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AND CORPORATE PERFORMANCE
IN THE CZECH REPUBLIC**

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ABSTRACT

Ownership Concentration and Corporate Performance in the Czech Republic*

The relationship between ownership structure and corporate performance has been the subject of intense research in both transition and market economies. The Czech Republic's mass-privatization program provides an unique opportunity to investigate this relationship. It changed the ownership of firms in a short period of time, and firm characteristics had only a limited influence on the resulting ownership structure. For a cross-section of 706 Czech firms over the period 1992 through 1997, we find that the more concentrated ownership, the higher firm profitability and labor productivity. These findings are weakly robust to the inclusion of control variables for the type of ownership, or to a correction for the endogeneity of ownership concentration.

JEL Classification: G32, G34

Keywords: ownership concentration, Czech republic

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NON-TECHNICAL SUMMARY

The association between ownership structure and corporate performance is a topic that has often been studied in both transition and market economies. Research on this topic dates back over 60 years to Berle and Means (1933), who contend that diffuse ownership yields significant power in the hands of managers whose interests do not coincide with the interest of shareholders. As a result, corporate resources are not used for the maximization of shareholders' value. Several studies find a strong positive relationship between ownership concentration and corporate performance in the US and other market economies and attribute it to the impact of better monitoring. In transition economies, empirical studies find a positive relationship between concentrated ownership and both voucher prices and stock market prices in the Czech Republic and China. Other studies find a positive relationship between actual firm performance and ownership concentration in Russia.

A second strand of literature argues, however, that the relationship is spurious. While greater ownership concentration results in stronger incentives to monitor, the expected gain from active monitoring and the costs of alternative ownership structures vary across firms. If transaction costs inhibiting investors from taking value-maximizing positions in firms are low, as is often the case in market economies, each firm would have the optimal ownership structure. Other proponents of this argument point to the evidence from the US stock market where large firms are widely held. Even though the ownership structure is dispersed, effective monitoring is in place since such firms are frequently in the public eye due to analysts' reports. In such cases, an investor would need a relatively small share to promote changes in management or alter its behaviour.

Much of the empirical work on the relationship between ownership structure and corporate performance has had difficulty allowing for the possible feedback of firm characteristics to ownership, especially since it has focused mainly on market economies with low transactions costs in changing ownership. Using a data set that, by construction, alleviates the endogeneity problem can contribute to the debate on the direction of causality. The design of the Czech privatization program precluded the adjustment of ownership to firm characteristics. In particular, the decision to change ownership was taken by the state, while the rules of the bidding process prevented participating agents from obtaining optimal ownership structure.

Thus, we can study the link between concentrated ownership and firm performance following voucher privatization. The Czech voucher scheme prevented insiders from acquiring large ownership stakes, as few direct sales of assets took place before voucher privatization. The short time before

privatization (the first round started only three months after the initial announcement) made it difficult for investors with insider knowledge to accumulate sufficient capital to buy significant quantities of shares. The Czech voucher, unlike its Russian counterpart, was not transferable so that the accumulation of an individual stake from the percentage of shares allocated to voucher privatization was impossible.

We relate ownership concentration to two corporate performance parameters for a cross-section of Czech firms over the period 1992-7. In particular, we test whether firms with more concentrated ownership have experienced larger positive changes in profitability and labour productivity. Controlling for some firm-specific variables, we find that both profitability and productivity changes are positively related with ownership concentration. A 10% increase in concentration leads to a 2% increase in short-term labour productivity and a 3% increase in short-term profitability. The results are weakly robust to alternative econometric and data specifications.

1. Introduction

The association between ownership structure and corporate performance is a much studied topic in both transition and market economies. The research on this topic dates back more than sixty years to Berle and Means (1933), who contend that diffuse ownership yields significant power in the hands of managers whose interests do not coincide with the interest of shareholders. As a result, corporate resources are not used for the maximization of shareholders' value. Shleifer and Vishny (1986), McConnell and Servaes (1990), Megginson et al. (1994), and Zingales (1994) find a strong positive relation between ownership concentration and corporate performance in the United States and other market economies and attribute it to the impact of better monitoring.

In transition economies, Claessens (1997) and Weiss and Nikitin (1999) find a positive relationship between concentrated ownership and both voucher prices and stock market prices in the Czech Republic. Xu and Wang (1997) find a similar result for a sample of listed Chinese companies. Other studies (Barberis et al (1996) and Earle and Estrin (1996)) find a positive relation between actual firm performance and ownership concentration in Russia.

A second strand of literature (Coase, 1988; Demsetz and Lehn, 1985) argues, however, that the relation is spurious. While greater ownership concentration results in stronger incentives to monitor, the expected gain from active monitoring and the costs of alternative ownership structures vary across firms. If transaction costs inhibiting investors from taking value-maximizing positions in firms are low, as is often the case in market economies, each firm would have the optimal ownership structure. Other proponents of this argument point to the evidence

from the US stock market where large firms are widely held. Even though the ownership structure is dispersed, effective monitoring is in place since such firms are frequently in the public eye due to analysts' reports. In such cases, an investor would need a relatively small share to promote changes in management or alter its behavior.

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The paper proceeds as follows. Section 2 describes the Czech privatization scheme. The data and empirical design are documented in section 3. Section 4 presents the results. Robustness checks are performed in section 5. Conclusions are summarized in section 6.

2. The Czech Voucher Scheme

The Czech mass-privatization scheme took place in two phases. The first started in October 1992 and ended in June 1993; the second started in January 1994 and ended in October the same year.² In total, 988 Czech enterprises participated in the first phase and 861 enterprises in the second phase. Firms selected for privatization had to submit privatization proposals to the founding ministry. Competing proposals from outside strategic investors were also possible. As part of the preparation, firms were corporatized and the book value of equity was determined. The number of shares for sale was set proportional to the book value of equity for all firms, i.e., the book value of equity per share was identical for all firms. There were some differences in the

selection of firms for the first and second phase. The first phase mainly consisted of manufacturing firms and excluded some large, vertically-integrated industrial conglomerates. Those needed extra time to be split up into smaller, independent firms (Lizal et al, 1995). The second phase included those newly created independent firms, as well as some banks and utility companies. Within a short period, about sixty percent of the Czech economy was transferred into private hands.

If a direct domestic or foreign investor had been identified prior to voucher privatization, those shares were not offered in the voucher rounds. In total, 442 sales to strategic investors happened outside the voucher privatization. The majority of those firms were, however, small. Only 36 firms from this group were subsequently listed on the stock exchange. The privatization proposal also determined the equity share that was to remain with the state. For all firms, 3% of shares was set aside to be used for restitution to individuals. All citizens 18 years and older could buy, for a nominal fee, a package of vouchers worth 1000 points. In both waves, the package price was equivalent to US\$35 or about the average weekly wage at the time. With these points, individuals could bid for shares or offer their points to investment funds. After the bidding rounds, points were exchanged for shares and secondary market trading started at the Prague Stock Exchange and the electronic market.

A large number of investment privatization funds emerged on a voluntary basis. Over 430 funds were established in the first phase and an additional 120 were established in the second phase. Sponsoring a fund involved the establishment of a management company that organized the fund. In the first phase, the funds themselves were established as joint stock companies, with

the original voucher holders as shareholders of the fund. In the second phase, some funds were also established as unit trusts. As a result of active marketing campaigns, investment funds ended up with 72% of all points in the first phase and 64% of all points in the second phase.

The authorities designed the privatization scheme to allow for the greatest price discovery. General information was made available by the state prior to the start of the auction process on each firm covering such items as business activity, number of employees, output and profit in preceding years, and prior allocation of shares. Individuals and investment funds alike had access to such information in all bank branches and post offices. The privatization scheme involved five sequential bidding rounds with price adjustments between rounds.

In the first round prices, points per share, were set identically for all firms. If demand matched the supply of shares of particular firm at that price, all shares of that firm were sold. If a firm was under-subscribed, those that bid received shares at that price and the remaining shares were offered in the next round at a lower price. When there was modest excess demand, less than 25% excess supply, citizens were given priority over investment funds and the demand of investment funds was scaled down to clear the market. With more than 25% excess demand, however, no shares were sold and all shares were to offered again in the next round at a new price that was set at the previous price times the ratio of demand to supply. The restrictions on sales limited the effects of inside information and linkages of preferred ownership to final ownership.

The valuation of firms during the voucher rounds may be due to signaling and informational advantages of certain owners. Some investors may be more able to evaluate firms

and their ownership may serve as a signal to other investors. These effects were not prevalent in the Czech Republic, however. The auction rules limited any investors with better knowledge from establishing large ownership. Any excessive bidding by investors with inside knowledge in the secondary market would presumably lead to higher prices. While inside information may thus have been revealed through the bidding process or in the secondary market, it is not necessarily associated with ownership by particular investors. Indeed, van Wijnbergen and Marcincin (1997) show that the majority of investment funds overpaid for their purchases, which is in conflict with any insider information theory.

Hingorani et al. (1997) focus on the possible endogeneity of ownership resulting from mass privatization in the Czech Republic. Their hypothesis is that investment funds had informational advantages over other investors during the privatization process. To test this hypothesis, Hingorani et al. form five portfolios, from the highest-demand portfolio to the lowest-demand portfolio, and compare the average change in share prices owned by funds and other investors. They find no statistically significant differences in the performance of these portfolios on the stock market. The authors interpret these findings to suggest that the design of the privatization process largely eliminated biases in stock-picking.

3. Empirical Design

We have survey data on Czech firms compiled by a private consulting firm. The database contains financial and ownership information for 1,782 firms listed on the Prague Stock Exchange, (PSE). All financial variables were defined using international accounting standards from the onset of the survey in 1992. A number of firms do not report revenues, expenditures, or employment changes. We exclude them from our analysis. The 1992 through 1997 data are complete for 371 firms that went through the first phase of voucher privatization, and for 335 firms that went through the second phase. As mentioned in section 2, strategic investors, including managers, had bought packages of shares in a number of firms prior to the first round. In most cases, the remaining shares were offered in the voucher rounds. Such firms, a total of 22, are included in the sample.

Using accounting data to test the effect of changes in corporate performance may be objectionable in formerly centrally planned economies. Data quality is weak as new accounting standards were introduced in the Czech Republic only in 1992. Nevertheless, firms in our sample do report quite complete information and accounting has improved considerably since the onset of the transition. Especially in the last years of our sample, profitability and productivity can be expected to reflect the effects of ownership structures.

Stock market data, used in other studies on the effect of ownership changes in the Czech Republic, have more weaknesses.³ While the stock market is reasonably active, liquidity is lower than in market economies. Furthermore, there is much block-trading off-the-exchange, as much as 85% of total trades in 1996, often at prices different from those on the exchange. The prices on the exchange are more a reflection of the valuation of firms by minority shareholders and not

of the value of control. Given the weak minority shareholder protection in the Czech market, this may lead to a downward bias in the relationship between concentrated ownership and firms' valuation. Hence, we do not use stock market prices in the construction of performance indicators.

For the empirical tests, we use profitability and labor productivity as indicators of corporate performance. Profitability is defined as gross operating profit over net fixed assets plus inventory. Table 1 shows its increase over time, from 14.4% in 1993 to 16.9% in 1995 on average, followed by a decline in 1996. Seven of the top ten firms, firms with the highest profitability, operate in the engineering and architectural design, management, accounting sectors. Six of the bottom 10 operate in the basic metals and the fabricated metal products, including armaments, sectors. Labor productivity is defined as value-added per employee, where sector-specific price indices provided by the Czech Statistical Office are used to deflate value-added. Labor productivity also increased throughout the period 1992 to 1996.

[Table 1 here]

As in Demsetz and Lehn (1985) and Weiss and Nikitin (1999), we use the share of equity held by the top five investors ($T5$) and a logistic transformation of this share ($L5$), defined as $\log\{T5 / [100 - T5]\}$ as the indicators for ownership concentration.⁴ Summary statistics for these measures are also provided in Table 1. Note that the magnitude of $T5$ increases by 40% between 1993 and 1997. The frequency distribution of $T5$ at the beginning and end of our sample shows a strong rightward shift, with significant increase in the number of firms with combined share of the five largest investors of above 70%. Since many of the ownership changes did not take place

through transactions on the Prague Stock Exchange but through directly negotiated sales at undisclosed prices, it may be the case that non value maximizing motivations were driving ownership concentration.

We also find a positive non-monotonic relation between ownership concentration and both profitability and labor productivity. Firms with ownership concentration above 50% in 1994 display a 30% higher labor productivity on average in 1996, compared to firms with less ownership concentration. Profitability shows a similar relation to concentrated ownership, with firms in the seventh decile displaying the highest value. In both cases, the dependent variables peak in the 60% through 70% range and decline afterwards. These findings are similar to those of Xu and Wang's for Chinese firms.

4. Evidence

We estimate regressions using a pooled sample of 2,860 observations, 371 firms with five years of data and 335 firms with three years of data. This sample is used consistently in all four specifications reported in Table 2. As control variables, we use a dummy for the first phase of privatization and also dummies for year and sector. The first phase dummy is used to control for selection bias. Sector dummies are commonly used in studies on firm performance to capture sector-specific shocks, e.g., increased exposure to international trade, growth opportunities and other sector-specific characteristics affecting firm performance. Finally, year dummies are included to correct for changes in the institutional environment as well as economy-wide shocks in a given year. OLS estimates are reported to provide a benchmark for comparison with Xu and

Wang (1997) and Weiss and Nikitin (1999), although F-tests reject the hypothesis that a common constant term across firms is appropriate in either the profitability or the labor productivity specification.⁵ The Hausman-specification tests indicate that the random-effects model is more appropriate, the calculated values were 25.32 and 27.81 respectively.

[Table 2 here]

The empirical tests reveal that the lower the dispersion of ownership, the higher profitability and labor productivity. In both specifications, profitability and labor productivity are positively, and statistically significantly, correlated with ownership concentration. In the year-by-year regressions, not reported, the significance of the ownership concentration variables increases over time, suggesting an improvement in the role of owners in corporate governance. The coefficient on the squared term of ownership concentration is negative and significant in both specifications. This suggests that consolidation of control yields decreasing returns beyond a certain level. This is particularly the case for the profitability regressions where the square-term of concentration has negative, and significant, coefficients in both the OLS and random-effects estimation. Labor productivity also has a decreasing first-derivative in ownership concentration, although it is only marginally significant in the random-effects model. This may reflect the costs of large ownership, as surveyed by Shleifer and Vishny (1997).⁶

The coefficient on the dummy for the first phase is always positive, possibly because ownership structure changed over a longer period of time for such firms and that has had a greater impact on firm performance. We tested the joint significance of sectors and year dummies in all regressions. The sector dummies are always jointly significant at the 1% level.

The sector dummies show some interesting patterns. Agribusiness, construction, and machinery have negative and significant coefficients in the both sets of regressions, while chemicals is the only sector with uniformly positive and significant coefficients. Year dummies are jointly significant at the 1% level for profitability and at the 5% level in the labor productivity regressions.

The results yield some support for the hypothesis that more concentrated ownership has a positive, albeit decreasing, association with firm performance. Next we test for the importance of concentrated ownership while controlling for the endogeneity of the ownership structure, i.e., we study the changes in concentration. The possible endogeneity stems from the heterogeneous nature of firms in the sample. Since this heterogeneity is unobserved, we are left in the uncomfortable position of arguing, at least implicitly, that investors are foregoing value in some firms by choosing the wrong ownership structure. If the endogenous nature of ownership structure is acknowledged but not addressed empirically, alternative explanations for the positive relation between concentrated ownership and firm performance may be valid. For example, profitability may be a proxy for growth opportunities. As managerial performance is less observable in high growth firms, more concentrated ownership may be an endogenous outcome rather than the effect of improved corporate governance. In other words, growth opportunities can affect ownership structure, rather than ownership structure affecting profitability.

To address this issue, we use the argument of the endogenous nature of ownership in the absence of high transactions costs. In its simplest form, this argument states that the structure of corporate ownership varies systematically in ways that are consistent with value maximization.

This should be exhibited in the changes in ownership of Czech firms that took place after mass privatization. Since all companies that participated in the privatization were listed on the stock exchange, managers, foreign firms, and investment funds could buy shares. We would expect that the ownership structure changed in ways that increased the value of investor holdings by the end of the sample period. Therefore, we run a two-step regression in which ownership concentration immediately following voucher privatization is regressed on ownership concentration at the end of the sample period thus purging any endogenous component of the initial ownership structure. The residual is then used as the new measure of ownership concentration.

The beginning ownership structure is positively correlated with the end-sample structure in the first-step regression, with a parameter estimate of 0.615 and a t-statistic of 59.6. The R^2 is low, at 0.123, confirming that significant changes in ownership structure took place and lending credence to the view that the beginning-of-period ownership structure was exogenous. Since the values of profitability and labor productivity are correlated over time, we use as additional control variables in the second-step regression the 1994 values for each dependent variable.

[Table 3 here]

The results of the second-step regression (Table 3) are similar to the results without the endogeneity correction. Again, ownership concentration is positively related to firm performance, although the concentration variable is not significant in the profitability regression. The quadratic term on ownership concentration is negative but insignificant in both regressions.

The coefficients on ownership concentration in Table 3 have a direct economic interpretation. A 10% increase in concentration leads to a 2% increase in short-term labor productivity, a 3.3% increase in short-term profitability, although the coefficient here is insignificant. The initial values of profitability and labor productivity are positively related to their respective 1996 values. The coefficients on the sector dummies are less robust than in Table 2, possibly reflecting the inclusion of the past values of the dependent variables. In all cases, the coefficients maintain their signs.⁷

5. Concentration and Types of Ownership

In this section, we perform a further robustness exercise by differentiating between types of owners. The analysis so far has assumed that ownership is homogeneous, i.e., that the concentration of ownership in the hands in *any* owner leads to improved corporate governance. However, a large literature (see, for example, Aghion and Blanchard, 1996) argues that certain types of owners, in particular foreign strategic investors, are preferred to others. Following the Czech mass privatization, two categories of owners emerged. Bank and non-bank sponsored investment funds built up large portfolios of firms in different industries. Local and foreign strategic investors accumulated significant ownership during the 1995 through 1997 period. These two groups of owners may have had different impact on corporate performance.

Since strategic investors try to build majority stakes in the firms they target, our results we may be driven by the presence of strategic investors. If concentration is strongly correlated with the entry of strategic investors, our interpretation would lead to misleading conclusions. If,

on the other hand, the result on concentrated ownership holds when one controls for types of ownership, our findings will be more convincing.

We report the distribution of ownership by different types in Table 4. We differentiate between bank-sponsored investment funds, non-bank-sponsored investment funds, local strategic investors, foreign strategic investors, and the state. Since we have data on the top five shareholders only, we do not know what share of ownership should be attributed to individual investors. The assumption that all investors not in the top five categories are individuals is probably erroneous, given the large number of small non-bank sponsored investment funds in the Czech Republic. We hence abstain from reporting the share of individual investors as a residual in Table 4. The sum of ownership stakes in the vast majority of sample firms is less than 100%, as many firms have more than five owners.

[Table 4 here]

Across all five ownership categories, the average stake in firms they have acquired is similar in the 1994 through 1997 period. Thus, bank-sponsored funds own an average stake of 21.318% in the firms in their portfolio in 1997, non-bank-sponsored investment funds own 27.308% on average, local and foreign strategic investors own 38.416% and 35.402% respectively. There is a bias towards larger concentration in the hands of strategic investors, as predicted earlier.

We turn to a regression analysis that investigates the impact of concentration and types of ownership on corporate performance in Table 5. The variables are constructed using the share of ownership of each category in total ownership of a given firm. In other words, the coefficients

can be interpreted as elasticities that show how increases in the share of, say, the stake held by local strategic investors influences corporate performance. We choose state ownership as the numeraire. The results suggest that certain types of owners, in particular foreign strategic investors and non-bank funds, are associated with improved performance in a positive and significant way. This association reduces the significance of the ownership concentration coefficient. Ownership types as well as the overall level of ownership concentration seem to determine enterprise performance.

[Table 5 here]

The parameter estimates on ownership types display some interesting patterns. The effect of bank-sponsored investment funds is insignificantly different from the effect of state ownership. Local strategic investors do not have a significant influence on labor productivity although their ownership is associated with higher profitability. Finally, ownership by foreign strategic investors is associated with higher profitability and labor productivity in both regressions and ownership by non-bank sponsored is associated with higher profitability and labor productivity in the random-effects estimation. Although we do not have theoretical priors for the signs of the respective ownership coefficients in the Czech case, our findings can be interpreted to suggest that particular types of owners, and not the overall concentration of ownership, are associated with improving corporate governance.

6. Conclusions

The Czech voucher scheme provides a unique experiment for empirical research on the relationship between ownership structure and firm characteristics as it allows us to study the effects of ownership on firm performance, in a situation in which ownership is exogenous to firm performance. Analysis of market valuation and profitability for 706 Czech firm yields some evidence that more concentrated ownership is associated with higher profitability and labor productivity. Using a number of sensitivity tests, we do not find much evidence to suggest that the relationship is the result of the ownership structure being influenced by firm characteristics. We do find, however, that certain type of owners, namely, foreign strategic investors and non-bank funds, are more strongly associated with improvements in performance. The evidence suggests that the overall concentration of ownership, as well as particular types of investors, are responsible for the changes in profitability and labor productivity.

The empirical results question the value of distributing shares of firms to a large number of individuals in an environment that gives them little chance to exercise their ownership control rights. The argument for the mass-privatization program was that investment funds would concentrate shares and exercise control, which we show did happen in the Czech Republic. New non-voucher investors were expected to accumulate shares and take over companies. Thus, the voucher scheme was seen as an intermediate step between state ownership and the correct ownership structure in which the costs of distributing shares were paid by the voucher holders.

Estimating the true costs and benefits of mass privatization in the Czech Republic is beyond the scope of this study. Previous work (Weiss and Nikitin, 1999) argues that the voucher experiment failed to deliver the promised results, because ownership concentration did not take

place, leading to bad performance of companies and the opportunity for asset stripping by incumbent managers. We show that the first argument at least is not supported by the data. Our results lend more support to the alternative view (World Bank, 1998) that the Czech government fell victim to its own success in privatization by not introducing proper institutions to oversee the development of capital markets.

Our findings may be driven by the prevalent method of mass-privatization in the Czech Republic that precluded managers and outside investors from gaining a significant corporate ownership. In Hungary and Poland, where mass-privatization was either not used or comprised a small share of the total number of privatized companies, other results may obtain. The results here have, however, implications for the other transition economies that followed mass-privatization, Bulgaria and Romania in Eastern Europe, Moldova, Kazakhstan, the Kyrgyz Republic, and Ukraine in the former Soviet Union, and Mongolia. Finally, these findings may help formulate future privatization programs in transition economies like China and Vietnam.

While we investigate the link between ownership concentration and corporate performance, several related questions remain outstanding. Most importantly, one would like to know what is the precise mechanism through which ownership concentration affects performance. One hypothesis is that concentration allows the owners to monitor incumbent managers better through the use of their seats on the Board of Directors. Alternatively, concentrated ownership may give owners sufficient clout in the selection of new managers and in the detrenchment of old managers. Both hypotheses merit further investigation.

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Table 1: Ownership and Performance Statistics
(Mean, Standard Deviation, Median)

A. Firm performance indicators

	1993	1994	1995	1996
Profitability	14.4	15.2	16.9	13.5
	(11.2)	(11.3)	(12.5)	(13.1)
	12.1	12.5	13.8	11.4
Labor Productivity	262.1	294.5	301.4	304.1
	(244.5)	(213.7)	(257.5)	(254.5)
	195.2	204.4	205.4	218.9

B. Concentration indicators

	1993	1994	1995	1996	1997
Share of top 5 investors (T5)	49.2	44.9	55.2	60.2	68.4
	(15.3)	(12.3)	(15.8)	(16.3)	(22.1)
	50.2	50.6	55.2	59.9	67.2
Logistic Transformation of Concentration (L5)	-0.09	-0.28	-0.04	0.21	0.40
	(0.65)	(0.79)	(0.54)	(0.85)	(0.97)
	-0.04	-0.23	0.03	0.14	0.27

Table 2: Estimation Results

Explanatory Variable	OLS Estimation		Random-Effects Estimation	
	Profitability	Labor Productivity	Profitability	Labor Productivity
Ownership Concentration (T5)	0.178** (2.998)	275.15** (3.098)	0.215** (4.045)	149.98* (1.967)
Ownership Concentration Squared T5 ²	-0.157** (3.664)	-162.17* (2.427)	-0.187** (5.354)	-114.21 (1.723)
Dummy for First Phase	0.017** (3.598)	47.762** (4.751)	0.014 (1.824)	49.356** (3.267)
Agribusiness	-0.045** (5.496)	-39.521** (3.246)	-0.046** (2.997)	-47.418 (1.596)
Furniture and Wood Products	0.024** (2.514)	-75.486** (6.465)	0.025 (1.658)	-80.276** (2.726)
Transport	-0.007 (0.785)	60.754** (3.487)	-0.008 (0.638)	56.834* (2.338)
Mining	0.043* (2.334)	37.168 (1.487)	0.041 (1.374)	32.846 (0.596)
Construction	-0.032** (3.394)	-67.892** (3.208)	-0.032* (2.185)	-79.854** (2.638)
Food	0.004 (0.482)	42.886** (2.679)	0.003 (0.248)	37.381 (1.256)
Apparel	-0.011 (1.238)	-86.312** (7.274)	-0.011 (0.648)	-94.625** (2.994)
Chemicals	0.038** (3.714)	60.508** (2.887)	0.040 (1.937)	54.784 (1.395)
Metals	0.016 (1.624)	-35.684** (2.967)	0.018 (1.165)	-41.251 (1.398)
Machinery	-0.028** (3.784)	-62.584** (5.219)	-0.028* (2.254)	-70.12** (2.826)
Year Dummies Included	Yes	Yes	Yes	Yes
Hausman test [^]			25.32	27.81
Adjusted R ²	0.103	0.176	0.412	0.604

Notes:

1. All regressions are based on 2,860 observations.
2. Absolute values of t-statistics in parentheses.
3. The numeraire sector is financial services.
4. Standard errors are heteroskedasticity-consistent.
5. All regressions include a constant term.
6. Statistical Significance: * 5% level; ** 1% level. [^] Cut-off point at 30.19 for the 5% level of significance.

**Table 3: Two-Step Estimation on the Effect
of Ownership Concentration on Firm Performance**
(Second-step results)

Explanatory Variable	Profitability	Labor Productivity
Ownership Concentration (T5:RES)	0.048 (1.815)	63.987* (1.9897)
Ownership Concentration Squared (T5:RES) ²	-0.048 (0.851)	-145.215 (1.268)
Dummy for First Phase	0.016 (1.849)	2.065 (0.139)
Initial Profitability	0.598** (8.719)	n.a.
Initial Labor Productivity	n.a.	0.754** (9.785)
Agribusiness	-0.032 (1.894)	-22.708 (0.769)
Furniture and Wood Products	0.011 (1.451)	-13.258 (0.539)
Transport	-0.008 (0.459)	31.085* (1.978)
Mining	0.054* (2.256)	35.658 (1.258)
Construction	-0.022 (0.879)	-10.216 (1.559)
Food	0.029 (1.458)	18.924 (0.485)
Apparel	-0.006 (0.364)	-25.614 (1.038)
Chemicals	0.016 (0.819)	-27.415 (0.784)
Metals	0.015 (1.269)	-12.698 (1.652)
Machinery and Equipment	-0.141* (1.987)	-3.828 (1.743)
Adjusted R ²	0.173	0.412

Notes:

1. All regressions are based on 706 observations.
2. Absolute value of t-statistics in parentheses.
3. All standard errors are heteroskedasticity-consistent.
4. Both regressions include a constant term.
5. *, ** Significant at the 5% and 1% level, respectively.

Table 4: Ownership by Type
(Mean, Standard Deviation, Median)

Panel A: Ownership Share in Full Sample (in %)

OWNER	1993	1994	1995	1996	1997
Bank-sponsored funds	12.116 (16.058) 0.421	15.251 (15.654) 10.471	14.079 (15.922) 9.054	15.719 (17.331) 10.300	14.011 (16.908) 8.055
Nonbank-sponsored funds	12.523 (15.692) 1.521	27.654 (14.759) 27.204	28.018 (16.643) 27.741	29.187 (18.231) 28.600	25.760 (19.547) 22.850
Local strategic investors	0.023 (0.509) 0.000	0.678 (4.215) 0.000	4.694 (10.258) 0.000	5.851 (13.465) 0.000	17.031 (25.385) 0.000
Foreign strategic investors	n.a.	n.a.	2.055 (8.947) 0.000	3.383 (11.990) 0.000	7.923 (19.746) 0.000
State, Municipality	48.809 (49.076) 16.851	5.164 (14.627) 0.000	4.845 (14.795) 0.000	4.019 (13.917) 0.000	3.317 (12.744) 0.000

Panel B: Number of Firms and Average Ownership Stake in %

OWNER	1993	1994	1995	1996	1997
Bank-sponsored funds	358 (23.894)	526 (20.470)	484 (20.537)	495 (22.419)	464 (21.318)
Nonbank-sponsored funds	361 (24.490)	697 (28.011)	688 (28.752)	688 (29.951)	666 (27.308)
Local strategic investors	2 (8.142)	29 (16.433)	170 (19.494)	174 (23.740)	313 (38.416)
Foreign strategic investors	n.a.	8 (25.325)	55 (26.379)	77 (31.016)	158 (35.402)
State, Municipality	388 (88.813)	127 (28.698)	110 (31.093)	83 (34.184)	72 (32.521)

Table 5: Concentration and Ownership Types

Explanatory Variable	OLS Estimation		Random-Effects Estimation	
	Profitability	Labor Productivity	Profitability	Labor Productivity
Ownership Concentration (T5)	0.142 (1.956)	262.270* (2.334)	0.122 (1.723)	84.143 (1.810)
Ownership Concentration Squared (T5 ²)	-0.162** (2.794)	-151.035 (1.652)	-0.153* (3.182)	-69.923 (1.012)
Dummy for First Phase	0.002 (1.884)	53.254* (4.985)	0.001 (0.993)	49.036** (3.176)
Bank-sponsored Funds	0.032 (1.719)	-30.972 (1.054)	0.043 (1.357)	-7.336 (0.274)
Nonbank-sponsored Funds	0.021 (1.235)	29.702 (0.894)	0.055** (3.634)	54.490* (2.452)
Local Strategic Investors	0.041 (1.784)	28.112 (0.914)	0.034* (2.347)	-5.647 (0.267)
Foreign Strategic Investors	0.103** (4.015)	35.314 (1.454)	0.091** (4.542)	43.442 (1.782)
Sector Dummies Included	Yes	Yes	Yes	Yes
Year Dummies Included	Yes	Yes	Yes	Yes
Adjusted R ²	0.109	0.176	0.423	0.621

Notes:

1. All regressions are based on 2,860 observations.
2. Absolute values of t-statistics in parentheses.
3. The numeraire ownership type is state and municipal ownership.
4. Standard errors are heteroskedasticity-consistent.
5. A constant term is included in each regression.
6. *, ** Significant at the 5% and 1% level, respectively.

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² Coffee (1996) describes the mechanisms of the Czech voucher scheme for privatizing state-owned enterprises in detail.

³ See, for example, Weiss and Nikitin (1998) and Filer and Hanousek (1998) for a discussion of the illiquidity of most publicly traded Czech stocks and the analytical problems that arise from it.

⁴ The average concentration reported for the sample of Czech firms is higher than the concentration typically reported for market economies and other transition economies. Demsetz and Lehn (1985) find an average concentration of the largest five investors of about 25% for the United States. Prowse (1992) finds the corresponding number for Japanese firms to be 32%. Xu and Wang (1998) find an average concentration of 39% for listed Chinese companies. These comparisons should, however, be treated with caution. Since all firms that participated in the Czech mass-privatization were listed, the sample includes relatively small firms. Such firms are likely to have high ownership concentration. If we take the largest fifty firms on the PSE, the ownership of the top five investors in June 1997 was 38%.

⁵ The calculated values are 0.74 and 0.68, respectively, while the cut-off value is 1.01 for the 5% significance level.

⁶ We also use a logistic transformation to convert the bounded independent variable (T5) into an unbounded one (L5), defined as $\log [T5 / (100 - T5)]$, and check whether our results are sensitive to changes in the functional form of the explanatory variable. The parameter estimate on L5 in both regressions is positive and significant. The negative coefficients on the quadratic terms carry through in these estimations.

⁷ We also perform the estimation while excluding all firms that have dominant insider ownership. The presence of such firms may lead to a bias in the results if these are firms with high growth prospects. The coefficients on concentration remain positive and significant, while the parameter estimates on the quadratic terms turn insignificant. Thus, the exclusion of insider dominated firms does not appear to change the results on the effect of concentration on firm performance.