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# Investment and Wages during the Transition: Evidence from Slovene Firms

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## 1. Introduction

Studies of investment behavior have always played a key part in western economics. On the demand side, much of the literature has focused on establishing the relative merits of the dynamic structural, Tobin Q, neoclassical, and accelerator models of investment, while studies concentrating on the supply side examined potential links between the firm's availability of internal finance and its investment (reflecting the possible effects of transaction costs and other market imperfections on the supply of capital).[1]

Studies of investment also constituted a key area of comparative economics. With respect to the centrally planned economies (CPEs), the focus was on the increasing technological obsolescence of domestic investment and the effects of foreign investment, as well as of the COCOM embargo imposed by western countries on high technology exports to the CPEs.[2] The Soviet bloc countries displayed high rates of investment until the 1980s, when gradual economic slowdown and popular pressure for higher consumption forced the authorities to reduce the rate of investment (EBRD, 1995,1996).

As the Soviet bloc disintegrated and the transition from central planning to a market economy was launched, the rate of investment declined further, led by a decline in enterprise saving. EBRD for instance estimates that between 1985 and 1993 gross fixed investment declined from 29.5% to 19% in the former Soviet Union and from 24% to 18% in Eastern Europe (EBRD, 1995, p. 67).

Concomitantly, there was considerable concern among policy makers and observers that the loosening of central controls in the absence of developed markets and competitive pressures would result in excessive wage increases (e.g., Blanchard, 1991, Burda 1993). Although real wages fell together with output in the early 1990s, they started rising from about 1992-93 on in most Central and East European countries (EBRD, 1996, pp. 113-119).

Apart from being concerned about the effect of rapid wage increases on macroeconomic stability, policy makers and analysts saw the early transition period as one in which insiders (workers and managers) seized power and the economies took on labor-management features (Hinds, 1990, Prasnikar and Svejnar, 1991, Commander and Coricelli, 1995, and Earle, Estrin and Leschenko, 1995). The literature on labor-management has for a long time debated the existence and seriousness of the so called "underinvestment problem," brought about by the relatively short time horizon of individual workers in labor-managed firms. The basic argument is that workers, unlike diversified capital owners, would prefer to distribute enterprise surplus as wages and fringe benefits rather than reinvesting it in the firm for future growth (see e.g., Furobotn, Pejovich, 1970, Vanek, 1970).

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[1] See e.g., Jorgenson (1971), Nickell (1977), Abel (1980), Abel and Blanchard (1986), Shapiro (1986), Fazzari et al. (1988), Hayashi and Inoue (1991), Blundel et al. (1992), Blanchard et al. (1990), Bond and Meghir (1994), and Kaplan and Zingales (1997).

[2] 2 See e.g., Thornton (1970), Desai (1976), Gomulka (1978, 1986), Greene and Levine (1978), Weitzman (1979), Brada and Hoffman (1985), and Terrell (1992, 1994).

In the context of the transition, this issue is of course particularly important. The lifting of central controls gave workers potentially significant powers in enterprises, a phenomenon that may have been further enhanced by the form of privatization in countries such as Russia. Moreover, with the inability of many firms in the transition economies to pay wages, the tradeoff between using value added for investment versus paying wages and fringe benefits has become acute.

In this paper, we analyze the investment and wage (labor cost per worker) behavior of 458 Slovenian firms during the 1991-95 period. We carry out the analysis in a way that permits us to examine the wage-investment tradeoff, as well as to compare the investment and wage behavior of the transition firms with that observed in firms operating in market economies.

An analysis of Slovenian firms during the transition is especially interesting because Slovenia exemplifies features of a number of other economies. Like firms in the Soviet bloc countries, the Slovenian firms traditionally exhibited high rates of investment as a result of government pressure and easy credit (soft budget constraint) policies of the banks.[3] The firms were traditionally socially-owned, which meant that the society at large owned the firms but in practice government officials, managers and workers shared control. In this sense the firms resembled those in Poland, Hungary and several other countries just before the fall of communism (Hinds, 1990). Between 1989 and 1991, the Slovene government greatly relaxed its traditional influence over firms and decision-making power devolved to a significant extent to managers and workers. In this respect, the Slovene firms exemplified the greater autonomy observed in Russia after the insider privatization.

Our analysis is of interest for four additional reasons. First, we analyze the behavior of these 458 firms while they were going through the transition but before they were privatized in the late 1990s. Yet, we know how these firms were ultimately privatized – by sale to insiders or outsiders. We are hence able to test whether the pre-privatization investment and wage behavior of these firms differed for the firms that were later privatized by insiders versus outsiders. Second, by comparing the names and addresses of the chief executive officers (CEOs) of these 458 firms with the corresponding information in the registry of all private firms, we identified 82 CEOs who established their own private firms on the side before this practice was banned by the government in 1994. This information enables us to check if firms headed by these CEOs displayed significantly lower profitability and propensity to invest than other firms, a phenomenon that could reflect the CEOs' abuse of their position for purposes of self-enrichment. Third, we were able to identify 108 firms as being partly owned by individuals, domestic and foreign enterprises and institutions (banks and government agencies) rather than being solely in social ownership. We use this information to assess if this more tangible ownership affected the investment and wage behavior of firms. Finally, while our study is of interest to the analysts, policy makers and observers of the transition process, the fact that we

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[3] See Prašnikar and Svejnar (1988).

are able to use a relatively large panel of annual firm-level data makes our work relevant in the context of the recent investment literature in general. In particular, by using the micro panel data we are able to eliminate bias introduced by aggregation (see e.g., Abel and Blanchard (1986), reduce measurement error and take into account the heterogeneity across firms and over time (see e.g., Bond and Meghir (1994)).

## 2. The Model

Our empirical model consists of an investment equation and a wage (labor cost per worker) equation. In the investment equation we focus on the importance of the firm's output demand, cash flow and labor cost as determinants of its investment. In terms of the relevant literature, we include sales revenues as a regressor in order to assess the relative importance of the neoclassical and accelerator models of investment.[4] We also include value added, defined as profit plus labor cost plus depreciation, as a broad (cash-flow) measure of the resources generated by the firm for the purposes of paying wages and providing internal financing for both replacement and net investment.[5] The measure allows us to test whether the firm's behavior varies systematically with its internally generated funds and hence lends itself to testing the financing hierarchy and credit rationing hypotheses advanced in the western literature[6]. Finally, in order to capture the bargaining between workers and management over the allocation of value added between investment and worker compensation, we include as a regressor the labor cost agreed upon in bargaining. As mentioned earlier, this aspect of enterprise behavior is particularly important in the context of the transition economies, as both workers and managers have frequently gained significant control over state-owned as well as privatized firms.[7]

Suppressing subscripts for simplicity of exposition, our basic firm-specific investment equation is hence of the form

(1)     $I/K = \alpha_0 + \alpha_1 (R/K) + \alpha_2 (VA/K) + \alpha_3 (yL/K) + (OWNER)\alpha_4' + (YEAR)\alpha_5'$
        $+ (IND)\alpha_6' + \varepsilon_1,$

where I = the firm's gross investment, K = the firm's capital stock, R = sales revenue of the firm, VA = value added of the firm, y = income per worker (measured as total labor cost per worker), L is the total number of workers, and yL = total labor cost. The term OWNER =

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[4] As was shown by Jorgenson (1971), under a set of plausible assumptions the neoclassical and flexible accelerator models may both be captured by including sales in the investment equation. The two models differ only in terms of interpretation of the estimated coefficient on sales.
[5] Value added is measured net of servicing loans and "other costs".
[6] See Fazzari et al. (1988) and Gertler (1988), and Kaplan and Zingales (1997) for overviews of this literature.
[7] Since the Slovenian stock market is still relatively undeveloped, we have not formulated our analysis in terms of Tobin's Q specification.

vector of ownership dummy variables capturing the following phenomena: i) the firm would subsequently be privatized to insiders (internal ownership), ii) the firm would subsequently be privatized to outsiders (external ownership), iii) the CEO owns a separate private firm (CEO bypass firm), and iv) the firm was since the early 1990s less than 100% in social ownership (previous owner). We also include YEAR = vector of annual dummy variables and IND = vector of industry dummy variables. Finally, and $\varepsilon_1$ = the error term.

In terms of our conceptual framework, the neoclassical and accelerator models are consistent with the hypothesis $\alpha_1 > 0$, while the credit rationing (cash-flow) theory implies $\alpha_2 > 0$. Finally, if workers are able to appropriate part of the investable surplus in terms of their wages and fringe benefits (labor cost), one should find support for the hypothesis $\alpha_3 < 0$.

Traditionally, investment equations such as (1) have been estimated with all non-categorical variables divided by the capital stock. The practice reflects the fact that intertemporal profit maximization with cost of capital adjustment yields Euler equations in the per capital form (see e.g., Bond and Meghir, 1994, Lizal, 1995, and Lizal and Svejnar, 1997). However, the power of workers in many transition economies calls into question the usefulness of profit as the goal of the firm. In fact, when one carries out the dynamic maximization of income per worker in the presence of cost of capital adjustment (the dynamic analog to the traditional maximand in the labor-management literature), one obtains an Euler equation that is analogous to the one obtained from profit maximization except that all variables are scaled by labor rather than capital. In particular, assume that the firm maximizes the value function $V_t$

$$(2) \quad V_t = E\left[\sum_{j=0}^{\infty} \xi_{t+j} y_{t+j} \middle| \Omega_t \right],$$

where E is the expectations operator, $\xi_{t+j}$ is the discount factor given by

$$\xi_{t+j} = \prod_{n=0}^{j-1} \frac{1}{1+r_{t+n}} \quad \text{for } j > 0, \text{ and } \xi_{t+j} = 1 \text{ for } j = 0,$$

$r_{t-n}$ is the discount rate, $y_t$ is income per worker, and $\Omega_t$ is the information set at time t. Define income per worker as $y_t$

$$(3) \quad y_t = w_t + \frac{\pi_t}{L_t},$$

where $w_t$ is the market (reservation) wage, $\pi_t$ is net profit and $L_t$ is the number of workers. Now let $p_t$ denote the product price, $F$ the production function, $G$ the cost of capital adjustment function, and $p_t^I$ the price of investment goods. Next define net profit $\pi_t$ as revenue $p_t F$ net of the cost of capital adjustment $G$, labor cost $wL$ and direct investment cost $p_t^I I$:

$$(4) \quad \pi_t = \pi(K_t, L_t, I_t) = p_t[F(K_t, L_t) - G(K_t, I_t)] - w_t L_t - p_t^I I_t.$$

Substituting equation (4) into (3) yields the following expression for the income per worker:

$$(5) \quad y_t = y(K_t, L_t, I_t) = \frac{p_t[F(K_t, L_t) - G(K_t, I_t)] - p_t^I I_t}{L_t}.$$

Assuming that direct investment cost is incurred at the start of each period,[8] the dynamic programming problem of optimal investment in the presence of capital adjustment cost may be formulated as

$$(6) \quad V_t(K_{t-1}) = \max_{K_t, L_t, I_t} \left\{ y_t(K_t, L_t, I_t) + E[\xi_{t+1} V_{t+1}(K_t) | \Omega_t] \right\},$$

where $K_t = (1 - \delta)K_{t-1} + I_t$ and $\delta$ is the rate of depreciation of the capital stock. Maximizing equation (6) with respect to $K_t$, $L_t$ and $I_t$, and assuming that the firms have rational expectations, quadratic cost of capital adjustment and a Cobb-Douglas production function, yields a dynamic nonlinear investment equation of the form

$$(7) \quad \frac{I_t}{L_t} = \gamma_0 + \gamma_1 \frac{Q_{t-1}}{K_{t-1}} \frac{K_t}{L_{t-1}} + \gamma_2 \left(\frac{I_{t-1}}{K_{t-1}}\right)^2 \frac{K_t}{L_{t-1}} + \gamma_3 \frac{I_{t-1}}{K_{t-1}} \frac{K_t}{L_{t-1}} + \gamma_4 \frac{K_t}{L_{t-1}} + \gamma_5 K_t$$

Note that the corresponding equation under dynamic profit maximization is analogous except that the relevant variables are expressed in a "per unit of capital" rather than "per worker" form (Lizal and Svejnar, 1997):

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[8] This assumption is not extremely unreasonable in view of the capital imperfections in the transition economies. See also Lizal and Svejnar (1997).

$$(8) \quad \frac{I_t}{K_t} = \psi_0 + \psi_1 \frac{I_{t-1}}{K_{t-1}} + \psi_2 \left(\frac{I_t}{K_{t-1}}\right)^2 + \psi_3 \left(\frac{R_{t-1} - w_{t-1}L_{t-1}}{K_{t-1}}\right)$$

In a linearized form, the per worker specification of equation (7) hence provides an alternative specification to investment equation (1):

$$(9) \quad I/L = \beta_0 + \beta_1(R/L) + \beta_2(VA/L) + \beta_3 y + (OWNER)\beta_4' + (YEAR)\beta_5' + (IND)\beta_6' + \varepsilon_2,$$

where $\varepsilon_2$ = the error term corresponding to this specification and the predictions about the signs of $\alpha_1$, $\alpha_2$ and $\alpha_3$ carry over directly to $\beta_1$, $\beta_2$ and $\beta_3$, respectively.

In this study, we have estimated both equations (1) and (9). They provide broadly similar findings but the per worker form appears to fit the data better. As a result, in the main body of this paper we report estimates based on equation (9). The basic estimates based on equation (1) are reported in Appendix Table A1.[9]

In most investment studies, the issue of endogeneity of regressors is handled by including the lagged rather than current values of the right hand side of equation such as (1). Unfortunately, to the extent that the error term contains a fixed component, this approach does not eliminate the correlation of the regressors with the error term. In order to assess the sensitivity of our results to this problem, we report estimates based on this approach as well as on several other methods. In particular, we also report coefficients that are obtained when one uses current values of regressors and estimates by ordinary least squares (OLS) versus instrumental variables (IV), as well as OLS and IV estimates based on first difference (fixed effects) specifications. By design, the fixed effects model of course eliminates the aforementioned problem of the fixed component of the error term and it also avoids the problem of data heterogeneity across firms. Depending on the particular specification, we use lagged values or lagged first differences of the principal variables in addition to dummy variables as instruments. The specific lists of instrumental variables used in particular specifications are given in notes to Tables 2-4.

Our approach is first to estimate equation (9) independently in order to obtain estimates that may be compared to the existing western literature. We next draw on the bargaining and labor-management literature and complement equation (9) with an income per worker equation that further illuminates the extent to which workers share in profit and possibly even appropriate part of the funds that the Slovene firms should set aside by law for depreciation. In particular, we extend the models of Svejnar (1986) and Prasnikar et al. (1994) to the transition setting characterizing the Slovene firms.

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[9] The two equations are non-nested. Since they generate broadly similar results and the power of non-nested tests is low, we have not performed these tests.

We start with the Nash nonsymmetric bargaining solution which predicts that the income per worker y consists of the reservation level (best alternative) income per worker $y^a$ plus a share $\gamma_2$ of the surplus per worker $(R - H - y^aL)/L$, where the surplus is defined as revenue R net of the non-labor cost H and the reservation income per worker $y^a$:

(10)    $y = y^a + \gamma_2[(R - H - y^aL)/L]$.

The share $\gamma_2$ reflects workers' bargaining power relative to managers and any other party that may have a claim on the firm's surplus. At one extreme, $\gamma_2 = 0$, workers obtain just their reservation-level income $y^a$ and appropriate no surplus. This case corresponds to a perfectly competitive labor market or a situation where the government sets the wage at a market clearing level. At the other extreme is a pure labor-managed firm, as $\gamma_2 = 1$ and workers appropriate all surplus $[y = (R - H)/L]$. In practice, one expects $0 < \gamma_2 < 1$, as workers share the surplus with managers and other parties.

For estimation purposes it is convenient to rearrange the bargaining condition (10) by collecting the terms on $y^a$ to obtain

(11)    $y = (1 - \gamma_2)y^a + \gamma_2[(R - H)/L]$,

where $R - H$ is of course value added of the firm.

An interesting empirical and policy question is whether the relatively low rate of investment discussed in the introduction is in part brought about by workers appropriating part of the funds that the firm should set aside for depreciation DEPR. Since the allocation of funds for depreciation is required by Slovene law, it may be hypothesized that it is more difficult for workers to appropriate the depreciation funds DEPR than to share in the surplus that the firm generates over and above this amount (i.e., $R - H - DEPR$). We test this hypothesis by subtracting DEPR from $R - H$ and entering $(R - H - DEPR)/L$ and DEPR/L as two separate terms in the estimating equation (12) that also includes ownership, regional, annual and industry dummy variables:

(12)    $y = \gamma_0 + \gamma_1 y^a + \gamma_2[(R - H - DEPR)/L] + \gamma_3(DEPR/L) + \gamma_4 OWNER + \gamma_5 REGION + \gamma_6 YEAR + \gamma_7 IND + \varepsilon_3$.

The form of equation (12) permits us to test the hypothesis $\gamma_2 = \gamma_3$ (workers appropriate depreciation funds as easily as surplus over and above depreciation) against the alternative hypothesis $\gamma_2 > \gamma_3$ (surplus may be appropriated easier than depreciation funds). In addition, we test whether $\gamma_1 = 1 - \gamma_2$, as implied by condition (11) of the bargaining model. Finally, combining the investment model of equation (9) with the bargaining model of equation (12), note that if workers appropriate part of the surplus and do so at the expense of investment, we

should observe simultaneously $\beta_3 < 0$ and $\gamma_2 > 0$. We test this hypothesis while estimating equations (9) and (12) separately, as well as jointly as a system.

## 3. The Slovenian Transition and Enterprise Data

### 3.1    The Slovenian Transition[10]

The Slovenian transition of the 1990s may be described as an evolutionary path combining macro-stabilization with soft-budget constraints, a relatively slow process of ownership transformation and a gradual change of the legal system toward the market environment (Mencinger 1991, Bole 1992 and OECD, 1997). The declaration of independence of Slovenia from Yugoslavia in 1991 led to the creation of a new currency (Tolar) and the start of autonomous monetary policy by the Bank of Slovenia. A lack of foreign exchange reserves led the Bank to adopt a floating exchange rate policy together with sterilization of capital inflows as a strategy for stabilization.

The economic results have been relatively successful. Mirroring the situation in the other transition economies, Slovenia experienced a period of economic decline in 1990-92. Thereafter growth resumed, with the GDP increasing 0.9% in 1993, 4.9% in 1994, 3.5% in both 1995 and 1996, and 3.8% in 1997. After experiencing hyperinflation while being part of Yugoslavia in the late 1980s and early 1990s, Slovenia stopped hyperinflation and consistently reduced inflation to one of the lowest levels observed in the transition economies. Hence, while retail prices increased by 104.6% in 1991, the increases gradually declined to 92.9%, 22.9%, 18.3% , 8.6%, 8.8%, and 9.4% in 1992, 1993, 1994, 1995, 1996, and 1997 respectively. As in most other transition economies, the unemployment rate rose dramatically, starting at 2% in 1989 and reaching to 14% in December 1997.

During the 1990s, Slovenia also rehabilitated its (already existing) commercial bank sector. In 1993, current losses were written off against capital and bad loans of the two largest banks were replaced with long-term bonds of the Agency for Bank Rehabilitation. As a result of this operation, the two banks (accounting for about one-third of total bank assets) came under state ownership. The positive results of rehabilitation became visible as operational costs started to decrease, profitability was increasing and the regulations of the Bank of Slovenia were fulfilled. By the mid-to-late 1990s the two banks were ready for privatization[11]. As in many other transition economies, interest rates have been kept relatively high, as a result of limited competition, low domestic savings and foreign direct investment, and high

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[10] Due to space limitations, we provide only a brief account of the principal features of the Slovenian transition. For more detailed account, see e.g., OECD (1997).

[11] As of January 1997, there were thirty-three banks operating in Slovenia. Except for the two largest banks, all of them are in private hands. Twelve banks have foreign shareholders and in seven of them the share of foreign capital exceeds 20 percent. The market share of 5 largest banks is about 60 percent. Not all of the banks have equal operating licenses, with the limitations on bank operations varying with their capitalization and other factors.

operating costs of the banks. It has also been argued that the nature of the transition process has aggravated the problem of asymmetric information between banks and firms (Bole, 1997), resulting in credit rationing for firms (Stiglitz and Weiss, 1981). In this situation, firms may be expected to use internal sources of financing. The supply of credit may still be positively related to profitability and other performance criteria, but the demand for credit will be negatively related to profitability as high profit firms are able to finance internally rather than borrow (Cornelli et al., 1997). In this context, it is worth noting that the Bank of Slovenia has been strict in enforcing its requirements and regulations, thus forcing the banks to be more careful in screening credit applications by firms. Overall, the financing of firms by Slovenian banks has been limited. In 1994 commercial bank credit was 23.2% of GDP and by 1996 it was only 14.5% of GDP.[12]

The part played by the Ljubljana Stock Market in capital supply and allocation has also been limited. With the annual turnover of transactions being about $6 billion, the primary capital market is almost non-existent and there have been very few new issues over the last few years. The information provided by the Stock Exchange is also spurious as a result of inadequate regulatory framework, high volatility and insider trading.

With respect to the ownership and governance of firms, in 1993 the Slovene Parliament passed a privatization law that contained the following important provisions:[13]

- Each adult citizen of Slovenia received a special ownership certificate with a nominal value of $2,500 – $4,000, with the exact amount depending on the person's age. Ownership certificates could be used in four ways: a) in internal distribution of shares, b) in internal buyout of shares, c) in exchange for public offering of shares, and d) in exchange for shares of special investment funds.
- Each socially-owned business enterprise is obliged to transfer 20 % of its shares to the Development Fund, 10 % to the Pension Fund and 10 % to the Restitution Fund. Shares transferred to the Development Fund are sold at auctions to privatization investment funds for ownership certificates.
- Internal distribution amounts to 20 % of shares, which are to be exchanged for the ownership certificates held by employees.
- In each enterprise, the worker's council or the board of directors (if it exists) decides on how to distribute the remaining 40 % of its shares. They can be either sold to insiders for cash or certificates (internal buyout) or offered to the public (public tender).

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[12] In comparison, in 1994 the ratio of bank credits to GDP attained 95% in the Czech Republic, 63% in Hungary, 33% in Poland, and 13% in Russia. By 1996, the corresponding percentages were 75, 27, 20, and 13. The range of values observed in developed market economies is 120-130% (see Meyendorff and Snyder, 1997).
[13] For an analysis of the debate that preceded the passage of this law see Prasnikar et al. (1996)

The 1993 Law on Privatization covers 1,345 firms in all sectors of the economy.[14] Calculations by the Ministry of Economic Affairs show that on December 1993 these firms employed almost 50% of the labor force in the business sector, had a 37.5% share in the book value of the total capital and created 39.2% of revenues.[15]

## 3.2.  The Data and Summary Statistics

The main data source for our research is the Slovenian Agency for Privatization. All Slovene firms had to provide their privatization plans to the Agency for Privatization. We use data on 458 firms that were given permission by the Agency to start implementing privatization by 10 January 1997 and whose data were consistent for the period 1989-1995.[16] The enterprises are from twelve industries, comprising all areas of the Slovene economy. Each firm's privatization plan indicates whether the firm allows workers to buy residual 40% of shares during a five year period (internal buyout method of privatization), offers the the residual 40% of shares to the public, sells the entire company to a new owner, or uses other methods of external privatization (firms with external method of privatization). The privatization plan also provides information on whether the firm was already partially owned by a domestic or foreign legal entity (e.g., a bank) before its privatization. The data set for the 458 firms includes balance sheets and income statements that the Slovene firms were required by law to provide to the government.

The second data base comes from the Slovenian National Office of Statistics and contains annual enterprise-level investment data during the 1990-1995 period. The data were supplied by firms in annual reports on investment spending in fixed capital. The third data base comes from the 1992-93 Directory of Slovene Legal Entities. It provides data on private enterprises and their founders and owners. By comparing the names and addresses of general managers of the fully or partly socially-owned firms with the names and addresses of founders and owners of private firms, we were able to identify managers who own or are partners in private firms (called "bypass firms") that are legally not related to the firms that they manage. This allows us to test the hypothesis that the investment behavior of a fully or partly socially-owned firm is systematically different when its general manager owns a

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[14] The Law does not apply to enterprises which provide special public services, banks and insurance companies, enterprises engaged in the organization of gambling, enterprises which are transformed under the Law on Cooperatives, enterprises which are transformed under the forestry legislation, and firms in the process of bankruptcy.

[15] Additional calculation show that state enterprises comprised 31.1% of total assets and employed 11.2% employees in over 2,000 firms with more then 10 employees in 1995 (Rems et al., 1997). Moreover, small private firms employed 16% of all employees in the economy in 1994 (Ferligoj et al., 1997). For a more detailed discussion of the structure of the Slovenian economy, see Prasnikar et al. (1996).

[16] We have also excluded from the data set firms in agriculture and fishery, forestry and water regulation, housing, communal and environmental services, educational and scientific organizations and health, and social organizations. These firms are either under the provisions of special privatization laws or are non-commercial organizations. We also excluded electricity and mining firms, which, are under government control with regulated prices and subsidized activities.

private bypass firm on the side.

In Table 1 we present the means and standard deviations of the principal variables that we use in our analysis. The values are averages for the 1991-1995 period and they are presented for the entire sample of 458 firms as well as for the four principal categories of firms: i) 303 firms that were subsequently privatized to insiders (internal ownership), ii) 155 firms that were subsequently privatized to outsiders (external ownership), iii) 82 firms whose CEOs established private bypass firms, and iv) 108 firms that were since the early 1990s less than 100% in social ownership (previous owner firms). Naturally, the four categories of firms are not mutually exclusive.

As may be seen from column 1 of Table 1, during the 1991-95 period the average firm employed 301 workers, generated 51 million Tolars ($4.7 million) in value added, paid 38.5 million Tolars ($3.7 million) in wages and fringe benefits, and reported 0.57 million Tolars ($54,000) in profit. The average level of gross investment was 11.8 million Tolars ($1.1 million), with the average level of capital stock[17] being reported at 140 million Tolars ($13.3 million).[18] All variables show sizable standard deviations, reflecting significant cross-sectional as well as temporal variations in the values of the relevant variables. Interestingly, during the 1991-95 period the mean value of gross investment fell short of the (legally prescribed) mean level of depreciation investment. The phenomenon was in part brought about by the fact that loss-making firms paid wages and fringe benefits out of funds that were earmarked for depreciation.

In examining the variable values across types of firms in Table 1, one observes that firms that were subsequently privatized by the internal buy-out method had been on average smaller and less capital-intensive than firms that subsequently sold residual shares to outsiders (the "external owner" firms). Since the Slovene capital market was underdeveloped throughout the 1990s, the finding that insiders bought smaller and less capital-intensive firms is in accordance with expectations.[19] The internal buy-out firms were also more profitable, suggesting that insiders had been able to cherry-pick the firms that they subsequently privatized. In fact, the negative value of average profit among firms that were subsequently privatized by the external method reflects the fact that this group contained several firms with sizable losses. These firms also account for the fact investment on average fell short of depreciation for all firms taken together.

The firms run by managers who established their own private bypass firms were relatively capital-intensive firms with high value added. They reported high profits and relatively high rates of investment in comparison to other types of firms. Thus, it appears that the managers of these firms were not under-investing and siphoning off profits from these firms.

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[17] We use real assets as our measure of the capital stock.

[18] One U.S.$ was approximately 10.5 Tolars (Dinars) in 1990. All Tolar values are in constant 1991 prices.

[19] See Dreze (1989) for the theoretical underpinning of these arguments.

Finally, firms with previous owners were on average larger than other types of firms. They reported positive profit and displayed relatively high rate of investment.

## 4. Empirical Results

The estimated parameters are reported in Tables 2-4. In Table 2, we present the estimates of equation (9), while in Table 3 we report the estimated parameters of equation (12). Finally, in Table 4 we present parameters that are obtained when equations (9) and (12) are estimated jointly to check for parameter stability and efficiency gains.

As may be seen from Table 2, the estimated coefficients of equation (9) indicate that investment is linked positively to value added and negatively to labor cost. The coefficients thus have the predicted signs and are statistically significant in all estimations. Moreover, except for the IV regression in levels, the corresponding coefficients have similar values across the various estimation methods, with the coefficient on value added ranging from 0.25 to 0.37 and that on labor cost per worker from -0.21 to -0.32.

The value added coefficients hence indicate that the value of internal revenue generated by the firm after paying suppliers and other outside claimants has a positive effect on investment, *ceteris paribus*. This is consistent with the cash-flow (credit rationing) theories which suggest that in imperfectly functioning capital markets the availability of internal financing is an important determinant of the firm's investment. As we discussed earlier, a highly imperfect capital market is a noted feature of the Slovene economy.

The negative estimated coefficient on labor cost per worker suggests that there is a trade-off between worker compensation and the amount of investment, *ceteris paribus*. Most coefficients are in the -0.2 to -0.3 range, suggesting that a one hundred Tolar increase in the labor cost per worker results in a twenty to thirty Tolar decrease in investment per worker.

Interestingly, the neoclassical and accelerator models of investment receive virtually no support from our data, as the estimated coefficients on sales revenue are all quantitatively very small and statistically insignificant. This finding is in contrast to that obtained by the contemporaneous studies of the Czech industrial firms (Anderson and Kegels, 1997, and Lizạl and Svejnar, 1997) where investment is found to be positively related to firm's sales. There may be a number of reasons in this discrepancy, including the fact that in the 1980s and early 1990s Slovenia was a more western-oriented market economy than the Czech Republic. The Slovenian firms were for instance equipped with a more modern capital, which enabled them better to redirect exports from Yugoslavia and the Soviet bloc to other countries, mainly in Western Europe.[20]

Finally, in terms of investment behavior of different types of firms, our estimates indicate that firms that had managers without bypass firms and were in part owned by external institutions (Groups 2 and 4) invested significantly more than all other firms, controlling for

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[20] Exports represented more than 60 percent of Slovene GDP in 1994.

industry affiliation and the other explanatory variables.[21]

Estimates of the labor cost equation are reported in Table 3. They indicate that workers share significantly in the firm's surplus, with the estimated coefficient $\gamma_2$ on profit plus labor cost per worker ranging from 0.3 to 0.6. In all models we also find that workers appropriate a part of the funds that are legally supposed to be allocated for depreciation investment. Moreover, with the exception of the IV first difference model, we find that workers' ability to appropriate the depreciation funds is significantly lower than their ability to share in their firm's net profit ($\gamma_2 > \gamma_3$). Indeed, Wald tests indicate that in each column in Table 3 the estimated coefficients on profit plus labor cost per worker and on depreciation per worker are statistically different from one another. In particular, the values of the relevant F-statistics for the OLS Levels, IV Levels, OLS First Difference, IV First Difference, and OLS Lagged Levels models are 107.4, 38.6, 167.3, 13.9 and 16.1, respectively, and exceed the critical levels of these tests.

The estimated coefficients on the alternative (reservation) labor cost per worker $\gamma_1$ are all positive and significantly different from zero, providing basic empirical support for the bargaining model. However, since the estimated coefficients $\gamma_1$ and $\gamma_2$ are very precisely estimated, the more stringent condition of the bargaining model, namely $\gamma_1 = 1 - \gamma_2$, is rejected in most specifications. The values of the relevant F-statistics for the OLS Levels, IV Levels OLS First Difference, IV First Difference, and OLS Lagged Levels models are 4.48, 2.80, 12.16, 2.88 and 3.34, respectively.

Unlike in the investment equation, the type of firm appears to have no independent effect in the labor cost equation. Hence, once the bargaining structure and regional as well as industry characteristics of the firms are taken into account, factors such as the presence or absence of external ownership, the form of subsequent privatization and the private bypass activities of managers do not affect systematically the cost per worker.

In Table 4, we present the coefficients from the joint estimation of equations (9) and (12). As may be seen from the table, the parameter estimates are very similar to those obtained in the separate estimations of these equations in Tables 2 and 3. This is reassuring in that it suggests that the specification of the models is correct and hence robust to simultaneous estimation.

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[21] Definitions of the different groups of firms are presented in notes to Tables 2-4.

## 5. Conclusions

In view of the debate about the role of insiders during the transition to a market system, we have analyzed the determinants of investment and wages, as well as the tradeoff between investment and wages, using panel data from Slovene firms during the transition.

The central finding of our research is that enterprise investment is positively linked to value added and negatively to labor cost. In the context of our model this finding implies that for a given level of value added, the higher the share of wages in value added, the lower the level of investment in the firm, *ceteris paribus*. In this sense, the Slovene firms exemplify a strong tradeoff between investment and wages during the transition.

Our second finding is that workers share in their firm's surplus and are also able to appropriate as wages some of the funds that firms are legally supposed to use for depreciation investment. However, our estimates suggest that workers find it more difficult to appropriate these depreciation funds than surplus.

Third, firms whose managers own private (bypass) firms on the side do not invest less than several other types of firms. This suggests that managers who also act as private entrepreneurs do not tend to siphon off enterprise resources at the expense of investment. They also appear to follow a similar wage setting process as their counterparts in the other types of firms.

Since investment declined in Slovenia as well as the Soviet bloc countries during the transition, our findings have important implications for the policy makers in these economies. In particular, our results suggest that the reduction of government influence over firms and the introduction of market forces have not prevented rent-sharing by workers and that higher wages and fringe benefits are in part obtained at the expense of net as well as gross investment. In terms of the Slovene policy discussion, our findings provide support for the conjecture that workers appropriate rents which, as was argued for instance by Bole (1997), may cause spillovers that raise the aggregate level of wages and weaken the competitive positions of Slovenian firms. If Damijan (1996) is correct in arguing that rent-sharing in Slovenia is brought about primarily by a high level of trade protection, a further opening up of the Slovenian economy to international competition would naturally contribute to the reduction of these rents. Finally, if in some firms or sectors the rents cannot be eliminated by open trade policies, a selectively imposed excess wage tax may be an effective mechanism for alleviating the pressure by insiders to raise wages, decapitalize firms and prevent outsiders from entering the firm (Estrin et al., 1988, and Crombrugghe and Walque, 1997).

Interestingly, our findings hold for firms that subsequently choose the internal form of privatization as well as for those that relied on the external method. Hence, while eighty nine percent of Slovene firms, mostly small and medium-sized ones, eventually opted for the internal privatization method, our findings suggest that their decision was not influenced by differences in prior investment or wage policies.

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*Table 1: Means and Standard Deviations of Selected Variables During the 1991-95 Period*

| | Entire Sample | Internal Owner | External Owner | Bypass Owner | Previous Owner |
|---|---|---|---|---|---|
| No. of Workers | 301 | 252 | 397 | 206 | 411 |
| | (546) | (475) | (652) | (298) | (663) |
| Value Added | 50957 | 36876 | 78482 | 36408 | 80373 |
| | (129013) | (73539) | (193646) | (76959) | (209137) |
| Labor Cost | 38491 | 30058 | 54977 | 26242 | 56013 |
| | (79751) | (56666) | (110078) | (42114) | (118159) |
| Profit | 566 | 1016 | -313 | 2406 | 2431 |
| | (38985) | (19362) | (61321) | (30510) | (29781) |
| Revenue | 205362 | 142609 | 328033 | 149627 | 332074 |
| | (463857) | (262476) | (691940) | (262588) | (777043) |
| Depreciation | 11899 | 5801 | 23818 | 7758 | 21929 |
| | (48336) | (11926) | (80102) | (20191) | (82327) |
| Investment | 11822 | 6333 | 22553 | 9439 | 25292 |
| | (55397) | (17846) | (90986) | (29187) | (105437) |
| Capital | 140066 | 69441 | 278126 | 120619 | 268407 |
| | (478726) | (116646) | (788861) | (425447) | (788959) |
| Alternative Wage | 94.377 | 94.384 | 94.365 | 94.627 | 93.466 |
| | (16.807) | (17.185) | (16.054) | (17.217) | (16.603) |
| Profit+Labor Cost | 39057 | 31074 | 54664 | 28649 | 58444 |
| | (95551) | (63714) | (136717) | (61017) | (138912) |
| Profit / Value Added | 0.111 | 0.027 | -0.004 | 0.066 | 0.030 |
| | (0.765) | (0.525) | (0.781) | (0.837) | (0.370) |
| Labor Cost / Worker | 127.472 | 119.004 | 138.469 | 126.857 | 136.255 |
| | (264.112) | (224.350) | (277.250) | (203.580) | (287.431) |
| Value Added / Worker | 168.754 | 145.999 | 197.670 | 175.997 | 195.513 |
| | (427.254) | (291.153) | (487.728) | (372.022) | (508.740) |
| Profit / Worker | 1.875 | 4.023 | -0.788 | 11.634 | 5.913 |
| | (129.109) | (76.660) | (154.448) | (147.485) | (72.446) |
| Revenue / Worker | 680.098 | 564.619 | 826.204 | 723.297 | 807.792 |
| | (1536.156) | (1039.186) | (1742.760) | (1269.351) | (1890.208) |
| Depreciation / Worker | 39.406 | 22.970 | 59.989 | 37.505 | 53.344 |
| | (160.075) | (47.218) | (201.750) | (97.603) | (200.266) |
| Investment / Worker | 39.152 | 25.074 | 56.804 | 45.628 | 61.526 |
| | (183.459) | (70.658) | (229.163) | (141.094) | (256.482) |
| Capital / Worker | 463.857 | 274.930 | 700.506 | 583.071 | 652.919 |
| | (1585.397) | (461.821) | (1986.872) | (2056.608) | (1919.195) |
| (Profit+Labor Cost) / Worker | 129.347 | 123.028 | 137.680 | 138.491 | 142.169 |
| | (316.437) | (252.255) | (344.343) | (294.959) | (337.914) |
| No. of Workers / Capital | 0.002 | 0.003 | 0.001 | 0.001 | 0.001 |
| | (0.003) | (0.006) | (0.002) | (0.002) | (0.002) |
| Value Added / Capital | 0.363 | 0.531 | 0.282 | 0.301 | 0.299 |
| | (0.921) | (1.059) | (0.696) | (0.638) | (0.779) |
| Labor Cost / Capital | 0.274 | 0.432 | 0.197 | 0.217 | 0.208 |
| | (0.569) | (0.816) | (0.395) | (0.349) | (0.440) |
| Profit / Capital | 0.004 | 0.014 | -0.001 | 0.019 | 0.009 |
| | (0.278) | (0.278) | (0.220) | (0.252) | (0.110) |
| Revenue / Capital | 1.466 | 2.053 | 1.179 | 1.240 | 1.237 |
| | (3.311) | (3.779) | (2.487 | (2.177) | (2.895) |
| Depreciation / Capital | 0.084 | 0.083 | 0.085 | 0.064 | 0.081 |
| | (0.345) | (0.177) | (0.288) | (0.167) | (0.306) |
| Investment / Capital | 0.084 | 0.091 | 0.081 | 0.078 | 0.094 |
| | (0.395) | (0.257) | (0.327) | (0.241) | (0.392) |
| (Profit+Labor Cost) / Capital | 0.278 | 0.447 | 0.196 | 0.237 | 0.217 |
| | (0.682) | (0.915) | (0.491) | (0.505) | (0.517) |
| No. of Firms | 458 | 303 | 155 | 82 | 108 |
| No. of Observations | 2290 | 1515 | 775 | 410 | 540 |

Notes:
- Values are in thousand of Tolars in constant 1991 prices.
- Values in parentheses are standard deviations.
- Means and standard deviations for ratios were calculated by dividing the numerator of each observation by the mean value of the denominator (taking into account the different sample means) and calculating the mean and standard deviation for each of these newly created variables.

## Table 2: Determinants of the Investment / Labor Ratio

| Variable \ Model | OLS Levels | IV Levels | OLS First Difference | IV First Difference | OLS Lagged Levels |
|---|---|---|---|---|---|
| Value Added / Worker | 0.370*** | 1.012*** | 0.249*** | 0.316*** | 0.335*** |
| | (0.016) | (0.142) | (0.022) | (0.058) | (14.237) |
| Labor Cost / Worker | -0.323*** | -1.388*** | -0.211*** | -0.259*** | -0.267*** |
| | (0.237) | (0.246) | (0.030) | (0.104) | (0.032) |
| Revenue / Worker | 0.0005 | 0.004* | 0.004 | 0.002 | -0.002 |
| | (0.001) | (0.003) | (0.003) | (0.017) | (0.001) |
| Group 1 Firm Dummy | -7.144 | -3.098 | / | / | -8.464 |
| | (5.549) | (7.751) | | | (5.896) |
| Group 2 Firm Dummy | 12.098* | 13.162 | / | / | 12.472* |
| | (7.203) | (9.955) | | | (7.656) |
| Group 3 Firm Dummy | 1.775 | 1.279 | / | / | -1.109 |
| | (6.695) | (9.249) | | | (7.118) |
| Group 4 Firm Dummy | 16.681*** | 3.230 | / | / | 17.262*** |
| | (6.453) | (9.353) | | | (6.876) |
| Group 5 Firm Dummy | 0.312 | -0.093 | / | / | -1.369 |
| | (6.134) | (8.481) | | | (6.522) |
| Constant | 0.914 | 6.265 | 3.358** | 2.858 | 0.905 |
| | (6.972) | (9.851) | (1.565) | (2.533) | (7.551) |
| Year Dummies | Yes | Yes | No | No | Yes |
| Industry Dummies | Yes | Yes | No | No | Yes |
| Adjusted R-squared | 0.25 | ... | 0.06 | 0.03 | 0.15 |
| No. of Observations | 2290 | 2290 | 2290 | 1832 | 2290 |

Notes:
- Values in parentheses are standard errors.
  - * - statistically significant at 10% on a two-tail test
  - ** - statistically significant at 5% on a two-tail test
  - *** -statistically significant at 1% on a two-tail test
- Firms in Group 1 are firms that (a) did not have managers with private bypass firm on the side, (b) were not owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 2 are firms that (a) did not have managers with bypass firms, (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 3 are firms that (a) had managers with bypass firms, (b) were not owned by external owners prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 4 are firms that (a) did not have managers with bypass firms, (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms in Group 5 are firms that (a) did not have managers with bypass firms, (b) were not in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms serving as the base (in the constant term) are firms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization, were eventually privatized by the external method and did not have managers with bypass firms.
- In the IV Levels model we used the following instruments: dummy variables for industry, time and firm types, lagged value added/worker, lagged revenue/worker, lagged capital/worker and lagged (profit+labor cost)/worker. In the IV First Difference model we used the same instruments except that instead of lagged levels we used lagged first differences of the relevant variables.
- In the level estimates, the constant term reflects the year 1991, firms in manufacturing industry and firms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization, were eventually privatized by the external method and did not have managers with bypass firms.

## Table 3: Estimates of the Labor Cost Equation

| Variable \ Model | OLS Levels | IV Levels | OLS First Difference | IV First Difference | OLS Lagged Levels |
|---|---|---|---|---|---|
| Alternative Labor Cost / Worker | 0.994*** | 0.834*** | 0.711*** | 1.309*** | 0.660*** |
| | (0.270) | (0.274) | (0.077) | (0.375) | (0.103) |
| (Profit+Labor Cost ) / Worker | 0.577*** | 0.624*** | 0.552*** | 0.300*** | 0.525*** |
| | (0.009) | (0.013) | (0.010) | (0.048) | (0.014) |
| Depreciation / Worker | 0.286*** | 0.386*** | 0.110*** | 1.838*** | 0.366*** |
| | (0.026) | (0.035) | (0.032) | (0.400) | (0.037) |
| Group 1 Firm Dummy | 4.281 | 3.363 | / | / | 5.485 |
| | (4.884) | (4.931) | | | (6.408) |
| Group 2 Firm Dummy | 2.347 | 1.127 | / | / | 2.910 |
| | (6.318) | (6.378) | | | (8.323) |
| Group 3 Firm Dummy | 1.166 | 0.575 | / | / | -4.481 |
| | (5.854) | (5.908) | | | (7.663) |
| Group 4 Firm Dummy | 0.620 | -3.929 | / | / | -3.126 |
| | (5.749) | (5.875) | | | (7.653) |
| Group 5 Firm Dummy | 3.660 | 2.111 | / | / | -0.928 |
| | (5.410) | (5.470) | | | (7.125) |
| Constant | -58.439*** | -52.646** | 9.571*** | 6.709*** | -61.875*** |
| | (21.656) | (21.911) | (1.033) | (2.639) | (13.765) |
| Regional Dummies | Yes | Yes | No | No | Yes |
| Year Dummies | Yes | Yes | No | No | Yes |
| Industry Dummies | Yes | Yes | No | No | No |
| Adjusted R-squared | 0.72 | 0.72 | 0.61 | ... | 0.50 |
| No. of Observations | 2290 | 2290 | 2290 | 1832 | 2290 |

Notes: Values in parentheses are standard errors.
- \* - statistically significant at 10% on a two-tail test
- \*\* - statistically significant at 5% on a two-tail test
- \*\*\* -statistically significant at 1% on a two-tail test
- Firms in Group 1 are firms that (a) did not have managers with private bypass firm on the side. (b) were not owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 2 are firms that (a) did not have managers with bypass firms. (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 3 are firms that (a) had managers with bypass firms. (b) were not owned by external owners prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 4 are firms that (a) did not have managers with bypass firms. (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms in Group 5 are firms that (a) did not have managers with bypass firms. (b) were not in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms serving as the base (in the constant term) are firms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization, were eventually privatized by the external method and did not have managers with bypass firms.
- In the IV Levels model we used the following instruments: dummy variables for industry,region , time and firm types, lagged value added/worker. lagged revenue/worker, lagged capital/worker and lagged (profit+labor cost)/worker. In the IV First Difference model we used the same instruments except that instead of lagged levels we used lagged first differences of the relevant variables.
- In the level estimates. the constant term reflects the year 1991, firms in manufacturing industry,Ljubljana region and those that that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization. were eventually privatized by the external method and did not have managers with bypass firms.
- In testing the hypothesis $\gamma_1 = 1 - \gamma_2$, the values of the relevant F-statistics for the OLS Levels, IV Levels. OLS First Difference. IV First Difference. and OLS Lagged Levels models were 4.48. 2.80. 12.16, 2.88. and 3.34, respectively.
- In testing the hypothesis $\gamma_2 = \gamma_3$. the values of the relevant F-statistics for OLS Levels, IV Levels, OLS First Difference, IV First Difference. and OLS Lagged Levels models are 107.37. 38.62. 167.29, 13.85. and 16.09, respectively.

## Table 4: Simultaneous Investment and Labor Cost Equation

| Variable \ Model | Levels 2SLS | Levels 3SLS | First Difference 2SLS | First Difference 3SLS | Lagged Levels 2SLS |
|---|---|---|---|---|---|
| *Investment Equation* | | | | | |
| Value Added / Worker | 0.766*** | 0.823*** | 0.306*** | 0.312*** | 0.427*** |
| | (0.098) | (0.094) | (0.057) | (0.057) | (0.047) |
| Labor Cost / Worker | -0.948*** | -1.014*** | -0.241** | -0.255*** | -0.374*** |
| | (0.167) | (0.162) | (0.101) | (0.101) | (0.055) |
| Revenue / Worker | 0.001 | -0.002 | 0.006 | 0.007 | -0.004 |
| | (0.002) | (0.002) | (0.017) | (0.016) | (0.002) |
| Group 1 | -5.123 | -5.731 | | | -9.998 |
| | (6.428) | (6.387) | | | (6.963) |
| Group 2 | 12.542* | 12.386 | | | 14.247 |
| | (8.282) | (8.238) | | | (9.029) |
| Group 3 | 1.278 | 0.650 | / | / | -3.185 |
| | (7.696) | (7.654) | | | (8.410) |
| Group 4 | 7.968 | 6.486 | / | / | 12.873 |
| | (7.678) | (7.624) | | | (8.197) |
| Group 5 | -0.315 | -1.356 | / | / | -0.377 |
| | (7.057) | (7.015) | | | (7.704) |
| Constant | 2.924 | 3.856 | 2.449 | 2.643 | -0.646 |
| | (8.149) | (8.102) | (2.474) | (2.471) | (8.608) |
| Year Dummies | Yes | Yes | No | No | Yes |
| Industry Dummies | Yes | Yes | No | No | Yes |
| *Labor Cost Equation* | | | | | |
| Alternative Labor Cost / Worker | 0.835*** | 0.481** | 1.285*** | 1.271*** | 0.767*** |
| | (0.274) | (0.239) | (0.377) | (0.377) | (0.137) |
| (Profit+Labor Cost ) / Worker | 0.629*** | 0.637*** | 0.307*** | 0.307*** | 0.662*** |
| | (0.013) | (0.013) | (0.048) | (0.048) | (0.019) |
| Depreciation / Worker | 0.381*** | 0.350*** | 1.874*** | 1.886*** | 0.475*** |
| | (0.035) | (0.034) | (0.402) | (0.402) | (0.056) |
| Group 1 | 3.265 | 2.287 | / | / | 4.810 |
| | (4.936) | (4.880) | | | (7.998) |
| Group 2 | 1.059 | 0.306 | / | / | 2.299 |
| | (6.383) | (6.319) | | | (10.377) |
| Group 3 | 0.591 | 0.111 | / | / | -5.156 |
| | (5.913) | (5.859) | | | (9.557) |
| Group 4 | -3.809 | -3.766 | / | / | -7.350 |
| | (5.881) | (5.807) | | | (9.598) |
| Group 5 | 2.179 | 1.916 | / | / | -1.958 |
| | (5.475) | (5.412) | | | (8.891) |
| Constant | -53.097** | -26.006 | 6.504** | 6.499** | -13.292 |
| | (21.931) | (19.291) | (2.653) | (2.650) | (15.967) |
| Regional Dummies | Yes | Yes | No | No | Yes |
| Year Dummies | Yes | Yes | No | No | Yes |
| Industry Dummies | Yes | Yes | No | No | No |

Notes:
- Values in parentheses are standard errors.
- * - statistically significant at 10% on a two-tail test
- ** - statistically significant at 5% on a two-tail test
- *** - statistically significant at 1% on a two-tail test
- Firms in Group 1 are firms that (a) did not have managers with private bypass firm on the side, (b) were not owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 2 are firms that (a) did not have managers with bypass firms, (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 3 are firms that (a) had managers with bypass firms, (b) were not owned by external owners prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 4 are firms that (a) did not have managers with bypass firms, (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms in Group 5 are firms that (a) did not have managers with bypass firms, (b) were not in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms serving as the base (in the constant term) are firms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization, were eventually privatized by the external method and did not have managers with bypass firms.
- In the IV Levels model we used the following instruments: dummy variables for industry, region , time and firm types. lagged value added/worker, lagged revenue/worker, lagged capital/worker and lagged (profit+labor cost)/worker. In the IV First Difference model we used the same instruments except that instead of lagged levels we used lagged first

differences of the relevant variables.

- In the level estimates of the investment equation, the constant term reflects the year 1991, firms in manufacturing industry and firms that (a) had managers with bypass firms, (b) were or were not in part owned by an external institutions and (c) were eventually privatized by the external method.

- In the level estimates of the labor cost equation, the constant term reflects the year 1991, firms in manufacturing industry, Ljubljana region and firms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization, were eventually privatized by the external method and did not have managers with bypass firms.

- In the level estimates the instrumental variables used are all dummy variables, alternative wage, lagged alternative wage, lagged capital/lworker, lagged depreciation/worker, lagged (profit+labor cost)/worker, lagged value added/worker, and lagged revenue/worker. In the first difference and lagged levels models, the instrumental variables are the same, except that lagged first differences or twice lagged levels of the instruments were used instead of the lagged levels of variables.

# APPENDIX

## Table A1: Determinants of Investment / Capital Ratio

| Variable \ Model | OLS Levels | IV Levels | OLS First Difference | IV First Difference | OLS Lagged Levels |
|---|---|---|---|---|---|
| Value Added / Capital | 0.120*** | 0.209*** | 0.040*** | -0.013 | 0.082*** |
| | (0.010) | (0.029) | (0.012) | (0.083) | (0.009) |
| Labor Cost / Capital | -0.098*** | -0.177*** | -0.027* | 0.012 | -0.062*** |
| | (0.011) | (0.031) | (0.014) | (0.091) | (0.010) |
| Revenue / Capital | 0.0005 | 0.0002 | -0.001 | 0.005 | 0.001*** |
| | (0.0004) | (0.0005) | (0.002) | (0.003) | (0.0003) |
| Group 1 | -0.0002 | -0.006 | / | / | 0.001 |
| | (0.008) | (0.008) | | | (0.008) |
| Group 2 | 0.002 | 0.0007 | / | / | 0.003 |
| | (0.010) | (0.011) | | | (0.010) |
| Group 3 | 0.001 | -0.005 | / | / | 0.003 |
| | (0.010) | (0.103) | | | (0.100) |
| Group 4 | 0.002 | -0.009 | / | / | 0.004 |
| | (0.009) | (0.009) | | | (0.009) |
| Group 5 | -0.005 | -0.006 | / | / | -0.004 |
| | (0.009) | (0.009) | | | (0.009) |
| Constant | 0.0266*** | 0.019* | -0.001 | 0.008*** | 0.006 |
| | (0.010) | (0.010) | (0.002) | (0.003) | (0.010) |
| Year Dummies | Yes | Yes | No | No | Yes |
| Industry Dummies | Yes | Yes | No | No | Yes |
| Adj R-squared | 0.173 | 0.132 | 0.008 | ... | 0.169 |
| No. of Observations | 2290 | 2290 | 2290 | 1832 | 2290 |

Notes: Values in parentheses are standard errors.

* - statistically significant at 10% on a two-tail test
** - statistically significant at 5% on a two-tail test
*** -statistically significant at 1% on a two-tail test

- Firms in Group 1 are firms that (a) did not have managers with private bypass firm on the side. (b) were not owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 2 are firms that (a) did not have managers with bypass firms, (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 3 are firms that (a) had managers with bypass firms. (b) were not owned by external owners prior to privatization and (c) were subsequently privatized by the internal method.
- Firms in Group 4 are firms that (a) did not have managers with bypass firms, (b) were in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms in Group 5 are firms that (a) did not have managers with bypass firms. (b) were not in part owned by external institutions prior to privatization and (c) were subsequently privatized by the external method.
- Firms serving as the base (in the constant term) are firms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization. were eventually privatized by the external method and did not have managers with bypass firms.
- In the IV Levels model we used the following instruments: dummy variables for industry, time and firm types. lagged value added/worker. lagged revenue/worker. lagged capital/worker and lagged (profit+labor cost)/worker. In the IV First Difference model we used the same instruments except that instead of lagged levels we used lagged first differences of the relevant variables.
- In the level estimates, the constant term reflects the year 1991. firms in manufacturing industry andfirms that (a) had managers with bypass firms and were in part owned by external institutions prior to privatization and (b) were in part owned by an external institutions prior to privatization. were eventually privatized by the external method and did not have managers with bypass firms.

## Data description

**R**          **= revenue**
                = pure revenue from sales

**I**           **= investment**
                = paid for investments in real assets

**K**          **= stock of capital**
                = real assets

**DEPR**      **= depreciation**
                = depreciation of nonobject assets, long range assets and real assets

**LC**         **= labor costs**
                = cost of labor

**LC*/L)**    **= alternative labor cost per worker**
                $= AIW*(1-UR)+UC*UR,$
                where AIW is average annual wage per employee in industry, UR regional annual unemployment rate and UC average annual unemployment compensation

**L**           **= number of employees**
                = average number of employees according to working hours

**PROFIT**   **= net profit**
                = net profit/net loss

**VA**         **= value added**
                = PROFIT+LC+ DEPR

**OWNER**   **= ownership dummy variables**

> INTERNAL OWNER = firms which have chosen internal method of privatization
> EXTERNAL OWNER = firms which have chosen external method of privatization
> BYPASS OWNER = firms whose managers own so called by-pass firms
> PREVIOUS OWNER = firms which had an already known owner before the process of privatization

**REGION**   **= regional dummy variables**
                = firms were classified into 7 regions

**IND**         **= industry dummy variables**
                = firms were classified into 12 industries

**YEAR**      **= annual dummy variables**