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Wage Controls and Employment in a Socialist Economy

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Abstract

Wage controls have been an important element of several of the stabilization programs recently introduced in reforming socialist economies. In some cases, the controls have been placed on each state enterprise's total wage **bill**, rather than on the wage _rate_ paid. Such an incomes policy would be expected to have a dampening effect on employment, but this has not generally occurred; on the contrary, declines in employment in state enterprises have typically been much less than the associated declines in output. This paper presents a simple model of a labor-managed enterprise which offers an explanation of the behavior of wages and employment under such an incomes policy.

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Summary

Wage controls have figured largely in several stabilization programs recently introduced in reforming socialist economies. The rationale for these controls has been the dominant role of the workers in state enterprises, which may make these enterprises particularly prone to grant excessive wage increases.

In some cases, incomes policies have limited each state enterprise's total wage bill, rather than the wage rate paid. Such an incomes policy creates an obvious incentive for firms to lay off workers: if part of the workforce is laid off, the remainder can be paid a higher wage while the wage bill remains under its ceiling. The recent introduction of a "social safety net" in many of these countries would reinforce this incentive: laid-off workers receive unemployment benefits.

Employment has not generally been reduced as predicted, however. On the contrary, layoffs have been relatively few, and employment has typically fallen less than output.

A simple model developed in this paper offers an explanation for this observation. The model examines the effect of a wage-bill ceiling on a labor-managed firm that maximizes the expected utility of its representative worker. Workers' risk aversion is an important consideration in this model: because financial markets have not developed in which workers can hedge against the uncertainty they face and because workers' employment entitles them not only to a wage but also to a share of the firm's after-tax profits, the enterprise may choose higher employment at the expense of lower wages. The paper shows that under some conditions the enterprise may provide full employment for its incumbent workers. It thus provides an explanation for the observed stagnation of employment: no new hiring, but no layoffs either.

The implications of privatization--under which enterprises are given or sold to profit-maximizing private owners--are then considered. Privatization may alter the employment effects of wage controls, but this will depend on the structure of the labor market. The paper briefly examines two alternatives: a competitive labor market and bargaining between the owner and a trade union.

Introduction

Incomes policies have been an important feature of the stabilization programs adopted in the reforming socialist economies of Central and Eastern Europe. The main rationale for these policies has been a perceived weakness in the governance of state enterprises: in the wake of reforms which largely dismantled the structure of central planning (see e.g., United Nations Economic Commission for Europe, 1989), there emerged a state of "neither plan nor market", in which state enterprises functioned as substantially autonomous units, but without a market mechanism to guide and restrain their decisions (Beksiak, 1989). 1/ Kornai (1982) coined the term "soft budget constraint" for the situation in which an enterprise's losses are underwritten through subsidies and easy credit, while any profits are heavily taxed. Under these circumstances, as Lipton and Sachs (1991, p. 81) put it, "state enterprises...are prone to pay excessive wages out of the income stream that would otherwise accrue to the Treasury".

The softness of budget constraints has been viewed as an important source of inflation in socialist economies: excessive wage increases may depress budgetary revenues, given tax systems that depends mainly on state enterprise profits for tax revenues (see Tanzi, 1991), and this may force governments to resort to money creation to finance their activities (Nuti, 1990, Lane 1991). The danger of a wage-price spiral, as would arise for instance if firms follow markup pricing rules, is another aspect of this concern (Blanchard and Layard, 1990). This has been an important reason that programs devised to stabilize inflation in the reforming socialist economies have included wage controls as a major element. 2/

One important feature of the wage controls adopted in socialist economies is that they have placed limits on each enterprise's wage bill, not the wage rate paid to each worker. For example, this was a feature of the stabilization programs adopted in Hungary and Poland in 1989 and 1990, respectively. 3/ This feature may have been introduced as a result of a

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1/ These reforms include those implemented in Hungary beginning in 1968 (see Boote and Somogyi, 1991), in Poland beginning in 1981 and intensified after 1987 (see Balcerowicz, 1989; Lane, 1991), and in Yugoslavia from the 1960s onward. Other Central and Eastern European socialist countries and the Soviet Union continued their systems of central planning through the 1980s.

2/ This is in addition to the idea, often associated with heterodox stabilization programs, of using an incomes policy to break inflationary expectations; see e.g. Bruno et al. (ed.), 1988; Dornbusch and Simonsen, 1987.

3/ In Poland, the 1990 wage law limited the increase in wages charged to costs in a given month to a fixed percentage of monthly inflation; the indexation coefficient was set at 30 percent in January, 20 percent in February through April, 60 percent for May and June, 100 percent for July, and 60 percent for the remainder of the year. For further details, see Lane, 1991, and Blanchard and Layard, 1990. A similar incomes policy was adopted in Hungary; for details, see Boote and Somogyi, 1991.

perception of wages primarily as a distributive share rather than a factor cost, and of a concern over total rather than unit wage costs; it may also have been intended to give enterprises some flexibility in granting differential wage increases to different groups.

Another feature of the programs of stabilization and market-oriented reform in Central and Eastern Europe in the early 1990s was the development of a "social safety net". This initiative arose from the recognition that some unemployment is a normal feature of a market economy, and that frictional unemployment might be particularly high during the transition. There was also concern that, although price liberalization was conducive to allocative efficiency, it might have adverse distributional consequences from which the poor should be protected. The social safety net was introduced both for ethical-distributional reasons and to minimize the social unrest that might otherwise result from a stabilization program. It includes the payment of benefits to the unemployed, 1/ as well as the provision of income support payments to low-income households.

A ceiling on the enterprise wage bill, together with the provision of unemployment benefits, creates an obvious incentive for firms to reduce their employment. Clearly, if a firm lays off some of its existing workers, it can pay its employed workers more, while remaining within the wage bill ceiling; those laid off meanwhile earn unemployment insurance benefits.

This apparently did not happen in Central and Eastern Europe, however. In Poland, for example, total employment in the state enterprises fell by only 8 percent from 1989 to 1990, while output fell by about 25 percent. 2/ Unemployment did rise sharply, from close to zero at the beginning of 1990 to 8.3 percent 3/ at end-year. However, in 1990, very few of the unemployed appear to have been laid off; most were new entrants to the labor force. 4/ A similar pattern has been observed in other countries in the region (see e.g., Blanchard et al., 1991).

These developments, in the face of the incentive for layoffs created by the design of the incomes policy and the introduction of unemployment insurance, raise the following question: why was the fall in employment

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1/ In Poland, for example, unemployment insurance benefits were generally 70 percent of a previously employed worker's wage, and 70 percent of the minimum wage for those who had not previously been employed.

2/ These comparisons are on a yearly average basis; output here is sold production of socialized industry.

3/ Expressed as a percentage of the workforce excluding private agriculture.

4/ Early in 1990, many individuals who had not previously been employed, such as housewives, appear to have registered with the labor offices, possibly mainly in order to collect unemployment benefits. In the summer and fall of the same year, the ranks of the unemployed were swelled by school-leavers, individuals who had finished their required military service, and university graduates.

so small? In this paper, a simple optimizing model of a labor-managed enterprise operating under a soft budget constraint will be developed to address this question. This model provides a framework in which the state enterprise's wage and employment decision can be analyzed.

A further important question relates to the implications of the ambitious programs of privatization that have been initiated in many of the reforming socialist economies of Central and Eastern Europe (see e.g., Lipton and Sachs, 1990b; Blanchard and Layard, 1990; Borensztein and Kumar, 1991). Privatization, through sales and/or give-aways of state assets, would replace state ownership and worker management with private ownership and management. This introduces a further question: how would enterprises' wage and employment behavior, subject to the same incomes policy, be different after privatization?

The rest of the paper is structured as follows. In section II, a model of a state enterprise is developed and used to assess the implications of a system of wage controls placing a ceiling on the enterprise's wage bill. Section III considers how the results would differ if the enterprise were privatized. Section IV concludes the paper.

II. A Model of a State Enterprise

In this section, a simple model of a state enterprise will be constructed. This model incorporates three characteristic features of a reforming socialist economy. First, the enterprise is assumed to be labor-managed (e.g., Vanek, 1970); more specifically, it maximizes the income of its representative incumbent worker. This may be viewed in terms of reforing socialist economies such as Hungary and Poland where enterprise managers are chosen by enterprise councils representing the workers.

Second, the workers, who are risk averse, are assumed not to have access to a capital market, and thus to be unable to diversify away risk associated with their wages and employment. While this assumption is standard in the literature on implicit contracts in market economies (starting with Azariades, 1975), it seems particularly relevant to a reforming socialist economy, in which financial markets are little developed: in most reforming socialist economies, households have little alternative to bank deposits as a store of value. 1/

Third, it is assumed that the enterprise's net revenues are divided between the state, which takes a share of enterprise profits in the form of taxes, and the workers, to whom after-tax profits are distributed in the form of a premium or bonus in addition to their wages. For simplicity, it is assumed that the state takes a share r of the firm's profits in taxes; this may be interpreted not narrowly as the income tax on profits, but the

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1/ Even where, as in Hungary and Poland, stock markets have been established, only a handful of securities have been traded there so far.

whole set of taxes for which profits are essentially the base. 1/ Taxes on households are ignored, reflecting the fact that these have been relatively small in socialist economies prior to planned tax reforms. 2/ The portion of profits not paid in taxes is paid to employees (including managers) in the form of "premia" or bonuses.

The firm has a production function F(L) which depends only on labor employed, L, and which we assume is strictly monotonic and strictly concave (i.e., that $F'(L) > 0$ and $F''(L) < 0$). We ignore labor heterogeneity, abstracting from the distinction between workers and managers, and assuming that the labor-managed firm maximizes the expected utility of the representative incumbent worker.

The worker maximizes expected utility, where utility depends only on consumption. Consumption is

$$c = \ell(w+b) + (1 - \ell)v \tag{1}$$

where ℓ is the worker's state of employment (0 if unemployed, 1 if employed), w the wage, b the bonus or premium received out of profits, and v the unemployment insurance benefit. We confine the analysis to the case in which w+b > v, so the worker prefers to be employed.

It is assumed that employment for each worker is either 0 or 1; the probability of being employed is

$$\Pr(\ell = 1) = \phi, \ 0 \leq \phi \leq 1. \tag{2}$$

The firm can hire additional workers and keep all of its existing workers, or it can lay off some of its existing workers; we assume that the risk of being laid off falls equally on all workers, so that

$$\phi \leq L/L_o \tag{3}$$

1/ For instance, Tanzi (1991) argues that turnover tax, dividend taxes, profits taxes, and other taxes on enterprises are difficult to distinguish as to their tax base. It is also often argued that the share of tax revenues in profits is negotiated between the state and the enterprise; I have pursued this approach in other papers (Lane and Dinopoulos, 1991, and Dinopoulos and Lane, 1991).

2/ For instance, in Poland in 1989 taxes and dividends on state enteprises constituted 80 percent of total revenues of the state budget, and transfers from (also state-owned) financial institutions another 10 percent; taxes on households and on non-socialized enterprises were each less than 5 percent. Tax reform, replacing some taxes on enterprises with personal income tax and value added tax, was introduced in Hungary in 1988, is planned for Poland in 1992, and is also planned for other reforming socialist economies.

where L_o is the number of workers originally employed.

The premium that each employed worker receives is his share 1/L of after-tax profits: 1/

$$b = (1-\tau)(F(L)-wL)/L \qquad (4)$$

The firm is subject to the incomes policy, which places a ceiling on the wage bill:

$$wL \leq \mu w_o L_o \qquad (5)$$

where w_o is the original wage rate and μ a coefficient. 2/ Here, the price of the output good is taken as numéraire.

The firm's decision is made in the interest of the workers, who dominate the enterprise council. It chooses the wage, employment and the fraction of existing workers laid off, in order to maximize the expected utility of a representative incumbent worker.

$$Eu = \phi u(w+b) + (1-\phi)u(v) \qquad (6)$$

$$= \phi u[(1-\tau)F(L)/L + \tau w] + (1-\phi)u(v)$$

subject to the constraints (2), (3), and (5). Here u(c) is a strictly monotonic and strictly concave utility function, i.e., u' > 0 and u" < 0. This implies that, as in the literature on implicit contracts (e.g., Azariadis, 1975), workers are risk averse and also unable to insure against the risk of being unemployed.

The Lagrangean for the firm's optimization problem can be written as

$$\pounds = \phi U[(1-\tau)F(L)/L + \tau w] + (1-\phi)U(v) + \lambda(\mu w_o L_o - wL)$$

$$+ \lambda_0(L/L_o - \phi) + \lambda_1(1 - \phi) \qquad (7)$$

The first-order conditions for this problem imply that

$$(1-\tau)\phi u'(w+b)[F'(L) - F(L)/L] + \lambda_0(L/L_o) = \phi\tau wu'(w+b) \qquad (8)$$

1/ In practice, the premium that may be paid is also limited by the incomes policy; this was a feature of the 1990 wage law in Poland, for instance. Although this feature could be incorporated in the analysis, we ignore it for the sake of simplicity.

2/ An interpretation is $\mu = (1 + \xi\pi)/\pi$, where π is the inflation rate and ξ the indexation coefficient.

where λ_0 is the Lagrange multiplier associated with the constraint on the probability of employment for the incumbent workers. Also,

$$\lambda_0 + \lambda_1 = u(w+b) - u(v) \tag{9}$$

where λ_1 is the Lagrange multiplier associated with the condition that the probability of employment be less than unity. The usual Kuhn-Tucker conditions apply to multipliers λ_0 and λ_1 and the corresponding constraints: [1]/

$$\lambda_0 \leq 0, \quad L/L_o - \phi \geq 0; \quad \lambda_0 (L/L_o - \phi) = 0 \tag{10a}$$

$$\lambda_1 \geq 0, \quad 1-\phi \geq 0; \quad \lambda_1(1-\phi) = 0 \tag{10b}$$

There are three possible types of solution to this problem. The first is one with $\phi < L/L_o$ so that, from (10a), $\lambda_0 = 0$. In this case, equation (9) implies that

$$\lambda_1 = u(w+b)-u/v) > 0 \tag{11}$$

since $w+b > v$. Thus, given the condition that employed workers earn more than unemployed ones, using condition (9b) it is established that $\phi = 1$. An interpretation of this result is that no new workers are hired unless all existing workers are fully employed.

Using this result in (8), we find that

$$(1-\tau)(F'(L) - F(L)/L) = \tau w \tag{12}$$

Now due to the concavity of $F(L)$, the left-hand side, which is the after-tax difference between the marginal and average product of labor, is negative; the right-hand side, however, is generally positive. This establishes that this case is a vacuous one: a socialized firm operating under a wage bill constraint and maximizing the expected utility of its representative worker will never hire more workers. Through the wage bill constraint, increasing employment reduces the income of the existing work force proportionately, and requires that profits be shared among more workers, without increasing the existing workers' chance of employment. This result is consistent with the observation, mentioned in the Introduction, that new entrants to the labor force appear to have constituted the overwhelming majority of the unemployed after the inception of the 1990 stabilization program in Poland.

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[1]/ There are also Kuhn-Tucker conditions for constraint (5); this constraint always holds with strict equality unless $\phi\tau u'(w+b) = 0$. That is, workers are always paid at least the wage that is legally permitted, provided that the tax rate is positive.

We now turn to distinguishing the second and third cases, in both of which constraint (3) holds with strict inequality, i.e., $L/L_o = \phi \leq 1$. In the second case, there is a corner solution, with $\phi = 1$; this implies that

$$[u(mw_o+b)-u(v)] = [(1-r)(F(L)/L - F'(L)) + r\mu w_o]u'(\mu w_o+b) - \lambda_1 \qquad (13)$$

The first term in equation (13) represents the utility lost by laying off an individual worker; the magnitude of this loss depends on the worker's degree of risk aversion, as well as on how generous is the unemployment insurance payment v. The second term represents the benefit of raising wages at the expense of employment: the utility associated with the taxes saved on the wages paid (which thus do not enter into profits) and the after-tax difference between the average and marginal product of labor (reflecting the fact that, with fewer workers, there are fewer fruits to share, but fewer workers among whom they must be shared). If the losses of expected utility from introducing some unemployment exceed the utility gains, then the firm chooses this solution, fully employing all incumbent workers.

The other possible outcome is an interior solution, with $\phi < 1$, that is with some layoffs. In this case, $\lambda_1 = 0$, so the chosen combination of wages and employment is given by

$$[u(w+b) - u(v)] = [(1-r)(F(L)/L - F'(L)) + rw]u'(w+b) > 0 \qquad (14)$$

together with the wage bill constraint (5). That is, the firm raises wages to the point at which the difference of utility between the unemployed and unemployed states is equal to the marginal utility gains for the remaining workers associated with layoffs--where once again the latter arise from the taxes saved by paying higher wages, as well as the difference between the average and marginal product of labor for the number of workers who can, consistently with the wage bill ceiling, be employed at this wage.

Will the resulting level of employment exceed or fall short of the efficient level? This depends on five different effects, which will, in general, lead employment to differ from the level at which labor's marginal product equals its opportunity cost. First, labor management of the firm, together with the distribution of profits as premia to the currently employed workers, creates a disincentive for expanding the level of employment beyond the point at which the average product of labor is maximized (which, with a production function that is concave throughout, is zero). Second, risk aversion, in the absence of capital markets which might enable workers to hedge against the uncertainty of employment, tends toward over-employment of the existing workforce. Third, unemployment insurance tends to reduce the level of employment by increasing labor's opportunity cost. Fourth, wage controls constrain the level of employment, by introducing a legal tradeoff between employment and wages. Fifth, given these wage controls, taxes create an incentive for higher wages and thus lower employment, since wages charged to the enterprise's costs are deducted in calculating its taxable income. All these effects are reflected in the determination of the level of employment in equation (13) or (14). The

overall result is a level of employment that may be either higher or lower than optimal.

The enterprise's choice of wages and employment can be depicted diagrammatically, as in Figure 1, with the fraction of existing workers employed ϕ on the vertical axis and the wage w on the horizontal axis. Here, the wage bill ceiling (5) is depicted as rectangular hyperbola BB. 1/ Then we depict the worker's indifference curves between wages and probability of employment, which are shown as U_0 and U_1. The slope of these indifference curves is

$$\left.\frac{\partial w}{\partial \phi}\right|_{u_o} \quad \frac{-\phi[u(w+b) - u(v)] + (1-\tau)(F(L)/L-F'(L))u'(w+b)}{\phi^2 \tau u'(w+b)} \tag{15}$$

The negative slope of the indifference curves reflects the fact that both wages and employment are desirable. The indifference curves approach the horizontal axis asymptotically, reflecting the fact that workers must be offered an arbitrarily high wage to remain indifferent as the probability of employment approaches zero. It can also be shown that along an indifference curve $\partial^2\phi/\partial w^2 > 0$, so that the indifference curves have the convex shape shown in Figure 1.

The two frames of Figure 1 illustrate the two possible outcomes under the incomes policy. In the first frame, the corner solution giving rise to full employment is illustrated. This outcome is more likely to result if the loss of expected utility associated with an increased risk of unemployment is high, either because the unemployment insurance benefit is low or because the workers are highly risk averse; it is also more likely to result if the benefit of remunerating workers through wages rather than bonuses is small because the tax rate is relatively low. A higher wage ceiling also makes the full employment solution more likely.

The second frame shows the interior solution which implies that the wage is set at too high a level to be compatible with full employment of the firm's existing workers. The choice of a combination of wages and probability of employment in this case involves a tradeoff between the loss of expected utility associated with the risk of unemployment and the benefit of remunerating workers in the form of (untaxed) wages rather than of bonuses paid out of (taxed) profits.

It has been shown that it is quite possible that optimizing labor-managed firms would not lay off any workers even though the system of wage controls gives them the incentive to do so. Whether this case does in fact materialize has been shown to depend on the tax rate, on the generosity of unemployment insurance benefit, on the severity of the wage ceiling, and on
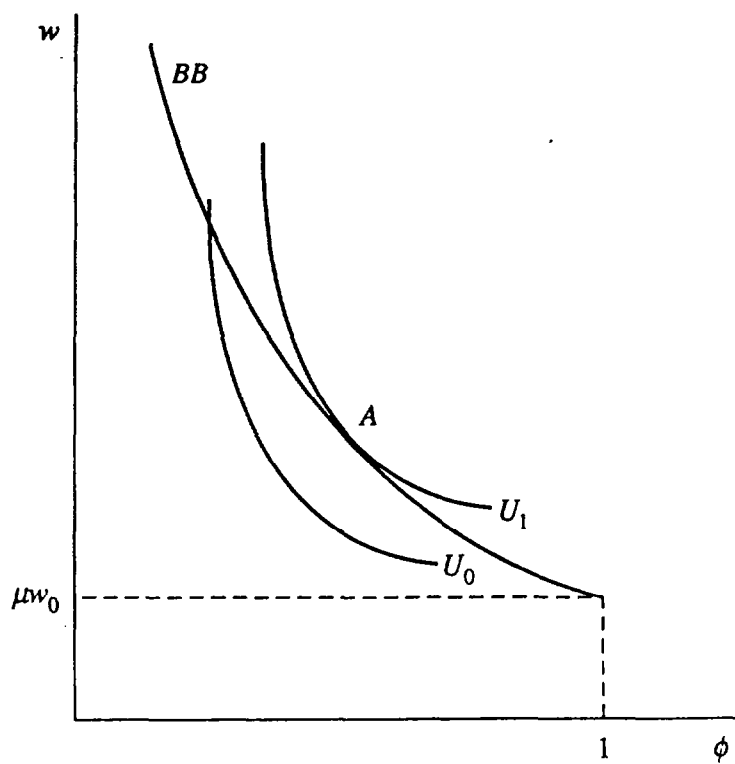

1/ We rule out the case in which this ceiling (5) is not binding, as it is shown above that this case is vacuous.

Figure 1
WAGES AND PROBABILITY OF EMPLOYMENT

(a) Full Employment
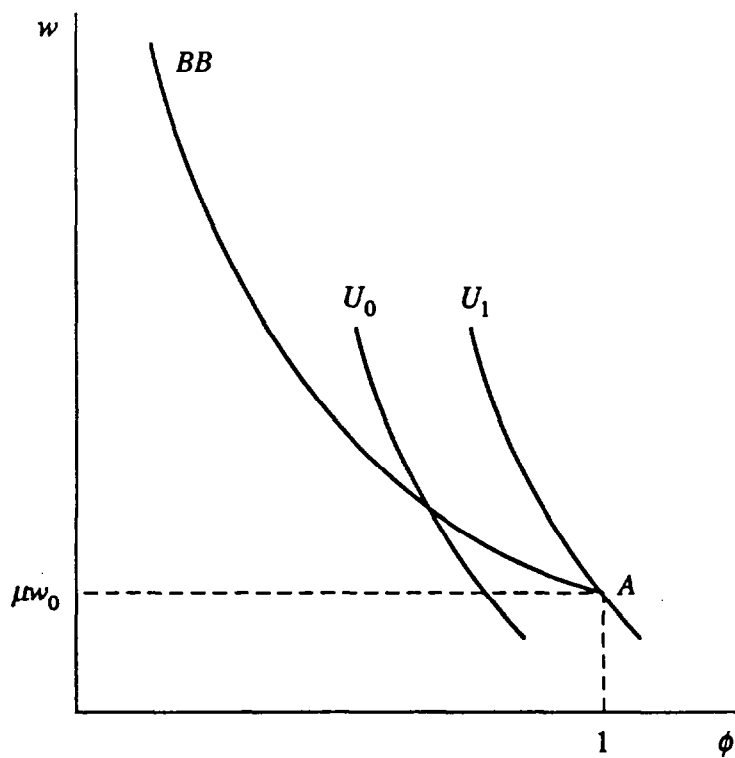
(b) Layoffs

the risk aversion of the workers. Even if there is an interior solution, it may entail some degree of labor hoarding, such that workers are retained even though their marginal product is less than their reservation wage.

The equilibrium described can be explored further by considering the comparative static results in the case in which there is an interior (less than full employment) solution. By totally differentiating optimality condition (14) and constraint (5), and solving simultaneously, we can determine how the firm's wage and employment decisions depend on the unemployment insurance benefit v, the tax rate r, and the indexation ceiling μ. The effects of the unemployment benefit are

$$dw/dv = -wu'(v)/\Delta > 0 \tag{16a}$$

$$dL/dv = u'(v)L/\Delta < 0 \tag{16b}$$

where

$$\Delta = \Delta_1 rw + u'(w+b)F''(L)L - \Delta_1(1-r)(F'(L) - F(L)/L) < 0 \tag{17a}$$

$$\Delta_1 = u''(w+b)\{(1-r)[F(L)/L - F'(L)] + rw\} < 0 \tag{17b}$$

That is, if unemployment insurance is made more generous, the firm raises wages while reducing its employment, since the workers then attach less importance to the risk of being thrown out of work.

The effects of the tax rate are

$$dw/dr = -w[u'(w+b)rF'(L) + \Delta_1(w-F(L)/L)]/\Delta > 0 \tag{18a}$$

$$dL/dr = L[u'(w+b)rF'(L) + \Delta_1(w-F(L)/L)]/\Delta < 0 \tag{18b}$$

A sufficient condition for the signs given in (18a) and (18b) is that the firm's profits are non-negative.

Thus a higher tax rate induces the firm to make more of its payments to workers through wages, which are untaxed, rather than through distributions of profits, even though this entails lower employment.

Finally, the effects of the indexation ceiling itself are

$$dw/d\mu = [u'(w+b)F''(L) - \Delta_1(1-r)(F'(L)/L - F(L)/L_0)] L_0/\Delta > 0 \tag{19a}$$

$$dL/d\mu = \Delta_1 r_0 L_0/\Delta > 0 \tag{19b}$$

That is, if the indexation ceiling is made more lenient, the firm responds partly by raising wages and partly by expanding employment.

Thus, it has been shown that a ceiling on wage bills may induce socialized firms to reduce their employment, especially if this measure is accompanied by the introduction of a generous unemployment insurance

scheme, and in an environment in which a large proportion of enterprise profits are returned to the government through dividend and other taxes, while wages are largely untaxed. Whether or not this result is desirable depends on whether employment is above or below its efficient level at which the worker's marginal product equals his social opportunity cost. The level of employment as given by (14) may either exceed or fall short of the efficient level, so the employment effects of an incomes policy may be either favorable or unfavorable to allocative efficiency.

III. Privatization

So far, the behavior of wages and employment in a state enterprise faced with wage controls has been considered. This raises the following question: what are likely to be the consequences of privatizing these state enterprises--that is, selling or giving away existing state enterprises to private owners?

Privatization would alter the enterprise's employment decisions for two immediate reasons. First, unlike in the labor-managed case, hiring more workers would not reduce existing workers' share of the firm's profits, and thus would not provide a disincentive to increasing employment. On the other hand, a worker discharged from a private firm would lose only his wage, and not a share of the firm's profits; this would reduce the disincentive to lay off workers whose marginal product is less than their opportunity cost. As a result, the net effect of privatization on employment may be ambiguous. The result would depend on the structure of the labor market. Let us consider, in turn, two alternatives: the case of a perfectly competitive labor market, and the case in which wages and employment in the privatized firm are determined by bargaining between the profit-maximizing new owners and a labor union representing the workers.

1. Competitive labor market

If the firm faced a competitive labor market with wage w_m, it would have to offer this wage in order to keep its workers, and to carry out whatever hirings or layoffs required to satisfy the ceiling on the wage bill. This situation may be depicted graphically in Figure 2. The wage bill constraint is shown as BB. Curves labelled Π_0 and Π_1 are the firm's iso-profit contours, defined by the equation

$$d\Pi = [F'(L)\partial L - wdL - Ldw](1-r) = 0 \qquad (20)$$

The slope of each iso-profit curve is

$$(21) \qquad \left.\frac{dw}{d\phi}\right|_{\Pi_o} = \frac{F'(L) - w}{\phi}$$
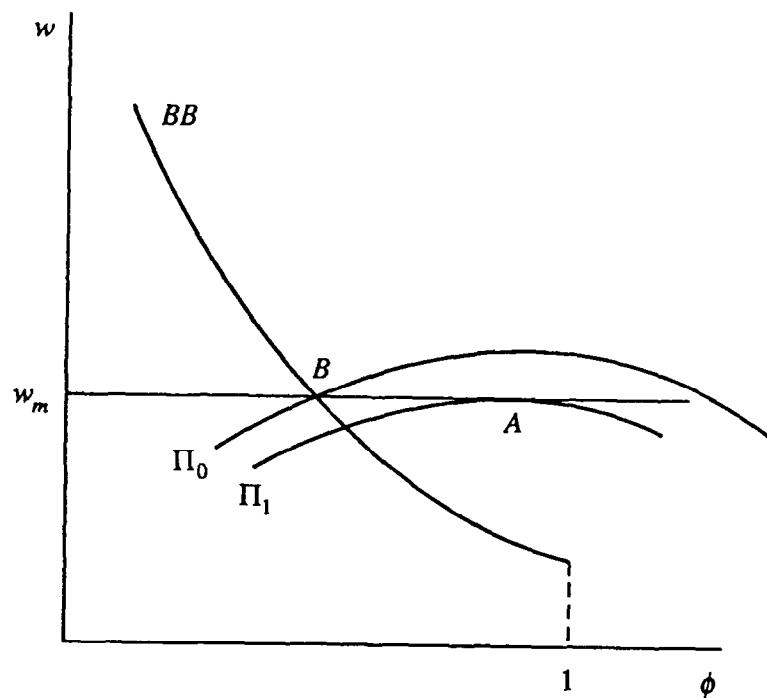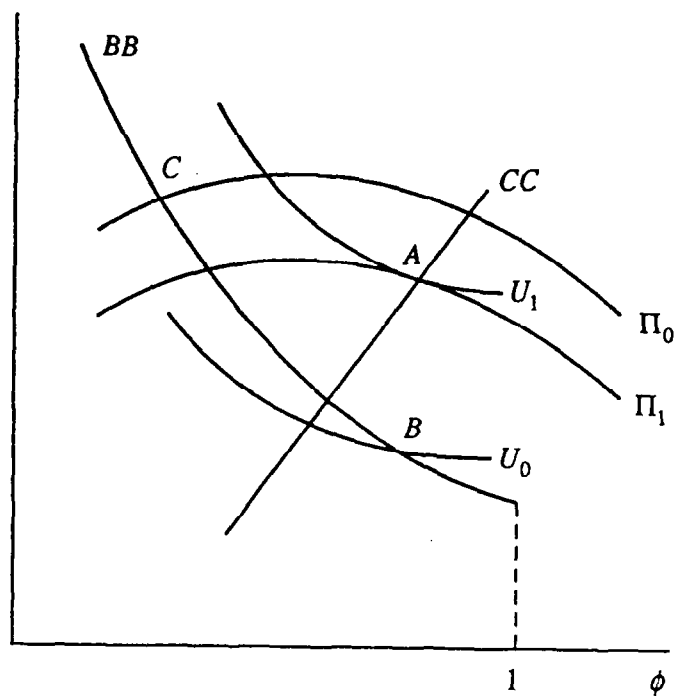
Figure 2

COMPE TITIVE LABOR MARKET

Figure 3

UNION BARGAINING

Notice that even if the privatized firm is subject to taxes at rate r, these do not affect its iso-profit contours and thus do not affect its choices between wages and employment; this is in striking contrast to the socialized firm analyzed in the previous section, whose decisions were strongly affected by taxes as shown by equations (18a) and (18b). The reason is that the privatized firm maximizes after-tax profits, whose relationship to pre-tax profits is unaffected by wage and employment decisions. Conversely, for the socialized firm, maximizing its employees' expected utility, taxes have an important influence on the relative attractiveness of wages and premiums.

In the absence of an incomes policy, a (profit-maximizing) privatized firm in a competitive labor market, facing a given wage w_m, would hire labor to reach point A, at which an iso-profit curve is horizontal at the market wage. With an incomes policy, the firm is restricted to combinations of wages and employment falling within the constraint BB; if its unconstrained profit maximizing point A is no longer attainable, it chooses point B, the maximum profit point on the BB curve.

In this competitive case, the incomes policy initially affects each firm's employment decision. The mechanism whereby wages are affected in this case is that the resulting unemployment would exert downward pressure on the market wage.

2. Union bargaining

Next, let us briefly consider the case in which the existing workers belong to a union, which bargains on their behalf. The workers' preferences can be represented by a family of indifference curves represented as U_0, U_1, etc. The equation of these indifference curves is

$$dEu = u(w)d\phi + \phi u'(w)dw - u(u)d\phi \qquad (22)$$

and their slope is

$$\left. \frac{dw}{d\phi} \right|_{U_0} = \frac{u(w) - u(v)}{\phi} \qquad (23)$$

Note that the indifference curves of unionized workers differ from those of the socialized firm, whose slope is given in equation (15). The reason is that, in a private firm, a worker who is laid off loses only his wage, and does not, as in the case of a socialized firm, also lose his share of the firm's profits; the union is therefore somewhat less hostile to unemployment under privatization.

Figure 3 shows the union's family of indifference curves, together with the firm's iso-profit curves. Let us assume that bargaining is efficient, in the sense that the bargaining solution is Pareto optimal with respect to

the two parties to the bargain; 1/ an example of efficient bargaining is the familiar Nash bargaining solution (Nash, 1950).

In the absence of a wage bill ceiling, efficient bargaining would give rise to a combination of wages and employment like A, where the union's and firm's indifference curves are tangent. The point reached by bargaining lies on the contract curve labelled CC; which point along the contract curve point is achieved depends upon the relative bargaining strength of firm and union. 2/

The wage bill ceiling may make the unconstrained wage-employment bargaining solution A infeasible; the conditions under which this occurs are derived in the Appendix. The constrained contract curve includes a portion of the unconstrained contract curve CC plus a portion of the wage constraint curve BB. If the wage controls are binding, the bargaining solution lies on BB, at a point giving each party a value of its objective function (expected utility or profit) at least equal to that which it could achieve in the absence of an agreement. The solution, as shown in Figure 3, would thus lie on BB between points B amd C, at which respectively the indifference curve corresponding to a wage equal to the unemployment benefit, U_0, and the iso-profit curve corresponding to zero profits, Π_0, intersect BB. If the wage bill constraint is binding as assumed here, the solution will generally entail both a lower wage and a lower probability of employment than the unconstrained bargaining equilibrium A.

We can also consider how the bargaining outcome differs from the choice of the labor-managed firm: this can be examined by considering the implications of increasing the owner's bargaining power from an initial level of zero (which corresponds to the labor-managed case). This issue is examined formally in the Appendix; the result is that an increase in the owner's bargaining power usually leads to lower wages and higher employment, given the constraint on the total wage bill.

In conclusion, the implications of an incomes policy that imposes a ceiling on each enterprise's wage bills would be different after privatization. The precise nature of the difference, however, would depend upon the nature of the labor market established. If a competitive labor market were established, the incomes policy would have a direct effect only on employment, affecting wages only indirectly through the downward pressure that unemployment exerts on wages. If, however, privatization gives rise to bargaining between the new owners and a union in each firm, both wages and

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1/ This does not necessarily imply Pareto optimality in a broader sense, where third parties are affected by the outcome of bargaining. In the present context, the outcome of bargaining affects tax revenues and the costs of umemployment insurance, and this is not taken into account in the bargaining solution.

2/ Wage and employment bargaining is considered in more detail in Lane and Dinopoulos, 1991, and Dinopoulos and Lane, 1991. See also, for instance, McDonald and Solow, 1981.

employment would be affected by the wage controls; the precise effect would depend on the production function, the workers' attitude to risk, and the policy variables (viz. the unemployment insurance benefit and the wage indexation coefficient) as well as on the relative bargaining strengths of owners and union.

IV. Conclusion

In this paper, the implications of a ceiling on a socialized enterprise's wage bill have been examined, and the circumstances under which it would result in layoffs have been considered. It has been shown that the ceiling may affect both wages and employment, and that this effect is influenced by the generosity of unemployment insurance benefits, as well as by the proportion of the firm's profits that it is required to return to the government in the form of dividends or taxes. It has also been shown, however, that given the risk aversion of the workers, and their inability to hedge this risk as a result of underdeveloped capital markets, it is possible that there will be labor hoarding despite the incentive of the labor-managed enterprise to lay off workers. This possibility may, in part, account for the fact that the decline in employment in state enterprises under the recent stabilization plans in Eastern and Central Europe has been small in relation to the decline in output. One way of viewing the model is that it predicts stagnation of employment: it predicts that although there may be few layoffs, there will also be no new hiring. This is consistent with the experience of reforming socialist economies, where the vast majority of the unemployed (at least for the first year of the program) have been new entrants to the labor force.

As emphasized earlier, a reduction in employment in state enterprises is not necessarily undesirable in a reforming socialist economy, where there has generally been labor hoarding, and some layoffs and/or shutdowns are needed to enable new firms to be established.

Several extensions of the analysis are possible. One aspect of the incomes policies in socialist economies in practice is that exceptions to the wage controls have often been made, under pressure from the enterprises and their workers. The process of bargaining for such exceptions between the labor-managed enterprise and the state could be examined in the frame-work of a bargaining model; this is one interpretation of the bargaining over wages and employment between a state enterprise and the government as modelled in Lane and Dinopoulos, 1991, and Dinopoulos and Lane, 1991.

Another issue that has not been addressed here is the enforcement of the incomes policy. In some countries, such as Poland, the incomes policy is a tax-based, rather than a mandatory one: enterprises whose wage bills are above the ceiling face high and sharply progressive taxation on the excess. In practice, some enterprises have chosen to violate the wage ceilings and pay the excess wage tax. The circumstances under which a labor-managed enterprise would optimally choose to violate the ceilings-- particularly in a dynamic context, in which the managers' expectations about

the future rates of wage tax, and their perception of the effect of current
wage increases on the base on which future indexation will be permitted, may
play a role--may be an interesting topic for further research.

In this Appendix, Nash bargaining subject to a wage bill ceiling is examined formally, and conditions derived under which the wage ceiling will be binding. It is assumed that the basic structure is the same as in Section 2; in particular, it is assumed that the firm can pay a non-negative bonus out of after-tax profits, and that any such bonus is not subject to the wage bill constraint. It is assumed that the owner's and the workers' threat points are zero profits and unemployment, respectively.

The generalized Nash bargaining problem can be written as follows:

$$\max H = V^{1-\alpha}\Pi^{\alpha} \tag{A1}$$

where $V = \phi u(w+b) + (1-\phi)u(v)$

$$\Pi = (1-\tau)(F(L) - wL) - bL$$

and where α is a parameter reflecting the bargaining power of the workers and the owners, where $0 \le \alpha \le 1$. Note that $\alpha=0$ corresponds to the case of the labor-managed firm presented in section II, while $\alpha=1$ is a profit-maximizing firm.

The product in (A1) is maximized subject to the following constraints:

$$wL \le \mu w_o L_o \tag{A2}$$

$$\phi \le L/L_o \tag{A3}$$

$$0 \le \phi \le 1 \tag{A4}$$

$$b \ge 0 \tag{A5}$$

The Lagrangean for this problem is

$$\pounds = V^{1-\alpha}\Pi^{\alpha} + \lambda(\mu w_o L_o - wL) + \lambda_0(L/L_o - \phi) + \lambda_1(1 - \phi) + \lambda_2 b \tag{A6}$$

This yields the following first-order conditions:

$$\partial\pounds/\partial w = (1-\alpha)\phi u'(w+b)H/V - \alpha(1-\tau)LH/\Pi - \lambda L = 0 \tag{A7}$$

$$\partial\pounds/\partial b = (1-\alpha)\phi u'(w+b)H/V - \alpha LH/\Pi + \lambda_2 = 0 \tag{A8}$$

$$\partial\pounds/\partial\phi = (1-\alpha)[u(w+b)-u(v)]H/V - \lambda_0 - \lambda_1 = 0 \tag{A9}$$

$$\partial\pounds/\partial L = \alpha[(1-\tau)(F'(L)-w) - b]H/\Pi - \lambda w + \lambda_0/L_o \tag{A10}$$

Then combining conditions (A9) and (A10), and using the result (see section II) that (A3) holds with strict equality, we find

$$\{(1-\alpha)\Pi[u(w+b)-u(v)] + \alpha VL_o[(1-\tau)(F'(L)-w) - b]\}H/\Pi V = \phi\lambda \tag{A11}$$

Now if the wage controls are <u>not</u> binding, then $\lambda = 0$. This means that, since the first term in brace brackets must be positive, the second must be negative, i.e. $(1-\tau)(F'(L) < (1-\tau)w - b$. That is, in the unconstrained bargaining equilibrium, there is some labor hoarding, as labor is hired beyond the point at which its after-tax marginal product equals its tax-adjusted cost.

Next, consider conditions (A9) and (A10). These can be solved to yield

$$\lambda_2/L = - \lambda + \alpha\tau LH/\Pi \tag{A12}$$

This implies that, if the wage bill constraint is not binding, so that $\lambda = 0$, then the non-negativity condition on the bonus must be binding, because then $\lambda_2 = \alpha\tau H/\Pi > 0$. The intuition is simply that no firm will pay a bonus out of after-tax profits without first using up all the room under the ceiling on wages charged to costs, since wages are tax-deductible. 1/

If the wage constraint is binding (and assuming that there is a positive bonus paid to the workers so that $\lambda_2 = 0$), equations (A11) and (A12) can be solved for the level of employment.

$$(1-\alpha)\Pi[u(w+b)-u(v)] + \alpha VL_o[(1-\tau)(F'(L)-w) - b] = \phi\alpha\tau LV \tag{A13}$$

Next, let us examine the effect of privatization on wages and employment. This can be considered by totally differenting equation (A13), and the wage constraint (A2). Then, let us consider the limiting case of $\alpha=0$ which approximates a labor-managed enterprise, and consider the effect of increasing the bargaining power of the owner (from zero). In this case,

$$\partial w/\partial \alpha = -\{\phi\tau L - L_o[(1-\tau)(F'(L)-w)-b]\}wV/\{[u(w+b)-u(v)]L[(1-\tau)F'-b]\} \tag{A14}$$

This expression is negative provided that the bonus is less than the marginal product of labor $(b < F'(L))$. In this case, a private owner operating under a wage bill constraint will bargain for lower wages and more employment than would be chosen by a labor-management enterprise.

1/ The converse is not true, however: a firm that is constrained by wage controls may or may not pay a bonus.

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