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## TRADE UNION BARGAINING, PRIVATIZATION AND ADJUSTMENT MEASURES\*

Anindya SEN and Bibhas SAHA

*Abstract.* This paper employs a generalized Nash bargaining solution to show that in the presence of strong trade union bargaining power, the privatization of a monopoly public sector enterprise increases social welfare. Two adjustment measures to reduce the adverse employment impact of privatization—a wage cut policy and a severance pay policy—are next examined. The wage cut policy is superior to the severance pay policy. However, the two policies are never simultaneously available.

### 1. INTRODUCTION

One of the major criticisms of the workings of public sector enterprises (PSEs) in many countries has been that the growing trade union power in these enterprises leads to overemployment and associated inefficiencies. It has been suggested that privatization can counteract these tendencies because it will be a credible commitment to “hard” policies towards trade unions.<sup>1</sup> Because of this perception, a movement towards privatization of the PSEs has gained momentum. The U.K. under Mrs. Thatcher took the lead and has since been followed by other developed countries as well as many LDCs [see Pirie (1985)].

The present paper is an attempt to examine the effect of privatization of a PSE on social welfare in the presence of bargaining with trade unions. Output and wage decisions in a monopoly PSE are taken on the basis of bargaining between the manager and a trade union. The trade union wants to maximize the expected utility of its members. Before privatization, the manager of the PSE is instructed to maximize social welfare. After privatization, the management’s aim becomes to maximize profit. The generalized Nash bargaining solution is employed as the necessary outcome of bargaining between the manager and the trade union. It is shown that privatization will lead to an improvement in social welfare if and

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<sup>1</sup> The same type of considerations often come into play in takeover decisions. Bhagat, Shleifer and Vishny (1990) point out that existing managers in private firms may be unwilling to reduce employment to the required levels and this provides the raider with a possible source of cost savings after takeover.

only if the relative bargaining strength of the trade union is stronger than that of the manager of the PSE.

However, the large scale unemployment resulting from privatization is bound to create severe political unrest.<sup>2</sup> Hence, privatization, to be successful, must be accompanied by changes in the policy regarding displacement of workers. It therefore becomes necessary to investigate alternative measures to lessen the adverse transitory effects of privatization. This paper examines the possibility of (a) wage cuts, keeping employment intact and (b) severance pay to displaced workers. It is shown that a wage cut (in a sense to be made more precise later on) is the optimal policy option from a welfare point of view. However, in our model, the two policies are never simultaneously available.

The next section sets out the basic model and obtains the condition under which privatization can improve social welfare. Section 3 discusses measures of adjustment during the transition period and examines their optimality and feasibility. Section 4 concludes the paper.

## 2. THE MODEL

The PSE is a monopoly which enjoys constant returns to scale. Labor is the only input, so that the production function is of the form  $X = kL$ , where  $X$  is output and  $L$  is labor input. We normalize by setting  $k$  equal to one. The cost function is then  $C = wX$ , where  $w$  is the wage rate;  $w \geq w_u$ , where  $w_u$  is the workers' reservation wage. This reservation wage can also be interpreted as unemployment welfare, i.e., all the benefits the worker would receive if he were not employed by the PSE. It therefore consists of several elements—unemployment benefits, the value of leisure, the value of working around the house, the expected value of alternative employment opportunities, etc. The PSE faces a linear inverse demand curve:  $P = a - X$ . It is assumed that  $a > w_u$ .

Suppose that there are  $N$  workers affiliated with the union, each owning one unit of indivisible labor. Each member has probability  $L/N$  of having a job and getting income  $w$  and a probability  $(1 - L/N)$  of being unemployed and getting  $w_u$ . Each worker has a concave utility function  $(w - w_u)^\tau$ ,  $0 \leq \tau \leq 1$ . The expected utility of each worker is then  $(L/N)(w - w_u)^\tau$ , so that the objective function of the union is then

$$U = L(w - w_u)^\tau \quad \text{or} \quad X(w - w_u)^\tau.^3$$

Let  $M$  be the objective function of the manager of the PSE. In a non-

<sup>2</sup> Public sector union workers in India went on strike in 1987 and in 1988, demanding, among other things, a halt to the policy of privatization. On March 7, 1988, all major opposition groups in the Upper House of the Indian Parliament staged a walkout, protesting against the decision to privatize Scooters India Ltd. Similar opposition is reported from Pakistan and Nigeria.

See Ramanadham (1989) for further details.

<sup>3</sup> See McDonald and Solow (1981) and Ohyama (1989).

privatized PSE, the manager is instructed to maximize social welfare, while in a privatized PSE he is instructed to maximize profits. Hence

$$M = \begin{cases} SW = \int_0^X P(z)dz - wX & \text{in the non-privatized PSE} \\ \pi = (P - w)X & \text{in the privatized PSE.} \end{cases}$$

(i) The non-privatized PSE.

Output and wage decisions within the PSE are taken on the basis of bargaining between the manager and the trade union. Kalai's generalization of the Nash bargaining solution is used to model the objective function of the PSE (Kalai, 1977, Ohyama, 1989). Output and the wage rate are therefore chosen as if to maximize

$$S = M^b U^{1-b}, \quad 0 < b < 1, \quad (1)$$

where  $b$  (resp.  $1 - b$ ) represents the relative bargaining strength of the manager (resp. trade union). In the non-privatized PSE, output and wage rate are chosen to maximize

$$S = \left[ \int_0^X P(z)dz - wX \right]^b [(w - w_u)^\tau X]^{1-b} \quad 0 < b < 1. \quad (2)$$

We assume that  $0 < b < 1$  to model the fact that the trade union always has some bargaining power. To keep things simple, the threat point for the manager is assumed to be 0 (both social welfare and profits are zero when output is zero). The benchmark situation is  $b = 1$ , i.e. a situation where the trade union has no bargaining power, and the PSE is managed to maximize social welfare. Obviously, the manager will then set the price equal to opportunity cost  $w_u$  and produce an amount  $a - w_u$ .

Assuming positive output and social welfare at equilibrium, the first order conditions  $\delta S / \delta X = 0$  and  $\delta S / \delta w = 0$  yield

$$X^* = \frac{2(a - w_u)}{1 + b^*}, \quad w^* = \frac{(1 + b)w_u + \tau a(1 - b)}{1 + b^*}, \quad P^* = \frac{2w_u - a(1 - b^*)}{1 + b^*}$$

where  $b^* = b + \tau(1 - b)$ . Note that  $b^* = 1$  if  $\tau = 1$ .

**LEMMA 1.** *Price is set below the wage rate. For  $\tau < 1$ , there is overemployment as compared with the situation where the PSE maximizes social welfare.*

*Proof.* 
$$P^* - w^* = \{(1 - b)(w_u - a)\} / (1 + b^*) < 0.$$

Also, for  $\tau < 1$ ,  $b^* < 1 \Rightarrow 1 + b^* < 2 \Rightarrow X^* > a - w_u$ .

(ii) The privatized PSE.

When the PSE is privatized, the manager is instructed to maximize profits.

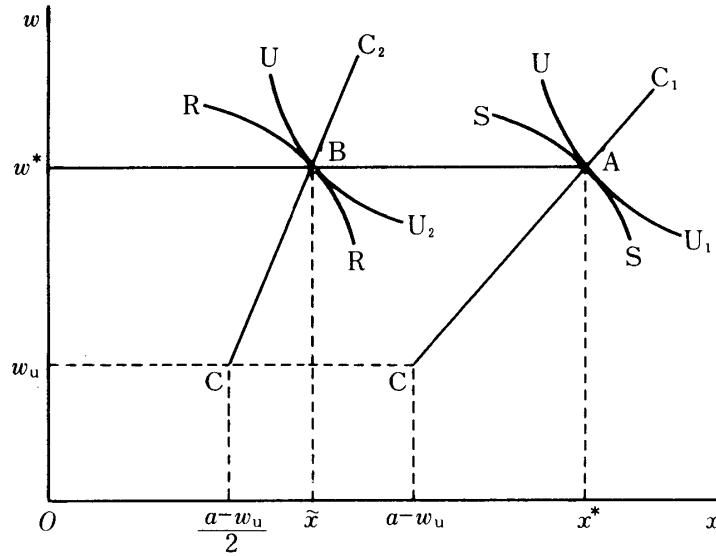


Figure 1.

Therefore the output and wage rate in this situation are chosen as if to maximize

$$S' = [(P-w)X]^b [(w-w_u)^{\tau} X]^{1-b}.$$

Solving the first order conditions, we obtain the equilibrium values

$$X^{\sim} = \frac{a-w_u}{1+b^*}, \quad w^{\sim} = \frac{(1+b)w_u + a\tau(1-b)}{1+b^*}, \quad P^{\sim} = \frac{w_u + ab^*}{1+b^*}.$$

LEMMA 2. *In the privatized PSE, the price is set above the wage rate, and there is underemployment.*

*Proof.* We can show that  $P^{\sim} - w^{\sim} = b(a-w_u)/(1+b^*) > 0$ . Moreover,  $X^{\sim} < a-w_u$ , which proves the second part of the lemma.

Note that the wage rate is unchanged between the two equilibrium situations. Figure 1 illustrates these outcomes. The line  $CC_1$ , obtained by equating the slopes of the union indifference curves (such as  $UU_1$ ) and the iso-social welfare curves (such as  $SS$ ) represents the contract curve in the non-privatized PSE. Point A corresponds to the Nash bargaining solution. The contract curve  $CC_2$  corresponds to the privatized PSE and point B to the bargaining outcome. The slope of the contract curve  $CC_2$  is twice that of  $CC_1$ . Note that the two contract curves are linear and B corresponds to the same wage rate but a smaller employment level as compared with point A. Consequently, the union's utility in the privatized PSE is less.

We can now compare social welfare before and after privatization. Denoting the expressions for social welfare before and after privatization by superscripts \* and  $\sim$  respectively, we get

$$SW^* = \frac{2b(a-w_u)^2}{(1+b^*)^2} \quad \text{and} \quad SW^\sim = \frac{(a-w_u)^2(2b+1)}{2(1+b^*)^2} \quad (3)$$

PROPOSITION 1. *Social welfare before privatization is greater than, equal to or less than that after privatization according as  $b$  is greater than, equal to or less than  $1/2$ .*

*Proof.* The proof follows from comparing  $SW^*$  with  $SW^\sim$ .

Thus when the relative bargaining strengths of the manager and the trade union are equal, ( $b=1/2$ ), it does not matter whether the manager is instructed to maximize social welfare or profit: the same level of social welfare is reached. However, if the manager's bargaining strength is less than the trade union's, ( $b < 1/2$ ) privatization will lead to an improvement in social welfare. The reason is that when the trade union has more bargaining power, it pays to delegate decisions to a profit-maximizing manager. The profit-maximizing manager always tends to choose an output below what would have been chosen by a social welfare maximizing manager. Hence, privatization is a *credible commitment* to a lower output and employment, and when decisions are reached via bargaining with a trade union that wants to maximize the wage bill, it provides a means of offsetting the trade union's goal and improving social welfare. Note that the trade union always loses under privatization. The loss in wage bill is  $w^*X^* - w^\sim X^\sim = w(a-w_u)/(1+b^*)$ , noting that  $w^* = w^\sim = w$ .

### 3. ADJUSTMENT MEASURES

Suppose that the trade union in our model is more powerful than the manager and hence privatization is expected to increase social welfare. However, the very redundancy of labor in the nonprivatized PSE creates powerful lobbies who oppose privatization tooth and nail.<sup>4</sup> To reduce such opposition, various measures can be taken to minimize the disruption caused by privatization. These include wage cuts, severance pay, redeployment, training and retraining programs and offer of shares in the enterprise to workers. We examine two such measures.

#### A. *Wage Cut Policy*

One way of diffusing opposition to privatization is to provide employment guarantee to the workers holding jobs. For example, while privatizing leading textiles and leather companies, Spain has included in the sales contracts the requirement that employees be retained for at least three years after privatization.<sup>5</sup> However, to make privately-run firms profitable under such conditions, the government must allow cuts in wages and other benefits. We now examine

<sup>4</sup> Realization of this possibility led British policy-makers to deal consistently and systematically with redundancies of labor before launching on to privatization. See Ramanadham (1989), pg. 30.

<sup>5</sup> See "Up for Grabs", Time International Edition, April 18, 1991.

this possibility. Since the wage rate is endogenously determined in this model, a wage cut refers to a fall in  $w_u$ .

It has already been noted that the reservation wage rate consists of several components. Thus a fall in  $w_u$  can be effected in a number of ways. The government can pass legislation lowering the minimum wage rate. But since this may not be politically feasible, other means have been employed to achieve the same results. For example, the government can deliberately pursue a policy of non-enforcement of minimum wage legislation. Or it can allow the employment of “contract” workers who typically are employed by intermediaries and are willing to accept less than the wages perceived to be reservation wages by the regular workers.<sup>6</sup>

Before privatization, employment is  $L^* = 2(a - w_u)/(1 + b^*)$ . Consider then a new reservation wage  $w_0$  that will enable the firm to employ  $L^*$  workers even after privatization. In the privatized PSE, employment is  $L^\sim = (a - w_0)/(1 + b^*)$ . Setting  $L^* = L^\sim$ , we obtain  $w_u - w_0 = (a - w_u) > 0$ , which is the extent of the wage cut needed to retain  $L^*$  workers.

Now introduce an individual rationality condition in the form of  $w_0 \geq 0$ . This implies  $w_u \geq a/2$ .

**LEMMA 3.** *If all the workers are sought to be retained in the privatized PSE, the extent of the necessary wage cut is independent of the relative bargaining powers of the manager or the trade union. For a wage cut policy to be successful, the original level of reservation wage must be high enough.*

This is a commonsensical result. If the reservation wage rate in the non-privatized PSE is quite high to begin with, only then will the equilibrium wage rate be high enough to permit a wage cut to be a feasible option. Otherwise, there will be little scope for a wage cut to make it optimal for the privatized firm to employ the same amount of labor as before.

Since a wage cut is like a reduction in costs, we expect social welfare to increase with the wage cut. Proposition 2 states this result:

**PROPOSITION 2.** *Social welfare after privatization with a wage cut is higher than (a) social welfare before privatization without any wage cut and (b) social welfare after privatization without a wage cut.*

*Proof.* The proof follows from noting that social welfare after privatization with wage rate  $w_0$  is

$$SW^\sim(w_0) = \frac{(a - w_0)^2(2b + 1)}{2(1 + b^*)^2}$$

<sup>6</sup> The Contract Labour Act of 1970 in India allows for the employment of labourers by intermediaries (or “contractors”, as they are called) in many industries. Such workers are technically not the employees of the firm and hence do not enjoy a number of benefits available to the regular employees.

and comparing with the expressions for social welfare in (3).

### B. Severance Pay Policy

One can next explore the possibility of displacing some workers and providing them with compensation. From the society's point of view, the maximum amount to be paid as severance pay to the workers who lose their jobs should not exceed the gains to privatization. With an unchanged wage rate, the gain to privatization will be

$$G = \frac{(a - w_u)^2}{(1 + b^*)^2} \left\{ \frac{(1 - 2b)}{2} \right\}$$

Obviously, the gains are positive for  $b < 1/2$ .

The number of displaced workers will be  $(a - w_u)/(1 + b^*)$ . If  $c$  is the amount of compensation paid per unemployed unit of labor, then the maximum possible rate of compensation is

$$C_{\max} = \frac{(a - w_u)(1 - 2b)}{2(1 + b^*)}$$

**LEMMA 4.** *The maximum amount of compensation (as severance pay) per unit of labor varies inversely with the reservation wage rate and the bargaining power of the manager.*

*Proof.* The first part is obvious. Moreover,

$$\frac{\delta c_{\max}}{\delta b} = - \frac{(a - w_u) \{ -2(1 + b^*) - (1 - \tau)(1 - 2b) \}}{2(1 + b^*)^2} < 0.$$

The higher  $b$  is (for  $b < 1/2$ ), the smaller are the potential gains to privatization.

The welfare implications follow directly. Since the layoff compensation can be viewed as a pure transfer, social welfare with layoff compensation is just the social welfare with privatization and an unchanged wage rate.<sup>7</sup>

**PROPOSITION 3.** *Even if the entire gains from privatization are distributed as severance pay to the jobless workers, social welfare will be less than that under the wage cut along with no shrinkage in employment.*

A privatization policy is bound to generate strong opposition from the workers about to be displaced. Consider the following hypothetical scenario. Each worker who loses his job needs one period to find a new job that pays the wage rate  $w_u$ . The cost of job search is  $s > 0$ . The best that can be done for the unemployed workers is to pay out the entire gains to privatization as severance pay. If  $c_{\max} = w_u + s$ , then workers will voluntarily accept displacement. Hence, we must

<sup>7</sup> Ordinarily, not all the gains from privatization will be paid out as severance compensation and the administration cost will introduce a distortion factor. If  $g < G$  is paid out and there is a distortion factor of  $k > 1$ , then social welfare will be reduced by  $g(k - 1)$  as a result of the transfer.



have  $c_{\max} > w_u$ , i.e.

$$w_u < a(1-2b)/\{3+2\tau(1-b)\}.$$

**PROPOSITION 4.** *The wage cut policy and the policy of maximum severance pay can never be simultaneously feasible.*

*Proof.* For the wage cut policy to be feasible,  $w_u \geq a/2$  is needed, while for the severance pay policy to be feasible,  $w_u < a(1-2b)/\{3+2\tau(1-b)\}$  must hold. However, we note that for  $1 \geq b > 0$ ,  $a/2 > a(1-2b)/\{3+2\tau(1-b)\}$ . Hence the wage cut and the severance pay policy cannot both be simultaneously feasible.

Obviously, workers may be paid less than the maximum compensation rate. We have set up a scenario to illustrate two possible sources of problems to the available policies. If the initial reservation wage rate is too low to begin with, then the wage in the PSE is also low and a wage cut of the required magnitude may drive employees below the subsistence level. While workers may be willing to accept some reductions in existing benefits, too large a wage cut will be unbearable for them and lead to a political backlash. The higher the reservation wage rate to begin with, the more the ability of workers to accept wage cuts. On the other hand, if the reservation wage rate is too high to begin with, then it will be difficult to provide a satisfactory level of compensation to the displaced workers.<sup>8</sup>

#### Risk-neutral workers

It is interesting to analyse briefly the situation where workers are risk-neutral, i.e.  $\tau=1$ . In this case, there is no overemployment in the non-privatized PSE:  $X^* = a - w_u$  and  $P^* = w_u$ , so that the socially optimal amount of output is produced and price is set equal to the reservation wage rate. However, the union's bargaining power enables it to wrest a wage rate higher than the reservation level from the manager, so that the enterprise runs at a loss. Thus the concavity of the utility function for workers is responsible for the overemployment result. However, all the other results go through with suitable modifications to the relevant expressions.

#### 4. CONCLUSION

A simple model was developed to examine the rationale for privatizing a PSE in the presence of trade union bargaining power. It was found that in the absence of privatization, there will be overemployment and pricing below marginal cost, leading to losses for the PSE. If the PSE is privatized, on the other hand, there

<sup>8</sup> A. S. Jayawardena (in Ramanadham, 1989), notes that in Sri Lanka, working in the public sector carries prestige and recognition quite out of proportion to income. This will of course make it more difficult to design attractive levels of severance pay. The search costs can be reinterpreted to include the valuation workers place on public sector jobs over and above their income.

is underemployment, pricing above marginal cost and hence positive profits for the enterprise. When the relative bargaining strength of the trade union is greater than the manager's, privatization of the PSE improves social welfare. These results lend support to the generally held perceptions about the workings of PSEs.

The reduction in employment associated with privatization may create severe adjustment problems. Two measures to ease the adjustment process were considered—a wage cut policy and a severance pay policy. Since wages are endogenously determined in this model, a wage cut refers to a lowering of the reservation wage rate. When the reservation wage rate is “high”, the wage rate in the non-privatized PSE will also be high and it will be possible to cut wages sufficiently to retain all the workers in the privatized firm. For this, the reservation wage rate must be high enough. On the other hand, the displaced workers can be given severance benefits. This policy is available if the reservation wage rate is low to begin with. Our analysis therefore highlights the fact that the adjustment policies depend for their availability and effectiveness on the overall institutional context, which is summarized through the reservation wage rate. We found that the wage cut policy, if possible, leads to a higher level of social welfare than any other situation analyzed. However, these policies will not be simultaneously available. The level of the reservation wage rate may then force the policy maker to take a sub-optimal decision. Our analysis therefore points to the need for a detailed study of the cost conditions of the firms that are about to be privatized and careful evaluation of the feasibility of alternative adjustment measures in the light of such study.

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