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## Revenue-sharing subsidies as employment policy: Reducing the cost of stimulating East German employment

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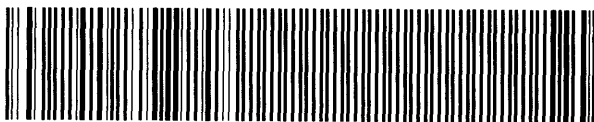
## DISCUSSION PAPER SERIES

No. 783

**REVENUE-SHARING SUBSIDIES AS  
EMPLOYMENT POLICY:  
REDUCING THE COST OF STIMULATING  
EAST GERMAN EMPLOYMENT**

Dennis J Snower

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# REVENUE-SHARING SUBSIDIES AS EMPLOYMENT POLICY: REDUCING THE COST OF STIMULATING EAST GERMAN EMPLOYMENT

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Discussion Paper No. 783  
April 1993

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## ABSTRACT

### Revenue-sharing Subsidies as Employment Policy: Reducing the Cost of Stimulating East German Employment\*

This paper provides a brief overview of the East German employment problem and presents a simple model in which to evaluate two rival policy proposals: wage subsidies and revenue-sharing subsidies. Revenue-sharing subsidies have received little, if any, attention in the ongoing public debate on how to raise East German employment efficiently. This paper suggests that this may be a serious omission. Given the labour market conditions in East Germany today, it is shown that the social and budgetary costs associated with revenue-sharing subsidies may be expected to be lower than those associated with wage subsidies. The intuition underlying this result is that given the structure of wage bargaining in East Germany, wage subsidies may be expected to lead to excessive real wage increases, whereas revenue-sharing subsidies may not. The reason is that revenue- or profit-sharing may be expected to bring the labour market close to full employment even when the associated subsidies are negligibly small, and thus these subsidies can be devoted entirely to the achievement of the government's wage targets. By contrast, negligibly small wage subsidies cannot generate full employment under current East German labour market conditions, and subsidies that are sufficiently large for this purpose may be expected to drive real wages far above the government's wage objectives.

JEL classification: H2, J3, J5, J6, P5

Keywords: employment policy, revenue-sharing, East Germany

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## NON-TECHNICAL SUMMARY

Revenue- or profit-sharing subsidies have received very little consideration in the ongoing public debate on how to raise East German employment efficiently. This paper suggests that this may be a serious omission. Given the labour market conditions in East Germany today, it appears likely that the social and budgetary costs associated with revenue- or profit-sharing subsidies would be lower than those associated with wage subsidies.

The underlying intuition is straightforward. Given the structure of wage bargaining in East Germany, wage subsidies may be expected to lead to excessive real wage increases, whereas revenue- or profit-sharing subsidies may not. The reason is that revenue- or profit-sharing may be expected to bring the labour market close to full employment even when the associated subsidies are negligibly small. These subsidies can thus be devoted entirely to the achievement of the government's wage targets. By contrast, negligibly small wage subsidies cannot be expected to generate full employment under current East German labour market conditions, and subsidies that are sufficiently large for this purpose will drive real wages far above the government's wage objectives.

There is good reason to believe, however, that this by no means exhausts the advantages of revenue-sharing subsidies relative to wage subsidies. Wage subsidies distort the labour-capital ratio, whereas revenue- or profit-sharing subsidies do not. Moreover, in small enterprises where individual workers' labour inputs can have a noticeable effect on the profits of their enterprise, the revenue- or profit-sharing subsidies may be expected to have incentive effects that the wage subsidies cannot reproduce.

Furthermore, it is important to observe that the above-mentioned deficiency of wage subsidies is generally also shared by output, export, credit, and investment subsidies. All of these subsidies tend to increase the marginal value product of labour and thereby raise the amount of economic rent that may be partially appropriated by workers in the wage-bargaining process. These subsidies, like the wage subsidies, thus lead to wage increases, and subsidies that are sufficiently high to ensure full employment may generate real wages far in excess of government targets.

Finally, it is significant that many of the most serious criticisms levelled against the establishment of profit- or revenue-sharing schemes in mature market economies appear to lose much of their force with regard to economies that are in the process of transformation to a market mechanism. It has been asserted, for example, that managers of firms may have a substantial incentive to resist switching from a wage system to a profit- or revenue-sharing system, because

the latter involves revealing revenue information to the employees. Moreover, the insiders in these firms may also have an incentive to resist, since they may be able to achieve higher remuneration under the wage system. It is clear, however, that these problems are likely to be much more pronounced for existing firms that have operated under a wage system in the past and that employ workforces containing a large proportion of insiders. Yet East Germany, like other East European economies, has experienced such substantial shifts in final demand that the establishment of a revenue-sharing system would lead to the destruction of most old firms and the creation of many new ones. Thus it is to be expected that most of the jobs operating under the revenue-sharing system would not involve switching from the wage system and reparameterizing insider contracts, and would thereby avoid the conflicts with the vested interests of incumbent workers and firms.

In view of these various considerations, the analysis above suggests that revenue-sharing subsidies deserve more attention in the policy debate concerning employment stimulation in East Germany – as well as in other East European economies – than they have thus far received.

**REVENUE-SHARING SUBSIDIES AS EMPLOYMENT POLICY:**  
*Reducing the Cost of Stimulating East German Employment*

Dennis J. Snower

**I. Introduction**

This paper provides a brief overview of the East German employment problem and the deficiencies of the current employment policies, and then builds a simple model in which alternative policy proposals can be analyzed. Only two proposals are considered here: (i) wage subsidies, which is perhaps the employment policy that most economists would currently recommend to replace the current array of employment stimuli,<sup>1</sup> and (ii) revenue- or profit-sharing subsidies, which this paper seeks to draw to policy makers' attention. Revenue- or profit-sharing subsidies have received as good as no consideration in the ongoing public debate on how to raise East German employment efficiently. This paper suggests that this may be a serious omission. Given the labor market conditions in East Germany today, it appears likely that the social and budgetary costs associated with revenue- or profit-sharing subsidies would be lower than those associated with wage subsidies.

It would be trivial to analyze other employment policies - particularly output, investment, export, and credit subsidies in the context of the model - and to derive the associated social and budgetary costs, although for brevity I do not do so here. Suffice it to say that the reasons that make revenue-sharing subsidies attractive relative to wage subsidies also apply, with a few modifications, to output and investment subsidies.

As the paper makes clear, there is little if anything in the present analysis that ties the conclusions of this analysis more to East Germany than to other East European economies in the process of transformation to a market system. The case for revenue-sharing subsidies appears equally applicable to, say, Czechoslovakia, Hungary, and Poland.

The intuition underlying the message of the paper, namely, that the revenue-sharing subsidies necessary for full employment may be expected to entail a smaller

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<sup>1</sup>See, for example, Akerlof et al. (1992).

social and budgetary cost than the wage subsidies leading to full employment, is straightforward. Given the structure of wage bargaining in East Germany, wage subsidies may be expected to lead to excessive real wage increases, whereas revenue- or profit-sharing subsidies do not share this disadvantage. The reason is that revenue- or profit-sharing may be expected to bring the labor market close to full employment even when the associated subsidies are negligibly small, and thus these subsidies can be devoted entirely to the achievement of the government's wage targets. By contrast, negligibly small wage subsidies certainly cannot be expected to generate full employment under current East German labor market conditions, and subsidies that are sufficiently large for this purpose may be expected to drive real wages far above the government's wage objectives.

It is worth stressing that this argument is probably a gross understatement of the advantages of revenue- or profit-sharing subsidies relative to wage subsidies, since it does not take account of the incentive effects and factor composition effects of these policies.

Section 2 provides a brief summary of East Germany's current employment problem. Section 3 presents a simple model of the East German labor market and uses it to document the need for government intervention by describing the problems that would arise in the absence of such intervention. Sections 4 and 5 analyze the effects of wage subsidies and revenue-sharing subsidies in this context. Section 6 concludes.

## **2. The Current Employment Problem**

It is widely recognized that the policies the German government has implemented thus far to stimulate East German employment have been inefficient and have incurred an unduly high budgetary cost. The problem, in the opinion of many observers, was not that the government's wage and employment targets were set inappropriately high. It was clear from the outset that the political process of German unification would be not be meaningful unless it was accompanied by a rapid fall in the wage differential between East and West Germany without simultaneously creating a rapid rise in the unemployment differential between these two regions. Either differential, it was recognized, could lead to a massive migration of workers from East to West Germany, thereby reducing the potential for making East Germany productive and putting downward pressure on the real wages and employment



probabilities of West German workers. It was equally clear that it would take some time for the productivity differential between East and West Germany to disappear. The creation of new firms in the east, the dismantling of inefficient organizational practices, the modernization of existing plant and equipment, and the retraining of workers in accordance with demand-led output adjustments were all known to take a significant amount of time.

The upshot of these considerations is that it would be inevitable that East Germany would have to go through a substantial period in which labor incomes exceeded productivity and employment would have to be sustained at level where the marginal product of labor fell far short of the marginal value of time. The implication was that East German employment would have to be subsidized. On all this there was wide agreement. What was up for debate was the form these subsidies would take.

#### *2a. Sources of Inefficiency in Employment Policies Thus Far*

The policies that were in fact implemented were wide-ranging and diverse. There were subsidies for investment, research and development, exports, and credit; these were supplemented by work-creating measures, vocational training schemes, early retirement and transitory retirement regulations, and subsidies for short-time work. In addition, the Treuhandanstalt sought to create employment opportunities through transfers to loss-making firms, debt write-offs, and privatization. This vast array of policies has proved to be seriously wasteful in several important respects.

The absence of clear-cut and general rules on which subsidies to offer to which enterprises in which amounts over which period of time has meant that the Treuhandanstalt has had to consider each case independently. As result, policy implementation has been costly and unnecessarily slow. The process of keeping loss-making enterprises in business through individually negotiated hand-outs has diverted manpower and resources from the privatization process, and has kept resources tied to inefficient production processes and unwanted outputs.

In addition, the case-by-case approach has vastly increased the returns from redistributive battles. Many inefficient East German enterprises found that the payoff from lobbying was higher than that from restructuring. The upshot was doubtlessly a sizeable waste of potential managerial resources and a socially undesirable incentive to use political pressure to maintain the status quo rather

than to reorganize production in accordance with consumer demand.

The absence of effective limits on the Treuhand's budget meant that there were insufficient incentives, on the part of both the Treuhand and the managers of East German enterprises, to keep the costs of restructuring in check. Policy makers made little attempt to subsidize loss-making firms through a cost-minimizing set of policy instruments and managers saw little need to respond to given policies in a cost-minimizing way.

### *2b. Unemployment and Productivity*

As it turned out, the policies above were unable to prevent a dramatic rise in East German unemployment. From the third quarter of 1990 to the third quarter of 1991, the number of registered unemployed in East Germany rose from 359,000 to 1,053,000, leading to a rise in the official unemployment rate from 4.1% to 12.0%. Government intervention to reduce unemployment, both by creating work and by reducing labor supply, has grown enormously over this period, but this growth has been no match for the massive inflows into the unemployment pool. From the third quarter of 1990 to the second quarter of 1991, the number of participants in work-creating measures and further vocational training rose from 22,000 to 370,000.<sup>2</sup> The number of claimant of early retirement and transitory retirement over this period rose from 225,000 to 375,000.<sup>3</sup>

East German productivity, measured in terms GDP per man hour, is far beneath that of West Germany. Franz (1991) estimates of the ratio of East to West German productivity to have been 38.3% in 1989 and 36.8% in 1990. In part, this productivity gap is due to inefficient use of management and administrative practices as well as the large number of East Germans previously employed in the political arms of enterprises and the armed services and national security. In part, it is due to an obsolete capital stock. Koldt (1990) estimated that only 27% of the East German industrial equipment was installed over the past 5 years, in comparison with 40% of the West German equipment. Beyond that, insufficient industrial infrastructure is also recognized to play an important role.

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<sup>2</sup>Observe that the latter figure exceeds the number of registered unemployed in the third quarter of 1990!

<sup>3</sup> See Franz (1991).

This may help explain why West German investment in East Germany has been disappointing. Weichselberger and Jackel (1991) estimate that this investment comprised approximately 4% of gross West German investment in 1990 and 10% in 1991. They cite that the most common problem are those of valuing existing East German firms, followed by insufficient infrastructure, followed by environmental uncertainties and legal problems.

Aside from the productivity gap, East Germany also suffers from the structural problem that workers are employed in inappropriate sectors. Comparisons of the sectoral distribution of employment in East and West Germany are instructive in this context. For example, whereas 9.9% of the East German workforce in 1991 was employed in agriculture, forestry, and fishing, only 3.9% of the West German workforce was employed there. On the other hand, only 0.7% of East German employment was devoted to banking and insurance, the corresponding West German figure is 3.1%.<sup>4</sup>

East German output after unification was clearly not suited to consumer demand, as evidenced by the 67% increase in real East German imports in 1990.<sup>5</sup> Largely due to the massive subsidies to East German exports, real exports in this period grew by approximately 19%. From mid-1990 to mid-1991 industrial production in East Germany fell by approximately 60%.<sup>6</sup>

### *2c. The Wage Setting Process*

Wage settlements turned out to be unexpectedly high, for a variety of complementary reasons. West German unions exerted a strong influence on East German wage negotiations after March 1990. Their objective was the equalization of East and West German wages. In this regard, they had the support of most politicians. Both the West German unions and the politicians appeared to think that the elimination of the wage gap was the most effective way of preventing large migration flows from East to West Germany.

This approach seemed curious to many economists, who pointed out that a closing of the wage differential would lead to a widening of the unemployment differential and that migration tends to be more sensitive to the latter differential

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<sup>4</sup>See Siebert (1991).

<sup>5</sup>DIW Wochenbericht, 25-27/1991, for 27 June 1991, p.382.

<sup>6</sup>DIW Wochenbericht, 39-40/1991, for 26 Sept.1991, p. 556.

than the former. This argument, however, does not take account of the German unemployment benefit system, which makes the size of the unemployment benefits highly dependent on the previously earned wage. Consequently, workers who faced the likely prospect of plant closure had a powerful incentive to press for high wages in order to secure maximal unemployment benefits in the future. This incentive, incidentally, was equally strong for the managers of loss-making firms. Thus none of the parties to these negotiations stood to benefit substantially from wage restraint. For its part, the Treuhand did little to lean against the wind; on the whole, tried not to get involved in wage negotiations.

The resultingly high wage settlements and the associated, generous unemployment benefits undoubtedly did much to moderate migration flows. In view of this effect, the narrowing of wage differentials may well have had a stronger effect in keeping East German workers at home than a narrowing of unemployment differentials would have had.

It is in the context of the above incentive structure that the East German wage developments after unification are to be understood. From the third quarter of 1990 to the second quarter of 1991 the contractual hourly wage rate per full-time East German employee rose 32%, the consumption wage (i.e. the contractual wage deflated by the cost-of-living index) rose by 15%, while the product wage (i.e. the gross hourly wage rate plus 15% for non-wage costs, deflated by the producer price index) rose by as much as 31%.<sup>7</sup>

It is important to emphasize that bargaining over contractual wages through Germany tends to be conducted primarily by sector and geographic region. Moreover, actual wages can exceed the negotiated contractual levels on account of wage drift. The geographical differentiation has meant that there has been no overriding institutional reason for an abrupt equalization of East and West German earnings. The sectoral differentiation combined with wage drift meant that the narrowing of the earnings differential between East and West Germany has proceeded unevenly across sectors. For example, in Jan 1990 the ratio of East to West German earnings in the chemical industry was 27.4%, in construction was 34.0%, and in retail trade was 31.6%. By April 1991, the spread between the earnings differentials had widened

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<sup>7</sup>See National Accounts for East Germany of 21 June 1991, Statistisches Bundesamt, Fachserien 16 and 17; and Franz (1991).

dramatically: 40.2% in the chemical industry, 60.4% in construction, and 50.3% in retail trade.

On the basis of these observations, we now proceed to build a simple model of the East German labor market.

### 3. A Simple Model of the Current Employment Problem

Our model deals with labor market activity in an individual sector of the economy (e.g. construction, food, retail trade). It focuses attention on the value of a job to the firm and the worker. We consider two types of jobs, "old" ones with low productivity and "new" ones with high productivity. Let  $a(N)$  be the real marginal revenue product from a new job in a particular sector, where  $N$  stands for aggregate East German employment in that sector and  $a' < 0$  (diminishing returns to labor), and  $\gamma \cdot a(N)$  be the real marginal revenue product from an old job, where  $0 < \gamma < 1$ .

In line with the German wage setting process, we assume that wage bargaining is sector-specific, so that old and new jobs in each sector command the same wage,  $W$ . Let  $b$  (a positive constant) be the real non-labor cost associated with each job.<sup>8</sup> Then the real profit generated by an old job is

$$(1a) \quad \pi_o = \gamma \cdot a(N) - b - W,$$

whereas a new job yields

$$(1b) \quad \pi_n = a(N) - b - W.$$

Let  $E$  be the real fixed cost of creating a new job,  $H$  be the real cost of hiring and training a newly hired worker, and  $F$  be the real cost of firing an incumbent worker. Then, under single period optimization,<sup>9</sup> an old job is kept open as long as

$$(2a) \quad \gamma \cdot a(N) - b - W + F \geq 0,$$

<sup>8</sup>We could have assumed that  $b(N)$ , with  $b' > 0$ , i.e. a rising non-labor cost per worker, but for expositional simplicity we include any such effects in  $a(N)$ .

<sup>9</sup>This is not an assumption of substance. It is easy to show that the qualitative conclusions of our analysis also hold under multi-period optimization.

which will be called the "incumbency constraint" (IC). A new job is created when

$$(2b) \quad a(N) - b - W - E - H \geq 0,$$

which is the "entry constraint" (EC).

We assume that wages and employment are determined in a Nash equilibrium setting. Specifically, employment decisions are made taking wages as given and wage decisions are made taking employment as given. This setup differs from the standard analysis in which wage-employment decisions are made in two stages, with wages set first (taking the employment repercussions into account) and then employment (taking wages as given). The relative merits of these alternative frameworks depend on the relative frequency with which wage and employment decisions are made. Given significant costs of creating new jobs as well as significant costs of hiring, training, and firing - a particularly important assumption when considering the East German employment problem - it is often unrealistic to view wages as precommitted when employment decisions are made. Our setup implicitly presupposes that neither wages nor employment can be renegotiated instantaneously and that they are generally not set simultaneously.<sup>10</sup>

Wages are assumed to be set by a Nash bargain between the employers and employees in a sector. The employers cover both old and new jobs in that sector, and the employees are represented by a union which seeks to maximize the utility of its representative member. Under bargaining agreement, each employee receives the real wage  $W$  (taking employment ( $N$ ) in that sector as given). Under disagreement, each employee is assumed to look for another job. With probability  $\rho$  he finds another job and then receives the real "outside wage"  $\hat{W}$ . The employment probability  $\rho$  depends on labor demand and supply not only in East Germany, but also in West Germany and, to a lesser extent, abroad. Both the employment probability  $\rho$  and the outside wage  $\hat{W}$  are exogenously given when the wage  $W$  is determined. With probability  $(1-\rho)$  the worker finds no job and he then receives an exogenously given unemployment benefit  $B$ .<sup>11</sup> Thus

<sup>10</sup>Non-simultaneous wage-employment decisions are assumed in the monopoly union and right-to-manage bargaining literature, but generally not in the efficient contract bargaining models.

<sup>11</sup>In accordance with German practice, this may be viewed as positively related to the worker's previous wage; but as long as this latter wage is exogenously given in the

the worker's fall-back income is  $\hat{Y} = \rho \cdot \hat{W} - (1-\rho) \cdot B$  which, under the assumptions above, is exogenous to the bargain. Since the employment probability  $\rho$  depends, in part, on the sectoral employment  $N$ , the fall-back income may be written as  $\hat{Y} = \hat{Y}(N)$ , where  $\hat{Y}' > 0$ . In this context, the union's bargaining objective may be specified quite simply as

$$(3a) \quad \Omega_w = W - \hat{Y}(N),$$

Under bargaining agreement, an old job generates profit  $\pi_o$ , given by (1a). Under disagreement the job is kept vacant, yielding no revenue and generating the cost  $b$ . A new job under agreement generates profit  $\pi_n$ , given by (1b), and yields neither revenue nor cost under disagreement. Given that there are  $M$  old jobs and  $N$  jobs in total in the sector under consideration, the employers' bargaining objective may be specified as

$$(3b) \quad \Omega_f = \left( \frac{M}{N} \right) \cdot [\gamma \cdot a(N) - W + F] \\ + \left( 1 - \frac{M}{N} \right) \cdot [a(N) - W - H - E].$$

Given the bargaining objectives (3a) and (3b), the wage may be derived as the outcome of the following Nash bargain:<sup>12</sup>

$$(4) \quad \text{Maximize } \Omega = (\Omega_w)^\mu \cdot (\Omega_f)^{1-\mu},$$

where  $\mu$  (a constant,  $0 \leq \mu \leq 1$ ) is a measure of the bargaining strength of the employees relative to the employers. Let the proportion of old jobs be

bargaining process, we are justified in assuming that the unemployment benefit is exogenous as well.

<sup>12</sup>The wage  $W$  in our analysis is defined as the real wage. Whereas it is unrealistic to assume that employers and employees bargain over the real wage, it would be trivial to restate our model in terms of bargaining over the nominal wage, with prices set by the employers under perfectly or imperfectly competitive conditions in the product markets.

$$(5a) \quad \beta \equiv (M/N)$$

and define the average productivity factor as

$$(5b) \quad \Gamma \equiv \beta \cdot \gamma + (1-\beta).$$

Then the negotiated wage, that solves the bargaining problem (4) may be expressed as

$$(6) \quad W^n = \mu \cdot [\Gamma \cdot a(N) + \beta \cdot F - (1-\beta) \cdot (H + E)] + (1-\mu) \cdot \hat{Y}(N),$$

which will be called the "negotiated wage function" (WN).

Figure 1 illustrates the labor market equilibrium for relative parameter values that appear to be relevant to the East German unemployment problem. The negotiated wage function (WN) may be upward or downward sloping since  $a' < 0$  (diminishing returns to labor) and  $\hat{Y}' > 0$  (fall-back income depends positively on the employment level  $N$ ). The entry constraint (EC),  $W \leq a(N) - b - H - E$ , has a slope that is less than the WN curve.<sup>13</sup> The incumbency constraint (IC),  $W \leq \gamma \cdot a(N) - b + F$ , is parallel to the entry constraint. The figure implicitly assumes - as in probably realistic in most cases - that the productivity differential between new and old jobs exceeds the cost of job turnover:

$$(7) \quad (1-\gamma) \cdot a(N) > E + H + F.$$

Then the entry constraint lies above the incumbency constraint and the labor market equilibrium is given by the intersection of the negotiated wage function (6) and the entry constraint (2b).<sup>14</sup> Specifically, at the equilibrium wage  $W^*$ , new jobs will be created until employment is  $N^*$  (as determined by the entry constraint); and at the equilibrium level of employment  $N^*$ , the negotiated wage will be  $W^*$  (as determined by the wage setting function).

<sup>13</sup>The reason is that even if  $\hat{Y}$  were equal to zero (so that the wage setting function WS would be unambiguously downward sloping), the EC curve would be steeper than the WS curve since  $\mu < 1$ .

<sup>14</sup>If, on the contrary,  $(1-\gamma) \cdot a(N) < E + H + F$ , then the incumbency constraint lies above the entry constraint and the labor market equilibrium is given by the intersection of the WS and IC curves. Under these conditions no new jobs are created.



By the negotiated wage function (6), the entry constraint (2b), and the definitions (5a) and (5b), the equilibrium wage is

$$(8a) \quad W_{AG}^* = \left[ \frac{1}{1 - \mu \cdot \Gamma} \right] \cdot [\Gamma \cdot b + \beta \cdot F + (\beta \cdot \gamma) \cdot (H + E)] \\ + \left[ \frac{1 - \mu}{1 - \mu \cdot \Gamma} \right] \cdot \hat{Y},$$

where the superscript "\*" in  $W_{AG}^*$  stands for "equilibrium" and the subscript "AG" stands for the wage in the "absence" of "government" intervention. If we assume that  $a(N)$  takes the Cobb-Douglas form  $a(N) = A \cdot N^{-\alpha}$ , the equilibrium employment level is

$$(8b) \quad N_{AG}^* = A^{\alpha} \cdot \left[ \left[ \frac{1}{1 - \mu \cdot \Gamma} \right] \cdot [\Gamma \cdot b + \beta \cdot F + (\beta \cdot \gamma) \cdot (H + E)] \right. \\ \left. + \left[ \frac{1 - \mu}{1 - \mu \cdot \Gamma} \right] \cdot \hat{Y} + b + H + E \right].$$

In the absence of the fixed cost ( $b = 0$ ) and all entry barriers ( $F = H = E = 0$ ), the equilibrium wage reduces to

$$(8a') \quad W_{AG}^* = \left[ \frac{1 - \mu}{1 - \mu \cdot \Gamma} \right] \cdot \hat{Y}$$

and the equilibrium employment level becomes

$$(8b') \quad N_{AG}^* = A^{-\alpha} \cdot \left[ \frac{(1 - \mu) \cdot \hat{Y}}{1 - \mu \cdot \Gamma} \right]^{-\frac{1}{\alpha}}.$$

Figure 1 is drawn to illustrate some basic features of the East German employment problem in the absence of government intervention in the East German labor market. Observe that the labor market equilibrium ( $W_{AG}^*, N_{AG}^*$ ) lies at the intersection of the EC and WN curves. The full-employment level of employment,  $N^{FE}$ , is given by the intersection of the entry constraint (EC) and the labor supply curve (LS). To fix ideas, we assume that the government's employment target,  $N^t$ , is equal to the full employment level  $N^{FE}$ , and that its wage target,  $W^t$ , is equal to the equilibrium wage  $W_{AG}^*$ . The latter assumption is probably not unreasonable given the involvement of West German unions in the East German wage setting process. It is generally recognized

that, in the absence of any government intervention, most old jobs would become unprofitable, necessitating the firing of most incumbents. It is also widely agreed that, in the short run at least, not enough new jobs would be created to avoid substantial unemployment. In terms of our figure this means that the point  $(M, W^*)$  lies to the right of the incumbency constraint, so that at the equilibrium wage  $W_{AG}^*$  only  $N_0^*$  old jobs survive and  $(M - N_0^*)$  incumbent workers are fired. Moreover, the equilibrium level of employment  $N_{AG}^*$  falls short of the full employment level  $N^{FE}$ , so that there is unemployment of  $U = N^{FE} - N_{AG}^*$ .

It is to avert such layoffs and unemployment that the German government has instituted its vast, intricate and costly program of subsidies, tax incentives, and transfers to prop up the East German labor market. In the following sections we investigate two rival policy proposals designed to improve the employment performance of the East German economy at lower social and public cost.

#### 4. Wage Subsidies

Perhaps the most prominent policy proposal to revive the East German labor market is to establish a program of wage subsidies and then to auction of East German firms to the highest bidder.<sup>15</sup> The main line of reasoning in support of this proposal is quite simple: The government's wage target, formulated on grounds of social acceptability, lies far above the market-clearing wage. Under these circumstances, economic efficiency can be restored by a subsidy that reduces the cost of labor sufficiently to bring the associated marginal product of labor (net of the subsidy) back into equality with the marginal value of time.

The obvious problem with this argument is that it presupposes perfect competition. If wage determination is imperfectly competitive, as it doubtlessly is East German labor markets, then the imposition of wage subsidies will raise the negotiated wage at any given level of employment. Then, if  $W^t = W_{AG}^*$ , then a subsidy sufficiently large to restore full employment will push wage outcomes above the target wage.

Even if  $W^t > W_{AG}^*$ , there is still a convincing case to be made that the full-

<sup>15</sup>See, for example, Akerlof (1992) and Begg and Portes (1992).

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employment level of wage subsidies would drive real wages in excess of the government's target. There is widespread agreement that current East German real wages are generally above government targets, and there is good reason to believe that the replacement of the current employment policies by a wage subsidy program would raise real wages, simply because some of the current transfers to East German firms are not related to the magnitude of employment and consequently do not put upward pressure on the outcomes of wage negotiations. In short, it may be impossible to restore efficiency in production and employment at the target wage through wage subsidies.

This, of course, does not imply that wage subsidies are necessarily inappropriate to deal with the East German employment problem. The first-best optimum may be unattainable through any feasible policy intervention. The crucial issue is whether wage subsidies can achieve a second-best optimum, given that East German wages cannot fall beneath the government's wage target. Specifically, the case for wage subsidies must rest on the argument that this policy can achieve full employment with socially acceptable wages at lower social cost and/or lower government budgetary cost than other feasible proposals. It is this issue that the present paper calls into question.

Consider the impact of a proportional wage subsidy  $s$  in the context of the labor market described in the previous section. The entry constraint may now be rewritten as

$$(9a) \quad W \leq \left( \frac{1}{1-s} \right) \cdot [a(N) - b - H - E],$$

and the incumbency constraint as

$$(9b) \quad W \leq \left( \frac{1}{1-s} \right) \cdot [\gamma \cdot a(N) - b + F].$$

Turning to wage setting, the employees' bargaining objective remains (3a), whereas the employers' bargaining objective now becomes

$$\Omega_f = \left( \frac{M}{N} \right) \cdot [\gamma \cdot a(N) - (1-s) \cdot W + F] \\ + \left( 1 - \frac{M}{N} \right) \cdot [a(N) - (1-s) \cdot W - H - E].$$

Thus the negotiated wage becomes

$$(10) \quad W_{ws}^n = \left( \frac{\mu}{1-s} \right) \cdot [\Gamma \cdot a(N) + \beta \cdot F - (1-\beta) \cdot (H + E)] + (1-\mu) \cdot \hat{Y},$$

where the subscript "WS" in  $W_{ws}^*$  stands for the wage under the "wage subsidy" scheme.

Given that the labor market equilibrium is determined by the intersection of the negotiated wage function (10) and the entry constraint (9a), the equilibrium wage is

$$(11a) \quad W_{ws}^* = \left( \frac{1}{1 - \mu \cdot \Gamma} \right) \cdot \left[ \Gamma \cdot b + \left( \frac{1}{1-s} \right) \cdot [\beta \cdot F + (\beta \cdot \gamma) \cdot (H + E)] \right] + \left( \frac{1 - \mu}{1 - \mu \cdot \Gamma} \right) \cdot \hat{Y}.$$

The equilibrium employment level becomes

$$(11b) \quad N_{ws}^* = a^{-1} \left[ \left( \frac{1}{1 - \mu \cdot \Gamma} \right) \cdot [\Gamma \cdot b \cdot (1-s) + \beta \cdot F + (\beta \cdot \gamma) \cdot (H + E)] + \left( \frac{(1-\mu) \cdot (1-s)}{1 - \mu \cdot \Gamma} \right) \cdot \hat{Y} + b + H + E \right],$$

where  $(a^{-1})' < 0$  since  $a' < 0$ . One important implication of equation (11a) is that the greater the labor turnover costs (H and F) and the greater the entry cost (E) and the greater the ratio of old to new jobs ( $\beta$ ), the more the wage subsidy raises the negotiated wage. Moreover, in the absence of the fixed cost ( $b = 0$ ) and all entry barriers ( $F = H = E = 0$ ), the equilibrium wage is unaffected by the wage subsidy (i.e.  $W_{ws}^*$  is given by equation (8a')) and the equilibrium employment level is

$$(11b') \quad N_{ws}^* = a^{-1} \left( \frac{(1-\mu) \cdot (1-s)}{1 - \mu \cdot \Gamma} \right) \cdot \hat{Y}.$$

Equations (11a) and (11b) indicate that the greater the wage subsidy  $s$ , the greater will be the resulting equilibrium employment level  $N_{ws}^*$  and, in the presence some entry barriers ( $F, H, E > 0$ ), the greater will be the equilibrium wage  $W_{ws}^*$ . In fact, as the wage subsidy is raised from  $s=0$  to  $s=1$ , we can trace out a locus of labor market equilibrium points denoted by  $LE_{ws}$  in Figure 1. The greater the entry

barriers (F, H, E), the steeper this locus will be. By (11a), in the extreme case of no entry barriers (F = H = E = 0), the locus is horizontal.

From the figure it is clear that if  $W^t = W_{AG}^*$  and some entry barriers exist, it is impossible to achieve the government's wage-employment target ( $W^t, N^t$ ) through the wage subsidy scheme. A subsidy that raises employment to its target level  $N^t$  will necessarily raise the equilibrium wage  $W_{WS}^*$  above its target level  $W^t$ . In practice, the unwillingness of West German firms to engage in substantial job creation after German unification, despite the massive government incentives to do so, leads one to believe that the costs of firm entry (E) and perhaps also the costs of training in East Germany are large, and thus (by (11a) and (11b)) the  $LE_{WS}$  locus may be expected to be steep. Then, provided that the wage target  $W^t$  is in the neighborhood of the equilibrium wage  $W_{AG}^*$  in the absence of intervention, the full-employment wage under the subsidy scheme will far exceed the target wage.

Now turn to the social benefit and the budgetary cost of a wage subsidy that is sufficiently high to raise employment to the full-employment level  $N^{FE}$ . One appropriate measure of the social benefit ( $SB_{WS}$ ) of the scheme is total production minus the direct budgetary cost (DBC) of the scheme. Total production is  $\Gamma \cdot N^{FE} \cdot A(M) + (1-\beta) \cdot N^{FE} \cdot A(N)$ , where  $A(N) = \int_0^N a(n) dn$ . The direct budgetary cost is

$$(12) \quad DBC_{WS} = s \cdot W_{WS}^* \cdot N^{FE}.$$

Thus the social benefit of the wage subsidy scheme is

$$(13) \quad SB_{WS} = \Gamma \cdot N^{FE} \cdot A(M) + (1-\beta) \cdot N^{FE} \cdot A(N) - s \cdot W_{WS}^* \cdot N^{FE}.$$

The total budgetary cost of the scheme, on the other hand, consists of three main components: (i) the direct budgetary cost of the subsidy scheme, minus (ii) the additional tax revenue generated by the scheme, minus (iii) the rise in the value of firms as result of the scheme, which is an additional value that accrues to the government when the firms are auctioned off. The direct budgetary cost (DBC) is given by (12). Assuming a proportional income tax rate  $t$ , the additional tax revenue is  $t \cdot (Y_{WS} - Y_{AG})$ , where  $Y_{AG}$  is income in the absence of government intervention (as

determined in the previous section) and  $y_{ws}$  is income under the wage subsidy scheme.  $y_{ws}$  is the sum of wage income ( $W_{ws}^* \cdot N^{FE}$ ) and profit income ( $\Gamma \cdot N^{FE} \cdot a(N^{FE}) - (1-s) \cdot W_{ws}^* \cdot N^{FE} - (1-\beta) \cdot N^{FE} \cdot (H + E) - b \cdot N^{FE}$ ). In short, the additional tax revenue is

$$(14a) \quad t \cdot (y_{ws} - y_{ag}) = t \cdot [\Gamma \cdot N^{FE} \cdot a(N^{FE}) + s \cdot W_{ws}^* \cdot N^{FE} - (1-\beta) \cdot N^{FE} \cdot (H + E) - b \cdot N^{FE} - y_{ag}].$$

The rise in the value of firms as result of the wage subsidy scheme is

$$(14b) \quad \zeta \cdot [V_{ws} - V_{ag}] = \zeta \cdot [\Gamma \cdot N^{FE} \cdot \mathcal{A}(M) + (1-\beta) \cdot N^{FE} \cdot \mathcal{A}(N) - b \cdot N^{FE} - (1-s) \cdot W_{ws}^* \cdot N^{FE} - (1-\beta) \cdot N^{FE} \cdot (H + E) - V_{ag}],$$

where  $\zeta$  is the proportion of firms that remain to be privatized,  $V_{ws}$  is the value of firms under the wage subsidy scheme, and  $V_{ag}$  is their value in the absence of government intervention. Consequently, the total budgetary cost ( $TBC_{ws}$ ) of the scheme is

$$(15) \quad TBC_{ws} = DBC_{ws} - t \cdot (y_{ws} - y_{ag}) - \zeta \cdot (V_{ws} - V_{ag}) \\ = W_{ws}^* \cdot N^{FE} \cdot [\zeta \cdot (1 - s) - t \cdot s] - t \cdot \Gamma \cdot a(N^{FE}) \cdot N^{FE} \\ + b \cdot N^{FE} \cdot (\zeta + t) + (H + E) \cdot (1-\beta) \cdot N^{FE} \cdot (\zeta + t) \\ - \zeta \cdot N^{FE} \cdot [\Gamma \cdot \mathcal{A}(M) - (1-\beta) \cdot \mathcal{A}(N)] \cdot N^{FE} + \zeta \cdot V_{ag} + t \cdot y_{ag}.$$

Equation (15) implies that the total budgetary cost depends positively on the size of the hiring and training cost ( $H$ ), the entry cost ( $E$ ), the fixed cost ( $b$ ), and the equilibrium wage ( $W_{ws}^*$ ), and negatively on the tax rate ( $t$ ) and the marginal revenue product of labor ( $a(N)$ ).

## 5. Revenue-Sharing Subsidies

Now consider the labor market implications of government subsidies for revenue-sharing. To begin with, it is useful to note that revenue- and profit-sharing are formally equivalent, provided that the revenue to be shared is *net* revenue, viz, revenue net of non-wage costs. To see this in the context of our model, note that net revenue sharing<sup>16</sup> in old jobs gives an incumbent employee a labor income of  $Y_o = \lambda \cdot [\gamma \cdot a(N) - b]$  and the employer a profit of  $\pi_o = (1 - \lambda) \cdot [\gamma \cdot a(N) - b]$ , where  $\lambda$  is the revenue-sharing coefficient. Under profit sharing, the incumbent employee receives  $Y_o = \delta \cdot \pi_o$ , where  $\delta$  is the profit-sharing coefficient, and the employer receives  $\pi_o = \gamma \cdot a(N) - b - Y_o = [1/(1+\delta)] \cdot [\gamma \cdot a(N) - b]$ . Clearly, these two systems are equivalent provided that the revenue-sharing coefficient is set so that  $\lambda = [\delta/(1+\delta)]$ . The same argument obviously holds for new jobs as well. Thus, in what follows, we can restrict our attention to revenue sharing without loss of generality.

Let the government's revenue-sharing subsidy to employers be  $\theta_\pi$  and to employees be  $\theta_Y$ , so that the labor and profit incomes from old jobs become

$$(16a) \quad Y_o = (\lambda + \theta_Y) \cdot [\gamma \cdot a(N) - b] \quad \text{and}$$

$$(16b) \quad \pi_o = (1 - \lambda + \theta_\pi) \cdot [\gamma \cdot a(N) - b],$$

respectively, and the incomes from new jobs are

$$(17a) \quad Y_n = (\lambda + \theta_Y) \cdot [a(N) - b - H - E] \quad \text{and}$$

$$(17b) \quad \pi_n = (1 - \lambda + \theta_\pi) \cdot [a(N) - b - H - E].$$

The entry constraint is therefore

$$(18a) \quad (1 - \lambda + \theta_\pi) \cdot [a(N) - b - H - E] \geq 0,$$

and the incumbency constraint is<sup>17</sup>

<sup>16</sup>For brevity, we restrict our attention to the case of "pure" revenue- and profit-sharing, where workers receive *all* their labor income as a share of the revenues or profits they generate.

<sup>17</sup>The firing cost (F) in our model falls entirely on the firm; it is generally not feasible to pass it on to the employees when they leave the firm.

$$(18b) \quad (1 - \lambda + \theta_{\pi}) \cdot [\gamma \cdot a(N) - b] + F \geq 0.$$

To make these constraints comparable with the analysis in the previous sections, it will be convenient to restate them in terms of labor income. Accordingly, by (17a) and (18a), the entry constraint may be expressed as

$$(19a) \quad Y_n \leq (1 + \theta_{\pi} + \theta_Y) \cdot [a(N) - b - H - E],$$

and the incumbency constraint may be written as

$$(19b) \quad Y_o \leq (1 + \theta_{\pi} + \theta_Y) \cdot [\gamma \cdot a(N) - b] + F.$$

Provided that (7) is satisfied, the entry constraint lies above the incumbency constraint in income-employment space, as shown in Figure 2.

The wage setting process now involves negotiation over the revenue-sharing coefficient  $\lambda$ , rather than over the wage  $W$ . The employers' bargaining objective<sup>18</sup> is

$$\begin{aligned} \Omega_f &= \beta \cdot N \cdot [\pi_o + b + F] + (1-\beta) \cdot N \cdot \pi_n \\ &= (1 - \lambda + \theta_{\pi}) \cdot [\Gamma \cdot a(N) - b] + \beta \cdot N \cdot (b + F) \\ &\quad - (1 - \lambda + \theta_{\pi}) \cdot (1-\beta) \cdot N \cdot (H + E). \end{aligned}$$

The union's bargaining objective is

$$\begin{aligned} \Omega_w &= \beta \cdot N \cdot Y_o + (1-\beta) \cdot N \cdot Y_n \\ &= (\lambda + \theta_Y) \cdot [\Gamma \cdot a(N) - b] - (1-\beta) \cdot N \cdot (\lambda + \theta_Y) \cdot (H + E) - \hat{Y}. \end{aligned}$$

The revenue sharing coefficient is the outcome of the Nash bargain:

$$(20) \quad \underset{\lambda}{\text{Maximize}} \quad \Omega = (\Omega_w)^{\mu} \cdot (\Omega_f)^{1-\mu}.$$

Solving,

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<sup>18</sup>Since workers' productivities are independent of one another in this model, the negotiated wage does not depend on whether employers and employees bargain individually or in groups.



$$(21) \quad \lambda^n = \mu \cdot (1 + \theta_\pi + \theta_Y) + \mu \cdot \beta \cdot [(b + F)/I] - \theta_Y + (1 - \mu) \cdot \hat{Y}/I,$$

where  $\lambda^n$  is the negotiated revenue-sharing coefficient and

$$I = \Gamma \cdot a(N) - b - (1 - \beta) \cdot (H + E)$$

is average income per head.

Substituting the negotiated revenue-sharing coefficient (21) into the expressions for income in (16a) and (17a), we obtain the negotiated incomes that are generated by the revenue-sharing coefficient:

$$(22) \quad Y_n = [a(N) - b - H - E] \cdot [\mu \cdot (1 + \theta_\pi + \theta_Y) + \mu \cdot \beta \cdot (b + F)/I + (1 - \mu) \cdot \hat{Y}(N)/I],$$

which we can call the "negotiated income function" for new entrants, denoted by  $Y_n$  in Figure 2, and

$$(23) \quad Y_o = [a(N) - b] \cdot [\mu \cdot (1 + \theta_\pi + \theta_Y) + \mu \cdot \beta \cdot (b + F)/I + (1 - \mu) \cdot \hat{Y}(N)/I],$$

which can be called the negotiated income function for incumbents, denoted by  $Y_o$  in Figure 2. These two functions play an analogous role to the wage setting function in the previous sections. Observe that whereas workers at new and old jobs receive the same remuneration under the bargaining in the wage system described in the previous sections, they do not do so under revenue sharing for the simple reason that the old firms tend to make less revenue than the new firms. Thus the  $Y_o$  curve may be understood as the equivalent of a wage setting function for incumbents and the  $Y_n$  curve can be seen as the equivalent of a wage setting function for new entrants.

Figure 2 illustrates the labor market equilibrium under this revenue sharing system. Note that the entry constraint (18a) implies that

$$a(N) - b - H - E \geq 0,$$

i.e. new jobs are created as long as the revenue they generate exceeds the sum of the

non-wage costs of production. The incumbency constraint (18b) implies that

$$\gamma \cdot a(N) - b \geq -F/(1 - \lambda + \theta_{\pi}),$$

i.e. old jobs are retained as long as the revenue they generate exceeds the fixed cost of production. It is reasonable to assume that the entry constraint are compatible with full employment for any feasible values of the government subsidies for revenue sharing, even when  $\theta_{\pi} = \theta_Y = 0$ . What this means is that all workers seeking jobs at the prevailing revenue-sharing coefficient would be employed if firms would continue hiring workers as long as their marginal revenue products exceeded the associated hiring cost, non-wage factor cost, and job entry cost, *but without taking account of any labor costs*. This assumption is illustrated in Figure 2, where the intersection of the incumbency constraint (IC) with the negotiated income function for incumbents ( $YN_0$ ) as well as the intersection of the entry constraint with the negotiated income function for entrants both occur to the right of the full employment level  $N^{FE}$ .

Consequently, the government's employment objective is achieved automatically under revenue sharing, and the revenue subsidies can be devoted entirely to attaining the target level of labor income,  $W^t$ . Since the  $YN_n$  curve lies above the  $YN_0$  curve (by condition (7)), the requirement that all workers receive at least  $W^t$  reduces to the requirement that

$$(24a) \quad Y_0 = W^t,$$

which, by (23), implies that the wage subsidies be set as follows:

$$(24b) \quad \theta_{\pi}^* + \theta_Y^* = [W^t/(\mu \cdot \gamma \cdot a(N) - b)] - [\mu \cdot \beta \cdot (b + F)/I] \\ - [\hat{Y}(N) \cdot (1 - \mu)/(I \cdot \mu)].$$

Note that it is only the sum of the revenue-sharing subsidies to the employers and the employees that are relevant to the achievement of the target labor income. Once this sum is set at the desired level (24b), the  $YN_0$  curve intersects the labor supply

curve at the target labor income  $W^t$ , as shown in Figure 2.

Now consider the social benefit and the budgetary cost of this revenue sharing system. Measuring the social benefit in the same way as in the previous section, we find

$$(25) \quad SB_{RS} = \Gamma \cdot N^{FE} \cdot A(M) + (1-\beta) \cdot N^{FE} \cdot A(N) - \theta_{\pi}^{\bullet} \cdot N^{FE} \cdot I^{\bullet},$$

where  $SB_{RS}$  is the social benefit under the optimal revenue sharing system and the third right-hand term is the direct budgetary cost. It is easy to show that, for a broad range of plausible parameter values, this social benefit exceeds that from the optimal wage subsidy scheme, as described in the previous section. The main intuitive reason is that the optimal revenue-sharing scheme permits the achievement of both the full-employment target  $N^{FE}$  as well as the exact achievement of the labor income target  $W^t$  for incumbent workers; however, assuming that  $W^t = W_{AG}^{\bullet}$ , the wage subsidy scheme can achieve the full-employment target only when all workers receive more than the labor income target. Consequently the direct budgetary cost (DBC) of the optimal revenue-sharing scheme generally falls short of DBC of the optimal wage subsidy scheme. Comparing the labor remuneration equations under the wage subsidy and revenue-sharing schemes, it is easy to see that the greater the labor turnover costs (H and F) and the greater the entry cost (E) and the greater the ratio of old to new jobs ( $\beta$ ) - all of which are known to be very important in the East German labor market - the greater will be the direct budgetary cost of the wage-subsidy scheme relative to that of the revenue-sharing scheme.

As in the analysis of the previous section, the total budgetary cost consists the direct budgetary cost of the scheme minus the additional tax revenue from the scheme minus the additional value of the firms to be auctioned off. It may be expressed as

$$(26) \quad TBC_{RS} = DBC_{RS} - t \cdot (y_{RS} - y_{AG}) - \zeta \cdot (V_{RS} - V_{AG}) \\ = [\theta_{\pi}^{\bullet} \cdot (1-t) - t] \cdot I^{\bullet} \\ + (1 - \lambda^{\bullet} - \theta_{\pi}^{\bullet}) \cdot N^{FE} \cdot [b \cdot (\zeta+t) + (H + E) \cdot \zeta \cdot (1-\beta)]$$

$$\begin{aligned}
& - (1 - \lambda^* - \theta_n^*) \cdot \zeta \cdot [A(N^{FE}) - (1-\gamma) \cdot A(M)] \cdot N^{FE} \\
& + \zeta \cdot V_{AG} + t \cdot Y_{AG}
\end{aligned}$$

It is easy to show that this total budgetary cost is less than that under the optimal wage subsidy scheme, provided that the revenue generated ( $A$ ) is small relative to the non-wage costs. There are two countervailing factors to be taken into account. First, as noted, the direct budgetary cost of the optimal revenue-sharing scheme is generally less than that of the optimal wage subsidy scheme. Second, if the revenue generated minus the non-labor remuneration costs is positive, then the value of the auctioned firms will be larger under the optimal wage subsidy scheme than under the optimal revenue-sharing scheme. The reason, obviously, is that under the revenue-sharing scheme only a fraction of the revenue minus non-labor remuneration costs accrue to the employers, whereas under the wage subsidy scheme all of it does. Consequently, the smaller the value of the firms to be auctioned off (i.e. the lower the revenue generated by these firms or the smaller the proportion of firms yet to be privatized), the lower the total budgetary cost of the revenue-sharing scheme relative to that of the wage subsidy scheme. Since the process of privatization is already far advanced, while the labor turnover costs and entry costs (that raise the direct budgetary cost of the wage subsidy scheme relative to the revenue-sharing scheme) are sizeable, it is to be expected that the total budgetary cost of the revenue-sharing scheme will generally be lower than that of the wage subsidy scheme.

## 6. Concluding Remarks

The analysis above is meant to provide a simple, tractable framework within which the relative social benefits and budgetary costs of wage subsidies versus revenue- or profit-sharing subsidies can be assessed. It is worth stressing that the implementation of either policy would probably lead to substantial social and budgetary gains in relation to the vast array of policies, implemented on a case-by-case basis, that are currently in operation. Nevertheless, which of these policies may be expected to perform better in a social and budgetary sense is clearly a matter of prime policy importance. The model highlights an important disadvantage of wage

subsidies and an important countervailing advantage of revenue-sharing subsidies: Wage subsidies lead to higher wages as well as to higher employment, and subsidies large enough to achieve full employment may well lead to extravagantly high wages. By contrast, revenue-sharing schemes, even in the absence of subsidies, may be expected to bring the labor market close to full employment, and consequently the subsidies can be set so as to achieve an appropriate level of labor income.

There is good reason to believe, however, that this by no means exhausts the advantages of revenue-sharing subsidies relative to wage subsidies. Wage subsidies distort the labor-capital ratio, whereas revenue- or profit-sharing subsidies do not. Finally, in small enterprises where individual workers' labor inputs can have a noticeable effect on the profits of their enterprise, the revenue- or profit-sharing subsidies may be expected to have incentive effects that the wage subsidies cannot reproduce.

Furthermore, it is important to observe that the above-mentioned deficiency of wage subsidies is generally also shared by output, export, credit, and investment subsidies. All of these subsidies tend to increase the marginal value product of labor<sup>19</sup> and thereby raise the amount of economic rent that may be partially appropriated by workers in the wage bargaining process. Thus these subsidies, like the wage subsidies, lead to wage increases, and subsidies that are sufficiently high to ensure full employment may generate real wages far in excess of government targets. The implications for the budgetary costs of these subsidies are also similar to those of the wage subsidies. As we have seen, when wage subsidies raise wages, they automatically raise the direct budgetary cost of the wage subsidy program, since the total government expenditure on wage subsidies is positively related to the level of wages. By contrast, when output, export, credit, or investment subsidies raise wages, they do not thereby have any impact effect on the magnitude of the subsidy payments. They do, however, have an important indirect effect: the induced rise in wages discourages employment and consequently higher subsidies are now required to achieve full employment than would have been called for in the absence of the wage increase. It is for this reason that the induced wage increase raises the budgetary cost of these subsidy schemes.

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<sup>19</sup>Of course, if labor and capital are Edgeworth substitutes then investment subsidies that raise the capital stock will reduce the marginal product of labor, but this contingency appears not to be predominant in practice.

Finally, it is significant that many of the most serious criticisms that have been leveled against the establishment of profit- or revenue-sharing schemes in mature market economies appear to lose much of their force with regard to economies that are in the process of transformation to a market mechanism. It has been asserted, for example, that managers of firms may have a substantial incentive to resist switching from a wage system to a profit- or revenue-sharing system, because the latter involves revealing revenue information to the employees. Moreover, the insiders in these firms may also have an incentive to resist, since they may be able to achieve higher remuneration under the wage system.<sup>20</sup> It is clear, however, that these problems are likely to be much more pronounced for existing firms that have operated under a wage system in the past and that employ workforces containing a large proportion of insiders. Yet East Germany, like other eastern European economies, has experienced such substantial shifts in final demand that the establishment of a revenue-sharing system would lead to the destruction of most old firms and the creation of many new ones. Thus it is to be expected that most of the jobs operating under the revenue-sharing system would not involve switching from the wage system and reparameterizing insider contracts and thereby would avoid the conflicts with the vested interests of incumbent workers and firms.

In view of these various considerations, the analysis above suggests that revenue-sharing subsidies deserve more attention in the policy debate concerning employment stimulation in East Germany - as well as in other eastern European economies - than they have thus far received.

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<sup>20</sup>Of course, a two-tier revenue-sharing system could be implemented, whereby insiders are offered a sufficiently large revenue-sharing coefficient to prevent a drop in insider income while new entrants receive a lower coefficient. The problem with this approach is that insiders generally resist two-tier systems since they often prove to be time-inconsistent: at a future date, when the current entrants have achieved a comparable productivity to the current insiders - the firm will have an incentive to retain the low-paid entrants and dismiss the high-paid insiders. Besides, a sufficiently large revenue-sharing coefficient for insiders may not be sustainable by the relative bargaining strengths and fall-back positions of the insiders and their firms, in which case firms will have an incentive to reduce the insiders' revenue-sharing coefficient in future bargaining rounds.

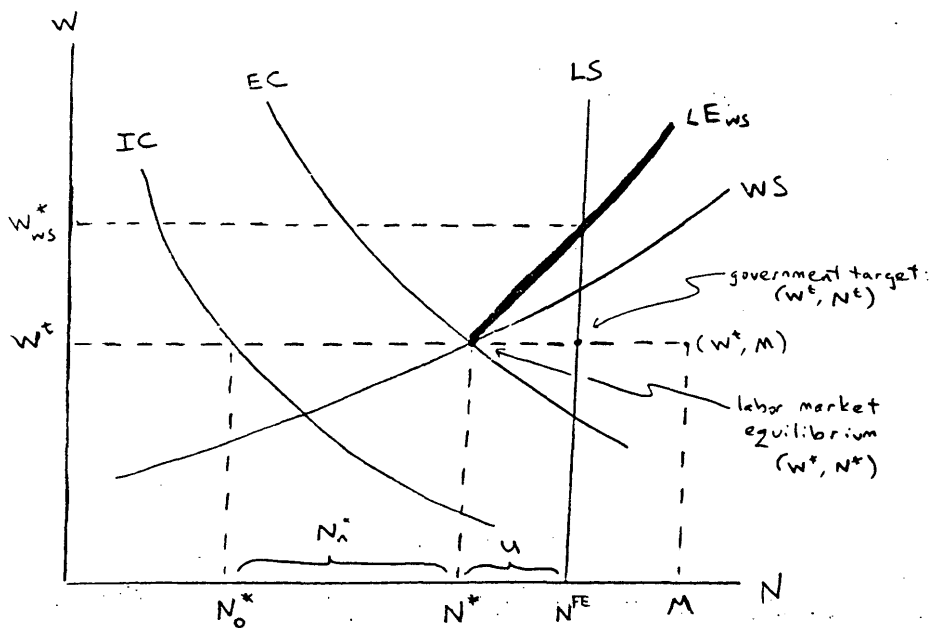


FIGURE 1: Labor Market Activity in the Absence of Government Intervention and under the Wage Subsidy Scheme

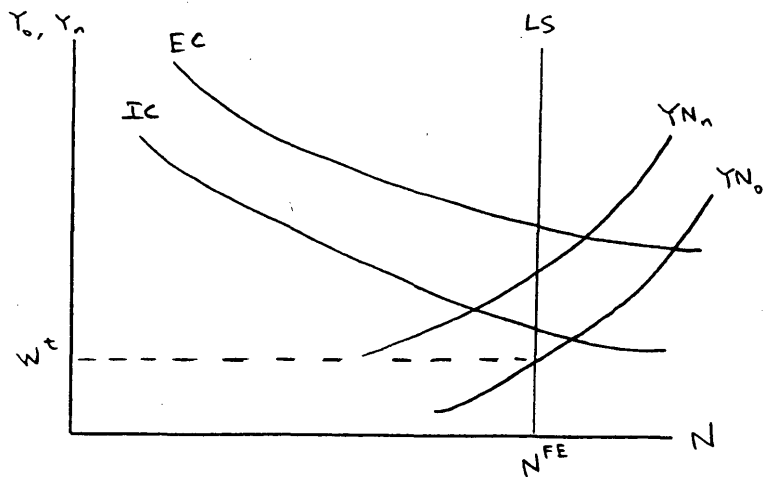


FIGURE 2: Labor Market Activity under the Revenue-Sharing Scheme