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ABSTRACT

Getting It Right: Employment Subsidy or Minimum Wage?*

In monopsony models of the labour market either a minimum wage or an employment subsidy financed by a lump sum tax on profits can achieve the efficient level of employment and output. Incorporating working conditions into a monopsony model where higher wages raise firm labour supply, but less attractive working conditions reduce it, changes these policy implications. Specifically, a minimum wage policy could, in contrast to an employment subsidy, cause working conditions to deteriorate and welfare to fall. Empirical evidence from the Republic of Trinidad and Tobago shows that a minimum wage may indeed cause working conditions to worsen.

JEL Classification: J2, J3

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I. Introduction

There has been a large literature estimating the employment effects of minimum wages in recent years. While there is still no consensus on the issue (see for example Neumark and Wascher (2000) and Card and Krueger (2000)) many of the studies that find insignificant or small positive employment effects appeal to monopsony models as a rationale for their results (Card and Krueger (1995), Dickens et. al (1999), Dickens et. al 1995). Such monopsony models where minimum wages may increase employment can be rationalised in labour markets by appealing to labour market frictions; see, for example, Burdett and Mortensen (1998) for a search model where the firms labour supply curve slopes upwards, Bhaskar and To (1999) for a model of monopsonistic competition and Manning (1995) or Rebitzer and Taylor for efficiency wage models where minimum wages can increase employment.

While the monopsony model can certainly rationalise the small or positive employment effects found in some of the empirical minimum wage studies listed above, in this paper we argue that even if a monopsony model is the appropriate model for the labour market, then minimum wages may not be the most effective policy tool to deal with the distortion resulting from monopsony power. Specifically, we show that in a more general and realistic employment contract where not only a wage but also a set of working conditions is specified an employment subsidy is a more effective way of improving welfare than minimum wages, unless the regulator can choose and enforce the appropriate regulated level for wages and all working conditions. This arises because an employment subsidy does not distort the firm's choice between the wage and working conditions, but does lead the firm to choose the optimal level of employment. A subsidy (the size of which depends only on the slope of the labour supply curve) will lead to the efficient outcome. In other words, small or positive employment effects from minimum wages may be consistent with a monopsony model but that does not imply that the minimum wage is the best method for dealing with the distortion created by monopsony power.

The theoretical literature on working conditions and minimum wages has produced mixed results. Brown (1999) argues in a simple competitive model where efficiency units of labour is the product of employees times effort (working conditions), that the negative employment effects of minimum wages would be larger than in a model with fixed working conditions if labour demand is inelastic. Accordingly, larger negative employment effects can occur because firms substitute from workers to higher effort in response to a minimum wage. De Fraja (1999) develops a model with a distribution of workers with different disutilities of effort, where a minimum wage just above the market level has negligible employment effects. In this model each worker has diminishing marginal productivity from exerting effort, but the productivity of each worker is not diminishing. This assumption may limit the degree to which firms will substitute between effort and workers. Naylor (2002) page 1 models a monopsonistic firm with a representative worker and concludes that "neither a minimum wage or maximum hours regulation –each on its own is likely to be of benefit to workers: only when they are combined are they likely to raise the welfare of the low paid working long hours." In this paper we reach a similar conclusion but argue further that a subsidy is a more desirable policy, especially since working conditions may include many factors which would be difficult to regulate.

Of course, working conditions are in general difficult to measure and there is little direct evidence of working conditions changing in response to minimum wage changes (see Brown, 1999, for a survey). Examples of potentially affected working conditions include the amount of time workers devote to health and safety standards, how hard they are expected to work or whether they work their desired type of hours. Even apart from measurement issues, the lack of evidence on changes in working conditions may arise because the technology or workers' preferences are such that it is difficult to substitute between working conditions and the number of workers, in which case working conditions would vary little and the theoretical arguments outlined below would not be important. We thus also provide empirical evidence using the case study of the islands of Trinidad and Tobago that the implementation of a minimum wage can lead to the deterioration in working conditions measured as the incidence of involuntary part-time employment. The incidence of involuntary part-time employment acts as a proxy for one important dimension of working conditions: namely, whether the worker is working the desired number of hours. If workers move from a situation where they can choose the number of hours worked optimally, to one where they wish to work longer hours but are in fact working shorter hours, one can argue that this is one type of deterioration in working conditions. Moreover it seems reasonable to suspect that other, unmeasured, working conditions are likely to fall with the reduction in hours, for example, since moving from full-time to part-time employment is often associated with a deterioration in working conditions.

The paper is organized as follows. In the following section we present our partial equilibrium model and analyse the effects of an employment subsidy and a minimum wage. In Section III we provide evidence, using the case study of Trinidad and Tobago, that a minimum wage can indeed cause working conditions to deteriorate. Concluding remarks are provided in the final section.

II. A Partial Equilibrium Monopsony Model

General framework

Each potential worker has a utility function:

$$util_i = u(x, w) \qquad \text{(II.1)}$$

Where $u_x < 0$, $u_{xx} > 0$, $u_w > 0$ and $u_{ww} \leq 0$. Unemployed workers get some reservation level of utility $\bar{u}$ + d_i. Each worker i has an individual characteristic d_i, where different values for d_i are the basis for the firm's upward sloping labour supply curve. In a traditional model of monopsony where firms have power in the local labour market, one can think of d_i as representing different reservation wages amongst potential workers. In models where labour market frictions are the source of monopsony power d_i might represent distance to work or preference for a particular employer as in the example model outlined later. Alternatively it might represent the fact that workers have different information or search costs. A firm which wishes to attract more workers must offer a (w,x) bundle that has higher utility. Firms cannot discriminate across workers at this stage. Firms who are price takers for output have the following profit function[1], which is used to choose the optimal wage and working condition combination. This combination will determine the number of workers any firm i attracts given the wage/working condition combinations offered by other firms:

$$\Pi = PF(L_i[w,x]x) - (w+q)L[w,x] - C \tag{II.2}$$

The wage and working conditions are w and x, respectively, where $L_w > 0$, $L_{ww} \leq 0$, $L_x < 0$ and $L_{xx} < 0$. The product of working conditions (x) and employment (L) is the number of efficiency units of labour (N). P is the output price, which is assumed to be constant. There is a per unit tax (subsidy) of q per worker and C represents fixed costs. We assume that the firm's labour supply curve is separable in wages and working conditions.

The first order condition for x implies:

$$PF_N(w,x)[L(w,x) + L_x(w,x)x] = (w+q)L_x(w,x) \tag{II.3}$$

The first order condition for w implies

$$PF_N(w,x)L_w(w,x)x = L + (w+q)L_w(w,x) \tag{II.4}$$

Together the first order conditions imply:

$$PF_N(w,x) = \frac{-L_x}{L_w} \tag{II.5}$$

Equation (I.5) is important in that it illustrates that once a firm has decided how many workers to hire, it will choose the socially optimal combination of w and x for that level of employment. Since labour supply depends on utility which in turn depends on the (w,x) combination the right hand side of (II.5) is just the marginal rate of substitution

[1] The model can be modified to analyse working conditions that do not affect productivity but are costly to improve for the employer with similar results.

between w and x for the marginal worker at the fixed level of employment or the amount of w it would take to compensate for a small increase in x. The left hand side is the marginal benefit of an increase in x divided by the number of workers. The monopsony distortion comes from the firm not hiring enough workers. This is reflected in the fact that the marginal benefit of the last worker exceeds the wage needed to attract the last worker given working conditions ($PF_N x > w$. It is straightforward to show that if $q = -\frac{L^*}{L_w^*}$ (where * denotes the value at the socially optimal outcome) then the first order conditions will satisfy $PF_N x = w$. Equation (II.5) will continue to hold, but employment will be expanded until the wage equals the value of marginal product of the last worker which is the socially efficient outcome. If the first order conditions are satisfied a sufficient condition for the second order conditions, which are derived in the Appendix 1, being satisfied is $q \leq 0$.

The rationale for using a subsidy to overcome the monopsony distortion is the same as in a standard monopsony model with fixed working conditions. The distortion in the model comes from the necessity to offer contracts with higher utility to attract additional workers. A subsidy on employees equal to the difference between the marginal cost of the last worker at the optimal combination of employment and working conditions and the wage at the optimal combination, will overcome this distortion.

The Cost of the Optimal Subsidy

We label the level of profit a firm would make if it chooses the optimal combination of working conditions and employment the normal profit level, and the excess of profits over this amount as monopsony profits. It is easy to see that if the optimal subsidy is financed by a lump sum tax on profits then the firm will be left at the normal profit level. If the firm chooses the optimal outcome (in the absence of a subsidy) profits will be:

$$p^{N} = PF(x^{*}L^{*}) - w^{*}L^{*} \tag{II.6}$$

The optimal wage means a wage just high enough to secure the optimal number of workers at the optimal level of working conditions. Since at the optimal subsidy q the firm chooses this optimal combination the firm's profit with the subsidy is:

$$p^{S} = p^{N} + qL^{*} \tag{II.7}$$

This shows that a lump sum tax of qL^{*} on profits would raise enough revenue to finance the subsidy and leave the firm with normal profits.

Minimum wages, working conditions and employment with pure monopsony

We shall assume that the firm is in equilibrium choosing working conditions and wages freely and satisfying equations (II.3) and (II.4). If a minimum wage just above that chosen by the firm is imposed we totally differentiate (II.3) to calculate the impact on working conditions (see Manning (1995) for a similar exercise in an efficiency wage model)[2]:

$$\frac{dx}{dw} = -\frac{p_{xw}}{p_{xx}} > 0 \tag{II.8}$$

[2] One of Manning's examples is the Solow model, which is the same as the model above except with no monopsony power so the firms' labour supply curve is horizontal at any given wage effort combination. The elasticity of employment with respect to the minimum wage is $\frac{dL}{dw}\frac{w}{L} = -1$. See Brown (1999, p.2110) for a similar example. If labour demand is inelastic then incorporating working conditions into the model will accentuate the negative employment effects.

It is clear from Appendix 1 that (II.8) is positive when the first order conditions hold. The impact on employment L(w,x[w]) of a minimum wage would be

$$\frac{dL}{dw} = L_w + L_x \frac{dx}{dw} \qquad \text{(II.9)}$$

In Appendix 1 (b) we show that if the following condition is met then the employment effect of a minimum wage will be negative:

$$-\frac{L_{xx}\dfrac{x}{L_x}}{F_{NN}\dfrac{N}{F_N}} > L_w \frac{w}{L} \qquad \text{(II.10)}$$

(II.10) implies that if the ratio of the elasticity of the change in labour supply from a change in working conditions relative to the elasticity of the marginal revenue of efficiency units with respect to efficiency units exceeds the labour supply elasticity, the employment effects of the minimum wage will be negative. One can also see from II.8 that working conditions, which were already below the optimal level, will deteriorate further as a result of the minimum wage, while the impact on employment is ambiguous. It is difficult to provide a strong argument that II.10 will be either positive or negative. Using minimum wages to regulate labour market outcomes in this model is very much a shot in the dark. While the number of workers may rise or fall in response to the minimum wage, one can show that there will be an unambiguous rise in efficiency units of labour . The change in efficincy unit s from a minimum wage is:

$$\frac{d(Lx)}{dw} = L_w x + [L_x X + L]\frac{dx}{dw} \qquad \text{(II.11)}$$

The term in square brackets on the right hand side is negative from the first order conditions. It follows that efficiency units of labour will unambiguously rise in response to a minimum wage.

A Minimum Level of Working Conditions, Wages and Employment with Pure Monopsony

Given that the first order conditions hold, if a maximum level of working conditions below the equilibrium level were imposed by totally differentiating (II.4) one can then show that the optimal wage would fall in response and employment could increase:

$$-\frac{dw}{dx} = \frac{p_{xw}}{p_{ww}} < 0 \tag{II.12}$$

The impact on employment would be

$$-\frac{dL}{dx} = -L_x - L_w \frac{dw}{dx} \tag{II.13}$$

It is shown in Appendix 1 (c) that if the following condition is met then a minimum standard of working conditions increases employment:

$$L_w \frac{w}{L} > \frac{L_{ww} \dfrac{w}{L_w}}{PF_{NN} \dfrac{N}{F_N}} \tag{II.14}$$

If the labour supply elasticity is greater than the ratio of the elasticity of L_w with respect to w over the elasticity of the marginal revenue of efficiency units with respect to efficiency units employment will increase. For example, if there were a linear labour supply curve (L_{ww} =0) then a restriction on working conditions will increase employment. Once again it is difficult to get a clear picture of the employment and welfare consequences of this policy. Working conditions move closer to the optimal level but employment may rise or fall.

A Simple Example

In this short section we derive the labour supply curve in a very simple example. A mass of m workers with the following utility function is uniformly distributed along a unit interval:

$$U = w - x^2 \tag{II.15}$$

A firm, which is a price taker on the output market lies at one end of the interval. Workers face a transport cost td if they travel to the firm where d is distance and t is the marginal transport costs. Transport costs could be thought of as firm specific preferences as in Bhaskar and To (1999) or some other labour market friction. The firm will have the following labour supply curve:

$$L = m(\frac{w - x^2}{t}) \tag{II.16}$$

Equation II.10 in this case becomes:

$$\frac{x^2}{w} - 1 > F_{NN}\frac{N}{F_N} \tag{II.17}$$

One should note that if labour supply is positive this condition will not hold with a constant marginal product of efficiency units, also it is also more likely to hold the more concave the production function. Solving analytically we set m and t equal to unity for simplicity. The change in employment from a change in the minimum wage (evaluated at the unconstrained equilibrium is 0.111 if the production function is $F(N) = N$. If the production function is $F(N) = \ln(N)$ the employment effect is -0.111. In both cases the second order conditions are satisfied and the outcomes are economically plausible (positive wages, working conditions, labour supply and profit). The output price must lie above a threshold level in the second case for profits to be positive. This crude example demonstrates for a simple textbook monopsony model that when working conditions are incorporated into the model the employment effects of minimum wages can be reversed, by changing the production function in a simple way.

Welfare Analysis of a Minimum Wage or Restricted Working Conditions Level with Pure Monopsony

A cost minimising firm will hire the cheapest workers first (the workers with the lowest values for their individual characteristic d_i. This implies that if a firm wishes to attract an additional worker it must offer a wage and working conditions combination which raises the utility of it's existing workers, while a firm which lowers employment can lower the utility of its remaining workers. If p is profit per firm, we define the welfare function as:

$$Wf = Wf\left(\sum_{i=1}^{k} Util_i , \sum_{i=1}^{n} p_i\right) \qquad \text{(II.18)}$$

where welfare is increasing in the utility of any of the k potential workers, or in the profits of any of the n firms.

One can see that if a binding minimum wage or maximum working conditions requirement leads to a fall in employment then welfare must fall. Each firm's profits must be lower since the regulated outcome could have been chosen in the absence of regulation but was not. Each worker who moves to unemployment has lower utility since utility in employment must have been at least as great as the reservation utility. Since the firm is still on the labour supply curve after the regulation, but at a lower level of employment, then each employed worker is worse off because when employment falls the firm can offer a contract giving lower utility. If regulation leads to an increase in employment the welfare effects are ambiguous. Firms are worse off and workers are unambiguously better off.

Monopsony in the Product Market

One should also note that the model developed above for the labour market can be thought of as a generic monopsony model where firms have market power over input suppliers. The wage is the price of the input, working conditions is the quality of the input and the utility function of workers can be thought of as the profit function of input suppliers. Input suppliers face different transport costs to different firms. These costs may be actual transport costs or act as a proxy for any logistical advantage that makes it easier for an input supplier to supply to a particular firm. The results indicate that while output and the input price will be too low in a market equilibrium while the quality will be too high. In other words, the monopsonist will be able to enforce undue restrictions on input suppliers. Regulating price may lower welfare in the absence of regulations on quality. A welfare reduction might result from regulations on quality in the absence of regulations on price. A per unit subsidy on the input achieves the socially desirable outcome.

Involuntary part-time employment and working conditions

One interpretation of the working conditions variable in the above analysis is that it measures hours per worker, where workers have upward sloping individual labour supply curves. In this interpretation one could think of w as the weekly wage and x as weekly hours. As shown in (II.11), while a minimum wage may lower the number of workers, it will certainly increase total hours worked if x is hours per worker. There are a number of qualifications to this. As we outlined earlier deteriorating working conditions may take many forms, for example, working unsociable hours rather than longer hours, working harder, or accepting increased responsibility etc. If employers choose to impose stricter conditions on these dimensions one may not observe an increase in employment, even though efficiency units of employment, and as a result output should increase. We have shown in the welfare analysis that any policy that reduces the number of workers (even if aggregate hours increase) will reduce welfare.

In the empirical analysis that follows we, faced with the lack of other proxies as much of the previous literature of this issue, explicitly interpret a rise in the incidence of involuntary part-time employment as a deterioration in working conditions. One should note that in our theoretical model we have, in order to be as general as possible, not incorporated such an interpretation of hours worked. This can be easily done however. Specifically, one can do so, for instance, by assuming that the firm uses both part-time and full time workers in the production process. It is easy to think of examples (a restaurant say) where the firm would have an optimal mix of full-time and part-time workers. The production process is such that the firm will hire mostly full-time workers and will offer a separate (inferior) contract to a smaller number of part-time workers. The model offers a rationale for the persistent existence of a substantial number of workers who are part-time involuntarily. Essentially the point of this version of the model is that if a monopsonistic firm has workers in different jobs of different quality, imposing a minimum wage on the low quality jobs may give the firm the incentive to expand relative employment in the worst jobs. The existence of different types of jobs gives the firm a mechanism for discriminating across workers.

The labour supply curve facing the firm is the same as in the example in the previous sub–section except that now the firm offers two types of jobs to workers where w_1 is the weekly wage for full time workers and x_1 is weekly hours, while w_2 and x_2 are wages and hours for part-time workers. In equilibrium firms will demand more full time relative to part-time workers. Given the hours specified, the firm will choose a wage such that full-time jobs are more attractive than part-time jobs.[3] Given the distribution of workers and their transport costs the supply of workers to full-time jobs will be:

$$L_1 = \frac{m}{td}(w_1 - x_1^2) - \frac{m}{td}(w_2 - x_2^2) \qquad \text{(II.19)}$$

The first term on the right hand side is the number of workers the firm attracts given its full-time wage offer, while the second term is the number of these workers that will be allocated to part-time jobs. By choosing a combination of w_1 and w_2 the firm chooses a combination of full-time and part-time workers, where we treat hours as fixed within each category. It follows that the labour supply of part-time workers is:

$$L_2 = \frac{m}{td}(w_2 - x_2^2) \qquad \text{(II.20)}$$

Firms choose a full-time and part-time wage to maximise their profit function:

$$p = ax_1L_1 + bx_2L_2 - w_1L_1 - w_2L_2 \qquad \text{(II.21)}$$

The first order conditions for w_1 and w_2 imply that:

[3] The firm could choose a contract where the utility of the part-time job is better than the utility of the full-time job. Because of the amount of simplifying assumptions we impose the solution to this problem would yield exactly the same profits and symmetric results to those presented, replacing full-time with part-time.

$$w_1 = \frac{1}{3}[(a + 2x_1)x_1 + (b - x_2)x_2] \tag{II.22}$$

$$w_2 = \frac{1}{3}[(-a + x_1)x_1 + (2b + x_2)x_2] \tag{II.23}$$

where details of the parameter restrictions such that labour supply is positive in both jobs, implying in turn that full-time jobs are more desirable, are provided in Appendix (d). Next we impose a minimum wage binding just above the part-time wage. The first order condition for the full time wage will continue to hold. We totally differentiate this to get the impact on full-time wages from the minimum wage imposed on part-timers:

$$\frac{dw_1}{dw_2} = \frac{1}{2} \tag{II.24}$$

We also differentiate part-time and full-time labour supply to get the impact on employment:

$$\frac{dL_1}{dw_2} = \frac{\partial L_1}{\partial w_1}\frac{\partial w_1}{\partial w_2} + \frac{\partial L_2}{\partial w_2} = -\frac{m}{2} \tag{II.25}$$

$$\frac{dL_2}{dw_2} = m \tag{II.26}$$

A minimum wage, which is binding on part-time workers, causes the monopsonist firm to substitute from full-time into part-time employment. Since full-time jobs are more desirable for all workers this represents an increase in involuntary part-time employment. The increase in total employment induced by the minimum wage causes an increase in the full-time wage.

III. Empirical Evidence On the Impact of Minimum Wages on Working Conditions

Review of the literature

The implicit assumption in using our model to argue that an employment subsidy would be preferred to a minimum wage under monopsony power is that employers are able to substitute working conditions and employment. In his survey of the minimum wage literature Brown (1999) states that "while I find it hard to believe that employers do not respond to minimum wage increases by raising standards of effort, punctuality etc. Evidence on the scale of such adjustments is sadly lacking; but if they are important, they are likely to intensify rather than resolve the puzzle of the small employment elasticities" (p. 2157). Part of the reason for this lack of evidence is that working conditions are not only difficult to measure, but that it is rather difficult to identify and isolate situations and corresponding data where minimum wages could have potentially affected working conditions. Since, in either competitive or monopsony models of the labour market employers can demand more stringent working conditions of the employee when the minimum wage is imposed, the empirical analysis of this section does not distinguish between these two types of models. Rather it is an attempt to deal with the concern expressed by Brown (1999) above that there is little direct evidence on the degree that minimum wages effect can affect other outcomes of employment such as working conditions.

Working conditions, of course, can pertain to a large number of characteristics of a job. One important feature of a job in terms of its affect on worker utility, and the one we focus on in our analysis, is for how many hours employees have to work. As in standard neo-classical labour supply, workers preferences would determine the wage needed to induce workers to work different numbers of hours etc. We could reasonably conjecture that employers also have strong preferences over how long they would like their employees to work. The interaction between workers and firms would lead to an equilibrium level of employment, hours and other characteristics. If we observe an increase in the likelihood that workers will be working less than desired hours in response to minimum wage increases, this can be taken as evidence of a deterioration in working conditions. Firms pay a wage greater than the equilibrium wage but insist on less than the desired number of hours worked per worker.

A small number of studies have examined the impact of minimum wages on workers' hours. Brown's (1999) conclusion from the literature on p2117 is that "limited evidence suggests that the minimum wage reduces hours worked by employed teenage workers". Couch and Wittenberg (2001) use the U.S. current population survey to construct state level data by month from 1972-92 and find that changes in the minimum wage led to significant reductions in average hours worked for teenagers. A well known empirical study on the impact of minimum wages on employment and other outcomes is detailed in Card and Krueger (1995). This focussed on an increase in the state minimum wage in New Jersey. The impact on employment in fast food outlets was measured using counties from eastern Pennsylvania where the minimum wage remained unchanged as a control. The evidence on hours worked from this and a series of related studies by the same authors and by Neumark and Wascher was that there was weak evidence of a positive impact on hours work from the minimum wage change[4]. It should be noted though that none of the above studies distinguish between situations where the change in hours was a desired or an undesired change, and hence whether they simply are

[4] The data did not contain actual hours, rather the number of full-time and part-time workers. Two part-timers were treated as equivalent to one full-time.

movements along a worker's supply curve.[5]

Case study of Trinidad and Tobago

Events in the Republic of Trinidad and Tobago provide us with a natural case study with which to examine the effects of the minimum wage on the labour market. In April of 1998 the Trinidad and Tobago government introduced a national minimum wage for the first time[6, 7], setting the minimum wage at the rate of $TT7.00 per hour, regardless of the characteristics of the worker or the nature of work involved. Of course, one of the problems with assessing the impact of minimum wages on the labour market in developing countries is that if compliance is low due to weak regulatory structures, in essence minimum wages can be ineffectual. However, as shown by Strobl and Walsh (2001), although there was a large degree of non-compliance in Trinidad and Tobago, the national minimum wage did push up the wage rate of some workers to the minimum wage rate, while others consequently lost their job.

In order to examine how this national minimum wage may have affected working conditions in Trinidad and Tobago we, as in Strobl and Walsh (2001) utilize the Trinidad and Tobago Continuous Sample Survey of Population (CSSP). The CSSP is a quarterly multi-purpose household survey with its primary objective being to provide up-to-date data on the labour force characteristics of the population of Trinidad and Tobago

[5] Regressions we carried out on hours work from the current population survey for New Jersey and Pennsylvania indicate that hours fell for minimum wage workers and that involuntary part-time status became more likely for teenagers.

[6] While the legislative framework enabling the introduction of minimum wages in Trinidad and Tobago was first passed in 1976, only very few sectoral minimum wages were introduced until 1998, most of which were well below the 1998 level and in practise not strictly enforced; see Strobl and Walsh (2001).

[7] The minimum wage rate was implemented in response to recommendations from a 1995 World Bank report on poverty in Trinidad and Tobago and was largely unanticipated by the public and, hence, can be considered a largely exogenous change; see Strobl and Walsh (2001) for details.

on a continuing basis, for which we have access to the 1996-98 CSSP surveys. Moreover, it is a rotational survey in that households are surveyed three times – a year after the first interview and a last time the quarter subsequent to the second interview.[8] This latter aspect allows us to create short panels for a significant number of individuals.[9] For all calculations in the present paper we use information on the first two observations, i.e., those which lie a year apart, of the continuously employed, but exclude the self-employed and those working in the government sector.

Apart from information on earnings, hours worked, human capital and working place characteristics, the CSSP also provides information on the reasons why individuals worked part-time (defined as working less than 33 hours per week). Specifically, one is able to distinguish between the voluntarily and involuntarily part-time employed, where we assume that involuntary part-time employment is an utility decreasing working condition.[10] In comparing whether the incidence of involuntary part-time employment increased due to the minimum wage it is of course important to choose the correct study and comparison groups. This becomes somewhat more complicated in a developing country relative to developed countries given the possibility of non-compliance. Normally, i.e. under complete compliance, the natural study group would simply be those workers whose first wage observation is below $TT 7.00 (in appropriate 1998 prices) and

[8] For a more extensive description of this data set see Strobl and Walsh (2001).

[9] Given the CSSP's close parallel in structure to the US CPS, we used a similar algorithm to that proposed by Madrian and Lefgren (1999) to link individuals over time. This involves using questionnaire, household and time invariant individuals information to link individuals and then using age and its anticipated possible range of changes over time to double check the merges. This allowed us to link 64,700 individuals, of which about 46,000 were of working age.

[10] Persons working less than 33 hours are asked to choose among a number of reasons, namely (a) no more work available, (b) new job, (c) illness, (d) temporary layoff, (e) own choice, (f) vacation, and (g) other. Using this information we classified part-time workers as involuntary if they stated either (a), (b), or (d) as reasons. For a study of the incidence of involuntary part-time employment in Trinidad and Tobago using the same data set see Görg and Strobl (2002).

occurs before the minimum wage, but whose second observation falls at some point thereafter. When there is the possibility of non-compliance, however, only those whose second observation is actually at least at the minimum level can be considered to be affected, and it is this sub-group that serves as our study group. As a control group we use those individuals whose first observation is below the minimum level and whose second observation falls before the introduction of the minimum wage. Examining the yearly wage distributions for the same sample as here, Strobl and Walsh (2001) show that the only apparent shift in the wage distribution seems to have occurred after the implementation of the minimum wage.[11] However, for further verification that any changes in working conditions are not due to other factors that may have coincided with the minimum wage, we also use non-compliant workers as a secondary study group. Hence a high degree of non-compliance is not necessarily a disadvantage in terms of what we are trying to measure here, but rather provides us with another control group to check the robustness of our results.

One of the problems with interpreting the incidence of involuntary part-time employment as an aspect of working conditions is that, in the context of the minimum wage, the desire to work more hours may simply be a response to the increase in the higher wage rate not to a reduction in hours, i.e., it may simply be a movement along the worker's supply curve. Moreover, a worker's hours may have well increased while at the same time his/her status changed from voluntary to involuntary part-time. Ideally, however, one would like to identify only those who have become involuntary part-time

[11] One might be inclined to also use the non-compliant workers as a control group. However, there clearly could be spillover effects from the compliant sector, so that these are unlikely to be a good control group. For instance, for Ghana Jones (1998) shows that there were spillover effects in the informal sector due to changes in the minimum wage that affected the formal sector.

because of a reduction in hours. One problem in doing so is that the information given by the CSSP is categorical in the sense that the number of weekly hours worked is grouped into one the following categories: (a) under 1, (b) 1-8, (c) 9-16, (d) 17-24, (e) 25-32, (f) 33-40, (g) 41-50, (h) 51-60, (i) 61-70, and (j) 71+ hours.[12] It is thus difficult to identify all of those who experienced a reduction in hours. As a matter of fact, not surprisingly, given the fairly wide categorical bands, most workers remained in the same category over the yearly interval and we do not know for certain whether their actual hours have changed. We thus proceeded as follows. First of all, we did re-classify those who became involuntary part-time but whose hours increased as not having become involuntary part-timers in terms of a deterioration in working conditions. Secondly, while we do not similarly re-classify those who did not change hours categories, we do check the robustness of the results of the overall sample by also separately examining the much smaller sample of workers whose hours definitely decreased over the period, by moving to a lower hours category, some of which become involuntarily part-time.

Summary statistics for the sample of workers who were potentially affected by the minimum wage, i.e., those whose second observation fell after April 1998, relative to all others in the sample are given in Table 1. As can be seen, the incidence of involuntary part-time employment rose after minimum wage. However, one must also note that other characteristics were higher for the sample of workers potentially affected – for instance, employer size, educational attainment, and the initial wage rate are also higher for this group. Hence, one cannot draw any clear a priori conclusions with regard to

[12] For the calculation of the hourly wage rate from our measure of monthly income, we use the midpoints of all categories except for (a), (f), and (j) were we used 1, 40, and 71 hours respectively, as in Strobl and Walsh (2002).

these simple means and we thus proceed to investigate the relationship between minimum wage and involuntary part-time employment econometrically.

Using the sample and information just described we ran a simple probit model on rises in the incidence of involuntary part-time employment controlling for highest educational attainment, gender, age and its value squared, occupation, industry, employer size, region, the initial wage rate, and year and seasonal effects, where our study and control group are as stated earlier. In order to assess the impact of compliance to the minimum wage on the incidence of involuntary part-time work, we included a simple dummy variable for whether an individual's second observation fell after the introduction of the minimum wage. One should note since the time between the actual implementation and when the second observation occurred differs for individuals, from anywhere between one day up to nine months, we are implicitly assuming that the impact was the same regardless of time elapsed.

Our results for this exercise for the overall sample are given in Table 2, where the coefficients are reported as marginal effects. As can be seen, only a few factors help to predict who is more likely to become involuntarily part-time employed. Specifically, workers who work in large firms and workers who receive higher (initial) wages, possibly indicative of higher ability or higher tenure[13], are less likely to experience involuntary part-time employment. Most importantly, we find that, after controlling for other factors, for workers who experienced compliance the introduction of the minimum wage also significantly increased the probability of a person becoming involuntarily part-time employed. Specifically, the introduction of the minimum wage increased the incidence of involuntary part-time employment by 6.5 per cent. In order to confirm that

[13] Unfortunately the CSSP does not collect information on an employed person's tenure.

this is not due to other changes occurring at the same time of the minimum wage, we also used those workers who second observation fell after implementation but who were not subjected to compliance in the second column of Table 2. Accordingly, for this group, although the results on the other variables are similar, we do not find a similar effect of the minimum wage - the coefficient on this zero-one dummy is decisively insignificant.

Given the categorical nature of the hours information in our data so that one cannot be certain that those who remain in the same category have not increased the number of hours they worked, we also re-estimated our empirical model for the much smaller sample of workers whose hours decreased in the last two columns of Table 2. As can be seen these confirm our results from the overall sample. As a matter of fact, we find that for this group that the impact of the minimum wage was larger than that for the total sample – specifically, the introduction of the minimum wage increased the incidence of involuntary part-time employment by 22.4 per cent among those whose employers complied with the minimum wage.

IV. Conclusion

In this paper we argue that employment subsidies financed by taxes on profits are more effective than minimum wages (or regulations in working conditions) in dealing with the distortion caused by monopsony power. The source of the distortion in a monopsony model is the difficulty a firm has in attracting a higher number of workers. An employment subsidy deals directly with the distortion and can lead to the first best outcome. If the employment contract depends on wages and working conditions the government must be confident in its ability to set and enforce all of these variables appropriately to improve welfare. The optimal subsidy on the other hand depends only on the slope of the firms labour supply curve. The cost of the subsidy could be recouped from a tax on monopsony profits.

Boal and Ransom (1997) conclude that Monopsony power is not quantitatively important in terms of its affect on wages. The model presented here raises the possibility that monopsony power could be more important quantitatively than had been thought. A firm with monopsony power might pay only slightly lower wages but will offer less favourable working conditions. We provide empirical evidence for the case of Republic of Trinidad and Tobago, where a national minimum wage was introduced for the fist time, that working conditions, at least measured working less than the desired number of hours, may be important empirically. Considering wages alone could thus understate the drop in workers utility relative to non-monopsony firms.

References

Boal W. and Ransom, M. (1997). "Monopsony in the Labor Market", *Journal of Economic Literature*, XXXV, pp. 86-112.

Bhaskar, V. and Ted To, (1999). "Minimum Wages for Ronald McDonald Monopsonies: A Theory of Monopsonistic Competition", *The Economic Journal*, 109, pp. 190-203.

Brown, C. (1999). "Minimum Wages,Employment, and the Distribution of Income", in Handbook of Labor Economics, Volume 3B, eds. Ashenfelter, O. and Card, D..

Burdett, K. and Mortensen, D. (1998). "Wage Differentials, Employer Size and Unemployment", *International Economic Review*, 39, 2.

Card, David and Alan Krueger (1995*), Myth and Measurement: the New Economics of the Minimum Wage*. Princeton: Princeton University Press.

______(2000), "Minimum Wages and Employment: A case Study of the Fast Food Industry in New Jersey and Pennsylvania:Reply", *American Economic Review*, 90, pp. 1397-1420.

Couch, K. and Wittenberg, D. (2001). "The Response of Hours of Work to Increases in the Minimum Wage", *Southern Economic Journal*, 68, pp. 171-177.

De Fraja, G. (1999). "Minimum Wage Legislation, Productivity and Employment", *Economica*, 66, pp. 473-88.

Dickens, R., Machin, S. and Manning, A. (1999). "The Effects of Minimum Wages on Employment: Theory and Evidence from Britain", *Journal of Labor Economics*, 17,

Görg, H. and Strobl, E. (2002). "The Incidence of Visible Underemployment: Evidence for Trinidad and Tobago", *Journal of Development Studies*, forthcoming.

Manning, A. (1995). "How do we Know that Real Wages are too High?", *Quarterly Journal of Economics*,

Naylor, R. (2002). "Labour Supply, efficient bargains and countervailing power", mimeo, University of Warwick.

Neumark, D. and Wascher W. (2000). "Minimum Wages and Employment: A case Study of the Fast Food Industry in New Jersey and Pennsylvania: Comment", *American Economic Review*, 90, pp. 1362-1396.

Rebitzer, J. and Taylor, L. (1995). "The Consequences of Minimum Wage Laws: Some new Theoretical Ideas", *Journal of Public Economics*, 56, pp. 245-255.

Salop, S. (1979). "A model of the Natural Rate of Unemployment", *American Economic Review*, LX1X, pp. 117-25.

Strobl, E. and Walsh, F. (2003). "Minimum Wages and Compliance: The Case of Trinidad and Tobago", *Economic Development and Cultural Change*, forthcoming.

Appendix

(a) Second order conditions

We define the elasticity of employment with respect to working conditions and wages, respectively, as:

$L_x \dfrac{x}{L} = e$ and $L_w \dfrac{w}{L} = E$

The first order conditions (II.3) and (II.4) imply:

$$\frac{PF_N x}{w+q} = (\frac{e}{1+e}) = 1 + \frac{w}{(w+q)E} \quad \text{(A.1)}$$

(A.1) implies that in equilibrium with no taxes or subsidies (q =0):

$$1 + E = -e \quad \text{(A.2)}$$

If q <0 then (A.1) implies:

$$1 + E < -e \quad \text{(A.3)}$$

The second order conditions for the firms problem are:

$$p_{xx} = PF_{NN}[L + L_x x]^2 + (PF_N x - w^s)L_{xx} + 2PF_N L_x \quad \text{(A.4)}$$

where $w^s = w + q$

$$p_{ww} = PF_{NN}[L_w x]^2 + (PF_N x - w^s)L_{ww} - 2L_w \quad \text{(A.5)}$$

We see that for a firm satisfying the first order conditions and if $L_{ww} \le 0$ and $L_{xx} \le 0$, then the above derivatives will be negative.

The cross partial derivative is:

$$p_{xw} = PF_{NN}[L_w x][L + L_x x] + (PF_N - w^s)L_{xw} + PF_N L_w - L_x \quad \text{(A.6)}$$

If we assume separability between working conditions and wages in the labour supply function this equation simplifies to.

$$p_{xw} = PF_{NN}[L_w x][L + L_x x] + PF_N L_w - L_x \quad \text{(A.7)}$$

We also note at this stage that if the first order conditions hold then $[L + L_x x] < 0$.

Finally the determinant of the Hessian matrix ($p_{ww}p_{xx} - p_{xw}^2$) is

$$
\begin{aligned}
|H| = {} & P^2F_{NN}^2[L+L_xx]^2(L_wx)^2 + [(PF_Nx - w^s)L_{ww} - 2L_w]PF_{NN}[L+L_xx]^2 + \\
& (PF_Nx - w^s)L_{xx}[PF_{NN}(L_wx)^2 + (PF_Nx - w^s)L_{ww} - 2L_w] \\
& + 2PF_NL_x[PF_{NN}(L_wx)^2 + (PF_Nx - w^s)L_{ww} - 2L_w] \\
& - P^2F_{NN}^2[L+L_xx]^2(L_wx)^2 - 2PF_{NN}L_wx[L+L_xx][PF_NL_w - L_x] \\
& + (1+s)PF_NL_wL_x - F_N^2L_w^2 + L_x^2
\end{aligned}
\tag{A.8}
$$

After we cancel out terms this becomes.

$$
\begin{aligned}
|H| = {} & [(PF_Nx - w^s)L_{ww} - 2L_w]PF_{NN}[L+L_xx]^2 + \\
& (PF_Nx - w^s)L_{xx}[PF_{NN}(L_wx)^2 + (PF_Nx - w^s)L_{ww} - 2L_w] \\
& + PF_NL_x[2PF_{NN}(L_wx)^2 + 2(PF_Nx - w^s)L_{ww} - 2L_w] \\
& - 2PF_{NN}L_wx[L+L_xx][PF_NL_w - L_x] - P^2F_N^2L_w^2 + L_x^2
\end{aligned}
\tag{A.9}
$$

We can verify easily that as long as the firm is satisfying the first order conditions and the following conditions hold: $L_x < 0$, $L_{xx} < 0$, $L_w > 0$, $L_{ww} < 0$ and $F_{NN} < 0$ then all terms on the first three lines of (A.9) are unambiguously positive. Using equation (I.4) we see the second term on the last line can be rewritten: $(PF_N)^2L_w^2 = -L_x^2$ so that the last two terms on the last line cancel. The only ambiguity in (A.9) comes from the first term on the last line which is negative. We will show that this term is dominated by positive terms in the Hessian for the case when $q < 0$. I show in the paper that these values for the tax variable will give the first best outcome. As long as the subsidy is not too big (A.9) will be positive.

Using the result from the first order condition that $PF_n = -\dfrac{L_x}{L_w}$ the first term on the last line of (A.9) can be rewritten:

$$
-2PF_{NN}L_wx[L+L_xx][PF_NL_w - L_x] = 4PF_{NN}L_wxL_x(L+L_x) \tag{A.10}
$$

Using the fact that $PF_n = -\dfrac{L_x}{L_w}$ again the first term on the second last line can be rewritten as:

$$
2PF_NL_x[PF_{NN}(L_wx)^2 = -2PF_{NN}L_wxL_xL_xx \tag{A.11}
$$

The last term on the first line can be rewritten as:

$$-2L_w PF_{NN}[L+L_x x]^2 = -2L_w PF_{NN} L_w x L_x \frac{(L+L_x x)^2}{xL_x} \tag{A.12}$$

If we add the right hand side of (A.10) to (A.12) and the sum is positive we know the determinant is positive and we are at a maximum:

$$4(L+L_x x) - 2L_x x - 2\frac{(L+L_x x)^2}{xL_x} > 0 \tag{A.13}$$

Dividing across by $(L+L_x x)$ (which we can see from the first order conditions is negative) (A.13) can be rewritten as:

$$4 - 2\frac{1}{1+\frac{1}{e}} - 2(1+\frac{1}{e}) < 0 \tag{A.14}$$

If $-e > 1$ the condition in (A.14) is unambiguously satisfied. (A.2) and (A.3) imply that inequality (A.14) is satisfied and we are at a maximum.

(b) Employment effect of a minimum wage

Using equations (II.10) we see that the employment effect of a minimum wage will be negative if the following condition is met:

$$-\frac{L_x}{L_w}\frac{dx}{dw} = \frac{L_x}{L_w}\frac{p_{xw}}{p_{xx}} > 1 \tag{A.15}$$

Using the fact that $PF_n = -\frac{L_x}{L_w}$ from the first order conditions and equations (A.4) and (A.6), inequality (A.15) can be rewritten:

$$\frac{PF_{NN} L_x X[L+L_x x] - \frac{2L_x^2}{L_w}}{PF_{NN}[L+L_x X][L+L_x x] + (PF_N x - w^s)L_{xx} - \frac{2L_x^2}{L_w}} > 1 \tag{A.16}$$

We see that all terms in the numerator and denominator are negative. The numerator is a bigger negative number than the denominator if the following term is positive:

$$PF_{NN} L[L+L_x x] + (PF_N x - w^s)L_{xx} > 0 \quad \text{(A.17)}$$

If (A.17) is positive inequality (A.15) holds. Using the first order conditions in (A.17)

$$L[L+L_x x] = -w^s L_w L \quad \text{and} \quad (PF_N x - w^s) = \frac{L}{L_w} \tag{A.18}$$

If inequality (A.17) holds a minimum wage slightly above the market level will reduce employment, that is if:

$$\frac{L_{xx}}{L_w} > PF_{NN} wL_w \qquad \text{(A.18)}$$

Multiply both sides of (A.18) by x, multiply and divide the right hand side by L and the left hand side by L_x and use the fact that $PF_n = -\frac{L_x}{L_w}$ to rewrite the above condition as:

$$-\frac{L_{xx}\frac{x}{L_x}}{F_{NN}\frac{N}{F_N}} > L_w \frac{w}{L} \qquad \text{(A.19)}$$

(c) Employment effects of a maximum working conditions requirement

Using equations (II.12) and (II.13) we see that a maximum working conditions requirement will increase employment if the following condition holds:

$$\frac{L_w}{L_x}\frac{p_{xw}}{p_{ww}} > 1 \qquad \text{(A.20)}$$

Using (A.5), (A.6) and the fact that $PF_n = -\frac{L_x}{L_w}$ (A.20) can be written as:

$$\frac{PF_{NN} L_w^2 x[L/L_x + x] - 2L_w}{PF_{NN} L_w^2 x[x] + (PF_N x - w)L_{ww} - 2L_w} > 1 \qquad \text{(A.21)}$$

All terms in the numerator and denominator are non-positive. We see that if the following inequality holds then inequality (A.21) also holds:

$-PF_{NN} L_w^2 x\frac{L}{L_x} - (PF_N x - w)L_{ww} > 0$ Using the first order conditions again this can be rewritten as:

$$L_w \frac{w}{L} > \frac{L_{ww}\frac{w}{L_w}}{PF_{NN}\frac{N}{F_N}} \qquad \text{(A.22)}$$

(d) A model with full-time and part-time workers

The first order conditions for w_1 and w_2 implied by equation (II.21) are:

$$ax_1 - (w_1 - x_1^2) + (w_2 - x_2^2) - w_1 = 0 \qquad \text{(A.23)}$$

$$-ax_1 + bx_2^2 + w_1 - (w_2 - x_2^2) - w_2 = 0 \qquad \text{(A.24)}$$

The parameter restriction that ensures that part-time employment is positive is: $(w_2 - x_2^2) > 0$. From the solutions for full and part-time wages in equations (II.22) and (II.23) this can be written as:

$$x_2(b - x_2) > \frac{1}{2}(a - x_1)x_1 \qquad \text{(A.25)}$$

The condition that ensures positive full-time employment (and also that full-time jobs are better than part-time is $(w_1 - x_1^2) > (w_2 - x_2^2)$. These two conditions impose the following restriction on the parameters.

$$\frac{1}{2} < \frac{x_2(b - x_2)}{x_1(a - x_1)} < 2 \qquad \text{(A.26)}$$

Table 1: Summary Statistics for those potentially affected by the minimum wage versus others in the sample

	BEFORE	AFTER
INV PTTIME	0.040	0.071
Log(INITIAL WAGE)	4.834	5.012
EMPLOYER SIZE	0.447	0.459
MALE	0.551	0.568
AGE	28.560	28.255
MARITAL STATUS	0.186	0.193
COMMUTE	0.459	0.453
URBAN	0.564	0.579
PRIMARY EDUCATION	0.531	0.561
SECONDARY EDUCATION	0.258	0.262

Table 2: The Impact of the Minimum Wage on the Incidence of Involuntary Part-Time Employment in Trinidad and Tobago

	(1)	(2)	(3)	(4)
MINIMUM WAGE	0.065**	0.034	0.224**	0.134
	(0.041)	(0.030)	(0.125)	(0.121)
AGE	-0.004	-0.002	-0.022	-0.017
	(0.003)	(0.003)	(0.014)	(0.015)
AGE2	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
MALE	-0.004	-0.007	-0.093	-0.138
	(0.016)	(0.016)	(0.072)	(0.087)
MARITAL STATUS	0.020	0.016	0.111	0.176
	(0.021)	(0.020)	(0.091)	(0.117)
PRIMARY EDUCATION	0.006	-0.007	-0.004	-0.055
	(0.015)	(0.014)	(0.070)	(0.068)
SECONDARY EDUCATION	0.003	-0.014	-0.080	-0.134*
	(0.020)	(0.015)	(0.072)	(0.070)
COMMUTE	-0.035**	-0.034**	-0.162***	-0.172***
	(0.014)	(0.013)	(0.053)	(0.056)
URBAN	0.015	0.006	0.047	0.033
	(0.013)	(0.013)	(0.061)	(0.066)
EMPLOYER SIZE	-0.027*	-0.028**	-0.137**	-0.131**
	(0.014)	(0.014)	(0.056)	(0.058)
Log(INITIAL WAGE)	-0.010**	-0.011**	-0.014	-0.028
	(0.005)	(0.005)	(0.023)	(0.024)
Observations	650	685	181	184
Test	58.70***	66.49***	43.59***	52.31***
PSEUDO R2	0.20	0.21	0.25	0.26

Notes: (1) Coefficients reported as marginal effects.

(2) ***, **, and * signify 1, 5, and 10 per cent significance levels.

(3) Includes 1998 year dummy, gender dummy seasonal dummies, and one digit occupational and industry dummies.

(4) PRIMARY EDUCATION and SECONDARY EDUCATION are highest educational attainment dummies, MARITAL STATUS is a martial status dummy, COMMUTE is a commuting to work dummy, URBAN is an urban workplace dummy, EMPLOYER SIZE is a dummy for whether employer has at least ten employees and MINIMUM WAGE is a dummy indicating whether the worker was affected by the minimum wage.

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