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On the Economics of Compliance with the Minimum Wage Law

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This paper reexamines the issues of compliance with and enforcement of the minimum wage law recently addressed in this *Journal* by Ashenfelter and Smith and by Grenier. Pursuing a more rigorous methodology we are able to add new general conclusions, and correct and reconcile some previous conflicting conclusions concerning the role of the disparity between the minimum and free market wages, the level and elasticity of labor demand, and the magnitude of deterring monetary sanctions on the noncompliance decision. Our formulation also addresses the law evasion (reduced wages) as well as the law avoidance (modified employment) aspects of the noncompliance decision, which previous formulations have ignored.

Recent articles in this *Journal* have dealt with the issues of compliance with and enforcement of the minimum wage provisions of the Fair Labor Standards Act (FLSA). Ashenfelter and Smith (1979; henceforth AS), analyzing the determinants of noncompliance behavior by firms, concluded that "the incentive to comply is lower: (*a*) the lower is the market wage below the minimum wage, and (*b*) the larger is the elasticity of demand for labor (in absolute value)" (p. 336). In a comment on AS, Grenier (1982; henceforth G) treated the prospective penalty for noncompliance as a function of the difference between

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the statutory minimum and the free market wage, unlike AS, who had treated it as a fixed sanction, and he concluded that "the incentive to comply is lower: (*a*) the closer is the minimum wage to the market wage, and (*b*) the smaller is the elasticity of demand for labor" (G, p. 186). G observed that "this result is totally contrary to the result obtained by AS," and he ascribed the discrepancy between the two analyses to the alternative penalty structures assumed. Also, contrary to AS's analysis concerning an efficient enforcement mechanism, G suggested that "the requirement that a noncomplying employer pay a fraction of the difference between the two wages to his employees constitutes a real penalty" (G, p. 184) and that consequently his analysis provided a rationale for observed enforcement practices.

In this article we show that both AS's and G's analyses are only partially correct. We propose the following: (1) A sanction based on the requirement that a noncomplying firm pay a fraction of the difference between the statutory minimum and the market wage cannot constitute an effective deterrent on profit-maximizing firms. (2) If positive, the incentive for compliance is lower the lower the market wage below the minimum, regardless of the penalty structure. (3) For a given reduction in the market wage below the statutory minimum, the incentive for noncompliance is stronger (*a*) the larger the quantity of labor demanded and (*b*) the lower the market wage itself; furthermore, (*c*) the *increase* in the incentive for noncompliance due to a lower market wage is greater the higher (in absolute value) the elasticity of demand for labor. These propositions modify some erroneous inferences in both AS's and G's papers, which are due to a basic methodological shortcoming in their analyses. Our formulation is also more general in that it addresses the "law evasion" aspect (the effect on wages paid) as well as the "law avoidance" aspect (the effect on labor employment) of the noncompliance decision, which the previous formulations have ignored.

I. The Economics of Compliance

Our model adopts the simple 1-period optimization framework for an expected-profit-maximizing firm also used by AS and G. We assume that at the start of the representative period the firm is faced with the choice of paying either the statutory minimum wage M or the "free market" wage w. The capital market and the firm's product market are in competitive equilibrium with rental price of capital r and product price p. If the firm chooses to comply with the law, its maximized profits would be given by the indirect profit function $\pi(M, r, p)$. Similarly, if the firm could pay the free market wage without any risk of being detected, its indirect profit function would be $\pi(w, r, p)$. Since the profit function is nonincreasing in wages and, by definition, $M > w$, we have $\pi(w, r, p) - \pi(M, r, p) > 0$ as long as labor employment, $L(w, r, p)$, is positive.

The prospective decline in profits given compliance with the minimum wage law generates an intrinsic incentive for noncompliance. Under effective enforcement of the law, however, evasion of the law is punishable by a legal sanction. Assume that with probability λ of being detected and convicted the firm is required to pay back for each unit of labor a positive multiple $k > 0$ of the difference between the legal minimum wage and the market wage; that is, the actual fine is $F = k(M - w)L$. The expected profit of a noncomplying firm to be maximized is then given by

$$\begin{aligned} E(\pi) &= (1 - \lambda)[pf(L, K) - wL - rK] + \lambda[pf(L, K) - wL \\ &\quad - rK - k(M - w)L] \\ &= pf(L, K) - [w + \lambda k(M - w)]L - rK, \end{aligned} \tag{1}$$

and the indirect (expected) profit function becomes

$$\pi[w + \lambda k(M - w), r, p] \equiv \pi[E(w), r, p], \tag{2}$$

where $E(w) \equiv w + \lambda k(M - w)$ represents the expected wage rate in the case of noncompliance. Equation (2) recognizes implicitly the dependence of the violating firm's labor demand on the prospective legal sanction for noncompliance $L = L[E(w), r, p]$, which, by raising the marginal cost of labor, acts as a "deterrent" to labor employment. This formulation of the problem accounts for the wage evasion as well as the employment avoidance implication of the noncompliance decision by the firm, which both AS's and G's formulations generally ignore.

Under profit-maximizing behavior the incentive for noncompliance can be measured by the magnitude of the excess profit from noncompliance:

$$V = \pi[E(w), r, p] - \pi(M, r, p). \tag{3}$$

In the absence of any additional costs or benefits to employers from noncompliance, the decision whether to comply with the law would depend strictly on the sign of V. If firms incur, however, some additional "fixed" costs (D) beyond the prescribed legal sanctions in the form of loss of federal contracts or public "good will," and if these costs vary in magnitude across firms, the actual frequency of violations of the FLSA law would be a monotonically increasing function of the excess profit from noncompliance. This analysis leads to the following propositions:

PROPOSITION 1: (*a*) A minimum wage enforcement policy requiring the violating firm to pay only a fraction of the difference between the statutory minimum and the market wage per unit labor will not constitute an effective deterrent. (*b*) The incentive for noncompliance would be eliminated, in contrast, if the penalty rate, k, were determined at a level sufficiently high to make the expected wage rate for the violating firm higher than the minimum wage. (*c*) Regardless of the structure of the legal sanction imposed, whether fixed or proportional to $L(M - w)$, the incentive for noncompliance, if positive, will be greater the lower is the market wage below the statutory minimum.

The proof of this proposition follows from the well-known property of the profit function, which is decreasing in wages as long as employment is positive. Clearly, if $k \leqslant 1$, then $\lambda k \leqslant 1$ as well, since $0 \leqslant \lambda \leqslant 1$. Thus, $E(w) \equiv w + \lambda k(M - w) \leqslant M$, and $V = \pi[E(w), r, p] - \pi(M, r, p) \geqslant 0$, which proves proposition 1*a*. A fortiori, if the penalty rate were set at a critical level above unity $k > 1/\lambda$, $E(w)$ would exceed M and V would become negative, in which case the incentive for noncompliance would be entirely eliminated. This proves proposition 1*b*. And the proof of proposition 1*c* follows from the fact that if $V > 0$—that is, $E(w) < M$, or $(1 - \lambda k) > 0$—then

$$\frac{\partial V}{\partial w} = \frac{\partial \pi[E(w), r, p]}{\partial E(w)} \frac{\partial E(w)}{\partial w} = -L[E(w), r, p](1 - \lambda k) < 0, \quad (4)$$

since by Hotelling's lemma $\partial \pi[E(w), r, p]/\partial E(w) = -L[E(w), r, p]$. As long as $(1 - \lambda k) > 0$, therefore, a reduction in the free market wage below the statutory minimum will increase the incentive for noncompliance.[1] And the same result would follow if the penalty structure for noncompliance includes a fixed cost, D, or consists only of such cost.

PROPOSITION 2: For a given reduction in the free market wage rate below the statutory minimum, the incentive for noncompliance is stronger (*a*) the larger the quantity of labor demanded at the effective (expected) wage rate and (*b*) the lower the market wage itself; in addition (*c*) the *increase* in the incentive for noncompliance due to a

[1] It is interesting to note that unlike a reduction in w, an increase in M does not necessarily raise the incentive for noncompliance since

$$\frac{\partial V}{\partial M} = \frac{\partial \pi[E(w), r, p]}{\partial E(w)} \lambda k - \frac{\partial \pi(M, r, p)}{\partial M} = L(M, r, p) - \lambda k L[E(w), r, p],$$

where, by Hotelling's lemma, L denotes the quantity demanded of labor at the alternative wage levels. Note that $1 > L(M, r, p)/L[E(w), r, p] \geqslant E(w)/M > \lambda k$ if $\bar{e} \leqslant 1$, where $\bar{e}$ denotes the arc elasticity of demand for labor between $E(w)$ and M. Thus, a differentially higher minimum wage would unambiguously raise the incentive for noncompliance (i.e., $\partial V/\partial M > 0$) only if it did not lead to a reduction in the (optimal) wage bill of the firm upon compliance relative to noncompliance with the law.

lower free market wage is greater the higher (in absolute value) the relevant point elasticity of demand for labor.

The proof of proposition 2a follows immediately from equation (4) since

$$\frac{\partial}{\partial L}\left(\frac{\partial V}{\partial w}\right) = \frac{\partial}{\partial w}\left(\frac{\partial V}{\partial L}\right) = -(1 - \lambda k) < 0 \quad \text{if } (1 - \lambda k) > 0. \quad (5)$$

Proposition 2b similarly follows since

$$\begin{aligned}\frac{\partial^2 V}{\partial w^2} &= -\frac{\partial L[E(w), r, p]}{\partial E(w)}(1 - \lambda k)^2 \\ &= e[E(w), r, p] \cdot \frac{L[E(w), r, p]}{E(w)}(1 - \lambda k)^2 > 0,\end{aligned} \quad (6)$$

where

$$e \equiv \left\{\frac{\partial L[E(w), r, p]}{\partial E(w)} \cdot \frac{E(w)}{L[E(w), r, p]}\right\}.$$

And equation (6) implies, in turn, that

$$\frac{\partial}{\partial e}\left(\frac{\partial^2 V}{\partial w^2}\right) > 0, \quad (7)$$

which proves proposition 2c. The economic rationale behind proposition 2 is straightforward: for any given discrepancy between the free market wage and the minimum wage, the incentive for noncompliance (if positive) is greater the larger the quantity of labor demanded at the effective (expected) wage rate. And the more elastic the labor demand curve about the expected wage rate, the greater would be the increase in the incentive for noncompliance as the free market wage rate declines, since the increase in employment then would be greater.

Whence the difference between our propositions and those of AS and G? AS measure the monetary incentive for noncompliance, using our terminology, by the difference

$$V = (1 - \lambda)[\pi(w, r, p) - \pi(M, r, p)] - \lambda D, \quad (8)$$

where D denotes a "fixed" sanction level. They then proceed to rewrite equation (8) after taking a second-order Taylor expansion of the profit functions about (w, r, p). Such an expansion should have resulted in

$$V \cong (1 - \lambda)\left\{L(w, r, p)(M - w) - \left(\frac{L}{w}\right)[\tfrac{1}{2}(M - w)^2 e]\right\} - \lambda D, \quad \text{(8a)}$$

where $e \equiv -[\partial L(w, r, p)/\partial w][w/L(w, r, p)]$. Unfortunately, AS commit a computational error (they apparently confuse the algebraic and the absolute value of e) and reverse the sign of the second term on the right-hand side of equation (8a) (see their eq. [2] on p. 336). They then conclude that "the incentive to comply is lower . . . the larger is the elasticity of demand for labor (in absolute value)," and they go on to suggest that "firms . . . for which wage changes produce large employment adjustments have the greatest incentives to violate the law" (p. 336). Equation (8a), if valid, produces, however, just the converse inference since it implies that $\partial V/\partial e < 0$. The reader may also note that although AS conclude intuitively, and correctly, that the incentive for noncompliance is higher the lower is w relative to M, as our proposition 1c implies, this conclusion cannot be defended systematically from equation (8a), which indicates that the effect of a decrease in w on V is ambiguous.

Unlike AS, G assumes that the monetary punishment for noncompliance is imposed as the difference between M and w per unit of labor, which amounts to the requirement of a full back payment policy with no additional sanction ($k = 1$). His version of equation (8) is, then,

$$V = \pi(w, r, p) - \lambda L(w, r, p)(M - w) - \pi(M, r, p), \tag{9}$$

which he also rewrites using a second-order Taylor expansion about (w, r, p) as

$$V \simeq L(w, r, p)(M - w)\left[1 - \lambda - \tfrac{1}{2}e(w, r, p)\frac{M - w}{w}\right], \tag{9a}$$

with $e \equiv -(\partial L/\partial w)(w/L)$. From this equation (which is equivalent to eq. [6] in G's paper, p. 186), G concludes that "if faced with the choice of paying the market wage or the minimum wage, the firm will have more incentive to pay the minimum wage if the difference between the two wages is *high* [our italics]"—a result that is contradicted by our proposition 1c. And he also concludes that to be effective as a deterrent it is not necessary that the sanction for noncompliance with the minimum wage law involve a complete back payment of the difference $(M - w)$ per unit of labor, since, even if the proportion of the back pay k is less than unity, equation (9a) could have a negative sign provided that $(1 - \lambda) < \tfrac{1}{2}e(w, r, p)[(M - w)/w]$—a result that is inconsistent with our proposition 1a as well as with AS's analysis (see p. 337 of their paper).

The erroneous conclusions in G's paper stem from two basic methodological shortcomings that are also implicit in AS's formulation: First, both formulations ignore the "employment effect" of the noncompliance decision due to the expected fine, which raises the effective marginal cost of labor services. Put differently, equations (8) and (9) do not rely on the relevant (optimized) profit function of the noncomplying firm, which is introduced in equation (2) of this paper. Second, both formulations attempt to derive inferences about the influence of the minimum wage level and structure of the legal penalty on noncompliance, as specified in equations (8a) and (9a) above. The problem with these approximations, however, is that they are valid only for quadratic profit functions (i.e., linear demand curves for labor) and for small increments in the minimum wage M above the market wage w. Applying them to significant discrepancies between M and w can easily lead to erroneous inferences, as the following illustration indicates: Let the probability of being detected and punished for noncompliance, λ, be zero. Then by the theorem that the profit function is decreasing in the wage rate, we must have $V = \pi(w, r, p) - \pi(M, r, p) > 0$. However, in G's analysis equation (9a) becomes in this case $V \simeq L(w, r, p)(M - w)\{1 - \frac{1}{2}e(w, r, p)[(M - w)/w]\}$, which implies that the firm's incentive for noncompliance would disappear once w fell below M to a level where $(M - w)/w > 2/e$, a totally false inference.

Furthermore, the conclusion that ceteris paribus (given w, M, λ, and k) the incentive for noncompliance is higher the *lower* the elasticity of labor demand, which follows from equations (8a) and (9a) regardless of whether the monetary sanction is fixed or proportional to the difference $L(M - w)$,[2] is valid only for linear demand curves and for small increments in M or $E(w)$ above w.[3]

Thus, the only generally valid inferences regarding the role of market wages and the demand for labor services as determinants of noncompliance with the minimum wage law are those summarized in our propositions 1 and 2.

II. Some Lessons for Efficient Enforcement Policies

To the extent that minimum wage enforcement policies are designed to minimize the aggregate social cost of violations of this law, with the latter assumed to be a monotonically increasing and convex function of the frequency of violations, then an efficient enforcement agency,

[2] Grenier (p. 186) attributes the difference between his and AS's conclusions regarding the role of the elasticity of demand for labor to the different penalty structures assumed.

[3] By taking a second-order Taylor approximation of eq. (3) in our paper about (w, r, p), we obtain a similar inference. Note that our proposition 2*c* shows that the differentially greater incentive for noncompliance generated by a more elastic demand for labor, given a decline in the market wage, is due to the interaction between the elasticity and the market wage level effects (see our eq. [7]) rather than the independent effect of e.

by our analysis, should allocate a higher share of the overall enforcement budget to law enforcement activities (site inspections, prosecutions, and trials) in industries and regions where the demand for labor earning subminimum wages is high and the average wage earned by low-paid workers is substantially lower than the statutory minimum wage imposed. This analysis may indeed explain why the U.S. government allocates almost half of its inspection efforts to the low-wage southern regions (see AS, p. 338), where the wage bill impact of higher minimum wages is the largest (see, e.g., U.S. Department of Labor 1974, p. 41; 1975, pp. 37–38). Our analysis also suggests, however, that to be efficacious, an enforcement policy cannot rely on a penalty scheme that requires employers to pay back merely a fraction of the difference between the minimum and the market wage per unit labor. If actual enforcement practices in fact relied on such a "penalty" scheme, as Grenier and Smith seem to claim (see G, p. 185, n. 1), then systematic variations in the (true) incidence of noncompliance across firms or regions would be essentially unrelated to direct enforcement efforts and could be explained, perhaps, largely as a result of indirect potential losses from noncompliance, such as those arising from losses of federal or state contracts or related governmental subsidies.

A related issue is the apparent reluctance of the federal minimum wage enforcement authority to impose high monetary fines on convicted firms, although this would have been a far more efficient means of inducing compliance than devoting considerable resources to assure a high probability of detecting and convicting violators.[4] This apparent "inefficiency" suggests that the actual minimum wage enforcement policy of the government cannot be understood solely in terms of the achievement of monetary efficiency in enforcement efforts (for a survey of alternative social welfare criteria, see Ehrlich [1982]).

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[4] The reason is that fines are essentially transfer payments and thus socially costless relative to the production of direct enforcement activities through resource-consuming policing and prosecutorial efforts. For a full analysis, see Becker (1968).