PERFORMANCE OF CZECH VOUCHER-PRIVATIZED FIRMS

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Abstract:
This paper works with a broad data sample of Czech voucher-privatized firms. The period of 1996 – 1999 enables to capture true post-privatization effects. It analyzes the effect of ownership structure on corporate performance and firm's characteristics. Results show that overall ownership concentration cannot be associated with improving corporate performance. Further, particular types of domestic owners do not affect firm's performance but they do affect firm's characteristics. Effect of foreign owners is limited. No clear or unambiguous effect of changes in ownership structure on corporate performance emerged.

Keywords: ownership structure, firm's performance, voucher privatization, type of owner, panel data

JEL Classification: C23, D21, G32, L20

1. Introduction

This paper analyzes effect of ownership structure on economic performance using an extensive sample of Czech voucher-privatized firms during period of 1996 –1999. The period from 1991 to 1995 was characterized by progressing process of voucher privatization. The resulting ownership structure after both its waves was more or less an outcome of the logistics of the voucher scheme's administration. More economically meaningful patterns of ownership structure began to emerge in Czech companies in 1996. Thus, the analysis is motivated by uniqueness of the privatization process itself and the data span that allows for true post-privatization development to take place. In particular we address the question whether a change in ownership concentration of a certain type of shareholder has an impact on a firm's performance.

In order to make the subsequent exposition lucid, we briefly overview the voucher-privatization scheme in the Czech Republic. The privatization program in the Czech Republic was carried out in the first half of the 1990s under three different

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schemes: restitution, small-scale privatization and large-scale privatization. The first two schemes started in 1990 and were most important during the early years of the transition. Large-scale privatization, by far the most important scheme, began in 1991 and was completed in early 1995. The privatization program allowed various privatization techniques (tenders, direct sales, public auctions, transfers to municipalities, and transformation of state enterprises into joint stock companies and distribution of their shares within voucher privatization).

The voucher scheme was part of the large-scale privatization process and it attracted considerable interest and publicity. Two waves of voucher privatization took place in 1992 – 1993 and 1993 – 1994, respectively. First wave, in the Czech Republic, contained 988 firms, the second wave contained additional 676 firms plus 185 firms that were not fully privatized during the first wave. Almost one-half of the total number of all shares of all joint stock companies was privatized in the voucher scheme. The early post-privatization ownership structure emerged as shares from the second wave were distributed in early 1995 and rapid reallocation of shares across new owners took place in 1995 – 1996 during the so-called "third wave" of privatization as new owners, including the investment privatization funds (IPFs), reshaped their initial post-privatization portfolios of acquired companies. Since the privatization process has been extensively described and analyzed in the literature, interested reader should consult for example Svejnar and Singer (1994), Kotrba (1995), Coffee (1996), or Kočenda (1999) among others.

The critical assumption behind privatization in many parts of the world is that private ownership together with its concentration improves corporate performance. As for the ownership concentration alone, it is important for that the ownership structure is often hypothesized to have effect of economic performance of firms.[1)] It is standard wisdom that dispersion of ownership has an adverse effect on performance of the firm. Schleifer and Vishny (1997) survey research on corporate governance, with special attention to ownership concentration in corporate governance systems around the world. McConnel and Servaes (1990) examine the impact of ownership structure on company economic performance in the largest European companies. Claessens and Djankov (1999) found that the more concentrated the ownership, the higher the firm's profitability and labor productivity. On the other hand, studies by Coase (1988) or Demsetz and Lehn (1985) argue that the relationship between ownership concentration and corporate performance is spurious. Also Leech and Leahy (1991) found out that control-type effects have no clear effect on firm's performance. In general, results seem to be mixed. This paper aims to augment the knowledge on the effect of ownership structure on firms' performance in case of the Czech voucher-privatized firms.

2. Data and Models

2. 1 *Data: Measures of Performance and Firm Characteristics*

We use a set of financial data to capture various aspects of a firm's performance: profitability, strength and size of the firm, its financial position, and its scope of business activity. We are aware of the fact that profitability of a company, being an ultimate goal in the long run, cannot be taken as a reliable short-term indicator du-

1) Extensive analysis of the development of ownership structures in Czech firms during the late 1990s is presented in Kočenda and Valachy (2002).

ring transition. Therefore, we employ additional performance variables as well as firm's characteristic indicators. The set of indicators consists of three performance variables: gross operating profit over sales, sales, value-added over labor costs (wages), and three firm's characteristics: total assets, long-term bank loans, and cash-flow over equity.

The data sample contains ownership and financial data of the Czech voucher-privatized firms that were listed on the Prague Stock Exchange (PSE) during 1996 –1999. The data were compiled from the commercial database Aspekt Ltd. and the National Property Fund of the Czech Republic. Since the voucher-privatized firms in the sample were involved in the first, second, or both waves of the voucher privatization, the sample exhibits a large extent of homogeneity if measured by the single privatization technique used. All performance variables and firm's characteristics were defined using international accounting standards.[2] In our data set we distinguish six types of owners: industrial company, bank, investment fund, individual owner, portfolio company, and state.[3] The data also allow for distinction between domestic or foreign ownership.

Due to limits of data availability we do not require that performance data of each particular firm be available for all four consecutive years. Instead we relax data availability to a minimum of three consecutive years in order to enlarge our sample size. Consequently, the sample consists of 722 firms that posted data for three (65 % of firms) or four (35 % of firms) consecutive years within the interval 1996 – 1999. Our sample thus contains performance indicators precisely identifiable with ownership structure for more than 43 % of voucher privatized firms.[4] Essential attributes of the above variables in 1996 are shown in Table 1. The sample clearly represents a very diverse group of firms with both poor and good economic performance.

Table 1
Performance Indicators and Firm Characteristics: Basic Statistics of Growth Rates

	No. of firms	Mean	Std. dev.	Min	Max
Gross operating profit / Sales	722	-0.059	1.547	-7.153	4.847
Sales	722	0.040	0.351	-0.951	3.407
Value added / Labor costs	722	0.047	0.503	-2.847	5.095
Total assets	722	-0.006	0.161	-0.658	0.847
Long-term bank loans	722	-0.245	0.521	-1.000	1.965
Cash flow / Equity	436	0.047	0.263	-0.297	0.733

Despite the fact that the data sample covers a considerable portion of voucher-privatized companies, and hence it is a homogenous sample with respect to the privatization technique used, the data do pose limits to work within. Having firms'

2) Filer and Hanousek (2002) present discussion and evaluation of available data on transition economies. They caution against certain deficiencies, namely differences in performance data reported under different accounting standards and less than obvious distinctions of ownership, that may impair results of an analysis. Our previous account shows that our data based on international accounting standards maintain a high degree of integrity and allow an exact differentiation of ownership structure.

3) There is a difference between an investment fund and a portfolio company. An investment fund buys shares of a certain company in order to exercise voting rights and to acquire profit from the company later. On the other hand, a portfolio company buys shares of a certain firm mainly in order to sell these shares for a higher price in order to realize a capital gain. A portfolio company does not attempt to exercise voting rights or extract corporate profits.

4) Sample size is reduced for cash flow/equity due to scarcity of financial data.

ownership and performance data does not mean that one knows what information is available to an investor when his/her acquisition decision is made. Changes in ownership structure may be a function of an investor's prior knowledge of potential future performance of a firm rather than being exogenously determined.

Since the design of the Czech voucher scheme precluded the adjustment of ownership to firm's characteristics, using the described data set helps to alleviate the endogeneity problem.[5] Still, within the econometric part of our analysis, we aim to deal with problems of selection bias and endogeneity of ownership structure. One way is to use an instrumental variable but the fact that the time dimension of our panel is short disqualifies using the instrumental variable technique.[6] Instead of the above method we use the differences of ownership concentration index between two consecutive periods as our ownership measure, we control for different stages of voucher privatization, and we perform formal test to distinguish whether groups of firms differ in performance due to their earlier or later privatization. In regressions we also use inter-period growth rates of performance variables rather than their nominal values. Since the growth rates of financial variables are not correlated over time, such an approach also solves the problem of their rather high autocorrelation in levels. The interpretation of coefficients in the case of growth variables is easy and straightforward.

2. 2 *Models*

We analyze relationship between ownership structure and firm's performance by analyzing three issues that are dominant in the current literature. These issues are formulated as three panel-data models described by the following equations. First model assess the question whether changes in ownership concentration alone affect firm's performance:

$$y_{it} = \alpha + \beta c_{it} + \boldsymbol{\delta}'\boldsymbol{d} + u_i + \varepsilon_{it} \tag{1}$$

The second model discriminates among different types of owners and analyzes whether a particular type of owner has an effect on firm's performance:

$$y_{it} = \alpha + \beta c_{it} + \boldsymbol{\gamma}'\boldsymbol{p}_{it} + \boldsymbol{\delta}'\boldsymbol{d} + u_i + \varepsilon_{it} \tag{2}$$

The third model accounts for possible coalitions among same type of owners. It serves as a tool to analyze possible effect of owners of the same type on firm's performance:

$$y_{it} = \alpha + \beta c_{it} + \boldsymbol{\gamma}'\boldsymbol{k}_{it} + \boldsymbol{\delta}'\boldsymbol{d} + u_i + \varepsilon_{it} \tag{3}$$

In all three models y_{it} is the growth rate of dependent variable, e.g. performance indicator or firm's characteristic introduced earlier; namely $y_{it}=(Y_{it} - Y_{it-1})/Y_{it-1}$.[7] Variable c_{it} is the difference of ownership concentration index of the single largest owner ($C1$) between two consecutive years; namely $c_{it} = C1_{it} - C1_{it-1}$.

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5) For a full account of the argument see Claessens and Djankov (1999).

6) An instrumental variable technique requires finding valid instruments. These instruments could be, for example, lagged values of the left-hand side variables. In our case it would be lagged concentration index. Then, regressing performance variable on concentration index using lagged values of index as an instrument would produce almost the same specification - changes in concentration index - as a left-hand side variable.

7) We do not use the first logarithmic difference approximation for growth since we often encounter negative entries in the data that are related to economic performance.

In model (2) vector $\boldsymbol{p}_{it}$ contains dummy variables that indicate type of single largest owner in a given firm and year. Ownership categories are industrial company, bank, investment fund, individual owner, and portfolio company. Our data sample also allows differentiating between domestic and foreign form of ownership. State as a common numeraire is represented by a constant term (α). The coefficients for other ownership categories thus represent deviations from the effect of State and are interpreted in such manner.

In model (3) vector $\boldsymbol{k}_{it}$ contains variables whose values represent cumulative share of ownership of each particular category of owners in total ownership in a given firm and year for both domestic and foreign types of owners. Thus, the principal difference between the ownership variables in both models is that type of owner dummy captures effect of the type of single largest owner (model 2), whereas, the cumulative ownership variable captures effect of the cumulative share of all owners of the same type in a given firm (model 3). An alternative specification allows us to investigate a broader representation of the relationship of ownership concentration and its structure to a firm's performance than is usual in the current literature. The random effect is represented by u_i.[8)]

Specific effect dummies (represented by vector $\boldsymbol{d}$) include industry sector, year, and privatization sequence dummies. The Prague Stock Exchange classification contains 19 different types of industry sectors and industry sector dummies are to capture sector-specific effects.[9)] Year dummies are to correct for changes in institutional environment as well as economy-wide shocks in a given year. Privatization sequence dummies are to control for an effect of the first or second wave of the voucher scheme.

3. Empirical Results

We estimated all three models including specific effect dummy variables and we also tested their joint significance in all regressions. The sector dummies were jointly insignificant in general. The only exception was a model where total assets' growth was explanatory variable and where sector dummies were jointly significant at 1 % level. However, in this particular case only utilities, as a sector, had significant positive coefficient. This may be attributed to a much-needed overhaul in the sector that was severely neglected during the decades of command system. Only a handful of sector dummies had significant coefficients in all other cases when sector dummies were found jointly insignificant. No pattern was found as for any particular sector dominating an influence over performance or firm characteristic.[10)] In general, we found sector dummies lacking significance and were unable to detect any significant performance differences among sectors. The possible explanation for failure to find reasonable sector effects is that since the sectors are defined broadly

8) In preliminary regressions the *F*-test rejects the hypothesis that a common constant term across firms is appropriate. Moreover, the Hausman-specification test (Hausman, 1978) in all three models indicates that the random effect model is more appropriate than the specific effect model.

9) We do not incorporate two sectors, finance and banking, and investment funds, due to data identification insufficiency.

10) Fort both specifications (model 2 and 3) particular sector dummies were found to have significant coefficients: GOP/sales (agriculture), sales (food production, textiles, wood and paper industry), value added/labor costs (wood and paper industry, construction and building materials, mechanical engineering, transportation and telecommunications), long-term bank loans (beverages and tobacco, metallurgy and metal processing, utilities, transportation and telecommunications), cash flow/equity (no sector significant).

(equivalent to 2-digit industries in the US or EU data), they are unlikely to represent industry sectors in an economic sense.

The year dummies, to capture possible macroeconomic impact or the state of economy, were found to be jointly significant in cases where specification explanatory variables were profit, sales, assets and loans. Significant coefficients of year dummies belong exclusively to the later period of the sample. We credit this to the fact that the Czech Republic slowed its economic pace in 1996 and during 1997 – 1999 was in recession. Thus, the economy was on the downturn trajectory during the whole period of our data sample, and on a steeper one in its second half.

Privatization sequence dummies had insignificant coefficients and were found to be jointly insignificant. We implemented them to distinguish an effect that might stem from a firm having been privatized during the first or second wave of the voucher scheme and as an instrument to control for possible selection bias stemming from different privatization sequencing. In addition we verified above result by employing a formal statistical method of Kruskal and Wallis (1952) to test for difference in variation of performance indicators and firm's characteristics of firms from the two privatization waves against each other. The test corroborated previous finding (insignificant privatization dummies) since it did not find the variation of growth rates of variables for both sub-samples to be different.

Empirical results from estimated models are presented in Tables 2-4. Based on results from a simple model (1) we conclude that a change in ownership concentration alone does not explain an inter-period change in firm's performance (see Table 2) since the coefficients are statistically insignificant. As a sensitivity check we followed an argument of Demsetz and Lehn (1985) that one should use the logistic transformation of the *C*1 index instead of its usual values. It is done to convert the bounded independent variable *C*1 into an unbounded one, defined as a logistic transformation ln[*C*1/(100-*C*1)]. We performed estimation with a newly defined concentration variable and found our results not to be sensitive to change in functional form of ownership concentration. All coefficients of the transformed ownership concentration variable were found to be insignificant (not reported), which is the same finding as that found on bounded variable *C*1. Therefore, we consider our results to be robust with respect to alternative definition of the ownership concentration.[11)]

Table 2
Effect of Ownership Concentration

	GOP/ Sales	Sales	Value added/ Labor cost	Total assets	Long term bank loan	Cash flow/ Equity
Change in *C*1	1.2E-03 (2.9E-03)	1.7E-04 (6.5E-04)	5.1E-04 (9.6E-04)	4.1E-04 (2.9E-04)	-5.4E-04 (9.5E-04)	3.1E-04 (7.6E-04)
Constant	-0.392 (0.256)	-0.048 (0.081)	0.071 (0.115)	-0.028 (0.036)	-0.315* (0.119)	0.066 (0.073)
Adj. *R* square	0.0286	0.0247	0.0284	0.0767	0.0404	0.0450
Num. of obs.	722	722	722	722	722	436

Note: Numbers in parenthesis are standard errors. * denotes significance at 1% level, two-tail test.
Industry, year, and privatization dummies included. *C*1 represents the stake held by single largest owner.

11) The same applies on results from model (2) and (3).

Further we estimated model (2) to analyze effect of specific types of owners on firms' performance, and model (3) to analyze effect of the share of ownership of each category in total ownership of a given firm. In the two models state ownership was chosen as a common numeraire and the effect of other categories of owners is hence measured over this state ownership effect.[12] Based on estimation of both models we found coefficients of change in ownership concentration to be insignificant in all regressions. This fact is in line with our results from model (1), and thus we conclude that we did not find any evidence for ownership concentration having an influence on firms' performance.

As for the effect of a particular type of owner the results do not provide evidence that a type of owner has an effect on firm's performance (model 2). The coefficients for all types of owners, including the state (constant) were found to be statistically insignificant (see Table 3). The same outcome we report for a cumulative share of identical category of owners (model 3, see Table 4).

Table 3
Effect of Owner Type

	GOP/ Sales	Sales	Value added/ Labor cost	Total assets	Long term bank loan	Cash flow/ Equity
Change in *C*1	9.4E-04 (2.7E-03)	1.7E-04 (6.5E-04)	5.1E-04 (9.6E-04)	4.1E-04 (2.9E-04)	-5.4E-04 (9.5E-04)	3.1E-04 (7.6E-04)
Constant (state)	-0.260 (0.304)	-0.048 (0.081)	0.071 (0.115)	-0.028 (0.036)	-0.315* (0.119)	0.066 (0.073)
Industrial Co.	0.024 (0.183)	0.036 (0.048)	0.049 (0.068)	-0.024 (0.021)	-0.122*** (0.069)	-0.047 (0.046)
Bank	-0.305 (0.431)	0.105 (0.106)	-0.007 (0.154)	-0.045 (0.047)	-0.262*** (0.154)	-0.072 (0.117)
Invest. fund	-0.083 (0.199)	0.044 (0.052)	0.055 (0.074)	-0.050** (0.023)	-0.074 (0.075)	-0.035 (0.051)
Individual	0.129 (0.207)	0.037 (0.054)	0.034 (0.077)	-0.027 (0.024)	-0.022 (0.079)	-0.082*** (0.050)
Portfolio Co.	0.238 (0.270)	-0.048 (0.069)	0.124 (0.098)	-0.032 (0.030)	-0.107 (0.100)	-0.151** (0.067)
Adj. *R* square Num. of obs.	0.028 722	0.025 722	0.028 722	0.077 722	0.040 722	0.045 436

Note: Numbers in parenthesis are standard errors. *, ** and *** denote significance at 1%, 5% and 10% level, two-tail test, respectively. Industry, year, and privatization dummies included. *C*1 represents the stake held by a single largest owner.

We show, however, that the type of owner or its cumulative share has an effect on firm's characteristics (total assets, long-term bank loans, and cash flow over equity). Tables 3-4 present the evidence, albeit not overwhelming one, since only a

12) The constant also reflects 1996 – 1997 rate of change in performance or characteristic of firms that operate in the miscellaneous ("other") category out of 19 sectors which we take into consideration.

Table 4
Effect of Cummulative Ownership Type

	GOP/ Sales	Sales	Value added/ Labor cost	Total assets	Long term bank loan	Cash flow/ Equity
Change in *C*1	1.2E-03 (2.9E-03)	2.0E-04 (6.5E-04)	6.1E-04 (9.6E-04)	3.5E-04 (2.9E-04)	-5.6E-04 (9.5E-04)	3.4E-04 (7.6E-04)
Constant (state)	-0.396 (0.327)	-0.047 (0.089)	0.114 (0.126)	-0.008 (0.039)	-0.264** (0.130)	0.070 (0.080)
Industrial Co.	0.003 (0.197)	0.034 (0.060)	0.003 (0.085)	-0.038 (0.026)	-0.177** (0.088)	-0.056 (0.057)
Bank	-0.303 (0.464)	0.143 (0.146)	-0.066 (0.211)	-0.079 (0.064)	-0.171 (0.213)	-0.001 (0.142)
Invest. fund	-0.173 (0.214)	0.051 (0.065)	-0.005 (0.092)	-0.078* (0.028)	-0.156*** (0.095)	-0.036 (0.062)
Individual	0.135 (0.223)	0.045 (0.067)	0.008 (0.095)	-0.055*** (0.029)	-0.080 (0.097)	-0.071 (0.064)
Portfolio Co.	0.090 (0.290)	-0.043 (0.092)	0.088 (0.132)	-0.067*** (0.040)	-0.082 (0.134)	-0.149*** (0.088)
Adj. *R* square Num. of obs.	0.032 722	0.024 722	0.028 722	0.080 722	0.039 722	0.040 436

Note: Numbers in parenthesis are standard errors. *, ** and *** denote significance at 1%, 5% and 10% level, two-tail test, respectively. Industry, year, and privatization dummies included. *C*1 represents the stake held by a single largest owner.

minority of coefficients is statistically significant at conventional levels. In case of total assets the investment funds tend to decrease their growth by 5 %. Such activity tends to increase their relative controlling stake, which can be seen as a plausible motivation. Since ownership combines both domestic and foreign form, finer division offered additional insights (not reported in the tables). When disintegrating effect of domestic and foreign owners, then domestic industrial companies (-3.5% at 10% significance level) and banks (-11% at 5% significance level), along with domestic investment funds, tend to have negative effect on growth of assets. The result does not change for the cumulative share of investment funds and the effect is even stronger (-7.8 %, see Table 4). Tendency to negatively affect total assets growth is also shown in cases of cumulative shares of individual owners and portfolio companies. When augmenting model specification to allow for effect of domestic versus foreign owners, the results showed domestic owners being dominating since the coefficients of foreign owners were statistically insignificant (not reported).

Our further results show that state, industrial companies, and banks tend to decrease growth of long-term bank loans in their role of single largest owners (see Table 3). As a cumulative share of owner type these are state, industrial companies and investment funds that have the same negative effect (see Table 4). Model specification allowing for domestic and foreign owners showed that foreign industrial companies have twice as large negative effect on growth of loans than domestic firms. Domestic banks alone are responsible for affecting reduction of long-term bank loans in firms they own. These findings are somehow interwoven. Since stan-

dard capital market was non existent, at the beginning of transformation firms financed their operations with excessive dependency on banking credit. After financial crisis in 1997 credit crunch heavily affected Czech companies. Thus banks tended to reduce their credit positions and firms were forced to repay at weighty costs. Foreign owners, on other hand, were in position to supply needed financing through their headquarters.

At last, the individual owners tend to negatively affect changes in cash flow over equity ratio in both cases of single and cumulative ownership definition, while portfolio company has negative effect only as cumulative share of owners. Due to the relatively expensive credit and high level of secondary indebtedness in the economy, individual owner naturally aims and is also forced to reduce cash flows relative to value of the firm. Portfolio company enforces the same since non-interest-bearing cash reduces firm's earnings. In all cases it is a domestic type of owner that dominates such effect since coefficients on foreign individual owners and portfolio companies were insignificant (not reported).

Our findings show that overall ownership concentration cannot be associated with improving corporate performance. Further, particular types of owners do not have effect on firm performance indicators but they do affect firm characteristics. When allowing for influence of domestic against foreign owners we found domestic owners being dominant and effect of foreign owners being rather limited.

4. Conclusions

An ongoing process of voucher privatization has dominated in the years 1991 – 1995. The resulting ownership structure after both its waves was more or less an outcome of the logistics of the voucher scheme's administration. In 1995 changes in ownership also reflected legal requirements to prevent excessive stakes being held by privatization funds. More economically meaningful patterns of ownership structure began to emerge in Czech companies in 1996.

The time period of our extensive data sample allows for true post-privatization effects take place. Econometric analysis of the effect of ownership structure on firms' performance and firm's characteristics showed that overall ownership concentration cannot be associated with improving corporate performance. Further, particular types of owners do not have effect on firm performance indicators but they do affect firm's characteristics that shape company in the long run and should eventually materialize in corporate performance. When allowing for influence of domestic against foreign owners we found effect of foreign owners to be quite limited. We conclude that our results do not identify any clear or unambiguous effect of changes in ownership structure on performance of firms privatized within the Czech voucher-scheme.

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