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# *Employment and Wage Behavior of Enterprises in Transitional Economies*

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# EMPLOYMENT AND WAGE BEHAVIOR OF ENTERPRISES
## IN TRANSITIONAL ECONOMIES

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## 1.    Introduction

In this paper we present the first comparative analysis of the employment and wage behavior of industrial enterprises as they moved from the centrally planned system of the late 1980s into the transition to a market economy in the 1990s. In carrying out this analysis, we use large panels of annual data on industrial enterprises in the Czech Republic, Slovakia, Poland, Hungary and Russia. We are thus able to demonstrate how the employment and wage setting behavior of firms varied with the change in the economic system as well as specific changes in enterprise ownership and legal form (registration) before and during the transition.

Apart from dealing with inherently important topics, our analysis is of interest for four reasons. First, virtually all the transition economies in Central and East Europe (CEE) experienced dramatic declines in output, employment and wages during the first few years of the transition, but the exact pattern varied across countries. In particular, aggregate output fell by about 20% in all these economies during the first three years of the transition (see e.g., Dyba and Svejnar (1995). Employment followed the decline in output with a lag and it declined faster economies such as Hungary and Poland than in others, such as the Czech and Slovak Republics and Russia. Real wages also fell dramatically in all the countries in the first three years of the transition as the countries devalued their currencies, freed most prices, phased out subsidies, and imposed wage (bill) controls. However, with the exception of the Czech and Slovak republics, where in the first few years of the transition producer and consumer price indices moved in tandem (see Tables 1 and 2), the decline in real producer wages was much less pronounced than the decline in real consumer wages, thus resulting in a more pronounced decline in living standards for workers than the corresponding relief

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in lower labor cost for enterprises (see Tables 3 and 4).[1]

Second, in all the CEE economies except for the Czech Republic, the unemployment rate shot up from zero to double digits.[2] This rise occurred despite major declines in labor force participation, competitive devaluations, reductions in formerly generous unemployment benefits, and the introduction of active labor market policies. The wage and employment responses of enterprises to exogenous shocks, policies, and phenomena such as local unemployment is thus of major policy interest in the transitional economies.

Third, the tough economic changes in the first few years of the transition brought about a strongly negative political response, with the former (reformed) communists having been voted into office in all the countries except for the Czech Republic. The outcome presumably reflected the anxiety of the population that the reforms would require economic sacrifices without ensuring adequate social security. In this context, the former communists were seen as being better providers and guardians of job security, living standards and social programs than other political parties. At the policy level, one accordingly observed a growing realization that understanding the wage and employment behavior of enterprises was crucial for pursuing successful transition policies.

Finally, because the economies of Central and East Europe were the first ones to enter the transition process and because they differed dramatically from one another in their initial conditions,

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Real producer wages refer to nominal wages deflated by the producer price index, while real consumer wages refer to nominal wages deflated by the consumer price index.

In the former Soviet Union, one also observed low unemployment rates in the first few years of he transition. They appear to be attributable to a large extent to the continuation of soft budget policies and extraordinarily low wages in some areas. These policies allowed firms to continue hoarding labor and thus prevented the rise of unemployment to the same extent as in the other transitional economies (see e.g., Commander (1994).

policies and outcomes, our comparative results provide important information for the policy makers in these economies and in those that entered transition later. Poland and Hungary for instance entered the transition with a significant private sector in agriculture and services, as well as significant foreign direct investment and relatively limited government control over enterprises. In many respects, they were regarded as being part of the way toward a market economy before the downfall of the communist regime. In contrast, the Czech, Slovak and Russian economies were highly centralized, almost completely state-owned and relying on cross-subsidization to maintain the state-owned enterprise sector. The data from these economies hence display the complete transition path from a centrally planned to a market economy. In this context it is of interest to note that the Czech Republic, Slovakia and Russia have carried out massive privatizations of state property, while others, such as Hungary, Poland, Bulgaria and Romania, have been slower in privatizing their state sector, stressing instead the commercialization of firms (Poland), attracting western capital (Hungary) and creating new firms (Poland and Hungary).

The format of the paper is as follows. We start in Section 2 by presenting our conceptual framework and the estimating equations. In Section 3 we describe the data and report the econometric estimates. We conclude in Section 4.

## 2.    The Conceptual Framework and Estimating Equations

In examining the wage and employment outcomes before and during the transition, it is useful to use the conceptual framework depicted in Figure 1. For any given firm, the competitive labor market outcome is given by employment $L^*$ at point A, with the marginal revenue product of labor $R_L$ equaling the competitive (market clearing) wage $W_c$. Since wages were kept low by the

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planners when central planning ruled supreme, one way to conceptualize the (efficient) centrally planned system with full employment is precisely as one that induces firms to operate at point A. At this point, the workers are paid the minimum acceptable wage and the planners appropriate the maximum profit, as depicted by the iso-profit curve $\Pi = $ Max.

Another, and perhaps more realistic, way to conceptualize the workings of the communist labor market is to assume that it reflects bargaining between the planners, managers and workers. Depending on the preferences and relative power of these three parties, the wage-employment outcome could lie anywhere in the area AB'F' in Figure 1.[3] Points B' and F' lie on the zero profit iso-profit curve and reflect the maximization of income per worker and employment, respectively, subject to profit being zero and the wage being at least $W_c$. The contract curve ABB' thus reflects outcomes with varying degrees of emphasis placed on wage and profit maximization (no emphasis on employment), while contract curve AFF' corresponds to varying degrees of joint employment and profit maximization (no emphasis on wages). The intermediate outcomes C',D' and E' on the zero iso-profit curve ($\Pi = 0$) reflect varying degrees of emphasis on wages and employment (no emphasis on profit). A set of intermediate outcomes where the planners appropriate a given level of profit are depicted by the iso-profit curve $\Pi = \alpha$ Max and the corresponding points B, C, D, E, and F.

The socially efficient set of outcomes, corresponding to efficient allocation of labor ($R_L = W_c$) along with various wage-profit combinations, lies on the vertical contract curve ADD'. These outcomes are also important from an empirical standpoint because they correspond to a situation where the firm does not adjust employment in response to changes in the wage, *ceteris paribus.*

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[3] See e.g., Svejnar (1982,1986).

Backward bending contract curves (e.g., ACC' and ABB' in Figure 1) imply that the firm reduces employment in response to a wage increase, while forward sloping contract curves (e.g., AEE') imply that wages and employment move in the same direction.[4]

Finally, it should be noted that the framework of Figure 1 can capture the widely discussed phenomenon of soft budget constraints, whereby the planners cross-subsidize loss making firms from the surplus of profitable firms. In Figure 1, this scenario is captured by the loss making firms operating above and the profitable firms below the $\Pi = 0$ curve. Hardening of the budget constraint, be it through privatization or other means, would presumably be reflected in a move from a point above the $\Pi = 0$ curve to this curve or even further to point A or some other point on labor's marginal revenue product (short run labor demand) curve.

As our discussion indicates, firms in different countries are likely to have started the transition from different wage-employment-profit combinations. Moreover, they probably exhibited different original distribution of power among the planners, managers and workers. Finally, depending on the form of macro stabilization, enterprise commercialization and privatization, the hardening of budget constraints, and redistribution of power among the government, managers and workers, the behavior of firms is likely to have evolved differently in different countries. In view of all these possible changes, it would be necessary to invoke very strong assumptions if one tried to identify the preferences of the three parties. As a result, our goal is to use the conceptual framework and the data to assess if (a) enterprise behavior observed during the pre-transition and transition periods reflected outcomes consistent with being on the labor demand or another contract curve, (b)

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[4] Prasnikar et al. (1994) for instance found that firms in former Yugoslavia operated along the ACC' curve of Figure 1.

this behavior changed systematically as a result of the transition, and (c) the behavioral changes varied systematically across countries and institutional features such as enterprise ownership and legal form.

Our empirical strategy is to proceed in several steps. We first estimate a dynamic labor demand equation to see if the estimated elasticities vary over time and whether the employment outcomes are affected by enterprise ownership and legal form. In this initial specification, we hence invoke a relatively traditional labor demand model and obtain elasticity estimates under the assumption that wages are either set exogenously (by the planners or the market) or that they are set by the employer or through bargaining, with the management setting employment in a cost minimizing way. We next estimate an employment equation that includes a proxy for the reservation (alternative) wage of workers and hence permits one to interpret the estimated coefficients as indicating whether the outcome deviates from the labor demand curve and hence reflects bargaining over both wages and employment. Our third set of estimates comes from a simultaneous system of employment and wage equations that correspond to a more explicit model of wage-employment setting.

In estimating the basic labor demand equation, we use the following specification:

(1)    $L = L(W/P, Q, X)$,

where L = number of employees, W = the nominal wage, P = the product price index, Q = the sales or output of the firm, and X = a vector of ownership, legal structure, and industry and regional dummy variables that may affect the firm's demand for labor. The specification in equation (1) corresponds to a labor demand function of an enterprise characterized by cost minimization subject to an exogenously given level of output (see e.g., Hamermesh (1986, 1993)). This approach has been

used fruitfully in the West (e.g., Hamermesh (1986, 1993) and Quandt and Rosen (1992)), and it is useful to adopt it as a starting point in the analysis of enterprises in transition.

In estimating equation (1), we treat W as endogenous since enterprises had some latitude in setting wages despite the wage (bill) controls. We also assess econometrically whether the negative output shocks brought about by the dissolution of the COMECON, the collapse of the Soviet market, and the restrictive macroeconomic policies have imposed exogenous output (sales) constraints and, if so, during which period this constraint was binding. We estimate the employment equations with W and Q instrumented by W and Q of the other firms in the same industry, industry and regional dummy variables and (one year) lagged capital assets of the firm interacted with industry dummy variables. We test for the exogeneity of Q by comparing the instrumented and non-instrumented estimates within the Hausman test framework.

In estimating equation (1), we strive to find the best compromise between two goals: allowing for dynamics and carrying out the estimation on the shortest possible panels of data. The reason for a dynamic specification is obvious as the transition is a dynamic process and an assumption of complete adjustment of variables within a one-year period would be unrealistic. The use of short panels is motivated by (a) the desire to assess the extent to which the behavior of firms changed from the pre-transition period into the various stages of the transition and (b) the fact that enterprise restructuring, entry and exit would make us lose most Czech and Slovak observations if we went beyond two-year panels of data. As a result, for each country we use consecutive two-year panels of data and test for the stability of coefficients across the two-year periods. It should be noted that since we use two-digit industry dummy variables and estimate on a two-year panel of annual data, a two digit producer price variable P would be collinear with the industry dummies and we

therefore do not enter the price variable on the right hand side of equation (1).

We specify equation (1) in a loglinear form and introduce a general dynamic framework by allowing the left hand side variable and all the principal right hand side variables to enter in both current and one-year lagged form (see e.g., Hendry and Mizon, 1978, Nickell, 1986, and Estrin and Svejnar, 1993). Formally, this first degree general distributed lag model is specified for equation (1) as

$$\ln L_t = \alpha_o + \alpha_1 \ln(W/P)_t + \alpha_2 \ln(W/P)_{t-1}$$
$$+ \alpha_3 \ln Q_t + \alpha_4 \ln Q_{t-1} + \alpha_5 \ln X_t$$
$$+ \alpha_6 \ln X_{t-1} + \alpha_7 \ln L_{t-1}.$$

(1')

In equation (1'), the short-term elasticity of employment with respect to the wage is given by $\alpha_1$, while the corresponding long-term elasticity is given by the ratio of the two relevant polynomials in the lag operator $(\alpha_1 + \alpha_2)/(1 - \alpha_7)$. The short and long-term employment elasticities with

respect to output and the other variables are defined analogously.

While the flexible stochastic difference equation (1') is intuitively an appealing specification in an investigative analysis such as ours, it should be noted that the equation can also be derived quite rigorously from an underlying cost minimization behavior of the firm (see e.g., Nickell, 1986 and Bresson et.al., 1992). In particular, suppose firms face exogenous output constraints and quadratic costs of adjusting their labor L and capital K inputs. Furthermore, assume that they determine their employment paths by minimizing input costs $C_t$:

$$C_t = E_t \sum_{\tau=0}^{\infty} \left(\frac{1}{1+r}\right) [c_{t+\tau} K_{t+\tau} + W_{t+\tau} L_{t+\tau} + d(\Delta L_{t+\tau}^2)$$

$$+ e(\Delta K_{t+\tau})^2] \qquad \forall t$$

(3)

subject to a production constraint

$$Q(L_{t+\tau}, K_{t+\tau}) = Q_{t+\tau}, \qquad \forall t,$$

(4)

where E is the expectation operator, $c_t$ is the user cost of capital, d and e are the parameters of quadratic adjustment costs, $\Delta L_t = L_t - L_{t-1}$, and $\Delta K = K_t - K_{t-1}$. Assuming further that

the production function is of the Cobb-Douglas form, changes in employment from period to period are relatively small and the exogenous variable follow an autoregressive process of the second degree AR(2), one obtains a loglinear equation such as (1'), where vector $X_t$ includes $c_t$.

Note that equation (1') represents a relatively general model, within which one can conveniently test if (a) a partial adjustment model[5] is the appropriate specification $\alpha_2 = \alpha_4 = \alpha_6 = 0$, (b) a completely static model is best supported by the data $\alpha_2 = \alpha_4 = \alpha_6 = \alpha_7 = 0$, and (c) a (first difference) fixed effects model is the preferred specification $\alpha_2 = -\alpha_1$, $\alpha_4 = -\alpha_3$, $\alpha_6 = -\alpha_5$, and $\alpha_7 = 1$. In our empirical work we start

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Within the above cost minimization exercise, this specification corresponds to the assumption that the exogenous variables follow an AR(1) process.

with the most general specification given in equation (1') and we test the various restrictions.

In the second step of our empirical investigation, we allow for bargaining over both wages and employment, with the contract curve deviating from the marginal product curve of labor in relation to the weight that the bargainers place on employment. In particular, using the bargaining models of Brown and Ashenfelter (1986) and Prasnikar et al. (1994), one can derive an employment equation of the form

$$\ln L = \beta_0 + \beta_1 \ln Q + \beta_2 X - \sigma(1-\gamma) \ln(W/P) - \sigma\gamma \ln(W^a/P) \qquad (1")$$

where $W^a$ is the alternative (reservation) wage, $\gamma$ is the weight that the firm places on employment relative to wages and, depending on the model, sigma is the constant elasticity of substitution between labor and capital in production or some other non-negative parameter. As can be seen from the equation, when the firm places no weight on employment ($\gamma = 0$), the coefficient on the alternative wage is zero and the specification reduces to the standard labor demand equation. When the firm places equal weight on wages and employment ($\gamma = 1$), the coefficient on the own wage is zero and employment is driven by the alternative wage. This is the case corresponding to the (socially efficient) vertical contract curve ADD' in Figure 1. For $\gamma > 1$, one obtains forward sloping contract curves such as AEE' in Figure 1.

Econometrically, equation (1") of course represents a relatively straightforward extension of the basic labor demand model, with the alternative wage and possibly some other control variables added to the right hand side. Since we have accurate district-level data on local unemployment, we follow Brown and Ashenfelter (1986) and postulate that the alternative wage is an inverse linear function of local unemployment and industry dummy variables. In addition, in order to allow for

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the possibility that during the transition employment is influenced by the capital stock that planners allocated to firms under communism, we include one year lagged capital assets of the firm as an explanatory variable in equation (1'').

In the third step of our estimation, we model explicitly the outcome of wage and employment determination and estimate jointly a wage and employment equation. We use equation (1'') and supplement it with a wage equation that allows for the possibility that worker-insiders appropriate some of the enterprise-specific rents in their wages. The wage equation that we estimate hence reflects the hypothesis that, in addition to exogenous factors, wages may depend on enterprise characteristics and policy variables:

(2)     $W = W(Q/L, X, Z)$,

where $Q/L$ = sales per employee, $X$ = the ownership, legal structure, and industry cum regional variables discussed above and $Z$ = a vector of relevant structural and policy variables that may affect wages in a given firm. Controlling for industry, sales per employee are used to proxy for the firm's ability to pay. Ideally, we would like to be able to construct a variable such as net profit per worker (see e.g., Svejnar, 1986) but the data sets do not contain sufficiently reliable information to do so. Like Q and L above, the Q/L variable is treated as being potentially endogenous to the firm's decisions and we therefore test for its endogeneity in equation (2) by the Hausman test, using the same instruments as in equation (1). In the present analysis, we use the firm's share of the industry output, the firm's export to sales ratio, and the local unemployment rate as the variables that make up the Z vector. We also estimate equation (2) with local unemployment on the right hand side in order to test if local demand for and supply of labor affect wage outcomes. This hypothesis has

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received much attention in the last few years in the western context under the heading of a "wage curve" (see e.g., Blanchflower and Oswald, 1994). It is hence of interest if the regularity observed in the western economies is also detected at some in the trasition from planning to markets. The dynamic aspect of the wage equation is specified and tested analogously to equation (1').

Before proceeding with the presentation of the results, it is useful to mention the relative strengths and weaknesses of studies such as ours that use annual as opposed to monthly or quarterly data. The obvious disadvantage is that the annual data contain aggregation over time that smoothes the short term changes in variables such as labor. On the other hand, Singer's (1995) recent labor demand analysis using Czech monthly data produces very low output elasticities of labor demand, suggesting that employment and wages may be set annually rather than at shorter time intervals. Moreover, in order to carry out a comparative analysis of more than one transitional economy, we are forced by data (un)availability to use annual data.

Recent literature also indicates that potentially important decisions have to be made on how many lags to use in estimating equation such as (1') and whether to estimate the dynamic model in levels or differences of variables. Nickell's (1986) discussion for instance indicates that if firms optimize over inputs that are aggregated in the data (e.g., skill categories in the labor input), it may be appropriate to include additional lags of the dependent variable in the employment equation. Since our principal goal is to detect expected changes in the parameters (elasticities) of the model that occurred in different stages of the transition, and woulkd lose much data if we used the entire panel in the Czech and Slovk republics, we need to use a sequence of the shortest possible panels of data. As a result, our strategy is to start with a sequence of two-year panels and allow for one annual lag in all the variables. If the hypothesis of equal parameters across neighboring panels cannot

be rejected, we can examine models with longer lags.

The choice between estimating the model on levels vs. first differences of variables depends in large part on the availability of instruments and the structure of the error term (see Anderson and Hsiao, 1982, Arellano, 1988, Arellano and Bond, 1991, Keane and Runkle, 1992, and Singer, 1995). In particular, if the error term for instance contains an individual effect, even lagged values of the dependent variable contain the same individual component and thus are correlated with the error of the estimated equation. Another example of the problem arises when variables are measured with an error that has an individual component. In these cases, the variables in question cannot be used as instruments if the equation is estimated in levels, but they may be used as instruments if the estimation is carried on differences of variables. The tradeoff arises from the fact that estimation on differences of variables is likely to be less efficient than that on levels. As we show below, we start with equation (1') in levels, select carefully the instrumental variables, and test for the relative superiority of equation (1') vs. the first difference specification embedded in (1') under the assumption and

## 3.    The Summary Statistics and Econometric Estimates

In contrast, in Poland the coefficient of variation calculated from the data in Table C1 stood at 27% in both 1988 and 1991.

The average number of employees per firm held steady in the Czech and Slovak republics in 1989 and 1990, but it fell substantially in 1991 and 1992. We use annual data on industrial enterprises in four important transition economies: The Czech Republic, Slovakia, Poland, Hungary, and Russia. The data for the first four countries were collected from records that enterprises were

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legally required to submit to their country's statistical offices and ministries of finance. The Czech, Slovak and Polish data constitute almost the entire population of industrial firms with twenty five or more workers. The Hungarian and Russian data are samples of industrial enterprises. The Hungarian data.... The Russian data come from a panel of 394 firms that accounted for about 10% of Russian manufacturing output in 1991. The sample was stratified by industry and region, and the firms were sampled with replacement. Unfortunately, many of the data turned out to be unusable. For the purposes of our estimation, we were able to construct a two-year (1993-94) panel on 229 of these firms.

Annual summary statistics for the firm-level as well as more aggregate variables used in the analysis are given in the appendix Table A1 for the Czech Republic, B1 for Slovakia, C1 for Poland, D1 for Hungary and E1 for Russia. The data cover the period 1989-93 for the Czech Republic, 1989-92 for Slovakia, 1988-91 for Poland, and 1988-92 for Hungary and 1993-94 for Russia. Overall, the data we use enable us to provide a complete chronicle of the behavior of the Czech and Slovak firms before and during the transition and a somewhat shorter chronicle for Poland and Hungary. The two-year panel for Russia relates to an early phase of the transition.

In examining the Czech and Slovak nominal monthly wages and consumer and producer price indices in Tables A1 and B1, respectively, one observes that real consumer wages declined slightly in 1990, fell dramatically in 1991, and gained some of the lost ground in 1992. In the case of the Czech Republic (for which enterprise-level data are available) one can see that consumer wages rose also in 1993. The real producer wages held steady in 1990, experienced a sharper decline than real consumer wages in 1991, and registered a steeper rise thereafter. On the whole, the evolution of real consumer and producer wages was quite similar over the 1989-92 period. As can

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be seen from Table C1, in Poland real consumer and producer wages rose in 1989 and fell significantly in 1990. By 1991 real producer wages reached the level of 1988 but real consumer wages continued to lag behind. The phenomenon of producer prices lagging behind the consumer prices hence started much earlier and was much more pronounced in Poland than in the Czech and Slovak republics.

One can also see from Tables A1, B1 and C1 that the dispersion in inter-enterprise earnings was rising during the transition in the Czech and Slovak republics but remained unchanged between 1988 and 1991 in Poland. In the Czech Republic, for instance, the standard deviation started at 391 crowns in 1989 and reached 1,220 crowns in 1993. With the average wage in the Czech firms rising from 3,160 crowns in 1989 to 5,370 crowns in 1993, the coefficient of variation increased from 12% to 23% in this period.[6] the Czech Republic one observes a further moderate decline in 1993. As can be seen from Table C1, in Poland the average number of employees per firm also held steady in the 1988-90 period and declined in 1991. The Czech and Slovak figures in Tables A1 and B1 reflect the major wave of breakups and spinoffs of firms,[7] the significant reductions of the labor force in many firms, and the entry of a large number of smaller firms. The different pattern observed in the Polish data is in part accounted for by the fact that Poland did not create the same giant enterprises as did Czechoslovakia and Hungary in the 1980s, as well as by the fact that the Polish data set does not include the numerous small private firms.

In the Czech and Slovak republics, one also observes production greatly exceeding sales in

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Using Czech and Slovak household expenditure data, Garner, Lubyova and Terrell (1995) also find an increase in the coefficient of variation for blue and white collar workers' incomes between 1989 and 1992.

See Lizal, Singer and Svejnar (1995) for an analysis of the spinoffs.

the 1989-91 period as enterprises were initially absorbing the shock by increasing inventories. The situation changed from 1992 on as sales started to run ahead of production. In Poland, the data for 1988-90 indicate that sales on average tracked production very closely. This feature of the Polish transition is important for our analysis. While in the Czech and Slovak regressions we are able to use sales as an explanatory variable, in the Polish case the unavailability of sales data for 1991 has forced us to use output as a proxy for sales. The fact that output was on average closely related to sales in the 1988-91 period justifies this empirical approximation.

The exports to sales ratio declined in the Czech and Slovak republics in 1991 and especially 1992 as the firms suffered the shock of dismantling the CMEA, the collapse of the Soviet market, and the effects of the transition measures. By 1993 the Czech data show a significant increase in the export-sales ratio as the firms started reorienting their exports westward. Interestingly, in Poland one observes only a minor decrease in the export to sales ratio in 1990, thus indicating that the Polish firms were much more adaptable in their export behavior than their Czech and Slovak counterparts. Note, however, that the Czech and Slovak firms export a much higher proportion of their output than Polish firms.

The average market share of a firm is measured as the ratio of a given firm's output to the output of all firms in a given single digit industry (Poland) or double digit industry (the Czech and Slovak republics). The share declined in the Czech and Slovak republics in 1991 but it climbed back in 1992 and, in the case of the Czech Republic, also in 1993. However, as Zemplinerova (1995) has shown, imports surged and the extent of actual competition in the Czech (and probably also Slovak) industry actually increased during this period. In Poland, where the market share measure includes imports and the industry output is measured at the one-digit industrial classification, one observes

no significant change in the firm's market share between 1989 and 1991, the two years for which these data are available.

The entry of new firms (including spun-off units) into the data set was considerable in the Czech and Slovak republics, while in Poland virtually the same firms appear to stay in the sample throughout the first three years of the sample period, with some decline taking place in 1991. State and cooperative ownerships of firms dominate private ownership and joint ventures in all three countries in the periods for which data are available. The paucity of declared private firms in the Czech Republic is brought about by the fact that a firm is classified as being privately owned only when it is more than 50% privately owned. For this reason, it is desirable to use the legal registration of a firm (e.g., joint stock company or limited liability company ) as an additional signal of privatization and/or restructuring.

### 3.a    Estimates of the Employment and Wage Equations

In interpreting the estimated coefficients, it is important to remember that the transition process started at different dates in different countries. For the Czech and Slovak data our estimates hence cover the pre-transition period of 1989-90, the early transition period of 1990-91, and the more mature phase of transition (1991-92 for Slovakia and 1991-92 as well as 1992-93 for the Czech Republic). For Poland, the estimates cover the pre-transition period of 1988-89, the early transition period of 1989-90 and the more mature transition of 1990-91. Hungary adopted many market oriented reforms already in the 1970s and 1980s. Nevertheless, it is generally assumed that the transition process accelerated in 1989 and 1990. Our estimates hence cover the early or pre-transition period of 1988-89, the early transition period of 1989-90, and the more mature transition period of

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1990-92. As mentioned earlier, the 1993-94 Russian data cover the period of early transition.

The principal estimated coefficients of the dynamic labor demand equation (1') are reported for the five countries in Tables 1 and 2. Estimates of all coefficients of the underlying equations are reported in Appendix Tables A2 for the Czech Republic, B2 for Slovakia, C2 for Poland, D2 for Hungary and E2 for Russia.[8] As may be seen from Table 1, while the long term elasticity estimates are similar across all four Central European economies, the short term elasticity estimates show a strikingly different pattern. The Czech and Slovak firms registered very low (.0 to .1) short term labor demand-sales elasticities before and at the start of the transition. A zero elasticity estimate is also generated on the early transition data from Russia. In contrast, the .3 Polish and .6 Hungarian elasticity estimates indicate that firms in these more market oriented communist economies were quite responsive in their employment adjustment to changes in sales already in the 1988-89 pre-transition period.

The second major finding observed in Table 1 is the rise in the estimated short term labor demand-sales elasticities in all four Central European countries shortly after the start of the transition. In particular, the elasticity rose to .33 in Slovakia by 1991-92 (after a temporary decline to .06 during the big bang of 1990-91) and to .5 - .6 in the Czech Republic in the 1991-93 period. In Hungary and Poland one observes a temporary decline in the estimated elasticities to about .23 at the start of the transition but the estimates rise to .4 in Poland by 1990-91 and to .46 -.65 in

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[8]As can be seen from the test results reported at the bottom of the Appendix tables, the more restricted models, including the first difference specification, are rejected by the data. We also cannot reject the hypothesis that sales (output in the Polish case) are exogenous and that parameter estimates differ across the two-year subperiods. The exogenous shocks thus appear to have significantly constrained the sales of firms and labor demand behavior has undergone significant changes as the firms moved from the centrally planned system into the transition to a market economy.

Hungary by 1990-92. Hence the fundamental differences in the short term responsiveness of employment to sales observed between the more market oriented economies (Poland and Hungary) and the more traditional centrally planned economies (Czech and Slovak Republics) in the pre-transition period basically disappeared shortly after the prices were freed and enterprise subsidies phased out at the start of the transition.

The estimated labor demand elasticities with respect to wages are reported in Table 2. The short term elasticities suggest that in the pre-transition period the Czech and Slovak firms were equally or more responsive in adjusting employment to wages than their Polish and Hungarian counterparts. Indeed, the Czech and Slovak elasticities are in the -.33 to -.39 range, while the Polish point estimate stands at -.26 and the Hungarian one is at -.35 but is not highly significant statistically. The Czech estimate becomes insignificant and the Slovak one temporarily reverses sign during the big bang of 1990-91, but both become significantly negative thereafter. As with the labor demand elasticity with respect to sales, one finds that shortly after the start of the transition the labor demand-wage elasticities were significantly negative in all four CEE economies. In this context, it is interesting to note that the Slovak estimate (-.25) is lower than those found in the other three CEE economies (-.6 to -.96).

The estimated short term labor demand-wage elasticity for Russia is statistically insignificant. Hence, as with the labor demand elasticity with respect to sales, the Russian firms are found to be unresponsive in adjusting their employment to changes in wages. The two sets of findings hence indicate that the Czech and Slovak firms started adjusting much faster than the Russian firms.

The finding in Tables 1 and 2 that after the start of the transition the Czech firms displayed significantly higher short term elasticities of labor demand than the Slovak firms is interesting in the

context of the double digit high unemployment rate observed in Slovakia as compared to the 3-4% unemployment rate registered in the Czech lands. Since both sales and real wages fell during this period, the Slovak firms hoarded labor more on account of their weak link between employment and sales but less as a result of their lower labor demand elasticity with respect to wages. Overall, the result is consistent with the observed fact that the Czech and Slovak labor markets displayed roughly similar inflow rates into unemployment but that the Czech Republic had a significantly higher outflow rate.

In Table 3, we report estimates of employment elasticities with respect to own wage and local unemployment. These estimates correspond to employment equation (1"), with local unemployment proxying for the tightness of the local labor market and hence the alternative (reservation) wage. The full set of parameter estimates and the associated diagnostic statistics are reported in appendix tables A3, B3, C3, and D3. Since we could not match local unemployment rate to the Russian firms, we have not estimated equation (1") for Russia. As may be seen from Table 3, while the estimated own wage coefficients are by and large negative and statistically significant, the estimated coefficients on local unemployment are mostly statistically insignificant. In fact, the unemployment coefficients are positive, as expected, and significant only in Poland and the Czech Republic during their respective big bang years. In that period one also finds the coefficient on the own wage to be insignificant in the Czech Republic and negative and significant in Poland. In all other cases, the unemployment coefficient is statistically insignificant, occasionally displaying a negative sign. Our findings hence suggest that at the very start of the transition, the Czech and Polish firms operated to the right of their labor demand curves, with the Czech estimates actually corresponding to an outcome on the vertical contract curve (ADD' in Figure 1). However, in both countries the data from

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the following year already generated estimates corresponding to an outcome on the demand curve for labor. In the case of the Czech Republic, where we have data also for the subsequent year, we find another set of estimates corresponding to an outcome on the labor demand curve. In sum, our findings indicate that while outcomes to the right of the demand curve may have characterized the pre-transition and early transition period, as soon as the CEE economies started adjusting to the shock of price liberalization, reduction of subsidies and loss of markets, they started operating on the labor demand curves. In terms of econometric specification, this finding provides support for the labor demand specification of equation (1') during the transition period.

In Table 4, we report wage elasticities with respect to sales per worker and unemployment The elasticities correspond to wage equation (2), which was estimated jointly with equation (1"). The complete set of parameter estimates and diagnostic statistics is reported in appendix Tables A4-D4 and A5-D5. The estimates in Table 4 indicate that in the pre-transition Czech Republic and Slovakia there was virtually no association between wages and sales per worker -- suggesting that in this period Czech and Hungarian workers did not share in rents. In contrast, in Poland and Slovakia, one observes a positive association between wages and sales per worker already under the communist regime. In the transition period, one finds a positive effect in all four countries. To the extent that the instrumented sales per worker provide an adequate proxy for the firms' ability to pay, the estimates in Table 4 provide strong evidence that at least in the short run workers' wages contained an element of firm-specific rent. The estimate for Russia is positive but statistically insignificant, suggesting that as late as 1993-94 rentsharing was not a systematic phenomenon in Russian manufacturing firms.

The wage curve hypothesis receives support in Poland and in 1991-92 also in Slovakia.

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However, it is uniformly rejected in the Czech Republic and Hungary, with the latter country actually generating positive coefficients on local unemployment.

### 3b.    Balanced Panels

While the Polish and Hungarian data sets contain for the most part the same firms during the entire time period, the Czech and Slovak data display a significant turnover of firms. Since the latter data sets basically cover the entire population of existing firms, the turnover is brought about by breakups, spinoffs and other forms of entry and exit of firms. In this respect, the Czech and Slovak transition differed markedly from that observed for instance in Poland.

The high turnover of firms in the Czech and Slovaks republics provides us with an opportunity to check if the state-owned enterprises (SOEs) that existed before the transition and survived during (at least) the first few years of the transition behaved differently from the population as a whole. As may be seen from appendix tables A6 and B6, in 1991 these firms represented about one-quarter of the Czech and one-third of the Slovak firms.

In Table 5 we report for these firms labor demand elasticities that correspond to employment equation (1").[9] As may be seen by comparing these results with those in Table 3, the SOEs have lower labor demand elasticities than the entire population of firms in the Czech Republic but equal or higher ones than the rest of the firms in Slovakia. The wage elasticities, reported in Table 6, are significantly smaller in both republics than those reported for all firms in the two countries, respectively, in Table 4. The Czech industrial SOEs are thus in all respects stodgier than the population of all industrial firms, while the Slovak SOEs appear to have adjusted employment more

[9]The complete sets of estimates and diagnostic statistics are reported in appendix tables A6 and B6.

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and held back more on rent sharing than the entire population of Slovak industrial firms. The asymmetric outcome could be brought about by a number of factors, including the possibility that the Slovak SOEs have been relatively more pressed financially than their Czech counterparts.


**4.      Conclusions**

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## Table A1: Means (Standard Derivations) of Principal Variables for the Czech Republic (1989-1993)

| | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|
| Consumer Price Index, CPI | 1.5 | 9.6 | 56.7 | 11.1 | 20.8 |
| Producer Price, Index, PPI | 0.1 | 4.3 | 70.4 | 9.9 | 13.4 |
| Average Monthly Wage (thousand Kc) | 3.16 (0.391) | 3.27 (0.393) | 3.78 (0.619) | 4.38 (.927) | 5.37 (1.22) |
| Labor (No. Employees) | 1887 (4901) | 1860 (4753) | 1186 (3106) | 7.55 (2220) | 716 (1966) |
| Production (hundred million Kc) | 6.12 (15.3) | 6.01 (14.9) | 5.66 (19.5) | 3.77 (13.4) | 4.27 (16) |
| Sales (hundred million Kc) | 2.23 (7.21) | 2.28 (7.24) | 2.21 (11.2) | 4.53 (15.7) | 5.01 (18.6) |
| Exports (hundred million Kc) | 0.789 (2.70) | .764 (2.5) | .921 (3.79) | .910 (4.52) | 1.36 (7.35) |
| Exports/Sales (lagged) % | n/a | 27.6 (28.8) | 25.3 (30.0) | 14.1 (20.4) | 19.0 (21.6) |
| Fixed Assets, state on 12/31 of previous year (hundred million Kc) | n/a | 9.38 (43.9) | 8.56 (44.4) | 5.79 (24.6) | 5.92 (27.7) |
| Market Share (Sales/Ind. Sales) % | 2.08 (6.53) | 2.10 (6.47) | 1.13 (3.44) | 1.77 (7.67) | 2.91 (8.69) |
| Regional Unemployment % | n/a | 0.724* | 3.38 (1.46) | 2.39 (1.42) | 3.17 (1.88) |
| % New Firm | n/a | n/a | 34.9 | 47.3 | 4.37 |
| **Ownership** | | | | | |
| % State-Owned | n/a | n/a | 98.0 | 79.5 | 74.9 |
| % Private | n/a | n/a | | 2.0 | 2.5 |
| % Cooperative | n/a | n/a | | 15.6 | 18.4 |
| % Joint (Domestic-Foreign)Venture | n/a | n/a | | 1.9 | 2.7 |
| **Legal Form** | | | | | |
| % State Enterprise | n/a | n/a | 77.5 | 55.6 | 46.7 |
| % Limited liability | n/a | n/a | | 1.2 | 2.0 |
| % Joint Stock Co. | n/a | n/a | 21.4 | 26.3 | 32.4 |
| % Cooperatiaves | n/a | n/a | | | 9.6 |
| % Industrial Coop. | n/a | n/a | | 14.4 | 8.7 |
| Number of Enterprises, N | 781 | 761 | 1053 | 1455 | 1030 |

* Only Overall Unemployment Rate Available c:\wp51\basu\employmen\table 1

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**Czech Republic: IV Estimates of Basic Employment Equation (1') for Unbalanced Panels
of Firms, 1990-93**
(Dependent Variable is the Logarithm of the Number of Employees, $\ln L_t$;
Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| $\ln L_{t-1}$ | .975*** | .854*** | .914*** | .899*** |
|  | (.016) | (.032) | (.035) | (.029) |
| $\ln Q_t$ | -.022*** | .119*** | .591*** | .495*** |
|  | (.035) | (.030) | (.064) | (.057) |
| $\ln Q_{t-1}$ | .039*** | .017 | -.509*** | -.405*** |
|  | (.027) | (.038) | (.067) | (.066) |
| LR elasticity of Q | n.a. | .936*** | .944*** | .894*** |
|  |  | (.031) | (.093) | (.046) |
| $\ln W_t$ | -.389* | -.108 | -.959*** | -.611*** |
|  | (.208) | (.217) | (.216) | (.189) |
| $\ln W_{t-1}$ | .266 | -.065 | .919*** | .559** |
|  | (.203) | (.239) | (.238) | (.221) |
| LR elasticity of W | n.a. | -1.19** | -.464 | -.509 |
|  |  | (.553) | (1.38) | (.932) |
| *Type of Firm* |  |  |  |  |
| (Existing State-owned & Registered Firm) | .152 | -.619*** | -.589*** | -.471*** |
|  | (.111) | (.134) | (.207) | (.171) |
| New Firm | - | .003 | -.004 | .021 |
|  |  | (.009) | (.017) | (.024) |
| *Ownership* |  |  |  |  |
| Private | - | .023 | .109** | .011 |
|  |  | (.063) | (.052) | (.019) |
| Cooperative | - | - | .294*** | .016 |
|  |  |  | (.108) | (.017) |
| Other | - | .071 | -.192*** | -.014 |
|  |  | (.045) | (.069) | (.019) |
| Joint venture (International domestic and foreign) | - | -.071 | .136** | -.009 |
|  |  | (.061) | (.062) | (.032) |
| *Legal Form* |  |  |  |  |
| Limited liability | - | .079 | .148** | .146*** |
|  |  | (.058) | (.068) | .042 |
| Joint Stock Co. (International domestic and foreign) | - | .015 | .022 | .023 |
|  |  | (.009) | (.017) | (.017) |

## Table A2 con't

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| Cooperative | - | - | -.365*** (.125) | - |
| Industrial Cooperative | - | - | -.317*** (.107) | - |
| State Enterprise | - | - | - | - |
| Other Legal Form | | -.216*** (.045) | -.050 (.055) | - |
| *Test Results* | | | | |
| $\chi^2$ - First Difference (p value) | 16.28 (.000)*** | 21.88*** (.000) | 8.66** (.034) | 13.21*** (.004) |
| $\chi^2$ - Industry Dummies (p value) | 69.59 (.000) | 76.63*** (.000) | 31.49 (.542) | 64.54*** (.000) |
| $\chi^2$ - Ownership Dummies (p value) | - | 4.41 (.220) | 31.40*** (.000) | 2.35 (.672) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 32.33*** (.000) | 16.99*** (.005) | 12.25*** (.002) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$ [a] | 9.46 (no) | 9.5 (no) | 13.19 (no) | 8.59 (no) |
| $R^2$ | .998 | .991 | .971 | .988 |
| Number of Observations | 761 | 990 | 1453 | 1017 |

Notes:
*     Significant at test level 1%
**    Significant at test level 5%
***   Significant at test level 10%

p     Probability of a given restriction being true.

a:    Yes = $Q_t$ & $Q_{t-1}$ exogenous
      No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.   Not applicable

## Table A3
### Czech Republic: IV Estimates of Augmented Employment Equation (1′) for Unbalanced Panels of Firms, 1990-93
(Dependent Variable is the Logarithm of the Number of Employees, $\ln L_t$; Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| $\ln L_{t-1}$ | .981*** (.017) | .870*** (.038) | .860*** (.050) | .944*** (.037) |
| $\ln Q_t$ | -.025*** (.036) | .101*** (.019) | .538*** (.071) | .478*** (.057) |
| $\ln Q_{t-1}$ | -.042 (.028) | -.011 (.023) | -.469*** (.069) | -.389*** (.067) |
| LR elasticity of Q | n.a. | .695*** (.049) | .489*** (.189) | 1.58** (.749) |
| $\ln W_t$ | -.384* (.209) | -.074 (.209) | -1.030*** (.227) | -.472** (.208) |
| $\ln W_{t-1}$ | .268 (.205) | -.021 (.230) | .882*** (.231) | .424** (.232) |
| LR elasticity of W | n.a. | -.732 (.665) | -1.08 (.896) | -.861 (1.77) |
| Unemployment$_t$ | - | .519** (.249) | -.024 (.454) | .233 (.269) |
| Assets$_{t-1}$ | -.005 (.005) | .021** (.009) | .049 (.029) | -.029 (.016) |
| *Type of Firm* | | | | |
| (Existing State-owned & Registered Firm) | .161 (.112) | -.589*** (.118) | -.611*** (.201) | -.337 (.191) |
| New Firm | - | -.005 (.008) | -.015 (.017) | .018 (.023) |
| *Ownership* | | | | |
| Private | - | .055 (.063) | .123** (.061) | .010 (.019) |
| Cooperative | - | - | .294*** (.105) | -.008 (.021) |
| Other | - | .046 (.042) | -.172*** (.069) | -.021 (.019) |
| Joint venture (International domestic and foreign) | - | -.091 (.059) | .156** (.061) | -.007 (.031) |

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| *Legal Form* | | | | |
| Limited liability | - | .106* (.056) | .177** (.068) | .122*** (.044) |
| Joint Stock Co. International domestic and foreign) | - | .019** (.009) | .043** (.020) | .010 (.018) |
| Cooperative | - | - | -.348*** (.121) | - |
| Industrial Cooperative | - | - | -.286*** (.105) | |
| Other | - | -.195*** (.042) | -.073 (.055) | - |
| *Test Results* | | | | |
| $\chi^2$ - First Difference (p value) | 2.49 (.476) | 13.00*** (.004) | 8.48** (.037) | 15.39*** (.001) |
| $\chi^2$ - Industry Dummies (p value) | 68.03*** (.000) | 82.44*** (.000) | 35.15 (.367) | 67.44*** (.000) |
| $\chi^2$ - Ownership Dummies (p value) | - | 4.72 (.194) | 33.76*** (.000) | 2.31 (.679) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 33.91*** (.000) | 20.59*** (.001) | 8.17** (.017) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 10.19 (no) | 1.47 (yes) | 12.07 (no) | 9.65 (no) |
| $R^2$ | .998 | .992 | .972 | .989 |
| Number of Observations | 761 | 990 | 1453 | 1017 |

Notes:  *       Significant at test level 1%
        **      Significant at test level 5%
        ***     Significant at test level 10%

p       Probability of a given restriction being true.

a:      Yes = $Q_t$ & $Q_{t-1}$ exogenous
        No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.    Not applicable

**Czech Republic: 3SLS Estimates of Augmented Employment Equation (1′) for
Unbalanced Panels of Firms 1990-93
(Dependent Variable is the Logarithm of the Number of Employees, $ln \; L_t$;
Values in Parentheses are Standard Errors)**

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| $ln \; L_{t-1}$ | .977*** (.016) | .863*** (.038) | .864*** (.040) | .941*** (.035) |
| $ln \; Q_t$ | -.020 (.035) | .123*** (.029) | .742*** (.054) | .528*** (.055) |
| $ln \; Q_{t-1}$ | .042 (.027) | -.007 (.036) | -.643*** (.057) | -.447*** (.063) |
| LR elasticity of Q | n.a. | .847*** (.126) | .728*** (.162) | 1.37** (.542) |
| $ln \; W_t$ | -.588*** (.201) | -.218 (.207) | -1.60*** (.168) | -.864*** (.193) |
| $ln \; W_{t-1}$ | .452** (.197) | .125 (.227) | 1.45*** (.185) | .840*** (.217) |
| LR elasticity of W | n.a. | -.676 (.632) | -1.12 (.832) | -.397 (1.63) |
| Unemployment$_t$ | - | .512** (.247) | -.517 (.419) | .021 (.261) |
| Assets$_{t-1}$ | -.006 (.045) | .008 (.014) | .023 (.019) | -.022 (.015) |
| *Type of Firm* | | | . | |
| Existing State-owned & Registered Firm (Base) | .169 (.109) | -.646*** (.128) | -.593 (.191) | -.309 (.184) |
| New Firm | - | -.002 (.009) | -.015 (.016) | .012 (.023) |
| *Ownership* | | | | . |
| Private | - | .042 (.064) | .050 (.047) | .009 (.018) |
| Cooperative | - | - | .329*** (.102) | -.0002 (.02) |
| Other | - | .052 (.043) | -.279*** (.063) | -.013 (.019) |
| Joint venture (International domestic and foreign) | - | -.072 (.058) | .151*** (.056) | -.009 (.031) |

# Table A4 con't

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| *Legal Form* | | | | |
| Limited liability | - | .083<br>(.058) | .129**<br>(.065) | .112***<br>(.042) |
| Joint Stock Co. (International domestic and foreign) | - | .018<br>(.009) | .022<br>(.018) | .018<br>(.017) |
| Cooperative | - | - | -.359***<br>(.119) | - |
| Industrial Cooperative | - | - | -.352 ***<br>(.102) | - |
| State Enterprise | - | - | - | - |
| Other Firm | - | -.198<br>(.043)*** | -.038<br>(.053) | - |
| *Test Results* | | | | |
| $\chi^2$ - First Difference (p value) | 12.83**<br>(.025) | 18.04<br>(.003)*** | 17.25***<br>(.004) | 13.85*<br>(.017) |
| $\chi^2$ - Industry Dummies (p value) | 133.88**<br>(.000) | 108.13***<br>(.000) | 88.19**<br>(.04) | 109.88***<br>(.000) |
| $\chi^2$ - Ownership Dummies (p value) | - | 11.05*<br>(.086) | 59.78***<br>(.000) | 4.65<br>(.795) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 33.27***<br>(.000) | 23.14***<br>(.010) | 12.99**<br>(.011) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 37.73<br>(no) | 7005.093<br>(no) | 41493.25<br>(no) | 2027.44<br>(no) |
| $R^2$ | .998 | .991 | .955 | .987 |
| Number of Observations | 761 | 990 | 1453 | 1017 |

Notes:    \*     Significant at 1% test level
       \*\*     Significant at 5% test level
      \*\*\* Significant at 10% test level

      p     Probability of a given restriction being true.

      a:     Yes =$Q_t$ & $Q_{t-1}$ exogenous
             No = $Q_t$ & $Q_{t-1}$ endogenous

      n.a. Not applicable

**Table A5**

**Czech Republic: 3SLS Estimates of the Wage Equation for Unbalanced Panels of Firms, 1990-93.**

(Dependent Variable is the Logarithm of Average Monthly Wage, ln $W_t$; Values in Parentheses are Standard Errors.)

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| ln $W_{t-1}$ | .779*** (.079) | .967 (.086)*** | .871 (.076)*** | .971 (.063)*** |
| ln $(Q/L)_t$ | .027 (.028)*** | .102 (.019)*** | .437 (.046)*** | .254 (.049)*** |
| ln $(Q/L)_{t-1}$ | .013 (.022) | -.056* (.029) | -.377*** (.044) | -.239*** (.047) |
| LR elasticity of Q/L | .179*** (.058) | n.a. | .462** (.226) | n.a. |
| (Export/Sales)$_{t-1}$ | .002 (.029) | -.011 (.021) | -.042 (.046) | .009 (.043) |
| Unemployment$_t$ | - | .034 (.225) | -.303 (.271) | -.237 (.184) |
| *Type of Firm* | | | | |
| (Existing State-owned & Registered Firm) | .105 (.091) | -.044 (.102) | -.214 (.122) | .082 (.113) |
| New Firm | - | -.014** (.006) | -.008 (.009) | -.014 (.013) |
| *Ownership* | | | | |
| Private | - | .033 (.045) | -.011 (.027) | .002 (.011) |
| Cooperative | - | - | .168*** (.064 | .006 (.009) |
| Other | - | .044 (.033) | -.179*** (.039 | .011 (.011) |
| Joint venture (International domestic and foreign) | - | .068 (.042) | .072*** (.032 | -.008 (.017) |

## Table A5 con't

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| *Legal Form* | | | | |
| Limited liability | - | -.015 (.042) | .040 (.039) | -.003 (.027) |
| Joint Stock Co. (International domestic and foreign) | - | .010 (.007) | .001 (.009) | .019 (.009)** |
| Cooperative | - | - | -.174*** (.075) | - |
| Industrial Cooperative | - | - | -.199*** (.065) | - |
| Other Form | - | -.013 (.033) | -.003 (.031) | - |
| *Test Results* | | | | |
| $\chi^2$ - First Differences (p value) | 12.83** (.025) | 18.04*** (.003) | 17.25*** (.004) | 13.85* (.017) |
| $\chi^2$ - Industry Dummies (p value) | 133.88** (.000) | 108.13*** (.000) | 88.19* (.040) | 109.88*** (.000) |
| $\chi^2$ - Ownership Dummies (p value) | - | 11.05* (.086) | 59.78*** (.000) | 4.65 (.795) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 33.27*** (.000) | 23.14*** (.010) | 12.99** (.011) |
| $\chi^2$ -Exogeneity of $Q_t$ & $Q_{t-1}$ [a] | 37.73 (no) | 7005.09 (no) | 41493.2 (no) | 2027.44 (no) |
| $R^2$ | .871 | .804 | .594 | .873 |
| Number of Observations | 761 | 990 | 1453 | 1017 |

Notes: ***    Significant at 1% level test
     **    Significant at 5% level test
     *    Significant at 10% level test

p      Probability of a given restriction being true.

a:      Yes = $Q_t$ & $Q_{t-1}$ exogenous
       No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.      Not applicable

## Table A6
### Czech Republic: IV Estimates of Augmented Employment Equation (1') for a Balanced Panel of Firms, 1990-93
(Dependent Variable is the Logarithm of the Number of Employees, $ln\ L_t$; Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| $ln\ L_{t-1}$ | .966*** (.019) | .833*** (.054) | .964*** (.041) | .938*** (.034) |
| $ln\ Q_t$ | .026 (.019) | .131*** (.030) | .214*** (.068) | .233*** (.026) |
| $ln\ Q_{t-1}$ | -.009 (.018) | -.019 (.045) | -.191*** (.067) | -.158*** (.030) |
| LR elasticity of Q | n.a. | .668*** (.096) | n.a. | 1.210*** (.384) |
| $ln\ W_t$ | -.103 (.195) | -.289 (.281) | -.465** (.203) | -.162 (.202) |
| $ln\ W_{t-1}$ | .00007 (.176) | .018 (.328) | .414* (.237) | .110 (.214) |
| LR elasticity of W | n.a. | -1.620 (1.090) | n.a. | -.836 (1.590) |
| Unemployment$_t$ | - | .795 (.546) | .225 (.523) | .220 (.357) |
| Assets$_{t-1}$ | .001 (.005) | .037* (.020) | .018 (.028) | -.011 (.014) |
| **Type of Firm** | | | | |
| Existing State-owned & Registered Firm (Base) | .151 (.127) | -.444* (.244) | -.227 (.199) | -.427** (.215) |
| New Firm | - | - | - | - |
| **Ownership** | | | | |
| Private | - | - | -.006 (.080) | -.069** (.029) |
| Cooperative | - | - | - | - |
| Other | - | .142** (.067) | -.071*** (.120) | -.052** (.026) |
| Joint venture (International domestic and foreign) | - | - | .047*** (.117) | -.041 (.041) |

## Table A6 con't

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| *Legal Form* | | | | |
| Limited liability | - | - | - | - |
| Joint Stock Co. (International domestic and foreign) | - | .020 (.018) | .014 (.019) | .032* (.018) |
| Cooperative | - | - | - | - |
| Industrial Cooperative | - | - | - | - |
| Other Firm | - | -.093 (.110) | - | - |
| *Test Results* | | | | |
| $\chi^2$ (p- value) - First Difference | 6.92** (.074) | 10.0** (.018) | 1.00 (.800) | 25.70*** (.000) |
| $\chi^2$ (p- value) - Industry Dummies | 24.52 (.177) | 25.12* (.092) | 34.59** (.010 | 77.24*** (.000) |
| $\chi^2$ (p- value) - Ownership Dummies | - | 4.49** (.034) | .632 (.889) | 7.17* (.067) |
| $\chi^2$ (p- value) - Legal Form Dummies | - | 2.01 (.366) | 5.29 (.467) | 3.05* (.081) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | .378 (yes) | .246 (yes) | 6.61 (no) | 1.66 (yes) |
| $R^2$ | .998 | .990 | .992 | .994 |
| Number of Observations | 266 | 266 | 266 | 266 |

Notes:
\*     Significant at 10% test level
\*\*    Significant at 5% test level
\*\*\* Significant at 1% test level

p    Probability of a given restriction being true.

a:    Yes = $Q_t$ & $Q_{t-1}$ exogenous
      No = $Q_t$ & $Q_{t-1}$ endogenous

n.a. Not applicable

## Table A7
### Czech Republic: 3SLS Estimates of Augmented Employment Equation (1') for a Balanced Panel of Firms, 1990-93
(Dependent Variable is the Logarithm of the Number of Employees, $\ell n\ L_t$; Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| $\ell n\ L_{t-1}$ | .966*** (.018) | .820*** (.056) | .948*** (.037) | .940*** (.032) |
| $\ell n\ Q_t$ | .026 (.018) | .146*** (.050) | .265*** (.062) | .283*** (.045) |
| $\ell n\ Q_{t-1}$ | .009 (.017) | -.038 (.072) | -.229*** (.062) | -.217*** (.048) |
| LR elasticity of Q | n.a. | .597*** (.187) | .684* (.440) | 1.11*** (.427) |
| $\ell n\ W_t$ | -.120*** (.185) | -.550** (.268) | -.845** (.180) | -.270 (.189) |
| $\ell n\ W_{t-1}$ | .014 (.168) | .252 (.314) | .774*** (.214) | .268 (.203) |
| LR elasticity of W | n.a. | -1.66* (1.00) | -1.36 (2.33) | -.025 (1.81) |
| Unemployment$_t$ | - | .630 (.552) | .009 (.489) | .114 (.348) |
| Assets$_{t-1}$ | .0008 (.004) | .053* (.031) | .018 (.025) | -.007 (.019) |
| *Type of Firm* | | | | . |
| Existing State-owned & Registered Firm (Base) | .155 (.121) | -.427* (.253) | -.154 (.186) | -.430** (.202) |
| New Firm | - | - | - | - |
| *Ownership* | | | | |
| Private | - | - | -.004 (.075) | -.072** (.028) |
| Cooperative | - | - | - | - |
| Other | - | .125* (.066) | -.152 (.112) | -.043* (.024) |
| Joint venture (International domestic and foreign) | - | - | .036 (.109) | -.052 (.040) |

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| *Legal Form* | | | | |
| Limited liability | - | - | - | - |
| Joint Stock Co. (International domestic and foreign) | - | .019 (.017) | .014 (.018) | .033* (.017) |
| Cooperative | - | - | - | - |
| Industrial Cooperative | - | - | - | - |
| Other Firm | - | -.109 (.105) | - | - |
| *Test Results* | | | | |
| $\chi^2$ (p value) - First Difference | 14.20** (.0174) | 12.89** (.024) | 3.65 (.601) | 13.08** (.023) |
| $\chi^2$ (p value) - Industry Dummies | 52.01* (.064) | 47.99* (.056) | 99.84*** (.000) | 105.44*** (.000) |
| $\chi^2$ (p value) - Ownership Dummies | - | 4.11 (.128) | 7.09 (.313) | 16.62** (.011) |
| $\chi^2$ (p value) - Legal Form Dummies | - | 2.98 (.561) | .915 (.633) | 4.17 (.125) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 5.20 (yes) | 1513.1 (no) | 1632.4 (no) | 9554.8 (no) |
| $R^2$ | .998 | .989 | .990 | .994 |
| Number of Observations | 266 | 266 | 266 | 266 |

Notes:
*     Significant at 10% test level
**    Significant at 5% test level
***   Significant at 1% test level

p      Probability of a given restriction being true.

a:     Yes = $Q_t$ & $Q_{t-1}$ exogenous
       No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.   Not applicable

## Table A8
### Czech Republic: 3SLS Estimates of the Wage Equation for a Balanced Panel of Firms, 1990-93.
(Dependent Variable is the Logarithm of Average Monthly Wage, ln $W_t$; Values in Parentheses are Standard Errors.)

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| ln $W_{t-1}$ | .781*** | .903*** | .891*** | .833*** |
| | (.089) | (.117) | (.092) | (.096) |
| ln $(Q/L)_t$ | .068*** | .130*** | .155*** | .085** |
| | (.013) | (.030) | (.054) | (.041) |
| ln $(Q/L)_{t-1}$ | -.057 | -.088* | -.142*** | -.075* |
| | (.035) | (.048) | (.053) | (.042) |
| LR elasticity of Q/L | .052 | -.433 | .180 | .057 |
| | (.046) | (.541) | (.161) | (.116) |
| Unemployment$_t$ | - | -.273 | -.299 | -.162 |
| | | (.428) | (.442) | (.332) |
| (Export/Sales)$_{t-1}$ | .047* | .019 | -.011 | .090 |
| | (.029) | (.039) | (.086) | (.066) |
| **Type of Firm** | | | | |
| (Existing State-owned & Registered Firm) | .234* | .054 | .319** | .405 |
| | (.125) | (.172) | (.140) | (.167) |
| New Firm | - | - | - | - |
| **Ownership** | | | | |
| Private | - | - | -.002 | .008 |
| | | | (.061) | · (.022) |
| Cooperative | - | - | - | - |
| Other | - | -.012 | -.204** | .049*** |
| | | (.045) | (.083) | (.018) |
| Joint venture | - | - | -.002 | .015 · |
| | | | (.078) | (.032) |
| **Legal Form** | | | | |
| Limited liability | - | - | - | - |
| Joint Stock Co. | - | -.002 | -.002 | .013 |
| | | (.011) | (.012) | (.013) |
| Cooperative | - | - | - | - |
| Industrial Cooperative | - | - | - | - |

## Table A8 con't

| Variable | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|
| State Enterprise | - | -.057 (.067) | - | - |
| *Test Results* | | | | |
| $\chi^2$ - First Differences (p value) | 14.20** (.014) | 12.89** (.024) | 3.65 (.601) | 13.08** (.023) |
| $\chi^2$ - Industry Dummies (p value) | 52.01* (.064) | 47.99* (.056) | 99.84*** (.000) | 105.44*** (.000) |
| $\chi^2$ - Ownership Dummies (p value) | - | 4.11 (.128) | 7.09 (.313) | 16.62** (.011) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 2.98 (.561) | .915 (.633) | 4.17* (.125) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$ [a] | 5.17 (yes) | 1513.06 (no) | 1632 (no) | 9554.8 (no) |
| $R^2$ | .875 | .837 | .843 | .891 |
| Number of Observations | 266 | 266 | 266 | 266 |

Notes: *** Significant at 1% test level
** Significant at 5% test level
* Significant at 10% test level

p = Probability of a given restriction being true.

a: Yes = $Q_t$ & $Q_{t-1}$ exogenous
No = $Q_t$ & $Q_{t-1}$ endogenous

## Table B1
## Means (Standard Deviations) of Principal Variables
## for the Slovak Republic (1989-93)

| | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|
| Consumer Price Index, CPI | 1.3 | 10.4 | 61.2 | 10.0 | 25.6 |
| Producer Price Index, PPI | -2.7 | 4.8 | 68.9 | 5.3 | 16.6 |
| Average Monthly Wage | 3.11 (0.32) | 3.22 (0.344) | 3.73 (0.559) | 4.28 (1.07) | |
| Labor (No. Employees) | 1633 (1922) | 1597 (1866) | 980 (1819) | 766 (1425) | |
| Production (hundred million Kc) | 5.4 (2.58) | 5.26 (7.56) | 5.64 (22.3) | 3.83 (14.2) | |
| Sales (hundred million Kc) | 1.62 (2.67) | 1.64 (2.64) | 1.5 (5.41) | 4.37 (16.7) | |
| Exports (hundred million Kc) | .494 (.925) | .505 (.973) | 1.06 (7.26) | .874 (2.90) | |
| Exports/Sales (lagged)% | - | 23.3 (28.6) | 19.1 (27.5) | 13.2 (19.6) | |
| Fixed Assets, state on 12/31 of previous year (hundred million Kc) | - | 8.06 (21) | 6.78 (2.45) | 7.19 (2.4) | |
| Market Share (Sales/Ind. Sales) % | 2.19 (7.34) | 2.21 (7.33) | 0.855 (2.33) | 1.57 (4.59) | |
| Regional Unemployment% | - | 1.51* | 11.6 (3.88) | 8.37 (2.61) | |
| % New Firm | - | - | 41.4 | 51.9 | |
| Ownership | | | | | |
| % State-Owned | - | - | 98.5 | 79.4 | |
| % Private | - | - | - | 1.2 | |
| % Cooperative | - | - | - | 16.2 | |
| % Joint Venture | - | - | - | 1.5 | |
| Legal Form | | | | | |
| % State Enterprise | - | - | 94.1 | 53.5 | |
| % Limited liability | - | - | - | 0.8 | |
| % Joint Stock Co. | - | - | 4.4 | 27.9 | |
| % Industrial Coop. | - | - | - | 16.0 | |
| Number of Enterprises, N | 315 | 311 | 476 | 592 | |

\*     Only overall unemployment rate available.

## Table B2
### Slovak Republic: IV Estimates of Basic Employment Equation (1') for Unbalanced Panels of Slovak Firms, 1990-92
(Dependent Variable is the Logarithm of the Number of Employees, $\ln L_t$; Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $\ln L_{t-1}$ | .977 (.013)*** | .847 (.046)*** | .966 (.024)*** |
| $\ln Q_t$ | .101 (.015)*** | .063 (.035) | .328 (.027)*** |
| $\ln Q_{t-1}$ | -.081 (.012)*** | .086 (.046) | -.278 (.030)*** |
| LR elasticity of Q | n.a. | .974 (.053)*** | n.a. |
| $\ln W_t$ | -.329 (.116)*** | .403* (.222) | -.249 (.150) |
| $\ln W_{t-1}$ | .318 (.117)*** | -.536 (.277)** | .096 (.148) |
| LR elasticity of W | n.a. | -.871 (.771) | n.a. |
| *Type of Firm* | | | |
| (Existing State-owned & Registered Firm) | -.123 (.096) | -.945 (.188)*** | -.242 (.175) |
| *Ownership* | | | |
| New Firm | - | .009 (.016) | .023 (.028) |
| Private | - | - | .239 (.085)*** |
| Cooperative | - | .264 (.152) | -.035 (.227) |
| Other | - | -.088 (.092) | .212 (.093)** |
| Joint venture (International domestic and foreign) | - | .152 (.138) | .068 (.094) |

## Table B2 con't

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| *Legal Form* | | | |
| Limited liability | - | - | .142 (.117) |
| Joint Stock Co. (International domestic and foreign) | - | -.011 (.031) | .025 (.028) |
| Industrial Cooperative | - | - | .023 (.255) |
| Other Form | - | - | -.291 (.089)*** |
| | | | |
| *Test Results* | | | |
| $\chi^2$ (p value) - First Difference | 3.91 (0.27) | 15.61 (.001)*** | 13.92*** (.003) |
| $\chi^2$ (p value) - Industry Dummies | 26.32 (0.24) | 25.92 (.130) | 28.77 (.322) |
| $\chi^2$ (p value) - Ownership Dummies | - | 4.84 (.184) | 11.61** (.020) |
| $\chi^2$ (p value) - Legal Form Dummies | - | .122 (.727) | 17.09*** (.002) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$ [a] | 1.88 (yes) | 11.53 (no) | 1.26 (yes) |
| $R^2$ | .998 | .991 | .979 |
| Number of Observations | 311 | 426 | 569 |

Notes:
*     Significant at 1% test level
**    Significant at 5% test level
***   Significant at 10% test level

p     Probability of a given restriction being true.

a:     Yes = $Q_t$ & $Q_{t-1}$ exogenous
     No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.    Not applicable

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### Table B3
### Slovak Republic:  IV Estimates of Augmented Employment Equation (1′) for Unbalanced Panels of Slovak Firms, 1990-92
(Dependent Variable is the Logarithm of the Number of Employees, $\ln L_t$; 

Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $\ln L_{t-1}$ | .971*** (.029) | .821*** (.040) | 1.02*** (.046) |
| $\ln Q_t$ | .104*** (.019) | .042** (.017) | .331*** (.029) |
| $\ln Q_{t-1}$ | -.081*** (.012) | .035** (.016) | -.297 (.035) |
| LR elasticity of Q | n.a. | .427*** (.062) | n.a. |
| $\ln W_t$ | -.347** (.139) | .461** (.202) | -.206 (.169) |
| $\ln W_{t-1}$ | .329*** (.128) | -.772*** (.210) | .111 (.154) |
| LR elasticity of W | n.a. | -1.740** (.694) | n.a. |
| Unemployment$_t$ | - | -.106 (.173) | .216 (.366) |
| Assets$_{t-1}$ | .003 (.011) | .082*** (.019) | -.029 (.021) |
| *Type of Firm* | | | |
| (Existing State-owned & Registered Firm) | -.134 (.109) | -.819*** (.178) | -.176 (.227) |
| New Firm | - | -.001 (.014) | .029 (.029) |
| *Ownership* | | | |
| Private | - | - | .218** (.089) |
| Cooperative | - | .275* (.141) | -.044 (.237) |
| Other | - | -.038 (.090) | .212** (.096) |
| Joint venture (International domestic and foreign) | - | .336*** (.127) | .061 (.098) |

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| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| *Legal Form* | | | |
| Limited liability | - | - | .152<br>(.121) |
| Joint Stock Co. International domestic and foreign) | - | .015<br>(.029) | .023<br>(.029) |
| Cooperative | - | - | - |
| Industrial Cooperative | - | - | .011<br>(.233) |
| State Enterprise | - | - | -.302***<br>(.092) |
| Other Legal Firm | - | - | - |
| *Test Results* | | | |
| $\chi^2$ - First Difference (p value) | 3.43<br>(.329) | 19.78***<br>(.000) | 12.29***<br>(.006) |
| $\chi^2$ - Industry Dummies (p value) | 22.65<br>(.422) | 48.53***<br>(.000) | 28.07<br>(.355) |
| $\chi^2$ - Ownership Dummies (p value) | - | 10.46**<br>(.015) | 9.75**<br>(.045) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 0.258<br>(.618) | 17.06***<br>(.002) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 2.22<br>(yes) | 1.11<br>(yes) | 1.08<br>(yes) |
| $R^2$ | .998 | .992 | .977 |
| Number of Observations | 311 | 426 | 569 |

Notes:
*     Significant at test level 1%
**    Significant at test level 5%
***   Significant at test level 10%

p     Probability of a given restriction being true.

a:    Yes = $Q_t$ & $Q_{t-1}$ exogenous
     No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.   Not applicable

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## Table B4
### Slovak Republic: 3SLS Estimates of Augmented Employment Equation (1′) for Unbalanced Panels of Slovak Firms, 1990-92
(Dependent Variable is the Logarithm of the Number of Employees, $\ln L_t$; Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $\ln L_{t-1}$ | .939*** (.028) | .803*** (.045) | 1.01*** (.043) |
| $\ln Q_t$ | .187*** (.037) | .054 (.032) | .421*** (.082) |
| $\ln Q_{t-1}$ | -.115*** (.030) | .054 (.045) | -.364*** (.090) |
| LR elasticity of Q | 1.18*** (.339) | .545*** (.146) | n.a. |
| $\ln W_t$ | -.632 (.133) | .551*** (.205) | -.374** (.174) |
| $\ln W_{t-1}$ | .581*** (.126) | -.799*** (.218) | .276 (.175) |
| LR elasticity of W | -.829 (.119) | -1.26 (.708) | n.a. |
| Unemployment$_t$ | - | .018 (.197) | .113 (.352) |
| Assets$_{t-1}$ | -.010 (.013) | .069 (.024)*** | -.038 (.027) |
| *Type of Firm* | | | |
| Existing State-owned & Registered Firm (Base) | -.264 (.119) | -.989 (.224)*** | -.240 (.284) |
| *Ownership* | | | |
| New Firm | - | .003 (.014) | .042 (.031) |
| Private | - | - | .219*** (.086) |
| Cooperative | - | .268 (.139) | .045 (.233) |
| Other | - | -.003 (.089)*** | .224** (.094) |
| Joint venture (International domestic and foreign) | - | .256 (.143) | .006 (.122) |

## Table B4 con't

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| *Legal Form* | | | |
| Limited liability | - | - | .115<br>(.119) |
| Joint Stock Co. (International domestic and foreign) | - | .005<br>(.029) | .015<br>(.030) |
| Industrial Cooperative | - | - | -.093<br>(.232) |
| State Enterprise | - | - | - |
| Other Form | - | - | -.302***<br>(.089) |
| | | | |
| *Test Results* | | | |
| $\chi^2$ - First Difference (p value) | 35.08<br>(.000)*** | 32.03***<br>(.000) | 15.85***<br>(.007) |
| $\chi^2$ - Industry Dummies (p value) | 58.79*<br>(.067) | 77.52***<br>(.000) | 67.19*<br>(.077) |
| $\chi^2$ - Ownership Dummies (p value) | - | 22.04***<br>(.001) | 22.77***<br>(.004) |
| $\chi^2$ - Legal Form Dummies (p value) | - | 11.20<br>(.548) | 20.36***<br>(.009) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 99385.21<br>(no) | 21.56<br>(no) | 10.06<br>(no) |
| $R^2$ | .998 | .991 | .977 |
| Number of Observations | 311 | 426 | 569 |

Notes:  *    Significant at 1% test level
    **    Significant at 5% test level
    *** Significant at 10% test level

    p     Probability of a given restriction being true.

    a:    Yes = $Q_t$ & $Q_{t-1}$ exogenous
         No = $Q_t$ & $Q_{t-1}$ endogenous

    n.a. Not applicable

## Table B5
### Slovak Republic: 3SLS Estimates of the Wage Equation for Unbalanced Panels of Slovak Firms, 1990-92
(Dependent Variable is the Logarithm of Average Monthly Wage, in $W_t$; Values in Parentheses are Standard Errors.)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| ln $W_{t-1}$ | .816*** (.089) | .741*** (.090) | .664*** (.097) |
| ln $(Q/L)_t$ | .174*** (.043) | .093*** (.021) | .303*** (.066) |
| ln $(Q/L)_{t-1}$ | -.062 (.038) | -.035 (.029) | -.283*** (.069) |
| LR elasticity of Q/L | .608* (.325) | .224** (.108) | .060 (.078) |
| Export/Sales | -.008 (.034) | .014 (.037) | -.033 (.104) |
| Unemployment$_t$ | - | -.022 (.165) | -.567* (.320) |
| **Type of Firm** | | | |
| (Existing State-owned & Registered Firm) | -.224 (.157) | .208 (.164) | .529** (.214) |
| New Firm | - | .003 (.010) | .002 (.022) |
| **Ownership** | - | | |
| Private | - | - | .131** (.062) |
| Cooperative | - | -.032 (.099) | .188 (.170) |
| Other | - | -.205*** (.055) | .228*** (.066) |
| Joint venture (International domestic and foreign) | - | .125 (.092) | .065 (.083) |
| **Legal Form** | | | |
| Limited liability | - | - | .014 (.087) |
| Joint Stock Co. (International domestic and foreign) | - | .022 (.021) | .026 (.021) |

## Table B5 con't

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| Industrial Cooperative | - | - | -.245 (.167) |
| State Enterprise | - | - | - |
| Other Form | - | - | -.115 (.067) |
| *Test Results* | | | |
| $\chi^2$ (p value) - First Difference | 35.08*** (.000) | 32.03*** (.000) | 15.85*** (.007) |
| $\chi^2$ (p value) - Industry Dummies | 58.79* (.067) | 77.52*** (.000) | 67.19* (.077) |
| $\chi^2$ (p value) - Ownership Dummies | - | 22.04*** (.001) | 22.77*** (.004) |
| $\chi^2$ (p value) - Legal Form Dummies | - | 1.20 (.548) | 20.36*** (.009) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 99385.2 (no) | 21.56 (no) | 10.06 (no) |
| $R^2$ | .759 | .736 | .641 |
| Number of Observation | 311 | 426 | 569 |

Notes: *** Significant at 1% test level
** Significant at 5% test level
* Significant at 10% test level

p     Probability of p value restriction being true.

a:     Yes = $Q_t$ & $Q_{t-1}$ exogenous
      No = $Q_t$ & $Q_{t-1}$ endogenous

## Table B6
### Slovak Republic: IV Estimates of Employment Equation (1') for a Balanced Panel of Firms, 1990-92
(Dependent Variable is the Logarithm of the Number of Employees, $\ln L_t$; Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $\ln L_{t-1}$ | 1.020*** (.026) | .911*** (.049) | .873*** (.065) |
| $\ln Q_t$ | .047*** (.020) | .072*** (.028) | .483*** (.048) |
| $\ln Q_{t-1}$ | -.046*** (.016) | .025 (.026) | -.304*** (.054) |
| LR elasticity of Q | n.a. | 1.090*** (.321) | 1.410** (.579) |
| $\ln W_t$ | -.100 (.229) | .224 (.206) | -.924*** (.303) |
| $\ln W_{t-1}$ | .081 (.240) | -.250 (.219) | .596** (.302) |
| LR elasticity of W | n.a. | -.294 (1.53) | -2.58 (2.07) |
| Unemployment | - | .273 (.227) | -.046 (.837) |
| Assets$_{t-1}$ | -.014 (.012) | .0001 (.019) | -.016 (.040) |
| *Type of Firm* | | | |
| Existing State-owned & Registered Firm (Base) | -.087 (.143) | -.741*** (.234) | -.921** (.444) |
| New Firm | - | - | - |
| *Ownership* | | | |
| Private | - | - | - |
| Cooperative | - | - | - |
| Other | - | - | - |
| Joint venture (International domestic and foreign) | - | - | - |
| *Legal Form* | | | |
| Limited liability | - | - | - |

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## Table B6 con't

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| Joint Stock Co. (International domestic and foreign) | - | .018 (.025) | -.006 (.047) |
| Cooperative | - | - | - |
| Industrial Cooperative | - | - | - |
| State Enterprise | - | - | - |
| Other Form | - | - | - |

*Test Results*

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $\chi^2$ - First Difference (p value) | 1.86 (.601) | 11.38** (.009) | 25.41*** (.000) |
| $\chi^2$ - Industry Dummies (p value) | 35.47** (.008) | 27.74* (.066) | 17.88 (.596) |
| $\chi^2$ - Ownership Dummies (p value) | - | - | - |
| $\chi^2$ - Legal Form Dummies (p value) | - | .722[b] | -.136[b] |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$ | 3.03 (yes) | .837 (yes) | 3.06 (yes) |
| $R^2$ | .998 | .996 | .986 |
| Number of Observations | 145 | 145 | 145 |

Notes:   *   Significant at 1% test level
      **   Significant at 5% test level
      ***   Significant at 10% test level

      p   Probability of a given restriction being true.

      a:   Yes = $Q_t$ & $Q_{t-1}$ exogenous
          No = $Q_t$ & $Q_{t-1}$ endogenous

      n.a. Not applicable

## Table B7
### Slovak Republic: 3SLS Estimates of Employment Equation (1′) for a Balanced Panel of Firms, 1990-92
(Dependent Variable is the Logarithm of the Number of Employees, $ln\ L_t$;
Values in Parentheses are Standard Errors)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $ln\ L_{t-1}$ | 1.02*** | .911*** | .870*** |
| | (.027) | (.046) | (.063) |
| $ln\ Q_t$ | .125*** | .092*** | .457*** |
| | (.038) | (.030) | (.095) |
| $ln\ Q_{t-1}$ | -.107*** | .026 | -.229** |
| | (.036) | (.035) | (.103) |
| LR elasticity of Q | n.a. | 1.31*** | 1.76** |
| | | (.458) | (.794) |
| $ln\ W_t$ | -.539** | .144 | -1.33*** |
| | (.239) | (.191) | (.288) |
| $ln\ W_{t-1}$ | .075 | -.186 | .894** |
| | (.065) | (.200) | (.287) |
| LR elasticity of W | n.a. | -.473 | -3.37* |
| | | (1.40) | (2.17) |
| Unemployment | - | .270 | -.543 |
| | | (.206) | (.826) |
| $Assets_{t-1}$ | -.024 | -.015 | -.058 |
| | (.017) | (.029) | (.049) |
| *Type of Firm* | | | |
| (Existing State-owned & Registered Firm) | -.103 | -.751*** | -.743* |
| | (.140) | (.212) | (.450) |
| *Legal Form* | | | |
| Joint Stock Co. (International domestic and foreign) | - | .014 | -.009 |
| | | (.023) | (.045) |
| *Test Results* | | | |
| $\chi^2$ (p value) - First Difference | 9.82* | 25.43*** | 30.39*** |
| | (.080) | (.000) | (.000) |
| $\chi^2$ (p value) - Industry Dummies | 61.60*** | 54.85* | 46.69 |
| | (.005) | (.022) | (.217) |
| $\chi^2$ (p value) - Ownership Dummies | - | - | - |
| $\chi^2$ (p value) - Legal Form Dummies | - | .436 | .983 |
| | | (.804) | (.612) |

## Table B7 con't

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$ | 54.53 (no) | 44.91 (no) | 122268.9 (no) |
| $R^2$ | .998 | .996 | .996 |
| Number of Obs. | 145 | 145 | 145 |

Notes: * Significant at 1% test level
\*\* Significant at 5% test level
\*\*\* Significant at 10% test level

p Probability of a given restriction being true.

a: Yes = $Q_t$ & $Q_{t-1}$ exogenous
No = $Q_t$ & $Q_{t-1}$ endogenous

n..a.Not applicable

## Table B8
### Slovak Republic: 3SLS Estimates of the Wage Equation for a Balanced Panel of Slovak Firms, 1990-92
(Dependent Variable is the Logarithm of Average Monthly Wage, ln $W_t$; Values in Parentheses are Standard Errors.)

| Variable | 1990 | 1991 | 1992 |
|---|---|---|---|
| ln $W_{t-1}$ | 1.04*** (.063) | .817*** (.111) | .627*** (.141) |
| ln $(Q/L)_t$ | .103*** (.030) | .101*** (.023) | .185*** (.072) |
| ln $(Q/L)_{t-1}$ | -.071** (.032) | .018 (.032) | -.111* (.066) |
| LR elasticity of Q/L | n.a. | .650* (.352) | .197** (.087) |
| Export/Sales | .040 (.035) | -.064 (.047) | -.456 (.581) |
| Unemployment$_t$ | - | -.124 (.239) | -.391** (.171) |
| *Type of Firm* | | | |
| Existing State-owned & Registered Firm (Base) | -.047 (.097) | -.218 (.187) | .269 (.297) |
| *Legal Form* | | | |
| Joint Stock Co. (International domestic and foreign) | - | .006 (.020) | .024 (.027) |
| *Test Results* | | | |
| $\chi^2$ (p value) - First Differences | 9.82* (.080) | 25.43*** (.000) | 30.39*** (.000) |
| $\chi^2$ (p value) - Industry Dummies | 61.60*** (.005) | 54.85** (.022) | 46.69 (.217) |
| $\chi^2$ (p value) - Ownership Dummies | n/a | n/a | n/a |
| $\chi^2$ (p value) - Legal Form Dummies | n/a | .436 (.804) | .983 (.612) |
| $\chi^2$ - Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 54.53 (no) | 44.91 (no) | 12268.9 (no) |
| $R^2$ | .908 | .836 | .784 |
| Number of Observations | 145 | 145 | 145 |

# Table B8 con't

Notes: *** Significant at 1% level
    ** Significant at 5% level
    * Significant at 10% level

    p   Probability of a given restriction being true.

    a:  Yes = $Q_t$ & $Q_{t-1}$ exogenous
       No = $Q_t$ & $Q_{t-1}$ endogenous

    n.a. Not applicable

|  | 1988 | 1989 | 1990 | 1991[1] | 1991[2] |
|---|---|---|---|---|---|
| Consumer Price Index, CPI (1988 = 100) | 100 | 351.1 | 2407.6 | 4100 | |
| Producer Price Index for 2 digit industry (1988=100) | 100 (3.46) | 320.87 (40.05) | 2048.85 (391.76) | 2977.90 (729.67) | |
| Average Annual Wage, W (Thousand Zloty) | 609.1 (164.83) | 2292.25 (605.3) | 10459.21 (3357.38) | 19156.44 (5170.73) | 16577.36 (4154.39) |
| Real Consumer Wage (base = 1988) | 609.1 (164.83) | 652.88 (172.40) | 434.42 (139.45) | 467.23 (126.12) | 404.33 (101.33) |
| Real Product Wage (base = 1988) | 609.1 (164.83) | 714.36 (188.6) | 510.49 (163.87) | 419.12 (126.23) | 389.15 (121.32) |
| Number of Employees, L | 726.23 (1315.28) | 694.11 (1271.02) | 701.64 (1293.44) | 774.76 (1283.99) | 178.81 (358.81) |
| Value of Production, Q (Million Zloty) | 5759.64 (19623.86) | 18103.97 (56470.44) | 98625.82 (396201.1) | 151485.294 (549356.2) | 16870.243 (43245.901) |
| Sales (Million Zloty) | 5836.03 (19719.09) | 18504.83 (57004.19) | 100474.67 (398740.59) | - | - |
| Export/Production (lagged) | - | 6.2% (0.577) | 5.8% (0.151) | 5.9% (0.147) | 6.64% (0.152) |
| Market Share (Production/Ind. Production[a]) | - | 0.1% (0.004) | - | 0.132% (.004) | .08% (.002) |
| Gross Fixed Assets, K (Million Zloty) | 3997.69 (16238.73) | 4224.0 (17012.99) | 69320.0 (261932.8) | 234261.410 (647285.9) | 22382.35 (79697.742) |
| Type of Firm: | | | | | |
|     Basic Unit with Subsidiaries | 85% (0.36) | 85% (0.36) | 90% (0.30) | - | |
|     State Ownership | - | - | - | 72% (0.449) | 20.3% (0.402) |
|     Cooperative | - | - | - | 24% (0.428) | 75.9% (0.427) |
|     Private | - | - | - | .21% (.046) | 0.36% (0.059) |
|     Mixed Ownership | - | - | - | .61% (0.078) | 0.86% (0.092) |
|     Others | - | | | 3.1% (0.173) | 2.51% (0.157) |
| Number of Enterprises, N | 4922 | 4922 | 4856 | 2787 | 1394 |

[a]     Includes one digit industry production and imports

1     Top 2/3 of industries by profit.
2.     Bottom 1/3 of industried by profit.

## Table C2
### Poland:  IV Estimates of Basic Employment Equation (1′) for Unbalanced Panels of Polish Firms, 1989-91
#### (Dependent Variable is the Logarithm of the Number of Employees, $ln\ L_t$; Values in Parentheses are Standard Errors)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| $ln\ L_{t-1}$ | 1.00*** (.016) | .915*** (.016) | .865*** (.018) |
| $ln\ Q_t$ | .300*** (.031) | .226*** (.025) | .397*** (.009) |
| $ln\ Q_{t-1}$ | .296*** (.033) | .145*** (.030) | -.276** (.018) |
| LR elasticity of Q | n.a. | .948*** (.045) | .890*** (.032) |
| $ln\ W_t$ | .257*** (.059) | -.558*** (.054) | -.836*** (.072) |
| $ln\ W_{t-1}$ | .117*** (.050) | .494*** (.057) | .617*** (.072) |
| LR elasticity of W | n.a. | -0.752* (0.357) | -1.623*** (.255) |
| *Ownership* | | | |
| Basic Unit | -.0781 (.188) | -.130. (.239) | .999*** (.018) |
| Non-Basic Unit | .008 (.006) | .020*** (.007) | |
| Was Basic, now Coop | - | - | -.030** (.008) |
| Was Basic, now Private | - | - | .012** (.055) |
| Was Basic, now Mixed Ownership | - | - | .082** (.037) |
| Was Basic, now Others | - | - | -.066*** (.017) |
| Was Non-Basic, now State | - | - | -.029 (.020) |
| Was Non-Basic, now Coop | - | - | -.050 (.038) |
| Was Non-Basic, now Mixed Ownership | - | - | -.255*** (.078) |
| Was Non-Basic, now Others | - | - | .031 (.057) |

## Table C2 con't

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| *Test Results* | | | |
| P value First Difference | .0001 | .0001 | .00001 |
| P value Industrial Dummies | .0001 | .0001 | .0001 |
| P value Ownership Dummies | - | - | .0001 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 42.69 (no) | 6.60 (no) | 1.730 (yes) |
| $R^2$ | .985 | .986 | .971 |
| Number of Observations | 4914 | 4854 | 4181 |

Notes:

| | |
|---|---|
| * | Significant at 1% test level |
| ** | Significant at 5% test level |
| *** | Significant at 10% test level |
| p | Probability of a given restriction being true |
| a: | Yes = $Q_t$ & $Q_{t-1}$ exogenous <br> No = $Q_t$ & $Q_{t-1}$ endogenous |
| n.a. | Not applicable |

## Table C3
## Poland:  IV Estimates of Augmented Employment Equation (1′) for Unbalanced Panels of Polish Firms, 1989-91
### (Dependent Variable is the Logarithm of the Number of Employees, $\ell n\ L_i$; Values in Parentheses are Standard Errors)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| $\ell n\ L_{i-1}$ | .988*** (.017) | .894*** (.018) | .829*** (.027) |
| $\ell n\ Q_i$ | .286*** (.032) | .189*** (.027) | .413*** (.033) |
| $\ell n\ Q_{i-1}$ | -.301*** (.034) | -.133*** (.030) | -.317** (.037) |
| LR elasticity of Q | n.a. | .538*** (.133) | .566*** (.105) |
| $\ell n\ W_i$ | -.260*** (.060) | -.501*** (.057) | -.826*** (.075) |
| $\ell n\ W_{i-1}$ | .130*** (.051) | .470*** (.058) | .592*** (.073) |
| LR elasticity of W | n.a. | .300 (.337) | -1.37*** (.275) |
| Unemployment$_i$ | - | .002*** (.001) | -.0002 (.0008) |
| Assets$_{i-1}$ | .020*** (.007) | .030 (.011) | .037*** (.013) |
| *Ownership* | | | |
|    Basic Unit | -.817*** (.191) | -.104*** (.277) | 1.124*** (.437) |
|    Non-Basic Unit | .010 (.006) | .023*** (.008) | - |
|    Was Basic, now Coop | - | - | -.039*** (.011) |
|    Was Basic, now Private | - | - | .180*** (.066) |
|    Was Basic, now Mixed Ownership | - | - | .120*** (.040) |
|    Was Basic, now Others | - | - | -.066*** (.018) |
|    Was Non-Basic, now State | - | - | -.015 (.021) |

## Table C3 con't

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| Was Non-Basic, now Coop | - | - | -.048 (.038) |
| Was Non-Basic, now Mixed Ownership | - | - | -.200*** (.081) |
| Was Non-Basic, now Others | - | - | .054 (.058) |
| **Test Results** | | | |
| P value First Difference | .0001 | .0001 | .0001 |
| P value Industrial Dummies | .0001 | .0001 | .0001 |
| P value Ownership Dummies | - | - | .0001 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$ [a] | 39.61 (no) | 12.78 (no) | 6.45 (no) |
| $R^2$ | .987 | .985 | .975 |
| Number of Observations | 4914 | 4854 | 4181 |

Notes:

| | |
|---|---|
| * | Significant at 1% test level |
| ** | Significant at 5% test level |
| *** | Significant at 10% test level |
| p | Probability of a given restriction being true |
| a: | Yes = $Q_t$ & $Q_{t-1}$ exogenous |
| | No = $Q_t$ & $Q_{t-1}$ endogenous |
| n.a. | Not applicable |

## Table C4
### Poland: 3SLS Estimates of Augmented Employment Equation (1') for Unbalanced Panels of Polish Firms, 1989-91
(Dependent Variable is the Logarithm of the Number of Employees, $\ell n\ L_t$;
Values in Parentheses are Standard Errors)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| $\ell n\ L_{t-1}$ | .968*** (.016) | .862*** (.016) | .853*** (.032) |
| $\ell n\ Q_t$ | .314*** (.032) | .316*** (.013) | .496*** (.040) |
| $\ell n\ Q_{t-1}$ | -.312*** (.034) | -.219*** (.013) | -.427*** (.042) |
| LR elasticity of Q | .074 (.441) | .699*** (.045) | .473*** (.136) |
| $\ell n\ W_t$ | -.349*** (.058) | -.816*** (.077) | -1.192*** (.097) |
| $\ell n\ W_{t-1}$ | .185*** (.050) | .772*** (.071) | .823** (.095) |
| LR elasticity of W | -5.07*** (2.27) | -.313 (.307) | -2.523*** (.504) |
| Unemployment$_t$ | - | .002*** (.001) | -.001 (.001) |
| Assets$_{t-1}$ | .020*** (.007) | .015 (.005) | .039*** (.014) |
| *Ownership* | | | |
| Basic Unit | -.981*** (.189) | -.070 (.328) | 2.882*** (.560) |
| Non-Basic Unit | .010* (.006) | .012 (.007) | - |
| Was Basic, now Coop | - | - | -.057*** (.012) |
| Was Basic, now Private | - | - | .250*** (.071) |
| Was Basic, now Mixed Ownership | - | - | .111*** (.043) |
| Was Basic, now Others | - | - | -.058*** (.019) |
| Was Non-Basic, now State | - | - | -.001 (.022) |

## Table C4 con't

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| Was Non-Basic, now Coop | - | - | -.065 (.040) |
| Was Non-Basic, now Mixed Ownership | - | | -.119 (.084) |
| Was Non-Basic, now Others | - | - | .016 (.061) |
| *Test Results* | | | |
| P value First Difference | .203 | .0001 | .105 |
| P value Industry Dummies | .611 | .522 | .915 |
| P value Ownership Dummies | - | - | .569 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$ [a] | 8125.7 (no) | 48.73 (no) | 223.80 (no) |
| $R^2$ | .777 | .983 | .967 |
| Number of Observations | 4914 | 4854 | 4182 |

Notes:
   \*       Significant at 1% test level
   \*\*      Significant at 5% test level
   \*\*\*     Significant at 10% test level

   p        Probability of a given restriction being true.

   a:       Yes = $Q_t$ & $Q_{t-1}$ exogenous
           No = $Q_t$ & $Q_{t-1}$ endogenous

## Table C5
### Poland: 3SLS Estimates of the Wage Equation for Unbalaned Panels of Polish Firms, 1989-91.
(Dependent Variable is the Logarithm of Monthly Wage, ln $W_t$;
Values in Parentheses are Standard Errors.)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| ln $W_{t-1}$ | .723***<br>(.040) | .661***<br>(.045) | .593***<br>(.067) |
| ln $(Q/L)_t$ | .340***<br>(.056) | .204***<br>(.007) | .324***<br>(.045) |
| ln $(Q/L)_{t-1}$ | -.239***<br>(.059) | -.119***<br>(.010)* | -.302***<br>(.042) |
| LR elasticity of Q/L | .362***<br>(.057) | .251***<br>(.018) | .055<br>(.050) |
| Export/Sales | .074<br>(.057) | -.200***<br>(.045) | -.287***<br>(.064) |
| Unemployment$_t$ | - | -.007***<br>(.001) | -.003***<br>(.001) |
| *Ownership* | | | |
| Basic Unit | 1.880<br>(.243) | 3.059***<br>(.265) | 4.045***<br>(.536) |
| Non-Basic Unit | .006<br>(.007) | -.016***<br>(.007) | - |
| Was Basic, now Coop | - | - | -.040***<br>. (.011) |
| Was Basic, now Private | - | - | .137***<br>(.052) |
| Was Basic, now Mixed Ownership | - | | -.018<br>(.035) |
| Was Basic, now Others | | | .009<br>(.017) |
| Was Non-Basic, now State | - | - | .015<br>(.019) |
| Was Non-Basic, now Coop | - | - | -.034<br>(.036) |
| Was Non-Basic, now Mixed Ownership | - | - | .068<br>(.073) |
| Was Non-Basic, now Others | - | - | -.031<br>(.055) |

## Table C5 con't

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| *Test Results* | | | |
| P value First Differences | .030 | .010 | .032 |
| P value Industry Dummies | .534 | .466 | .678 |
| P value Ownership Dummies | - | - | .813 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 8125.7 (no) | 48.73 (no) | 223.89 (no) |
| $R^2$ | .777 | .741 | .578 |
| Number of Observations | 4914 | 4854 | 4181 |

Notes:  ***    Significant at 1% test level
      **     Significant at 5% test level
      *      Significant at 10% test level

      p     Probability of a given restriction being true.

      a:    Yes = $Q_t$ & $Q_{t-1}$[a] exogenous
           No = $Q_t$ & $Q_{t-1}$[a] endogenous

## Table C6
**Poland: IV Estimates of Employment Equation (1′) for a Balanced panel of Polish Firms, 1989-91**
(Dependent Variable is the Logarithm of the Number of Employees, $ln\ L_t$;
Values in Parentheses are Standard Errors)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| $ln\ L_{t-1}$ | 1.01*** (.014) | .902*** (.018) | .830*** (.027) |
| $ln\ Q_t$ | .307*** (.037) | .173*** (.029) | .383*** (.036) |
| $ln\ Q_{t-1}$ | -.333*** (.038) | -.150*** (.032) | -.275*** (.039) |
| LR elasticity of Q | n.a. | .233 (.175) | .637*** (.136) |
| $ln\ W_t$ | -.169*** (.0545) | -.489*** (.058) | -.890*** (.078) |
| $ln\ W_{t-1}$ | .050*** (.045) | .457*** (.057) | .660** (.078) |
| LR elasticity of W | n.a. | -.332 (.376) | -1.35*** (.298) |
| Unemployment$_t$ | n.a. | .002*** (.0009) | -.00003 (.0008) |
| Assets$_{t-1}$ | .015* (.008) | .050*** (.012) | .029 (.018) |
| *Ownership* | | | |
| Basic Unit | -.739*** (.205) | .903 (.018) | 1.06*** (.465) |
| Non-Basic Unit | .027*** (.007) | .015 (.013) | - |
| Was Baisc, now Coop | - | - | -.028*** (.011) |
| Was Basic, now Private | - | - | .111 (.127) |
| Was Basic, now Mixed Ownership | - | - | -.020 (.122) |
| Was Basic, now Others | - | - | -.047*** (.018) |
| Was Non-Basic, now State | - | - | -.026 (.021) |

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| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| Was Non-Basic, now Coop | - | - | -.039 |
| | | | (.038) |
| Was Non-Basic, now Mixed Ownership | - | | -.125 |
| | | | (.170) |
| Was Non-Basic, now Others | - | - | -.028 |
| | | | (.058) |
| *Test Results* | | | |
| P value First Difference | .0001 | .0001 | .0001 |
| P value Industry Dummies | .0001 | .0001 | .0001 |
| P value Ownership Dummies | - | - | .117 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 28.19 | 21.67 | 36.23 |
| | (no) | (no) | (no) |
| $R^2$ | .989 | .985 | .975 |
| Number of Observations | 3796 | 3796 | 3796 |

Notes:  *  Significant at 1% test level
\*\*  Significant at 5% test level
\*\*\*  Significant at 10% test level

p  Probability of a given restriction being true.

a:  Yes = $Q_t$ & $Q_{t-1}$ exogenous
No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.  Not applicable

**Table C7**
**Poland: 3SLS Estimates of Employment Equation (1′) for a Balanced Panel of Polish Firms, 1989-91**
(Dependent Variable is the Logarithm of the Number of Employees, $\ell n\ L_t$;
Values in Parentheses are Standard Errors)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| $\ell n\ L_{t-1}$ | 1.00*** (.014) | .886*** (.020) | .849*** (.030) |
| $\ell n\ Q_t$ | .311*** (.037) | .152*** (.038) | .486*** (.044) |
| $\ell n\ Q_{t-1}$ | -.336*** (.038) | -.122*** (.041) | -.409*** (.045) |
| LR elasticity of Q | n.a. | .265 (.175) | .509*** (.175) |
| $\ell n\ W_t$ | -.182*** (.055) | -.557*** (.084) | -1.358*** (.107) |
| $\ell n\ W_{t-1}$ | .060 (.045) | -.543*** (.074) | .904*** (.103) |
| LR elasticity of W | n.a. | -.123 (.438) | -3.006*** (.597) |
| Unemployment$_t$ | - | .002** (.001) | -.001 (.001) |
| Assets$_{t-1}$ | .015** (.008) | .056*** (.014) | .036*** (.019) |
| *Ownership* | | | |
| Basic Unit | .766*** (.204) | -.013 (.401) | 3.694*** (.689) |
| Non-Basic Unit | .027*** (.007) | .019 (.014) | - |
| Was Basic, now Coop | - | - | -.053*** (.013) |
| Was Basic, now Private | - | - | .285*** (.139) |
| Was Basic, now Mixed Ownership | - | - | -.020 (.132) |
| Was Basic, now Others | - | - | -.042** (.020) |
| Was Non-Basic, now State | - | - | -.014 (.023) |

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## Table C7 con't

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| Was Non-Basic, now Coop | - | - | -.054 (.041) |
| Was Non-Basic, now Mixed Ownership | - | | -.104 (.183) |
| Was Non-Basic, now Others | - | - | .011 (.064) |
| *Test Results* | | | |
| P value First Difference | .380 | .154 | .089 |
| P value Industry Dummies | .879 | .934 | .930 |
| P value Ownership Dummies | - | - | .897 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 170.73 (no) | 120.44 (no) | 139.81 (no) |
| $R^2$ | .990 | .984 | .961 |
| Number of Observations | 3796 | 3796 | 3796 |

Notes:
*    Significant at 1% test level
**   Significant at 5% test level
***  Significant at 10% test level

p      Probability of a given restriction being true.

a:     Yes = $Q_t$ & $Q_{t-1}$ exogenous
       No = $Q_t$ & $Q_{t-1}$ endogenous

n.a.   Not applicable

## Table C8
### Poland: 3SLS Estimates of the Wage Equation for a Balanced Panel of Polish Firms, 1989-91
(Dependent Variable is the Logarithm of Average Monthly Wage, ln $W_t$; values in parentheses are standard errors.)

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| ln $W_{t-1}$ | .780*** (.050) | .645*** (.048) | .535*** (.075) |
| ln $(Q/L)_t$ | .130 (.089) | .274*** (.029) | .296*** (.044) |
| ln $(Q/L)_{t-1}$ | -.047 (.095) | -.218*** (.036)* | -.282*** (.042) |
| LR elasticity of Q/L | .374*** (.109) | .159*** (.036) | .029 (.046) |
| Unemployment$_t$ | - | -.006*** (.001) | -.003*** (.001) |
| Export/Sales | .063 (.070) | -.135*** (.054) | -.183*** (.061) |
| *Ownership* | | | |
| Basic Unit | - | 3.326*** (.315) | 4.679*** (.581) |
| Non-Basic Unit | -.011 (.010) | -.016 (.013) | - |
| Was Basic, now Coop | - | - | -.042*** .(.011) |
| Was Basic, now Private | - | - | .263*** (.115) |
| Was Basic, now Mixed Ownership | - | | .066 (.113) |
| Was Basic, now Others | | | .001 (.017) |
| Was Non-Basic, now State | - | - | .004 (.019) |
| Was Non-Basic, now Coop | - | - | -.026 (.036) |
| Was Non-Basic, now Mixed Ownership | - | - | -.025 (.158) |
| Was Non-Basic, now Others | - | - | -.035 (.054) |

## Table C8 con't

| Variable | 1989 | 1990 | 1991 |
|---|---|---|---|
| *Test Results* | | | |
| P value First Differences | .138 | .027 | .017 |
| P value Industry Dummies | .943 | .956 | .713 |
| P value Ownership Dummies | - | - | .881 |
| $\chi^2$ Exogeneity of $Q_t$ & $Q_{t-1}$[a] | 170.73 (no) | 120.44 (no ) | 139.81 (no) |
| $R^2$ | .790 | .725 | .545 |
| Number of Observations | 3796 | 3796 | 3796 |

Notes:   \*\*\*    Significant at 1% level
        \*\*     Significant at 5% level
       \*      Significant at 10% level

       p      Probability of a given restriction being true.

       a:     Yes = $Q_t$ & $Q_{t-1}$[a] exogenous
             No = $Q_t$ & $Q_{t-1}$[a] endogenous