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Property Rights, Finance, and Entrepreneurship

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PROPERTY RIGHTS, FINANCE, AND ENTREPRENEURSHIP

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Working Paper No. 212

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Abstract

Is investment constrained more by insecure property rights or by limited external finance? For five transition economies in Eastern Europe and the former Soviet Union we find that weak property rights limit the reinvestment of profits in startup manufacturing firms. Access to credit does not appear to explain differences in investment. At least in the early stages of post-communist reform, retained earnings appear to have been enough to finance the investments that managers wanted to make.

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Property Rights, Finance, and Entrepreneurship

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Is investment constrained more by insecure property rights or by limited external finance? For five transition economies in Eastern Europe and the former Soviet Union we find that weak property rights limit the reinvestment of profits in startup manufacturing firms. Access to credit does not appear to explain differences in investment. At least in the early stages of post-communist reform, retained earnings appear to have been enough to finance the investments that managers wanted to make.

1. Introduction

Property rights are fundamental: people will not invest if they cannot keep the fruits of their investment. We estimate in this paper how firms' investment levels vary with the perceived risk of expropriation. We also ask whether security of property is enough by itself to induce firms to invest, or whether they also need access to credit.

Our data come from a 1997 survey of recently formed manufacturing firms in five transition countries, Poland, Romania, Slovakia, Ukraine, and Russia. Access to credit and the perceived security of property-rights vary considerably both across and within these countries. Those firms in our sample with the least secure property rights invest nearly 40% less than those with the most secure property rights. Property rights have a large effect on investment; but the insecurity of property rights does not completely stifle investment. We further find that, at the low levels of institutional development of these countries, the absence of external finance does not prevent firms from investing. Those

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managers in our sample who perceived their property rights to be reasonably secure were able to generate enough investable funds from retained earnings. Internal finance can substitute for external finance.

That a functioning financial system is important for investment and growth is well established (Levine, 1997; Demirgüç-Kunt and Maksimovic, 1998; Rajan and Zingales, 1998). Our results do not contradict this, but suggest two caveats. First, in a country with insecure property rights credit may be inessential, for managers will invest little even if they are able to borrow. Reforms to secure property rights are more urgent than reforms in the banking system. Second, firms can earn unusually high profits in the early stages of reform of a distorted economy, because unfilled demands and profitable niches are plentiful or because entry barriers persisting from the old economy restrict competition. Firms may not seek outside funds but prefer to invest from their abundant retained profits. Financial institutions are irrelevant in these two situations; they start to matter only once property rights are perceived to be secure.[1]

Weak property rights and corruption have been shown in cross-country studies to affect aggregate growth. Knack and Keefer (1995), Mauro (1995), and Svensson (1998) construct country-level indices of property rights based on evaluations obtained from consultants to foreign investors. They find that this property-rights index significantly affects investment and growth. Using a similar property-rights index, Demirgüç-Kunt and Maksimovic (1998) find that firms invest more and use more external funds in countries with secure property rights. Rather than using economy-wide indices of property rights based on foreign consultants' perceptions, our micro-level study uses the managers' own evaluations of the security of their property rights.[2] The post-communist experience

[1] This paper adds some empirical detail to the idea that certain market-supporting institutions will work only after other institutions have been built: see McMillan (1997) and Shleifer and Vishny (1998).
[2] Other micro-level studies include Frye and Shleifer (1997) and Shleifer (1997), who argue that the Russian government acts like a "grabbing hand," impeding investment, whereas the Polish government does not. Besley (1995) finds a significant link between property rights and investment in Ghana.

allows us to examine the relative importance of property rights and credit in countries where both are inadequate.

We use a variety of survey questions to measure the managers' perceptions of their property-rights security. We asked managers whether "extralegal payments" are needed for government services and for licenses. We also asked whether "unofficial" payments are made for specific services: payments for renewing their business registration, and payments to fire, sanitary, and tax inspectors. We asked whether the courts could be used to enforce an agreement with a customer or supplier, and whether payments are normally made for "protection" of the firms' activities. Finally, as a check on these property-rights measures, we asked the managers whether they would invest $100 today to receive $200 in two years; answering no presumably indicates, among other things, a fear that they would not be able to keep the future profits.

Many of these new firms, we find, are extremely profitable. Profits are actually highest in Russia, where a hostile business environment creates barriers to entry.[3] Our data suggest that credit is a less important determinant of investment than retained earnings. The willingness to reinvest profits does not depend on access to credit, but does depend on the perceived security of property rights.

Credit markets seem to work for the firms in our sample, at least at the level of the firms' limited demand for credit. Obtaining a loan is significantly associated with both supply factors—holding collateral and having had a loan in the past—and a demand factor—having less internal funds available. Most sampled firms in all five countries have received loans at some point. Most say they have the collateral to back a loan.[4]

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[3] High profits to new entrants appear to have been common in the early stages of reform in the formerly planned economies. China's newly entering rural firms had an average rate of profit on capital of 40% in 1978, the first year of reform; in subsequent years this profit rate fell as China's marketization proceeded (Naughton, 1995, p.150). Anecdotal evidence that early entrants in Poland earned high profits is given in Johnson and Loveman (1995).

[4] Evidence that financial intermediation works reasonably well in Poland, Hungary, and the Czech Republic is given in Bratowski, Grosfeld, and Rostowski (1999).

A shortage of capital, according to Holmström (1996), has hindered investment in eastern Europe. Our analysis argues against this view. Collateral "plays the central role in increasing the liquidity of liabilities and in determining the firms' capacity to fund investments" (Holmström, 1996, p.208). But most of our firms hold collateral and most have received a bank loan. The firms do not appear to have suffered unduly from being unable to obtain loans. Our analysis suggests on the contrary that often loans were not made because the firms did not want them. The limited use of external finance by firms in the transition economies reflects not just a lack of loan supply but also a lack of loan demand. Firms with higher levels of unreinvested profits are significantly less likely to have loans. In all five countries, the capital available from unreinvested profits exceeds the capital provided by the banking sector. The firms could, if they chose, use their considerable unreinvested profits to finance further investment. They do not do so, because of property-rights insecurity.[5]

Section 2 describes the data. Section 3 develops a model of the manager's investment decision, focusing on the effects of insecure property rights and the choice between using retained earnings and bank loans. Section 4 summarizes our hypotheses. Section 5 reports regressions on the effects of property rights on firms' willingness to reinvest from profits. Section 6 reports regressions on the determinants of bank loans.

2. The Data

We surveyed private manufacturing firms in Poland, Romania, Russia, Slovakia, and Ukraine, in May and June of 1997 for Russia and Ukraine and from September to December of 1997 in Poland, Slovakia and Romania. The survey, described in more detail in Appendix A and Johnson, McMillan and Woodruff (1999b), was designed to

[5] Holmström's point may be correct for potential firms that were not formed due to lack of credit or firms that failed due to lack of credit. Our sample covers only firms that were in business at the time of our survey.

find similar firms in similar cities in all five countries.[6] The sample includes about 300 manufacturing firms with between seven and 270 employees in each country; the total sample size for most variables is about 1400 observations. Some of the firms were started from scratch and others were spun off from state enterprises. In our sample for Poland, Romania and Slovakia, startups far outnumber spinoffs; in Russia and especially Ukraine, spinoffs predominate. This probably reflects characteristics of the population of firms. Appendix C summarizes our key questions about finance, profits, investment, and property rights.

Internal finance

Initial entrants in transition economies often earn large profits, which fall over time as new firms enter (McMillan, 1997). Our data are consistent with this at the country level. Table 1 shows the firms' average profit after taxes as a percent of sales in 1996. Reported after-tax profits are much higher in Russia (21%) and Ukraine (18%), where there has been the least progress with economic reform, than in Poland (10%), where the transition has progressed much further. Romania is in between (13%). Slovakia appears to be the outlier in this pattern, with profit rates much lower than in any of the other countries (6%).[7] Managers were also asked to estimate profit rates after taxes in their industry, as a percent of sales. These estimates, also shown on Table 1, indicate a similar pattern, but with less variation across countries.

Throughout, we use the reported rate of profit as a proxy for the firm's cash flow available for reinvestment. In reality, profits and cash flow may diverge for a number of

[6] All of the firms were going concerns at the time of the survey, and hence the sample has the usual bias of omitting failed firms. We examine the reinvestment of profits conditional on survival.

[7] Responses to own profits were provided in categories. Appendix B provides some details on how the numbers on Table 1 were calculated from these responses. The profit data are also compared in the appendix to data from the National Survey of Small Business Finance, conducted in 1993 in the United States among similarly sized firms (Federal Reserve Board of Governors, 1994).

reasons, in particular depreciation. However, information on depreciation recorded by the firms is not available from the survey.

We also asked what fraction of 1996 profits after taxes were reinvested in the firm. Polish and Romanian firms reinvested the highest fraction, slightly more than 50% on average. Reinvestment rates average about 40% in Slovakia and Russia, and 30% in Ukraine. We combine the firm's profit rate as a percent of sales with reinvestment as a percent of profits to compute each firm's internally financed investments as a percentage of its sales. These data show that reinvested profits exceed 5% of annual sales in every country except Slovakia.[8] We also compute the profits entrepreneurs choose not to reinvest in their businesses. Unreinvested profits are highest in Russia and Ukraine, where they exceed 10% of sales, and lower in Romania (5.9% of sales), Poland (5.2%) and Slovakia (5.1%). By this measure, then, entrepreneurs in Russia and Ukraine are the most reluctant to reinvest their profits.

Table 1 also divides these data into startups and spinoffs. Startups are more profitable than spinoffs in all five countries, though the difference is much greater in Poland and Romania than in the other three countries. Startups reinvest a greater proportion of their profits than spinoffs in Poland, Slovakia and Romania.

External finance

The survey contains three indications of access to external finance. First, we asked firms what their sources of startup capital were. A minority of firms, ranging from 6.6% of Polish firms to 27% of Slovakian firms, obtained part of their startup capital from bank loans (see Table 2). Second, we asked whether they have obtained a loan at some point in the past. Over 90% of Russian firms and 79% of Ukrainian firms say they have received loans. Only half of Slovakian and Romanian firms have had a loan at some point in the life of the enterprise. Third, we asked whether they obtained loans from

[8] See Appendix B for the details of these calculations as well as some caveats to their interpretation.

banks in 1996, the year before the survey. The greatest percentage of current borrowers was in Poland, where just under half (49%) of firms said they had loans in 1996.[9] About a quarter of firms in Slovakia and Romania said they had loans in 1996, with lower percentages in Russia (17%) and Ukraine (14%).[10]

More than 75% of firms in each of the countries – and more than 90% of firms in Poland and Romania – say they were able to offer collateral to banks. At least in the minds of managers, a lack of collateral does not appear to be a major constraint a borrowing.[11]

An alternative source of external funds is credit received from other firms. We measure trade credit by the level of accounts payable reported by firms (Table 2). Trade credit is almost non-existent in Russia (0.1% of annual sales) and is low in Ukraine (0.7%), but is an important source of capital in Poland (2.7%) and Slovakia (3.4%). Credit received from suppliers is comparable in size to credit received from banks in Poland, Slovakia and Ukraine. Reliable data for this question are not available for Romania.[12] In Johnson, McMillan, and Woodruff (1999a) we find that firms are more willing to grant trade credit when their managers believe that courts are effective.

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[9] Even the Polish numbers suggest an under developed financial market. 83% of similarly sized manufacturers in the National Survey of Small Business Finance, conducted in the US in 1993, reported having a loan. See Appendix B for more discussion of the NSSBF data. Although fewer firms in Russia and Ukraine received loans than in the other three countries, the average loan size was larger there. Loans average less than 5% of a borrower's annual sales in Poland, more than 10% of annual sales in Slovakia and Ukraine, and almost 25% of annual sales in Russia. As a result, the variation across countries in the total funds provided by banks is small. Including firms who do not receive loans, Slovakia firms received the most credit in 1996, 2.5% of annual sales. In Poland and Russia, finance provided by banks represents 2.3% of annual sales, in Romania 1.7% and in Ukraine 0.8%.

[10] Real money supply in Russia and Ukraine fell dramatically between 1991 and 1996, which would account for credit becoming harder to get in these two countries.

[11] While the response rate to the collateral question was more than 99% in Romania, it was only 76% in Ukraine and 61% in Russia. If nonrespondents are less likely to have collateral, then the numbers in Table 2 may overstate the availability of collateral in Russia and Ukraine. Still, as lower bound (taking all nonrespondents as having no collateral), the survey indicates that more than half of firms in Russia (53%) and Ukraine (57%) are able to offer collateral.

[12] Apparently respondents misunderstood what we were asking. This question may not have been translated properly.

Profit reinvestment is a bigger source of investment capital than either bank funds or trade credit in all 5 countries (compare Tables 1 and 2). In Poland, firms internally generate investments averaging 5.3% of sales (Table 1). Bank loans average 4.8% of sales for firms receiving loans and 2.3% of sales for the whole sample in Poland. By contrast, we estimate that firms in Russia and Ukraine have unreinvested profits averaging 12% of sales (Table 1). This suggests that the Russian and Ukrainian firms could have used their unreinvested profits in productive projects, but for some reason they chose not to. The potential for using retained earnings as a source of capital is seen from the fact that in, all five countries, the capital available from unreinvested profits exceeds the capital provided by the banking sector.

Property rights

A firm's returns are affected both by the portion of earnings captured by bureaucrats, and by the efficiency with which commercial disputes are resolved. Table 3 shows that by either of these two categories of security of property, the five countries fall into two distinct groups: the three east European countries, and the two former Soviet Union countries. Courts are less reliable in resolving commercial disputes in Russia and Ukraine, and interactions with the government are also more costly in these countries.[13]

The manager's beliefs about the security of property are indicated by several survey questions. We asked managers first whether firms in their industry make "extralegal payments" for government services, and second whether firms in their industry make "extralegal payments" for licenses. As firms are understandably reluctant to reveal the level of their payments to the government, we phrased questions about these payments in terms of payments typically made by "firms in your industry." More than 90% of the Russian managers and almost 90% of Ukrainian managers answered

[13] See Frye and Shleifer (1997) for further evidence that Poland's regulatory environment is less hostile to business activity than Russia's.

affirmatively to these questions (see Table 3). Only one in five managers in Poland and Romania said that firms make extralegal payments for services or licenses. Note that the response rates for these questions are well above 98% in the three Eastern European countries, but are 40% or less in Russia and Ukraine.

Third, we asked whether firms make payments for "protection" of their activities, finding a similar pattern of responses across the countries (Table 3). We chose not to ask directly about whether firms made payments to organized crime, because our pilot interviews indicated that most entrepreneurs would not admit this. However, the indirect question probably picks up whether a firm believes it is likely to be subject to extortion by some form of mafia.

Using courts to enforce contracts with trading partners is a logically distinct activity from protecting property rights. Nevertheless the effects on investment are similar. Inadequate contractual enforcement could put firms' profits at risk and make them reluctant to invest. Asked whether courts could be used to enforce an agreement with a customer or supplier, most firms in all of the countries said they could. Affirmative answers to this question ranged from 87% in Romania to 56% in Ukraine (see Table 3). Spinoffs were more likely than startups to say courts could be useful in Slovakia, Russia and Ukraine. There was no difference in the response to this question among privatized and start-up firms in Poland and Romania. (For more on the role of the courts in enforcing contracts, see Johnson, McMillan, and Woodruff, 1999a.)

Table 4 shows the correlations among our property-rights measures for individual firms in all five countries. Not surprisingly, most are highly correlated. Extralegal payments for services and extralegal payments for licenses have a correlation coefficient of 0.66, while the correlation between payments for "protection" and either of these measures is larger than 0.50. For the regressions, we combine the three property-rights questions—extralegal payments for licenses, extralegal payments for services, and paying for protection—into an index of property-rights security for each firm. The property-

rights index we construct ranges from 0 to 3, with 0 indicating that the managers said all three payments were common, 1 indicating an affirmative response to two of the payments, and so on, so a higher index number represents more secure property rights.

This index of property-rights security is additive. An alternative index would equal one if firms make any one of the three types of payments and zero otherwise. Either of these indexes can be justified theoretically. The additive index is appropriate if responding affirmatively to more than one question represents a greater level of insecurity than responding affirmatively to only one. The either/or index is appropriate if one bribe-taker has the same effect as multiple bribe-takers. According to the model of Shleifer and Vishny (1993, 1998), if two or more corrupt bureaucrats coordinate so as to maximize their total bribes, they will extract the same total amount as a monopoly extortionist. If they compete with each other, however, their total bribes will, by prisoners'-dilemma logic, exceed the bribe-maximizing amount. Some evidence on whether bribe-takers coordinate will come from whether the additive index explains the data better than the either/or index. The data show the effects of corruption are additive, as discussed below, suggesting that total bribes rates might exceed what even the bribe-takers would want.

A belief that courts are not effective in enforcing contracts is positively correlated with the corruption measures, but the correlation is smaller. The correlation between courts and the index of property rights is 0.15. In the regressions, we use the effectiveness of courts along with the index of property rights. We also run regressions using the components of the index separately, as well as using the variable measuring unofficial payments for ongoing registration, fire/sanitary and tax inspection. Finally, an alternative index of property rights that we use in the regressions, ranging from 1 to 4, adds to the first index the measure of the ineffectiveness of courts.

For further measures of property-rights security, we asked managers whether they make "unofficial" payments for specific services: payments for renewing their business

registration, and payments to fire, sanitary, and tax inspectors (Table 3). Though the response rates to these questions are lower, the pattern is the same. A majority of managers in Russia and Ukraine say such payments are common, while a minority of managers in the other three countries say the same. We use these specific corruption measures in variants of the basic regression.

Official payments to government are also higher in Russia and Ukraine, where tax payments are more than one quarter of sales, compared to about a sixth of sales in Eastern Europe.[14]

As yet another check on our property-rights measures, we asked managers whether they would invest $100 today if they expected to receive $200 in two years. The response to this question gives an indication of both the opportunity cost of money and the security of property. At a cross-country level, the responses are consistent with, and are strongly correlated with, our property-rights measures (see Tables 3 and 4). Between one-fourth and one-sixth of Eastern European managers would not make such an investment, while a striking 99% of Russian and Ukrainian managers would not.

Managers' perceptions of the security of property rights may vary within a country for three reasons. First, different firms may face different realities. Interaction with the government may be more frequent in some industries than in others. Activities may vary in the ease with which they can be hidden from government bureaucrats. And some managers may have connections that allow them to avoid extortion. In our data, for example, managers who previously worked as high-level managers in state owned enterprises are less likely to say that bribes are paid. Second, managers may differ in their perceptions. This is especially likely in an economy undergoing deep reform, where

[14] We asked managers to report taxes as a percent of total sales. Firms in Eastern Europe and the former Soviet Union routinely underreport sales to avoid taxes and extortion (Johnson, Kaufmann, and Shleifer, 1997). In separate questions, managers indicated that the percentage of sales hidden by firms in their industry is about 41% in Ukraine, 29% in Russia, and around 6% in the other three countries. It may be that some managers reported taxes and profits as a percent of official sales rather than total sales. If so, then the tax burden and profit rates will be overstated, especially for Russia and Ukraine. These issues are discussed at length by Johnson, Kaufmann, McMillan, and Woodruff (1999).

institutions and circumstances change quickly. We find, for instance, that older managers are less likely to say bribes are paid. Third, the responses may reflect some unmeasured characteristic of the firm or the manager.

3. Investment Decisions

A firm's desired investment level is a function of both industry and firm-specific factors. Firms in growing industries are faced with more investment opportunities than firms in declining industries. Production in a capital-intensive industry also necessitates higher investment levels. More able managers will find investments more profitable in any industry. All of these factors affect the profitability of potential investments.

Investment demand also depends on the ability of entrepreneurs to retain any profits they make. Entrepreneurs may be unwilling to invest when returns are insecure. The effect of managers' perceptions of property rights on investment decisions is the main issue we want to explore. Suppose that the firm makes its investment and borrowing decisions simultaneously, and extortion, if it occurs, comes after any profits are realized, so that firm's demand for investable funds is given by

(1) $$I^d = I(p, s, r),$$

where p represents expected (pre-extortion) profits, s represents the amount of those profits that will be extracted by corrupt bureaucrats or criminals, and r represents the cost of funds (either the interest rate the entrepreneur pays on borrowed money or the interest rate the entrepreneur can earn by investing the firm's profits outside the firm). Investable funds may be obtained either internally from retained earnings or externally through credit markets. Thus:

(2) $$I^d = R + L^d,$$

where R represents reinvested earnings and L^d the firm's demand for loans.

We adopt a pecking-order model of investment, with firms first using internal funds and seeking external funds only after the internal funds are exhausted. One reason

firms might prefer internal to external finance is that, since managers have better information about their prospects than outside lenders or investors, firms must pay a premium on funds received from outside (Myers and Majluf 1984, Shyam-Sunder and Myers, 1999). Such asymmetric information problems are probably much worse in transition economies than in developed market economies, because information sources are missing and investment uncertainties are greater. Moreover, firms in transition economies have another reason to prefer internal financing. External financing makes it hard for firms to hide their activities from tax collectors or the mafia. The effective cost of external finance in Russia is increased, according to Meyendorff (1998), by the fact that firms that apply for a bank loan are more likely to have to pay their taxes; and according to Lotspeich (1996), firms are reluctant to disclose information to banks for fear it will be leaked to the mafia. Given these conditions, we propose the pecking-order model as a reasonable framework in which to examine the investment decision.

We represent the pecking-order hypothesis by supposing that firm i has a maximum amount of money that it is willing to reinvest out of its current profits, E_i; this might be the total current profit, or it might be strictly less than that. We assume E_i depends on manager-specific characteristics. Then the pecking-order hypothesis says:

(3) $$I^d = R, \qquad \text{if } I^d \leq E_i$$
$$I^d = E_i + L^d, \qquad \text{if } I^d > E_i$$

This gives us the main equation we will estimate, relating the firm's willingness to reinvest its profits to its expected profits and the security of its property rights:

(4) $$R = I(p, s, r), \qquad \text{if } I^d \leq E_i$$
$$R = E_i, \qquad \text{if } I^d > E_i$$

So far we have modeled the firm's investment from retained earnings. Now consider the demand and supply of loans. If firms exhaust internally generated funds before seeking loans, then loan demand will be inversely related to the firm's unreinvested profits. Loan demand may also depend on the characteristics of the firm's

industry. By the pecking-order hypothesis, the firm will seek a loan only if its demand for investment exceeds the amount it has available for reinvestment from profits. That is:

(5) $$L^d = 0, \quad \text{if } I^d \leq E_i$$
$$L^d = I(p, s, r) - E_i, \quad \text{if } I^d > E_i$$

The willingness of banks to lend, on the other hand, depends on the firm's collateral and creditworthiness. We know from the survey if a firm has received loans in the past, and we use this as an indication of creditworthiness. Also, we might expect banks to be more willing to lend to profitable firms (although, given the difficulty of gathering information and the extent to which activity is hidden, it is less clear that profitability is a factor in loan decisions in Eastern Europe than it might be in an economy with a well-developed legal system and reporting requirements). We assume that banks' lending decisions give rise to a loan-supply function:

(6) $$L^s = L^s(c, p, s, L_{-1}, r, m),$$

where c represents the collateral the firm has available to underpin the loan (and L^s is zero if c is zero), L_{-1} is previous loans received by the firm, and m represents various manager and firm characteristics. Assuming that the loan market clears, we get a reduced-form loan equation by putting $L^d = L^s$, or

(9) $$L = L(c, p, s, L_{-1}, r, m, R).$$

This is the second equation we will estimate.

The usual analysis of finance in eastern Europe and the former Soviet Union attributes the relative paucity of loans to supply constraints resulting from the inadequacy of the banks. To obtain equation (9), however, we assumed that the supply of loans equals the demand.[15] Contrary to the usual analysis, our claim is that we see little loan activity in these countries not (or not only) because there is an unsatisfied demand for loans but because demand is low. That the firms' investment demand is low is suggested

[15] Note that the assumption of market clearing for loans is used only in equation (9) and therefore underlies only the second of our estimation equations; the first estimation equation holds regardless of loan supply.

by the size of their unreinvested profits, which amount to 12% of sales in both Russia and Ukraine (see Table 1). If in fact loans are supply-constrained, then in estimating equation (9) we are simply estimating the loan-supply function; if so we will find demand factors to be insignificant. On the other hand, both demand and supply factors being significant is consistent with the loan market clearing.

4. Internal vs. External Finance

We run two sets of regressions. In Section 5, we examine the determinants of the firm's decision to reinvest from its profits (equation (4)). The main hypothesis is that firms reinvest less if they perceive their property rights to be insecure. We also ask whether reinvestment is affected by expected profits and by the level of taxes and other payments to the government. In Section 6, we examine the determinants of bank loans, asking whether receiving a loan is associated with supply factors—collateral and reputation represented by prior loan history—and demand factors—primarily unreinvested profits (equation (9)).

We are primarily concerned with the effect of corruption on investment demand. The pecking order hypotheses suggests that insecurity of property rights should have the greatest impact on the firms' reinvestment decisions, since firms apply for loans only after exhausting internal sources of funds. The pecking order also suggests that, structurally, the reinvestment equation should be estimated independently of the bank loan equation. The regressions allow us to estimate how much investment is deterred by insecure property rights, and whether bank loans reflect supply and demand factors. By estimating both equations, our regression results also enable us to check whether the data are consistent with the pecking-order hypothesis that underlies equation (4). There are two alternatives to the pecking-order hypothesis.

First, entrepreneurs for whom property rights are insecure may prefer to invest bank funds in their businesses and to divert internally generated funds to more secure

accounts. This implies that firms receiving loans should invest, on average, a lower proportion of their own profits than firms without loans. The data suggest this is not the case. Among profitable firms (those with profits 10% or more of sales) who are investing less than half of their profits, loans are infrequent. Only 64 of 476 (13%) of these firms received loans in 1996. On the other hand, 306 out of 858 (36%) other firms received loans. We will find in Section 6's regressions an inverse relationship between the level of unreinvested profits and the probability the firm has a bank loan. Furthermore, if firms prefer to invest from loans rather than from profits, we should expect to see this preference be more marked when property rights are more insecure, because with loans it is the bank's money that is at risk. Consistent with the pecking-order hypothesis, the regressions in Section 6 find no association between the security of property rights and the probability of receiving a loan, controlling for investment demand.

A second alternative to the pecking-order hypothesis is that the firm prefers reinvesting profits to obtaining a loan, but (at least in some sectors) investment is lumpy and the minimal investment is larger than retained earnings can accommodate (Rajan and Zingales, 1998). Given the level of technology used by small-scale manufacturers in these countries, however, it seems unlikely that investments are lumpy. Moreover, Table 5 shows that 35% of firms without loans in 1996 reinvested half or more of their profits, indicating that the lack of external finance does not preclude internally funded investment. (By comparison, 53% of firms with loans in 1996 invested half or more of their profits.) Further evidence on this comes in Section 5, where we use a firm's ability to offer collateral as an instrument for loans in the reinvestment equation. If investments are lumpy then reinvestment should be positively associated with collateral; we find no significant interaction.

5. Determinants of Profit Reinvestment

Security of property is positively correlated with profit reinvestment rates at the country level, as we saw in Section 3. Reinvestment rates are highest in Poland and Romania, where extralegal payments and payment for protection are lowest and the reliability of the courts is highest. Reinvestment rates are lowest in Ukraine and Russia, where extralegal payments are highest and courts less effective. Reinvestment rates are affected, however, by factors other than property rights. In this section, we estimate the reinvestment-demand equation (4), with the percentage of its profits a firm reinvests as the dependent variable and our property-rights indices as independent variables. Our data on reinvestment rates are categorical rather than continuous, and hence we use ordered probit regressions. We control for factors affecting investment demand other than property rights—the industry profit rate, the age of the firm, access to external finance (represented by whether the firm had collateralizable assets), manager characteristics, and other industry effects.

Table 6 presents the results of these regressions. There are six categories of responses to the reinvestment question, increasing in the rate of reinvestment (see Appendix C). A positive coefficient indicates that an increase in the level of the independent variable increases the chance that a firm is in a higher reinvestment category. We exclude from the regression sample firms that had zero or negative profits in 1996, since we are unable to measure their reinvestment rate. We also exclude firms not operating at the start of the year in 1996. Both startups and spinoffs are included in the initial regressions.

The regression reported in the first column of Table 6 includes our two primary property-rights variables: the index of property rights and the measure of the effectiveness of courts. Both variables are negative and significant at the 0.01 level.[16]

[16] We treat property rights as exogenous to the investment decisions of our firms. Besley (1995) presents a model in which property rights are endogenously determined by the level of investment. Very large firms in these transition countries may also endogenously create property rights by becoming 'too big to fail.'

Additional controls for investment demand are the manager's estimate of the industry profit rate and 9 industry dummy variables. As expected, firms in more profitable industries invest more.[17] The regression also controls for the age of the firm and whether the firm is a startup.

Our index of the security of property rights is additive. An alternative index would take a value of one if firms make any one of the three types of payments, and a value of zero otherwise. As discussed above, either of these indexes can be justified theoretically. The additive index explains the data better. The either/or index is significant (β=0.27, t=3.48), but has a lower t-value and results in a lower χ^2 (60.8 vs. 65.4 with the additive index).[18] These results suggest that the effects of corruption are additive, perhaps because multiple affirmative responses indicate stronger convictions on the part of the manager. Alternatively, the better performance of the additive index may indicate that those extracting payments do not coordinate their activities, consistent with the model of Shleifer and Vishny (1993).

The first regression does not control for country effects. Since much of the variance in security of property rights is across country rather than within country, this measures the full effect of property rights. However, there may be other factors that vary across countries and affect the demand for investment. If so, then these other country-level effects will be correlated with our measures of property rights. The regressions in Columns 2-10 control for differences in each industry in each country using 39

However, given the small size of the firms in our sample, we believe it is more appropriate to treat property rights as exogenous.

[17] We use the manager's estimate of industry profits rather than the firm's own profits because we believe the former are more likely to represent the expected profits from new investments. Additionally, own profits may be determined in part by reinvestment, creating endogeneity problems. Nevertheless, when we rerun all of the regressions on Table 5 with own profits replacing industry profits, we find that own profits are significant everywhere industry profits are. The property rights index and courts results are not affected.

[18] Moreover, the additive index can be used to create four dummy variables, the first representing an index value of zero, the second an index value of one, and so on. When dummies representing index values of zero, one, and two are used in place of the index (with the value three being the base group), the coefficients are –0.15, -0.28 and –0.44, respectively. The gives another indication that the additive index best explains the data.

country/industry dummy variables. We include interacted controls because the factors affecting investment demand in the food industry in Poland, for example, may differ from factors affecting investment demand in the food industry in Russia. Neither the index of property rights nor the reliability of the courts is affected by the inclusion of the country/industry dummies.[19]

The regressions in Columns 2-10 also include a set of four variables measuring manager characteristics. These variables measure the age, years of schooling, and prior work experience of the manager. The two work experience variables indicate whether the manager previously was a high level manager in a state-owned enterprise and whether the manager has prior experience in the private sector. The coefficients of these controls for manager characteristics (not shown on Table 6) indicate that investment rates are higher for younger managers (β=-0.01, t=2.65 in the Column 2 specification) and managers who were previously high level managers at state owned enterprises (β=0.24, t=2.64 in the Column 2 specification). Education and private sector experience have no significant effect.

Columns 3 and 4 split the sample into firms that are startups and those that were spun off from a state enterprise. For startups, the coefficients are similar to those obtained for the whole sample, though the measure of courts is not significant at the 0.10 level. Moreover, the manager's estimated profit rate for the industry is significant at the 0.10 level among startups. Among spinoffs, both of the property rights variables have the expected sign, though neither is significant. The industry profit rate is significant, but is not the expected sign. There are significant differences between the behavior of spinoffs and startups, with the regressions doing a better job explaining the behavior of startups. Given that most of the spinoffs underwent downsizing after being privatized (Johnson, McMillan and Woodruff, 1999b), other factors may play an important role in determining

[19] Because response rates were lower in Russia and Ukraine, only 14% of the observations in the regressions are firms in those countries. This may explain why the country controls have only a small impact on the property rights variables.

reinvestment rates for these firms. For the remaining regressions, we limit the sample to startup firms.

Our framework assumes that internal funds and external funds are substitutes for one another. It is possible, however, for internal and external funds to complement one another. If investment projects are lumpy, then firms may need outside finance in order to undertake investment projects at all. In this case, those not receiving loans would not invest internal funds either. We cannot include a direct measure of whether the firm has a loan because the latent variable investment demand determines (at least in part) both reinvestment of profits and demand for loans. Instead, we test for the importance of loans by instrumenting for access to current loans with the availability of collateral. We find no significant effect (Column 5). The inclusion of the collateral variable has little impact on the magnitude or significance of the index of property rights. However, the variable measuring the reliability of courts is now significant at the 0.10 level.

Higher taxes may also reduce investment demand. Column 6 adds the manager's estimate of industry tax payments as a percent of sales. We find no significant effect of taxes on investment demand. The lack of significance may only reflect a lack of variance in taxes across firms, since statutory tax rates vary only across countries. Alternatively, perhaps it is the secrecy and unpredictability of the unofficial payments, rather than just the fact that some profits will be taken, that discourages firms from investing. In either case, the inclusion of the tax payment variable has little impact on the other coefficients (compare with Column 3).

The regression in Column 7 uses an alternative index of security of property rights. The alternative measure is an index ranging from one to four that adds to the original index the lack of effectiveness of courts. As with the original index, a higher value represents less secure property rights. The four-factor index has the expected negative sign, and is significant at the 0.01 level.

Last, we divide the sample by region, first considering investment among startups in Poland, Slovakia and Romania (column 8), and then considering all firms in Russia and Ukraine (column 9). (The number of startups with non-missing responses in these two countries is too small for us to use only startups in this regression.) The two property-rights measures both have the expected sign in the three Eastern European countries. The index is significant at the 0.01 level; the significance of the effectiveness of courts falls below the 0.10 level. In Russia and Ukraine, the effectiveness of courts is significant. The index of property rights is not included in this regression because there is not enough variation in the index in the Russia/Ukraine sample to make the results meaningful. (Only three of 116 firms in the sample answer "no" to any of the three questions in the index).

Table 7 reports regressions that use the components of the index one at a time, as well as regressions using variables measuring unofficial payments for ongoing registration, fire/sanitary and tax inspection. We use the sample of startups in these regressions. Among the elements of the index, payment for services and payment for protection are both significant at the 0.10 level or better (Columns 1 and 3, respectively).

Columns 4 to 6 of Table 7 replace the components of our index with the responses to questions about bribes paid for specific services. All three types of bribes—payments for ongoing registration, payments for fire/sanitary inspection and payments for tax inspection—are negatively and significantly associated with reinvestment levels. The sample size in these regressions varies and is smaller than the other regressions because the response rate for these questions is generally lower. The trust-in-courts variable has the correct sign in all of the regressions reported on Table 7, though it is not significant in many of the specifications.

The ordered probit coefficients represent changes in the probabilities of being in each category of investment. Hence, giving an economic interpretation of their magnitude is difficult. To gain a better picture of the effect of property rights on investment, we

calculate the probability of being in each investment category conditional on different values of the property rights index. We use the regression reported in Column 7 of Table 6, incorporating the four-point security index. The results are shown on Table 8. The bottom row of the table shows the weighted average reinvestment rate for each value of the index, using the midpoint of each reinvestment category. Firms with the most secure property rights (those with an index value of four) have an average predicted reinvestment rate of 55.1%; those with the least secure property rights have an average predicted reinvestment rate of 33.5%. Insecure firms' investment is 39% lower than that of the most secure firms.

The estimated impact of corruption in our data is roughly similar to that estimated in cross-country regressions. Mauro (1995) finds that a one standard-deviation improvement in his corruption index is associated with a 3% increase in a country's investment/GDP ratio. Since the average investment/GDP ratio in Mauro's sample is 0.21, this represents an increase in the rate of investment of 14%. A one standard-deviation increase in our four-level security index (albeit a different index from Mauro's) is associated with an increase in the reinvestment rate of 6.5 percentage points, which is also 14% of the sample-mean reinvestment rate.

Our regression coefficients may understate the effects of property-rights insecurity. Since our regressions look at the determinants of firms' marginal investment decisions in their current lines of activity, we cannot pick up possible intersectoral distortions. For example, certain industries might be especially susceptible to extortion (Choi and Thum, 1998); the insecurity of property rights might cause entrepreneurs to shun those industries. If capital is more susceptible to extortion than labor, weak property rights may also cause production to be inefficiently labor-intensive. Since we surveyed existing firms, our sample omits both failed firms and potential firms that were deterred

from entering. Both failure and the decision not enter presumably reflect the insecurity of property rights.[20]

In summary: Weak property rights have a consistently negative effect on reinvestment in the regressions. The index of property rights is significant in all but the sample of spinoffs. The measure of trust in courts is less robust in showing an effect on reinvestment, but is significant when the full sample is used.

6. Determinants of Loans

We next estimate equation (9), a reduced form equation representing the loan market. The dependent variable is a dummy representing whether the firm received a loan in 1996, which is estimated as a function of supply factors—collateral and prior loan history (which presumably proxies for the borrower's reputation)—and demand factors—primarily unreinvested profits. Most of the regressions also include the age of the firm, the number of employees at the end of 1994 and a set of dummy variables controlling for industry, country, and manager characteristics.

Table 9 presents a series of probit regressions. The dependent variable is one if the firm received a bank loan in 1996, and zero otherwise. The first regression controls only for supply factors—whether the firm offered collateral and whether the firm received a loan at any time before 1996. The coefficients in Table 9 represent the marginal effects of a change in the independent variable on the probability of receiving a loan. Firms with collateral are 25% more likely and firms with prior loans 14% more likely to have received a loan in 1996. We also control for firm age and size, with the latter measured as the log number of employees at the end of 1994. Larger and older firms are more likely to have received loans in 1996. Startups and spinoffs are equally likely to have obtained a loan, conditional on other characteristics.

[20] Evidence is given in Johnson, McMillan, and Woodruff (1999b) that Russia and Ukraine have seen less entry than might reasonably have been expected.

The first regression includes industry controls but no country controls. The addition of country/industry controls (Column 2) has modest effects on the results, though firm age is no longer significant. Column 3 adds the firm's unreinvested profit as a percentage of sales and the manager's estimated industry profit rate. The pecking order hypothesis implies that unreinvested profits should be treated as an exogenous variable, since firms are presumed first to exhaust internal sources of finance and then to seek loans. Consistent with this framework, the regression in Column 3 shows that firms with higher levels of unused internally generated funds are less likely to have received a bank loan in 1996. This indicates that credit market outcomes in these five countries are affected by the demand for loans.

Columns 4 and 5 split the sample into startups and spinoffs. The coefficients of collateral and previous loan history have similar magnitudes in the two subsamples. The measured effect of higher unreinvested profits also is of similar size in the two regressions. Industry profits are unexpectedly negative and significant in the privatized subsample, indicating that spinoffs in low-profit industries are more likely to have received loans. Column 6 uses the startup sub-sample and adds the index of security of property rights. Security of property has no direct effect on the probability of obtaining a loan.[21] Finally, the last two columns divide the sample geographically. Column 7 uses only startup firms in Poland, Slovakia and Romania. The results are similar to those for the whole sample in Column 6. Column 8 uses all firms in Russia and Ukraine. Collateral has a positive and significant coefficient. The only other significant coefficient suggests that firms with loans prior to 1996 were less likely to have received loans in 1996. Only 9% of the firms in Russia and Ukraine reported having a loan in 1996. (This may be as

[21] There are a large number of missing responses for the property-rights index, particularly in Russia and Ukraine. We have chosen not to limit the sample in the regressions shown in the other columns by eliminating observations where data underlying this index are missing. As a result, the sample used in Column 6 differs from that in the other columns, and the results are not directly comparable. Any difference in the coefficients results from the different sample. The inclusion of the property-rights index has no effect on the other variables when the same sample is used.

small as it is because of the prevailing macroeconomic conditions in those countries, with the real money supply having fallen drastically. As noted, most of the Russian and Ukrainian firms had received loans in an earlier year.)

In summary: a firm is more likely to receive a loan if it holds collateral, if it has received a loan in the past, or if it is larger than average.[22] Also, a firm with more unused internally generated funds is less likely to receive a bank loan. There is no significant relationship between security of property and receiving a bank loan. These last two results are consistent with the pecking-order hypothesis (as discussed on Section 3). Loans are associated not only with supply factors (collateral, past loans) but also with a demand factor (unused internal funds).

7. Conclusion

Both our cross-country data and firm-level regressions provide evidence that the investment decisions of firms are affected by the perceived security of property rights. Reinvestment rates are lowest in Russia and Ukraine, where bribes for government services and licenses are common, firms make payments for protection, and the courts are least effective. Investment rates are highest in Poland and Romania, where property rights are most secure. Our firm level regressions indicate that firms that perceive their property rights to be the least secure reinvest 32% of their profits, while firms with the most secure perceived property rights reinvest 56%. Insecurity of property rights reduces a firm's investment by over a third, all else equal.

Perceived property rights also have an indirect effect on a firm's demand for loans. Firms with higher levels of reinvested profits are less likely to have recently obtained a loan. We find that credit markets appear to function reasonably well in Poland,

[22] Bratkowski, Grosfeld, and Rostowski (1999) similarly find, for a sample of new firms in the Czech Republic, Hungary, and Poland, that loans are significantly associated with collateral and past loans. This is not to say, however, that these countries do not need major financial-market reforms. See for example Meyendorff and Thakor (1997) on financial reforms needed in Romania.

Slovakia, and Romania. The probability of obtaining a bank loan in these countries is a function of collateral, reputation, and the firm's demand for credit. Credit markets appear to function less well in Russia and Ukraine, but even there most firms say they can offer lenders collateral and most have at some time obtained a loan.

Credit has not been essential for private sector development until now in these five transition countries for two reasons. First, especially in Russia and Ukraine, the insecurity of property rights has meant firms had little incentive to invest and therefore little need for external finance. Second, the high profits created by the persistent distortions in these economies meant that firms that wished to invest were able to do so from retained profits.

More than 75% of firms in each of the countries--and more than 90% in Poland and Romania--say they were able to offer collateral to banks. While the regressions indicate that having collateral significantly increases the likelihood of receiving credit, the lack of collateral does not appear to have been a binding constraint on firms' investment.

The banks' willingness to lend might reflect property-rights insecurity; if a firm's property rights are insecure the banks might not accept its property as collateral. Our loan regressions show a significant effect of collateral on loans; but perhaps this coefficient would be still larger if property rights were more secure. One of our loan regressions includes the property-security index, and finds an insignificant effect. However, to test for this effect properly, we would have to know the banks' perceptions of property rights, not the just firms'. If the supply of loans were limited by weak property rights, then this would strengthen the main message of this paper: securing property rights is more urgent than setting up financial institutions.

Although the firms appear to have had little demand for external finance at the time of our survey, they will begin to need access to credit as these economies develop market-supporting institutions. This is because legal and bureaucratic reforms increase

the demand for investable funds by solidifying property rights; and because profits will be driven down to normal levels as transaction costs fall and market competition increases, so investment will not be sustainable from internal funds.

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Appendix A: The Sample and the Survey

The data reported here are from surveys undertaken in Russia and Ukraine in May and June 1997, and in Poland, Romania and Slovakia in September-December 1997. Pilot surveys were undertaken in Russia and Ukraine in January-February 1997, in Poland and Slovakia in March 1997 and in Romania in August 1997. The sample of about 300 firms in each country was drawn from a list provided by the country's official statistical office. In order to increase the cross-country comparability of the sample, the initial selection was limited to one medium-sized city in each country: Katowice (Poland), Brasov (Romania), Bratislava (Slovakia), Volgograd (Russia) and Dnepopetrovsk (Ukraine). Only in Slovakia did we have trouble identifying a large enough sample of firms meeting the our size criteria who were willing to participate. In the final sample, about one-quarter of the Slovakian firms are located in Bratislava, one-quarter in Kosice, and the remaining half are spread across seven other cities. Participation rates were high among the firms contacted—in excess of 70% in Poland and Romania, and 68% in Slovakia. We believe the resulting sample is reasonably representative of small and medium-sized manufacturing firms in each country, though it is not a census.

Appendix Table 1 provides a summary of the characteristics of firms in the sample. Most were started in 1990 or after; many within 3 years of the survey. Only in Poland was a significant share of the firms started before 1988. The majority of firms in Russia and Ukraine were privatized, or spun off from state-owned enterprises; the majority in the other three countries started from scratch, with none of their equipment coming from state-owned enterprises.

At least 85% of the managers in each of the countries report that they have previous experience working in a state enterprise. Previous work experience in the private sector is much more common for startup firms than spin-offs. At least 29% of startup managers have prior private sector experience in every country except Romania.

In all five countries the educational background of managers is similar; the average amount of schooling is 15-16 years everywhere.

Measured by employment, in all five countries spinoffs were much larger in their first year of operation than the startups. The startups were smallest at birth in Slovakia and largest in Poland, though there is not a large difference among the countries in the average size of startups in their first year.

In Poland, Romania and Slovakia, the sample was drawn so that one-quarter of the firms were from the same industry, metal parts and products. Nearly a fifth of the Ukrainian firms and one-eighth of the Russian firms also produce metal products. The remaining firms are spread across manufacturing sectors, as shown in Appendix Table 1.

The survey was administered face-to-face in the local language by interviewers contracted in each country, with responses provided by the general manager or deputy general manager of each firm. The largest part of the survey is a series of questions related to the longest running and newest customer and supplier relationships. There are also sections on the resolution of contract disputes with customers and suppliers, access to formal bank finance, hidden and unofficial payments, and a set of general questions regarding the size and profitability of the firms.

Appendix B: Finance variables

Because of the sensitivity of the questions, managers were asked for profit and reinvestment rates by category. For profits as a percent of sales, the categories were: negative, 0%, 1-10%, 11-20%, 21-40% and more than 40%. For the percentage of profits reinvested, the categories were 0%, 1-10%, 11-25%, 26-49%, 51-75% and more than 75%. The midpoint of each category was used in compiling Table 1. For example, firms reporting profits between 1 and 10% of sales were assigned profit rates of 5% of sales, those reporting profits 11-20% of sales, 15%, and so on. Firms reporting negative profits were assigned a value of –5% of sales and firms reporting profits of more than 40% of sales were assigned values of 45% of sales. Only a small percentage of the firms have profits which are negative (5.2%) or greater than 40% of sales (2.3%).

To benchmark our survey responses, we compare them with data from the National Survey of Small Business Finances (NSSBF), conducted in the United States in 1993 (Federal Reserve Board of Governors, 1994). Of 4637 firms in the NSSFB, 284 are manufacturers with between 10 and 270 employees. The average size of firms in this subsample of the NSSBF is 77 employees, somewhat larger than the average of 55 employees in our sample. The US firms are more likely to report negative profits (23% vs. 5% of the firms in our survey) or positive profits below 10% of sales (60% vs. 35%), and less likely to report profits of 10-20% of sales (8% vs. 40%) or profits of 20-40% of sales (2% vs. 15%). 2% of each sample reports profits in excess of 40% of sales. The average profit rate for US manufactures is 3.4% of sales, lower than each of the countries in our survey. This average is impacted by values in the tails of the distribution. When the US data are recoded to correspond to the categories in our survey, (i.e., profits above 0 and less than 10% recoded as 5%, and so on), the average profit in the sample of US manufacturers is 4.4%.[23]

[23] When manufacturers with less than 10 or more than 270 employees are included, the US profit rates are higher--4.8% using the raw data and 6.5% using the categories.

The higher profit rate found when the US data is recoded to our categories raises the question of whether our estimated profits are similarly biased upward. Two factors account for approximately equal shares of the upward bias in the US estimates. First, the categorical data crops the lower (and upper) tail of the distribution. The average profit rate in the lower tail is much lower than –5% in the US data. Since the lower tail is much smaller in our data, we expect that –5% is a better representation for our data. Second, within each category, the distribution is weighted toward firms with lower profit levels. Thus there are more firms in the US sample earning profits which are 1%-5% of sales than firms earning profits 6%-10% of sales. As a result, using the midpoint of the range overstates the average profit rate in the range. For our data, the number of firms reporting 11-20% profits is as large as the number reporting 1-10%. So we would not expect the midpoint to be biased for the 1-10% group. On the other hand, there are a lower number of firms in higher profit categories in our data, as in the US. In the US data, the averages profit rate of all firms earning 10-20% is 14%, and the average for firms earning 20-40% is 28%. Using these values with our data lowers the average profit rate shown in the first line of Table 1 to 9.4% in Poland, 5.4% in Slovakia, 12.2% in Romania, 19.4% in Russia and 17.0% in Ukraine. Note that the categories do not affect the reinvestment regressions shown on Tables 6, 7 and 9 because responses to the industry profit rate are continuous rather than categorical.

For reinvested profits as a percent of sales, there is another potential bias in our estimates. We obtain the estimate of each firm's internally generated investment as a percent of sales by multiplying estimated profits as a percent of sales by the reinvestment rate. Across categories there is a positive correlation between reinvestment rates and profit rates. If the same is true within categories, then the numbers of Table 1 may understate the reinvestment of profits and overstate the unreinvested profits.

To give some idea of the potential magnitude of the error caused by using the midpoints of ranges, we calculated a lower bound on the unreinvested profits in the five

countries. We did this by taking the lowest value in each range for profits (e.g., 1% for the 1%-10% category) and the highest value in each range for the reinvestment rate (e.g., 10% for 1%-10%). These provide a lower bound on the profit rate, and an upper bound on the reinvestment rate. Multiplying the lower-bound profit rate by 100% minus the upper-bound reinvestment rate provides a lower bound for profits that are not reinvested. The lower bound estimates of unreinvested profits as a percent of sales are 7.5% in Ukraine (compared to 12.3% on Table 1) , 6.7% in Russia (11.7%), 2.7% in Romania (5.7%), 2.3% in Poland (4.8%) and 1.5% in Slovakia (3.6%). The levels in Russia and Ukraine, which certainly underestimate the level of unreinvested profits, are still far above the average level of bank credit in any of the five countries (see Table 2).

Finally, the data on Tables 1 and 2 are unweighted averages of the firms in the sample. Since the loan regressions reported on Table 9 indicate that larger firms are more likely to receive loans, the data may understate the importance of bank credit in these countries. We have also calculated weighted averages for loans, reinvested profits and unreinvested profits, using the number of employees as weights. Employment-weighted data for bank credit and unreinvested profits produce the same pattern as the unweighted data in four of the five countries. In Slovakia, however, employment-weighted bank loans average 3.9% of sales (compared with an unweighted average of 2.5% shown on Table 2) and employment-weighted unreinvested profits average 3.3% of sales. Hence, in Slovakia, the employment-weighted data suggest that bank credit is larger than the level of unreinvested profits.

Appendix C

Relevant Excerpts from the Questionnaire

The purpose of this survey is to gather information on institutional constraints and adaptation in SME Development in Poland/Slovakia/Romania (Interviewer: Read out appropriate country). This study is commissioned by the European Bank for Reconstruction and Development (EBRD) and MEMRB were charged with the responsibility of administering this questionnaire. Results from this survey will assist the Bank to formulate its development strategies towards the SME sector. The information obtained here will be treated as strictly confidential. No accurate financial details are needed, only approximations on the spot and to the best of your memory.

(29) From which source did you get your start-up capital in the beginning and what was the percentage share from each source?

	YES	NO	Percent Share (%)		
1 Your own savings	1	2		**Q 31**	{152-54}
2 Savings of family	1	2		**Q 31**	{155-57}
3 Financing from other private firms or individuals	1	2		**Q 31**	{158-60}
4 Financing from a state enterprise	1	2		**Q 31**	{161-63}
5 A loan	1	2		**Yes Q 30 No Q 31**	{164-66}
6 Issuing shares to the public	1	2		**Q 31**	{167-69}
7 Other: (specify) ……..	1	2		**Q 31**	{170-72}

100%

(30) Where was this loan obtained from? {.....173}

	YES	NO	
1 A State bank	1	2	{207}
2 A Private bank	1	2	{208}
3 A friend	1	2	{209}
4 A family member	1	2	{210}
5 A domestic private firm	1	2	{211}
6 A domestic state firm	1	2	{212}
7 A foreign firm	1	2	{213}
8 Other source: (specify) ……..	1	2	{214}

{.....215}

(183) Even if you never had a contract dispute could you please tell me which of the following third parties can enforce an agreement with a customer or supplier?

	YES	NO	
1 Court	1	2	{707}
2 The national government	1	2	{708}
3 The local government	1	2	{709}
4 A non-governmental organisation (such as a trade association	1	2	{710}
5 Other	1	2	{711}

6 There is no one	1	2	{712}

(184) Even if you never had a contract dispute could you please tell me if there is anyone who assists in arbitrating a dispute or negotiating a settlement with a customer or supplier?

	YES	NO	
1 Local Government Agency	1	2	{713}
2 National Government Agency	1	2	{714}
3 Trade association	1	2	{715}
4 Middleman or wholesaler	1	2	{716}
5 Other	1	2	{717}
6 There is no one	1	2	{718}

(210) What percentage of your time as a top manager is devoted to the following activities:

1 Internal matters: .....% {809-10}
2 External matters with firms: .....% {811-12}
3 Matters related to all levels of government/regulatory: .....% {813-14}
(Including taxes, licences, labour and trade regulations) 100 %

(211) Of the time dealing with other firms, what percent of your time is spent

Dealing with existing customers and suppliers _____% {815-16}
Searching for new suppliers and customers _____% {817-18}
100 %

VII CREDIT

(212) What are your accounts payable as a percentage of monthly sales? .....% {819-20}

(213) What are your accounts receivable as a percentage of monthly sales?.....% {821-22}

(214) Have you ever had a loan/credit from a bank or a formal financial institution?

Yes 1 **Q 216** {823}
No 2 **Q 215**

(215) Even if you haven't had a successful loan application, did you offer the following kinds of collateral

	YES	NO	
Equipment	1	2	{824}
Land	1	2	{825}
Commercial real estate (e.g office or factory space)	1	2	{826}
Residential real estate (e.g apartment or house	1	2	{827}
Other (specify)	1	2	{828}

[GO TO Q VIII FINAL SECTION] {.....829}

Loan/Credit in 1996

(216) In 1996, did you receive credit from a bank or a formal financial institution?

Yes	1	**Q 217**	{830}
No	2	**Q 226**	

(217) How many different banks or formal financial institutions did you receive credit from?
..... {831}

If you borrowed from more than one source, please answer the following questions referring to the bank or formal financial institution that has given you the largest loan.

(218) How large was this credit as a percent of monthly sales?.....% {832-33}

(223) How much collateral did you provide as a percent of the loan .....% {838-9}

(224) What kind of collateral did you provide

	YES	NO	
1 Equipment	1	2	{840}
2 Land	1	2	{841}
3 Commercial real estate (e.g office or factory space)	1	2	{842}
4 Residential real estate (e.g apartment or house	1	2	{843}
5 Other (specify)	1	2	{844}

(225) If you received credit from this bank or financial institution before 1996 in what year did you first get credit from this bank?

(254) It is thought that many firms in your industry, in order to survive and grow, may need to mis-report their operational and financial results. Please estimate the degree of misreporting by firms in your area of activity.

_____ hidden sales as percent of actual sales {1007-09}
_____ hidden salaries as percent of actual salary bill {1010-12}
_____ inputs and materials costs as percent of actual costs {1013-15}
(note: this should be more than 100% if there is misreporting)
_____ reported exports as percent of actual exports {1016-18}
(may be greater than or less than 100%)
_____ reported imports as percent of actual imports {1019-21}
(may be greater than or less than 100%)

(255) How much do firms pay for expert assistance (e.g., accountants, lawyers, auditors, other) in dealing with government regulations per year?

1 Amount (in local currency) ..... [Zolty/Koruna/Leu] {1022-28}
2 Usual percent of turnover ..... % {1029-30}

(256) How much are the following as a percent of sales for firms in your sector

_____% Labour {1031-32}
_____% Materials and other production costs {1033-34}
_____% Taxes {1035-36}
_____% Other payments to the government {1037-38}
_____% Profits {1039-40}
_____% Other {1041-42}
100 %

(257) It is thought that some firms may need to make a payment for "protection" of their activities. Do you think this is generally true for firms in your sector?

Yes 1 {1043}
No 2

(258) How much would a typical firm in your sector be likely to pay per month?

1 Amount (in local currency) ..... [Zolty/Koruna/Leu] {1044-50}

2 Usual percent of turnover ..... % {1051-52}

(259) It is thought that some firms may need to make indirect or direct payments to government officials to obtain permissions, licences and regulations. Do you think this is generally true for firms in your sector?

Yes 1 {1053}
No 2

(260) How much would a typical firm in your sector be likely to pay per month?

1 Amount (in local currency) ..... [Zolty/Koruna/Leu] {1054-60}

2 Usual percent of turnover ..... %

(261) It thought that some firms in addition to official payments for government services, may also need to make unofficial or extralegal payments. Do you think this is generally true for firms in your sector?

Yes 1 {1061}
No 2

(262) Please estimate the size of official and unofficial payments for firms in your sector.

	Official	Unofficial	
1 Phone line installation	.....	.....	{1107-16}
2 Initial enterprise registration	.....	.....	{1117-26}
3 Continuing registration requirements (per annum)	.....	.....	{1127-36}
4 Single visit of fire/sanitary inspector	.....	.....	{1137-46}
5 Quarterly interaction with tax inspector	.....	.....	{1147-56}
6 Production or office space at a state enterprise (per month)	.....	.....	{1157-66}
7 Electricity (per month)	.....	.....	{1167-76}
8 Gas (per month)	.....	.....	{1207-16}
9 Obtaining necessary permissions to export	.....	.....	{1217-26}
10 Border crossing with customs (percent of goods value)	.....	.....	{1227-36}
11 Obtaining permissions to import	.....	.....	{1237-46}
12 Access to credit at lower than market interest rates	.....	.....	{1247-56}

Table 1
Use of Internal Finance

	Poland	Slovakia	Romania	Russia	Ukraine
Number of firms	303	308	321	269	270
1996 profit after taxes, % of annual sales	9.9%	5.7%	12.9%	20.6%	18.0%
Estimated industry profit rate after taxes	11.1%	10.0%	13.4%	17.6%	14.3%
Profit reinvestment, % of profits after taxes	52.6%	42.3%	52.8%	38.8%	29.6%
Profit reinvestment, % annual sales	5.3%	2.9%	7.2%	8.9%	5.7%
Unreinvested profit, % annual sales	4.8%	3.6%	5.7%	11.7%	12.3%
STARTUPS					
Number of firms	237	238	281	128	82
1996 profit after taxes, % of annual sales	10.5%	6.0%	13.4%	20.8%	19.0%
Estimated industry profit rate after taxes	11.3%	9.8%	13.8%	18.3%	14.9%
Profit reinvestment, % of profits after taxes	53.6%	44.8%	54.2%	37.5%	29.4%
Profit reinvestment, % annual sales	5.8%	3.2%	7.6%	8.6%	6.0%
Unreinvested profit, % annual sales	4.8%	3.7%	5.8%	12.2%	12.9%
SPINOFFS					
Number of firms	66	70	40	123	183
1996 profit after taxes, % of annual sales	7.7%	4.6%	9.6%	20.3%	17.7%
Estimated industry profit rate after taxes	10.1%	10.6%	10.5%	17.1%	14.0%
Profit reinvestment, % of profits after taxes	49.0%	33.7%	42.5%	39.4%	29.6%
Profit reinvestment, % annual sales	3.3%	2.2%	4.6%	9.1%	5.6%
Unreinvested profit, % annual sales	5.0%	3.5%	5.0%	11.2%	12.1%

Profit reinvestment as a percent of profits excludes firms with zero or negative profits. In order to make the data more comparable to the external finance data shown on Table 2, we assume that firms with negative or zero profits reinvest zero percent of sales and have unreinvested profits of zero percent of sales. The profit reinvestment as a percent of annual sales is calculated by multiplying profits as a percent of sales by profit reinvestment as a percent of profits. Unreinvested profits as a percent of sales is calculated as profits as a percent of sales times one minus profit reinvestment as a percent of profits. See Appendix B for more detail on the calculations.

Table 2
Sources of External Finance

	Poland	Slovakia	Romania	Russia	Ukraine
Number of firms	303	308	321	269	270
% firms w/ bank loans at startup	6.6%	27.0%	9.7%	15.2%	12.2%
% of firms with bank loans ever	70.0%	51.0%	49.8%	92.4%	79.0%
% of firms with bank loans in 1996	48.8%	27.6%	24.1%	17.0%	13.8%
% of firms with collateral at the time of interview	95.7%	80.8%	94.4%	87.2%	75.5%
Average 1996 loan, % of annual sales					
--all firms (no loan=0%)	2.3%	2.5%	1.7%	2.3%	0.8%
--firms with loans	4.8%	10.6%	7.3%	24.7%	13.4%
Accounts payable, % of annual sales					
--all firms	2.7%	3.4%	NA	0.1%	0.7%
--firms with 1996 loans	2.5%	4.2%	NA	0.04%	0.3%
STARTUPS					
Number of firms	237	238	281	128	82
% of firms with bank loans					
--ever	72.2%	42.4%	46.6%	95.4%	81.9%
--in 1996	50.6%	22.7%	20.8%	12.0%	11.1%
Average 1996 loan, % of annual sales (no loan=0%)	2.5%	2.0%	1.7%	1.7%	1.3%
Accounts payable, % of annual sales	2.5%	3.2%	NA	0.1%	0.9%
PRIVATIZED					
Number of firms	66	70	40	123	183
% of firms with bank loans					
--ever	62.1%	80.0%	72.5%	89.4%	78.5%
--in 1996	42.4%	44.3%	47.5%	21.5%	14.6%
Average 1996 loan, % of annual sales (no loan=0%)	1.5%	4.4%	2.2%	2.8%	0.6%
Accounts payable, % of annual sales	3.2%	4.0%	NA	0.1%	0.7%

Table 3
Security of Property

	All countries	Poland	Slovakia	Romania	Russia	Ukraine
% of managers who say firms make extralegal payments for government services	37.3%	20.1%	38.2%	20.0%	91.2%	86.9%
	1117	298	306	315	114	84
% of managers who say firms make extralegal payments for licenses	37.9%	19.3%	42.2%	17.0%	91.7%	87.5%
	1128	300	303	317	120	88
% of managers who say firms make payments for protection	24.4%	7.9%	14.9%	0.6%	92.9%	88.8%
	1163	302	308	320	126	107
% of managers who say courts cannot be used to enforce contracts	31.6%	27.1%	32.1%	13.1%	44.2%	45.4%
	1470	303	308	321	269	269
% of managers who say they would not invest $100 now to receive $200 in 2 years	49.2%	22.1%	24.6%	16.2%	98.9%	99.3%
	1464	303	308	321	264	268
Tax payments to government as a % of sales for firms in industry	18.9%	15.5%	16.4%	17.2%	26.9%	28.0%
	1130	277	278	321	119	135
% of managers who say firms make unofficial payments for ongoing registration	14.0%	0.4%	3.0%	19.1%	80.0%	76.9%
	805	234	236	267	55	13
% of managers who say firms make unofficial payments for fire/sanitary inspection	19.2%	2.8%	12.1%	21.8%	67.9%	91.2%
	881	254	248	289	56	34
% of managers who say firms make unofficial payments for tax inspection	12.9%	0.8%	2.5%	17.3%	75.6%	85.0%
	843	247	242	289	45	20
Number of respondents	1471	303	308	321	269	270

Note: The number of observations is given below each response level.

Table 4
Correlations of Property Rights Indicators

	Payments for services	Payments for licenses	Payments for protection	Index of property rights	Courts enforce	Invest to earn $200	Taxes as a % of sales	Bribes registartion	Bribes fire/sanitary
firms make extralegal payments for licenses	0.66 (1105, <.01)								
firms make payments for protection	0.52 (1109, <.01)	0.54 (1122, <.01)							
Index of security of property rights	0.87 (1099, <.01)	0.87 (1099, <.01)	0.79 (1099, <.01)						
courts cannot be used to enforce contracts	0.1 (1117, <.01)	0.11 (1117, <.01)	0.22 (1163, <.01)	0.15 (1099, <.01)					
manager would not invest $100 to receive $200 in 2 years	0.34 (1116, <.01)	0.34 (1116, <.01)	0.51 (1162, <.01)	0.46 (1098, <.01)	0.17 (1463, <.01)				
Tax payments to government as a % of sales for firms in industry	0.24 (996, <.01)	0.24 (1007, <.01)	0.31 (1042, <.01)	0.29 (981, <.01)	0.11 (1130, <.01)	0.28 (1129, <.01)			
firms make unofficial payments for ongoing registration	0.29 (775, <.01)	0.27 (783, <.01)	0.36 (789, <.01)	0.38 (769, <.01)	0.06 (805, .09)	0.25 (805, <.01)	0.19 (756, <.01)		
firms make unofficial payments for fire/sanitary inspection	0.33 (840, <.01)	0.32 (843, <.01)	0.29 (857, <.01)	0.39 (830, <.01)	0.03 (881, .40)	0.27 (881, <.01)	0.17 (820, <.01)	0.49 (757, <.01)	
firms make unofficial payments for tax inspection	0.36 (816, <.01)	0.34 (818, <.01)	0.32 (828, <.01)	0.43 (806, <.01)	0.01 (843, .74)	0.27 (843, <.01)	0.16 (789, <.01)	0.47 (734, <.01)	0.63 (811, <.01)

Notes: Correlations are for all five countries combined. The number of observations and significance level are in parentheses.

Table 5
Reinvestment Rates
Firms with and without Loans

		Firms with loans in 1996	Firms without loans in 1996
Reinvestment rates, % of after-tax profits	0-25%	26.0%	33.0%
	26-49%	21.0%	31.5%
	50-75%	21.3%	18.2%
	76-100%	31.7%	17.4%

Table 6
Ordered Probits for Reinvestment Rate in 1996

	(1) W/O country controls	(2) W/ country controls	(3) Startups	(4) Spinoffs	(5) Startups w/ loan vars	(6) W/ Tax payments	(7) W/ 4 point security index	(8) Pol/Slov/Rom startups only	(9) Rus/Ukr all firms
Security of property	-0.15	-0.13	-0.18	-0.01	-0.17	-0.18		-0.18	
rights	(4.08)	(2.45)	(3.20)	(0.09)	(2.74)	(3.09)		(3.13)	
Courts cannot be used	-0.18	-0.18	-0.15	-0.14	-0.22	-0.15		-0.16	-0.49
to enforce contracts	(2.13)	(2.05)	(1.45)	(0.71)	(1.94)	(1.44)		(1.46)	(2.04)
Taxes payments as a						-0.004			
% of sales						(0.87)			
Security of property							-0.18		
w/ courts in index							(3.45)		
Manager's estimated	0.004	0.004	0.01	-0.02	0.01	0.01	0.01	0.01	-0.08
industry profit rate	(0.73)	(0.67)	(1.75)	(1.66)	(2.02)	(1.70)	(1.75)	(1.81)	(3.19)
Firm age (log 1+ years)	-0.24	-0.30	-0.25	-0.77	-0.33	-0.25	-0.25	-0.25	-0.38
	(2.99)	(3.41)	(2.45)	(3.17)	(3.08)	(2.44)	(2.45)	(2.45)	(0.88)
Firm has collateral					-0.05				
to offer bank					(0.29)				
Startup	0.297	0.33							-0.07
	(3.32)	(3.37)							(0.28)
Controls	Industry	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country
Manager characterics tics	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Obs	815	815	619	196	565	619	619	574	116
Chi-square	65.4	100.1	70.2	79.8	73.1	70.9	70.1	54.5	47.0
Prob	<0.001	<0.001	0.006	0.002	0.004	0.001	0.004	0.006	0.002

Note: t-stats in parentheses.
The regresions in Columns 1-7 include data from all five countries.

Table 7
Ordered Probits for Reinvestment Rate in 1996
Startups only

	(1)	(2)	(3)	(4)	(5)	(6)
Firms make extralegal	-0.43					
payments for services	(4.02)					
Firms make extralegal		-0.12				
payments for licenses		(1.08)				
Firms make payments			-0.34			
for protection			(1.70)			
Firms make unofficial				-0.40		
payments--ongoing registration				(2.52)		
Firms make unofficial					-0.31	
payments--fire and sanitary					(2.29)	
Firms make unofficial						-0.27
payments--tax inspection						(1.69)
Courts cannot be used	-0.16	-0.14	-0.13	-0.20	-0.14	-0.20
to enforce contracts	(1.54)	(1.35)	(1.26)	(1.65)	(1.23)	(1.72)
Controls	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country
Manager charactericstics	Yes	Yes	Yes	Yes	Yes	Yes
# Obs	619	619	619	499	538	529
Chi-square	76.0	-61.1	62.8	73.7	63.5	59.2
Prob	0.001	0.036	0.0026	0.001	0.006	0.026

Note: t-stats in parentheses. Regressions also include the manager's estimate of the industry profit rate and the age of the firm.
The regressions include data from all five countries.

Table 8
Predicted Profit Reinvestment Rate
Ordered Probit in Table 6, Column 7

		Least Secure ---------- Security index ---------- Most Secure				
Profit Reinvestment rate	All Firms	0	1	2	3	4
0%	3.3%	9.1%	6.5%	4.4%	3.1%	1.9%
1-10%	13.7%	25.0%	21.1%	16.7%	13.7%	10.4%
11-25%	11.0%	14.9%	14.0%	12.4%	11.2%	9.5%
26-49%	20.2%	21.3%	21.8%	21.2%	20.6%	19.2%
50-75%	21.0%	16.1%	18.3%	20.2%	21.4%	22.0%
76-100%	30.8%	13.5%	18.3%	25.1%	30.0%	36.9%
Weighted Investment rate	50.0%	33.5%	38.9%	45.3%	49.7%	55.1%

Table 9
Probits for Receiving Loan

Variables	(1) W/O country controls	(2) All firms	(3) All firms	(4) Startups	(5) Spinoffs	(6) Startups	(7) Startups Pol/Slov/Rom	(8) All firms Rus/Ukr
Colateral	0.25	0.25	0.24	0.24	0.25	0.25	0.27	0.06
	(3.35)	(3.28)	(3.33)	(2.82)	(1.72)	(2.79)	(2.73)	(2.12)
Had loan before 1996	0.14	0.22	0.22	0.22	0.22	0.25	0.27	-0.31
	(4.00)	(6.13)	(6.13)	(5.32)	(2.62)	(5.64)	(5.84)	(2.92)
Unreinvested profit			-0.01	-0.01	-0.01	-0.01	-0.01	-0.001
% of sales			(3.19)	(2.68)	(1.69)	(2.60)	(2.72)	(0.22)
Manager's estimated			-0.004	-0.0002	-0.020	0.0001	0.0001	
industry profit rate			(1.55)	(0.07)	(3.47)	(0.04)	(0.02)	
Security of property						-8.5E-06		
						(0.00)		
FIRM CHARACTERISTICS								
Log age+1	0.15	-0.01	-0.007	-0.07	0.25	-0.08	-0.09	0.05
(years)	(3.80)	(0.27)	(0.17)	(1.45)	(2.27)	(1.49)	(1.59)	(0.90)
Log employment,	0.06	0.06	0.05	0.04	0.11	0.04	0.05	-0.02
end of 1994	(3.86)	(3.32)	(3.05)	(2.04)	(2.97)	(2.00)	(2.39)	(0.89)
Startup	0.06	-0.02	-0.02					0.01
	(1.35)	(0.46)	(0.42)					(0.21)
Controls	Industry	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country	Industry/ country
Manager charactericstics	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Obs	805	805	805	588	217	535	510	241
Chi-square	106.1	253.0	268.9	190.8	94.4	182.1	175.7	32.0
Prob	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0311

Note: t-stats in parentheses.
The regressions in Columns 1-6 include data from all five countries.

Appendix Table 1
Basic Characteristics of Spinoff and Start Up firms

	Poland		Slovakia		Romania		Russia		Ukraine	
	Spinoffs	Startups	Spinoffs	Startups	Spinoffs	Startups	Spinoffs	Startups	Spinoffs	Startups
Number of firms	66	237	70	238	40	281	132	123	183	82
Year Founded										
before 1990	13.6%	40.9%	7.1%	6.3%	0.0%	1.1%	6.8%	5.7%	17.5%	6.1%
1990	4.5%	12.2%	1.4%	10.5%	25.0%	5.3%	12.9%	11.4%	18.8%	12.3%
1991	18.2%	8.4%	17.1%	14.7%	37.5%	16.7%	21.2%	18.7%	13.7%	12.2%
1992	19.7%	12.7%	44.3%	21.0%	17.5%	24.9%	15.2%	13.8%	8.7%	14.6%
1993	18.2%	8.0%	8.6%	16.4%	2.5%	13.9%	15.2%	30.1%	17.5%	23.2%
1994	9.1%	8.0%	4.3%	9.2%	12.5%	18.5%	17.4%	9.8%	16.9%	19.5%
1995	12.1%	5.1%	5.7%	10.5%	2.5%	16.0%	6.8%	7.3%	5.5%	8.5%
1996	0.0%	3.0%	10.0%	9.2%	2.5%	3.6%	3.0%	1.6%	3.6%	2.4%
Manager's previous work experience										
Private Sector	21.2%	39.2%	22.9%	29.8%	0.0%	9.6%	11.4%	31.7%	1.1%	36.6%
Public Sector										
as a manager	44.3%	32.0%	36.4%	22.4%	47.5%	26.8%	65.9%	43.0%	68.7%	36.7%
as an engineer	41.0%	31.7%	36.4%	39.7%	50.0%	52.0%	29.4%	53.1%	29.1%	61.2%
as a worker	23.0%	42.5%	27.3%	36.8%	2.5%	20.1%	5.6%	5.1%	2.2%	2.0%
Years of schooling	16.3	15.6	16.6	16.1	16.7	16.0	15.5	15.1	15.4	14.8
Number of employees										
First year	83	33.4	119.3	19.3	257.1	25.4	47.1	21.7	72.6	31.9
1994	87.6	47.1	137.4	36.8	188.8	34	47.7	21.1	76.4	32.0
1996	92.4	55.1	118.0	45.8	148.8	45.5	48.2	22.0	78.5	36.2
Sector										
Metal parts	34.9%	25.7%	22.9%	26.9%	25.0%	28.1%	12.2%	11.4%	20.3%	14.6%
Wood products	3.0%	6.8%	8.6%	9.7%	15.0%	11.0%	2.3%	2.4%	6.0%	2.4%
Food products	4.6%	13.9%	24.3%	6.7%	17.5%	19.9%	8.4%	12.2%	6.6%	6.1%
Footwear/clothing	6.1%	19.4%	4.3%	15.1%	12.5%	15.0%	15.3%	16.3%	2.8%	7.3%
Const. Materials	18.2%	6.8%	15.7%	8.8%	22.5%	10.0%	15.3%	16.3%	18.7%	8.5%
Chemicals	12.1%	9.3%	4.3%	9.2%	2.5%	8.5%	8.4%	3.3%	11.5%	4.9%
Paper and pack.	1.5%	1.7%	5.7%	3.8%	2.5%	2.5%	6.9%	8.1%	1.7%	2.4%
Handicrafts	1.5%	1.3%	0.0%	0.8%	0.0%	1.8%	1.5%	0.8%	0.6%	4.9%
Elec. Machinery	12.1%	7.2%	7.1%	8.8%	0.0%	0.7%	15.3%	8.9%	11.5%	11.0%
Other	6.1%	8.0%	7.1%	10.1%	2.5%	2.5%	14.5%	20.3%	20.3%	37.8%