Minimum Wages and the Card–Krueger Paradox

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An apparent paradox perceived by Card and Krueger concerning the relationship between minimum wages, employment, and output prices is resolved by revisiting the economics of minimum wages to show that under monopsonistic conditions in the labor market and competitive price-taking in the market for output, increases in both firm-level and industry employment are compatible with increases in output prices.

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1. Introduction

David Card and Alan B. Krueger (1994) analyzed the experiences of 410 fast-food restaurants in New Jersey and Pennsylvania following the 1992 increase in New Jersey's minimum wage from $4.25 to $5.05 per hour. Their key findings were that (i) employment at stores affected by the increase in the minimum wage grew both absolutely and relative to stores unaffected by the increases (either because they were in Pennsylvania or were New Jersey stores already paying more than the new minimum); (ii) the higher minimum wage was not offset by reductions in nonwage benefits; and (iii) the resultant higher costs were passed through to consumers in the form of higher fast-food prices.

2. The Card–Krueger Paradox

Card and Krueger (CK) are puzzled by their results because the competitive model predicts lower employment, less output, and hence higher output prices following an increase in the minimum wage, whereas in their view monopsony models that predict greater employment following an increase in the minimum wage predict greater output, and hence lower output prices. In their words:

> "A standard competitive model predicts that establishment-level employment will fall if the wage is exogenously raised. For an entire industry, total employment is predicted to fall, and product price is predicted to rise in response to an increase in a binding minimum wage. . . .
>
> An alternative to the conventional competitive model is one in which firms are price-takers in the product market but have some degree of market power in the labor market. If fast-food stores face an upward-sloping labor supply schedule, a rise in the minimum wage can potentially increase employment at affected firms and in the industry as a whole. . . .

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> Although monopsonistic . . . models provide a potential explanation for the observed employment effects of the New Jersey minimum wage, they cannot explain the observed price effects. In these models industry prices should have fallen in New Jersey relative to Pennsylvania . . ." (Card and Krueger 1994, pp. 790–91).

The Card–Krueger paradox may be summarized as follows: according to economic theory, an increase in a binding minimum wage (one that changes behavior because it is higher than the prevailing wage) will decrease employment and increase output prices under competition, or under monopsony (perhaps) increase employment and decrease output prices, but it cannot increase both employment and output prices as it did in New Jersey. The purpose of this paper is to revisit the economic theory of minimum wages in order to resolve this paradox. Among other things, I will show that the CK results are not anomalous, as CK evidently believe, but rather are completely consistent with "the alternative to the conventional competitive model" they themselves mention.

3. The Alternative Model

The alternative to the conventional competitive model mentioned by CK is a blend of perfect competition in the market for output and monopsony power in the market for labor. (In this model the firm is not a true, or pure monopsony—strictly defined as a "single buyer"—in the relevant market for labor. But terms like "monopsony power," "monopsonist," and "monopsony" are used here because our firms, like the pure monopsony, perceive that their behavior affects the going wage.[1]) As in other competitive markets for output, profit-maximizing behavior in the face of free entry and exit is assumed to yield normal profits for firms, with price equal to minimum long run average cost at long run equilibrium.[2] In one or more input markets, including the labor market, the firm is assumed to perceive that a rising supply price causes marginal factor cost to exceed average factor cost. Thus, a hallmark of the model is the firm's perception of rents paid to intramarginal units of factors. This perception is expressed in the familiar identity,

$$MFC_L = AFC_L + L[d(AFC_L)/dL], \tag{1}$$

where MFC_L, AFC_L, and L are marginal factor cost, average factor cost, and quantity of a specific factor ($L = 1, 2, \ldots, N$), respectively, and $L[d(AFC_L)/dL] > 0$ is the variation in total rent paid to intramarginal units of the factor, occasioned by a small variation in employment of that factor. (In what follows I focus on the labor market, so L will specifically denote labor.)

A binding minimum wage affects MFC_L in two countervailing ways: it increases average factor cost, while eliminating incremental intramarginal rent up to the level of employment where the minimum wage equals the free market supply price of labor. (If employment expands beyond that point, the minimum wage is no longer binding and incremental intramarginal rent reappears.) The effective marginal factor cost of labor under a binding minimum wage

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[1] Bhaskar and To (1999) develop a model of monopsonistic competition in the labor market based on what they call "horizontal job differentiation"—the idea that workers have different preferences among the nonwage characteristics of a job that enable any one of several firms competing for labor to lower its wage offer without losing all its workers.

[2] With respect to the fast-food industry, I specify that each production site ("plant") is a separate firm for the purposes of my analysis. Thus, for example, 10 McDonald's stores would be analyzed as 10 separate decision-making units.

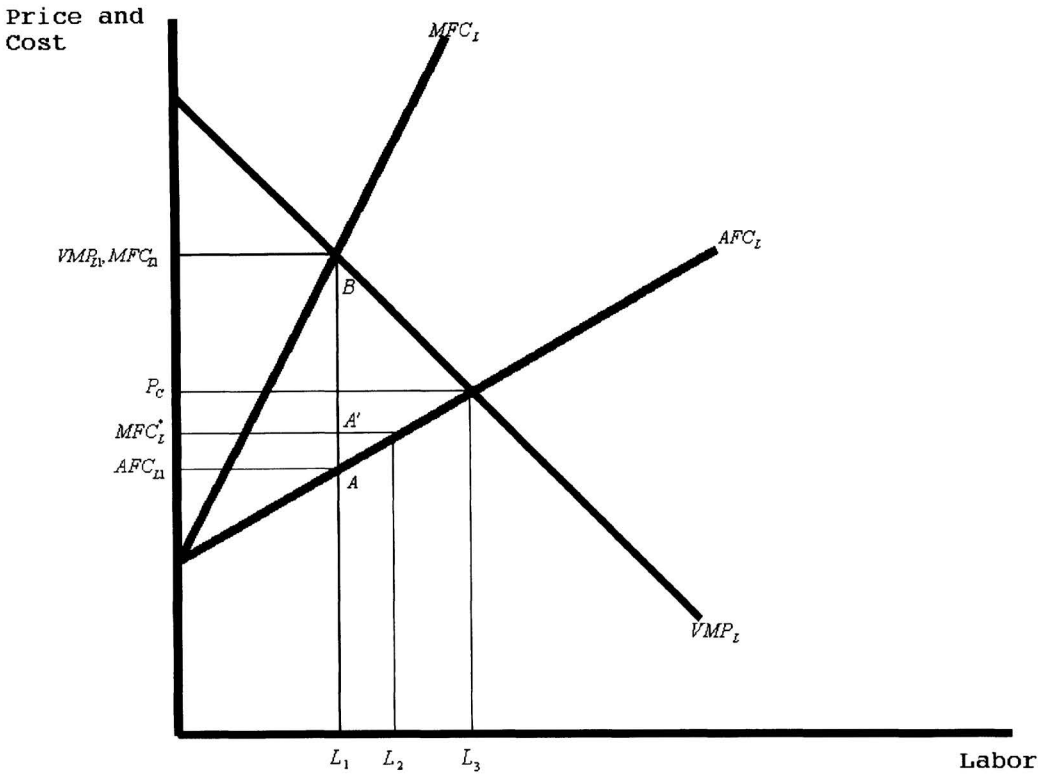

Figure 1. Minimum Wages and Firm-level Employment

(MFC_L^*) is therefore simply $MFC_L^* = AFC_L^*$ = minimum wage, where AFC_L^* is the effective average factor cost of labor under the minimum wage.

Profit maximization in this model, where firms are price-takers in the market for output, requires the employer to employ labor up to the point where MFC_L equals the market value of labor's marginal product: $MFC_L = VMP_L$, where VMP_L is the arithmetical product of output price and the marginal physical product of labor. At the equilibrium level of employment under the minimum wage,

$$MFC_L^* = AFC_L^* = VMP_L, \tag{2}$$

if this occurs within the relevant range, that is, the range over which the minimum wage is binding; otherwise it obtains at the end of the relevant range, where

$$MFC_L^* = AFC_L^* = AFC_L < VMP_L < MFC_L. \tag{3}$$

The foregoing points are illustrated in Figure 1, where AFC_L, MFC_L, and VMP_L curves of the typical firm are shown. (Note that the diagram is "opened up" for viewing by an overly steep MFC_L curve.) Profit-maximizing employment obtains initially at L_1, where $MFC_{L1} = VMP_{L1} = L_1B$. At this level of employment, the supply price of labor (free market wage) is $AFC_{L1} = L_1A$.[3] The difference between MFC_L and AFC_L at L_1—distance AB—measures the

[3] Note the implicit assumption here that labor is being supplied to the firm under competitive conditions, i.e., workers are assumed to be price-takers. I also assume that all factors are noninferior, i.e., that, ceteris paribus, factor usage varies directly with output. For a discussion of minimum wages that includes the possibility of inferior factors, see Maurice (1974).

increase (decrease) in rents paid to intramarginal workers as a result of a small increase (decrease) in employment in the neighborhood of L_1.

Now let a minimum wage be established at MFC_L^*. Profit-maximizing employment increases to L_2 at the end of the relevant range, satisfying the conditions noted in Equation 3, above.[4] Subsequent increases in the minimum wage up to the level denoted by P_C, the price that would prevail under perfect competition, would increase profit-maximizing employment while satisfying Equation 3. A minimum wage set equal to P_c would maximize employment at L_3 and satisfy the condition expressed in Equation 2, above. Further increases in the minimum wage would reduce employment while satisfying Equation 2, as it would require a higher marginal physical product of labor to achieve profit maximization after paying the higher wage. The relationship between minimum wages and incremental employment by the monopsonistic firm may be summarized as follows: ceteris paribus, imposition of a binding minimum wage will increase employment if, and only if, the new wage is higher than the immediately preceding wage and lower than the immediately preceding VMP_L.

At first it may seem counterintuitive that a mandate increasing the average cost of labor would at the same time reduce the marginal cost of labor. A closer look at the rent phenomenon clarifies the point as it yields the following key insight: the minimum wage reduces MFC_L as it transforms labor's rent from a variable to a fixed cost. Consider Equation 1. A binding minimum wage eliminates the second term on the right side as the wage, and hence intramarginal rent is now invariant with respect to employment in the relevant range. Thus MFC_L, as constrained by the minimum wage, includes a variation in rent only to the extent that rent is included in the remaining right-side term, AFC_L. But at the equilibrium margin of employment, where the wage just covers the opportunity cost of the marginal worker, AFC_L is devoid of rent. In sum, at the equilibrium margin of employment under a binding minimum wage, MFC_L is free of rent because at the equilibrium margin of employment all rent is intramarginal and under a binding minimum wage intramarginal rent is a fixed cost. Facing a binding minimum wage, the monopsonist knows that changing employment in the relevant range will now yield less change in cost for the firm because the wage paid to intramarginal units of labor remains unchanged. For example, with minimum wage at MFC_L^* in Figure 1, a small decrease (increase) of employment in the neighborhood of L_1 will reduce (increase) total cost of employment only by L_1A', rather than by L_1B.[5] Thus, even though the average cost of employment is increased by the minimum wage, the marginal cost of employment, the opportunity cost or saving associated with increasing or decreasing employment, may be reduced.

We have seen that under monopsonistic conditions the minimum wage may lead the firm to increase employment.[6] But we must note that our formulations have not provided the suffi-

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[4] Levels of employment greater than L_2 would require the incentives of a supraminimum wage. This would yield increased rents for intramarginal workers, and the effective marginal factor cost would once more be given by MFC_L. Because MFC_L is greater than VMP_L at L_2, the employer has no incentive to expand employment.

[5] Note that L_1 is inside the L_2 no-rent margin, and that MFC_L^* at L_1 includes the incremental rent shown by AA'. Only at the no-rent margin is rent completely invariant with respect to a small change in employment. Inside that margin it is correct to say, however, that under the minimum wage rent is less variable than before with respect to employment.

[6] The CK article discussed here provoked an outpouring of professional commentary, much of it highly critical, as the CK results struck many economists as an alleged refutation of the law of demand in the market for labor. Clearly many economists overlooked or discounted the role that monopsony may play in some segments of the market. Indeed, of 13 prominent economists responding to an inquiry by *The Wall Street Journal* concerning the effects of raising the minimum wage, only Robert Eisner discussed effects under monopsonistic conditions (Buchanan and Miller 1996; Poole et al. 1996).

cient condition(s) for such an increase. What we have shown is sufficient only to establish an increased labor intensity of production, that is, ratio of labor to one or more other inputs, as producers seek new least-cost combinations of inputs by substituting labor for those other inputs. This is not sufficient to establish an increase in the firm's total employment because if the optimum size of the firm decreases under a minimum wage, less employment of labor as well as other inputs would be consistent with an increased labor intensity of production.

4. Minimum Wages and the Optimum Size of the Firm

By "optimum size of the firm" I mean the output that yields minimum long run average cost for the firm. Because the firm's output cost curves in the model discussed here are based on monopsonistic rather than perfectly competitive factor market conditions, they are not those of the standard textbook case of competitive output markets because our cost curves reflect endogenous variations in factor prices, as well as variable returns to scale in the production function.[7] Still, it is not unreasonable to suppose that the standard U-shape will prevail, even though one or more factors are supplied to the firm at rising supply prices. To make this assumption as plausible as possible, we will assume that all factors except labor are supplied to the firm at constant supply prices.

For simplicity, we express the long run total cost of output (LTC) as the sum of input expenditures for only two inputs, labor and capital, $LTC = AFC_L L + AFC_K K$, where AFC_K is the average factor cost of capital, and L and K are the total quantities employed of labor and capital, respectively. Long run average cost of output (LAC) is given by $LAC = AFC_L L/Q + AFC_K K/Q$, where Q is the total quantity of output. Long run marginal cost of output (LMC) is given by (AFC_K assumed constant)

$$LMC = (AFC_L)dL/dQ + Ld(AFC_L)/dQ + (AFC_K)dK/dQ. \tag{4}$$

Intuitively it seems clear that LAC will increase as the minimum wage increases AFC_L directly and, we are assuming, L/Q indirectly (but, on the other hand, in the present context this implies that K/Q will be reduced). However, because my resolution of the Card–Krueger paradox depends on the validity of this prediction, it must be established rigorously.

Let $(X_1 + X_2 + \cdots + X_n)$ be the least-cost combination of factors, including labor, for producing some specific quantity of output Q at the preminimum wage set of equilibrium prices $(P_1 + P_2 + \cdots + P_n)$; then let $(X_1' + X_2' + \cdots + X_n')$ be the least-cost combination for producing that same quantity of Q at the postminimum wage set of equilibrium prices $(P_1' + P_2' + \cdots + P_n')$. If we then assert that $P_1X_1 + P_2X_2 + \cdots + P_nX_n > P_1'X_1' + P_2'X_2' + \cdots + P_n'X_n'$, we are compelled to note that, ceteris paribus, the right side of this inequality would be even less at the lower, preminimum wage price of labor. Because this right-hand side combination of factors was previously available, and the monopsonistic employer presumably perceives the cost implications of all input combinations, the original, pre-minimum wage combination cannot have been a least-cost combination. In sum, a lower total and hence average cost for producing any given output after the minimum wage is imposed or increased contradicts the standard assump-

[7] I assume here that capital (K) and labor are optimally combined in the homothetic production function $Q = Q[f(K, L)]$, where $f(K, L)$ is a linear homogeneous production function and $Q[f(K, L)]$ yields increasing, constant, and then decreasing returns to scale as output increases, as illustrated by the conventional U-shaped LAC curve.

tion that firms are always achieving least-cost combinations as a necessary condition for profit maximization. (There remains the possibility that the pre- and postminimum wage combinations are equally costly. As this would require, as a necessary but not sufficient condition, that a perfect substitute for labor be available to the firm at a constant supply price, we will consider this possibility negligibly remote.)

Our conclusion is that the firm's long run average cost curve (*LAC*) necessarily shifts upward as the binding minimum wage is imposed or increased. The effect of the minimum wage on the firm's optimum size, however, initially appears to be ambiguous. If we could establish that the firm's long run marginal cost curve (*LMC*) remains unchanged or shifts downward, we would know that the optimum size of the firm must increase because, in order for that *LMC* curve to intercept the new, higher *LAC* curve at its minimum, that new minimum would have to lie to the right of the original minimum. Analysis of Equation 4, however, reveals that *LMC* may shift upward, downward, or remain unchanged.[8]

This apparent ambiguity concerning the optimum size of the firm and firm-level employment can be resolved, however, into two unambiguous results: between the monopsony and competitive wages (between AFC_{L1} and P_C in Figure 1), the optimum size of the firm and firm-level employment vary directly with the minimum wage; whereas above the competitive wage the optimum size of the firm is invariant, and firm-level employment varies inversely with the minimum wage.

The argument whereby we reach this conclusion begins with the observation that the homothetic production function underlying the standard U-shaped cost curves of economic theory can be thought of as a constant returns to scale production function, except that the isoquants on a standard isoquant map are renumbered to show first increasing, then constant, and finally decreasing returns to scale as output increases. Thus, when input prices are given, expansion by the firm yields first decreasing, then constant, and finally increasing *LAC*. In order for the *LAC* curves to be strictly U-shaped, that is, to have only one output at which cost is minimized, there can be only one output at which constant returns to scale obtain. This implies that on the isoquant map in my model, there will be a unique isoquant for constant returns, so constant returns (minimum *LAC*) will be reached at the same output along any expansion path. This in turn implies that the optimum size of the firm is invariant with respect to an exogenously determined factor price ratio. (On the characteristics and consequences of our assumed production function, see the discussion and references cited in Ramenofsky and Shepherd [1979].)

In the left-hand panel of Figure 2, *LAC* curves labeled MFC_L^*, P_C, and $P > P_C$ are drawn, each with its minimum at output Q_3, the output yielding constant returns to scale. These curves are drawn on the assumption that factor prices are exogenous and that, ceteris paribus, the wage in Figure 1 is successively set equal to MFC_L^*, P_C, and some $P > P_C$ (the darker portion of each curve shows its relevant range for our analysis). In Figure 2, I also show LAC_M^F, the monopsonist's free market (i.e., preminimum wage) *LAC* curve, drawn on the assumption that the price of labor is endogenous and increasing with output. This latter curve reaches its min-

[8] The essence of the ambiguity is evident from the first two terms on the right side of Equation 4. The second term disappears under the minimum wage, but the first term will increase as the minimum wage increases AFC_L directly and, assuming as we are that the labor intensity of production is increased by the minimum wage, indirectly increases dL/dQ, the additional labor most profitably employed in producing an additional unit of output. Note that even though my interest is in the range over which MFC_L is reduced by the minimum wage, i.e., the range over which the disappearance of the rent term dominates the increase in AFC_L, the fact that the increase in AFC_L is multiplied by dL/dQ in determining the *LMC* of output means that *LMC* may increase even though MFC_L falls.

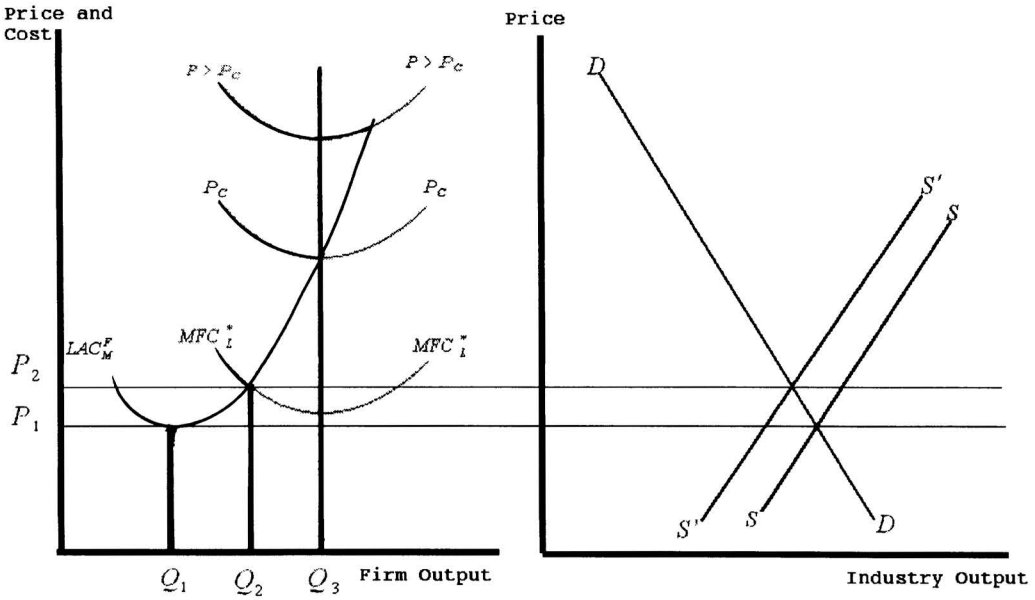

Figure 2. Minimum Wages, Average Costs, and Output Price

imum in the range of increasing returns where declining cost from the increasing returns is just balanced by rising cost due to the rising price of labor.[9]

Now let a binding minimum wage be imposed at level MFC_L^*. Reflecting our earlier analysis, average cost between Q_1 and Q_2 increases. Output Q_2, the output corresponding to employment level L_2 in Figure 1, marks the end of the relevant range for this minimum wage, so average cost for higher outputs will be shown by the free market curve, LAC_M^F. The effective average cost curve is formed by the intersecting MFC_L^* and LAC_M^F curves ($MFC_L^* - LAC_M^F$), with its minimum (derivative undefined) at Q_2. A similar analysis for minimum wages between MFC_L^* and P_C would yield similar curves (not shown) between the MFC_L^* and P_C curves. When the minimum wage is set equal to P_C, perfect competition is mimicked in my model and the firm's optimum output obtains at constant returns to scale. For any minimum wage $P > P_C$, optimum output holds at Q_3.[10]

The implications of my analysis concerning the effects of a minimum wage on employment by the firm may be summarized as follows: between the free market monopsony wage and the competitive wage the labor intensity of production, the optimum size of the firm, and hence

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[9] Express the LAC function as $LAC = f(P_L, P_K, Q)$, and let f_Q and f_{PL} denote the partial derivatives of the function with respect to output and price of labor, respectively. With P_K assumed constant, we have $d(LAC)/dQ = f_Q + (f_{PL})dP_L/dQ$. Now $f_Q < 0$ over the range of increasing returns, whereas $(f_{PL})dP_L/dQ$ is strictly increasing. Setting $d(LAC)/dQ = 0$ for a minimum yields the necessary condition $f_Q = -(f_{PL})dP_L/dQ < 0$.

[10] Note that for $P > P_C$ an increase in the minimum wage must cause equilibrium LMC ($= LAC$ at Q_3) to increase. That this is implied by the earlier analysis is shown with the aid of Figure 1 and Equation 4. For minimum wages greater than AFC_{L1} and less than P_C, increases in the minimum wage extend the relevant range in Figure 1, making free market MFC_L the relevant marginal cost for evaluating Equation 4. That is, there is an incremental rent term to be reduced to zero by the new minimum wage. For increases in the minimum wage above P_C, however, the relevant range in Figure 1 is reduced, and therefore the rent term in Equation 4, already brought to zero over that range by the earlier wage, is unchanged by the new wage. Thus, above P_C an increase in the minimum wage yields an unambiguous increase in LMC.

employment vary directly with the minimum wage; whereas above the competitive wage the optimum size of the firm is invariant, while both the labor intensity of production and employment vary inversely with the minimum wage.[11]

Card and Krueger found that in the New Jersey case firm-level employment increased, supporting our prediction for minimum wages less than a perfectly competitive wage. But what of employment at the industry level? Clearly, increased labor intensity of production and greater employment per firm are completely consistent with less industry employment if a sufficient number of firms are motivated by the consequences of the minimum wage to exit from the industry. The CK study does not provide a clear answer to this question for the fast-food industry, nor do we need to consider it further here for purposes of resolving their paradox.[12] For that purpose, all we need is the result established above concerning the effect of the minimum wage on *LAC*.

5. Resolution of the Card–Krueger Paradox

The foregoing discussion suggests that under monopsonistic conditions a minimum wage may increase the labor intensity of production and firm-level employment. To emphasize the point I now wish to make, let us further assume that total industry employment also increases. What can explain the fact, CK in effect ask, that in these circumstances, which seem to imply increased industry output, output prices are observed to rise rather than fall? Our answer is immediately at hand: because the minimum wage shifts firms' *LAC* curves upward, industry output falls rather than rises. Product market price-takers, initially at long run equilibrium at minimum *LAC,* find that they are now losing money; some firms exit from the industry; industry output declines and product prices rise until the remaining firms are able to break even at the higher minimum *LAC*. While the final outcome for industry employment will in a specific case depend on the profitability of substituting labor for other factors, and on the elasticity of demand for output, the long run equilibrium requirement that output price rise after the imposition or increase of a binding minimum wage is unambiguous.[13]

In Figure 2, where the panel on the right shows the industry long run supply of and demand for output, I illustrate the effects of the initial imposition of a binding minimum wage on the market supply and price of output. In the left panel equilibrium for the firm initially obtains at P_1 = minimum LAC_M^F; then the minimum wage shifts the firm's *LAC* curve to MFC_L^* –

[11] My analysis suggests that the perception of paying rent (monopsony power) yields lower average cost and a smaller optimum size of the firm as perceived by its managers. Then, when the binding minimum wage is imposed and intramarginal rent becomes a fixed cost, the perception of rent is suppressed in the relevant range and the perceived average cost and optimum size of the firm increase. In a free market, the perception of rent enables the monopsonist to achieve reduced cost by adjusting the employment of factors to economize on that rent. This is not, however, a reduction in the social opportunity cost of producing output because rent is an intrasocietal transfer rather than a measure of alternative production foregone. In Figure 2, the competitive *LAC* curve labeled P_C shows the minimum social average cost, implying that the monopsonist's private cost saving is achieved at the expense of a socially suboptimal allocation of resources. Specifically, the implication here is that the blend of monopsony and competition in my model yields socially excessive output by the industry (because perceived average cost and hence output price are suboptimally low), even though the output of each of the (excessively numerous) firms is suboptimally small. In this context, the minimum wage takes on the characteristics of a corrective tax.

[12] For a discussion of their findings relating to total industry employment, see Card and Krueger (1994, pp. 788–90).

[13] For a discussion of the relationship between key supply and demand elasticities and the effect of a minimum wage on industry employment, see Watson (1995, pp. 366–69).

LAC_M^F. With price unchanged temporarily at P_1, firms experience losses and some firms exit. Industry supply decreases from SS to $S'S'$, price rises to P_2, and the now larger surviving firms are able to break even with P_2 = minimum $MFC_L^* - LAC_M^F$.

As firms exit in the face of negative profits, the labor market (see Figure 1) becomes more (latently) monopsonistic. With fewer alternatives available, workers will be less likely to quit if an employer unilaterally reduces wages. The binding minimum wage constrains such reductions in the relevant range, however, so this additional monopsony power is latent rather than realized. Although not shown in Figure 1, the AFC_L and MFC_L curves of the remaining firms will shift to the right, thereby extending the relevant range for a given minimum wage, as workers displaced from exiting firms apply for work. At the same time, there is a tendency for the VMP_L curve to shift rightward as the price of output increases (on the other hand, any increased labor intensity of production will work to reduce the marginal productivity of labor, thereby restraining this rightward shift). Together these equilibrating developments—part of the process whereby labor is reallocated following imposition or increase of a binding minimum wage—will yield still greater labor intensity of production in the surviving firms.[14]

Card and Krueger apparently failed to see that the minimum wage necessarily increases *LAC*, otherwise it would have been clear to them that the increased output and lower output prices they anticipated from increased employment were not consistent with long run equilibrium in the competitive market for output.[15] Or they may have implicitly relied on the short run possibility that firms were initially realizing economic profits that could be dissipated without triggering exit as costs rose and prices fell. However that may be, we have shown that in terms of long run equilibrium analysis the alternative to the competitive model mentioned by CK is completely consistent with the observations that a binding minimum wage increases the labor intensity of production, employment by the firm, and (perhaps) employment by the industry, while increasing LAC for any given output, reducing industry output and increasing output price.[16]

References

Bhaskar, V., and Ted To. 1999. Minimum wages for Ronald McDonald monopsonies: A theory of monopsonistic competition. *Economic Journal* 109:190–203.

Buchanan, James M., and Merton H. Miller. 1996. Minimum wage addendum. *The Wall Street Journal*, 25 April, p. A20.

Card, David, and Alan B. Krueger. 1994. Minimum wages and employment: A case study of the fast-food industry in New Jersey and Pennsylvania. *American Economic Review* 84:772–93.

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[14] Bhaskar and To (1999) assess the welfare implications of the changes wrought by a binding minimum wage by considering its possible effects on producer and consumer surpluses. In general, it may be noted that if monopsony in one or more factor markets prevents the achievement of Pareto optimality, the minimum wage, as an additional distortion, can yield improved, worsened, or neutral welfare results. It is also worth noting here that the logic of monopsony profit maximization reveals that labor (or any other specific input) may, from the standpoint of social welfare, be overemployed rather than underemployed by monopsonists—it all depends on the comparative elasticities of factor supplies and the monopsony deviation from competitive output (e.g., Shepherd 1971).

[15] Bhaskar and To (1999) also fail to consider that LAC must increase, causing long run equilibrium output to fall and output prices to increase. This is evidently due to the centrality of fixed costs in their model, which makes their analysis inherently short run, even though they discuss the otherwise long run adjustment of exit from the industry following imposition of a minimum wage.

[16] For an interesting series of papers dealing—some more successfully than others—with several of the analytical issues discussed above, see Falero (1966), Gray and Morrill (1968), and Gramm and Ekelund, Jr. (1968a, b).

Falero, Frank, Jr. 1966. A note on monopsony, minimum wages and employment. *American Economist* 10:39–42.

Gramm, William P., and Robert B. Ekelund, Jr. 1968a. Monopsony, minimum wages and employment: A reconsideration. *American Economist* 12:52–4.

Gramm, William P., and Robert B. Ekelund, Jr. 1968b. Monopsony in a muddle. *American Economist* 12:79–80.

Gray, Ralph, and John E. Morrill. 1968. A note on monopsony, minimum wages and employment; extended. *American Economist* 12:55–64.

Maurice, S. Charles. 1974. Mosopsony and the effects of an externally imposed minimum wage. *Southern Economic Journal* 41:283–7.

Poole, William, Milton Friedman, Finis Welch, et al. 1996. Minimum wages vs. supply and demand. *The Wall Street Journal*, 24 April, p. A14.

Ramenofsky, Samuel D., and A. Ross Shepherd. 1979. A note concerning a basic inconsistency between the theory of production and the theory of costs. *American Economist* 23:55–8.

Shepherd, A. Ross. 1971. Output of the restrained firm: Comment. *American Economic Review* 61:237–9.

Watson, John K. 1995. Monopsony and the properly devised minimum wage: A reexamination. *Rivista internazionale di scienze economiche e commerciale* 42:357–70.