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Noncompliance and the effects of the minimum wage on hours and welfare in competitive labor markets

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ABSTRACT

This paper shows that increases in the minimum wage rate can have ambiguous effects on the working hours and welfare of employed workers in competitive labor markets. The reason is that employers may not comply with the minimum wage legislation and instead pay a lower subminimum wage rate. If workers are risk neutral, we prove that working hours and welfare are invariant to the minimum wage rate. If workers are risk averse and imprudent (which is the empirically likely case), then working hours decrease with the minimum wage rate, while their welfare may increase.

1. Introduction

The minimum wage rate is one of the cornerstones of protective labor legislation. Its purpose is to reduce income inequality by redistributing incomes toward the working poor, even if this is achieved at the cost of efficiency. However, the traditional view among economists is that the labor market for low-wage workers is reasonably competitive so that increases in the minimum wage rate have adverse consequences for some low-wage workers since employers' demand for labor falls. Ironically, then, the minimum wage legislation may end up harming many of those for whom it was intended to benefit.

There is persuasive empirical evidence that increases in the minimum wage rate reduce the *number of employed workers* in typical low-wage labor markets. For example, Neumark and Wascher (1992), Deere et al. (1995), and Burkhauser et al. (2000) find a negative relation between the minimum wage rate and the number of employed workers in low-pay jobs.[1] At the same time, there is conflicting empirical evidence about the effect of the minimum wage rate on *working hours* for the workers that remain employed. Thus, Neumark et al. (2004) find that working hours decrease with the minimum wage rate, while Zavodny (2000) finds that working hours increase with the minimum wage rate. Note, however, that the studies concerned with the number of employed workers have almost exclusively focused on teenagers, most of whom are only temporarily holding low-paying jobs. On the other hand, working-hour studies are, by their very nature, mostly concerned with adult breadwinners who are permanently attached to low-wage labor markets and whose well-being is likely to be greatly affected by changes in working hours. Thus, the policy objective of reducing income inequality is, arguably, more closely related to improving the earning prospects of low-pay adult workers whose income is the primary source of support for themselves and their dependents, rather than to reducing the job losses of teenagers who are often destined to be employed in high-paying jobs in the future. This paper therefore examines how the minimum wage rate affects the competitively determined working hours and welfare of the mainly adult workers who are permanently employed in low-wage labor markets, and, for simplicity, ignores changes in the number of employed workers.

The model in this paper explicitly incorporates that firms may not comply with the minimum wage legislation, which gives rise to a competitively determined endogenous subminimum wage rate that depends on the minimum wage rate.[2] This is important, because there is

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[1] However, Card and Krueger (1995) conclude that minimum wage increases may have either negligible or positive effects on employment, which they account for by suggesting that market imperfections may make employers behave monopsonistically. See Neumark and Wascher (2007) for a comprehensive survey of the recent empirical literature for the U.S. and many other countries.

[2] Previous theoretical models of noncompliance in Ashenfelter and Smith (1979), Grenier (1982), Chang and Ehrlich (1985), and Yaniv (2001) take the subminimum wage rate as exogenous and ignore that workers may adjust their labor supply in response to the uncertainty arising from not knowing whether a noncomplying firm will be caught. Yaniv (2004) allows for an endogenous subminimum wage rate in a model with risk-neutral workers, and asserts (without proof) that noncompliance has an ambiguous effect on employment and makes workers worse off. However, these conclusions are incorrect as will be shown below. Basu et al. (forthcoming) analyze a model in which both the subminimum wage rate and the enforcement intensity are endogenous. Danziger (forthcoming) shows that if the subminimum wage rate is endogenous and the working hours are fixed, then the minimum wage rate turns small firms into endogenous monopsonists. See Card and Krueger (1995), Strobl and Walsh (2003), and Gindling and Terrell (2009) for empirical evidence about the relationship between the minimum and subminimum wage rates.

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ample evidence that noncompliance with the minimum wage legislation is rampant. Thus, Ashenfelter and Smith (1979) estimate from the 1975 Current Population Survey that the overall compliance rate is only 60%, and for males aged 17–19 a mere 35%. More recently, Weil (2005) used the year-2000 Department of Labor survey of the apparel industry in the Los Angeles area to show that only 46% of the employers comply with the statutory minimum wage rate and that 27% of the workers are paid less than the minimum wage rate. Finally, Cortes (2005), based on the 1997 and 1998 Current Population Surveys, estimates that the compliance rate is only 28% for native males and 20% for immigrant males.

The reason for the low rate of compliance with the minimum wage legislation seems to be that enforcement is generally quite lax. First, the probability that a noncomplying firm will be caught is small. In fact, the annual likelihood that a firm will even be inspected by the Wage and Hour Division of the Department of Labor is less than 10% (Weil, 2005). Second, the penalty for a noncomplying firm that is caught is minimal. Indeed, it typically consists of no more than having to pay workers back wages equalling the difference between the minimum wage rate and the subminimum wage rate already paid, and no government fine is imposed (Ashenfelter and Smith, 1979). Even if the firm is subject to additional penalties, it can still expect to gain from noncompliance as long as the expected wage rate (defined as the subminimum wage rate plus the probability that the firm is caught times the penalties the firm is then obliged to pay) is less than the minimum wage rate. Accordingly, the minimum wage legislation has a built-in incentive for noncompliance. By paying only the illegal subminimum wage rate, a firm takes a calculated gamble with a positive expected payoff.[3]

The paper provides a comprehensive analysis of the equilibrium effects of the minimum wage rate on working hours and welfare in an otherwise competitive labor market. The endogeneity of the subminimum wage rate plays a crucial role in the analysis. If workers are risk neutral, an increase in the minimum wage rate causes the subminimum wage rate to decrease to the extent needed to leave the expected wage rate unaffected. The working hours in the competitive equilibrium are, therefore, unchanged, and the introduction of a minimum wage rate and increases in its size have no welfare effects. In the empirically more relevant case that workers are income risk averse, the effects of the minimum wage rate depend on the workers' relative prudence. In particular, if workers are imprudent (as appears likely), an increase in the minimum wage rate reduces the subminimum wage rate by less than required to keep the expected wage rate unchanged. The higher expected wage rate means that the increase in the minimum wage rate reduces working hours, may increase the workers' welfare, and reduces expected profits. On the other hand, if workers are prudent (which appears unlikely), an increase in the minimum wage rate reduces the subminimum wage rate so much that the expected wage rate decreases. This leads to increased working hours, a reduction in workers' welfare, and increased expected profits.[4]

2. The model

Consider a labor market with a unit continuum of homogeneous workers and a unit continuum of homogeneous employers. A worker's utility is given by $u(y)-v(h)$, $u'(y)>0$ and $v'(h)>0$, where y denotes the worker's income from work and h denotes the time spent working. For a given wage rate $w>0$, a worker's labor income is $y=wh$, and the corresponding utility is $u(wh)-v(h)$. A worker chooses how much to work in order to maximize his utility. This implies that a worker's labor supply is a function $h(w)$ of the wage rate, and, assuming an internal solution, is determined by $wu'(y)-v'(h)=0$. It is also assumed that $u'(y)+yu''(y)>0$, so that the labor supply increases with the wage rate.[5] A positive effect of a minimum wage rate on working hours cannot then be attributed to the labor supply being a backward-bending function of the wage rate.

Each employer's production is given by $f(\ell)$, $f'>0$ and $f''<0$, where ℓ denotes labor input. Normalizing the price of output to one, an employer's profit is $f(\ell)-w\ell$. An employer chooses the labor input in order to maximize profit. The demand for labor can therefore be written as a function $\ell(w)$ of the wage rate, and, assuming an internal solution, is determined by $f'(\ell)-w=0$. Since $f''<0$, the demand for labor decreases with the wage rate.

The labor market is competitive, and the equilibrium wage rate with no minimum wage legislation is denoted by w_c. Since the measures of workers and employers are equal, w_c is obtained by solving $h(w_c)=\ell(w_c)$.

Suppose that a minimum wage legislation is enacted with a statutory minimum wage rate m that exceeds w_c. However, employers may choose to violate the law by paying only the lower subminimum wage rate w_1. This subminimum wage rate equalizes supply and demand for labor in the competitive labor market that internalizes that noncomplying employers will sometimes be detected and penalized.

The probability that a noncomplying employer will be detected is $\phi\in(0,1)$. If detected, the employer must retroactively compensate workers with a backpay which, including awards, is proportional to the gap between the minimum wage rate and the subminimum wage rate that was actually paid. Stated formally, the backpay is $\beta(m-w_1)$, where $\beta\geq 1$ is the constant penalty rate. Thus, the subminimum wage rate augmented by the backpay is $w_2\equiv w_1+\beta(m-w_1)$. Taking this into account, the expected wage rate is $w^*\equiv(1-\phi)w_1+\phi w_2=w_1+\phi\beta(m-w_1)$. It is assumed that the expected backpay is less than the underpayment, $\phi\beta<1$, which is what provides employers with the incentive to violate the minimum wage legislation. It is also assumed that $w^*>\phi\beta m$, so that $w_1>0$.

Employers are risk neutral and choose to pay less than the mandated minimum wage rate in order to maximize their expected profit $f(\ell)-w^*\ell$. Hence, the labor demand is determined solely by the expected wage rate and therefore depends on the minimum wage rate only to the extent that the latter affects the expected wage rate. Similarly, the labor demand does not directly depend on the subminimum wage rate, the penalty rate, or the probability of detection. In other words, the employers' demand for labor is the same as if w^* was a certain wage rate. The demand is therefore given by $\ell(w^*)$.

3. Risk-neutral workers

In this section we assume that workers are income risk neutral, i.e., $u''(y)=0$. A worker is then only concerned with the expected wage rate and not with the extent to which it is uncertain. His utility can be

[3] Workers who are underpaid only rarely complain to the Wage and Hour Division of the Department of Labor, presumably out of fear that they will be marked as trouble makers and that the employer will retaliate by dismissing the complainants. Note that the employer cannot be sued for back wages unless the workers are willing to testify in open court, and that many of the underpaid workers are illegal immigrants.

[4] In contrast, if the subminimum wage rate was fixed exogenously, the qualitative results would be the same as with full compliance with the minimum wage rate: an increase in the minimum wage rate would always increase in the expected wage rate, and hence always decrease working hours which must be rationed. The effect on workers' welfare would depend on their risk preferences, while expected profits would always decrease.

[5] Differentiating $wu'(y)-v'(h)=0$ with respect to w yields

$$\frac{dh(w)}{dw} = -\frac{d[wu'(y)-v'(h)]/dw}{d[wu'(y)-v'(h)]/dh} = -\frac{u'(y)+yu''(y)}{w^2u''(y)-v''(h)},$$

which is positive since $w^2u''(y)-v''(h)<0$ from the second-order condition for a maximum. The assumption implies that a worker's relative risk aversion is less than one.