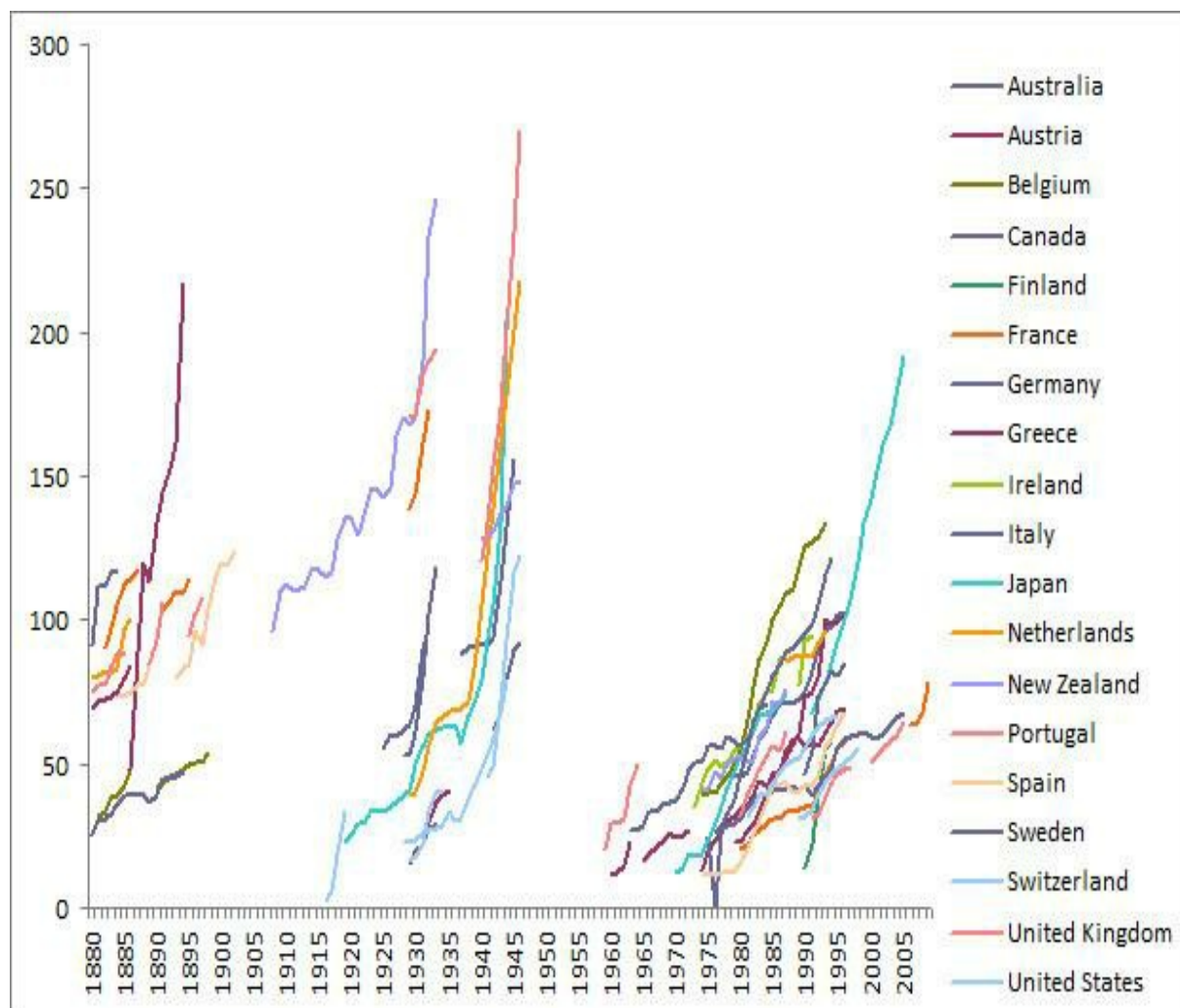
Drivers of large public-debt changes in advanced economies

So what drove these large debt movements? To find out, we decompose changes in the debt-to-GDP ratio into cumulative contributions from the primary deficit, the interest-growth differential (often referred to as the 'automatic debt dynamics'), and a stock-flow adjustment residual which could reflect a number of factors: currency valuation effects operating on foreign currency debt; assumption of debts of non-governmental entities; debt restructuring or default; privatisation or drawdown and build-up of government deposits (see Escolano 2010).

Table 1 summarises the decomposition results for large debt increases. While wartime debt increases started from higher debt levels and were associated with larger primary deficits, they were smaller in size than peacetime surges. The key driver of this appears to be the interest-growth differential component, which was relatively modest during wartime (2% of GDP), but sizable during peacetime recessions (20% of GDP, prior to

2007, and 10% of GDP during the present slowdown). Also, debt increases during non-recessionary periods were slightly larger than those during global recessions despite the former commanding debt-reducing negative interest-growth differentials. The key contributors to these 'good time' debt surges were runaway primary deficits and, especially, stock-flow adjustments which averaged 34% of GDP during (20% of GDP over all 60 debt increases during good and bad times). It appears that these stock-flow adjustments reflect governments absorbing liabilities 'below the line', while shielding headline fiscal balances 'above the line', which is consistent with the pattern documented by the IMF (2011a and 2011b) for more recent periods.

Table 1 Decomposition of 60 large debt ratio increases for different sub-samples (averages, in percent of GDP)

	No. of episodes	Starting debt ratio	Ending debt ratio	Increase	Primary deficit	Interest-growth differential $(i-\gamma)$	i	$-\gamma$	Debt-increasing stock-flow adjustment
EU	44	53.9	90.7	36.7	10.3	9.5	27.7	-19.0	16.9
Non-EU	16	51.7	114.6	62.9	26.8	6.0	26.0	-20.3	30.1
War 1/	16	71.4	109.5	38.0	17.2	1.9	17.9	-16.0	18.9
Peacetime	44	46.7	92.5	45.8	13.7	11.0	30.7	-20.6	21.0
Non-recession	16	39.6	86.4	46.8	18.0	-5.4	38.2	-44.9	34.1
Recession 2/	28	50.8	96.0	45.2	11.3	20.4	26.4	-6.7	13.5
Memo: Great Recession 3/	17	63.1	94.1	31.1	14.3	9.7	17.9	-8.3	7.0
Startyr < 1914	12	77.3	109.9	32.6	-14.3	23.5	18.7	4.8	23.4
Startyr b/w 1914-1945	20	65.5	119.2	53.7	21.5	7.3	10.9	-3.6	24.9
Startyr b/w 1946-1970	5	16.7	54.9	38.2	19.3	-17.3	40.2	-57.5	36.2
Startyr > 1970	23	38.2	80.2	42.0	22.8	7.6	43.2	-37.4	11.6
Start debt ratio >= 60	21	97.5	139.5	42.0	8.9	18.1	17.8	-0.3	15.0
Start debt ratio < 60	39	29.6	74.2	44.6	17.8	3.5	32.4	-29.7	23.4
Fast (annual debt increase >= 5 ppt)	30	72.3	126.6	54.3	12.5	14.9	20.0	-6.5	27.0
Slow (annual debt increase < 5 ppt)	30	34.4	67.5	33.1	16.8	2.3	34.6	-32.2	13.9
Long (episode duration >= 5 years)	44	47.1	97.2	50.1	21.3	5.1	33.3	-29.2	23.8
Short (episode duration < 5 years)	16	70.5	96.6	26.1	-3.5	18.3	10.6	7.6	11.3
Big (debt change > 20 ppt)	43	53.3	108.7	55.4	20.0	9.1	33.1	-24.1	26.3
Small (debt change b/w 10-20 ppt)	17	53.4	67.7	14.2	1.3	7.3	12.6	-7.5	5.6
All	60	53.3	97.0	43.7	14.7	8.6	27.3	-19.4	20.4
All (median)	60	43.5	81.3	32.5	7.0	10.2	18.6	-10.2	14.4

Table 2 illustrates the components of large debt decreases across various sets of circumstances – starting points, time periods, and duration, pace, and magnitude of debt reduction. Debt declines featuring a default averaged about 64 percentage points of GDP, much larger than non-default declines, and were reflected in large stock-flow adjustments (37 percentage points). The 61 non-default episodes registered an average reduction of 38% of GDP, and were accounted for by the primary balance and the growth-interest differential components in roughly equal amounts.

Interestingly, the post-World War II non-default debt reductions, aligned with the Bretton Woods years (1945–70), were associated with a dominant contribution from the growth-interest differential component: real growth averaged around 4%-5% annually in these episodes while the average real interest rates paid on debt were negative. These findings tend to support recent conclusions by Reinhart and Sbrancia (2011) that financial repression policies had a role to play during this period, characterised by capital controls, in reducing debt burdens in advanced economies.

Table 2 Decomposition of 68 large debt ratio reductions over different sub-samples (averages, in percent of GDP)

	No. of episodes	Starting debt ratio	Ending debt ratio	Decrease	Primary surplus	Growth-interest differential ($\gamma-i$)	γ	$-i$	Debt-reducing stock-flow adjustment
Default 1/	7	112.9	48.8	64.1	6.3	21.1	41.4	-20.2	36.7
Non-Default	61	92.6	54.9	37.8	21.5	19.5	46.9	-27.3	-3.2
EU	40	98.0	61.0	36.9	26.6	14.8	45.6	-30.8	-4.5
Non-EU	21	82.4	43.1	39.4	11.7	28.5	49.3	-20.8	-0.9
Startyr < 1914	11	88.9	62.3	26.7	18.5	9.3	31.1	-21.7	-1.2
Startyr b/w 1914-1944	14	121.7	87.7	34.0	23.1	12.0	37.5	-25.5	-1.0
Startyr b/w 1945-1970	17	92.3	32.7	59.6	20.7	53.2	78.9	-25.7	-14.2
EU	9	95.6	30.2	65.4	34.2	51.8	81.3	-29.5	-20.6
Non-EU	8	88.5	35.4	53.2	5.5	54.7	76.1	-21.4	-7.0
Startyr > 1970	19	73.6	46.3	27.3	22.7	0.8	34.2	-33.4	3.8
Start debt ratio >= 80	28	136.7	79.6	57.1	29.0	37.4	69.9	-32.5	-9.3
Start debt ratio < 80	33	55.2	33.9	21.3	15.1	4.3	27.3	-23.0	1.9
Fast (annual debt decrease >= 5 ppt)	16	147.7	84.4	63.4	27.7	47.3	70.2	-22.9	-11.6
Slow (annual debt decrease < 5 ppt)	45	73.0	44.4	28.6	19.3	9.6	38.5	-28.9	-0.3
Long (episode duration >= 5 years)	51	88.9	47.4	41.5	24.4	22.2	52.7	-30.5	-5.1
Short (episode duration < 5 years)	10	111.4	92.9	18.5	6.7	5.7	16.9	-11.2	6.1
Big (debt change > 20 ppt)	35	107.4	52.6	54.7	29.8	31.5	65.5	-34.0	-6.6
Small (debt change b/w 10-20 ppt)	26	72.7	57.9	14.9	10.2	3.3	21.7	-18.4	1.3
All Non-Default	61	92.6	54.9	37.8	21.5	19.5	46.9	-27.3	-3.2
All Non-Default (median)	61	76.0	45.3	22.7	15.0	6.6	34.0	-21.6	0.1

Notes: 1/ Includes episodes which either overlapped or immediately followed hard or soft defaults (the latter include forced currency conversions) on central government domestic and/or external debt (as documented in Reinhart and Rogoff 2009).

Implications for current debt debate

The composition of the 11 debt reductions observed during 1880–1914, the first era of financial globalisation, is quite similar to that witnessed in the post-1970 financially liberalised period. In both cases, the debt ratio reductions were mainly caused by large primary surpluses. In fact, the post-1970s debt reductions are accounted for almost entirely by primary surplus improvements. However, insofar as such improvements are boosted by the cycle and easier to implement in the context of strong growth, these results may somewhat understate the true role of growth in debt declines; strong growth was a consistent feature of most debt decline episodes.[2] That conventional fiscal adjustment and growth have led the way in periods of global financial integration is intuitive as well as consistent with previous studies (such as IMF 2010).

Looking ahead, highly indebted advanced economies are confronted by a challenging landscape. The pursuit of unconventional options – such as reverting to financial repression policies akin to those taken during the post-WWII years, reducing the burden of domestic debt through higher inflation, or restructuring – may be a tempting shortcut but it comes with high costs. A gradual but steady adjustment is the right way to go. History shows an orderly adjustment is much easier in the context of sustained medium-term growth. This suggests that there is a premium on both implementing structural measures that improve competitiveness and the business environment, and designing fiscal adjustment in a manner that minimises the drag on growth.

References

Abbas, SM Ali, Nazim Belhocine, Asmaa El-Ganainy, and Mark Horton (2011), "Historical Patterns and Dynamics of Public Debt – Evidence From a New Database", *IMF Economic Review*, 59(4):717-742.

Escolano, J (2010), "A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates", Technical Notes and Manuals, Fiscal Affairs Department, International Monetary Fund.

International Monetary Fund (2010), *World Economic Outlook*, April 2010.

International Monetary Fund (2011a), *The Fiscal Monitor*, IMF Fiscal Affairs Department, April.

International Monetary Fund (2011b), *The Fiscal Monitor*, IMF Fiscal Affairs Department, September.

Jaimovich, D and U Panizza (2010), "Public Debt Around the World: A New Data Set of Central Government Debt", *Applied Economics Letters*, 17(1):19-24.

Reinhart, Carmen, and Kenneth Rogoff (2010), "This Time is Different Chartbook: Country Histories on Debt, Default, and Financial Crises", NBER Working Paper No. 15815.

Reinhart, Carmen, and Kenneth Rogoff (2011), "A Decade of Debt", NBER Working Paper No. 16827.

Reinhart, Carmen, and M Belen Sbrancia (2011), "The Liquidation of Government Debt", NBER Working Paper No. 16893.

1 The countries covered are: Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

2 Interestingly, the role of the growth-interest differential varied across the two periods, mainly on account of the interest component, which was much higher in the post-1970 setting than the pre-1914 one.

Chapter 20 The Financial System: Opportunities and Crises

What do the new data tell us?

Barry Eichengreen and Kevin Hjortshøj O'Rourke

University of California, Berkeley; University of Oxford and CEPR

This column updates the original Vox columns by Barry Eichengreen and Kevin O'Rourke comparing today's global crisis to the Great Depression. The three previous columns have shattered all Vox readership records with over 450,000 views. This latest edition covers up to February 2010 showing that, while there is cause for optimism, there is no room for complacency.

Editor's Note: This column updates the original Vox columns by Barry Eichengreen and Kevin O'Rourke comparing today's global financial crisis to the Great Depression. The previous columns have shattered all Vox readership records with over 450,000 views (O'Rourke and Eichengreen 2009). The latest data cover up to February 2010, the original April 2009 column and the subsequent updates appear below. Click here to read the original column.

Global output

Global industrial production continues to recover – something for which policy deserves considerable credit (as we have argued on this site, see Almunia et al 2009 and O'Rourke and Eichengreen 2009). But before indulging in self-congratulation, policymakers should note that the level of industrial production is still 6% below its previous peak (figure 1). (At the trough it was 13% below its previous peak.) It follows that considerable excess capacity remains in a number of important economies. Exiting now from policies of stimulus in those countries would therefore be premature.

Figure 1 World industrial production, now vs. then
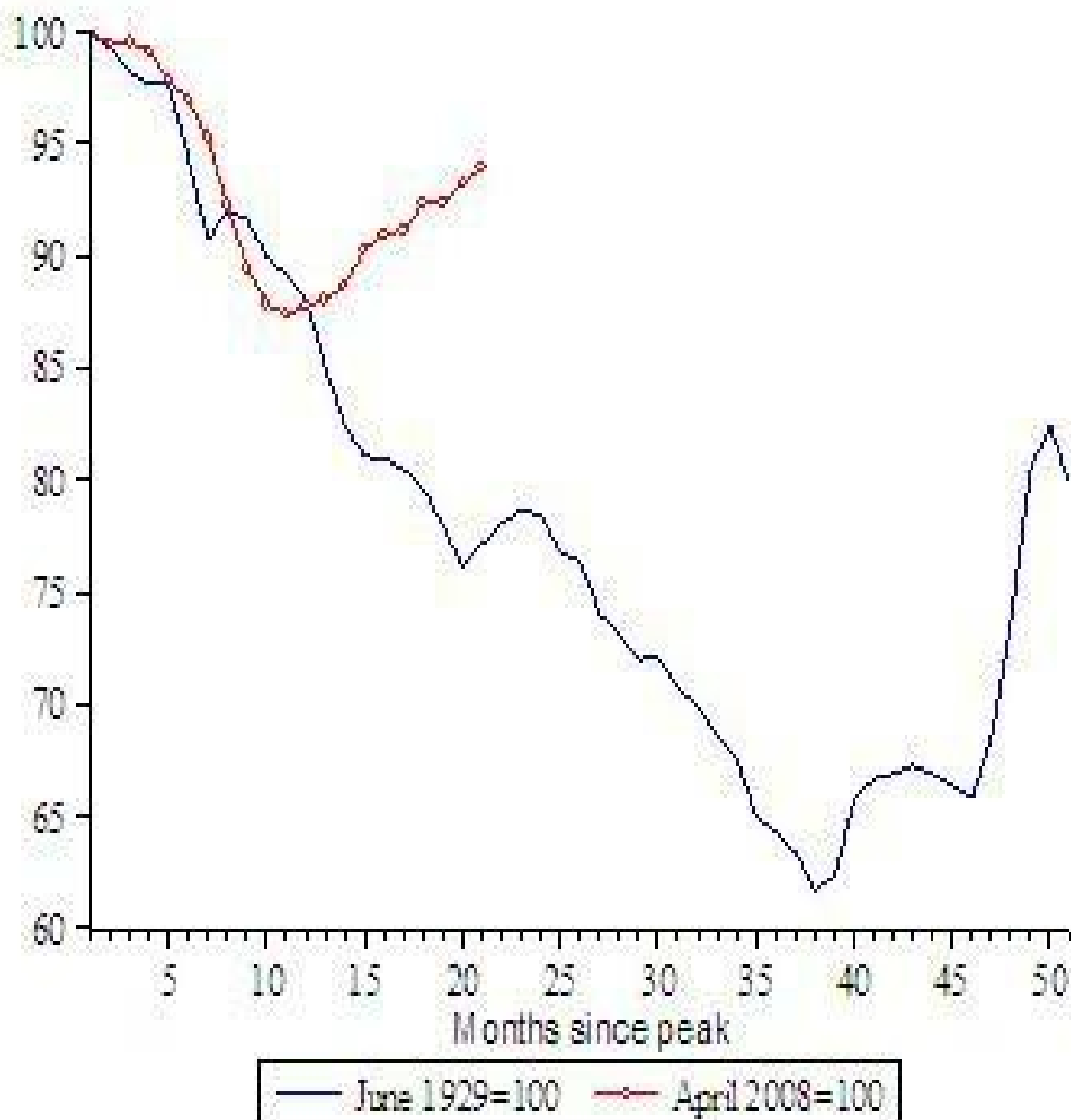
World trade

World trade also continues to recover but remains 8% below its previous peak (figure 2). (At the trough it was 20% below its previous peak.) The roots of this collapse of trade remain to be fully understood, although recent research has begun to shed light on some of the causes (see Baldwin 2009 and Chor and Manova 2009).

Figure 2 Volume of world trade, now vs. then
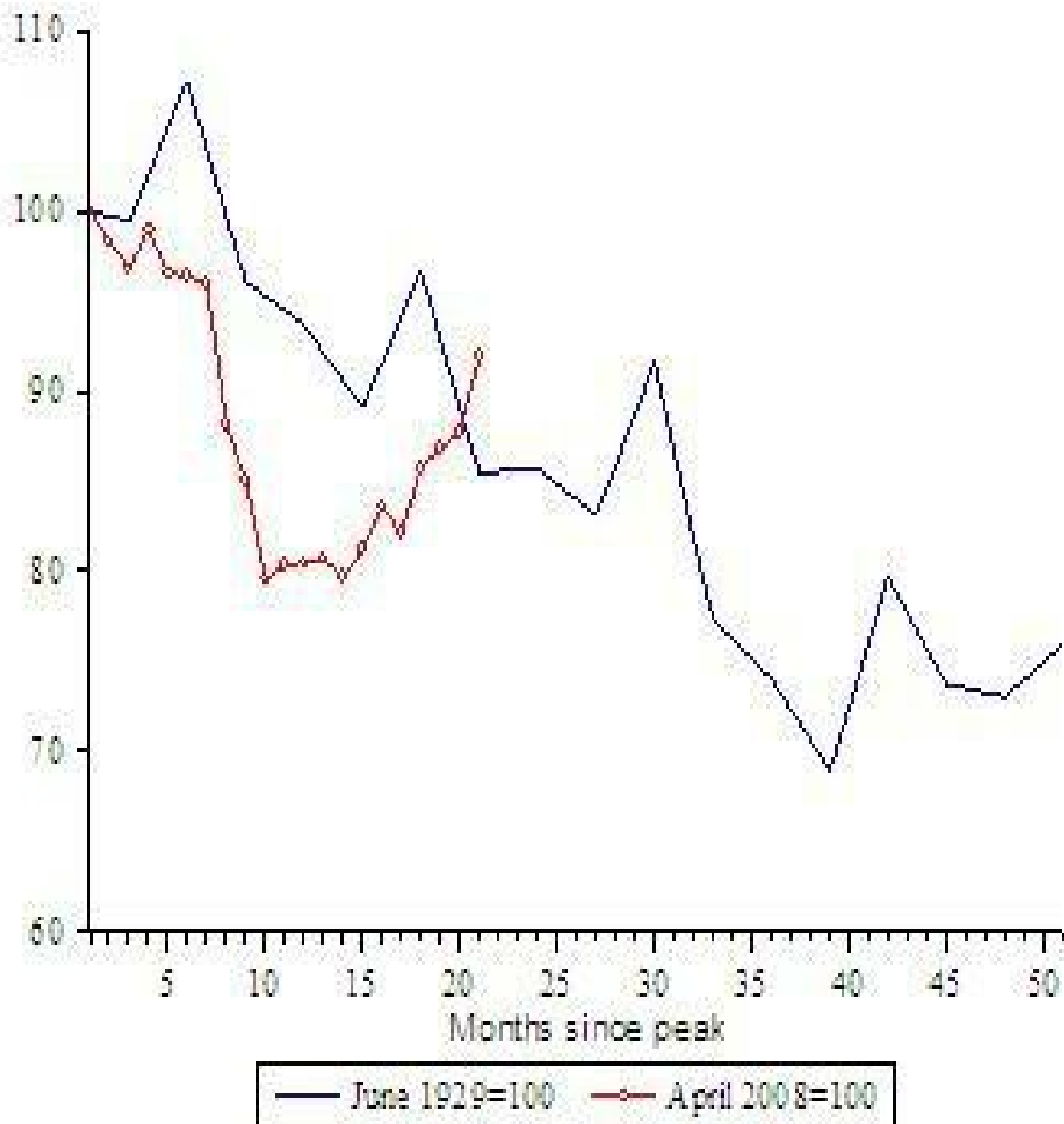
Equity markets

World equity markets are now 25% below peak (figure 3). (At their trough they were 50% below peak.) There was a break in the upward trend in January 2010 that may signal investors' growing concern about the danger of a double dip – although if the crisis has taught us anything, it has taught us that too much should not be made of the forecasting ability of financial markets.

Figure 3 World equity markets, now vs. then
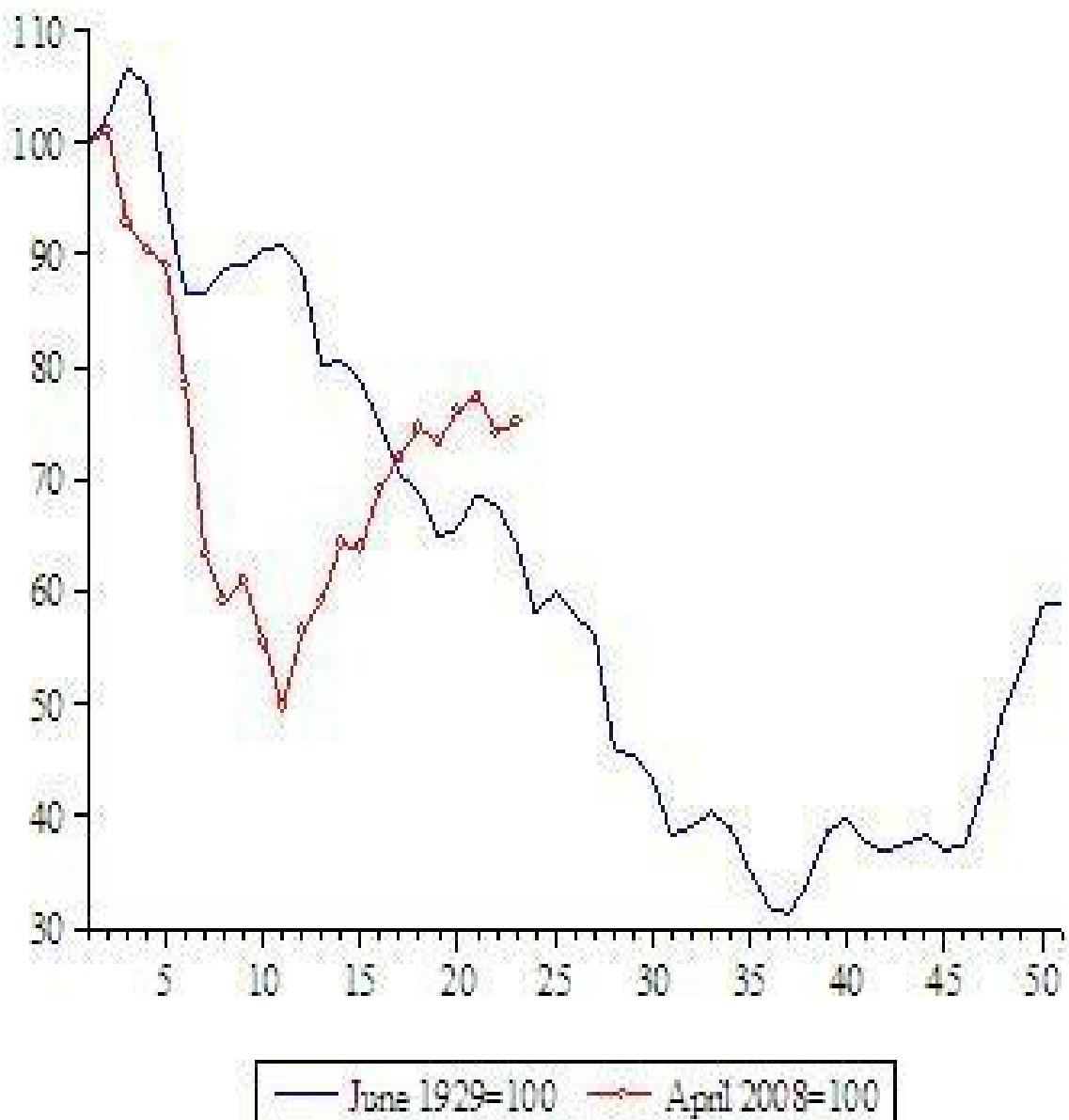
Start of second update (published June 2009); original column (published 6 April 2009) appears below

Editor's note: The original Vox column by Barry Eichengreen and Kevin O'Rourke shattered all Vox readership records (30,000 views in two days, over 100,000 in a week, now fast approaching 350,000). Here the authors provide updated charts, presenting monthly data up through June 2009 (or latest).

What do the new data tell us?

- Global industrial production now shows clear signs of recovering.

This is a sharp divergence from experience in the Great Depression, when the decline in industrial production continued fully for three years. The question now is whether final demand for this increased production will materialise or whether consumer spending, especially in the US, will remain weak, causing the increase in production to go into inventories, leading firms to cut back subsequently, and resulting in a double dip recession.

- Global stock markets have mounted a sharp recovery since the beginning of the year. Nonetheless, the proportionate decline in stock market wealth remains even greater than at the comparable stage of the Great Depression.
- The downward spiral in global trade volumes has abated, and the most recent month for which we have data (June) shows a modest uptick. Nonetheless, the collapse of global trade, even now, remains dramatic by the standards of the Great Depression.

Figure 1 World industrial production, now vs then
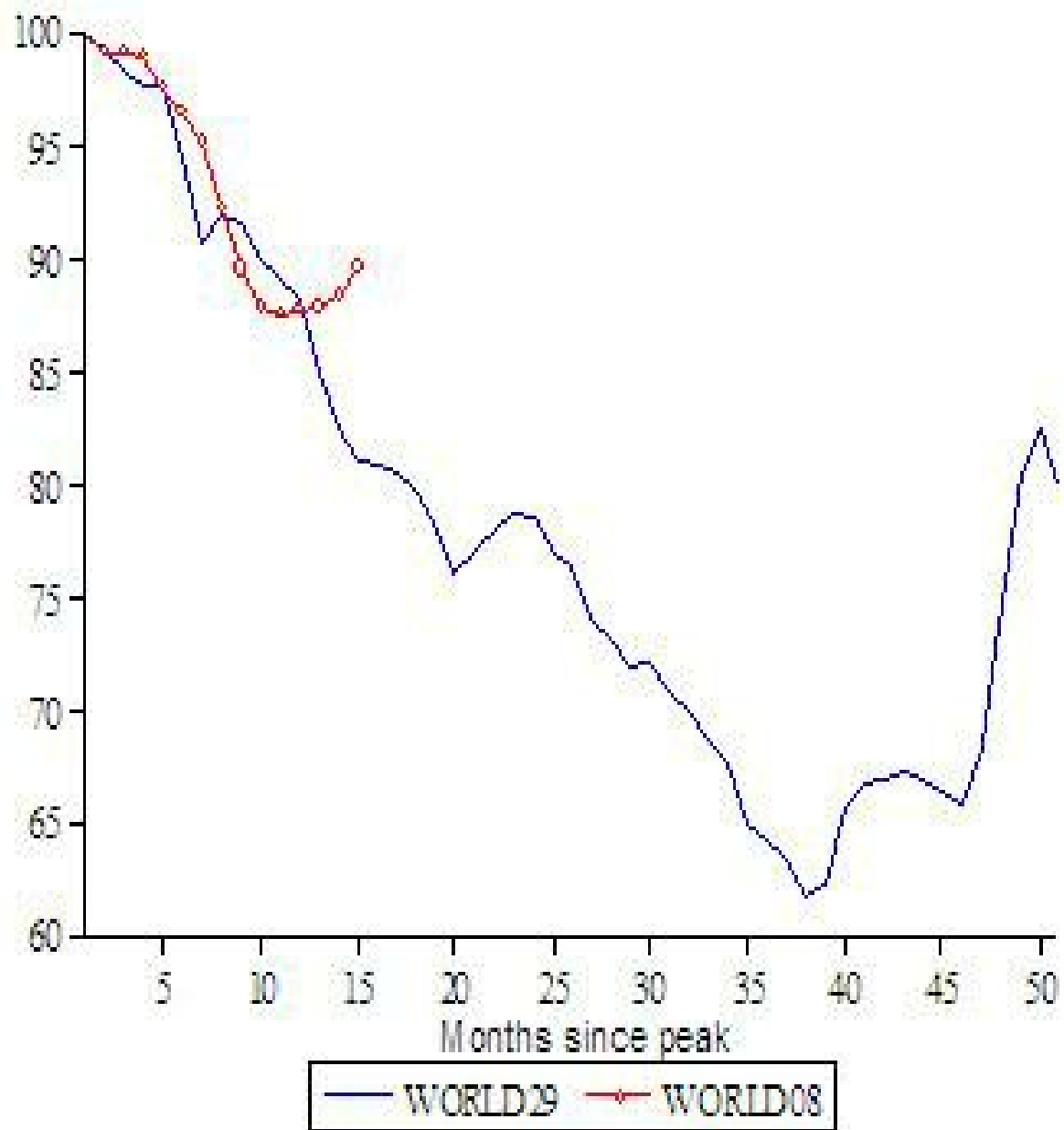
Figure 2 World stock markets, now vs then
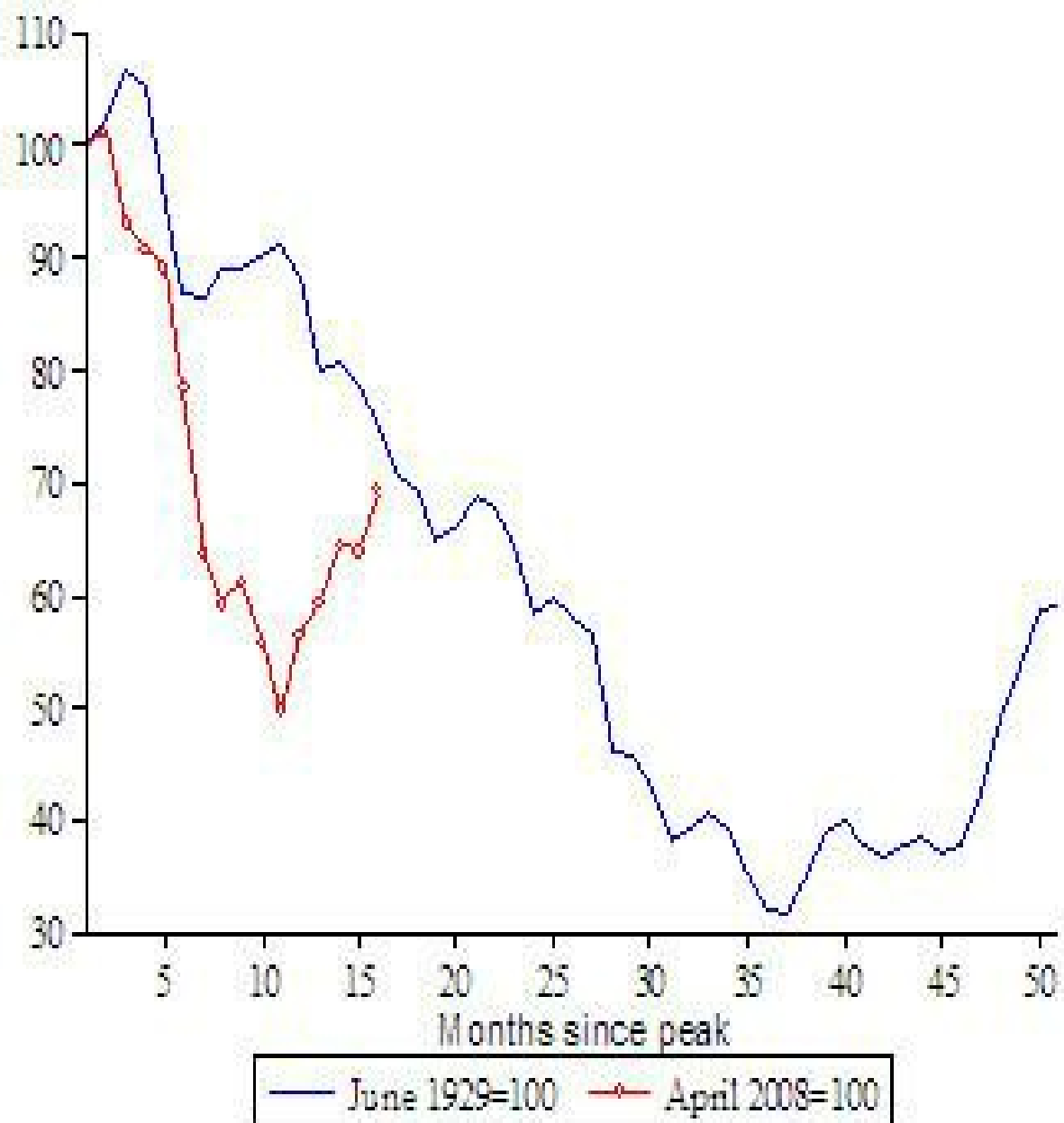
Figure 3 Volume of world trade, now vs then
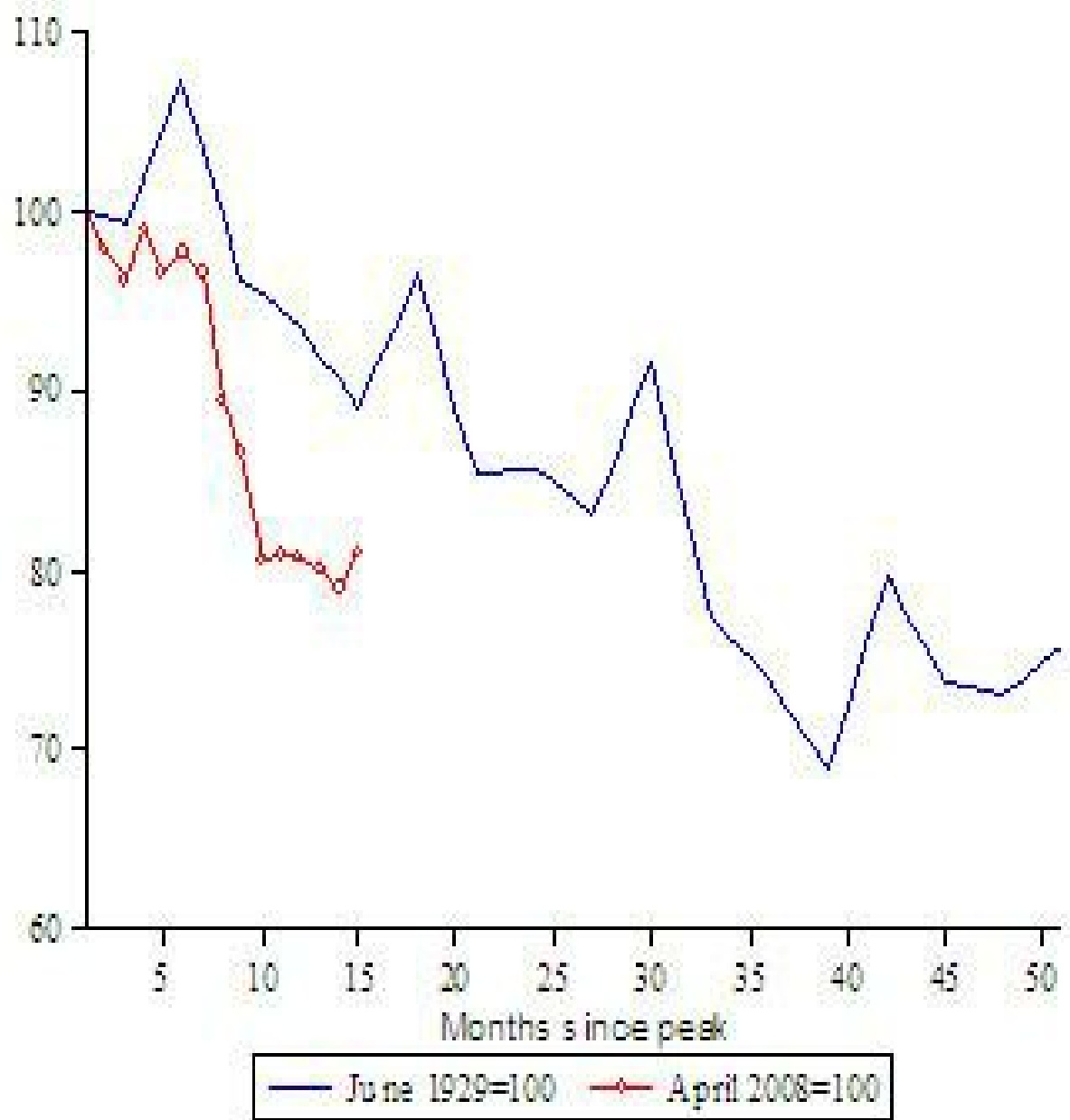
Figure 4 Industrial output, four big Europeans, then and now
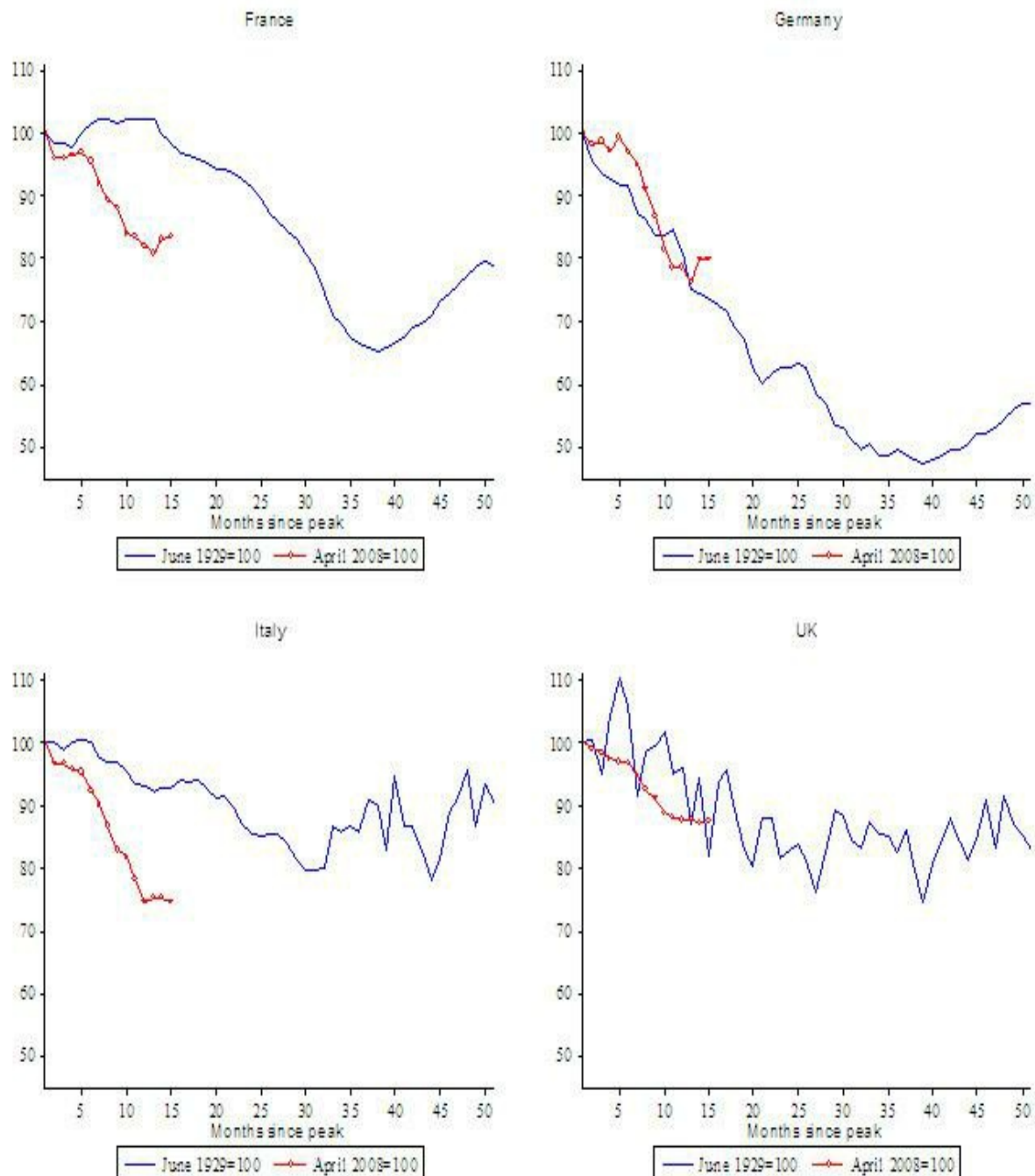
Figure 5 Industrial output, four non-Europeans, then and now

Figure 6 Industrial output, four small Europeans, then and now

Belgium

Czechoslovakia

Poland

Sweden
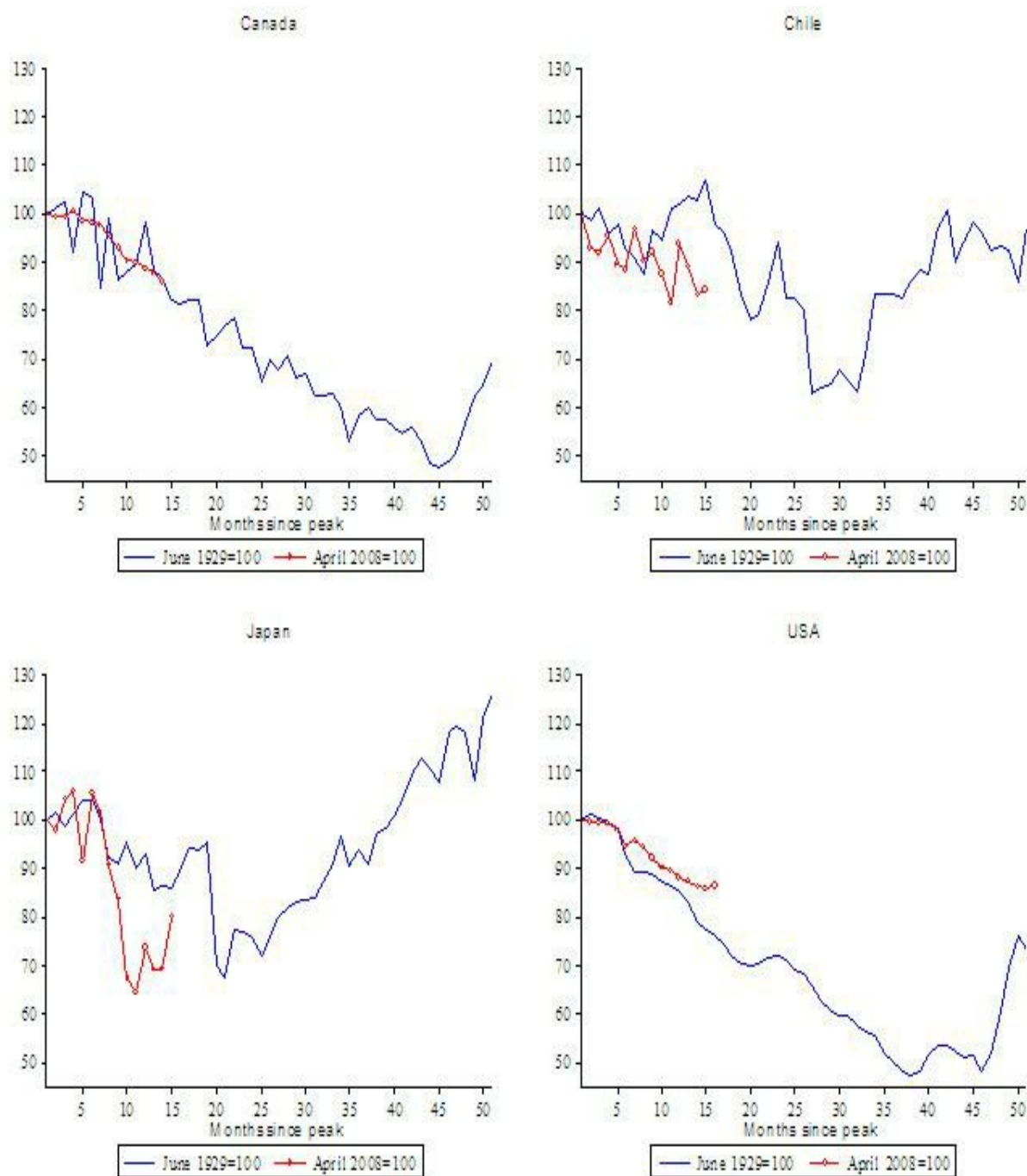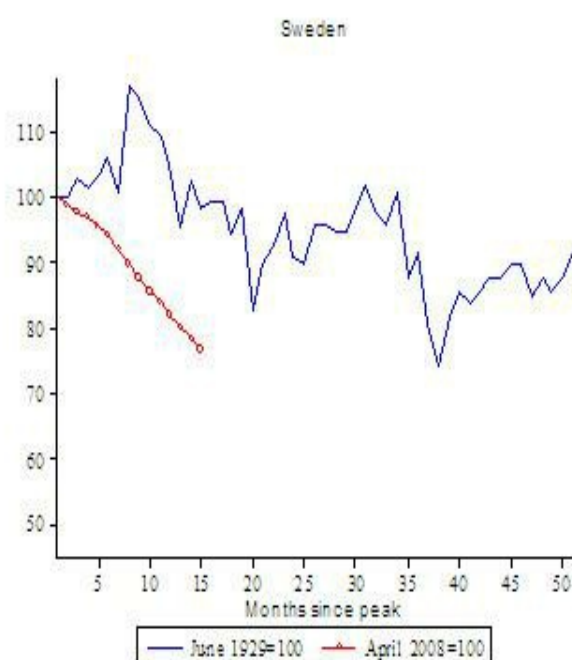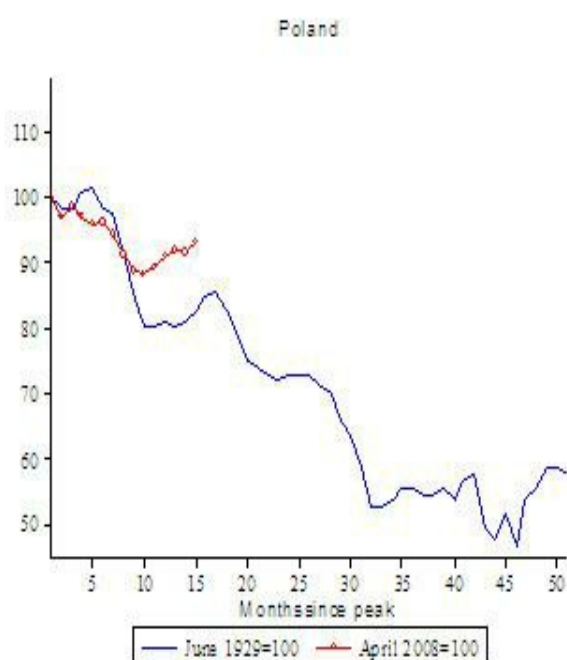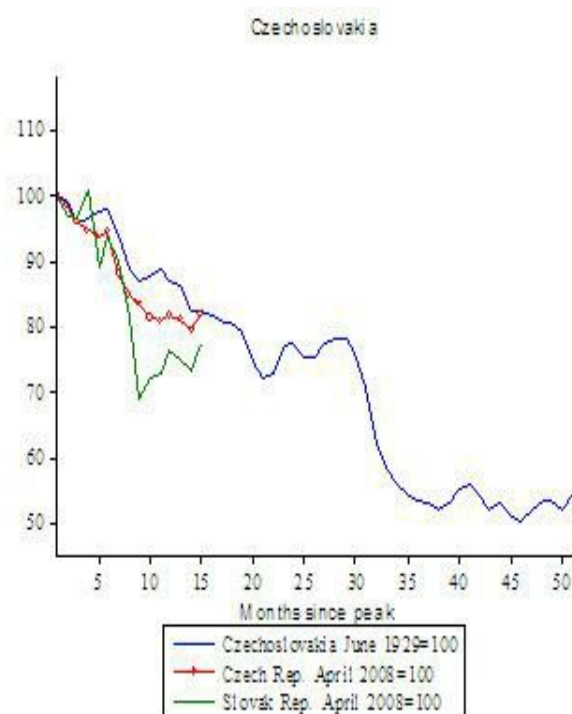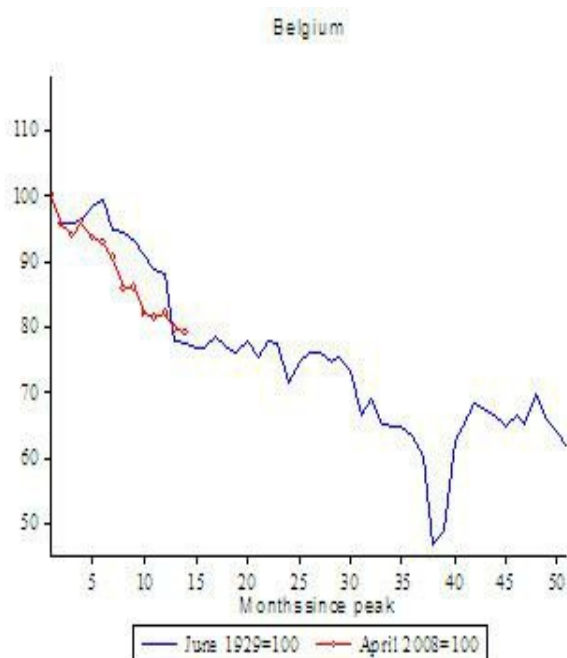
Start of first update (published 4 June 2009); original column (published 6 April 2009) appears below

Editor's note: The 6 April 2009 Vox column by Barry Eichengreen and Kevin O'Rourke shattered all Vox readership records, with 30,000 views in less than 48 hours and over 100,000 within the week. The authors will update the charts as new data emerges; this updated column is the first, presenting monthly data up to April 2009. (The updates and much more

will eventually appear in a paper the authors are writing a paper for Economic Policy.)

New findings:

- World industrial production continues to track closely the 1930s fall, with no clear signs of 'green shoots'.
- World stock markets have rebounded a bit since March, and world trade has stabilised, but these are still following paths far below the ones they followed in the Great Depression.
- There are new charts for individual nations' industrial output. The big-4 EU nations divide north-south; today's German and British industrial output are closely tracking their rate of fall in the 1930s, while Italy and France are doing much worse.
- The North Americans (US & Canada) continue to see their industrial output fall approximately in line with what happened in the 1929 crisis, with no clear signs of a turn around.
- Japan's industrial output in February was 25 percentage points lower than at the equivalent stage in the Great Depression. There was however a sharp rebound in March.

The facts for Chile, Belgium, Czechoslovakia, Poland and Sweden are displayed below; note the rebound in Eastern Europe.
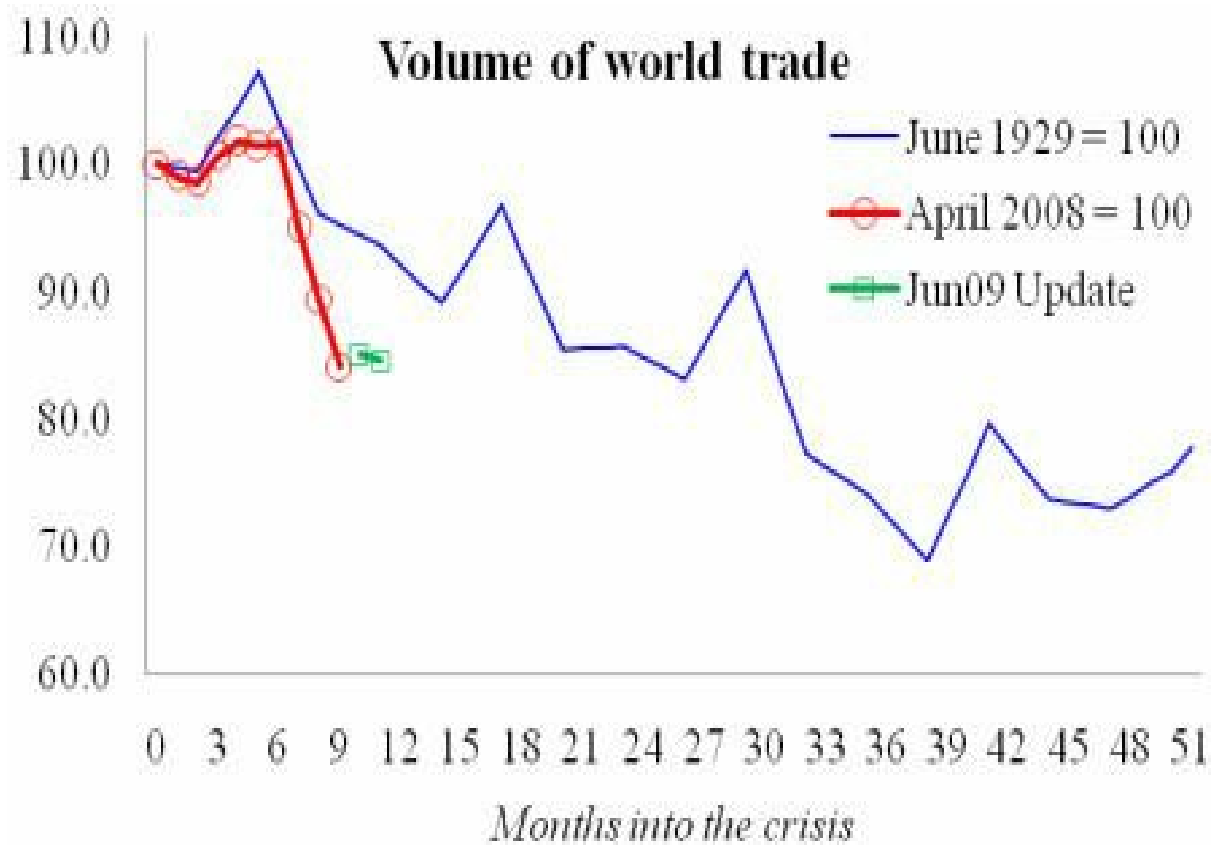
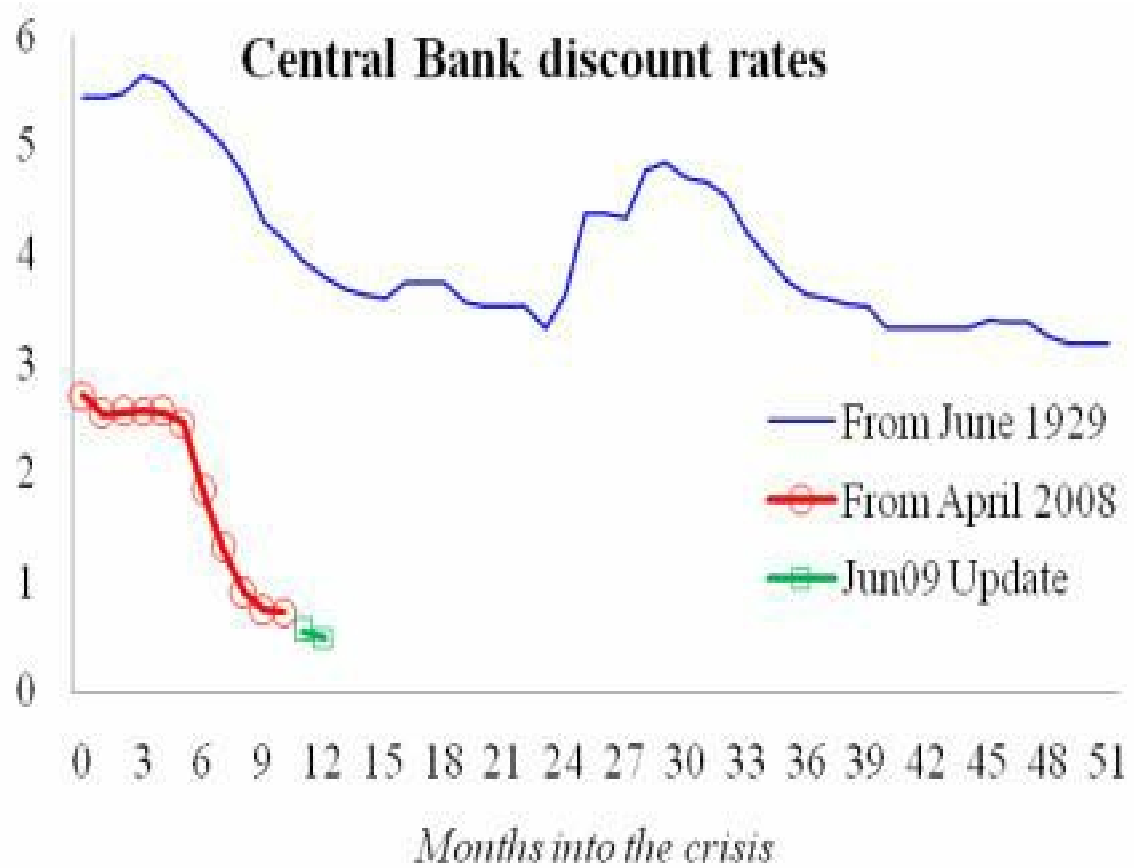**Updated Figure 1** World Industrial Output, Now vs Then (updated)
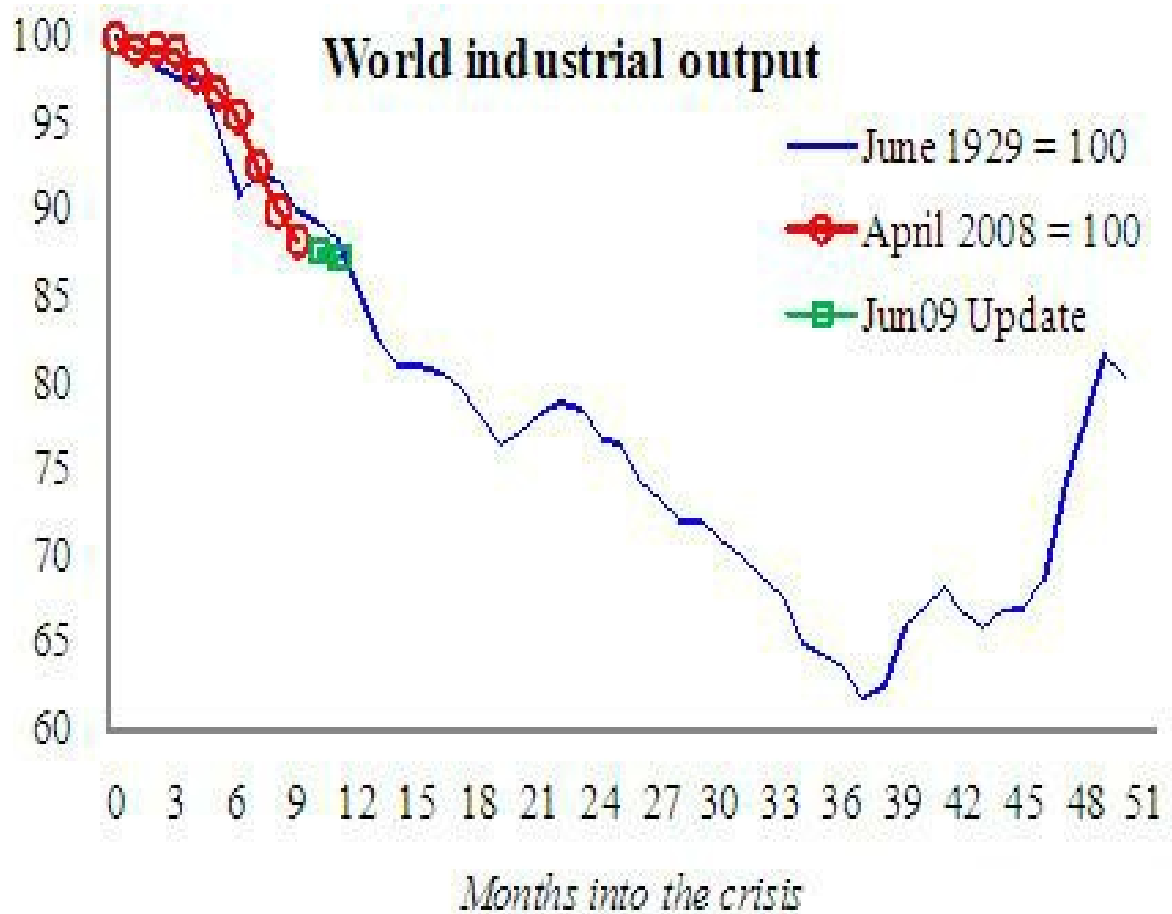
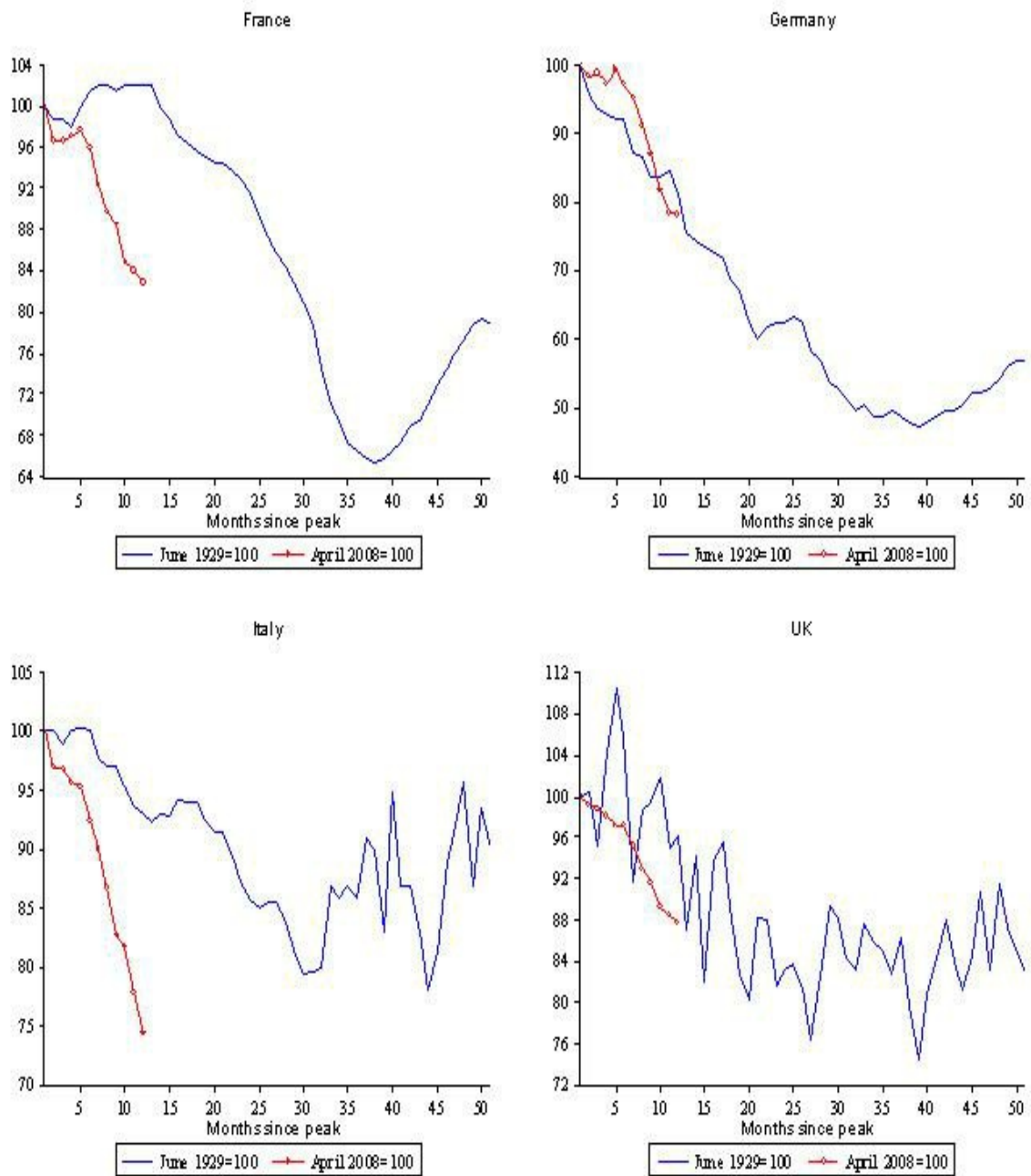**Updated Figure 2** World Stock Markets, Now vs Then (updated)
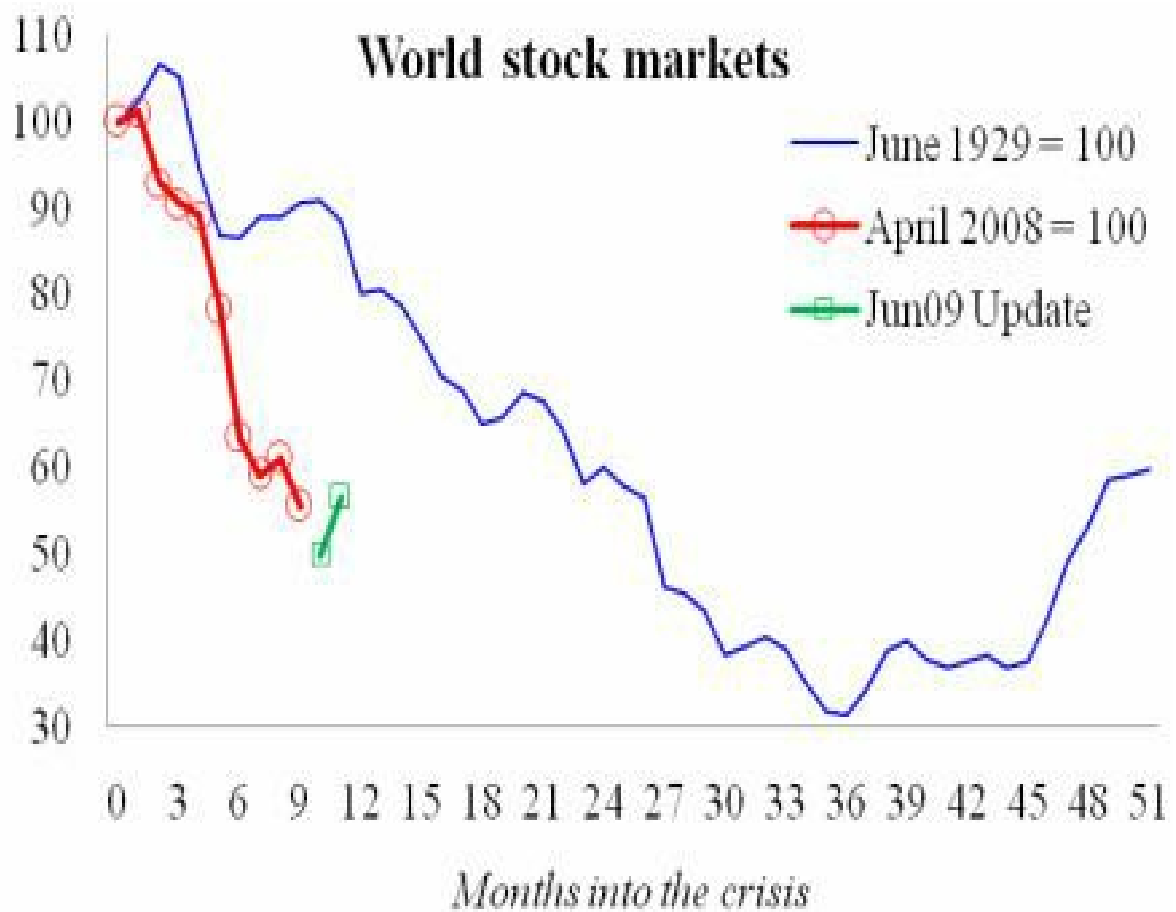
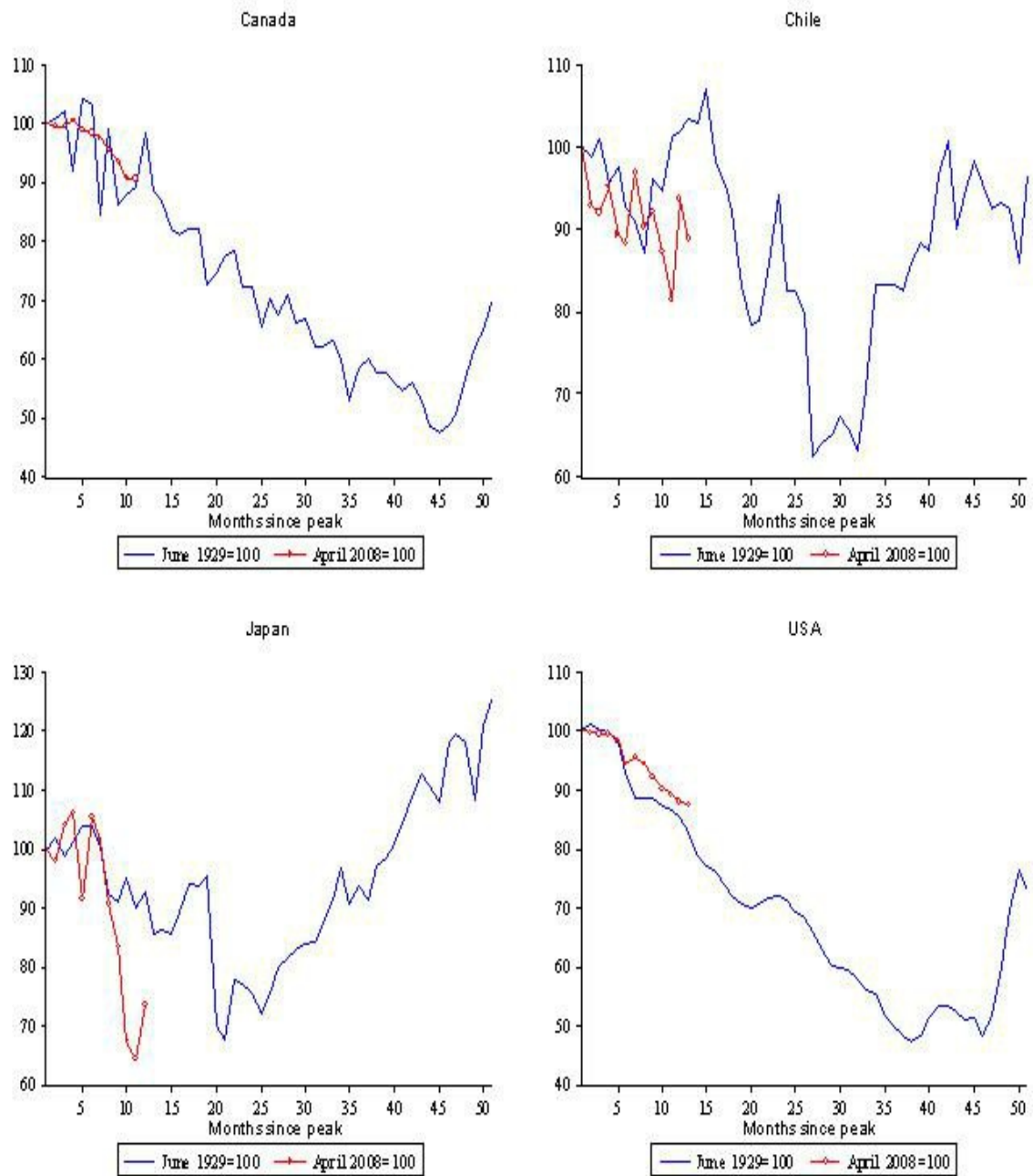**Updated Figure 3** The Volume of World Trade, Now vs Then (updated)

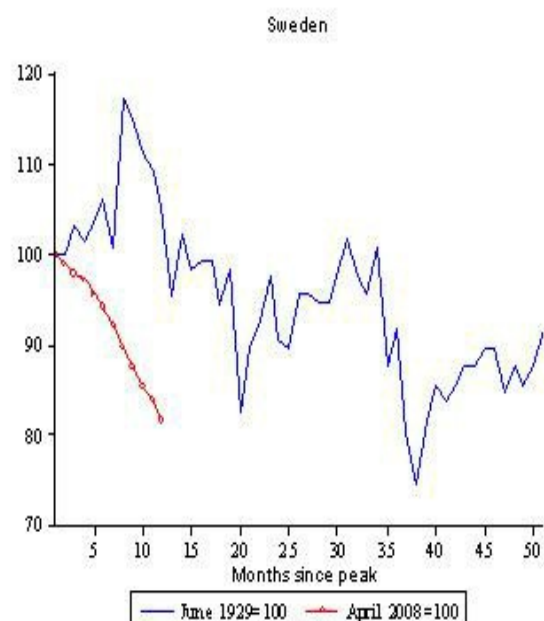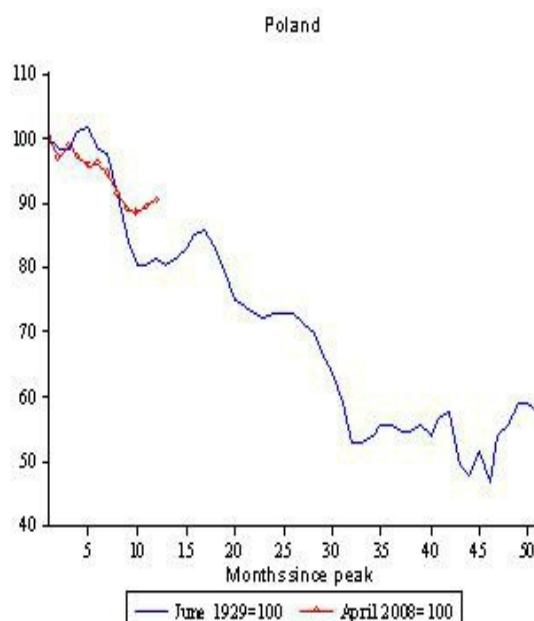**Updated Figure 4** Central Bank Discount Rates, Now vs Then (7 country average)
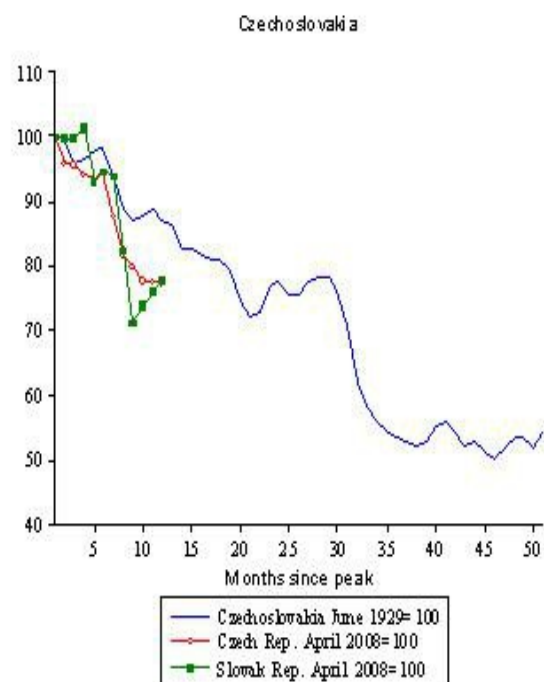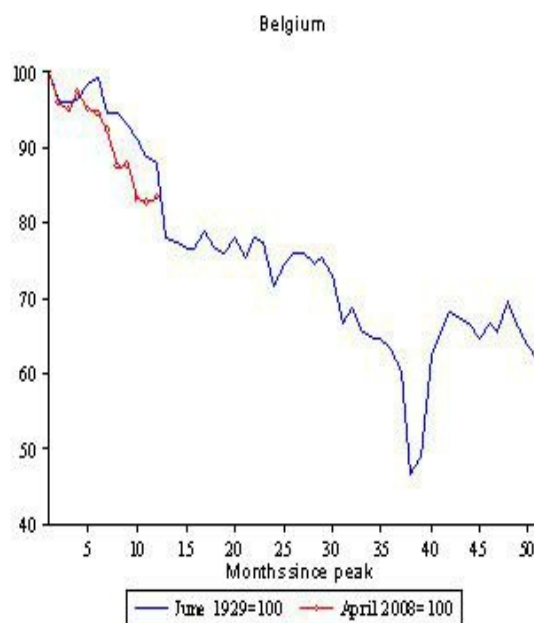
New Figure 5 Industrial output, four big Europeans, then and now

New Figure 6 Industrial output, four Non-Europeans, then and now.

New Figure 7 Industrial output, four small Europeans, then and now.

Belgium

Czechoslovakia

Poland

Sweden

Start of original column (published 6 April 2009)

The parallels between the Great Depression of the 1930s and our current Great Recession have been widely remarked upon. Paul Krugman has compared the fall in US industrial production from its mid-1929 and late-2007 peaks, showing that it has been milder this time. On this basis he refers to the current situation, with characteristic black humour, as only "half a Great Depression." The "Four Bad Bears" graph comparing the

Dow in 1929-30 and S&P 500 in 2008-9 has similarly had wide circulation (Short 2009). It shows the US stock market since late 2007 falling just about as fast as in 1929-30.

Comparing the Great Depression to now for the world, not just the US

This and most other commentary contrasting the two episodes compares America then and now. This, however, is a misleading picture. The Great Depression was a global phenomenon. Even if it originated, in some sense, in the US, it was transmitted internationally by trade flows, capital flows and commodity prices. That said, different countries were affected differently. The US is not representative of their experiences.

Our Great Recession is every bit as global, earlier hopes for decoupling in Asia and Europe notwithstanding. Increasingly there is awareness that events have taken an even uglier turn outside the US, with even larger falls in manufacturing production, exports and equity prices.

In fact, when we look globally, as in Figure 1, the decline in industrial production in the last nine months has been at least as severe as in the nine months following the 1929 peak. (All graphs in this column track behaviour after the peaks in world industrial production, which occurred in June 1929 and April 2008.) Here, then, is a first illustration of how the global picture provides a very different and, indeed, more disturbing perspective than the US case considered by Krugman, which as noted earlier shows a smaller decline in manufacturing production now than then.

Figure 1 World Industrial Output, Now vs Then
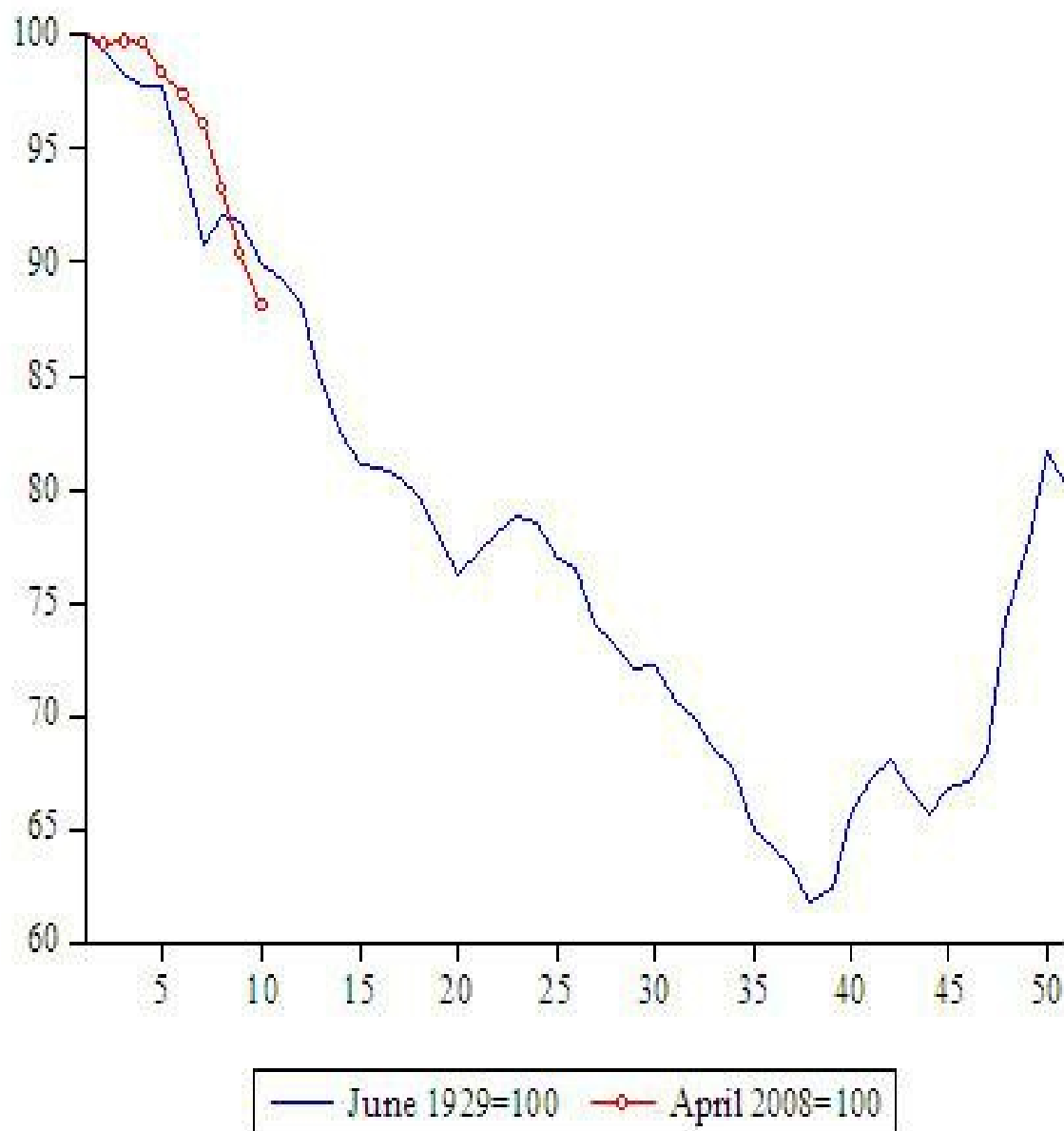
Similarly, while the fall in US stock market has tracked 1929, global stock markets are falling even faster now than in the Great Depression (Figure 2). Again this is contrary to the impression left by those who, basing their comparison on the US market alone, suggest that the current crash is no more serious than that of 1929-30.

Figure 2 World Stock Markets, Now vs Then
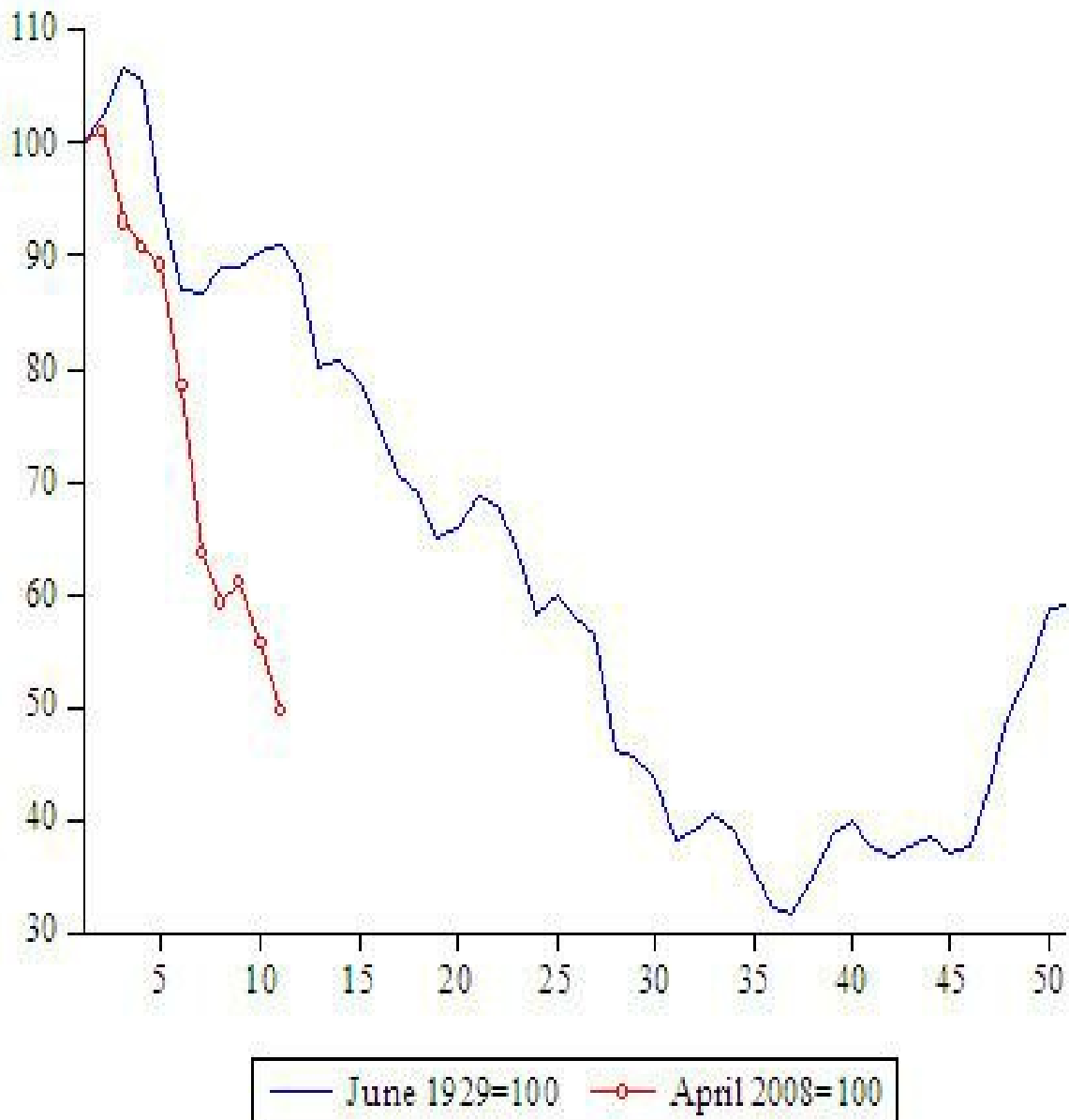
Another area where we are "surpassing" our forbearers is in destroying trade. World trade is falling much faster now than in 1929-30 (Figure 3). This is highly alarming given the prominence attached in the historical literature to trade destruction as a factor compounding the Great Depression.

Figure 3 The Volume of World Trade, Now vs Then
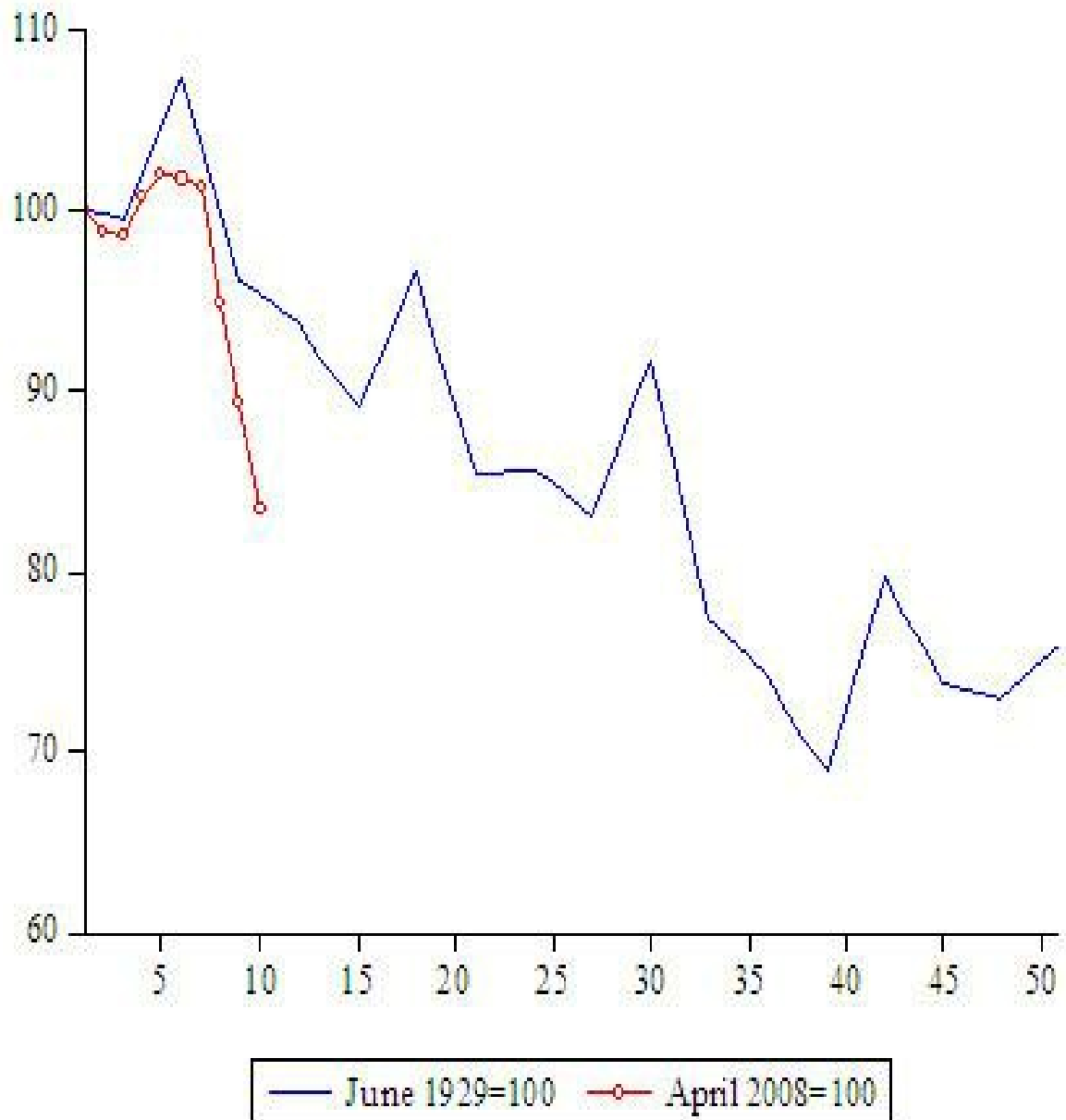
It's a Depression alright

To sum up, globally we are tracking or doing even worse than the Great Depression, whether the metric is industrial production, exports or equity valuations. Focusing on the US causes one to minimise this alarming fact. The "Great Recession" label may turn out to be too optimistic. This is a Depression-sized event.

That said, we are only one year into the current crisis, whereas after 1929 the world economy continued to shrink for three successive years. What

matters now is that policy makers arrest the decline. We therefore turn to the policy response.

Policy responses: Then and now

Figure 4 shows a GDP-weighted average of central bank discount rates for 7 countries. As can be seen, in both crises there was a lag of five or six months before discount rates responded to the passing of the peak, although in the present crisis rates have been cut more rapidly and from a lower level. There is more at work here than simply the difference between George Harrison and Ben Bernanke. The central bank response has differed globally.

Figure 4 Central Bank Discount Rates, Now vs Then (7 country average)
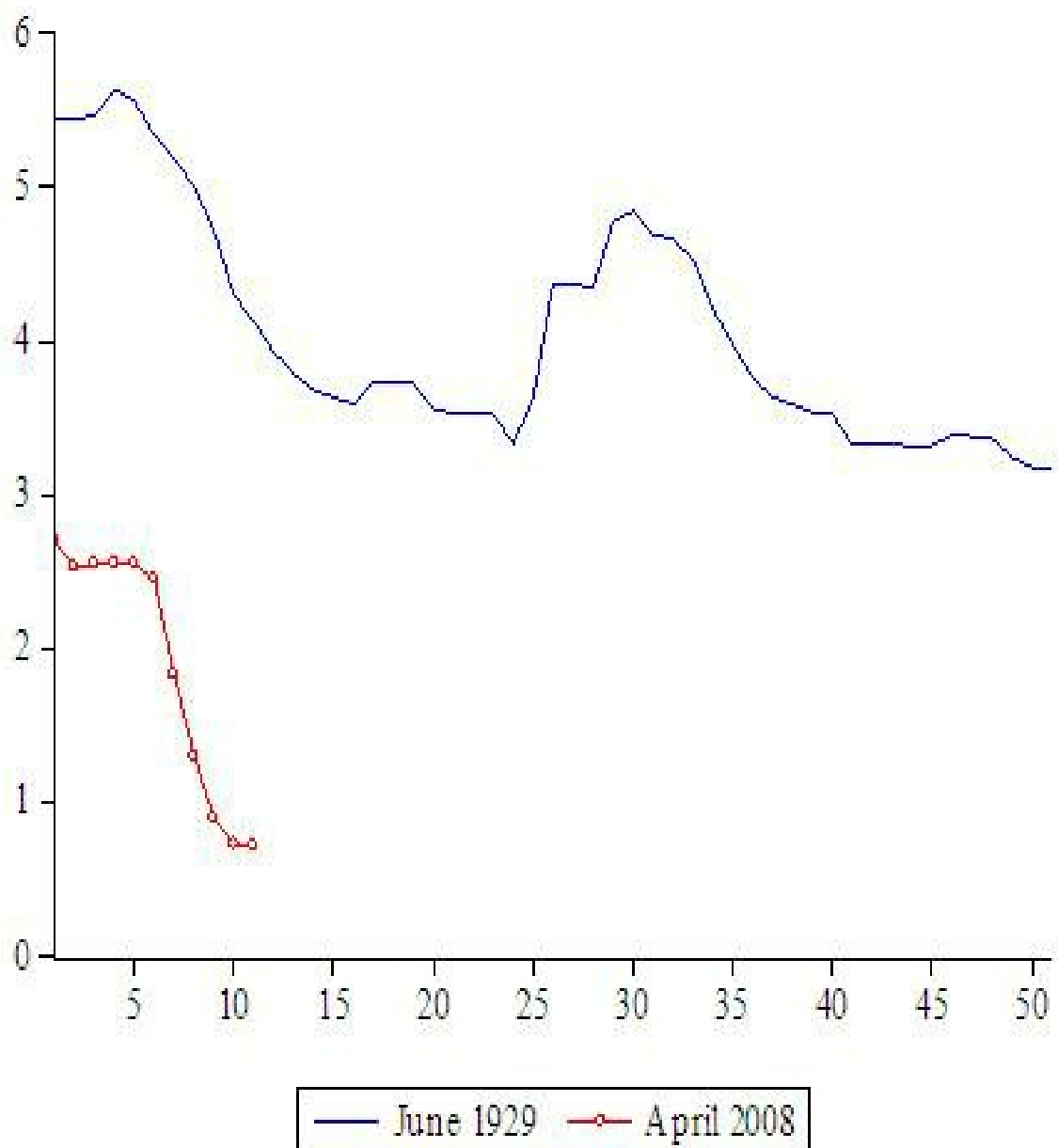
Figure 5 shows money supply for a GDP-weighted average of 19 countries accounting for more than half of world GDP in 2004. Clearly, monetary expansion was more rapid in the run-up to the 2008 crisis than during 1925-29, which is a reminder that the stage-setting events were not the same in the two cases. Moreover, the global money supply continued to grow rapidly in 2008, unlike in 1929 when it levelled off and then underwent a catastrophic decline.

Figure 5 Money Supplies, 19 Countries, Now vs Then
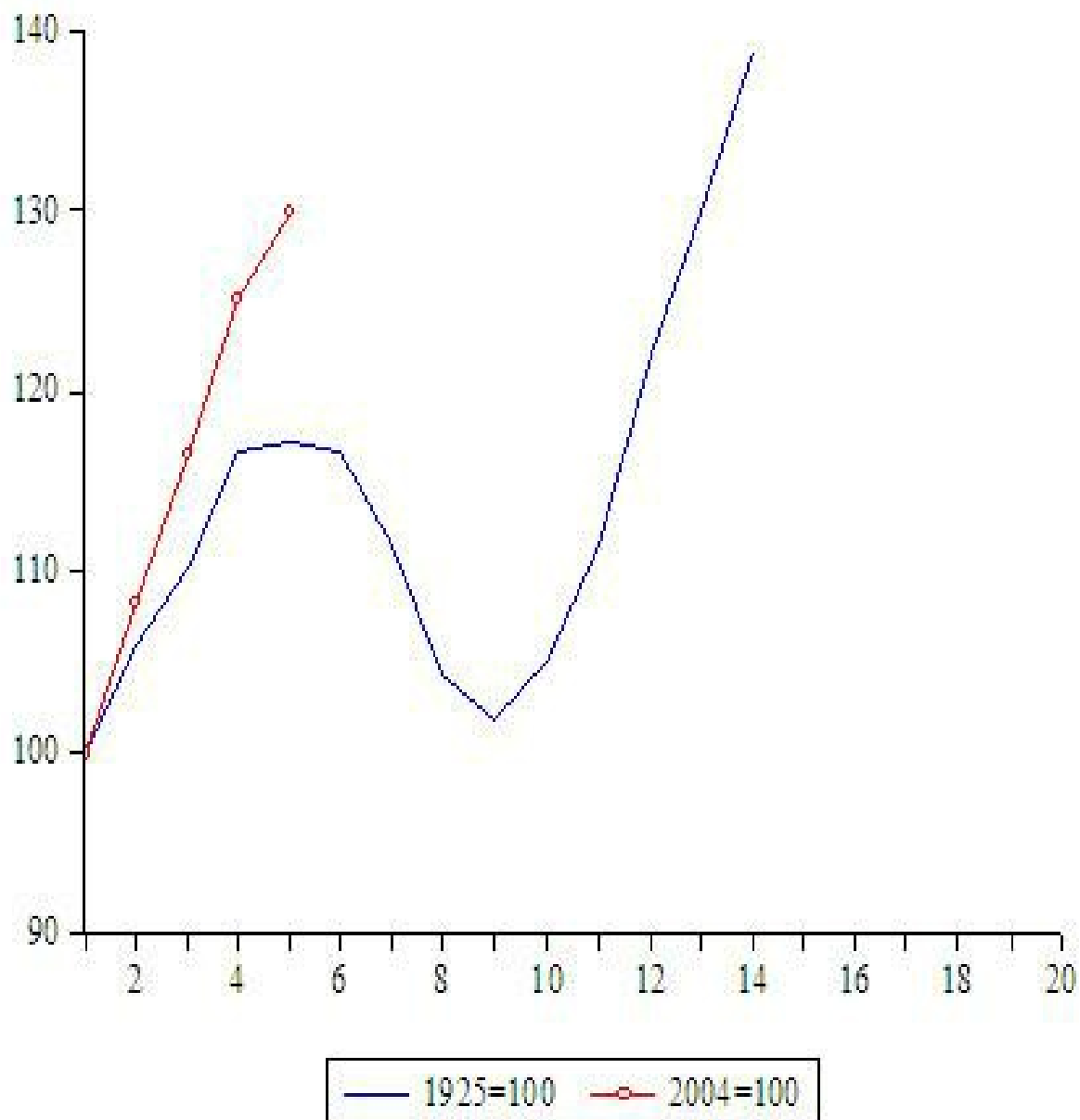
Figure 6 is the analogous picture for fiscal policy, in this case for 24 countries. The interwar measure is the fiscal surplus as a percentage of GDP. The current data include the IMF's World Economic Outlook Update forecasts for 2009 and 2010. As can be seen, fiscal deficits expanded after 1929 but only modestly. Clearly, willingness to run deficits today is considerably greater.

Figure 6 Government Budget Surpluses, Now vs Then
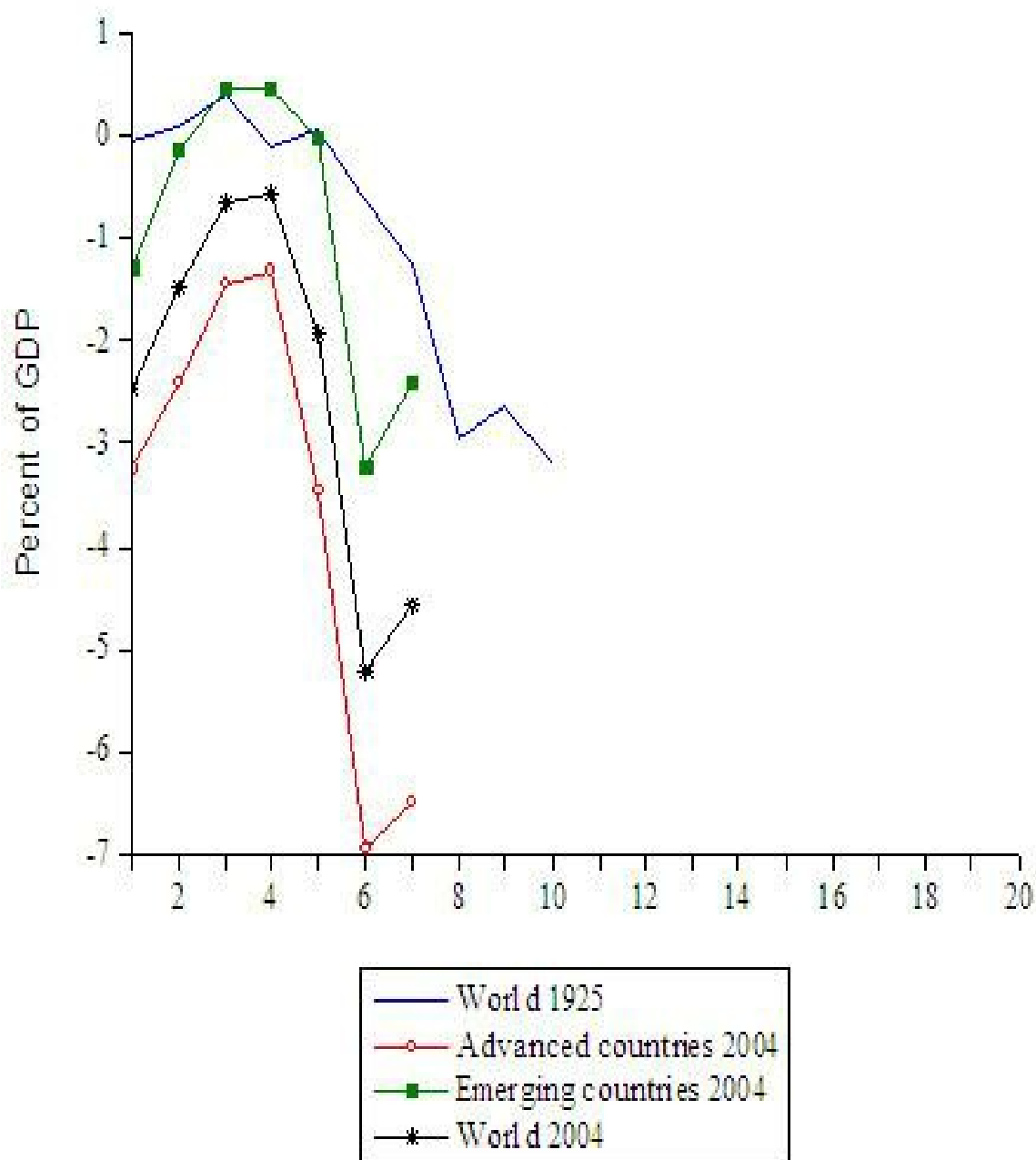
Conclusion

To summarise: the world is currently undergoing an economic shock every bit as big as the Great Depression shock of 1929-30. Looking just at the US leads one to overlook how alarming the current situation is even in comparison with 1929-30.

The good news, of course, is that the policy response is very different. The question now is whether that policy response will work. For the answer, stay tuned for our next column.

References

Eichengreen, B. and K.H. O'Rourke. 2009. "A Tale of Two Depressions." In progress.

Almunia, Miguel, Agustín S Bénétrix, Barry Eichengreen, Kevin H O'Rourke, Gisela Rua (2009), "The effectiveness of fiscal and monetary stimulus in depressions", VoxEU.org, 18 November.

Baldwin, Richard (eds) (2009), *The Great Trade Collapse: Causes, Consequences and Prospects*, VoxEU.org Ebook, 27 November.

Bernanke, B.S. 2000. Bernanke, B.S. and I. Mihov. 2000. "Deflation and Monetary Contraction in the Great Depression: An Analysis by Simple Ratios." In B.S. Bernanke, *Essays on the Great Depression*. Princeton: Princeton University Press.

Bordo, M.D., B. Eichengreen, D. Klingebiel and M.S. Martinez-Peria. 2001. "Is the Crisis Problem Growing More Severe?" *Economic Policy* 32: 51-82.

Chor, Davin and Kalina Manova (2010), "Off the cliff and back? Credit conditions and international trade during the global financial crisis", VoxEU.org, 15 February.

Paul Krugman, "The Great Recession versus the Great Depression," Conscience of a Liberal (20 March 2009).

Doug Short, "Four Bad Bears," DShort: Financial Lifecycle Planning" (20 March 2009).

The euro: love it or leave it?

Barry Eichengreen

University of California, Berkeley and CEPR

Originally posted 17 November 2007, this Vox column is more relevant than ever arguing that adopting the euro is effectively irreversible. Leaving would require lengthy preparations, which, given the anticipated devaluation, would trigger the mother of all financial crises. National households and firms would shift deposits to other Eurozone banks producing a system-wide bank run. Investors, trying to escape, would create a bond-market crisis. Here is what the train wreck would look like.

The world economy is continually changing, but one constant is dissatisfaction with the euro. Toward the beginning of the decade, the main complaint was that the euro was too weak for booming economies like Ireland. Now the complaint is that it is too strong for growth-challenged countries like Italy.

To be sure, the source of the current problem is external. It stems from the fall of the dollar, reflecting a combination of economic and financial problems in the United States, and the insistence of the Chinese authorities that the renminbi should follow the greenback. But that does nothing to defuse the complaints.

The negative impact is being felt by all Eurozone members. But some countries where growth was already stagnant, such as Italy, are least able to cope. Already in June 2005, following two years of euro appreciation, then-Italian welfare minister Roberto Maroni declared that "the euro has to go." Then-prime minister Silvio Berlusconi followed by calling the euro "a disaster." But this earlier episode of appreciation pales in comparison with what has happened since. And if the dollar depreciates further and the US falls into a full-blown recession – both of which are more likely than not – calls like these will be back.

So is the euro doomed? After seeing the number of Eurozone countries rise from 10 in 1999 to 15 at the beginning of 2008, will the process shift into reverse? If one country leaves the Eurozone by reintroducing its national currency, will others follow? Will the entire enterprise collapse?

The answer is no. The decision to join the Eurozone is effectively irreversible.1 However attractive the rhetoric of defection is for populist

politicians, exit is effectively impossible – although not for the reasons suggested in earlier discussions.

A first reason why members will not exit, it is argued, is the economic costs. A country that leaves the euro because of problems of competitiveness would be expected to devalue its newly-reintroduced national currency. But workers would know this, and the resulting wage inflation would neutralise any benefits in terms of external competitiveness. Moreover, the country would be forced to pay higher interest rates on its public debt. Those old enough to recall the high costs of servicing the Italian debt in the 1980s will appreciate that this can be a serious problem.

But for each such argument about economic costs, there is a counterargument. If reintroduction of the national currency is accompanied by labour market reform, real wages will adjust. If exit from the Eurozone is accompanied by the reform of fiscal institutions so that investors can look forward to smaller future deficits, there is no reason for interest rates to go up. Empirical studies show that joining the Eurozone does result in a modest reduction in debt service costs; by implication, leaving would raise them. But this increase could be offset by a modest institutional reform, say, by increasing the finance minister's fiscal powers from Portuguese to Austrian levels. Even populist politicians know that abandoning the euro will not solve all problems. They will want to combine it with structural reforms.

A second reason why members will not exit, it is argued, is the political costs. A country that reneges on its euro commitments will antagonise its partners. It will not be welcomed at the table where other EU-related decisions were made. It will be treated as a second class member of the EU to the extent that it remains a member at all.

Political costs there would be, but there would also be benefits for politicians who could claim that they were putting the interests of their domestic constituents first. And politics have not rendered countries like Denmark and Sweden that have steadfastly refused to adopt the euro second-class EU member states.

The insurmountable obstacle to exit is neither economic nor political, then, but procedural. Reintroducing the national currency would require essentially all contracts – including those governing wages, bank deposits, bonds, mortgages, taxes, and most everything else – to be redenominated in the domestic currency. The legislature could pass a law requiring banks,

firms, households and governments to redenominate their contracts in this manner. But in a democracy this decision would have to be preceded by very extensive discussion.

And for it to be executed smoothly, it would have to be accompanied by detailed planning. Computers will have to be reprogrammed. Vending machines will have to be modified. Payment machines will have to be serviced to prevent motorists from being trapped in subterranean parking garages. Notes and coins will have to be positioned around the country. One need only recall the extensive planning that preceded the introduction of the physical euro.

Back then, however, there was little reason to expect changes in exchange rates during the run-up and hence little incentive for currency speculation. In 1998, the founding members of the Eurozone agreed to lock their exchange rates at the then-prevailing levels. This effectively ruled out depressing national currencies in order to steal a competitive advantage in the interval prior to the move to full monetary union in 1999. In contrast, if a participating member state now decided to leave the Eurozone, no such precommitment would be possible. The very motivation for leaving would be to change the parity. And pressure from other member states would be ineffective by definition.

Market participants would be aware of this fact. Households and firms anticipating that domestic deposits would be redenominated into the lira, which would then lose value against the euro, would shift their deposits to other Eurozone banks. A system-wide bank run would follow. Investors anticipating that their claims on the Italian government would be redenominated into lira would shift into claims on other Eurozone governments, leading to a bond-market crisis. If the precipitating factor was parliamentary debate over abandoning the lira, it would be unlikely that the ECB would provide extensive lender-of-last-resort support. And if the government was already in a weak fiscal position, it would not be able to borrow to bail out the banks and buy back its debt. This would be the mother of all financial crises.

What government invested in its own survival would contemplate this option? The implication is that as soon as discussions of leaving the Eurozone become serious, it is those discussions, and not the area itself, that will end.

Reflections on the International Dimensions and Policy Lessons of the US Subprime Crisis

Carmen M Reinhart

Harvard Kennedy School

15 March 2008

We may just have started to feel the pain. Asset price drops – including housing – are common markers in all the big banking crises over the past 30 years. GDP declines after such crises were both large (-2% on average) and protracted (2 years to return to trend); in the 5 biggest crises, the numbers were -5% and 3 years. This column, based on the author's testimony to the Congress, picks through the causes and consequences. It argues that when it comes to 'cures,' it would be far better to get the job done right than get the job done quickly.

"There is nothing new except what is forgotten." - Mlle. Rose Bertin

The financial press has often characterised the 2007-2008 United States subprime mess as a new breed of crisis. Indeed, this view often points to the international repercussions of the US-based crisis as evidence that the globalization of financial portfolios has introduced brand-new channels for spillovers. At present, there is also considerable confusion in academic and policy circles as to whether the shaky predicament of the global economy owes to contagion or to shared (common) economic fundamentals. I address these issues, in turn, and discuss some of the questions, as regards regulation of financial institutions, that the current crisis has raised.

Financial Crisis: the setting

Across countries and over the centuries, economic crises of all types follow a similar pattern.[1] An innovation emerges. Sometimes it is a new tool of science of industry, such as the diving bell, steam engine, or the radio. Sometime it is a tool of financial engineering, such as the joint-stock company, junk bonds, or collateralised debt obligations. Investors may be wary at first, but then they see that extraordinary returns appear available on these new instruments and they rush in. Financial

intermediaries—banks and investment companies—stretch their balance sheets so as not to be left out. The upward surge in asset prices continues, and that generation of financial market participants concludes that rules have been rewritten. Risk has been tamed, and leverage is always rewarded. All too often, policy makers assert that the asset-price boom is a vote of confidence for their regime—that "this time is different". Seldom, to my knowledge, do they protest that perhaps the world has not changed and that the old rules of valuation still apply.

But the old rules do apply. The asset price rise peters out, sometimes from exhaustion on its own or sometimes because of a real shock to the economy. This exposes the weaknesses of the balance sheets of those who justified high leverage by the expectation of outsized capital gains. Many financial firms admit losses, and some ultimately fail. All those financial firms hunker down, constricting credit availability in an effort to slim their balance sheets. With wealth lower and credit harder to get, economic activity typically contracts. Only after the losses are flushed out of the financial system and often with the encouragement of lagging monetary and fiscal ease does the economy recover.

The role of the real estate market

This sorry spectacle repeats itself in the various types of crises, but the most relevant to the present situation is the aftermath of banking crises. In recent work with Kenneth Rogoff, I documented eighteen such episodes in industrial economies over the past thirty years.[2,3] Declines in assets, including those of both houses and equities that the US has experienced over the past year, are common markers of the onset of banking crises. In the worst five banking crises (The Big Five) in industrial countries over the past thirty years, the value of houses fell about 25 percent on average from their peak (Figure 1)

Figure 1 Real housing prices and banking crises
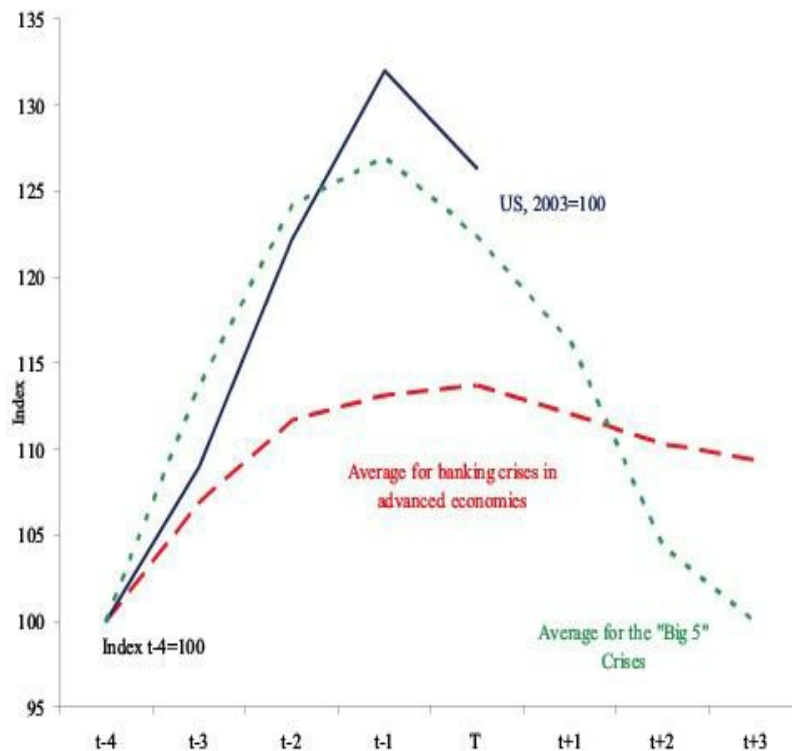
Sources: Reinhart and Rogoff (2008) and sources cited therein.

The fallout of banking crises

The cautionary lesson for today's situation in the United States is that the decline in output after a banking crisis is both large and protracted (Figure 2). The average drop in (real per capita) output growth is over 2 percent, and it typically takes two years to return to trend. For the five most catastrophic cases, the drop in annual output growth from peak to trough is over 5 percent, and growth remained well below pre-crisis trend even after three years.

Figure 2 Real GDP growth per capita and banking crises

The international repercussions of the US crisis: contagion or confusion?

Swift international spillovers are not a new phenomenon. In this regard, the panic of 1907, which began in the US and quickly spread to other advanced economies (particularly, Denmark, France, Italy, Japan, and Sweden), serves as an illustrative historical benchmark for modern-day financial contagion.[4] Like in the present episode, emerging markets were mostly spared in 1907; the only casualty in that episode was Mexico.

There is little doubt that the US crisis has spilled over into other markets. Two major advanced economies, Japan and Germany, have been singled out by the financial press as being particularly hard-hit. There is no denying that German and Japanese financial institutions sought more attractive returns in the US subprime market, perhaps owing to the fact that profit opportunities in domestic real estate were limited at best and dismal at worst (Figure 3). Indeed, after the fact, it has become evident that financial institutions in these countries had nontrivial exposure to the US subprime market.[5] This is a classic channel of transmission or contagion, through which a crisis in one country spreads across international borders. In the present context, however, contagion or spillovers are only a part of the story.

If other countries are experiencing economic difficulties at the same time as the US, it is due to the fact that many of the features that characterised the run-up to the subprime crisis in the US were also present in many other advanced economies. Specifically, many countries in Europe and elsewhere (New Zealand, for example) were having their own home-grown real estate bubbles (Figure 3). This, in and of itself makes, these countries vulnerable to the usual nasty consequences of asset market crashes—irrespective of what may be happening in the United States. This cannot be pinned on the US subprime fiasco or on contagion. The odds of a correction were already present.

Figure 3 Recent change in real housing prices, 2002-2006
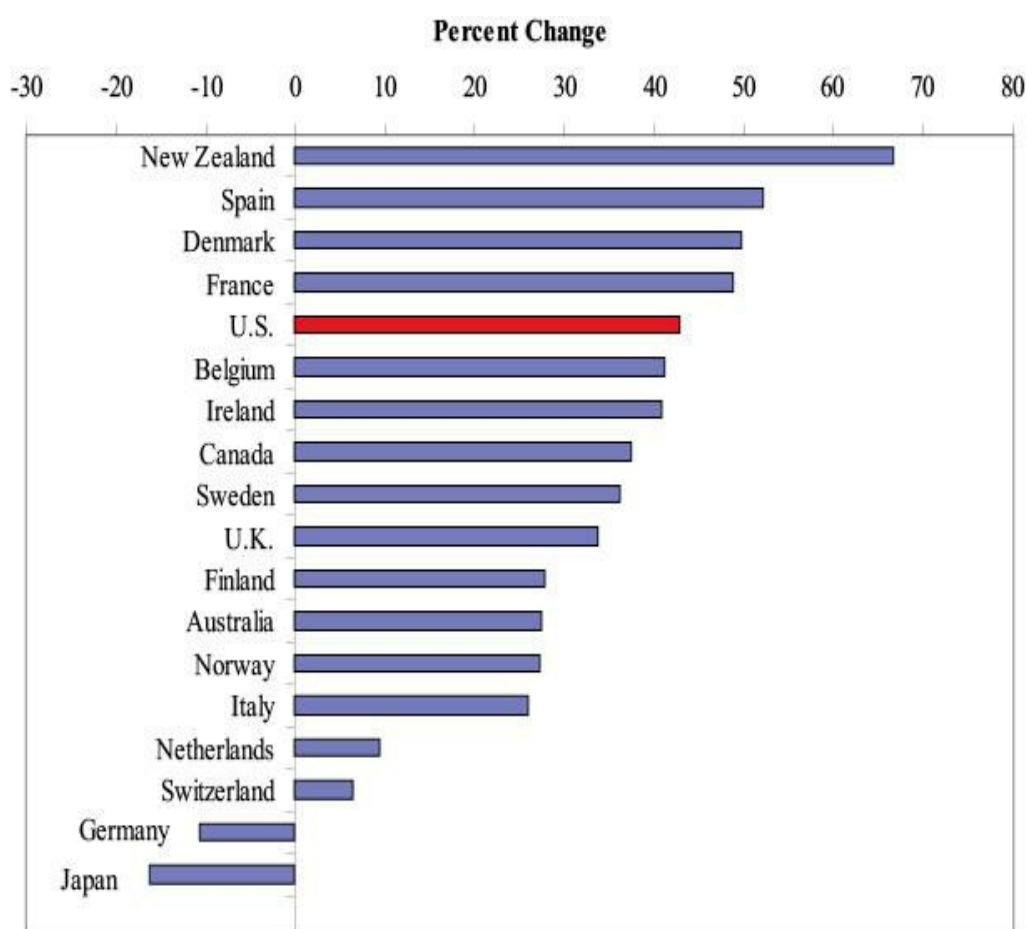
Sources: Shiller, and Bank of International Settlements.

Policy Lessons: the banana republic approach to banking supervision

As Venezuela's worst banking crisis unfolded in 1994-1995 (conservative estimates of the bailout costs of that crisis are at around 18 percent of GDP), no one in that country seemed to know whose responsibility it was

to supervise the financial institutions. As is usual in most banking crises, lending standards had become lax, there was interconnected lending, and there was plenty of plain old-fashioned graft. The central bank blamed the main regulatory agency (SUDEBAN), the regulatory agency blamed the deposit insurance agency (FOGADE), and everyone else blamed the central bank.[6]

At the time of that crisis, the received wisdom was that such supervisory disarray could only happen in an emerging market; advanced economies had outgrown such chaos. We now know better.

For starters, part of the supervisory responsibilities in the US is delegated to the states, which is to say that 50 emerging markets agencies were partially responsible for the oversight of real estate lending. Supervisors failed to caution depositories as they offered potential borrowers unsuitable mortgages.   They also acquiesced as complicated structures were booked off the balance sheet, even though, in the event, they were not treated as such by corporate headquarters at the first sign of stress. And after the fact, they have pointed to the other guy as responsible for the problem.

In the private sector, mortgage brokers often sought no more assurance of future repayment than a signature. That act of faith was made easier because their own compensation came from originating loans rather than how the loans played themselves out. And underwriters took that raw material of mortgages and somehow convinced themselves that the law of large numbers would make the whole better than the sum of its parts, even though many of those pieces needed double-digit house price growth to make economic sense. Credit rating agencies, encouraged by their own fee structure, listened attentively to underwriters' assurances of the power of pooling and their ability to predict despite a limited track record. And final investors substituted the judgment of the rating agencies for their own due diligence, perhaps abetted by regulation and accounting rules that imparted special significance to those judgments.

No doubt, change is needed in both the private and public sectors. My immediate fear is that, as in most prior episodes, the initial reaction will be overdone and inefficient. Financial institutions are already tightening the terms and standards for new lending at a ferocious clip. Rating agencies, following their pro-cyclical tendencies, will overreact as well in the effort to distract the investing public from their laxness of the past few years by strict standards going forward.[7] Similarly, bank examiners will interpret the regulations narrowly, reinforcing the natural tendencies of depositories

to tighten credit availability.

And last but not least, politicians have already turned their focus toward the financial industry. If the regulation of financial institutions needs to be revisited, there are compelling arguments to pare the multitude of regulators of depository institutions and insurance companies and to restructure the supervision of rating agencies.[8] But the outcome of hurried debate in the heat of the moment is more likely to be legislative overreach than informed policy making. It would be far better to get the job done right than get the job done quickly.

[1] Michael D. Bordo (2007), "The Crisis of 2007: The Same Old Story Only the Players have Changed".

[2] Carmen M. Reinhart and Kenneth S. Rogoff (2008), "Is The 2007 U.S. Subprime Crisis So Different? An International Historical Comparison," forthcoming in American Economic Review, May.

[3] The Five Big Five Crises: Spain (1977), Norway (1987), Finland (1991),Sweden (1991) and Japan (1992), where the starting year is in parenthesis. Other Banking and Financial Crises: Australia (1989), Canada (1983), Denmark (1987), France (1994), Germany (1977), Greece (1991), Iceland (1985), and Italy (1990), and New Zealand (1987), United Kingdom (1974, 1991, 1995), and United States (1984).

[4] See , Reinhart and Rogoff (2008).

[5] Owing to the opaqueness of balance sheets in many of these financial institutions in these countries the full extent of exposure is, as yet, unknown.

[6] Superintendencia de Bancos y Otras Instituciones Financieras (SUDEBAN) ; Fondo de Garantías de Depósitos y Protección Bancaria (FOGADE) .

[7] See Carmen M. Reinhart (2002), "Sovereign Credit Ratings Before and After Financial Crises," and other chapters in Richard Levich, Giovanni Majnoni, and Carmen M. Reinhart, eds. Ratings, Rating Agencies and the Global Financial System, (New York: Kluwer Academic Press, 2002).

[8] See Richard Portes (2008) "Rating Agencies Reform" http://www.voxeu.org/index.php?q=node/887
for an insightful discussion.

Economic crisis in Europe: Cause, consequences, and responses – A report by the European Commission

István P. Székely and Paul van den Noord

European Commission; OECD

6 October 2009

The European economy is in its deepest recession since the 1930s. This column says that swift policy response avoided a financial meltdown, but turning the ongoing recovery into sustained growth requires action on five challenges: boosting potential output, enhancing labour market flexibility, preparing fiscal consolidation, facilitating intra-EU adjustment, and unwinding global imbalances. Europe also needs an improved crisis-management framework, lest this happen again.

The financial crisis that began in 2007 is without precedent in post-war economic history (Eichengreen and O'Rourke, 2009). It was preceded by a long period of rapid credit growth, low risk premia, abundant liquidity, and the development of real estate bubbles. Overstretched leveraging positions rendered financial institutions extremely vulnerable to corrections in asset markets. As a result, a downturn in a relatively small corner of the financial system (the US subprime market) was sufficient to topple the whole structure. Such episodes have happened before (e.g. Japan and the Nordic countries in the early 1990s, the Asian crisis in the late-1990s), but they remained largely regional. The important difference is that, like during the Great Depression of the 1930s, the current crisis is global.

While it may be appropriate to consider the Great Depression as the best benchmark in terms of its financial triggers, it has also served as a great lesson. Governments and central banks are now well aware of the need to avoid the policy mistakes of the 1930s. Bank runs have been avoided, monetary policy has been eased aggressively, and governments have released substantial fiscal stimulus. Unlike during the Great Depression, countries in Europe or elsewhere have not resorted to protectionism large enough to have a macroeconomic impact. This crisis demonstrates the importance of EU coordination, even as it has called attention to the need for further progress in this regard.

Five key challenges

Notwithstanding the heavy policy intervention, the EU economy, like other developed economies, is projected to shrink by some 4% in 2009, the sharpest contraction in the EU's history (European Commission 2009). Signs of incipient recovery abound, but this is expected to be rather sluggish as demand will remain depressed due to deleveraging across the economy as well as inevitable structural adjustments. As discussed in a recent Commission report (European Commission 2009), the crisis is likely to raise five challenges.

1. Unless policies change considerably, the growth potential will suffer as parts of the capital stock are obsolete and increased risk aversion will weigh on capital formation and R&D (see Costello et al. 2009).

Recent studies suggest that past episodes of financial distress have resulted in sizeable output losses that are never entirely recovered. Estimates emerging from econometric work by the European Commission and simulations with its QUEST model put the potential output loss at up to 5%. Moreover, a reversal of financial development may weaken the incentives for structural reform, thereby adversely affecting potential growth further. But the historical evidence shows that crises also provide great opportunities to undertake far-reaching structural measures. This opportunity should not be missed.

2. While job losses have been contained so far, eventually the impact of rapidly rising unemployment will be felt.

So far lower levels of activity have been reflected mainly in shorter working hours, fostered by employment support schemes that have limited the increase in headline unemployment statistics (Figure 1). The relatively muted unemployment response may partly be the result of past labour market reform, but this is not uniformly the case in all Member States. Where labour markets are still rigid, the weak unemployment response is probably not sustainable and more lay-offs are likely to be in the pipeline. It will entail social hardship of many kinds, especially for highly indebted households already hit by downturns in housing markets. In those Member States, labour market measures should be high on the reform agenda.

Figure 1 Unemployment and hours worked

Change 2008M 04 - 2009M 06

☐ Unemployment rate   ■ Average hours worked
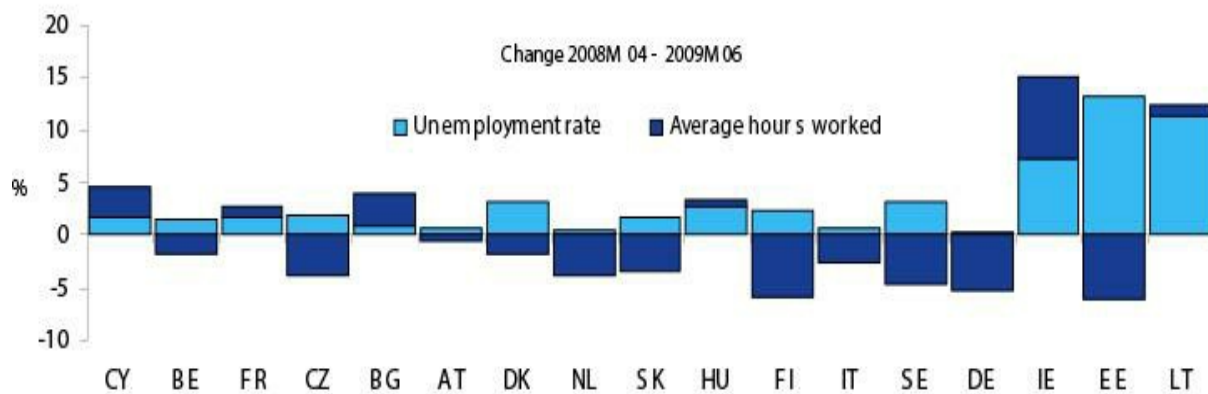
3. The fiscal deficits and debt will continue to increase, also in a structural manner as tax bases shrink permanently and contingent liabilities stemming from bank rescues may materialise.

As depicted in Figure 2, the pace of increase of the deficits is comparable to earlier financial crisis episodes. But the distribution of the increases in fiscal deficits is wide. The public finances of countries with important financial centres and/or that have seen major housing and construction booms have been particularly affected. To some extent this is deliberate, broadly in line with the distribution of "fiscal space" and serving to provide short-run demand support. But, as may be expected, public indebtedness is increasing too, and this will need to be reversed when recovery takes hold. As indicated by Figure 3, the projected increase in public debt – about 20% of GDP to end 2010 – is typical for a financial crisis episode. However, the jumping-off point is considerably higher than in the past.

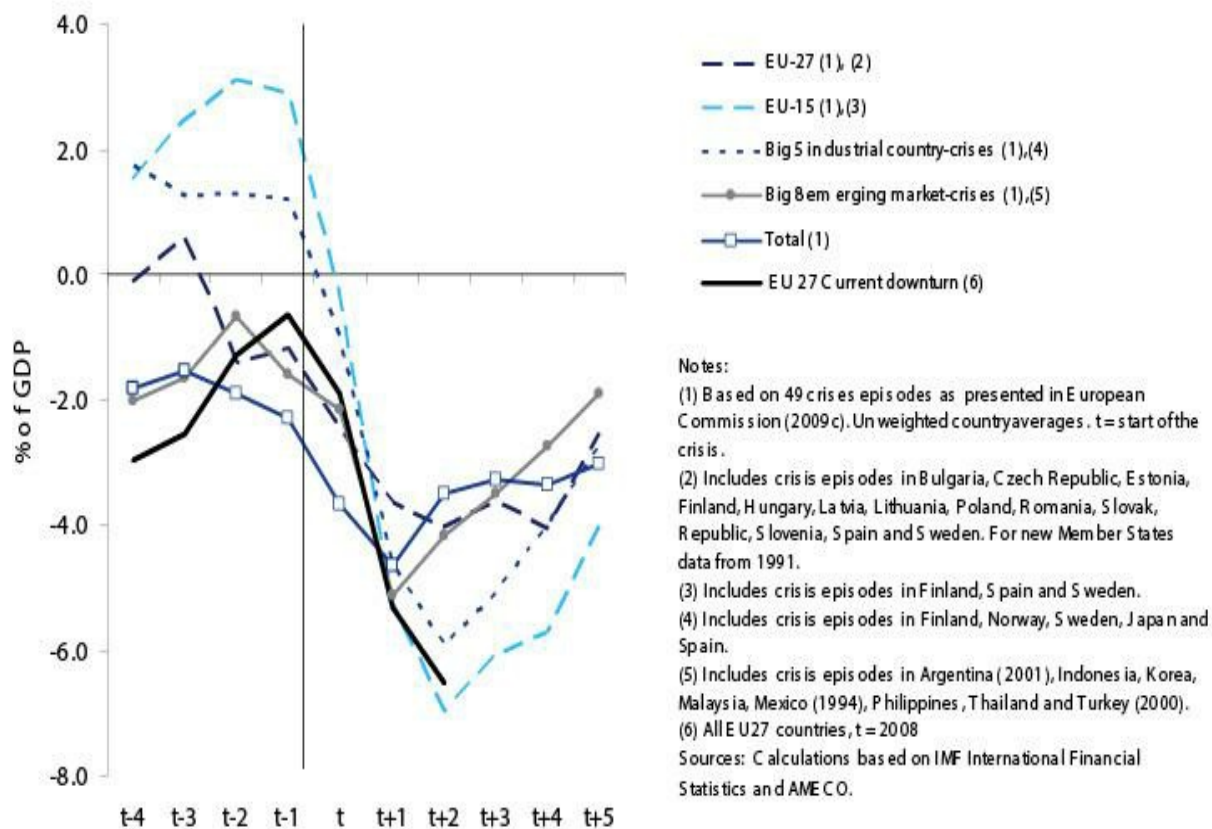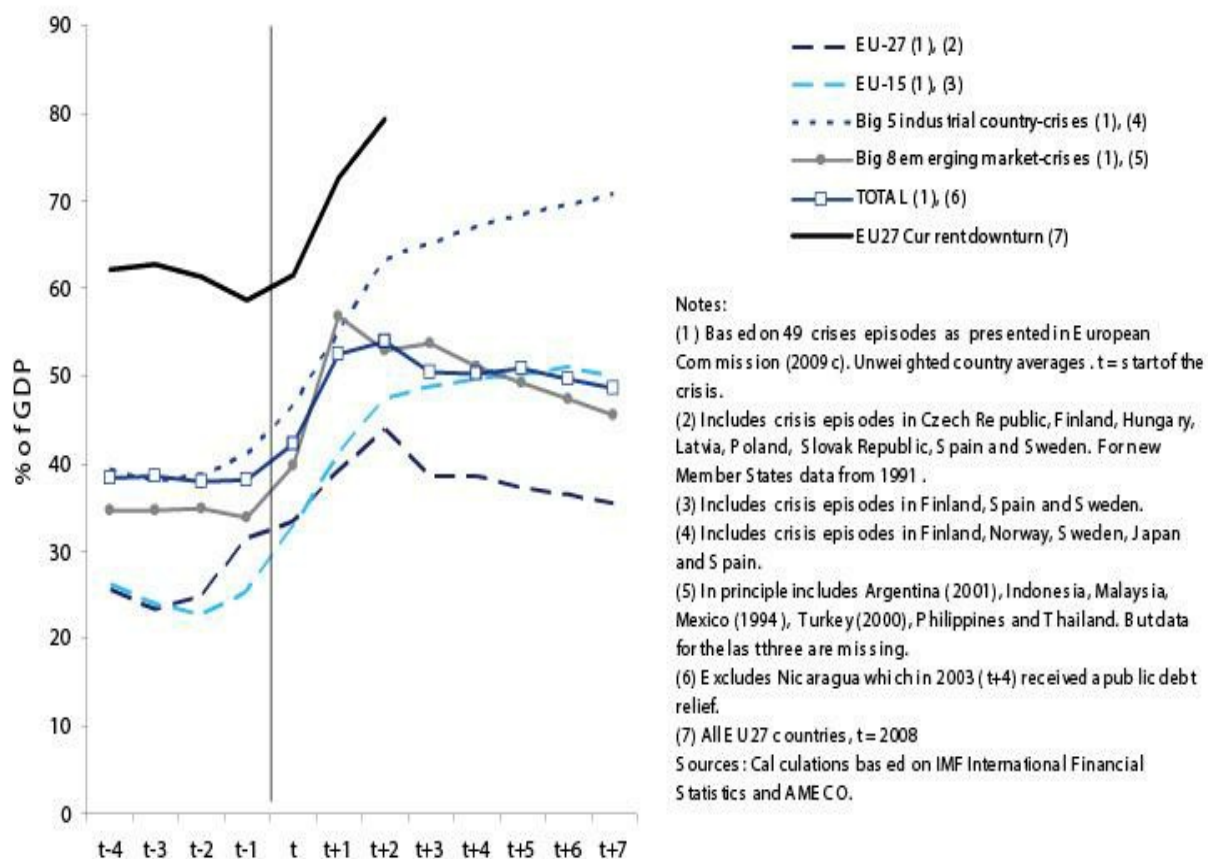**Figure 2** The fiscal position relative to previous banking crises

Figure 3 Government debt relative to previous banking crises

Notes:
(1) Based on 49 crises episodes as presented in European Commission (2009 c). Unweighted country averages. t = start of the crisis.
(2) Includes crisis episodes in Czech Republic, Finland, Hungary, Latvia, Poland, Slovak Republic, Spain and Sweden. For new Member States data from 1991.
(3) Includes crisis episodes in Finland, Spain and Sweden.
(4) Includes crisis episodes in Finland, Norway, Sweden, Japan and Spain.
(5) In principle includes Argentina (2001), Indonesia, Malaysia, Mexico (1994), Turkey (2000), Philippines and Thailand. But data for the last three are missing.
(6) Excludes Nicaragua which in 2003 (t+4) received a public debt relief.
(7) All EU27 countries, t = 2008
Sources: Calculations based on IMF International Financial Statistics and AMECO.

4. The financial crisis has asymmetric effects, which poses a long-lasting challenge for intra-EU adjustment.

The way countries are affected depends on their initial conditions and associated vulnerabilities.

- Countries that entered the crisis with a housing bubble and a large net foreign liability position face a need to shift activity from construction to export-oriented activities and to diminish their dependency on external financing.
- Countries that had been running large current account surpluses and had an associated greater exposure to toxic financial assets need to reduce their export dependency and work off their balance sheet problems.

Adjustment is necessary in both cases, but the policy recipes may be quite different.

5. There are potential implications of the present crisis for the resolution of

the global imbalances.

The ongoing correction of the current account deficit of the US associated with the deleveraging of its economy is unlikely to be matched by an equivalent correction of the current account surpluses of the emerging market economies (China, in particular). If so, the euro area, representing more than two-thirds of the EU economy, will have to bear the brunt of the adjustment. The euro area would need to find "indigenous" sources of growth, including through nurturing dynamic services sectors.

Towards a crisis-management framework

This crisis has demonstrated the importance of a coordinated crisis-management framework. It should contain the following building blocks:

- *Crisis prevention* to avoid a future repeat.

This should be mapped onto a collective judgment as to what the principal causes of the crisis were and how changes in macroeconomic, regulatory, and supervisory policy frameworks could help prevent their recurrence. Policies to boost potential growth and competitiveness would also bolster the resilience to future crises.

- *Crisis control and mitigation* to minimise the damage by preventing systemic defaults or by containing the output loss and easing the social hardship stemming from recession.

Its main objective is thus to stabilise the financial system and economic activity in the short run. To strike the right balance between national preoccupations and spillover effects affecting other Member States, it must be coordinated across the EU.

- *Crisis resolution* to bring crises to a lasting close and at the lowest possible cost for the taxpayer, while containing systemic risk and securing consumer protection.

This requires reversing temporary support measures and action to restore economies to sustainable growth and fiscal paths. This includes policies to restore banks' balance sheets, restructure the banking sector, and an orderly policy "exit", including from expansionary macroeconomic policies.

The beginnings of a framework

The beginnings of such a framework are emerging, building on existing institutions and legislation, complemented by new initiatives. Naturally, most EU policy efforts to date have focused on crisis control and mitigation. EU policymakers became acutely aware that financial assistance by countries to their financial institutions and unilateral extensions of deposit guarantees entail large and potentially disrupting spillovers. This led to emergency summits of the European Council at the Heads of State Level in the autumn of 2008 – for the first time in history also of the Eurogroup – to coordinate these moves. The Commission's role was to help ensure that financial rescues attain their objectives with minimal competition distortions and negative spillovers. Fiscal stimulus also has cross-border spillover effects, through trade and financial markets. The European Economic Recovery Programme (EERP, European Commission 2008) adopted in November 2008 was motivated by the recognition of these spillovers.

The framework for financial crisis prevention that was in place prior to the crisis proved underdeveloped – otherwise the crisis most likely would not have happened. But first steps have also been taken to redesign financial regulation and supervision – both in Europe and elsewhere – with crisis prevention in mind. Most recently, the European Commission has adopted draft legislation to create a new European Systemic Risk Board to detect risks to the financial system. It will also set up a European System of Financial Supervisors, composed of national supervisors and three new European Supervisory Authorities for banking, securities, and insurance and occupational pensions. The design of crisis resolution policies is now becoming a main task – not least because it should underpin the effectiveness of crisis control policies via its impact on confidence. Any premature withdrawal of policy stimulus should be avoided, but exit strategies should be ready for implementation when the recovery is firm, and they should be embedded in a broader policy framework that also entails growth-enhancing structural reforms.

Editor's Note: The authors write here in a personal capacity.

References

Costello, D., A. Hobza, G.-J. Koopman, K. Mc Morrow, G. Mourre and I. P. Székely (2009), "The negative impact of the financial crisis on potential output necessitates an EU-led policy response", VoxEU.org, 15 July.

Eichengreen, Barry and Kevin O'Rourke (2009), "A Tale of Two Depressions" VoxEU.org, 1 September.European Commission (2008), "A European Economic Recovery Plan", Communication from the Commission to the European Council COM(2008) 800 final.

European Commission (2009), "Economic Crisis in Europe: Causes, Consequences and Responses", *European Economy* 7.

The first casualty of the crisis: Iceland

Jon Danielsson

London School of Economics

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Iceland's banking system is ruined. GDP is down 65% in euro terms. Many companies face bankruptcy; others think of moving abroad. A third of the population is considering emigration. The British and Dutch governments demand compensation, amounting to over 100% of Icelandic GDP, for their citizens who held high-interest deposits in local branches of Icelandic banks. Europe's leaders urgently need to take step to prevent similar things from happening to small nations with big banking sectors.

Iceland experienced the deepest and most rapid financial crisis recorded in peacetime when its three major banks all collapsed in the same week in October 2008. It is the first developed country to request assistance from the IMF in 30 years.

Following the use of anti-terror laws by the UK authorities against the Icelandic bank Landsbanki and the Icelandic authorities on 7 October, the Icelandic payment system effectively came to a standstill, with extreme difficulties in transferring money between Iceland and abroad. For an economy as dependent on imports and exports as Iceland this has been catastrophic.

While it is now possible to transfer money with some difficulty, the Icelandic currency market is now operating under capital controls while the government seeks funding to re-float the Icelandic krona under the supervision of the IMF. There are still multiple simultaneous exchange rates for the krona.

Negotiations with the IMF have finished, but at the time of writing the IMF has delayed a formal decision. Icelandic authorities claim this is due to pressure from the UK and Netherlands to compensate the citizens who deposited money in British and Dutch branches of the Icelandic bank Icesave. The net losses on those accounts may exceed the Icelandic GDP, and the two governments are demanding that the Icelandic government pay a substantial portion of that. The likely outcome would be sovereign default.

How did we get here? Inflation targeting gone wrong

The original reasons for Iceland's failure are series of policy mistakes dating back to the beginning of the decade.

The first main cause of the crisis was the use of inflation targeting. Throughout the period of inflation targeting, inflation was generally above its target rate. In response, the central bank keep rates high, exceeding 15% at times.

In a small economy like Iceland, high interest rates encourage domestic firms and households to borrow in foreign currency; it also attracts carry traders speculating against 'uncovered interest parity'. The result was a large foreign-currency inflow. This lead to a sharp exchange rate appreciation that gave Icelanders an illusion of wealth and doubly rewarding the carry traders. The currency inflows also encouraged economic growth and inflation; outcomes that induced the Central Bank to raise interest rates further.

The end result was a bubble caused by the interaction of high domestic interest rates, currency appreciation, and capital inflows. While the stylized facts about currency inflows suggest that they should lead to lower domestic prices, in Iceland the impact was opposite.

Why did inflation targeting fail?

The reasons for the failure of inflation targeting are not completely clear. A key reason seems to be that foreign currency effectively became a part of the local money supply and the rapidly appreciating exchange-rate lead directly to the creation of new sectors of the economy.

The exchange rate became increasingly out of touch with economic fundamentals, with a rapid depreciation of the currency inevitable. This should have been clear to the Central Bank, which wasted several good opportunities to prevent exchange rate appreciations and build up reserves.

Peculiar central bank governance structure

Adding to this is the peculiar governance structure of the Central Bank of Iceland. Uniquely, it does not have one but three governors. One or more of those has generally been a former politician. Consequently, the governance of the Central Bank of Iceland has always been perceived to be closely tied to the central government, raising doubts about its independence. Currently, the chairman of the board of governors is a former long-standing Prime Minister. Central bank governors should of course be absolutely impartial, and having a politician as a governor creates a perception of politicization of central bank decisions.

In addition, such governance structure carries with it unfortunate consequences that become especially visible in the financial crisis. By choosing governors based on their political background rather than economic or financial expertise, the Central Bank may be perceived to be ill-equipped to deal with an economy in crisis.

Oversized banking sector

The second factor in the implosion of the Icelandic economy was the size of its banking sector. Before the crisis, the Icelandic banks had foreign assets worth around 10 times the Icelandic GDP, with debts to match. In normal economic circumstances this is not a cause for worry, so long as the banks are prudently run. Indeed, the Icelandic banks were better capitalized and with a lower exposure to high risk assets than many of their European counterparts.

If banks are too big to save, failure is a self-fulfilling prophecy

In this crisis, the strength of a bank's balance sheet is of little consequence. What matters is the explicit or implicit guarantee provided by the state to the banks to back up their assets and provide liquidity. Therefore, the size of the state relative to the size of the banks becomes the crucial factor. If the banks become too big to save, their failure becomes a self-fulfilling prophecy.

The relative size of the Icelandic banking system means that the government was in no position to guarantee the banks, unlike in other European countries. This effect was further escalated and the collapse brought forward by the failure of the Central Bank to extend its foreign currency reserves.

The final collapse was brought on by the bankruptcy of almost the entire Icelandic banking system. We may never know if the collapse of the banks was inevitable, but the manner in which they went into bankruptcy turned out to be extremely damaging to the Icelandic economy, and indeed damaging to the economy of the United Kingdom and other European countries. The final damage to both Iceland and the rest of the European economies would have been preventable if the authorities of these countries have acted more prudently.

While at the time of writing it is somewhat difficult to estimate the recovery rate from the sale of private sector assets, a common estimate for the net loss to foreign creditors because of private debt of Icelandic entities

is in excess of $40 billion.

The Icelandic authorities did not appreciate the seriousness of the situation in spite of being repeatedly warned, both in domestic and foreign reports. One prominent but typical example is <u>Buiter and Sibert (2008)</u>. In addition, the Icelandic authorities communicated badly with their international counterparts, leading to an atmosphere of mistrust.

The UK authorities, exasperated with responses from Iceland overreacted, using antiterrorist laws to take over Icelandic assets, and causing the bankruptcy of the remaining Icelandic bank. Ultimately, this led to Iceland's pariah status in the financial system.

British and Dutch claims on the Icelandic government

The current difficulties facing Iceland relate to its dispute with the Netherlands and the UK over high interest savings accounts, Icesave. Landsbanki set these savings accounts up as a branch of the Icelandic entity, meaning they were regulated and insured in Iceland, not in the UK or the Netherlands.

Icesave offered interest rates much above those prevailing in the market at the time, often 50% more than offered by British high street banks. In turn, this attracted £4.5 billion in the UK with close to £1 billion in the Netherlands. Landsbanki operated these saving accounts under local UK and Dutch branches of the Icelandic entity, meaning they were primarily regulated and insured in Iceland, although also falling under local authorities in the UK and the Netherlands. Hence the Icelandic, British and Dutch regulators approved its operations and allowed it to continue attracting substantial inflows of money. Since the difficulties facing Landsbanki were well documented, the financial regulators of the three countries are at fault for allowing it to continue attracting funds.

Landsbanki went into administration following the emergency legislation in Iceland.. The final losses related to Icesave are not available at the time of writing, but recovery rates are expected to be low, with total losses expected to be close to £5 billion. The amount in the Icelandic deposit insurance fund only covers a small fraction of these losses.

Both the Dutch and the UK governments have sought to recover the losses to their savers from the Icelandic government. Their demands are threefold. First, that it use the deposit insurance fund to compensate deposit holders in Icesave. Second, that it make good on the amounts promised by the insurance fund, around EUR 20,000. Finally, that it make

good on all losses. The last claim is based on emergency legislation passed in Iceland October 6, and the fact that the government of Iceland has promised to compensate Icelandic deposit holders the full amount, and it cannot discriminate between Icelandic and European deposit holders.

Murky legal situation

The legal picture however is unclear. Under European law 1% of deposits go into a deposit insurance fund, providing savers with a protection of €20,000 in case of bank failure. Apparently, the European law did not foresee the possibility of a whole banking system collapsing nor spell out the legal obligation of governments to top up the deposit insurance fund. Furthermore, the legal impact of the Icelandic emergency law is unclear. Consequently, the Icelandic government is disputing some of the British and Dutch claims.

Blood out of a rock

Regardless of the legal issues, the ability of the Icelandic Government to meet these claims is very limited. The damage to the Icelandic economy is extensive.   The economy is expected to contract by around 15% and the exchange rate has fallen sharply. By using exchange rates obtained from the ECB November 7 the Icelandic GDP is about EUR 5.5 billion, at 200 kronas per euro. In euro terms GDP has fallen by 65%.

(This calculation is based on the Icelandic GDP falling from 1,300 billion Icelandic kronas to 1,105 and a Euro exchange rate of 200. One year ago, the exchange rate was 83. In domestic currency terms the Icelandic GDP has contracted by 15% due to the crisis, in Euro terms 65%.)[1]

The total losses to Icesave may therefore exceed the Icelandic GDP. While the amount being claimed by the UK and the Netherlands governments is unclear, it may approximate 100% of the Icelandic GDP. By comparison, the total amount of reparations payments demanded of Germany following World War I was around 85% of GDP.[2]

Resolution and the way forward

Any resolution of the immediate problems facing Iceland is dependent on the UK and the Netherlands settling with Iceland. Unfortunately, the ability of the Icelandic government to meet their current demands is very much in doubt.

Opinion polls in Iceland indicate that one third of the population is considering emigration. Further economic hardship due to Icesave

obligations may make that expression of opinion a reality. Meanwhile, many companies are facing bankruptcy and others are contemplating moving their headquarters and operations abroad.

With the youngest and most highly educated part of the population emigrating along with many of its successful manufacturing and export companies, it is hard to see how the Icelandic State could service the debt created by the Icesave obligations to the UK and the Netherlands, making government default likely.

The economic rationale for continuing to pursue the Icesave case with the current vigor is therefore very much in doubt. If a reasonable settlement cannot be reached, and with the legal questions still uncertain, it would be better for all three parties to have this dispute settled by the courts rather than by force as now.

References

Willem Buiter and Anne Sibert (2008) "The Icelandic banking crisis and what to do about it: The lender of last resort theory of optimal currency areas". CEPR *Policy Insight* No. 26.

Webb, Steven (1988) "Latin American debt today and German reparations after World War I - a comparison", *Review of World Economics*.

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1 This calculation is based on the Icelandic GDP falling from 1,300 billion Icelandic krona to 1,105 and a Euro exchange rate of 200. One year ago, the exchange rate was 83. In domestic currency terms the Icelandic GDP has contracted by 15% due to the crisis, in Euro terms 65%.

2 Initial reparation demands from Germany were close to 200% of GDP, but quickly lowered to around 85%. See e.g. Webb (1988) for comparisons of German reparation payments and emerging market debt repayments.

Rescuing our jobs and savings: What G7/8 leaders can do to solve the global credit crisis

Barry Eichengreen, Richard Baldwin

University of California, Berkeley and CEPR; Graduate Institute, Geneva, CEPR and VoxEU Editor-in-Chief

Without rapid and coordinated action by G7/8 leaders, this financial crisis could turn into a jobs crisis, a pension crisis and much more. This column introduces a collection of essays by leading economists on what the G7/8 leaders should do this weekend. The dozen essays present a remarkable consensus on a few points: we need immediate, coordinated global action that includes recapitalisation of the banks.

We are in the throes of what is almost certainly the most serious economic and financial crisis of our lifetimes. The crisis is no longer a US crisis, or even a US and European crisis; it is a global crisis. It has spread from the financial sector to the real economy. It is not just investment portfolios and retirement accounts at risk, continued turmoil will soon start to destroy jobs.

There is a need for urgent action. The policy response needs to be decisive. It needs to be global.

With this sense of urgency in mind, we have assembled a group of leading economists to offer priorities for crisis response. This is not a homogeneous collection of experts. The contributors are from different continents and different schools of thought.

The G7/8 finance ministers meeting: An opportunity

Global economic and financial leaders are convening this weekend in Washington DC for the annual meetings of the IMF and World Bank. G7/8 finance ministers will meet Friday on the sidelines of the Fund/Bank meetings to craft their response. The global financial community will assemble the next day at IMF headquarters. This is a golden opportunity for agreeing a coordinated plan.

The authors of the thirteen essays do not agree on every point (there was little or no coordination among them as this initiative was launched on

mid-morning of 8 October). Nevertheless, there is a remarkable degree of consensus on what must be done.

Policy makers must move boldly to stabilise the financial system. The basic elements are:

- A quick bank recapitalisation with global coordination
- A guarantee of deposits and/or loans with global coordination
- Further, coordinated macroeconomic stimulus.

All the authors agreed on the first, many on the second and a good number on the third.

Download the essays

Here is the link to the short booklet entitled "*Rescuing our jobs and savings: What G7/8 leaders can do to solve the global credit crisis*." It is only 38 pages long.

The authors are: Alberto Alesina, Michael Burda, Charles Calomiris, Roger Craine, Stijn Claessens, J Bradford DeLong, Douglas Diamond, Barry Eichengreen, Daniel Gros, Luigi Guiso, Anil K Kashyap, Marco Pagano, Avinash Persaud, Richard Portes, Raghuram G Rajan, Guido Tabellini, Angel Ubide, Charles Wyplosz and Klaus Zimmermann.

Epilogue: What We Know, What We Don't

Macroeconomic paradigm shifts and Keynes's General Theory

Matthew N Luzzetti, Lee E. Ohanian

UCLA

31 January 2011

This month marks the 75th anniversary of the publication of Keynes's The General Theory of Employment, Interest, and Money. This column examines the book's influence today. It argues that the General Theory was a flawed idea whose time had come.

This month marks the 75th anniversary of the publication of Keynes's *The General Theory of Employment, Interest, and Money* (Keynes 1936). The impact of the General Theory is unquestionable. It became the dominant paradigm through the 1960s and today's policymakers still cling to many of the General Theory's tenets.

Google Scholar shows more than 12,000 citations to the General Theory – more than double the combined citations to Robert Lucas's "Expectations and the Neutrality of Money" and Kydland and Prescott's "Time to Build and Aggregate Fluctuations" – papers that helped supplant the General Theory as the major macroeconomic paradigm and helped earn their authors Nobel Prizes.

And in response to the recent economic crisis, some have attempted to resuscitate the General Theory in academia (Gordon 2009) and in the public sphere, evidenced by a debate in the Economist of the motion "This house believes that we are all Keynesians now".

In our recent paper "The General Theory of Employment, Interest, and Money After 75 Years: The Importance of Being in the Right Place at the Right Time" (Luzzetti and Ohanian 2010), we analyse the impact of the General Theory on the economics profession. We argue that the significant and long-lasting influence of the General Theory stems from the fact that Keynes was in the right place at the right time. In particular:

- Macroeconomic time series from the 1940s through the 1960s conformed qualitatively to patterns predicted by the General Theory (even though the driving forces behind the US economy at this time

may have been very different than the forces stressed by the Keynesian model);

- Simultaneous equation econometric developments made around this time elevated the Keynesian model to a quantitative enterprise;
- And perhaps most important, the General Theory was published during the Great Depression when there was enormous demand for new ideas to understand chronic depression.

But ultimately, just as the General Theory became the dominant macroeconomic paradigm, its influence waned for the same reasons that it had supplanted early equilibrium theories – its inability to explain subsequent macroeconomic developments when new theories could.

Why was the General Theory so influential?

The General Theory had its genesis during the Great Depression, the persistence and depth of which seemed to defy standard explanations of the time. Those explanations were based on equilibrium reasoning that held that price adjustment would equilibrate supply and demand.

Keynes jumped on the apparent inconsistency of using equilibrium theory to analyse prolonged depression by reviewing Pigou's analysis of the labour market (Pigou, 1933). Pigou's framework featured a labour-leisure tradeoff that is embedded in many of today's standard models.

As the Depression persisted for years in the UK and the US, it became increasingly difficult to reconcile chronically high unemployment with equilibrium theory that posited wage adjustments would reduce unemployment to normal levels. The General Theory was, in large measure, written in response to the inability of equilibrium theory to confront the Great Depression.

Furthermore, US macroeconomic time series following the publication of the General Theory appeared consistent with Keynes's predictions. As government spending soared in the 1940s, rising from about 16% of GDP in 1939 to 48% of GDP in 1944, the unemployment rate plummeted from 17.2% to 1.2% (Margo 1993). This increased economists' confidence in the Keynesian model, and the stable and prosperous economy of the 1950s and 1960s further solidified this confidence.

But perhaps the central factor behind the longevity of the General Theory was a series of breakthroughs in econometric methods that began in the 1940s. These methodological developments transformed the qualitative ideas of the General Theory into quantitative propositions. These

breakthroughs included Haavelmo's 1944 paper that integrated more formally probability theory with econometric methods, and other Cowles Commission classics on identification, estimation, and causal ordering.

These econometric developments formed the basis of the toolkit used to analyse business cycles following the General Theory both among university economists and policymakers. Throughout the 1960s, the economy continued to grow with remarkable stability, and for many observers, this stable prosperity was due in considerable part to the General Theory's tenets.

The decline of the Keynesian model

By the early 1970s, macroeconomic time series threw up patterns at odds with the Keynesian model:

- Poor forecasting performance of Keynesian econometric models,
- Increasing recognition of supply-side factors as drivers of fluctuations, and
- The breakdown of the Phillips curve.

Moreover, theoretical developments identified theoretical weaknesses of the Keynesian model and provided new theories grounded in the language of optimisation and equilibrium for understanding business cycles.

Charles Nelson (1972) levelled the first significant empirical criticism of the Keynesian model by showing that low-order integrated autoregressive-moving average models produced lower mean square error forecasts than detailed Keynesian models that were the industry standard.

Nowhere were these empirical inconsistencies more evident than with the Phillips curve.

Figures 1 and 2 demonstrate significant changes in the relationship between unemployment and inflation. This relationship, which was the focus of Samuelson and Solow's (1960) famous discussion of the Phillips curve, is negative, with a correlation of around -0.6, between 1959 and 1969. Some economists interpreted this as an exploitable trade-off in which unemployment could be permanently kept at a low level provided that there was at least some inflation. But as is evident from Figure 2, there is virtually no relationship between these variables after the 1960s, as the regression slope between the two variables is indistinguishable from zero.

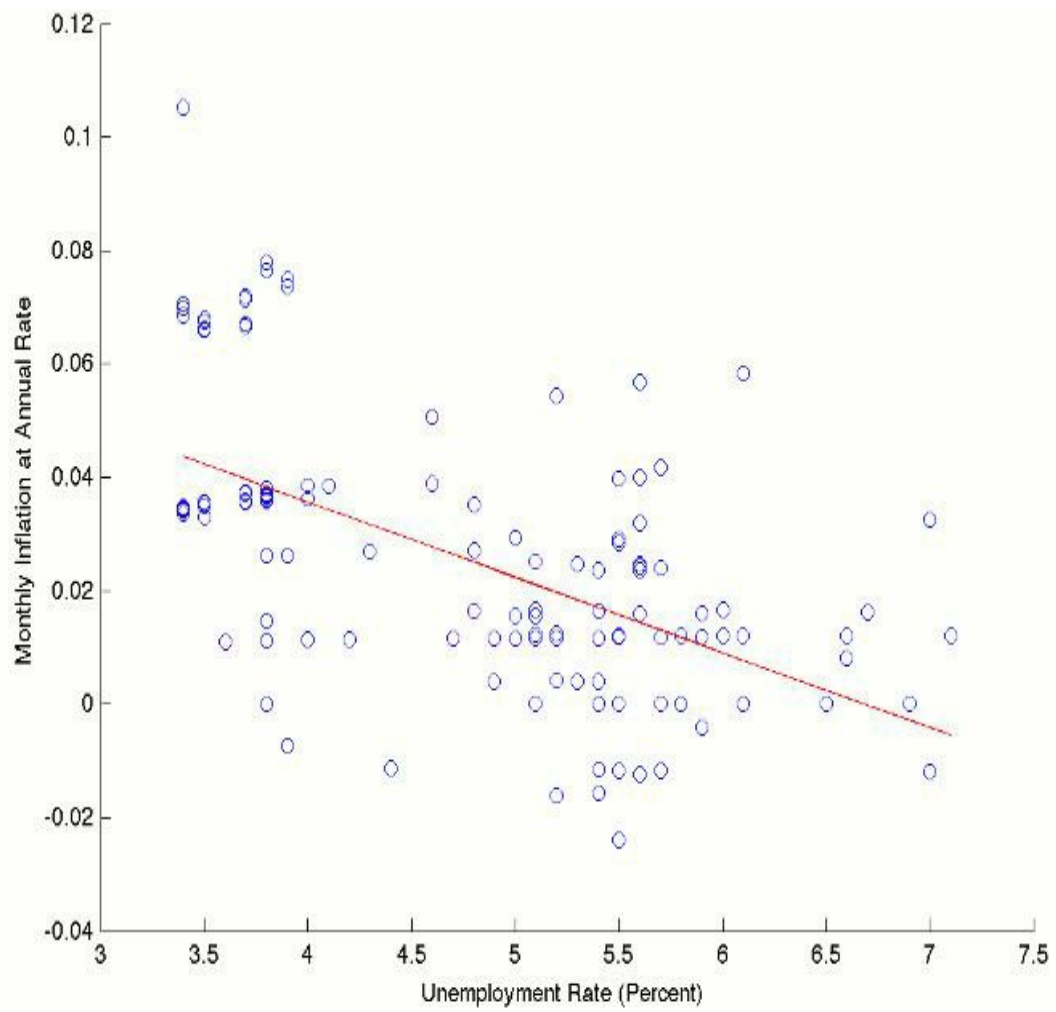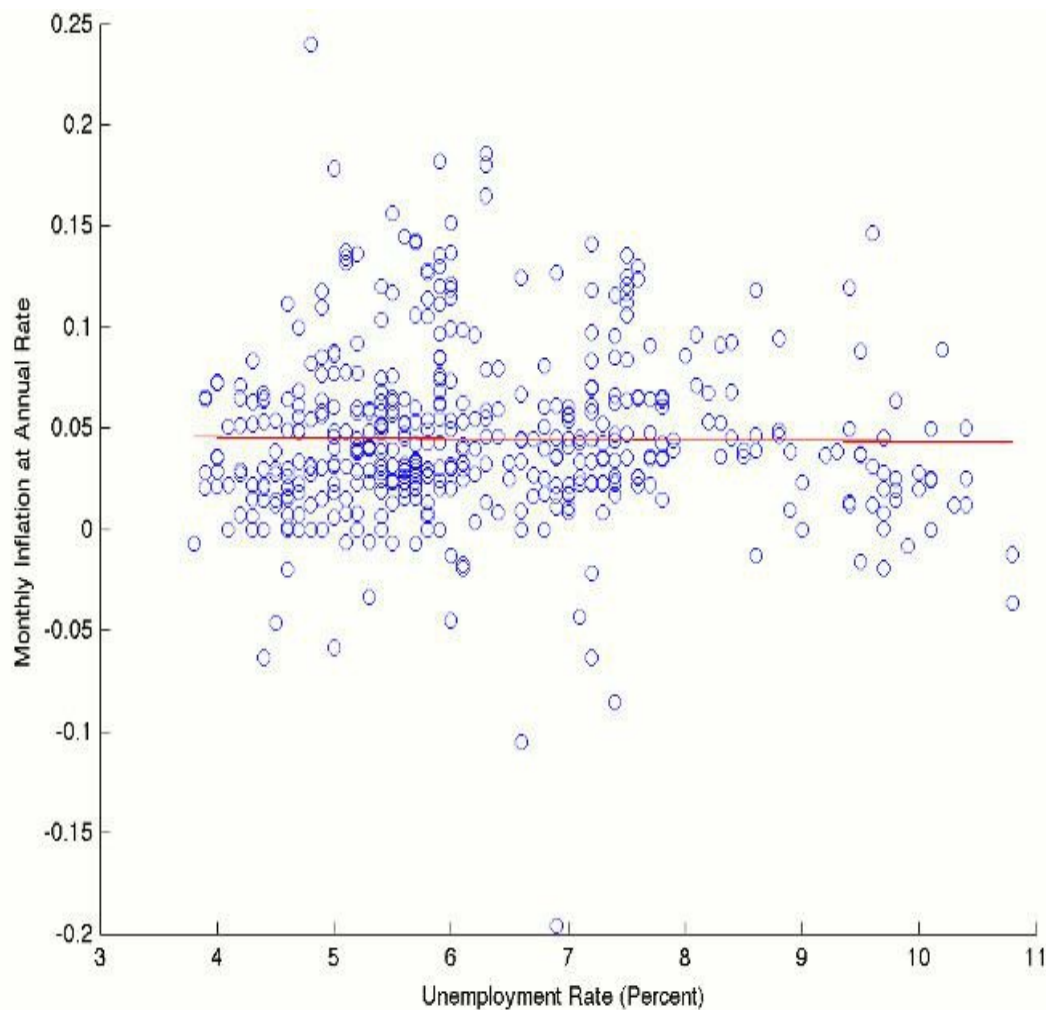**Figure 1** CPI inflation vs unemployment rate (1959-1969)

Figure 2 CPI inflation vs unemployment rate (1970-2010)

In addition, economists began to understand that a substantial fraction of fluctuations, particularly those in the 1970s, arise from the supply side of the economy. Kydland and Prescott (1982) used developments in general equilibrium theory to formalise this view as the real business cycle programme. They showed that roughly two-thirds of postwar fluctuations could be accounted for by variations in total factor productivity, i.e. a supply-side rather than demand-side factor.

The General Theory also advocated the importance of "animal spirits" in investment decisions. In equilibrium macroeconomic models, optimal decisions about the allocation of resources between current consumption and investment are summarised by the Euler equation. Thus, examining whether the Euler equation holds empirically is a natural test of the importance of animal spirits. To analyse the quantitative significance of animal spirits on physical investment, we use historical US data to construct Euler equation residuals under the assumption of perfect foresight (Luzzetti and Ohanian 2010). According to the Keynesian view,

these residuals should be large and volatile, representing shifting expectations. Moreover, residuals should be negative during depressions, representing pessimism about future returns to capital.

We find – in contrast to the Keynesian view – that the residuals are small and appear to be uncorrelated in postwar data. And although the residuals are larger during the Great Depression, they are positive, suggesting that investors were optimistic in expecting higher returns than those that materialised.

The Keynesian framework, as presented in large-scale econometric models, was not microfounded, and thus was sharply at odds with the developments in economic theory of the 1960s and 1970s. Muth (1961) and subsequent research developed the theory of modelling expectations in dynamic settings. Lucas and Prescott (1974) and Mehra and Prescott (1980) showed how to integrate infinite-dimensional economies with recursive methods, making it feasible to quantitatively assess fully microfounded dynamic stochastic equilibrium economies. This all came together in 1982 with the seminal Kydland-Prescott paper. This framework allowed equilibrium macroeconomics to address questions that previously were considered beyond its grasp, such as the causes of the Great Depression (Cole and Ohanian 2004 and Ohanian 2009) and the World War II economic boom (McGrattan and Ohanian 2010). And equilibrium models are generating very different answers for understanding these episodes.

The General Theory's staying power among policymakers

There is no doubt that the General Theory was one of the major economic events of the 20th century, at least as important as the impact of Kydland and Prescott (1982), which in turn dispensed with Keynesian economics. But some ideas from 1936 persist.

The notion of an inflation-unemployment trade-off and aggregate demand management remain at central banks, and the Keynesian vision provides a well-established framework for carrying this vision on within the context of policies that tie central bank behaviour to the joint mandate of promoting both low unemployment and price stability. This makes it politically unimaginable for a central bank, faced with a crisis, to argue it is unlikely they can increase output and trying to do so might make matters worse.

The General Theory will continue to have a large audience among policymakers as long as governments are pressed to boost nominal

spending during periods of crisis, whether or not those efforts are effective.

References

Cole, H and L Ohanian (2004), "New Deal Policies and the Persistence of the Great Depression: A General Equilibrium Analysis", *Journal of Political Economy*, 112(4): 779-816.

Gordon, R (2009), "Is Modern Macro or 1978-era Macro More Relevant to the Understanding of the Current Economic Crisis?", Unpublished Paper.

Haavelmo, T (1944), "The Probability Approach in Econometrics", *Econometrica* 12, July, pp. iii-vi+1-115.

Keynes, J (1936), *The General Theory of Employment, Interest, and Money*, Harcourt, Brace & World.

Kydland, F and E Prescott (1982), "Time to Build and Aggregate Fluctuations", *Econometrica* 50(6):1345-1370.

Lucas, R Jr. (1972), "Expectations and the Neutrality of Money", *Journal of Economic Theory*, 4(2), April:103-124.

Lucas, R Jr. and E Prescott (1974), "Equilibrium Search and Unemployment", *Journal of Economic Theory*, 7(2):188-209.

Luzzetti, M and L Ohanian (2010), "The General Theory of Employment, Interest, and Money After 75 Years: The Importance of Being in the Right Place at the Right Time", NBER Working Paper 16631, December, forthcoming i*n Keynes' General Theory: Seventy-Five Years later*, Tom Cate, editor, Edward Elgar: London.

Margo, R (1993), "Employment and Unemployment in the 1930s", *Journal of Economic Perspectives*, 7(2):41-59.

McGrattan, E and L Ohanian (2010), "Does Neoclassical Theory Account for the Effects of Big Fiscal Shocks? Evidence from World War II", *International Economic Review*, forthcoming.

Mehra, R and E Prescott (1980), "Recursive Competitive Equilibrium: The Case of Homogeneous Households", *Econometrica*, 48(6):1365-79.

Muth, J (1961), "Rational Expectations and the Theory of Price Movements", *Econometrica*, 29(3):315-335.

Nelson, C (1972), "The Prediction Performance of the FRB-MIT-PENN Model of the US Economy", *American Economic Review*, 62(5):902-917.

Ohanian, L (2009), "What - or who - started the great depression?", *Journal of Economic Theory*, 144(6):2310-2335.

Pigou, A (1933), *The Theory of Unemployment*, Macmillan and Co., Ltd.

Samuelson, P and R Solow (1960), "Analytical Aspects of Anti-Inflation Policy", American Economic Review, 50(2), *Papers and Proceedings of the Seventy-second Annual Meeting of the American Economic Association*,177-194.