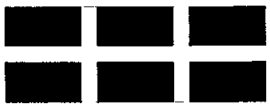

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Enterprise Investment During the Transition: Evidence from Czech Panel Data

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Comments welcome

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December 1997

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Abstract

We analyze investment behavior of the population of medium and large industrial firms located in the Czech Republic in 1992-95. We examine the relevance of alternative models of investment and test if investment behavior varies across ownership-legal form categories of firms. By using a large panel of quarterly observations, we eliminate biases introduced by data aggregation and selectivity, reduce measurement error, take into account heterogeneity across firms and over time, and control for the significant seasonal variation in investment. The data indicate that foreign owned companies invest the most and cooperatives the least. Contrary to earlier survey findings, our large data set does not support the hypothesis that private firms invest more than state owned ones. Our econometric tests suggest that, except for cooperatives and smaller private firms, the behavior of firms is better approximated by the neoclassical/accelerator model than cash flow or financing constraint theories. The data also fit quite precisely a dynamic structural model of investment for a profit-maximizing firm.

JEL Classification: E2, P5, G3

Keywords: investment, firms, ownership, financing, transition, Czech Republic

Non-Technical Summary

As the transition from central planning to a market system started to unfold in the 1990s, it became clear that the transition economies needed to invest heavily in order to modernize their obsolete capital stock and become competitive on world markets.

In this paper, we analyze investment behavior using quarterly data from the population of medium and large industrial firms located in the Czech Republic during the 1992-95 period. Our study is of special interest for three reasons. First, it constitutes one of the first analyses of investment behavior in the leading transition economies that serve as models for countries that have launched their transitions later. Second, in the context of the transition we examine the relevance of alternative models of investment and test if investment behavior varies across the principal ownership-legal form categories of firms. Unlike other studies, we are hence able to contribute to one of the most important but so far rather speculative debate about the relative performance of privatized, state-owned and other types of firms. Finally, by using a large panel of quarterly firm-level data, we generate credible estimates by being able to eliminate biases introduced by data selectivity and aggregation, reduce measurement error, take into account heterogeneity across firms and over time, and control for the significant seasonal variation in investment. This makes our work important in the context of the growing literature on transition as well as the recent investment literature in general.

In terms of testing alternative hypotheses, we focus on both the supply and demand side of investment. On the supply side, a principal goal of the paper is to assess if the investment behavior of firms is linked to the availability of internal finance and if this effect varies across the principal ownership-legal form categories of firms. The switch from central planning to a transition period forced firms that traditionally received centrally allocated investment funds to face the emerging commercial banks and other financial institutions. In this context, it appears that many of the existing (larger) firms continued receiving credit even for non-performing projects, while new firms tended to face expensive external finance for investment or were denied such finance. The data from transition economies hence lend themselves eminently to testing the credit rationing hypotheses advanced about the supply side of investment in the western literature and also put forth by Calvo and Coricelli (1994) as an explanation of the sharp decline of investment in the early transition period. On the demand side, we model the investment process as belonging to the neoclassical, accelerator or structural dynamic specifications. This makes our results directly comparable to the western micro studies of investment.

Our data set contains relatively detailed information about the ownership and legal form of the firms. The most important ownership-legal form categories are privately owned-limited liability companies (13,927 quarterly observations) and state owned-joint stock companies (11,475 quarterly observations). These are followed by state owned-

state registered enterprises (6,835 quarterly observations), cooperatively owned-rural cooperatives (3,063 observations), privately owned-joint stock companies (2,480 observations), foreign owned-limited liability companies (2,091 observations), privately owned-individual/family businesses (1,845 observations), mixed ownership-joint stock companies (766 observations), foreign owned-joint stock companies (707 observations), cooperatively owned-producer cooperatives (587 observations), state owned-limited liability companies (441 observations), and mixed ownership-limited liability firms (298 observations).

In examining the annual evolution of the investment/capital, investment/labor and investment/production ratios, we see that foreign owned companies generally tend to invest the most and (domestically owned) cooperatives the least. The behavioral difference that is perhaps the most interesting from a policy standpoint, namely that between the private and state owned firms, is more complex. Private firms clearly invest more than the state owned ones in relation to their recorded capital stock. Private joint stock companies also tend to invest a bit more than the state owned joint stock companies on all three criteria. However, in the last two years state owned-limited liability companies have dominated all domestic private firms in terms of the investment/production ratio. Moreover, the privately owned-limited liability firms (the single most numerous category of firms) and individual/family firms rank high in terms of investment/capital but low in the other two indicators, suggesting that these smaller private firms operate with a small (recorded) capital stock and do not invest heavily in terms of output and employment. The widely accepted notion based on a Polish survey by Belka et al. (1994) that during the transition investment is high in the new private firms and low in the state owned enterprises is hence not supported by the larger Czech data set.

Our econometric tests indicate that investment behavior of firms during the transition reflects both the demand side features captured by the neoclassical, accelerator and dynamic structural models, as well as the supply side (cash flow or financing constraints) hypotheses. When the basic neoclassical/accelerator specification is used on the demand side (stressing the link of investment to lagged production), our overall findings suggest that the general behavior of firms in the transition period may be better approximated by this model than that based on the cash-flow or financing constraint theories (proxied by a positive relationship between investment and firm's lagged profit). Our estimates, based on the population of industrial firms during the entire 1992-95 period, indicate that there is a strong positive link between investment and lagged output and a surprising negative one between investment and lagged profit. Estimates for individual types of firms in turn indicate that most firms have a positive relationship between investment and lagged output and that only cooperatives and the smaller (but not the very small) private firms display a significant positive link between investment and lagged profit.

When we estimate the same basic model on successive biennial sub-periods, we find more often a positive link between investment and output than between investment and profit and this support for the neoclassical/accelerator model grows over time. The importance of the investment-output link is somewhat diminished, however, when we are able to include other cash-flow variables (the firm's payables and receivables) in 1994. The latter estimates show a positive investment effect of receivables and negative one of payables overdue, thus providing mild support for the cash-flow hypothesis.

In our overall 1992-95 estimates of a dynamic structural model, we find support for the hypothesis that the transition economies have an imperfectly functioning legal system that permits firms not to honor commitments to their partners (i.e., a form of soft budget constraints) and that this phenomenon affects investment. In particular, we find that receivables overdue are associated with lower investment and payables overdue with higher investment, suggesting that firms do not expect these commitments to be honored.

Interestingly, our findings are in line with those from western economies in that we point to the importance of output as a determinant of investment and that we are able to estimate quite precisely a dynamic structural model of investment that was developed for the behavior of a profit maximizing firm. The fact that we only find a systematic link between profit and investment in certain groups of firms (e.g., the smaller private firms and cooperatives) suggests that these firms are more likely than the larger firms to encounter financing constraints.

1. Introduction

Since investment determines one of the most important factors of production, embodies technical progress and affects macroeconomic activity, studies of investment behavior have occupied a pivotal place in western economics. On the demand side, much of the literature has focused on establishing the relative merits of the structural dynamic, Tobin Q, neoclassical, and accelerator models of investment demand, for the most part assuming that the supply of investment finance is perfectly elastic. In recent years, an important part of the literature has concentrated on the supply side, examining the effects of potential capital market imperfections on investment behavior of firms.[1)]

In view of Stalin's and other communist leaders' preoccupation with overtaking capitalist economies by carrying out massive capital formation, studies of investment also constituted a key area of comparative economics.[2)] The centrally planned economies indeed reported very high rates of investment during most of their existence, although in the Soviet bloc these rates declined somewhat in the 1980s as economic growth slowed down and popular demand for consumption goods became harder to ignore (EBRD, 1995). The high pre-1980s investment rates also generated large stocks of capital whose vintage became old in the 1980s and 1990s. Finally, the centrally planned economies increasingly lagged technologically and the embargo imposed in the 1980s by western countries on advanced technology exports further hampered the ability of these economies to reduce their relative technological obsolescence.

As the transition from central planning to a market system started to unfold in the 1990s, it became clear that the transition economies needed to invest heavily in order to modernize their obsolete capital stock and become competitive on world markets. The issue of how best to restructure and modernize the state-owned firms has been a focal point in the policy debate about optimal types of ownership and legal (corporate) structure of firms in the new market economies. Interestingly, while a small number of studies have provided valuable partial surveys of investment in the transition economies,[3)] detailed analytical studies of the investment behavior of firms in these economies are just being launched.

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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), Bond and Meghir (1994), and Kaplan and Zingales (1997).

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).

3) See e.g., Belka et al. (1994), EBRD (1995) and Eickelpasch (1995).

In this paper, we analyze investment behavior using over 50,000 quarterly observations from the population of about 3,000 medium and large industrial firms located in the Czech Republic during the 1992-95 period. Our study is of special interest for three reasons. First, it constitutes one of the first firm-level analyses of investment behavior in the leading transition economies that serve as models for countries that have launched their transitions later.[4] Second, in the context of the transition we examine the relevance of alternative models of investment and test if investment behavior varies across thirteen principal ownership-legal form categories of firms. Unlike other studies, we are hence able to contribute with solid empirical evidence to one of the most important but so far rather speculative debates about the relative performance of privatized, state-owned and other types of firms. Finally, by using a large panel of quarterly firm-level data, we are able to eliminate bias introduced by data selectivity and aggregation (see e.g., Abel and Blanchard, 1986), reduce measurement error, take into account heterogeneity across firms and over time (see e.g., Bond and Meghir, 1994), and control for the significant seasonal variation in investment. This makes our work important in the context of the growing literature on transition as well as the recent investment literature in general.

In terms of testing alternative hypotheses, we focus on both the supply and demand side of investment. On the supply side, a principal goal of the paper is to assess if the investment behavior of firms is linked to the availability of internal finance and if this effect varies across the principal ownership-legal form categories of firms. The switch from central planning to a transition period forced firms that traditionally received centrally allocated investment funds to face the emerging commercial banks and other financial institutions. Operating in a highly protected and concentrated environment, the new commercial banks usually imposed high spreads between deposit and lending rates in order to increase their low initial capitalization. They also had to develop from start their project appraisal capability and establish international accounting standards. In this context, it appears that many of the existing (large) firms continued receiving credit even for non-performing projects,[5] while new firms tended to face expensive external finance for investment or were denied such finance. Moreover,

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4) For the other contemporaneous studies see Lizal (1996), Anderson and Kegel (1997) and Prasnikar and Svejnar (1997).

5) The liberal credit policy was criticized in a November 1997 statement of the governor of the Czech National Bank, who announced that as much as 30 percent of the loan portfolio of the largest commercial bank was composed of substandard loans. The reliance on bank credit is also evident from the fact that very few firms decided to raise capital on the already existing stock exchange.

foreign firms are reported to have been supplying themselves with investment funds from their parent companies and western as well as domestic banks. The data from transition economies hence lend themselves eminently to testing the financing hierarchy and credit rationing hypotheses advanced about the supply side of investment in the western literature,[6] and also put forth as a leading explanation of the sharp decline of investment in the early transition period by Calvo and Coricelli (1994). On the demand side, we test if the investment process may be approximated by the neoclassical, accelerator or structural dynamic specifications. This makes our results directly comparable to the western studies of investment behavior.

Finally, while our choice of the Czech Republic is obviously linked to the availability of a unique data set, there are good reasons to consider the Czech Republic as a model transition economy. Together with Poland, Hungary and several other countries in Central and East Europe, the Czech Republic has been one of the pioneering transition economies. In the early 1990s, it abolished central planning and carried out rapid price liberalization, macroeconomic stabilization and widespread privatization of state-owned firms. As may be seen from the comparative statistics in Table 1, like the other economies in Central Europe, the Czech Republic suffered a significant GDP decline in the first phase of the transition, followed by a recovery in the mid 1990s. The investment rate fell during the period of economic decline, but in the Czech Republic (as well as in Slovakia and some other economies) it rebounded from 1992 on. Understanding investment behavior of the large number of types of firms in the Czech Republic is hence a useful starting step for a broader understanding of the investment behavior of firms in the transition economies.

2. Data and Basic Statistical Findings

The data set that we use was collected by the Czech Statistical Office and it covers all industrial firms employing more than 25 people in the 1992-94 period and more than 100 employees in 1995. The data were collected in quarterly or monthly intervals, depending on the size of the enterprise and the reported variables. We have combined these two sources of data so as to maximize the sample size of quarterly observations.

While the Czech Statistical Office was careful in collecting the data, the data set contained some errors and inconsistencies.[7] In order to use a reliable data set, we have

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6) See Fazzari et al. (1988), Gertler (1988) and Kaplan and Zingales (1997) for overviews of this literature.

7)The Czech Statistical Office is regarded as one of the most professional statistical offices in the former Soviet bloc.

performed the following nine consistency checks:

1) The firm's capital at the start and end of each quarter should be positive;
2) The average labor force in a given quarter should be more than 20 employees;
3) Investment should be non-negative;
4) Production should be positive;
5) Depreciation should be positive and less than the total capital value;
6) Investment should be smaller than end of the period capital stock;
7) Average wage should be higher than 2000 crowns/month (minimum wage);
8) Sales should be non-negative;
9) One-year lagged production, sales and labor should be non-negative or missing.

In imposing these consistency criteria, about 10 percent of the observations had to be dropped, leaving us with a sample comprising approximately 50,700 quarterly observations.[8)] In terms of the total number of firms (quarterly observations), our data set covers 2860 firms (2252-2738 observations per quarter) in 1992, 3231 firms (2657-3009 observations per quarter) in 1993, 4133 firms (3503-3867 observations per quarter) in 1994, and 2271 firms (2205-2261 observations per quarter) in 1995.[9)]

As may be seen from Table 2, our data set contains detailed information about the ownership and legal form of the firms. The ownership categories reflect majority ownership of the firm (e.g., a firm is classified as privately owned if it is more than fifty percent privately owned). When the private owners, cooperative members, state, or foreign owners do not own a majority stake in the firm, the firm is classified as having mixed ownership. The ownership categorization was carried out by the Czech Statistical Office.

The legal form denotes company registration and reflects the particular type of

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8) One large firm that met the nine criteria reported a 90 percent drop in output during the third quarter of 1993. This deviation affected the summary statistics (see, e.g., the large coefficient and standard deviation in 1993:Q3 investment/production in Table 3) and some regression estimates. We have therefore eliminated this observation from the data set. Finally, data on capital stock are unavailable for 1992 and we hence use 1992 data for estimations that do not require the capital stock variable.

9) The range of observations for each year reflects the fact that data availability varies across variables. The decline in the number of firms and quarterly observations between 1994 and 1995 is brought about by the switch of reporting coverage from firms with 25 or more employees to 100 or more employees.

corporate governance and legal obligations associated with each form of registration. It also captures the relative financial and bureaucratic ease of establishing a given type of firm. Understanding the part played by the legal (corporate) form is important because different countries placed varying emphasis on privatization and corporatization of state-owned firms during the transition. For instance, while the Czech Republic focused on early and rapid privatization, Poland stressed early corporatization and slower privatization of state-owned firms. The relative merits of these different approaches have been hotly debated in the policy circles.

As may be seen from Appendix Tables A5-A8, in the Czech data set individual (family), cooperative and limited liability categories tend to contain smaller firms that were started with relatively low initial capital base. In contrast, joint stock companies tend to be larger in size. The exceptions to this rule are the state owned and mixed ownership firms, each of which has a similar average firm size in both the limited liability and joint stock legal form. Finally, state owned-state registered firms tend to be relatively small, averaging less than one-half of the employees of other state owned firms.

From Table 2 it is clear that the most important ownership-legal form categories are privately owned-limited liability companies (13,927 quarterly observations) and state owned-joint stock companies (11,475 quarterly observations). These are followed by state owned-state registered enterprises (6,835 quarterly observations), cooperatively owned-rural cooperatives (3,063 observations), privately owned-joint stock companies (2,480 observations), foreign owned-limited liability companies (2,091 observations), privately owned-individual/family businesses (1,845 observations), mixed ownership-joint stock companies (766 observations), foreign owned-joint stock companies (707 observations), cooperatively owned-producer cooperatives (587 observations), state owned-limited liability companies (441 observations), and mixed ownership-limited liability firms (298 observations). These twelve categories plus the remaining "other" firms category constitute the thirteen types of firms whose investment behavior we analyze in this paper.

Tables A1 and A2 in the Appendix give the evolution over time of the number of observations in the legal form and ownership categories, respectively. As may be seen from these tables, while the trend has not been monotonic in all cases, there has been the expected increase in the share of foreign, mixed and domestic private ownership, together with the share of joint stock and limited liability legal form.[10] Table A3 in the

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10) As can be seen from Table A1, between 1992 and 1995 joint stock companies increased their share in the total number of observations monotonically from 32% to 46%, while the share of limited liability companies rose from 27% in 1992 to 47% in 1994 and then dropped to 36% in 1995. The share of firms registered as state enterprises declined from 25% to 6% and those registered as individual/family businesses fell from 4% to 2%. In terms of ownership (Table A2), the share of privately

Appendix gives the distribution of observations across industries. The distribution is quite broad, with 16 percent of observations being in the food industry, 13 percent in the machinery industry, 11 percent in the metal product industry, 7 percent in the processing of non-metallic minerals and furniture industry, and 6 percent in the textile industry. Each of the remaining industry groups has less than 5 percent of all observations.

The summary statistics of the most relevant variables are presented in Table 3 and 4. As may be seen from Table 3, (gross) investment shows a seasonal pattern with a fourth quarter peak, reflecting an end-of-the-year investment spree.[11] It is interesting that the communist era phenomenon of "spending funds before year's end" is reflected in the investment behavior of firms well into the transition. As we show in Figure 1, this pattern is also seen in the overall data for the whole economy.[12] The profit data reported in Table 3 show a relatively steady pattern across all quarters in 1992, but a strong downward trend across quarters in 1993, 1994 and 1995. In 1993 and 1995 profit reaches negative values in the last quarter and shows relatively low overall levels in comparison to 1992 and 1994.[13] Overall, the post 1992 transition has not been associated with declining profits, as was sometimes conjectured in the popular debate. This finding, together with the consideration of the appropriateness and availability of data, has led us to use profit as a measure of availability of internal funds for investment in our analysis.

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owned firms rose from 31% in 1992 to 51% in 1994 and then receded to 41% in 1995. The share of state owned firms declined from 53% in 1992 to 31% in 1994, but then rose to 41% in 1995. Between 1992 and 1995 cooperatively owned firms' share decreased from 10% to 7%, while that of foreign owned firms jumped from 4% to 8% and that of mixed companies rose from 2% to 4%. In interpreting this evolution, it is necessary to bear in mind that the change from 1994 to 1995 reflects also the switch from a population of firms with 25 or more employees to firms with 100 or more employees.

11) As we show elsewhere, the seasonal pattern is much more pronounced in net investment than in depreciation (Lizal and Svejnar, 1997).

12) A more detailed examination indicates that the cyclical nature of investment is systematically reflected in the behavior of joint stock companies of all ownership types and, to a lesser extent, of state owned-state registered and foreign owned-limited liability firms.

13) The elimination of the small firms from the data set between 1994 and 1995 means that the average size of the labor force and capital stock increase between the last quarter of 1994 and the first quarter of 1995.

In Table 4 we present for the 13 ownership-legal form categories of firms the annual evolution of three principal indicators of the firm's propensity to invest: the investment/capital, investment/labor and investment/production ratios. The (relatively few) foreign owned-limited liability and joint stock companies record some of the highest values of the three ratios in most years. Hence, while foreign owned firms do not represent a large group, their propensity to invest supports the anecdotal and case study observations that investment and innovations are brought into the transition economies by foreign investors. It must also be noted, however, that domestic privately owned-joint stock companies compare quite favorably to the foreign owned companies and dominate them on some of the investment indicators in several years. Moreover, while the state owned-joint stock companies (the second most numerous group of firms) do not record high investment/capital ratios, they rank fifth out of thirteen on investment/labor in all years and move from the seventh to fourth place in investment/production between 1992 and 1995. Similarly, the state owned-limited liability companies register some of the highest investment/production ratios in recent years, while ranking relatively low in terms of investment/capital. The low investment/capital ratio found in state owned firms may hence indicate that these firms continue to report on their books the value of capital from the centrally planned period, rather than writing some of it off as obsolete and unproductive. In contrast, the privately owned-limited liability firms (the single most numerous category of firms) and individual/family firms rank high in terms of investment/capital but low in the other two indicators, suggesting that these smaller private firms operate with a small (recorded) capital stock and do not invest heavily in relation to their output and employment. Finally, cooperatives and the odd category of state owned-state registered firms record the lowest investment ratios on all indicators in virtually all years.

The statistics reported in Table 4 hence clearly indicate that (the few) foreign companies generally tend to invest the most and cooperatives the least. The behavioral difference that is the most interesting from a policy standpoint, namely that between the private and state owned firms, is more complex. Private firms clearly invest more than the state owned ones in relation to their recorded capital stock and the private joint stock companies (the large private firms) also tend to invest a bit more than the state owned joint stock companies on all three criteria. However, in the last two years state owned-limited liability companies have dominated all domestic private firms in terms of the investment/production ratio and the most numerous private-limited liability companies tend to invest relatively little in per output and per worker form. The widely accepted Polish survey findings by Belka et al. (1994) that during the transition investment is high in the new private firms and low in the state owned enterprises is hence not supported by the large Czech data set. Finally, it must be noted that some of the highest investment ratios are recorded in the mixed ownership and "other" categories of firms.

3. The Estimating Framework

In specifying our estimating equations, we use several models that allow us to compare our results to those obtained in western economies and at the same are estimable with our data.

On the demand side, we use two specifications. The first one corresponds to the basic neoclassical as well as accelerator models of investment demand (see e.g., Jorgenson, 1971). These models are internally consistent and have been widely used in the western context. However, they are based on rather restrictive assumptions about input substitutability (the accelerator model) or speed of adjustment (the neoclassical model). The second specification is an Euler equation derived explicitly from a dynamic structural model of investment demand in the presence of cost of capital adjustment. This model has a clear underlying optimization framework but in western empirical applications it has often encountered problems of convergence or generated counterintuitive parameter values. However, it represents an appealing alternative to empirical specifications relying on Tobin's Q, since financial markets are not yet efficient and adequate data for constructing the values of Q do not yet exist in the transition economies.

On the supply side, we use a specification that allows us to test whether the firm's availability of internal cash flow affects its investment decisions. As we mentioned earlier, the transition has brought about a significant reduction of government subsidies to firms, while capital markets have been developing only very gradually. The transition economies hence provide an ideal laboratory in which to examine the hypothesis that the availability of internal funds has a significant impact on investment behavior of certain types of firms. In particular, the cooperatives and the individually owned or limited liability companies, which tend to be small, could be expected to be much more rationed in the capital market than the joint stock companies that tend to be large, or the foreign firms that can supply themselves with investment finance from other countries.[14] We therefore estimate models that link gross investment to factors such as the availability of internal finance of the firm and permit us to test this hypothesis.[15]

In terms of actual specification, the neoclassical/accelerator model usually leads one to relate the firm's investment/capital ratio to its output/capital ratio. This empirical function has the form

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14) In the first phase of the transition, western banks have opened branches and subsidiaries in the transition economies primarily to serve the foreign firms, many of which had been their established clients.

15) See e.g., Fazzari et al.(1988), Oliner and Rudebusch (1992), Van Ees and Garretsen (1994), and Kaplan and Zingales (1997).

$$\frac{I_t}{K_{t-1}} = \alpha + \sum_{k=1}^{m} \gamma_k \frac{Y_{t-k}}{K_{t-1}} + \varepsilon_t \qquad (1)$$

where I, K and Y stand for (gross) investment, capital stock and output, respectively, the interpretation of γ's depends on whether the underlying theory refers to the neoclassical or accelerator models, m is the number of lags in the specification, and in line with the accepted practice all variables are scaled by the (one period lagged) capital of the firm. Equation (1) reflects the firm's demand for investment and implicitly assumes that supply of investment fund is perfectly elastic. In accounting for the possibility that the firm faces transaction costs or restrictions in obtaining external financing, the usual approach in the investment literature is to augment this type of equation by cash-flow variables. Since our data set contains information on profit for most firms for most of the time periods, we first examine the link of gross investment to this variable.

During some of the quarters we are missing either profit or investment data for some of the firms, and the data set on which we run the investment equation is hence smaller than the original data set. In order to control for possible selection bias in this process, we first run a Heckman-type probit equation, predicting the probability of the firm being included in the sample on the basis of data on investment, profit, industry and firm type. The resulting inverse Mills ratio is included as an explanatory variable in the investment equation.

Our basic estimating equation is hence of the form

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha + \sum_{k=1}^{4} \left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}} \right) + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t} \qquad (2)$$

where Π denotes gross profit, M the inverse Mills ratio from the probit estimation and X a set of quarterly (and in the case of longer panels also annual) dummy variables. We have run a number of pre-tests with various numbers of lags. Since we have quarterly data, we have focused on models with the number of lags equal to or greater than four. Since the results for four or more lags are similar, we report findings based on m=4. In order to control for firm-specific heterogeneity, we estimate equation (2) using a fixed effects specification. As is customary in the literature, we assume that the lagged values of the regressors are exogenous.

For 1994 we have more detailed data on variables that proxy the firms'

availability of funds. In particular, in addition to profit we have firm-level data on receivables R, receivables overdue RO, payables P, and payables overdue PO. For the 1994 period (using 1993 data as well), we hence also estimate by fixed effects the following equation:

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \\ + \delta_1 \frac{R_{i,t-1}}{K_{i,t-1}} + \delta_2 \frac{RO_{i,t-1}}{K_{i,t-1}} + \delta_3 \frac{P_{i,t-1}}{K_{i,t-1}} + \delta_4 \frac{PO_{i,t-1}}{K_{i,t-1}} + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t} \quad (3)$$

For firms that show sensitivity of investment to available funds, one would expect investment to be positively related to receivables and negatively to payables. However, the signs of the estimated coefficients on receivables and payables overdue are a priori ambiguous. In a well functioning legal framework, firms could expect to receive (pay) a significant part if not all of their receivables (payables) overdue. In this case, the estimated coefficients would be expected to have the same sign as (though perhaps smaller magnitude than) the corresponding coefficients on receivables and payables that are not overdue. However, the transition economies have been characterized by a highly imperfect legal framework and in the Czech case also great difficulties in carrying out bankruptcy proceedings. In these circumstances, unpaid receivables and payables may signal the unwillingness of the relevant agent to pay his/her obligations. Receivables (payables) overdue may then imply a decline (rise) in the previously expected cash flow and the estimated coefficients could be expected to be negative on receivables overdue and positive on payables overdue.

Finally, we estimate an investment equation that corresponds to a structural model of dynamic optimization by firms in the presence of costs of adjustment:

$$\frac{I_{i,t}}{K_{i,t}} = \alpha + \varphi_1 \frac{I_{i,t-1}}{K_{i,t-1}} + \varphi_2 \left(\frac{I_{i,t-k}}{K_{i,t-1}}\right)^2 + \varphi_3 \left(\frac{Y_{i,t-1} - w_{i,t-1} L_{i,t-1}}{K_{i,t-1}}\right) + \psi^T X_{i,t} + \varepsilon_{i,t} \quad (4)$$

where w denotes the wage and L employment. Since having a substantial time dimension is important for convergence of models such as the one given by equation (4) (see e.g., Bond and Meghir, 1994) and data on payables and receivables are only available for 1994, we estimate equation (4) in two steps. We first estimate the equation without receivables and payables on the 1994-95 sample of observations (using 1993 values as instruments) and then regress the 1994 residuals from this equation on

lagged current as well as overdue payables and receivables.[16] As is customary in these dynamic models that use a lagged value of the dependent variable as a regressor, we estimate the model by instrumental variables. In particular, in the first stage of estimation of equation (4), we use the first and second powers of once and twice lagged labor/capital ratio, the wage, the wage interacted with the labor/capital ratio, and the output/capital ratio as instruments for the first three right hand side variables.

Methodologically, equation (4) is appealing because it may be derived from the maximization of the present discounted value of firm's expected profits V_t in the following setting:[17]

$$V_t = E\left[\sum_{j=0}^{\infty} \xi_{t+j} \, \Pi_{t+j} \,|\, \Omega_t \right] \quad , \tag{5}$$

Subject to:

$$\begin{aligned} \xi_{t+j} &= \prod_{n=0}^{j-1} \frac{1}{1+r_{t+n}} \quad \forall \;\; j>0 \quad , \\ &= 1 \qquad\qquad j=0 \quad , \end{aligned} \tag{6}$$

$$K_t = (1-\delta) K_{t-1} + I_t \quad , \tag{7}$$

$$\begin{aligned} \Pi_t &= \Pi(K_t, L_t, I_t) = p_t Y(K_t, L_t, I_t) - w_t L_t - p_t^I I_t \quad , \\ Y(K_t, L_t, I_t) &= F(K_t, L_t) - G(K_t, I_t) \quad , \end{aligned} \tag{8}$$

and

$$G(K_t, I_t) = \frac{a}{2}\left(\frac{I_t}{K_t} - b \right)^2 K_t \quad , \quad a,b \geq 0 \quad . \tag{9}$$

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16) In carrying out this second stage, we assume that the residuals are orthogonal to payables and receivables.

17) See also Matyas and Severstre (1992) or Bond and Meghir (1994) for related derivations.

The term $E[.\bullet\Omega_t]$ denotes the expectation conditional on all information available at the time t, Π_t is the expected gain at time t, ξ_{t+j} is the discount factor between period t and t+j (assuming that payments are made at the beginning of each period), r is the discount rate, delta is the depreciation rate, p is output price, F(.,.) is a strictly concave frontier production function (unobservable), G(.,.) is a strictly convex and unobservable cost of capital adjustment function, Y(.,.,.)=F(.,.)-G(.,.) is the firm's observable production, and a and b are parameters of the cost of capital adjustment function.[18)] The term $p_t^I I_t$ is used instead of the usual "capital rental" since the capital market imperfection leads us to assume that investment has to be paid for fully at the time of purchase.

In this setting, the firm's optimal investment problem can be restated as a dynamic programming problem with a single state variable K_t and single control variable I_t:[19)]

$$V_t(K_{t-1}) = \max_{K_t, I_t, L_t} \{\Pi(K_t, I_t, L_t) + E[\xi_{t+1} V_{t+1}(K_t) | \Omega_t]\} . \qquad (10)$$

Assuming that the production function F(.,.) is homogeneous of degree 1 in labor and capital and the firm has rational expectations, one can differentiate equation (10) with respect to the choice variables K_t, L_t and I_t to obtain equation (4).[20)]

4. Empirical Estimates

In Table 5, we present our estimates of equation (2), which captures the relative importance of the neoclassical/accelerator model and the cash flow model in the basic estimating framework. We use 1992-95 quarterly data for the twelve principal categories of firms.[21)] The coefficient estimates in the table give the total effects of the four lagged

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18) Note that in the classical setup the production function F(.,.) and the adjustment cost function G(.,.) are assumed to be additively separable.

19) Capital can be changed only via investment and the investment decision is made at the beginning of each period.

20) We assume that the labor input may be adjusted costlessly. This assumption may be relaxed with no influence on the core of the derivation (see Estrin and Svejnar, 1993 for the derivation and estimation of a model with adjustment costs of labor).

21) The 1992 data are used for lagged values of regressors.

output and profit variables.[22] As may be seen from the table, the sum of the coefficients on output is in all cases positive and it is statistically significant in the overall regression using pooled data from all firms, as well as in seven of the twelve regressions that use data from specific categories of firms. In contrast, the sum of coefficients on profit is positive in only seven of the twelve categories of firms and among these it is significant in only two cases. Moreover, among the five negative estimated coefficients on profit, two are statistically significant, as is the negative coefficient from the overall regression based on pooled observations from all firms. In this basic test, the neoclassical/accelerator model hence receives much stronger support than the hypothesis that investment is positively affected by the availability of internal cash-flow, as proxied by a polynomial in lagged profit.

In examining the estimated output coefficients for individual categories of firms in Table 5, one can see that state owned firms (whether joint stock or state registered) display a strong link between production and investment.[23] Private firms do so in the case of (the smaller and most numerous) limited liability companies and individual/family firms, but not in the case of (the relatively large) joint stock companies. The positive relationship may also be seen in the case of cooperatives, foreign joint stock companies and the "other" category of firms. Firms with mixed ownership as well as foreign owned-limited liability firms do not show a significant output-investment relationship.

A significant positive link between profit and investment is found in Table 5 only for the (most numerous) privately owned limited liability firms and cooperatives. These firms are relatively small (averaging fewer than 250 employees) and it is hence plausible that they suffer more than others from constraints in the imperfect capital market. Interestingly, one finds a negative relationship between profit and investment in the case of private-single entrepreneur firms and state owned firms registered as limited liability companies. The former are very small and volatile, while the latter are special enterprises in which the state wants to retain control.

Since investment behavior may have undergone significant changes during the transition period, in Table 6 we report separate annual estimates of equation (2).[24] The data used in generating these estimates exclude three categories of firms (state owned-limited liability, mixed ownership-limited liability and "other" firms) for which there were

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22) The underlying individual coefficients are reported in Appendix Table A8.

23) The coefficient is positive but statistically insignificant in the category state owned-limited liability companies where we have only 187 observations.

24) As in Table 5, in Table 6 we report the total effects of output and profit. The individual coefficients for each of the lagged values of output and profit are reported in Appendix Table A9.

too few quarterly observations to perform separate regressions for each year. As may be seen from Table 6, the separate estimates for 1993, 1994 and 1995 broadly confirm the findings based on the entire 1992-95 period, but they also show considerable variation in investment behavior over the individual years.[25] In the overall regression based on observations from all firms, one finds a positive coefficient on the total output effect in each of the three years, while the effect on profit is negative in 1993, statistically insignificant in 1994 and positive in 1995. In examining the coefficients in the individual categories of firms, one finds in Table 6 (as in Table 5) that there are more positive and statistically significant coefficients on output than profit. The data are also increasingly supportive of the neoclassical/accelerator model as the transition proceeds, in the sense that the number of categories of firms with positive and significant coefficients on output increases from three in 1993 to five in both 1994 and 1995. In contrast, only two categories of firms generate positive coefficients on profit in each of the three years. The much greater support of the neoclassical/accelerator model also becomes evident when one notes that the categories of firms whose behavior is consistent with this model are the most numerous ones and increasingly so over time. Hence, while slightly over one-half of firms belonged to the categories that conformed to this model in 1993, by 1994 and 1995 the number rose to over 80%. The categories of firms whose coefficient estimates are consistent with the cash-flow model account for less than one-third of firms in each of the three years.

In examining the coefficients of individual categories of firms, it is worth noting that the category of state owned-joint stock companies (the second most numerous category) is the only one to conform to the neoclassical/accelerator model in all three years, but even in this category the significance is relatively low in one year (1994). On the other side of the spectrum, one observes cooperatives showing a statistically strong positive link between investment and profit in 1993 and 1994, with the estimated coefficient being also positive and significant at a 12 percent two-tail test level in 1995. The cooperatives thus appear to be the single most important type of firm that shows a consistent link between profitability and investment.

In Table 7 we report fixed effects estimates of equation (3), which captures the effect of payables and receivables.[26] As may be seen from Table 7, while the inclusion of the current and overdue payables and receivables does not much affect the coefficients on profit, it reduces the number of significant output coefficients from five to

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25) In all sets of regressions, the 1992 data are used as lagged values of 1993 regressors.

26) As in Tables 5 and 6, in Table 7 we present the total effects, with the coefficients on the individual lagged variables being reported in Appendix Table A10.

three. Hence, while all except one of the output coefficients are positive, only those on privately owned-limited liability, privately owned-single entrepreneur and foreign owned-limited liability firms are significant and hence supportive of the neoclassical/accelerator model.

The coefficients on payables and receivables provide some support for the cash flow hypothesis. In the overall regression, the coefficient on receivables is positive and statistically significant, implying that investment is positively related to this expected inflow of cash. The coefficient on receivables overdue is also positive but statistically insignificant, suggesting that overdue payments are expected with a lower probability than non-overdue ones. In contrast, the coefficient on payables is zero and that on payables overdue is negative, suggesting that investment is not negatively affected by current obligations but is reduced by overdue ones. At the level of individual categories of firms, one finds a similar mild support amidst a mixture of estimates. In particular, for both current and overdue receivables one observes three positive and one negative coefficient. Payables register two negative and two positive coefficients, while payables overdue yield three negative and one positive coefficient.[27)]

Finally, in Table 8 we present for the population of all firms two sets of estimated coefficients of the dynamic structural model. The first specification includes while the second one excludes dummy variables for ownership, legal form and industry of the firm. Both models include quarterly dummy variables. The inverse Mills ratio was statistically insignificant and its exclusion did not affect the estimated coefficients.[28)]

In view of the difficulties that are frequently encountered in estimating these types of models, our estimates are very encouraging since the three structural coefficients have the theoretically predicted signs and are statistically significant. Moreover, the coefficients on receivables and payables are consistent with the cash flow hypothesis of enterprise behavior in the presence of an imperfect legal environment. Receivables have a positive coefficient, suggesting that this expected inflow of capital has a positive effect on investment. In contrast, receivables overdue have a negative coefficient, indicating that firms attach low probability to receiving overdue payments from their business counterparts. Similarly, while statistically

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27) It should be noted that in random effects as well as between estimates, payables have a negative and payables overdue a positive effect on investment. These results are hence more in line with results that would be expected in a transitional economy with imperfect capital markets.

28) The unreported regressions for individual types of firms have relatively high standard errors. This finding is not unusual in this type of models when the number of observations is relatively small and the model is estimated by instrumental variables.

insignificant, the coefficients on payables are negative and those on payables overdue positive, suggesting that current obligations have a negative effect on investment, while overdue ones are not treated as seriously.

5. Conclusions

In this paper, we use the population of medium-sized and large industrial firms operating in the Czech Republic between 1992 and 1995 to analyze the investment behavior of firms with various types of ownership and corporate (legal) structure during the transition from plan to market. Ours is one of the first papers in this area and it differs from the other contemporaneous studies in that we (1) use quarterly rather than annual data in the presence of considerable seasonal variation of investment, (2) examine the validity of the main competing models of investment in the transition context, (3) test whether investment behavior of firms changes as the transition proceeds and whether it varies with firm's ownership and corporate (legal) form, and (4) apply panel data and sample selection techniques to the firm-level data and thus eliminate aggregation and selectivity biases and control for heterogeneity across firms and over time.

A comparison of the investment/capital, investment/labor and investment/production ratios across the 13 principal ownership-legal form categories of firms during 1992-95 shows that (the relatively few) foreign owned companies generally tend to invest the most and (the domestically owned) cooperatives the least. Privately owned-joint stock companies tend to rank after the foreign owned firms in terms of their propensity to invest, followed by state owned-joint ventures. However, the general picture is more complex, as some domestic firms dominate foreign ones on some criteria in some years, and some state owned firms dominate privately or foreign owned ones in some cases. In particular, in the last two years state owned-limited liability companies dominated all domestic private firms in terms of the investment/production ratio. Moreover, throughout 1992-95 the privately owned-limited liability companies (the most numerous group of firms) tended to invest little in relation to their output and employment. The findings from our large data set hence contrast with the widely accepted findings of the relatively small Polish survey (Belka et al., 1994) which suggested that investment during the transition was high in the new private firms and low in the state owned enterprises.

Our econometric tests indicate that when the basic neoclassical/accelerator specification is used on the demand side (stressing the link of investment to lagged production), the general behavior of firms may be better approximated by this model than that based on the cash-flow or financing constraint theories (proxied by a positive relationship between investment and firm's lagged profit). Estimates for individual types

of firms indicate that most firms have a positive relationship between investment and lagged output and that only cooperatives and the smaller (but not the very small) private firms display a significant positive link between investment and lagged profit. When we estimate the basic model on successive biennial sub-periods, we find more often a positive link between investment and output than between investment and profit and this support for the neoclassical/accelerator model grows over time. The importance of the investment-output link is somewhat diminished, however, when we are able to include other cash-flow variables (the firm's payables and receivables) in 1994.

In our estimates of the dynamic structural model, we find support for the hypothesis that the transition economies have an imperfectly functioning legal system that permits firms not to honor commitments to their partners (i.e., a form of soft budget constraints) and that this phenomenon affects investment.

Interestingly, our findings are in line with those from western economies in that we point to the importance of output as a determinant of investment and that we are able to estimate quite precisely a dynamic structural model of investment that was developed for the behavior of a profit maximizing firm. The fact that we only find a systematic link between profit and investment in the smaller private firms and cooperatives is not surprising, given that these firms are the most likely ones to encounter financing constraints. However, the limited scope of the link between profit and investment across the broad range of firms casts doubt on the general applicability of the Calvo-Coricelli hypothesis, at least from 1992 on.

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Table 1 Investment and GDP Growth in Central Europe

	Czech Republic		Hungary		Poland		Slovak Republic	
Date	%ΔGDP	I/GDP	%ΔGDP	I/GDP	%ΔGDP	I/GDP	%ΔGDP	I/GDP
1991	-14.2	0.22	-11.9	0.21	-7.6	0.15	-11.2	0.25
1992	-6.4	0.25	-3.1	0.19	2.6	0.12	-6.5	0.30
1993	-0.9	0.28	-0.6	0.18	3.8	0.09	-3.7	0.28
1994	2.6	0.31	2.9	0.20	5.2	0.09	4.9	0.28
1995	5.9	0.34	1.5	0.18	7.0	0.10	6.8	0.31
1996	4.1	0.34	1.0	0.18	6.1	0.11	6.9	0.42

Note: % ΔGDP stands for the annual percentage change in real GDP. Comparable methodology is used across countries. Investment includes tangible and intangible fixed assets (except for the Czech Republic, where it includes only tangible fixed assets). With the exception of Poland, all investment data are for the entire economy, including estimates for entities not directly monitored by the statistical offices. In Poland, investment reflects entities with more than 20 (50 in industry) employees. 1996 data for Hungary are estimates.

Source: CESTAT (Statistical Bulletin of Czech, Hungarian, Polish, Slovak and Slovenian Statistical Offices).

Table 2 Number of Firm-level Observations by Firm Ownership and Legal Form

Ownership / Legal Form	Private	State	Cooperative	Foreign	Mixed	Other	Sum
Joint Stock Co.	2480	11475	0	707	766	51	15479
State Enterprise (SOE)	0	6835	0	0	0	0	6835
Limited Liability (Ltd.)	13927	441	9	2091	298	22	16716
Other Coop	4	0	3063	0	0	0	3067
Producer Coop	0	0	587	0	0	0	587
Individual	1845	0	0	4	0	0	1849
Soc. Commandite	134	0	0	51	0	0	185
Subsidized Institutions	0	22	0	0	0	0	22
Other	12	0	3	26	0	11	52
Sum	18402	18773	3662	2807	1064	84	44792

Note: The shaded cells denote the major ownership-legal (corporate) form categories of firms that we analyze. All other types of firms are placed in the Other/Other (other ownership/other legal form) category. Firms with unknown ownership and/or legal form are also included in the Other/Other group.

Table 3 Means and Standard Deviations of the Principal Variables

	Investment/ Capital	Investment/ Production	Profit	Labor	Investment	Production	Capital	Max. No. of Obs.[b]
1992/Q1	na	0.14 (1.66)	5913 (34295)	626 (1818)	4851 (21288)	76746 (267)	na	2252
1992/Q2	na	0.17 (2.26)	5195 (28505)	552 (1660)	6113 (28147)	71087 (259)	na	2484
1992/Q3	na	0.15 (0.97)	4267 (27974)	520 (1584)	5904 (31109)	62763 (235)	na	2626
1992/Q4	na	0.20 (1.14)	5265 (74644)	494 (1527)	10868 (57006)	67753 (258)	na	2738
1993/Q1	0.029 (0.094)	0.08 (0.27)	4577 (37346)	494 (1536)	4278 (30115)	70715 (273)	347 (1522)	2657
1993/Q2	0.041 (0.118)	0.15 (1.64)	3159 (27386)	457 (1415)	6452 (32831)	65880 (273)	328 (1469)	2841
1993/Q3	0.040 (0.110)	0.99 (43.27)	1577 (33231)	433 (1352)	6264 (36822)	56979 (224)	315 (1447)	2940
1993/Q4	0.054 (0.132)	0.18 (1.22)	-3800 (45994)	417 (1312)	9488 (56153)	61305 (265)	311 (1451)	3009
1994/Q1	0.031 (0.096)	0.14 (1.67)	5150 (29255)	347 (1086)	3520 (20835)	53363 (227)	279 (1350)	3503
1994/Q2	0.039 (0.101)	0.10 (0.51)	4432 (30952)	337 (1056)	5633 (40038)	57962 (270)	278 (1352)	3613
1994/Q3	0.036 (0.098)	0.11 (0.46)	3392 (34164)	332 (1032)	5685 (45034)	52619 (216)	274 (1331)	3653
1994/Q4	0.061 (0.132)	0.19 (1.37)	1271 (29555)	313 (991)	8319 (66621)	56160 (221)	261 (1329)	3867
1995/Q1	0.029 (0.097)	0.16 (2.89)	5581 (47196)	506 (1242)	5936 (27955)	105557 (448)	445 (1759)	2205
1995/Q2	0.034 (0.09)	0.13 (0.87)	4931 (34482)	500 (1227)	8262 (37561)	108143 (437)	452 (1803)	2261
1995/Q3	0.032 (0.081)	0.13 (0.67)	3172 (41884)	496 (1212)	8965 (48508)	97267 (389)	453 (1784)	2234
1995/Q4	0.046 (0.100)	0.16 (0.51)	-1884 (35192)	493 (1201)	14463 (66746)	120059 (501)	459 (1815)	2243
Overall	0.040 (0.107)	0.19 (10.96)	3190 (38283)	442 (1326)	7033 (43544)	70895 (299)	335 (1509)	44984
Obs.[a]	34779	42936	44879	44879	44984	43610	34779	44984

Note: [a] The number of observations is the sum of all quarterly observations with non-missing values.
[b] The maximum number of observations is the maximum of all quarterly observations with non-missing values.

Table 4 Means and Standard Deviations of Investment Ratios by Type of Firm in 1992-1995

Owner/Form Share / Year	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop./ General	Coop./ Producer	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ Ltd.	Mixed/ J.Stock	Other
Investment/ Capital 1993	0.026 (0.064)	0.050 (0.108)	0.013 (0.033)	0.066 (0.158)	0.024 (0.061)	0.017 (0.048)	0.070 (0.148)	0.026 (0.078)	0.115 (0.208)	0.086 (0.181)	0.020 (0.066)	0.122 (0.232)	0.026 (0.049)
Investment/ Capital 1994	0.017 (0.037)	0.04 (0.092)	0.010 (0.034)	0.059 (0.137)	0.019 (0.059)	0.002 (0.003)	0.054 (0.129)	0.023 (0.052)	0.089 (0.159)	0.043 (0.059)	0.024 (0.065)	0.049 (0.128)	0.056 (0.13)
Investment/ Capital 1995	0.019 (0.042)	0.039 (0.095)	0.010 (0.047)	0.049 (0.122)	0.018 (0.033)	0.010 (0.037)	0.044 (0.083)	0.029 (0.064)	0.092 (0.150)	0.035 (0.066)	0.021 (0.066)	0.090 (0.204)	0.078 (0.114)
Investment/ Labor 1992	18.64 (76.07)	30.31 (123.50)	11.66 (50.18)	9.96 (71.69)	3.91 (13.00)	2.59 (7.10)	8.98 (33.27)	2.43 (7.01)	29.18 (110.56)	48.74 (153.51)	13.70 (37.23)	111.5 (581.10)	9.84 (20.92)
Investment/ Labor 1993	19.34 (57.29)	31.03 (125.19)	10.08 (31.05)	8.74 (33.48)	4.32 (10.01)	3.56 (14.06)	7.54 (17.28)	15.39 (62.43)	30.53 (101.74)	51.04 (142.1)	13.28 (39.97)	32.68 (78.36)	11.55 (23.16)
Investment/ Labor 1994	17.29 (48.53)	31.08 (190.00)	7.01 (25.78)	12.69 (69.50)	4.74 (11.33)	0.71 (1.29)	13.08 (47.46)	7.64 (14.80)	37.92 (119.80)	38.76 (59.66)	15.55 (34.16)	10.54 (25.40)	18.97 (49.31)
Investment/ Labor 1995	18.90 (43.17)	27.47 (92.00)	8.40 (20.88)	9.78 (33.11)	5.92 (11.87)	4.05 (13.60)	7.72 (21.15)	20.37 (79.27)	39.05 (85.64)	44.00 (77.46)	17.16 (66.15)	7.32 (18.47)	42.40 (81.88)
Investment/ Prod. 1992	0.176 (1.000)	0.272 (1.934)	0.144 (0.743)	0.124 (1.582)	0.087 (0.340)	0.061 (0.199)	0.764 (0.308)	0.029 (0.072)	0.239 (0.791)	0.516 (2.030)	0.403 (2.530)	0.651 (3.2)	0.093 (0.332)
Investment/ Prod. 1993	0.139 (0.403)	0.158 (0.420)	0.220 (2.745)	0.097 (0.439)	0.079 (0.184)	0.081 (0.385)	0.074 (0.205)	0.144 (0.419)	0.289 (1.346)	0.260 (0.694)	0.075 (0.219)	0.350 (0.908)	0.198 (0.492)
Investment/ Prod. 1994	0.132 (0.985)	0.223 (1.466)	0.055 (0.170)	0.127 (1.397)	0.076 (0.319)	0.013 (0.024)	0.153 (0.787)	0.250 (2.160)	0.275 (1.179)	0.171 (0.322)	0.103 (0.245)	0.085 (0.201)	0.150 (0.395)
Investment/ Prod. 1995	0.196 (2.606)	0.177 (0.524)	0.072 (0.298)	0.086 (0.473)	0.082 (0.182)	0.085 (0.221)	0.059 (0.178)	0.211 (1.142)	0.242 (0.889)	0.168 (0.333)	0.094 (0.291)	0.048 (0.081)	0.277 (0.640)

Table 5 Estimates of the Basic Investment Equation for 1992-1995

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha_i + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock	Mixed/ Ltd.	Other
$\Sigma\gamma_k$	0.027*** (0.002)	0.111*** (0.004)	0.007 (0.006)	0.006*** (0.002)	0.025*** (0.002)	0.045*** (0.008)	0.597*** (0.021)	0.038 (0.064)	0.016 (0.019)	0.296* (0.158)	0.002 (0.007)	0.011 (0.020)	0.177*** (0.045)
$\Sigma\beta_k$	-0.052*** (0.009)	0.002 (0.012)	0.008 (0.043)	-0.003 (0.013)	0.025*** (0.010)	0.068*** (0.019)	-0.801*** (0.162)	-1.241*** (0.303)	0.063 (0.073)	-0.273 (0.484)	0.125 (0.100)	-0.088 (0.148)	0.032 (0.251)
P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.065	0.000	0.073	0.184	0.000
Adj. R^2	0.124	0.380	0.210	0.125	0.280	0.214	0.695	0.547	0.046	0.221	0.126	0.628	0.538
N	20573	6643	1069	2853	5091	2201	692	187	772	379	431	94	161

Note: *** = significant at 1% level,
** = significant at 5% level,
* = significant at 10% level.

Table 6 Annual Estimates of the Basic Investment Equation

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha_i + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock
1993										
$\Sigma\gamma_k$	0.095***	0.120***	0.022	0.027*	-0.001	0.041	0.710***	-0.048*	0.510	0.172
	(0.005)	(0.011)	(0.025)	(0.016)	(0.006)	(0.028)	(0.029)	(0.025)	(0.968)	(0.150)
$\Sigma\beta_k$	-0.230***	-0.131**	-0.028	-0.006	0.137***	0.115*	-1.112**	-0.036	0.765	-0.303
	(0.031)	(0.065)	(0.408)	(0.042)	(0.041)	(0.059)	(0.473)	(0.084)	(3.682)	(0.300)
P-value	0.000	0.000	0.437	0.000	0.000	0.070	0.000	0.048	0.035	0.633
Adj. R^2	0.205	0.564	0.255	0.269	0.429	0.339	0.855	0.383	0.059	0.016
N	6543	2036	186	1568	1232	806	262	182	92	92
1994										
$\Sigma\gamma_k$	0.026***	0.037*	0.007	-0.001	0.016***	0.041*	0.290***	0.229***	0.006	0.080
	(0.004)	(0.021)	(0.019)	(0.006)	(0.007)	(0.022)	(0.039)	(0.030)	(0.128)	(0.057)
$\Sigma\beta_k$	0.001	-0.010	-0.062	0.017	-0.056**	0.010	-0.353***	0.115	1.007**	-0.337**
	(0.013)	(0.023)	(0.204)	(0.029)	(0.028)	(0.057)	(0.089)	(0.080)	(0.422)	(0.170)
P-value	0.000	0.000	0.007	0.995	0.000	0.077	0.000	0.000	0.023	0.390
Adj. R^2	0.227	0.329	0.493	-0.007	0.198	0.204	0.307	0.344	0.490	0.203
N	7255	2016	334	878	2109	840	325	304	124	155
1995										
$\Sigma\gamma_k$	0.074***	0.073***	0.040**	0.012**	0.090***	-0.008	0.063	-0.071	0.237***	-0.024
	(0.006)	(0.009)	(0.019)	(0.005)	(0.009)	(0.021)	(0.045)	(0.214)	(0.074)	(0.018)
$\Sigma\beta_k$	0.065***	-0.014	0.027	0.008	0.056**	0.140	0.011	0.443	-0.258	1.193**
	(0.016)	(0.042)	(0.079)	(0.039)	(0.023)	(0.086)	(0.121)	(0.630)	(0.225)	(0.476)
P-value	0.000	0.000	0.000	0.000	0.000	0.140	0.749	0.988	0.084	0.005
Adj. R^2	0.100	0.373	0.242	0.655	0.149	0.276	0.219	-0.005	0.637	0.064
N	6775	2591	549	407	1750	555	105	286	163	184

Note: *** = significant at 1% level,
** = significant at 5% level,
* = significant at 10% level.

Table 7 Estimates of the Extended Investment Equation

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha_i + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \delta_1 \frac{R_{i,t-1}}{K_{i,t-1}} + \delta_2 \frac{RO_{i,t-1}}{K_{i,t-1}} + \delta_3 \frac{P_{i,t-1}}{K_{i,t-1}} + \delta_4 \frac{PO_{i,t-1}}{K_{i,t-1}} + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock	Other
Receivabl.	0.007*** (0.003)	0.001 (0.003)	-0.008 (0.033)	-0.005 (0.014)	0.005 (0.005)	0.041** (0.018)	-0.056* (0.029)	0.017 (0.029)	-0.016 (0.047)	0.223*** (0.080)	-0.024 (0.048)	0.303*** (0.067)
Receivabl. Overdue	0.010 (0.006)	0.044** (0.021)	0.038 (0.059)	0.021*** (0.008)	-0.012 (0.011)	0.025 (0.026)	0.135** (0.055)	-0.019 (0.046)	0.046 (0.076)	-0.248* (0.126)	0.062 (0.071)	-0.051 (0.157)
Payables	0.000 (0.003)	-0.006 (0.006)	-0.013 (0.023)	0.041*** (0.011)	0.004 (0.006)	-0.023* (0.013)	0.090*** (0.018)	-0.027 (0.020)	-0.068*** (0.023)	-0.055 (0.050)	0.005 (0.035)	-0.016 (0.044)
Payables Overdue	-0.016*** (0.005)	-0.008 (0.020)	0.000 (0.039)	-0.046*** (0.015)	-0.009 (0.008)	0.006 (0.026)	-0.161*** (0.042)	0.109*** (0.032)	0.024 (0.063)	-0.443*** (0.102)	-0.058 (0.055)	-0.068 (0.210)
$\Sigma\gamma_k$	0.022*** (0.004)	0.032 (0.022)	0.015 (0.035)	-0.008 (0.006)	0.014* (0.008)	0.017 (0.025)	0.223*** (0.046)	-0.091 (0.070)	0.265*** (0.055)	0.118 (0.118)	0.091 (0.066)	0.019 (0.039)
$\Sigma\beta_k$	-0.001 (0.014)	-0.019 (0.027)	-0.095 (0.213)	0.073** (0.037)	-0.043 (0.030)	-0.009 (0.059)	-0.212** (0.087)	0.443** (0.182)	0.015 (0.085)	0.573 (0.405)	-0.365* (0.189)	-0.018 (0.289)
P-value	0.000	0.000	0.039	0.876	0.000	0.006	0.000	0.000	0.000	0.000	0.489	0.009
Adj. R^2	0.230	0.324	0.498	0.018	0.199	0.212	0.420	0.857	0.380	0.635	0.190	0.947
N	7255	2016	334	878	2109	840	325	70	304	124	155	74

Note: R=Receivables, RO=Receivables Overdue, P=Payables, PO=Payables Overdue, M=Inverse Mills Ratio, X= Vector of Dummies,

*** = significant at 1% level,

** = significant at 5% level,

* = significant at 10% level.

Table 8 Dynamic Model with Adjustment Costs

$$\frac{I_{i,t}}{K_{i,t}} = \alpha + \varphi_1 \frac{I_{i,t-1}}{K_{i,t-1}} + \varphi_2 \left(\frac{I_{i,t-k}}{K_{i,t-1}} \right)^2 + \varphi_3 \left(\frac{Y_{i,t-1} - w_{i,t-1} L_{i,t-1}}{K_{i,t-1}} \right) + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coefficient	Model 1	Model 2
φ_1	1.1400*** (.0825)	1.1495*** (.0651)
φ_2	-.0368*** (.0082)	-.0365*** (.0076)
φ_3	-.0022*** (.0005)	-.0023*** (.0005)
Dummies	Yes	No
Adj. R^2	.010	.011
N	18691	18691
Residual Analysis for 1994		
Receivables	.0046*** (.0018)	.0048*** (.0018)
Receivables Overdue	-.0043*** (.0015)	-.0046*** (.0015)
Payables	-.0016 (.0021)	-.0017 (.0022)
Payables Overdue	.0031 (.0027)	.0033 (.0027)
Adj. R^2	.001	.001
N	10838	10838

Notes: *** = significant at 1% level,
** = significant at 5% level,
* = significant at 10% level.

Estimates of the dynamic investment function are based on the 1994-1995 data, since results on 1994 data only were less significant or insignificant. 1993 data were used for instruments where necessary. In the residual analysis then uses the 1994 residuals. We have also tried specification which included inverse Mills ratio as one of the explanatory variables. Although the fraction of correct predictions was 0.8, the coefficient associated with Mills ratio was completely insignificant and there was no change in the other coefficients. We have therefore decided to exclude this variable. Both models contain quarterly dummy variables. Model 1 also includes ownership, legal form and industry dummies. We have used labor/capital, labor/capital times the marginal product of labor, and product/capital, as instruments. All instruments are in the form of a first and second power of once and twice lagged values.

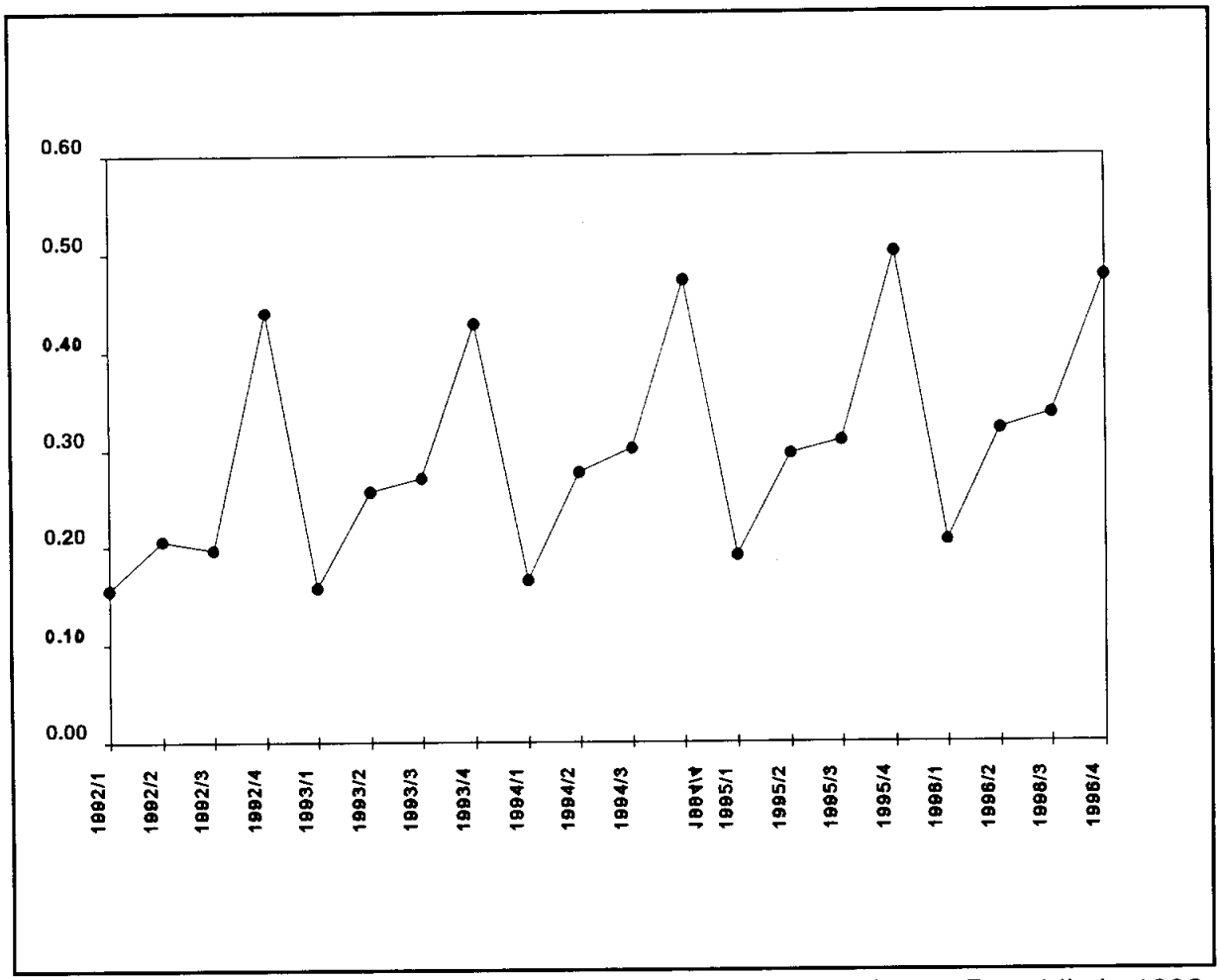

Figure 1 Quarterly Investment as a Share of GDP in the Czech Republic in 1992-1996

Table A1 Frequency Distribution of Firms by Legal Form

Legal Form	1992	1993	1994	1995	1992-95
Individual	4.23	4.92	4.80	1.59	4.06
Ltd.	26.83	33.06	47.06	35.58	36.67
Joint Stock Co.	31.99	28.95	31.50	46.17	33.88
General Coop	7.13	6.47	6.95	6.15	6.70
Industry Coop	2.64	2.36	0.05	0.36	1.28
SOE	25.16	22.04	8.18	5.55	15.00
State Subsidized	0.12	0.09	0.00	0.00	0.05
Other	1.90	2.11	1.46	4.60	2.36
Total	100.00	100.00	100.00	100.00	100.00
Observations	10257	11644	14706	9110	45717

Table A2 Frequency Distribution of Firms by Ownership

Ownership	1992	1993	1994	1995	1992-95
Private	31.11	37.40	50.63	40.85	40.93
Cooperative	9.86	8.94	6.99	6.52	8.04
State	52.62	46.53	31.10	41.11	41.85
International/Foreign	4.19	4.88	7.91	7.48	6.12
Mixed	1.65	1.74	2.53	3.70	2.36
Other/Unknown	0.57	0.51	0.84	0.34	0.70
Total	100.00	100.00	100.00	100.00	100.00
Observations	10257	11644	14706	9110	45717

Table A3 Frequency Distribution of Firms by Industry

Industry/NACE	Observations	Percent
Unknown/Other	672	1.46
Mining of Coal	220	0.48
Mining of Oil and Gas	64	0.14
Mining of Metal Ores	32	0.07
Other Mining and Quarrying	701	1.53
Food Production	7171	15.96
Textile	2652	5.80
Apparel Manufacturing	1773	3.88
Leather and Footwear	1128	2.47
Wood Production	1996	4.37
Pulp and Paper	815	1.78
Publishing and Printing	1371	3.00
Chemicals	1124	2.46
Rubber and Plastics	1308	2.86
Non-metallic Minerals	3017	6.60
Manufacture of Basic Metals	1186	2.59
Fabricated Metal Products Except Machinery	4903	10.72
Machinery	6103	13.35
Office Machinery and Computers	92	0.20
Electrical Apparatus	1783	3.90
Radio and Television	698	1.53
Medical and Precision Instruments	1043	2.28
Motor Vehicles	805	1.76
Other Transport Equipment	756	1.65
Furniture	3213	7.03
Recycling	336	0.73
Water Utilities	755	1.65
Total	45717	100

Table A4 Means and Standard Deviations of the Principal Variables by Type of Firm in 1992

Owner/ Form	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop./ General	Coop./ Producer	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ Ltd.	Mixed/ J.Stock	Other
Investment/ Capital	na	na	na	na	na	na	na	na	na	na	na	na	na
Investment/ Labor	18.64 (76.07)	30.31 (123.50)	11.66 (50.18)	9.96 (71.69)	3.91 (13.00)	2.59 (7.10)	8.98 (33.27)	2.43 (7.01)	29.18 (110.56)	48.74 (153.51)	13.70 (37.23)	111.50 (581.10)	9.84 (20.92)
Investment/ Production	0.176 (1.000)	0.272 (1.934)	0.144 (0.743)	0.124 (1.582)	0.087 (0.340)	0.061 (0.199)	0.764 (0.308)	0.029 (0.072)	0.239 (0.791)	0.516 (2.030)	0.403 (2.530)	0.651 (3.200)	0.093 (0.332)
Profit	10436 (45873)	3699 (11734)	5013 (35442)	1354 (5315)	700 (2859)	523 (3448)	1071 (4653)	-2003 (25276)	866 (7875)	37127 (313608)	3778 (13320)	3287 (25534)	1113 (5305)
Labor	1127 (2866)	435 (637)	539 (920)	153.6 (222.5)	209 (163)	224 (170)	94.74 (164.81)	1152 (1065)	115 (246)	895 (2960)	400 (740)	306 (732)	204 (216)
Investment	16197 (62462)	7438 (27429)	5918 (21959)	1184 (5952)	850 (2524)	679 (2163)	687 (2808)	2641 (8305)	3573 (15794)	33300 (122324)	3215 (7158)	10703 (30685)	1387 (2500)
Production	142523 (375498)	59391 (116413)	66014 (141968)	19468 (28438)	12390 (15009)	12857 (11700)	10843 (18731)	127080 (149797)	16335 (40967)	285600 (1173000)	63994 (100773)	42369 (103761)	25627 (32995)
Capital	na	na	na	na	na	na	na	na	na	na	na	na	na
Wage	4.66 (1.06)	4.97 (2.01)	4.46 (0.96)	4.59 (1.31)	3.78 (0.97)	3.89 (0.92)	4.40 (1.35)	4.88 (0.78)	5.08 (1.78)	5.47 (1.71)	4.66 (1.15)	4.69 (0.93)	4.79 (1.51)
N(max)	2663	346	2581	2319	731	271	434	99	287	129	127	39	155

Table A5 Means and Standard Deviations of the Principal Variables by Type of Firm in 1993

Owner/ Form	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop./ General	Coop./ Producer	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ Ltd.	Mixed/ J.Stock	Other
Investment/ Capital	0.026 (0.064)	0.050 (0.108)	0.013 (0.033)	0.066 (0.158)	0.024 (0.061)	0.017 (0.048)	0.070 (0.148)	0.026 (0.078)	0.115 (0.208)	0.086 (0.181)	0.020 (0.066)	0.122 (0.232)	0.026 (0.049)
Investment/ Labor	19.34 (57.29)	31.03 (125.19)	10.08 (31.05)	8.74 (33.48)	4.32 (10.01)	3.56 (14.06)	7.54 (17.28)	15.39 (62.43)	30.53 (101.74)	51.04 (142.10)	13.28 (39.97)	32.68 (78.36)	11.55 (23.16)
Investment/ Production	0.139 (0.403)	0.158 (0.42)	0.220 (2.745)	0.097 (0.439)	0.079 (0.184)	0.081 (0.385)	0.074 (0.205)	0.144 (0.419)	0.289 (1.346)	0.260 (0.694)	0.075 (0.219)	0.350 (0.908)	0.198 (0.492)
Profit	2305 (62298)	207 (13030)	2247 (37776)	913 (8307)	810 (3979)	683 (3239)	1034 (6316)	-5790 (31442)	-726 (14069)	-10588 (77925)	2214 (10071)	-436 (18576)	1303 (6275)
Labor	1008 (2562)	379 (566)	488 (850)	132 (177)	179 (147)	182 (135)	90 (132)	884 (889)	169 (458)	802 (2785)	368 (644)	240 (567)	194 (210)
Investment	15644 (61812)	7206 (23419)	5400 (18988)	961 (2382)	885 (2340)	557 (1350)	646 (1894)	9569 (33310)	7425 (27399)	54169 (211834)	4310 (11247)	9498 (27430)	7051 (18216)
Production	141845 (378194)	54103 (98033)	64615 (141421)	17077 (25314)	12187 (16387)	11770 (11264)	10827 (17029)	100830 (117097)	26799 (83701)	305212 (1361490)	56282 (81129)	35043 (84967)	23290 (36495)
Capital	777125 (2683192)	208708 (384474)	421418 (1113766)	39767 (75792)	44935 (68889)	47097 (41867)	23578 (77120)	459586 (556065)	82302 (245969)	752431 (2413205)	253069 (423279)	137377 (332314)	93082 (127073)
Wage	5.81 (1.42)	6.16 (2.68)	5.42 (1.18)	5.60 (1.60)	4.59 (1.16)	4.79 (1.11)	5.09 (1.41)	6.40 (1.04)	6.27 (2.09)	6.85 (1.99)	5.74 (1.20)	5.63 (1.27)	5.82 (1.92)
N(max)	2687	391	2566	3257	754	275	572	113	406	144	133	66	205

Table A6 Means and Standard Deviations of the Principal Variables by Type of Firm in 1994

Owner/ Form	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop./ General	Coop./ Producer	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ Ltd.	Mixed/ J.Stock	Other
Investment/ Capital	0.017 (0.037)	0.040 (0.092)	0.010 (0.034)	0.059 (0.137)	0.019 (0.059)	0.002 (0.003)	0.054 (0.129)	0.023 (0.052)	0.089 (0.159)	0.043 (0.059)	0.024 (0.065)	0.049 (0.128)	0.056 (0.130)
Investment/ Labor	17.29 (48.53)	31.08 (190.00)	7.01 (25.78)	12.69 (69.50)	4.74 (11.33)	0.71 (1.29)	13.08 (47.46)	7.64 (14.80)	37.92 (119.80)	38.76 (59.66)	15.55 (34.16)	10.54 (25.40)	18.97 (49.31)
Investment/ Production	0.132 (0.985)	0.223 (1.466)	0.055 (0.170)	0.127 (1.397)	0.076 (0.319)	0.013 (0.024)	0.153 (0.787)	0.250 (2.160)	0.275 (1.179)	0.171 (0.322)	0.103 (0.245)	0.085 (0.201)	0.150 (0.395)
Profit	8966 (49711)	5936 (42895)	436 (14432)	1602 (7313)	931 (6095)	189 (244)	1108 (3619)	292 (28059)	2909 (20102)	3253 (112464)	5763 (24781)	3098 (20397)	1807 (11437)
Labor	809 (1918)	428 (970)	279 (378)	122 (166)	162 (143)	38 (17)	83 (111)	730 (764)	150 (358)	742 (2242)	482 (693)	367 (555)	132 (129)
Investment	13021 (57018)	9031 (36900)	2241 (8125)	1227 (5694)	810 (2214)	38 (68)	836 (4014)	7164 (19368)	7561 (30788)	49257 (269262)	7739 (21954)	6969 (28591)	9348 (43367)
Production	135249 (384889)	69140 (187588)	37294 (65591)	17756 (27419)	12889 (24053)	2187 (654)	9923 (13967)	99866 (116022)	34040 (99953)	239548 (946759)	104716 (235027)	64032 (109975)	32749 (95218)
Capital	771171 (2455390)	423510 (1561458)	247935 (559310)	39080 (87244)	52673 (80917)	20984 (3125)	22630 (47006)	451189 (718105)	98893 (264924)	862069 (2893561)	520282 (1544992)	160024 (380825)	98488 (227349)
Wage	6.56 (1.58)	6.95 (2.19)	6.07 (1.39)	6.39 (1.85)	5.24 (1.30)	6.65 (0.49)	5.84 (1.70)	7.37 (1.30)	7.21 (2.26)	8.31 (2.46)	7.24 (2.56)	7.07 (2.48)	7.05 (2.43)
N(max)	3225	870	1186	5758	1018	8	695	126	881	243	272	99	306

Table A7 Means and Standard Deviations of the Principal Variables by Type of Firm in 1995

Owner/ Form	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop./ General	Coop./ Producer	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ Ltd.	Mixed/ J.Stock	Other
Investment/ Capital	0.019 (0.042)	0.039 (0.095)	0.010 (0.047)	0.049 (0.122)	0.018 (0.033)	0.010 (0.037)	0.044 (0.083)	0.029 (0.064)	0.092 (0.15)	0.035 (0.066)	0.021 (0.066)	0.090 (0.204)	0.078 (0.114)
Investment/ Labor	18.90 (43.17)	27.47 (92.00)	8.40 (20.88)	9.78 (33.11)	5.92 (11.87)	4.05 (13.60)	7.72 (21.15)	20.37 (79.27)	39.05 (85.64)	44.00 (77.46)	17.16 (66.15)	7.32 (18.47)	42.40 (81.88)
Investment/ Production	0.196 (2.606)	0.177 (0.524)	0.072 (0.298)	0.086 (0.473)	0.082 (0.182)	0.085 (0.221)	0.059 (0.178)	0.211 (1.142)	0.242 (0.889)	0.168 (0.333)	0.094 (0.291)	0.048 (0.081)	0.277 (0.640)
Profit	4960 (43822)	1863 (46211)	417 (18895)	1634 (15237)	866 (4082)	-575 (2703)	-256 (10130)	4113 (28060)	9204 (89970)	0 (98735)	-1350 (32291)	5460 (19792)	2637 (15642)
Labor	823 (1861)	486 (912)	327 (297)	242 (249)	210 (106)	183 (104)	198 (166)	845 (689)	358 (650)	912 (2384)	568 (688)	433 (579)	195 (87)
Investment	14696 (48980)	11126 (42637)	3170 (8325)	2217 (6816)	1300 (2840)	1101 (4959)	1233 (3780)	11698 (26618)	14789 (34643)	51272 (223421)	11816 (34962)	6671 (19701)	9492 (25383)
Production	150705 (403516)	80336 (176629)	50778 (72823)	36820 (51071)	18157 (24172)	7237 (6521)	23349 (18695)	175272 (193357)	93468 (169777)	392873 (1453467)	126977 (260081)	67426 (100698)	381909 (133915)
Capital	868185 (2655066)	468711 (1661331)	361926 (765303)	79192 (137220)	70002 (66750)	69941 (33302)	64694 (88694)	623811 (790346)	252529 (478841)	1270628 (3849551)	652680 (1778220)	175129 (474067)	121550 (131445)
Wage	7.68 (1.80)	7.84 (2.36)	7.31 (1.70)	7.23 (1.85)	6.16 (1.55)	5.97 (1.23)	6.96 (2.21)	9.11 (1.53)	8.91 (3.31)	9.60 (3.46)	8.09 (1.85)	8.37 (2.26)	8.36 (2.78)
N(max)	2900	873	502	2593	560	33	144	103	445	191	234	94	427

Table A8 Complete Parameter Estimates of the Basic Investment Equation for 1993-1995

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock	Mixed/ Ltd.	Other
β_1	-0.002	0.057***	-0.005	0.015**	0.005	0.037***	-0.341***	-0.467***	0.026	-0.220	0.004	-0.006	0.343***
	(0.004)	(0.010)	(0.019)	(0.007)	(0.005)	(0.010)	(0.045)	(0.119)	(0.039)	(0.258)	(0.041)	(0.027)	(0.096)
β_2	-0.030***	0.005	0.010	-0.001	0.022***	0.006	-0.337***	-0.299***	-0.031	-0.122	0.057	-0.051	-0.297***
	(0.004)	(0.010)	(0.019)	(0.007)	(0.005)	(0.010)	(0.048)	(0.112)	(0.046)	(0.221)	(0.039)	(0.060)	(0.109)
β_3	0.010**	0.020**	0.010	-0.005	-0.002	0.028***	-0.078*	-0.173	0.047	0.261	0.042	-0.016	-0.055
	(0.004)	(0.009)	(0.015)	(0.006)	(0.006)	(0.010)	(0.045)	(0.111)	(0.036)	(0.240)	(0.034)	(0.055)	(0.107)
β_4	-0.030***	-0.080***	-0.008	-0.012**	0.001	-0.002	-0.045	-0.302**	0.021	-0.193	0.023	-0.014	0.041
	(0.004)	(0.008)	(0.018)	(0.005)	(0.005)	(0.009)	(0.050)	(0.120)	(0.030)	(0.221)	(0.033)	(0.051)	(0.108)
γ_1	-0.003***	-0.004	-0.005	0.005*	0.009***	0.010*	0.430***	0.127***	-0.008	0.246**	0.021	0.000	-0.215***
	(0.001)	(0.006)	(0.004)	(0.003)	(0.002)	(0.006)	(0.033)	(0.036)	(0.028)	(0.096)	(0.021)	(0.017)	(0.036)
γ_2	-0.004***	0.049***	-0.001	-0.001	0.003	0.011	-0.065**	-0.011	-0.007	-0.026	-0.011	0.007	0.129***
	(0.001)	(0.006)	(0.002)	(0.003)	(0.003)	(0.007)	(0.028)	(0.040)	(0.032)	(0.092)	(0.018)	(0.026)	(0.031)
γ_3	0.002	0.016**	-0.001	0.003	0.001	0.013**	-0.132***	-0.043	0.029	0.101	-0.019	0.005	0.026
	(0.002)	(0.007)	(0.008)	(0.002)	(0.004)	(0.007)	(0.030)	(0.035)	(0.020)	(0.100)	(0.018)	(0.012)	(0.033)
γ_4	0.032***	0.050***	0.013*	0.000	0.012***	0.011*	0.364***	-0.036	0.003	-0.024	0.011	0.000	0.239***
	(0.002)	(0.006)	(0.008)	(0.002)	(0.003)	(0.006)	(0.036)	(0.042)	(0.026)	(0.089)	(0.019)	(0.012)	(0.042)
μ	-0.077	0.018	0.059	0.030*	0.070	0.022	0.249	-0.088	-0.118	-0.094	-0.012	0.148	-0.282*
	(0.060)	(0.029)	(0.072)	(0.018)	(0.142)	(0.017)	(0.484)	(0.096)	(0.311)	(0.420)	(0.064)	(0.099)	(0.169)
$\Sigma \gamma_k$	0.027***	0.111***	0.007	0.006***	0.025***	0.045***	0.597***	0.038	0.016	0.296*	0.002	0.011	0.177***
	(0.002)	(0.004)	(0.006)	(0.002)	(0.002)	(0.008)	(0.021)	(0.064)	(0.019)	(0.158)	(0.007)	(0.020)	(0.045)
$\Sigma \beta_k$	-0.052***	0.002	0.008	-0.003	0.025***	0.068***	-0.801***	-1.241***	0.063	-0.273	0.125	-0.088	0.032
	(0.009)	(0.012)	(0.043)	(0.013)	(0.010)	(0.019)	(0.162)	(0.303)	(0.073)	(0.484)	(0.100)	(0.148)	(0.251)
P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.065	0.000	0.073	0.184	0.000
Adj. R^2	0.124	0.380	0.210	0.125	0.280	0.214	0.695	0.547	0.046	0.221	0.126	0.628	0.538
N	20573	6643	1069	2853	5091	2201	692	187	772	379	431	94	161

Note: *** = significant at 1% level,
** = significant at 5% level,
* = significant at 10% level.

Table A9 Complete Annual Parameter Estimates of the Basic Investment Equation

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock
1993										
β_1	-0.069*** (0.009)	0.088*** (0.029)	0.273 (0.177)	0.012 (0.015)	0.016 (0.010)	0.068*** (0.019)	-0.441*** (0.117)	-0.003 (0.038)	-0.100 (1.254)	-0.143 (0.112)
β_2	-0.096*** (0.012)	0.002 (0.031)	-0.302 (0.193)	0.001 (0.012)	0.057*** (0.018)	0.027 (0.022)	-0.467*** (0.126)	-0.017 (0.039)	-0.597 (1.320)	-0.073 (0.084)
β_3	-0.008 (0.013)	0.066* (0.034)	-0.023 (0.106)	-0.007 (0.013)	0.034** (0.017)	0.037 (0.023)	-0.127 (0.124)	-0.086** (0.041)	1.695 (1.544)	-0.022 (0.074)
β_4	-0.057*** (0.012)	-0.287*** (0.027)	0.025 (0.114)	-0.013 (0.022)	0.029* (0.016)	-0.017 (0.024)	-0.077 (0.122)	0.070*** (0.025)	-0.233 (1.614)	-0.066 (0.080)
γ_1	0.029*** (0.002)	0.037** (0.016)	-0.057* (0.034)	0.001 (0.007)	0.003 (0.003)	0.015 (0.011)	0.366*** (0.050)	-0.012 (0.027)	0.521 (0.359)	0.040 (0.063)
γ_2	0.024*** (0.002)	0.040** (0.016)	-0.010 (0.014)	-0.001 (0.007)	0.000 (0.006)	-0.008 (0.014)	-0.068* (0.039)	-0.012 (0.020)	0.024 (0.363)	-0.042 (0.059)
γ_3	-0.044*** (0.006)	-0.017 (0.017)	-0.092** (0.042)	0.006 (0.007)	0.003 (0.007)	0.024 (0.016)	-0.225*** (0.040)	0.027 (0.021)	0.248 (0.633)	0.067 (0.073)
γ_4	0.086*** (0.006)	0.061*** (0.019)	0.181*** (0.054)	0.021** (0.010)	-0.008 (0.008)	0.009 (0.016)	0.637*** (0.055)	-0.051*** (0.019)	-0.283 (0.459)	0.108 (0.101)
μ	-0.072 (0.527)	0.020 (0.061)	0.313 (0.165)	0.095 (0.194)	-0.075 (0.633)	-0.001 (0.057)	0.724 (1.070)	2.268 (2.079)	-1.096 (1.025)	0.073 (0.189)
$\Sigma\gamma_k$	0.095*** (0.005)	0.120*** (0.011)	0.022 (0.025)	0.027* (0.016)	-0.001 (0.006)	0.041 (0.028)	0.710*** (0.029)	-0.048* (0.025)	0.510 (0.968)	0.172 (0.150)
$\Sigma\beta_k$	-0.230*** (0.031)	-0.131** (0.065)	-0.028 (0.408)	-0.006 (0.042)	0.137*** (0.041)	0.115* (0.059)	-1.112** (0.473)	-0.036 (0.084)	0.765 (3.682)	-0.303 (0.300)
P-value	0.000	0.000	0.437	0.000	0.000	0.070	0.000	0.048	0.035	0.633
Adj. R^2	0.205	0.564	0.255	0.269	0.429	0.339	0.855	0.383	0.059	0.016
N	6543	2036	186	1568	1232	806	262	182	92	92

1994										
β_1	0.019*** (0.006)	-0.004 (0.014)	0.045 (0.061)	0.016 (0.013)	-0.004 (0.012)	-0.008 (0.021)	0.000 (0.031)	0.060 (0.050)	0.284** (0.125)	-0.177 (0.109)
β_2	0.000 (0.006)	-0.005 (0.014)	-0.059 (0.064)	0.005 (0.021)	0.002 (0.011)	-0.011 (0.022)	-0.114 (0.031)	-0.040 (0.051)	0.116 (0.136)	-0.095 (0.090)
β_3	-0.001 (0.005)	0.004 (0.010)	0.023 (0.064)	-0.004 (0.016)	-0.015 (0.009)	0.030 (0.023)	-0.124*** (0.024)	0.158*** (0.050)	0.390*** (0.118)	-0.013 (0.054)
β_4	-0.017*** (0.005)	-0.005 (0.011)	-0.072 (0.064)	0.000 (0.010)	-0.040*** (0.010)	-0.001 (0.021)	-0.116*** (0.030)	-0.063* (0.034)	0.217* (0.124)	-0.051 (0.054)
γ_1	0.023*** (0.004)	0.004 (0.011)	0.006 (0.018)	0.002 (0.005)	0.026*** (0.008)	-0.004 (0.011)	0.044** (0.018)	0.053* (0.030)	-0.056 (0.050)	0.023 (0.035)
γ_2	0.001 (0.004)	0.013 (0.012)	0.007 (0.017)	0.001 (0.005)	-0.014* (0.007)	0.021* (0.012)	0.085*** (0.017)	0.156*** (0.037)	0.002 (0.058)	0.009 (0.030)
γ_3	0.012*** (0.003)	0.020* (0.011)	0.002 (0.016)	0.000 (0.006)	0.009 (0.005)	0.003 (0.012)	0.114*** (0.018)	-0.010 (0.037)	0.015 (0.034)	0.012 (0.032)
γ_4	-0.011*** (0.003)	-0.001 (0.011)	-0.007 (0.021)	-0.005 (0.006)	-0.003 (0.005)	0.020* (0.011)	0.047*** (0.017)	0.031 (0.028)	0.045 (0.035)	0.037 (0.032)
μ	-0.263*** (0.083)	-0.193 (0.043)	-0.113 (0.482)	-0.020 (0.054)	-0.163 (0.235)	0.025 (0.050)	0.323** (0.143)	-0.731 (0.407)	-0.134 (0.139)	0.057 (0.092)
$\Sigma\gamma_4$	0.026*** (0.004)	0.037* (0.021)	0.007 (0.019)	-0.001 (0.006)	0.016*** (0.007)	0.041* (0.022)	0.290*** (0.039)	0.229*** (0.030)	0.006 (0.128)	0.080 (0.057)
$\Sigma\beta_4$	0.001 (0.013)	-0.010 (0.023)	-0.062 (0.204)	0.017 (0.029)	-0.056** (0.028)	0.010*** (0.057)	-0.353*** (0.089)	0.115 (0.080)	1.007** (0.422)	-0.337** (0.170)
P-value	0.000	0.000	0.007	0.995	0.000	0.077	0.000	0.000	0.023	0.390
Adj. R^2	0.227	0.329	0.493	-0.007	0.198	0.204	0.307	0.344	0.490	0.203
N	7255	2016	334	878	2109	840	325	304	124	155

1995										
β_1	0.006 (0.008)	0.015 (0.015)	-0.007 (0.021)	0.011 (0.016)	0.000 (0.013)	0.076** (0.035)	0.033 (0.060)	-0.004 (0.230)	-0.197** (0.091)	0.150 (0.130)
β_2	-0.002 (0.009)	-0.014 (0.014)	0.004 (0.024)	-0.004 (0.016)	-0.003 (0.011)	0.015 (0.030)	0.017 (0.044)	-0.091 (0.226)	0.042 (0.071)	0.492*** (0.165)
β_3	0.051*** (0.009)	0.024* (0.014)	0.002 (0.031)	0.013 (0.016)	0.045** (0.018)	0.028* (0.016)	0.000 (0.041)	0.345 (0.223)	-0.066 (0.079)	0.194 (0.119)
β_4	0.011* (0.006)	-0.038*** (0.014)	0.027 (0.037)	-0.012 (0.016)	0.014 (0.009)	0.021 (0.028)	-0.038 (0.030)	0.193 (0.318)	-0.036 (0.080)	0.357** (0.149)
γ_1	0.028*** (0.006)	0.001 (0.006)	0.008 (0.008)	0.019** (0.007)	0.037*** (0.010)	-0.047*** (0.016)	0.019 (0.036)	-0.083 (0.140)	0.095* (0.049)	0.065 (0.057)
γ_2	0.010** (0.004)	0.034*** (0.006)	0.011 (0.009)	-0.009 (0.007)	0.021** (0.010)	0.016 (0.012)	-0.006 (0.052)	-0.209 (0.189)	0.045 (0.042)	-0.119** (0.054)
γ_3	0.011* (0.007)	-0.005 (0.006)	0.018 (0.011)	0.005 (0.006)	0.017 (0.015)	0.021** (0.010)	0.044 (0.045)	0.291* (0.150)	0.061 (0.040)	0.026 (0.045)
γ_4	0.024*** (0.008)	0.042*** (0.007)	0.003 (0.009)	-0.003 (0.005)	0.014 (0.016)	0.002 (0.012)	0.007 (0.048)	-0.070 (0.160)	0.035 (0.038)	0.004 (0.038)
μ	-0.159 (0.170)	-0.155*** (0.054)	-0.034 (0.061)	-0.035 (0.114)	0.063 (0.490)	-0.028 (0.277)	-0.243 (0.179)	-0.113 (1.329)	0.095 (0.104)	0.036 (0.181)
$\Sigma\gamma_k$	0.074*** (0.006)	0.073*** (0.009)	0.040** (0.019)	0.012** (0.005)	0.090*** (0.009)	-0.008 (0.021)	0.063 (0.045)	-0.071 (0.214)	0.237*** (0.074)	-0.024 (0.018)
$\Sigma\beta_k$	0.065*** (0.016)	-0.014 (0.042)	0.027 (0.079)	0.008 (0.039)	0.056** (0.023)	0.140 (0.086)	0.011 (0.121)	0.443 (0.630)	-0.258 (0.225)	1.193** (0.476)
P-value	0.000	0.000	0.000	0.000	0.000	0.140	0.749	0.988	0.084	0.005
Adj. R^2	0.100	0.373	0.242	0.655	0.149	0.276	0.219	-0.005	0.637	0.064
N	6775	2591	549	407	1750	555	105	286	163	184

Note: *** = significant at 1% level,
** = significant at 5% level,
* = significant at 10% level.

Table A10 Complete Parameter Estimates of the Extended Investment Equation

$$\frac{I_{i,t}}{K_{i,t-1}} = \alpha + \sum_{k=1}^{4}\left(\beta_k \frac{\Pi_{i,t-k}}{K_{i,t-1}} + \gamma_k \frac{Y_{i,t-k}}{K_{i,t-1}}\right) + \delta_1 \frac{R_{i,t-1}}{K_{i,t-1}} + \delta_2 \frac{RO_{i,t-1}}{K_{i,t-1}} + \delta_3 \frac{P_{i,t-1}}{K_{i,t-1}} + \delta_4 \frac{PO_{i,t-1}}{K_{i,t-1}} + \mu M_{i,t} + \psi^T X_{i,t} + \varepsilon_{i,t}$$

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock	Other
Receivabl.	0.007***	0.001	-0.008	-0.005	0.005	0.041**	-0.056*	0.017	-0.016	0.223***	-0.024	0.303***
	(0.003)	(0.003)	(0.033)	(0.014)	(0.005)	(0.018)	(0.029)	(0.029)	(0.047)	(0.080)	(0.048)	(0.067)
Receivabl. Overdue	0.010	0.044**	0.038	0.021***	-0.012	0.025	0.135**	-0.019	0.046	-0.248*	0.062	-0.051
	(0.006)	(0.021)	(0.059)	(0.008)	(0.011)	(0.026)	(0.055)	(0.046)	(0.076)	(0.126)	(0.071)	(0.157)
Payables	0.000	-0.006	-0.013	0.041***	0.004	-0.023*	0.090***	-0.027	-0.068***	-0.055	0.005	-0.016
	(0.003)	(0.006)	(0.023)	(0.011)	(0.006)	(0.013)	(0.018)	(0.020)	(0.023)	(0.050)	(0.035)	(0.044)
Payables Overdue	-0.016***	-0.008	0.000	-0.046***	-0.009	0.006	-0.161***	0.109***	0.024	-0.443***	-0.058	-0.068
	(0.005)	(0.020)	(0.039)	(0.015)	(0.008)	(0.026)	(0.042)	(0.032)	(0.063)	(0.102)	(0.055)	(0.210)
β_1	0.019***	-0.008	0.042	0.045***	0.000	-0.026	-0.007	0.063	0.033	0.073	-0.162	0.244**
	(0.006)	(0.015)	(0.061)	(0.017)	(0.012)	(0.022)	(0.031)	(0.051)	(0.051)	(0.122)	(0.113)	(0.108)
β_2	0.000	-0.005	-0.088	0.018	0.006	-0.018	-0.049	0.029	-0.116**	0.037	-0.116	-0.044
	(0.006)	(0.015)	(0.068)	(0.022)	(0.011)	(0.023)	(0.031)	(0.043)	(0.054)	(0.124)	(0.097)	(0.098)
β_3	0.000	0.000	0.015	0.007	-0.012	0.034	-0.083***	0.111**	0.170***	0.309***	-0.021	-0.202**
	(0.005)	(0.011)	(0.068)	(0.016)	(0.010)	(0.023)	(0.024)	(0.054)	(0.051)	(0.108)	(0.057)	(0.098)
β_4	-0.020***	-0.005	-0.064	0.002	-0.037***	0.001	-0.073***	0.239***	-0.073*	0.154	-0.067	-0.017
	(0.005)	(0.011)	(0.067)	(0.010)	(0.010)	(0.021)	(0.028)	(0.073)	(0.040)	(0.117)	(0.059)	(0.123)
γ_1	0.022***	0.002	0.020	0.000	0.023***	-0.011	0.021	-0.002	0.066**	-0.034	0.022	-0.091*
	(0.004)	(0.011)	(0.026)	(0.005)	(0.009)	(0.011)	(0.019)	(0.037)	(0.032)	(0.043)	(0.038)	(0.046)
γ_2	-0.001	0.013	0.009	0.001	-0.014*	0.024*	0.092***	-0.053*	0.203***	0.022	0.013	0.038
	(0.004)	(0.012)	(0.018)	(0.005)	(0.008)	(0.012)	(0.016)	(0.031)	(0.039)	(0.050)	(0.035)	(0.036)
γ_3	0.013***	0.017	0.008	-0.002	0.007	0.000	0.085***	-0.043	-0.076*	0.068**	0.007	-0.003
	(0.003)	(0.011)	(0.023)	(0.006)	(0.006)	(0.012)	(0.020)	(0.036)	(0.042)	(0.032)	(0.034)	(0.029)
γ_4	-0.011***	0.000	-0.022	-0.007	-0.003	0.005	0.026	0.007	0.072**	0.062*	0.049	0.075
	(0.003)	(0.011)	(0.023)	(0.007)	(0.005)	(0.013)	(0.017)	(0.022)	(0.033)	(0.035)	(0.032)	(0.060)
μ	-0.231***	-0.102***	0.876**	-0.056	-0.215	0.006	0.097	-0.027	-0.590	-0.052	0.078	-0.094
	(0.076)	(0.035)	(0.398)	(0.063)	(0.211)	(0.059)	(0.107)	(0.026)	(0.386)	(0.047)	(0.098)	(0.112)
Dummy	0.012	-0.004	-0.166**	-0.008	0.006	-0.015*	-0.058	0.008	0.050	-0.014	-0.023*	-0.009

Coeff.	All	State/ J.Stock	Private/ J.Stock	State/ SOE	Private/ Ltd.	Coop	Private/ Individ.	State/ Ltd.	Foreign/ Ltd.	Foreign/ J.Stock	Mixed/ J.Stock	Other
Quarter 1	(0.014)	(0.004)	(0.073)	(0.005)	(0.064)	(0.008)	(0.039)	(0.022)	(0.077)	(0.019)	(0.012)	(0.024)
Dummy Quarter 2	0.004 (0.008)	0.001 (0.003)	-0.098** (0.039)	-0.008* (0.004)	0.006 (0.031)	-0.011*** (0.004)	-0.032 (0.022)	-0.012 (0.009)	-0.017 (0.054)	-0.011 (0.017)	-0.008 (0.010)	-0.023 (0.018)
Dummy Quarter 3	-0.020*** (0.005)	-0.006** (0.002)	-0.064** (0.028)	-0.007** (0.003)	-0.036*** (0.014)	-0.011*** (0.004)	-0.045** (0.019)	-0.008 (0.006)	-0.036 (0.040)	-0.009 (0.012)	-0.015 (0.009)	0.002 (0.019)
$\Sigma\gamma_k$	0.022*** (0.004)	0.032 (0.022)	0.015 (0.035)	-0.008 (0.006)	0.014* (0.008)	0.017 (0.025)	0.223*** (0.046)	-0.091 (0.070)	0.265*** (0.055)	0.118 (0.118)	0.091 (0.066)	0.019 (0.039)
$\Sigma\beta_k$	-0.001 (0.014)	-0.019 (0.027)	-0.095 (0.213)	0.073** (0.037)	-0.043 (0.030)	-0.009 (0.059)	-0.212** (0.087)	0.443** (0.182)	0.015 (0.085)	0.573 (0.405)	-0.365* (0.189)	-0.018 (0.289)
P-value	0.000	0.000	0.039	0.876	0.000	0.006	0.000	0.000	0.000	0.000	0.489	0.009
Adj. R^2	0.230	0.324	0.498	0.018	0.199	0.212	0.420	0.857	0.380	0.635	0.190	0.947
N	7255	2016	334	878	2109	840	325	70	304	124	155	74

Note: R=Receivables, RO=Receivables Overdue, P=Payables, PO=Payables Overdue, M=Inverse Mills Ratio, X= Vector of Dummies,
*** = significant at 1% level,
** = significant at 5% level,
* = significant at 10% level.