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WHY OWNERSHIP MATTERS?

Politicization and Entrepreneurship in the Restructuring of Enterprises in Central Europe¹

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I. Introduction

There exists by now growing empirical evidence that privatization of state enterprises significantly improves their performance, as measured by a variety of yardsticks. Megginson, Nash, and van Randenborgh (1994) document significant improvements in post-privatization performance of 61 large firms in 18 countries. La Porta and López-de-Silanes (1977) provide evidence from Mexico, while Frydman *et al.* (1997) and Pohl *et al.* (1997) examine medium-size and large firms in Central and Eastern Europe and arrive at similar results. Earlier findings by Earle *et al.* (1994) and Barberis *et al.* (1996) provide evidence of the effectiveness of privatization of retail shops and other small businesses in Central Europe and Russia, respectively. Frydman *et al.* (1997) also show that the performance improvements due to privatization are the most immediate and striking in terms of revenue, and less pronounced on the cost side of operations. They further show that the better revenue performance of privatized firms allows them to increase employment levels relative to state firms and that fears that privatization might lead to social dislocations seem therefore unfounded.

That privatization is effective is very important. But can we also explain *why*? There are several explanations advanced in this connection. Some point to the *politicization* characteristic of state firms, i.e. the fact that state officials are prone to impose on the management a variety of objectives other than value maximization, such as minimization of layoffs, political patronage, protecting of other state firms' markets, etc. (Shleifer and Vishny [1994]). While politicization affects primarily the *objective function* of the persons in control of the firm, other explanations focus on the greater ability of the privatized firms to accomplish the objectives they pursue. This advantage of privatized firms, which is sometimes seen as manifested in their greater *entrepreneurship*, is said to be due to a better incentive structure of the persons charged with making business decisions in private firms or to the better quality of the human capital they employ (Barberis *et al.* [1996]).

So far there has been little empirical research to test these explanations¹. In this paper we present the results of empirical analyses that attempt to operationalize the concepts of

¹ Barberis *et al.* (1996) is an exception. It presents empirical evidence suggesting that the human capital effects of privatization – selection of more skillful individuals to run firms – might be more important than incentive effects. The authors caution, however, that their results, based on the evidence concerning privatization of retail shops and small enterprises in Russia, may not be applicable to larger, manufacturing enterprises.

politicization and entrepreneurship and focus on the behavioral differences between privatized and state firms that help explain why the former outperform the latter, i.e. on things that private owners and their managers do or don't do that differentiate them from their state counterparts.

With respect to politicization, we present evidence that state involvement in the monitoring of state enterprises results in inferior cost performance. We also show, in particular, that the employment policy of state firms departs from the standard business objective of value maximization, and that the presence of active state monitoring leads to less employment restructuring and lower layoffs.

Politicization does not, however, seem to be responsible for the state firms' inferior revenue performance, which is also independent of the degree to which a firm's decisions are actively monitored by state bureaucrats. What is decisive here is the difference in the degree of entrepreneurship manifested in the behavior of state and privatized firms, which makes the privatized firms much more successful in revamping their product offerings and increasing their sales.

In examining what determines the greater entrepreneurship of privatized firms, we test and reject the hypothesis that the better performance of privatized firms is due to the more thorough change of the old socialist management or to the greater ability of the new owners to pick better managers. We therefore argue in favor of the emphasis on the incentive effects of privatization. Looking beyond the differences in the *average* performance of state and privatized firms, we provide hitherto unobserved evidence concerning the much greater *variance* of the privatized firms' performance relative to that of their state counterparts. We connect this finding to the different attitudes toward risk of the persons in control of state and privatized firms as well as to the different degrees of accountability for their decisions, and through these factors, link the ownership and entrepreneurship.

This study is based on a survey of medium-sized firms in the Czech Republic, Hungary, and Poland. In the overwhelming majority of cases the privatized firms in our sample have a very concentrated structure of ownership and, although division of ownership and management is

the norm, the owners seem to be relatively active in monitoring their firms.² This means that some of the differences between state and privatized firms we observe may be due to the particular type of concentrated ownership in our sample, and private firms with more dispersed (and less active) owners may not behave in the same way.³

II. Politicization

Politicization of decision-making on the firm level is often thought to be a hallmark of state enterprises. This may mean a number of things. Management may be chosen for their political rather than managerial skills (Barberis *et al.* [1996]). Politicians in control of state firms may impose on them a variety of objectives other than value maximization, such as maintenance of employment, location of investment, choice of inputs, etc., which may foster their political objectives (Shleifer and Vishny [1994]). The multiplicity of objectives that state firms pursue may make it very difficult to monitor, or even measure, their performance (Niskanen [1971]). Given the politicians' stake in not letting state firms deteriorate or go bankrupt, managers of state firms may be able to exploit the information asymmetry concerning the firm's true financial position and focus their activities on extracting rents from the state, rather than on improving economic performance (Frydman and Rapaczynski [1994]).

The impact of politicization on cost and revenue performance

All of these factors affect the efficiency of state enterprises by raising various cost aspects of their operations. But politicization need not be the only deleterious effect of state ownership. We have hypothesized elsewhere (Frydman *et al.* [1997]) that, while the effects of politicization show mostly in the inferior cost performance of state firms, differences in the degree of entrepreneurship primarily affect the revenue performance of state and privatized firms. Unlike the more static and predictable cost cutting operations, capturing new sources of revenue (or regaining the disappearing ones) is essentially a future-oriented task, unpredictable on the basis

² The sample on which the present study is based is described in Appendix B.

³ The owners' behavior may also be affected by the degree of the diversification of their investments. There are indications that most owners of the firms in our sample are diversified.

of past history, and often requires the type of entrepreneurial skills not that much different from those needed to start a new business. Consequently, even when state firms are free from political interference, other factors may make them less entrepreneurial: the people in control of them may be less able, or have less incentive, to spot various business opportunities, and they may have different attitudes toward risk so that they may not pursue the opportunities they perceive.

The difference between the ways in which ownership affects the cost and revenue aspects of firm performance may be particularly stark in the postcommunist transition economies. On the one hand, the cost inefficiencies inherited from the communist past are relatively easily identifiable and their remedies require essentially political will (which comes from depoliticization of the firm's decision making), rather than a spirit of entrepreneurship. On the other hand, due to the shock of the transition, including marketization and the collapse of the COMECON, many firms lost their old captive markets, imports introduced overnight competition, and buyers became more careful and demanding. As a result, to maintain or raise their revenues, the post-communist firms needed entrepreneurial skills to reinvent their products and find the markets in which they could be sold.

We begin in what follows by testing the hypothesis that politicization is primarily responsible for the inferior cost performance of state firms, while another explanation is required to account for their inferior revenue performance *vis à vis* privatized firms. Despite widespread belief that the state is essentially a passive owner of enterprises in Central Europe (e.g. Pistor and Turkewitz [1997]), we found that state bureaucrats were "actively monitoring" the management in 40 percent of state-owned firms in our sample,⁴ and we took this fact of active state monitoring as a proxy that a firm's decisions are politicized.⁵ Our hypothesis predicts that (1) the very presence of active state monitoring, being tied to the pursuit of political objectives, results in higher costs of a firm's operation, but that (2) absent active state monitoring, the cost

⁴ The question we asked was: "Would you characterize any state organ or agent as actively monitoring certain decisions of the management of this enterprise?"

⁵ Politicization may perhaps manifest itself in other ways. For example, a firm's behavior may be considered to be politicized if its top management was chosen for political reasons, even though their decisions are later not actively monitored. We have no way of estimating accurately whether a firm's management was or was not chosen for political reasons. We argue in section III. below, however, that systematic differences in the quality of a firm's management are unlikely to be primarily responsible for the differences in revenue performance between state and privatized firms in our sample.

performance of state-owned firms is essentially similar to that of privatized firms. We further predict that (3) the presence or absence of state monitoring is unrelated to the differences in the revenue performance of state and privatized firms, which needs to be accounted for with the help of other factors (such as entrepreneurship).

To test our hypothesis, we related the cost and revenue performance (measured in annualized rates of growth⁶) of the firms in our sample to their ownership status (privatized vs. state) and, in the case of state firms, to the presence or absence of active state monitoring. We also controlled for the country in which the firm was located and the initial value of the firm's performance (i.e. the initial level of costs and revenues, respectively). Finally, because the initial revenue levels affect state and privatized firms differently, we added an interactive term measuring the differential effect of initial revenue levels on privatized firms.⁷ The resulting regression estimates are reported in Table 1, below.

⁶ The annualization method is explained in footnote 1 to Table 1. For a discussion of potential problems resulting from the choice of the period over which the performance of firms is annualized, see Appendix A.

⁷ The reasons for the inclusion of this interactive term, capturing the special (differential) impact of the initial revenue level on the performance of privatized firms, are explained in more detail in Frydman *et al.* (1998). The significance of the coefficient of this term indicates that the effects of privatization taper off with firm size. Fuller definitions of all the variables may be found in footnotes to Table 1.

TABLE 1: THE IMPACT OF STATE INVOLVEMENT ON COST AND REVENUE PERFORMANCE OVER 1991-93 PERIOD

	ANNUALIZED RATE OF GROWTH ¹ OF	
	REVENUE	COST/REVENUE
<i>Constant</i>	-13.53* (3.51)	34.56* (6.26)
<i>Privatized firms</i> ²	24.42* (4.87)	-1.70 (3.63)
<i>State firm with active involvement of the state</i> ³	0.05 (4.49)	6.22** (3.45)
<i>Initial value of performance measure</i> ⁴	-0.01 (0.12)	-0.32* (0.05)
<i>Initial level of revenues of privatized firms</i> ⁵	-0.39* (0.16)	-
<i>Hungary</i> ⁶	-10.53* (4.48)	-9.57* (3.12)
<i>Poland</i> ⁷	-4.85 (3.70)	-6.03 (3.99)
	n = 167 F = 8.18* adj. R ² = 0.21	n = 130 F = 10.58* adj. R ² = 0.27

* p= 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ To smooth year-to-year variations in performance, the rates of growth of both revenues and costs/revenues are annualized over the 1991-93 period for state firms and over the post-privatization period for privatized firms. (Thus, if R_t denotes the value of a firm's revenue level in year t , the annualized rate of revenue growth, ARR G , is an imputed rate which satisfies $R_{1993}/R_t = (1 + ARR\mathit{G})^{(1993-t)}$.) To eliminate possible bias due to the use different initial years in calculating annualized rates of growth for state and privatized firms, Table A1 in Appendix A provides the regression statistics which obtain when the rates of growth for state firms are annualized between 1990-93 and 1992-93. (Note that the choice of the initial year does not affect the significance or the order of magnitude of the estimates reported in this Table.) Revenues and costs are measured in constant local prices.

² A dummy variable equal 1 if the firm is privatized, 0 otherwise

³ A dummy variable equal to 1 if the state firm is actively monitored by the state, zero otherwise.

⁴ For privatized firms, the initial values of revenue, and cost per unit of revenue are for the year of privatization. For state firms, the initial values are those for 1991. (To avoid possible bias due to the use of different years for the initial values of performance of state and privatized firms, the initial values for state firms in Table A1 in Appendix A are for 1990 and 1992, respectively; note, however, that the choice of the year does not affect the significance or the order of magnitude of the estimates reported in this Table.) Initial revenue is measured in US\$1,000,000's.

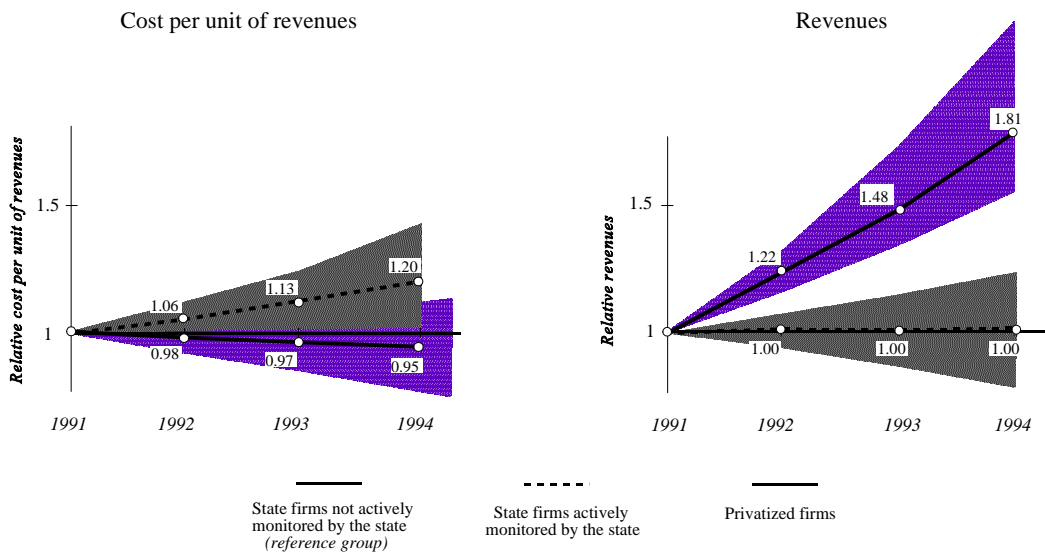
⁵ The coefficients of initial cost per unit of revenue for privatized firms was not significant, and the corresponding equation was re-estimated without this variables.

⁶ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁷ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

All three prongs of our hypothesis are supported by the regression estimates reported in Table 1. The comparison of the impact of state involvement on the cost and revenue performance, graphically illustrated in Figure 1, indicates that politicization affects primarily the cost performance of state firms (p-value=0.07) and that in its absence, state firms engage in effective cost restructuring. By contrast, however, politicization seems to have no significant impact on the revenue performance of state firms. This means not only that the firms actively monitored by the state do not lose their markets significantly faster than those in which the management has more or less a free hand, but also that the yawning performance gap between the state and privatized firms remains undiminished when the state does not seem to impose its political objectives on the firms it owns.

Figure 1
The impact of state involvement on cost and revenue performance



(One might object at this point that the results reported above are also compatible with the proposition that the involvement of the state in firms characterized by faster cost growth is not the cause but the effect of their poor performance, i.e. the state becomes involved because the costs are growing and not *vice versa*. As we shall see presently, however, state involvement is also related to a smaller likelihood of future layoffs, and thus to a greater likelihood of higher *future costs*.)

The impact of politicization on the employment behavior of state firms

In the remainder of this section, we analyze more closely the impact of politicization in one particularly sensitive area: the employment policies of state firms in the period of the postcommunist transition. In particular, we present evidence suggesting that while privatized firms, in their employment policies, pursue the objective of value maximization, the managers of state firms depart from this standard of business behavior. Moreover, we show that the managers of state firms actively monitored by state bureaucrats reveal different attitudes toward layoffs than the managers of state firms in which the state is not actively involved in monitoring.

Sharp employment declines characterized the early stages of the postcommunist transition in all three countries under study in this paper. (Blanchard, Commander, and Coricelli [1994]; Blanchard [1997].) In the environment of tightening budget constraints, these declines were in part a result of the revenue collapse experienced by most firms losing the previously captive markets for their goods. But in part the employment decline was also an unavoidable consequence of the communist labor policies. During the communist period, unemployment was politically unacceptable, and workers were kept on the job regardless of whether or not they contributed to (or even detracted from) the efficiency of the enterprise. Most firms in the transition environment therefore inherited a very severe problem of overmanning, and mere efficiency dictated that they reduce employment *over and above* any layoffs imposed on them by the revenue declines attributable to the demand shock of the transition.

Reflecting the broader changes in the whole population of firms, both privatized and state firms in our sample underwent heavy employment downsizing, with the overall number of employees declining in 91 percent of state and 57 percent of privatized firms between 1990 and

1993. Moreover, the process of labor shedding was clearly not completed by the time this study was made (1994): when we asked the CEOs of the firms in our sample how they viewed the then current level of employment in their companies, nearly half of them (45%) still considered it “too high.”⁸ We understood this to mean that future layoffs were perceived as desirable and to be expected in a substantial proportion of both state and privatized firms, and we took the likelihood of a top manager’s belief that his company’s employment was too high as a proxy for the probability that the company would undergo further employment reductions in the future.⁹

In order to determine whether decisions concerning these employment reductions are made according to normal business standards or are subject to other (including political) considerations, we made certain assumptions about how a firm interested in maximizing its value would behave. Unless real wages were falling faster than productivity,¹⁰ a firm’s employment behavior would presumably be sensitive to declines in its productivity (revenues per employee). For a firm operating under equilibrium conditions this would mean employment reductions in response to falling marginal productivity. We do not have marginal productivity figures for the firms in our sample. But it is also unlikely that firms in the early transition environment, facing constantly changing demand conditions, can adequately measure changes in their marginal productivity; in fact, they are unlikely to have the requisite information about the employment and production levels at which they might eventually reach an equilibrium. What these firms do know is that, buffeted by falling sales and suffering under the overmanning inherited from the old regime, they are most likely below any equilibrium they might eventually reach, and they are

⁸ 88 CEOs of state and 78 CEOs privatized firms in the sample answered the question. Of the 166 respondents, 27 (16%) considered the current employment level to be too low, 65 (39%) considered it about proper, and 74 (45%) considered it (to a varying degree) too high. Slightly fewer CEOs of state firms (35%) than those of privatized companies (44%) considered the current employment levels in their firms to be about proper, the difference of no statistical significance ($p=0.16$). Since the small number of firms in which the managers considered the employment levels to be too low did not allow for statistically meaningful contrasts, we have limited our analysis to firms in which the CEOs considered the employment level to be either too high or about proper.

⁹ The relationship between the chief executive’s judgment that employment is too high and the likelihood of future layoffs should, in principle, be very strong. The main reasons why the former might not be a fully accurate predictor of the latter are that (1) the parties cannot predict changes in future circumstances and (2) some managers might be constrained in laying off workers.

¹⁰ Unfortunately our data do not allow us reliably to apportion a firm’s wage bill among full-time and part-time or temporary employees, and thus we have only imperfect data on real wages of full time employees. But using these approximations, we found that in virtually all firms in our sample the drop in real wages was slower than the drop in productivity.

likely to react to changes in their average revenues per employee, since any falls in average productivity are moving them further away from an eventual equilibrium.

On the basis of the foregoing, we have formed a hypothesis about the employment behavior of the firms in our sample. Our hypothesis predicts that the employment estimates by the CEO's of privatized firms, whom we believe to be pursuing the objective of value maximization, are sensitive to prior productivity history: we expect that the more their productivity has fallen in the past, the more likely are these CEOs to believe that the present employment in their firms is too high, and thus the more likely they are to lay off people in the future. But for state firms, our hypothesis predicts a departure from the standard of value maximizing behavior, and we expect no relationship between higher past productivity declines and higher future layoffs. Moreover, we predict that the politicization of state firms' behavior, as measured by the presence of state monitoring, contributes to these firms' reluctance to engage in future layoffs, regardless of what would be standard business behavior.

We tested this hypothesis by estimating two probit equations relating the probability of future layoffs (as measured by the CEO's belief that the employment in his firm is "too high) to the past productivity history (measured by annualized rates of productivity growth) of state and privatized firms, respectively. Since our hypothesis did not predict any relationship between employment behavior and past productivity history for firms with rising productivity, we limited our sample to firms in which past productivity was falling. To capture the effect of direct politicization coming from the interference of state bureaucrats, we included a dummy variable indicating the presence of active state monitoring. Finally, we controlled for the initial employment level, and the country in which the firm was located. The estimates of the resulting probit equations are reported in Table 2.

TABLE 2: THE PROBABILITY OF FUTURE LAYOFFS AS A FUNCTION OF PRODUCTIVITY HISTORY
(FOR FIRMS WITH DECLINING PRODUCTIVITY OVER 1991-93 PERIOD)

	PRIVATIZED FIRMS	STATE FIRMS
<i>Constant</i>	-0.28 (0.29)	0.94* (0.35)
<i>State firm with active involvement of the state¹</i>	-	-0.31* (0.15)
<i>Past productivity growth rate²</i>	-0.024** (0.013)	0.014 (0.010)
<i>Initial employment level³</i>	0.29 (0.19)	-0.028 (0.15)
<i>Hungary⁴</i>	-0.32 (0.21)	-0.47** (0.24)
<i>Poland⁵</i>	-	-0.40** (0.23)
	n = 33 $\chi^2 = 10.5$ (d.f.=3)	n = 46 $\chi^2 = 11.68$ (d.f.=5)

* p = 0.05, ** p = 0.10 ; Marginal effects based on probit estimates, standard errors in parenthesis, significant coefficients bold-faced.

¹ A dummy variable equal to 1 if the state firm is actively monitored by the state, zero otherwise.

² Rate of growth of revenue per full-time employee annualized over 1991-93 period except for firms privatized in 1992 for which the rate is set to 1992-93 value. (Table A2 in Appendix A provides the estimates based on the growth of productivity over the entire 1990-93 period. Note that the choice of the period of annualization does not substantially affect the significance or the order of magnitude of the estimates reported in this Table.) Revenues are measured in constant local prices.

³ 1991 employment (in 1,000's full-time employees) except for firms privatized in 1992 for which the initial employment is that of 1992.

⁴ A dummy variable equal to 1 if the firm is in Hungary, 0 otherwise.

⁵ A dummy variable equal to 1 if the firm is in Poland, 0 otherwise.

The results in Table 2 support our hypothesis that state and privatized firms pursue different objectives with respect to employment. For privatized firms, a history of higher past productivity declines is predictive of higher future layoffs (p-value = 0.07). No such relation, however, obtains for state firms. The table also shows that the presence of state monitoring significantly decreases the likelihood that a state firm will respond to past productivity declines with increased layoffs in the future. But the difference in the employment behavior of state and privatized firms does not disappear even when state firms not actively monitored by their bureaucratic superiors are separated from those in which the state is actively involved.¹¹ Thus, although active state monitoring clearly increases the likelihood of the politicization of state firms' employment behavior, it may be an indication of the special political sensitivity of layoffs that even those among state firms that are not actively monitored by higher state bureaucrats do not systematically decrease their employment in response to higher productivity declines.

Finally, it may be worth noting that the politicization of the employment behavior of state firms appears to be higher in Poland and Hungary than in the Czech Republic, since a state firm's location in either of these two countries makes it less likely that the firm will lay off workers, regardless of past productivity declines.

III. Entrepreneurship and its relation to ownership

We have seen that politicization goes a long way to explain the inefficient cost behavior of state firms, but that other explanations are needed to account for their inferior revenue performance. We suggest that the explanation of the superior revenue performance of privatized firms lies in their greater entrepreneurship.

The nature of entrepreneurship is sometimes explained in terms of different attitudes toward risk (Knight [1921]) and in terms of the agents' ability to spot and pursue business opportunities. (Hayek [1948], Kirzner [1979]). But the concept of entrepreneurship remains somewhat vague. In particular, it is usually left unclear what difference entrepreneurship makes

¹¹ To test this we estimated a version of the equation reported in Table 2 with the productivity history for state firms split between those firms which were and those which were not monitored by the state. The coefficients of both of the interactive variables were insignificant.

in behavioral terms and how it could be measured.¹² The exact relationship between ownership and entrepreneurship also remains largely unexplored.

We focus here on the evidence of entrepreneurship in one specific type of economic activity, namely, the restructuring of a firm's product offerings in the wake of the postcommunist transition. This is a particularly important area of entrepreneurial behavior, given the collapse of the captive market previously assured for the shoddy products of most firms by the communist command economy, and the need of the postcommunist firms to "reinvent" their product offerings under the new conditions. Thus, a firm's ability to retain or regain its markets through a restructuring of its products is perhaps the most important manifestation of its ability to spot and pursue business opportunities capable of generating higher revenues and, ultimately, higher returns.

In order to gauge the entrepreneurial behavior of a firm, we examine the type of product restructuring measures it undertakes. We find, however, that the mere incidence of product restructuring is not what distinguishes privatized from state firms; instead, while the presence of product restructuring makes a great difference in the performance of privatized firms, its effect is quite negligible in the case of state firms. We conclude, therefore, that the substance of entrepreneurship lies not in the simple fact of product restructuring, but rather in the way in which the privatized firms go about it. We then inquire into what makes private firms more entrepreneurial.

Product restructuring measures and their effectiveness

We asked the chief production officers (CPOs) of our sample firms to list four product groups which contributed most to the firm's gross annual revenues in each year for which we collected our data.¹³ We then asked them to identify changes in each of these groups introduced in the subsequent year, and to list all new product groups (regardless of their contribution to

¹² For a recent discussion of the importance of incorporating entrepreneurship into the neoclassical theory of the firm, its measurement, and significance for understanding the demise of the planned economies, see Rosen (1997).

¹³ We defined a "product group" as "products which are produced using essentially the same type of equipment and production process, and do not differ substantially in the basic design. Examples of product groups include leather shoes, soaps, canned fruits, baked goods, beverages, etc."

revenue) introduced during each year.

On the basis of these questions, we constructed a category of *major product restructuring measures* by grouping together the following: (i) introduction of new product groups; (ii) introduction of major new products within an existing product group; (iii) major changes in design or packaging of existing products; and (iv) introduction of major new production processes. The rationale behind this grouping was to isolate those changes in the firm's product portfolio that are aimed at gaining new markets or retaining the vanishing old ones, rather than simple cost-cutting operations.¹⁴ An introduction of new or improved products may or may not increase sales, but it is likely to require outlays that may contribute to a deterioration of a firm's cash flows and/or balance sheet position.¹⁵ Undertaking such innovations is more likely to involve a substantially higher degree of uncertainty and higher business risk than implementing cost-reducing measures.

A bivariate comparison of the rate at which state and privatized firms introduce major product restructuring measures shows that the mere frequency of restructuring is not a distinguishing characteristic of privatized firms: CPOs of 48% of state firms in the sample indicated that their firms had introduced major product restructuring measures, a very similar proportion to that of privatized firms (44%). This result is consistent with previous reports of extensive restructuring among state firms in the transition environment (Pinto, Belka, and Krajewski [1993]). In a more stable environment, state firms might perhaps be more relaxed about their products and lag in innovation behind their private counterparts. But the pressure of the dramatic changes in the wake of the fall of communism seems to have simply taken the bottom out from under many state firms, and forced them to try to recover some of the lost ground. Perhaps precisely because they were less able than privatized firms to stem the revenue falls brought about by the change, they have tried repeatedly to modify their product offerings and thus show a very high incidence of major product restructuring.

¹⁴ In the context of the transition economies, we treat the introduction of major new production process and major packaging changes as primarily proxies for product quality improvements akin to the introduction of new products.

¹⁵ 78% of the firms (83% of state and 74% of privatized) in our sample financed investments between 1990 and 1994 primarily from retained earnings. The level of long-term debt among the firms that introduced major product restructuring measures is also very low: the median is 3% of 1993 revenues. Major product restructuring thus is very likely to have direct impact on a firm's cash position.

We thus hypothesized that what truly separates state and privatized firms is the *effectiveness* of product restructuring. In order to examine the effects of major product restructuring measures undertaken by state and privatized enterprises, we estimated a firm's revenue growth as a function of an interactive variable combining the firm's ownership (state or privatized) and the fact of its having or not having introduced major product restructuring measures. We also controlled for the initial revenue level (including the differential initial revenue effect for privatized firms, see footnote 7 above) and the country in which the firm is located. For firms that introduced major product changes we estimated the post-restructuring revenue growth, while for firms that did not, we estimated the growth rate annualized over the period from 1991 or the date of privatization to 1993. The results are presented in Table 3.

TABLE 3: THE IMPACT OF MAJOR PRODUCT RESTRUCTURING ON REVENUE GROWTH

	ANNUALIZED RATE OF REVENUE GROWTH ¹
<i>Constant</i>	-8.37* (4.82)
<i>Privatized firms that restructured their products²</i>	25.57* (6.97)
<i>Privatized firms that did not restructure their products³</i>	12.87* (6.19)
<i>State firms that did not restructure their products⁴</i>	4.17 (4.38)
<i>Initial value of revenues⁵</i>	-0.15 (0.10)
<i>Initial level of revenues for privatized firms</i>	-0.15 (0.14)
<i>Hungary⁶</i>	-12.31* (4.40)
<i>Poland⁷</i>	-13.90* (4.83)
	n=137 F=8.72* adj. R ² =0.24

* p = 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ For state or privatized firms that restructured their products in 1991, the post-restructuring rates of revenue growth are annualized over the 1990-93 period (thus counting the performance in the year in which the restructuring measure was introduced as part of the post-restructuring period); for those that restructured in 1992, the post-restructuring rate is for 1991-93, and for the firms that restructured in 1993, the rate is for 1992-93 period. For state firms that did not undertake restructuring of their products the rates are annualized over 1991-93. For privatized firms that did not restructure their products the rate of revenue growth is annualized between the year of privatization and 1993. (To eliminate possible bias due to the use different initial years in calculating annualized rates of growth for state firms that did not restructure their products, state firms, and privatized firms, Table A3 in Appendix A provides the regression statistics which obtain when the rates of growth for state firms that did not restructure their products are annualized between 1990-93 and 1992-93. Note that the choice of the initial year does not affect the significance or the order of magnitude of the estimates reported in this Table.)

Revenues are measured in constant local prices.

² A dummy variable equal 1 if the firm is privatized and restructured its products, 0 otherwise

³ A dummy variable equal 1 if the firm is privatized and did not restructure its products, 0 otherwise

⁴ A dummy variable equal 1 if the firm is state-owned and did not restructure its products, 0 otherwise

⁵ For privatized firms, the initial values of revenue are for the year of privatization. For state firms, the initial values are those for the first year of each post-restructuring rate of growth as specified in note 1 above (1990 for 1990-93 rates, 1991 for 1991-93 rates, and 1992 for 1992-93 rates). Initial revenue is measured in US\$1,000,000's. (Note that the choice of year for the initial revenue does not substantially affect the results reported in the Table.)

⁶ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

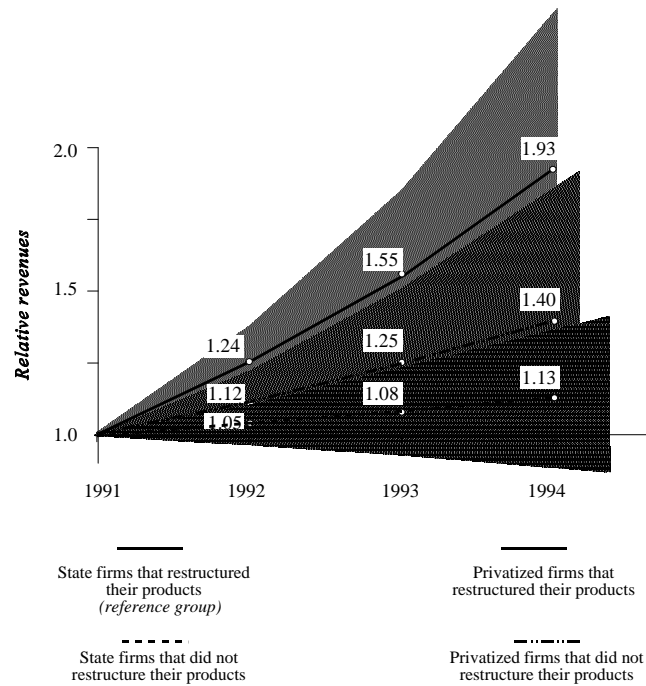
⁷ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

The estimates reported in Table 3 reveal a stark difference in the effect of major product restructuring in state and privatized firms. We have not been able to detect any systematic differences in the type of restructuring engaged in by the two types of firms, as reported by their CPOs. But clearly, if state and privatized firms are engaged in superficially similar forms of product restructuring, they must be doing *something* quite differently. For state firms, revamping product offerings does not bring any noticeable improvement in sales performance. For privatized firms, product restructuring is responsible for a significant (p-value = .04) increase in the firm's revenue growth: it adds, in fact, ca. 12 percentage points to the annual growth of a median-sized privatized company.¹⁶ This factor is apparently not the only one responsible for the generally superior revenue performance of privatized firms, observed in Table 1, since even those privatized firms that did not introduce major product changes outperform their state counterparts (whether or not the latter engaged in any product restructuring). But successful product restructuring seems to account for a substantial portion of the revenue advantage that privatized firms generally enjoy over state enterprises. Indeed, it is the difference made by successful product restructuring that moves an average privatized firm from a -5% annualized rate of decline to a +7% annualized rate of revenue growth.

The contrasts between the restructuring effects for privatized and state firms are illustrated in Figure 2 below which shows the post-restructuring performance of firms that have restructured their product offerings relative to the revenue performance of those that have not. The graph compares the performance of firms that are identical in all respects except for their ownership and the presence or absence of restructuring. The vertical axis measures the ratio of revenues of each type of firm to the revenues of state firms that restructured their products. (Shaded areas mark the confidence intervals around the mean values.)

¹⁶ Unfortunately, our data on many privatized firms in the sample does not go back far enough in time to enable us to control for prior revenue history in the equation reported in Table 3. Since we have data on revenue history prior to major product restructuring for state firms, we were able to check for this type of self-selection [Maddala (1983)] for those firms and the results on the ineffectiveness of product restructuring for state firms remain virtually identical to the ones reported in Table 3.

Figure 2
The impact of major product restructuring on revenue performance



Why ownership matters? The human capital hypothesis

We have seen that successful product restructuring explains a good part of the superior revenue performance of privatized firms. Nevertheless, product restructuring by itself does not seem to capture the distinctive advantage of privatized firms over their state counterparts, since state firms also engage in product restructuring, but without anything like the same results. If we are right that it is their greater entrepreneurship that gives the privatized firms their revenue growth advantage, the nature of entrepreneurship may perhaps lie not in what privatized firms do, but in *how* they do it. Can we isolate some features of the *modus operandi* that makes privatized firms succeed in the same activities that produce no significant benefits for state firms?

Barberis *et al.* (1996) summarize two broad types of views previously advanced in the economic literature on what gives the performance advantage to private businesses. According

to one view, the explanation lies in the differences in the incentive structures associated with different types of ownership. According to the other view, the superior performance of privatized firms is primarily attributable to fact that privatization “selects owners and managers who are better at running firms efficiently.”

The strikingly different impact of product restructuring measures on the performance of state and privatized firms seems quite compatible with the idea that the persons in control of the privatized firms are simply more skillful at what they do than their state counterparts. We will therefore begin by examining the possibility that the superiority of the privatized firms’ performance in our sample derives from the superior human capital of the persons who control them. To anticipate our conclusions, we find that while the quality of human capital is likely to play some role in firm performance, it is not likely that changes in the management of the privatized firms are among the primary reasons behind their superior revenue growth. Indeed, the evidence seems to favor the hypothesis that the incentives under which the persons in control of state and privatized firms operate play a more important role.

Our survey provides extensive information about the managers of both state and privatized firms, including their age, education, length of tenure, previous occupation, political beliefs, attitudes toward market economy and political changes since 1989, opinions about the role of the state and about the importance of various business objectives, etc. All in all, despite substantial efforts, we have been unable to identify any systematic differences between the managers of state and privatized enterprises. In particular, as may be seen from Table 4, it does not seem to be the case that the managers of state enterprises are any more likely than their counterparts in the privatized sector to have been members of the former *nomenklatura*, the factor to which considerable importance has been ascribed in Barberis *et al.* (1996). Indeed, unlike in Russia (where the small businesses studied by Barberis *et al.* were located), the managerial turnover in Central Europe has been very high (ca. 60%) in *both* state and privatized firms; the number of promotions from within (which may have been more likely to pick up members of the old *nomenklatura*) is not very high, and also similar in both types of firms. Nor

are the managers of privatized enterprises likely to be any younger than their state counterparts.¹⁷

TABLE 4: CEO'S OF STATE AND PRIVATIZED COMPANIES

	PRIVATIZED FIRMS	STATE FIRMS
Percentage of firms in which a new CEO was appointed during the 1990-93 period	63	59
Of whom promoted from within (%)	54	61
Average age of the present CEO	47	45
Percentage of firms in which the present CEO is		
between 30 and 40 years old	16	22
between 40 and 50 years old	47	53
more than 50 years old	37	25

One CEO in the sample (in a privatized firm) was below 30 years of age.

In order to compare more precisely the relative performance impact of managerial changes with that of ownership transformations, we related a firm's revenue growth to its ownership status (privatized vs. state) and the presence or absence of a new CEO during the 1990-93 period, while controlling for the initial level of revenues (including the differential effect of the initial revenue level on the performance of privatized firms; see footnote 7 above) and the country in which the firm was located. (See the left column in Table 5.) To distinguish further between the impact of internal managerial promotions (which are more likely to advance former *nomenklatura* members) and that of presumably more radical managerial changes involving appointments of corporate outsiders to the CEO's position, we run another regression equation with the same variables, but with the presence or absence of a new CEO split between internal promotions and outside appointments. (See the right column in Table 5.) In both equations, state firms in which the CEO did not change serve as a reference point.

¹⁷ In addition to the data presented in Table 4, we also examined answers to a range of questions concerning the managers' political beliefs, attitudes toward reforms and the old regime, and their views concerning economic priorities. In none of these, did we find any important differences between the managers of state and privatized firms.

**TABLE 5: THE IMPACT OF OWNERSHIP AND MANAGEMENT CHANGE
ON REVENUE PERFORMANCE**
OVER 1991-93 PERIOD

	ANNUALIZED RATE OF REVENUE GROWTH ¹	
<i>Constant</i>	-11.78* (4.82)	-10.61 (4.86)
<i>Privatized firm</i> ²	18.93* (5.04)	20.05* (5.19)
<i>Firm in which a new CEO was appointed during the 1990-93 period</i> ³	3.15 (3.25)	-
<i>Firm in which a new CEO (appointed during the 1990-93 period) was promoted from within</i> ⁴	-	2.03 (3.92)
<i>Firm in which a new CEO (appointed during the 1990-93 period) came from outside</i> ⁵	-	1.66 (3.87)
<i>Initial level of revenues</i> ⁶	-0.12 (0.11)	-0.12 (0.11)
<i>Initial level of revenues of privatized firms</i>	-0.29** (0.16)	-0.30** (0.19)
<i>Hungary</i> ⁷	-6.79** (4.16)	-7.20** (4.27)
<i>Poland</i> ⁸	-6.76** (3.98)	-7.23** (4.01)
	n = 179 F = 7.06* adj. R ² = 0.17	n = 175 F = 6.27* adj. R ² = 0.17

* p = 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ For privatized firms, all rates of growth of revenue are annualized between the year of privatization and the end of 1993; for state firms, the rates of growth are annualized between 1991 and 1993. (To eliminate possible bias due to the use of different initial years in calculating annualized rates of growth for state and privatized firms, Table A5 in Appendix A provides the regression statistics which obtain when the rates of growth for state firms are annualized between 1990-93 and 1992-93. Note that the choice of the initial year does not affect the significance or the order of magnitude of the estimates reported in this Table.) Revenues are measured in constant local prices.

² A dummy variable equal 1 if the firm is privatized, 0 otherwise

³ A dummy variable equal to 1 if a new CEO was appointed during the 1990-93 period, zero otherwise.

⁴ A dummy variable equal to 1 if the current CEO was promoted from within, zero otherwise.

⁵ A dummy variable equal to 1 if the current CEO came from outside, zero otherwise.

⁶ For privatized firms, the initial levels of revenue are for the year of privatization. For state firms, the initial levels are those for 1991. (To avoid possible bias due to the use of initial revenue levels for different years for state and privatized firms, the initial levels for state firms in Table A.5 in Appendix A are for 1990 and 1992, respectively. Note that the choice of the year does not affect the significance or the order of magnitude of the estimates reported in this Table.) Initial revenue is measured in millions of US dollars.

⁷ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁸ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

The results presented in Table 5 indicate that managerial change, whether involving an internal promotion or an outside appointment of a new CEO, by itself has an insignificant impact on a firm's revenue performance, while the fact of privatization retains its highly significant explanatory value.¹⁸

But it might be said that it is not management change as such that matters, but the choice of the new management made by an owner (as opposed to a state bureaucrat) who picks a CEO for his or her skills in maximizing the firm's value (as opposed to skills in pleasing state officials). We have therefore estimated yet another equation designed to test whether management change makes a difference *within* the same ownership category, i.e. whether privatized firms with new management perform better than those in which the management is unchanged, and whether the same is true for state firms with new and old management. In this equation, we related a firm's revenue growth to a variable interacting the firm's ownership and the fact of having or not having a new CEO appointed between 1990 and 1993 (for state firms) or between the time of privatization and 1993 (for privatized firms). We again controlled for initial revenue levels (including the differential impact of the initial revenue level on the performance of state firms; see footnote 7 above) and the country in which the firm was located. Privatized firms with no CEO change were, again, used as a reference group. The results are presented in Table 6, and indicate that differences in the quality of the human capital of the managers of state and privatized firms are not primarily responsible for differences in the growth performance of these firms. Indeed, although the sign of the appropriate coefficient is positive, the difference made with respect to the firm's revenue growth by a post-privatization appointment of a new CEO in a privatized firm is not significant. At the same time a median-sized privatized firm in which the CEO has *not* changed outperforms (p-value=0.06) a state firm of the same size,

¹⁸ When the performance of state firms is evaluated over the 1992-93 period (see Appendix A), management change has a significant (p-value = 8%) impact on revenue performance. But even then, the impact of managerial change on the revenues of a median firm (\$6 mln. in sales) amounts to less than 6 percentage points, while privatization adds independently another 21 percentage points to the firm's revenue growth (p-value less than 0.01). The thrust of our argument is not that the quality of human capital does not matter, but that it does not explain the most important effects of privatization.

regardless of whether or not it has a new CEO, by ca. 12 percentage points per annum.¹⁹

¹⁹ This result is not significantly changed if only outside CEO appointments, and not internal promotions, are considered. Nor are the results significantly affected if the changes of CEOs in 1993 are omitted (on the ground that they may have been too recent to produce significant effects before the second half of 1994, when our study was conducted). Finally, the results are virtually identical if the managerial change in privatized firms includes both post- and pre-privatization (and not only post-privatization) appointments, indicating that there may not be a great difference in the quality of managers chosen by the new owners and those chosen by the state prior to (perhaps in preparation for) privatization.

**TABLE 6: THE IMPACT OF MANAGEMENT CHANGE
ON THE REVENUE PERFORMANCE OF STATE AND PRIVATIZED FIRMS
OVER 1991-93 PERIOD**

	ANNUALIZED RATE OF REVENUE GROWTH ¹
<i>Constant</i>	4.70 (5.24)
<i>Privatized firm in which new CEO was appointed in the year of privatization or later²</i>	6.45 (5.68)
<i>State firm in which the CEO did not change during the 1990-93 period³</i>	-13.42* (5.64)
<i>State firm in which the new CEO was appointed during the 1990-93 period⁴</i>	-13.04* (6.70)
<i>Initial level of revenues⁵</i>	-0.14 (0.11)
<i>Initial level of revenues of privatized firms</i>	-0.24 (0.17)
<i>Hungary⁶</i>	-6.82 (4.48)
<i>Poland⁷</i>	-9.01* (4.13)
	n =165 F = 5.24* adj. R ² =0.15

* p = 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ For privatized firms, all rates of growth of revenue are annualized between the year of privatization and the end of 1993; for state firms, the rates of growth are annualized between 1991 and 1993. (To eliminate possible bias due to the use different initial years in calculating annualized rates of growth for state and privatized firms, Table A6 in Appendix A provides the regression statistics which obtain when the rates of growth for state firms are annualized between 1990-93 and 1992-93. Note that the choice of the initial year does not affect the significance or the order of magnitude of the estimates reported in this Table.) Revenues are measured in constant local prices.

² A dummy variable equal to 1 if the firm is privatized and a new CEO was appointed in the year of privatization or later, zero otherwise.

³ A dummy variable equal to 1 if the firm is state and its CEO did not change during the 1990-93 period, zero otherwise.

⁴ A dummy variable equal to 1 if the firm is state and a new CEO was appointed during the 1990-93 period, zero otherwise.

⁵ For privatized firms, the initial levels of revenue are for the year of privatization. For state firms, the initial levels are those for 1991. (To avoid possible bias due to the use of initial revenue levels for different years for state and privatized firms, the initial levels for state firms in Table A6 in Appendix A are for 1990 and 1992, respectively. Note that the choice of the year does not affect the significance or the order of magnitude of the estimates reported in this Table.) Initial revenue is measured in millions of US dollars.

⁶ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁷ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

Why ownership matters? Risk attitudes and non-accountability

The fact that the superiority of the privatized firms' performance is much less pronounced with respect to cost-cutting measures than with respect to generation of new revenues (Table 1, above; and Frydman *et al.* [1997]) provides another indication that the performance differences between these two types of firms are less likely to be due to differences in managerial skills (which play a role in both cost- and revenue-side restructuring) than to differences in incentives to use these skills in different types of situations. Indeed, the difference between the cost- and revenue-side restructuring may be instructive with respect to the differences between state and privatized firms' behavior.

We argued that cost restructuring is a matter of political will, while revenue generation is a matter of entrepreneurship. The reason why entrepreneurship is necessary to generate revenues is that, unlike post-restructuring costs, future sales depend strongly on decisions of customers and consumers which makes them inherently risky and unpredictable. This, in turn, we believe, makes two factors of special importance: the risk attitudes of the decision makers and the constraints on the types of risks they can justify taking. With respect to the first of these factors, decision makers in privatized firms have a different structure of payoffs from their decisions, as compared to their counterparts in state-owned companies, which in turn influences their attitudes toward risks. With respect to the second factor, regardless of the payoffs attached to different outcomes of particular decisions, the control structure of state firms, which requires that decision makers be accountable for their decisions, may narrow the range of opportunities that managers of state enterprises may be expected to pursue.

Managers of state companies have their human capital heavily invested in their jobs and are thus exposed to the downside of risky projects, the failure of which may threaten their positions. On the other hand, they have only limited expectation of a participation in the potential upside of their decisions. As a result, they are expected to be generally risk averse, except when their firms are close to collapse (or when their jobs are already threatened because of the firm's inferior performance). In the latter case, managers of state firms may be expected to become risk prone because the downside of risky decisions becomes low to them (though not to

the firm), while an even small chance of success promises to save their jobs.²⁰

A different pattern of behavior may be expected from an owner of a firm (insofar as he is active in company decisions).²¹ Unlike the manager, an owner benefits from all the upside potential of the firm's decision, and although he must also bear the downside risk, his ability to diversify it is much greater than that of the people in control of state-owned firms. Consequently, the owner may be expected to maximize the value of the firm and to be prepared to make risky decisions, if the payoffs justify the risks.²² Unless the firm is heavily leveraged (as few privatized firms in our sample are; see footnote 14 above), the owner is also less likely than a manager of a state firm to play Russian roulette with the firm when it is in financial difficulties, since the firm may have some residual value even if its business is not going well.

This pattern of risk attitudes is quite consistent with the different effectiveness of product restructuring measures we observe in our sample. If the privatized firms engage in more risky types of restructuring, attempting more radical changes and seizing the opportunities that present themselves, they can expect consistently higher returns than their state-owned counterparts. Similarly, if state firms undertake the more risky forms of major product restructuring not in response to opportunities that arise when their firms do relatively better and can focus on changing their offerings, but rather when the firms are in distress and have to fight for survival, the results may be expected to be inferior.

But there is yet another factor, much less commonly observed, which we believe to be of great importance in accounting for the different behavior of state and privatized firms. Quite independently from their different attitudes toward risks, the owners of privatized firms also have another advantage over the managers in charge of state enterprises in that *they do not have to*

²⁰ The monitors of the managers of state firms have similar payoffs to the managers themselves. Like the managers, they derive limited benefits from the upside potential of risky decisions. On the downside, on the other hand, they are more likely to encounter political problems if the firms under their supervision go bankrupt (or require big bailouts) than if their "scrap" value is wasted (so that they are willing to undertake very risky projects to keep the firms afloat).

²¹ Most privatized firms in our sample firms have very concentrated ownership (see Appendix B), and their owners are likely to be involved in most major decisions: 94% of the managers of privatized companies in the sample consult "regularly" (74%) or "occasionally" (20%) with their main shareholders.

²² To be sure, a nondiversified owner may be risk averse. Although we lack direct evidence on this, the types of outside owners most common in our sample (foreign and domestic companies, investment funds) are likely to be quite well diversified.

account to anyone for the decisions they make. It is in the very nature of entrepreneurship that it is not a science: it does not proceed in accordance with well understood rules or knowledge that can be objectively demonstrated. (Kirzner [1979].) Instead, entrepreneurial decisions involve a large measure of ineffable skills and often quite idiosyncratic evaluations of the situation. Indeed, the very idiosyncratic nature of an entrepreneur's approach, which allows him to succeed by breaking the mold of routine, rule-governed behavior, makes it very difficult for him to convey his "hunches" or "intuitions" to others whose views are within the prevailing consensus.

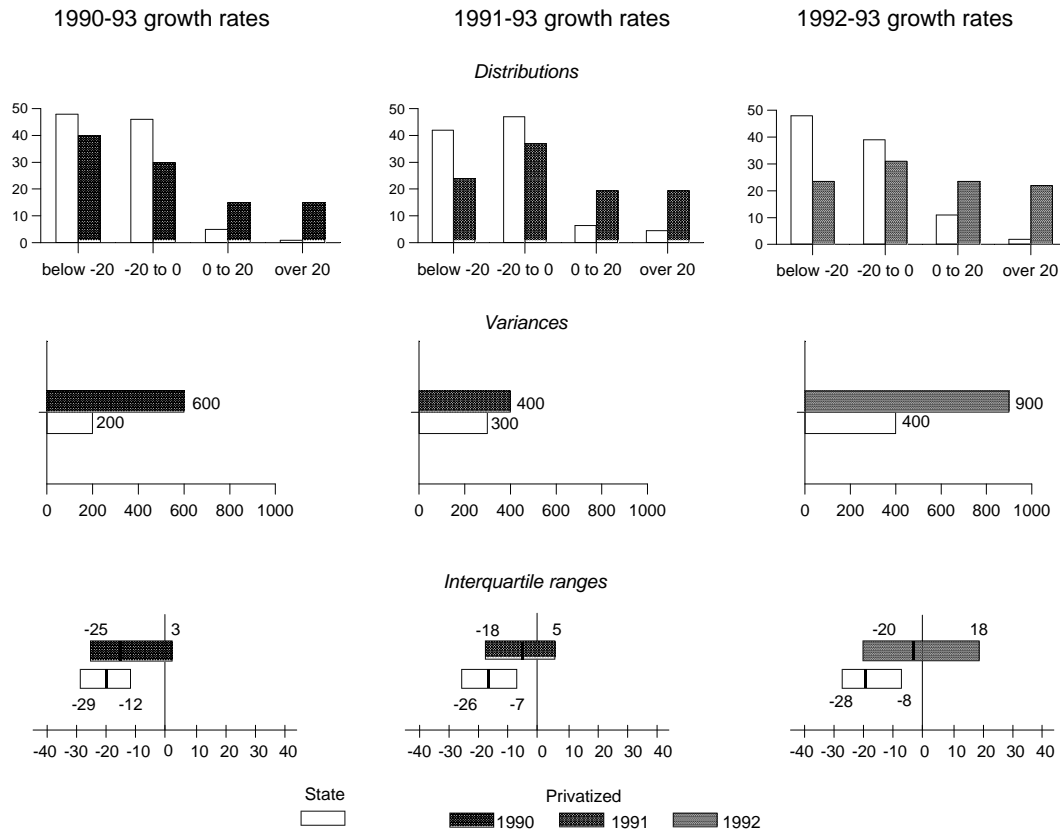
A paradigmatic example of an entrepreneurial point of view is an idiosyncratic subjective assignment of probabilities to events to which an objective (statistical) assignment of probabilities is extremely difficult or impossible. An assignment of probabilities is required to calculate the expected payoffs from a creative project, such as a bet on a new product or a far-reaching design change. If such an assignment is subjective, it is difficult for a manager of a state firm, in which the principles of bureaucratic accountability are necessarily the rule, to pursue entrepreneurial projects, because the more entrepreneurial the manager's decision, the more trouble he will have explaining the reasons why he acted in this way and not another.²³ This means that even if the decision is right, the manager might be unable to clear it in advance with his monitors or, if he makes it on his own responsibility, explain it adequately if things go wrong (Hayek [1948]). Decisions that are worth making, therefore, including many product innovations that an owner, who need not account to anyone for what he does, will be likely to make, may for this very reason not be taken by a manager of a state enterprise. In other words, the opportunity set from which an accountable manager picks his projects is narrowed down, as compared to that faced by an owner, by the very fact of the manager's accountability.

This suggests one more empirical test of the difference between state and privatized enterprises. If the opportunity set that accountable managers of state enterprises are likely to face is narrower than that of the owners of privatized firms, and if the owners, because of their

²³ This difficulty is not due to any "deficiency" of the monitors to whom a manager is accountable. Precisely because entrepreneurship involves idiosyncratic, subjective insights, the monitors who are unpersuaded by them are not only perfectly within their rights to reject them, but would also be derelict in their duty if they accepted them against their own best judgment.

different attitudes toward risk, are generally more likely to take justifiable risks than the managers of state firms, the performance of privatized firms should be characterized not only by higher averages, but also by a significantly greater *variance* of outcomes than that of state firms. This turns out to be the case, as may be seen from Figure 3 below which summarizes the differences in the distributions of the annualized rates of revenue growth of privatized and state firms over matching time periods.

Figure 3
Variability of revenue growth rates
of privatized and state firm



The top row of Figure 3 shows the distributions of growth rates of privatized and state firms. While the performance of state firms is quite concentrated (with a narrow tail barely reaching positive values of growth rates), the performance of privatized firms tends to be uniform over the entire range. The higher average rates of revenue growth of privatized firms are thus accompanied by higher variances, shown in the middle part of Figure 3. The overall distribution of post-privatization rates of revenue growth of privatized firms has a higher mean and a higher variance than the distribution of growth rates of state firms, with the differences in both moments significant (at p-values less than or equal to 0.01) regardless of the time period over which the performance of state firms is evaluated. The differences in variability persists even when the extreme values of performance are excluded. The bottom graphs in Figure 3 show the growth rates of the middle 50 percent of privatized and state firms. Again, the upward shifts of the median values of performance of privatized firms are accompanied by a pronounced lengthening of the interquartile ranges.

All of these results are consistent with our hypothesis that the superior results of product restructuring by privatized firms are a function of their greater willingness to accept risks and their freedom to make decisions without having to justify them to a hierarchy of state officials. Entrepreneurship certainly involves skills and abilities – risk taking and nonaccountability pay off only when the decision maker uses them to good purpose. But entrepreneurial skills may also be inherently tied to private ownership because only private ownership may provide the proper conditions for their exercise.

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APPENDIX A: PERFORMANCE ANNUALIZATION

In order to smooth year-to-year variations, the performance of the firms in the sample is usually annualized over a number of years according to the following formula: if P_t denotes a firm's performance level in year t , the annualized rate of growth of performance, $ARPG$, is an imputed rate which satisfies $P_T/P_t = (1 + ARPG)^{(T-t)}$ over the appropriate time interval ($T - t$), $T > t$.

In the regressions reported in this paper the performance of privatized firms is generally measured between the time of privatization and 1993 (which is the last year for which we have complete annual data in our sample). This raises the question of the period over which the performance of state firms should be measured. Ideally, the time interval should be the same for state and privatized firms. Otherwise, if 1990 was a bad recessionary year for all firms and if many firms were privatized only in 1991 or 1992, a comparison of the growth rates of state firms annualized over the 1990-1993 period with the growth rates of the privatized firms annualized over the 1991-1993 or 1992-1993 periods may make the performance of state firms look artificially weak. But different firms were privatized at different times (1990, 1991, 1992), and trying to keep the time interval the same for state and privatized firms would necessitate three different sets of comparisons, each of which would compare a relatively small number of firms privatized in a given year to the same set of state firms. This would, in turn, make the results less robust and the overall comparisons of state and privatized firms (regardless of the year in which they were privatized) obscure.

We therefore decided, for most purposes, to group all the firms together. As a result, firms within the single "privatized" category have their post-privatization performance annualized over different periods of time: those privatized in 1990 between 1990 and 1993; those privatized in 1991 between 1991 and 1993, and those privatized in 1992 between 1992 and 1993. This makes it clearly impossible to pick a single "matching" period for the evaluation of the performance of state firms. To avoid the problem created by the fact that the changing macroeconomic environment might have caused all firms, state or privatized, to grow or decline at different rates in different years, we estimated the performance of state firms over three different periods: 1990-93, 1991-93, and 1992-93. This produced three sets of estimates for each equation, one of which (using the 1991-1993 period, which generally happens to be the most "favorable" for state firms) is reported in the text of this paper, and the remaining two are reproduced in this Appendix. Note, however, that with a few exceptions noted in the text, *our results are essentially invariant with respect to the time period used: the estimates retain their signs and significance across all three sets*, indicating that *different macroeconomic conditions in different years do not affect our results*.

TABLE A1: THE IMPACT OF STATE INVOLVEMENT ON COST AND REVENUE PERFORMANCE

	ANNUALIZED RATE OF GROWTH ¹ OF			
	REVENUE		COST/REVENUE	
	1990-93	1992-93	1990-93	1992-93
<i>Constant</i>	-16.41* (3.41)	-15.35* (3.37)	35.45* (5.89)	36.58* (6.51)
<i>Privatized firms</i> ²	27.31* (4.64)	26.41* (4.89)	-1.72 (3.50)	-2.87 (3.65)
<i>State firm with active involvement of the state</i> ³	1.45 (3.83)	-2.97 (4.88)	6.02** (3.30)	4.94 (4.22)
<i>Initial value of performance measure</i> ⁴	-0.05 (0.08)	0.09 (0.11)	-0.33* (0.05)	-0.32* (0.06)
<i>Initial level of revenues of privatized firms</i> ⁵	-0.36* (0.13)	-0.50* (0.16)	-	-
<i>Hungary</i> ⁶	-10.58* (4.22)	-10.80* (4.53)	-9.61* (3.08)	-11.67* (3.34)
<i>Poland</i> ⁷	-4.47 (3.65)	-5.26 (3.86)	-6.86 (3.82)	-5.78 (4.29)
	n =167 F = 10.62* adj. R ² =0.26	n =167 F = 8.38* adj. R ² =0.21	n = 130 F = 11.09* adj. R ² =0.28	n = 130 F = 8.29* adj. R ² =0.22

* p ≤ 0.05, ** p ≤ 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroscedasticity consistent estimator of the asymptotic covariance matrix.

¹ Rates of growth of both revenues and costs/revenues are annualized over the 1990-93 and 1992-93 periods, respectively, for state firms and over the post-privatization period for privatized firms. Revenues and costs are measured in constant local prices.

² A dummy variable equal 1 if the firm is privatized, 0 otherwise

³ A dummy variable equal to 1 if the state firm is actively monitored by the state, zero otherwise.

⁴ For privatized firms, the initial values of revenue, and cost per unit of revenue are for the year of privatization. For state firms, the initial values are those for 1990 and 1992, respectively. Initial revenue is measured in US\$1,000,000's.

⁵ The coefficients of initial cost per unit of revenue for privatized firms were not significant, and the corresponding equation was re-estimated without this variables.

⁶ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁷ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

TABLE A2: THE PROBABILITY OF FUTURE LAYOFFS AS A FUNCTION OF PRODUCTIVITY HISTORY

(FOR FIRMS WITH DECLINING PRODUCTIVITY OVER 1990-93 PERIOD)

	PRIVATIZED FIRMS	STATE FIRMS
<i>Constant</i>	-0.33 (0.28)	0.38** (0.23)
<i>State firm with active involvement of the state¹</i>	-	-0.25** (0.15)
<i>Past productivity growth rate²</i>	-0.025* (0.012)	0.004 (0.007)
<i>Initial employment level³</i>	0.33* (0.17)	0.07 (0.12)
<i>Hungary⁴</i>	-0.29 (0.21)	-0.19 (0.21)
<i>Poland⁵</i>	-	-0.09 (0.18)
	n = 36 $\chi^2 = 12.0$ (d.f.=3)	n = 53 $\chi^2 = 6.71$ (d.f.=5)

* $p \leq 0.05$, ** $p \leq 0.10$; Marginal effects based on probit estimates, standard errors in parenthesis, significant coefficients bold-faced.

¹A dummy variable equal to 1 if the state firm is actively monitored by the state, zero otherwise.

²Rate of growth of revenue per full-time employee annualized over 1990-93 period. Revenues are measured in constant local prices.

³1990 employment (in 1,000's full-time employees)

⁴A dummy variable equal to 1 if the firm is in Hungary, 0 otherwise.

⁵A dummy variable equal to 1 if the firm is in Poland, 0 otherwise.

TABLE A3: THE IMPACT OF MAJOR PRODUCT RESTRUCTURING ON REVENUE GROWTH

	ANNUALIZED RATE OF REVENUE GROWTH ¹	
	1990-93	1992-93
<i>Constant</i>	-9.42* (4.52)	-9.12** (4.86)
<i>Privatized firms that restructured their products²</i>	27.01* (6.59)	26.63* (7.00)
<i>Privatized firms that did not restructure their products³</i>	14.24* (5.81)	13.87* (6.23)
<i>State firms that did not restructure their products⁴</i>	-0.83 (3.72)	1.98 (4.61)
<i>Initial value of revenues⁵</i>	-0.11 (0.08)	-0.12 (0.09)
<i>Initial level of revenues for privatized firms</i>	-0.19 (0.13)	-0.17 (0.14)
<i>Hungary⁶</i>	-13.02* (4.17)	-12.86* (4.40)
<i>Poland⁷</i>	-12.87* (4.37)	-13.00* (5.03)
	n = 137 F = 8.72* adj. R ² = 0.28	n = 137 F = 7.40* adj. R ² = 0.25

* p = 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ For state or privatized firms that restructured their products in 1991, the post-restructuring rates of revenue growth are annualized over the 1990-93 period (thus counting the performance in the year in which the restructuring measure was introduced as part of the post-restructuring period); for those that restructured in 1992, the post-restructuring rate is for 1991-93, and for the firms that restructured in 1993, the rate is for 1992-93 period. For state firms that did not undertake restructuring of their products the rates are annualized over 1990-93 and 1992-93 periods, respectively. For privatized firms that did not restructure their products the rate of revenue growth is annualized between the year of privatization and 1993. Revenues are measured in constant local prices.

² A dummy variable equal 1 if the firm is privatized and restructured its products, 0 otherwise

³ A dummy variable equal 1 if the firm is privatized and did not restructure its products, 0 otherwise

⁴ A dummy variable equal 1 if the firm is state-owned and did not restructure its products, 0 otherwise

⁵ For privatized firms, the initial values of revenue are for the year of privatization. For state firms, the initial values are those for the first year of each post-restructuring rate of growth as specified in note 1 above (1990 for 1990-93 rates, 1991 for 1991-93 rates, and 1992 for 1992-93 rates). Initial revenue is measured in US\$1,000,000's.

⁶ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁷ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

**TABLE A5: THE IMPACT OF OWNERSHIP AND MANAGEMENT CHANGE
ON REVENUE PERFORMANCE**

	ANNUALIZED RATE OF REVENUE GROWTH ¹			
	1990-93		1992-93	
<i>Constant</i>	-15.31* (4.25)	-14.07 (4.29)	-17.07* (4.57)	-16.00* (4.63)
<i>Privatized firm</i> ²	22.17* (4.58)	23.14* (4.76)	22.40* (4.98)	23.41* (5.19)
<i>Firm in which a new CEO was appointed during the 1990-93 period</i> ³	4.05 (3.02)	-	5.87** (3.34)	-
<i>Firm in which a new CEO (appointed during the 1990-93 period) was promoted from within</i> ⁴	-	2.49 (3.70)	-	4.70 (3.95)
<i>Firm in which a new CEO (appointed during the 1990-93 period) came from outside</i> ⁵	-	3.21 (3.62)	-	4.70 (4.21)
<i>Initial level of revenues</i> ⁶	-0.11 (0.07)	-0.11 (0.07)	-0.11 (0.07)	-0.01 (0.10)
<i>Initial level of revenues of privatized firms</i>	-0.30* (0.14)	-0.31** (0.17)	-0.30* (0.14)	-0.41* (0.18)
<i>Hungary</i> ⁷	-7.32** (3.96)	-7.86** (4.07)	-7.32** (3.96)	-7.13** (4.31)
<i>Poland</i> ⁸	-6.41** (3.81)	-6.97** (3.83)	-6.41** (3.81)	-6.61 (4.31)
	n=179 F=9.97* adj R ² =0.23	n=175 F=8.86* adj R ² =0.24	n=179 F=7.64* adj R ² =0.18	n=175 F=6.67* adj R ² =0.19

* p = 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ For privatized firms, all rates of growth of revenue are annualized between the year of privatization and the end of 1993; for state firms, the rates of growth are annualized between 1990-93 and 1992-93, respectively. Revenues are measured in constant local prices.

² A dummy variable equal 1 if the firm is privatized, 0 otherwise

³ A dummy variable equal to 1 if a new CEO was appointed during the 1990-93 period, zero otherwise.

⁴ A dummy variable equal to 1 if the current CEO was promoted from within, zero otherwise.

⁵ A dummy variable equal to 1 if the current CEO came from outside, zero otherwise.

⁶ For privatized firms, the initial levels of revenue are for the year of privatization. For state firms, the initial levels are those for 1990 and 1992, respectively. Initial revenue is measured in millions of US dollars.

⁷ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁸ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

**TABLE A6: THE IMPACT OF MANAGEMENT CHANGE
ON THE REVENUE PERFORMANCE OF STATE AND PRIVATIZED FIRMS**

	ANNUALIZED RATE OF REVENUE GROWTH ¹	
	1990-93	1992-93
<i>Constant</i>	5.05 (5.18)	4.62 (5.26)
<i>Privatized firm in which new CEO was appointed in the year of privatization or later²</i>	6.38 (5.66)	6.42 (5.68)
<i>State firm in which the CEO did not change during the 1990-93 period³</i>	-16.02* (5.36)	-15.26* (5.95)
<i>State firm in which the new CEO was appointed during the 1990-93 period⁴</i>	-17.40* (5.63)	-20.25* (6.07)
<i>Initial level of revenues⁵</i>	-0.13** (0.07)	-0.01 (0.1)
<i>Initial level of revenues of privatized firms</i>	-0.24** (0.14)	-0.36* (0.15)
<i>Hungary⁶</i>	-7.42** (4.27)	-6.72 (4.55)
<i>Poland⁷</i>	-8.63* (3.90)	-7.90** (4.43)
	n=165 F=7.36* adj R ² =0.21	n=165 F=5.47* adj R ² =0.16

* p = 0.05, ** p = 0.10 ; standard errors in parenthesis, significant coefficients bold-faced. All equations estimated by ordinary least squares (OLS) with the White (1980) heteroskedasticity consistent estimator of the asymptotic covariance matrix.

¹ For privatized firms, all rates of growth of revenue are annualized between the year of privatization and the end of 1993; for state firms, the rates of growth are annualized between 1990-93 and 1992-93, respectively. Revenues are measured in constant local prices.

² A dummy variable equal to 1 if the firm is privatized and a new CEO was appointed in the year of privatization or later, zero otherwise.

³ A dummy variable equal to 1 if the firm is state and its CEO did not change during the 1990-93 period, zero otherwise.

⁴ A dummy variable equal to 1 if the firm is state and a new CEO was appointed during the 1990-93 period, zero otherwise.

⁵ For privatized firms, the initial levels of revenue are for the year of privatization. For state firms, the initial levels are those for 1990 or 1992, respectively. Initial revenue is measured in millions of US dollars.

⁶ A dummy variable equal 1 if the firm is in Hungary, 0 otherwise

⁷ A dummy variable equal 1 if the firm is in Poland, 0 otherwise

APPENDIX B: SAMPLE DESCRIPTION

The present study is based on a survey of 506 mid-size firms in the Czech Republic, Hungary, and Poland conducted in the fall of 1994. The sample was drawn from firms employing between 100 and 1,500 persons: the median 1993 employment in the sample was - about 360 full-time employees, and the median 1993 sales were just short of US\$ 6 million. The procedure used was to draw randomly from the list of firms provided by the Central Statistical Office in each country, but when a maximum of firms with a certain type of owners was reached, further firms with the same ownership type were not included in the survey. (No such adjustments were necessary in Hungary.)

Separate interviews (using different close-ended questionnaires) were conducted in each firm with the chief executive officer, the chief financial officer, and the chief production officer. An additional questionnaire, requesting time series data on revenues, labor and material costs, employment, and taxes, was filled out at each firm by the accounting department.

The present study is based on a subsample of the original 506 firms. Excluded were 88 private firms that were never state-owned, 86 firms the ownership of which was in doubt, 87 firms privatized in 1993 or 1994 (for which no post-privatization data was available), and a varying number of firms (depending on the issue studied) that did not provide complete data on some aspects of their performance. (We have no reason to believe that the incompleteness of data for certain firms introduces any systematic bias "in favor" or "against" any group of firms. The most common reason for incompleteness was lack availability or an obvious misunderstanding of certain questions.) A firm was considered privatized if it or its predecessor was state-owned and the combined holdings of private parties gave them the power to block major decisions at the general shareholder meeting. In some (15%) of the firms classified as privatized, the state remained a majority shareholder, but otherwise the generally high concentration of holdings in our sample (reported below) makes the difference between blocking and majority power of little significance.

The number of firms actually used in the analysis thus varies with the particular aspect of performance and the time period under examination: for 1991-93 revenue performance data, the sample included 167 firms; for 1991-93 cost performance data, it included 130 firms. (The reason why the number of respondents is smaller for cost-related questions is that our cost data are composites of labor and material costs time series, which increases the possibility of data incompleteness.) The distributions of sample firms by ownership type country, and industrial sector are reproduced below.

B.1 COUNTRY DISTRIBUTION OF SAMPLE FIRMS

Firm type	Czech R	Hungary	Poland*	All
State firms**	23	15	42	80
Privatized firms	39	42	6	87
<i>privatized in 1990***</i>	-	13	2	15
<i>privatized in 1991</i>	5	12	4	21
<i>privatized in 1992</i>	34	17	-	51
All	62	57	48	167

* Because many Polish firms were privatized late (after 1992) and many were privatized through leasing (and are excluded from the subsample used in this paper because their ownership structure remains unclear), most of the privatized firms in the subsample are in Hungary or the Czech Republic.

** Extensive tests revealed no significant performance differences between state and corporatized firms in our sample.

*** In the Czech Republic, the year of privatization refers to the year in which the new owners assumed control rather than the year during which the shares were formally distributed

B.2 DISTRIBUTIONS OF INITIAL AND LAST-PERIOD REVENUES AND EMPLOYMENT

Firm type	<i>Initial / ending revenue</i> <i>(US\$ mil, constant prices)</i>			<i>Initial / ending</i> <i>employment</i>		
	Firms	Mean	Median	Firms	Mean	Median

ALL COUNTRIES

State	80	15.63 / 11.35	6.79 / 5.71	80	845 / 600	570 / 426
Privatized	87	14.86 / 14.25	6.56 / 8.40	77	711 / 621	400 / 344

CZECH REPUBLIC

State	23	19.27 / 12.97	13.19 / 6.61	23	1232 / 797	832 / 580
Privatized	39	14.91 / 16.53	5.45 / 8.57	32	819 / 770	394 / 343

HUNGARY

State	15	26.78 / 17.06	10.38 / 7.88	14	578 / 483	431 / 368
Privatized	42	14.16 / 11.38	8.51 / 5.96	40	556 / 465	390 / 277

POLAND

State	42	9.66 / 8.43	5.30 / 4.55	43	726 / 534	543 / 413
Privatized	6	19.45 / 19.52	21.64 / 17.76	5	1256 / 914	883 / 903

B.3 SECTORAL DISTRIBUTION OF SAMPLE FIRMS (TWO-DIGIT SIC CODES)

Industrial sector	Number (%) of	
	state firms	privatized firms
Food&beverages	16 (20%)	27 (31%)
Clothing	11 (14%)	17 (20%)
Furniture	13 (16%)	6 (7%)
Textile	6 (7%)	7 (8%)
Leather	3 (4%)	6 (7%)
Chemicals	13 (16%)	8 (9%)
Non-ferrous minerals	15 (19%)	15 (17%)
Other	3 (4%)	1 (1%)
	80 (100%)	87 (100%)

B.4 OWNERSHIP STRUCTURE OF PRIVATIZED FIRMS

Shareholder	Number of firms in which the shareholder is the largest owner	Mean holdings when the shareholder is the largest owner
Foreign company	26	75%
<i>Czech Republic</i>	7	69%
<i>Hungary</i>	17	82%
<i>Poland</i>	2	40%
Privatization fund	16	20%
<i>Czech Republic</i>	16	20%
Domestic nonfinancial company	8	72%
<i>Czech Republic</i>	4	75%
<i>Hungary</i>	2	77%
<i>Poland</i>	2	59%
Domestic individual	5	66%
<i>Czech Republic</i>	2	72%
<i>Hungary</i>	2	52%
<i>Poland</i>	1	80%
State or state-owned company	14	44%
<i>Czech Republic</i>	6	36%
<i>Hungary</i>	7	49%
<i>Poland</i>	1	60%
Managerial employees	8	78%
<i>Czech Republic</i>	4	87%
<i>Hungary</i>	4	69%
Non-managerial employees	9	74%
<i>Hungary</i>	9	74%

* For one Hungarian firm in the sample, the identity of the largest shareholder was not clear.