# Privatization Revisited:
# The Effects of Foreign and Domestic Owners on Corporate Performance

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Third draft, June 2002

## Abstract

Privatization of state enterprises is often viewed as a necessary condition for improved corporate performance, but many studies suffer from methodological and data problems. We use a 1992-98 panel of the population of Czech industrial firms to assess the effect of mass privatization on corporate performance. Using numerous performance indicators, we find that foreign owners unambiguously improve long-term performance of the former state-owned enterprises. However, the results with respect to privatization to domestic owners are much less impressive. Our study hence provides strong support for the hypothesis that foreign investment improves corporate performance, but it provides very sobering evidence with respect to the hypothesis that privatization to domestic owners (the majority of cases in transition economies) improves performance.

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## 1.    Introduction

The standard argument for privatization is that in most circumstances private ownership leads to the best possible economic performance of firms.[1] Recently, studies of the performance effects of privatization have been occupying a pivotal place in the economics literature as the former Soviet bloc countries rapidly privatized most of their state-owned enterprises (SOEs) in order to improve their performance and reduce the direct influence of the state (Kocenda, 1999, Turnovec, 1999).

As the transition started to unfold, the issue of how best to restructure and modernize firms has become a focal point of the academic and policy debate about optimal types of ownership and legal (corporate) structure of firms in the new market economies. The first strand of the literature described the likely consequences of different types of ownership and corporate governance regimes for the restructuring process.[2] Subsequent theoretical studies focused on the role and effect of defensive (reactive) restructuring that the firms would undertake in the short term, versus strategic or deep restructuring that would be carried out in the medium to long run.[3] From the outset, it was recognized that only productive investment would contribute to restructuring no matter which way of privatization was selected. If firms faced soft budget constraints (willingness of the government or some other institution to bail out poorly performing firms),[4] investment might lead to a waste of resources as inefficient firms used these funds for survival rather than restructuring.[5]

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[1] Megginson, Nash and van Radenborgh (1994) and La Porta and Lopez-de-Silanes (1999) for instance compare the pre- and post-privatization performance of privatized firms. Boardman and Vining (1989) and Pohl et al. (1997) compare private and state firms operating under similar conditions.

[2] Conceptual discussions may be found in Earle and Estrin (1995 and 1996) and other papers in Frydman, Gray, and Rapaczynski (1996 and 1999). Formal modeling has been employed to analyze some of these issues. For example, Aghion, Blanchard, and Burgess (1994) on privatization and restructuring define restructuring as layoffs but Kotrba (1996) provides more realistic version of such a model. Boycko, Shleifer, and Vishny (1996) analyze how privatization affects state subsidies and Earle and Sapatoru (1994) model transition as incentives of privatization intermediaries. Pagano and Rowthorne (1994) view restructuring as relationship between technology and ownership form while Schmidt and Schnitzer (1993) are interested in how privatization may alter managerial incentives. The role of banks in encouraging restructuring is analyzed by Schnitzer (1999a and b).

[3] See e.g., Grosfeld and Roland (1997), Aghion, Blanchard and Burgess (1994) and Blanchard (1997).

[4] See Kornai (1979, 1986, and 1998) for the introduction and discussion of the concept of a soft budget constraint.

[5] Indeed, there has been increasing concern that while direct government subsidies have been dramatically reduced in a number of countries, indirect subsidies through the banking system continued for the (former) SOEs on a large scale. Hence, while

Recently, as data started coming on stream, statistical analyses have focused on the "treatment" effect of a privatization, trying to determine whether privatization improves the performance of the former SOEs.[6] Yet, the effect is surprisingly hard to identify and one observes a variety of findings. At the country-level, one observes that some of the fastest growing transition economies (e.g., China, Poland and Slovenia) have been among the slowest to privatize. Recent surveys come up with assessments that range from finding a large variation of outcomes but no systematically significant effect of privatization on performance (Bevan, Estrin and Schaffer, 1999), to cautiously concluding that privatization improves firm performance (Megginson and Netter, 2001), to being fairly confident that privatization tends to improve performance (Shirley and Walsh, 2000, and Djankov and Murrell, 2000).

Unfortunately, many studies of the transition economies suffer from using small and unrepresentative samples of firms, having a short period of observations concentrated immediately before and/or after privatization, not controlling adequately for selection bias, mixing data from different accounting systems, and not being able to distinguish accurately differences in ownership (e.g., Filer and Hanousek, 2001). Moreover, a major problem is the inability to control adequately for selection bias or endogeneity in the privatization and restructuring process.[7] If the selection of firms for privatization is not random and privatization policies for instance produce biased outcomes in the sense of a systematic relationship between ownership structure on the one hand and firm quality and potential for restructuring, on the other hand, then statistical inferences concerning the relationship between observed behavior and ownership may be misleading. Indeed, Gupta et al. (2000) for instance show that better performing firms have been selected first in the Czech privatization process.

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between 1989 and 1992 direct government subsidies to firms as a share of GDP fell from 25 to 5 percent in the Czech and Slovak republics, 12 to 5 percent in Poland and 11 to 3 percent in Hungary, these economies experienced banking crises in the 1990s as the new commercial banks continued to extend loans to poorly performing SOEs and the large privatized firms.

[6] These studies include Lizal, Singer and Svejnar (2001), Hoekman and Djankov (1998), Claessens and Djankov (1999), and Lizal and Svejnar (2002) on the Czech Republic; Frydman, Rapaczynski, and Turkewitz (1994) on shops in the Czech Republic, Hungary, and Poland; Pinto, Belka, and Krajewski (1993) and Earle and Estrin (1996) on Poland; and Konings (1997) on Hungary, Romania, and Slovenia.

[7] Smith, Cin, and Vodopivec (1997); and van Wijnbergen and Marcincin (1997) are among the exceptions.

In this paper, we advance the literature by analyzing the performance effects of privatization using over 83,500 quarterly observations from the population of about 4,000 medium and large industrial firms located in the Czech Republic during the 1992-98 period. Our analysis is of special interest for several reasons. First, it is less prone to selection bias and is more conclusive than most other studies because it is based on a large number of observations – we use almost the entire population of large and medium-sized firms in the country. Second, we are able to measure effects of both different forms of ownership and different forms of legal (corporate governance) status. In view of the mounting evidence that privatization does not always improve performance, and that corporate governance matters for the success of restructuring and performance, our ability to capture different forms of ownership and corporate status provides an important step in the direction of improving the understanding of this area. Third, our 1992-98 panel is longer than the panels used in most studies and it covers both pre- and post-privatization observations. Since most studies have relatively few observations in the post-privatization period, they at best measure the effect of defensive (reactive) restructuring. With data from a relatively long post-privatization period, we are able to capture the effects of defensive as well as strategic restructuring. Fourth, our data provide us with many more indicators of corporate performance than may be found in other studies. We hence offer a broader perspective on the performance effects of privatization. Fourth, our study is of interest because it uses data from one of the lead transition countries that serve as models for countries that have launched their transitions later. Our findings are hence of broad interest in the context of the transition. Fifth, we can link our evidence on performance to the findings of Lizal and Svejnar (2001), who use the same data and show which types of firms faced credit rationing or soft budget constraints, and how the degree of rationing or softness of the budget constraint varied with firm's ownership and legal status. In particular, Lizal and Svejnar (2001) find that cooperatives and to a lesser extent smaller and medium sized private firms have been rationed in their access to credit, while the majority of firms, including

the state-owned and larger privatized firms, have operated under soft budget constraints. Finally, our study is of methodological interest since we use a large panel of quarterly firm-level data. We are hence able to eliminate bias introduced by data selectivity and aggregation, reduce measurement error, take into account heterogeneity across firms and over time, and control for the seasonal variation in all performance indicators. This makes our work important in the context of the growing literature on transition as well as recent literature on performance of firms in general.

## 2. The Institutional Setting of Czech Privatization

Overall, while our choice of the Czech Republic is linked to the availability of a unique data set, an important factor for studying this case is clearly the fact that together with other countries in Central Europe, the Czech Republic has been a pioneering transition economy.[8] In the early 1990s, the Czech Republic abolished central planning and carried out rapid price liberalization, macroeconomic stabilization and widespread privatization of state-owned firms. It was one of the most successful countries in the region in terms of macroeconomic stabilization, keeping relatively low inflation, budget deficit, and unemployment rate.[9] As may be seen from Table 1, like the other economies in Central Europe, the Czech Republic suffered a significant GDP decline in the first phase of the transition, followed by a recovery in the early-to-mid 1990s. Unlike the other Central European economies, however, the Czech Republic experienced a recession from 1997 to 1999. As in Slovakia and Poland, the Czech investment rate fell during the economic decline of the early 1990s and rebounded thereafter. Finally, like other transition economies, the Czech Republic experienced a severe banking crisis in the

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[8] Pre-privatization behavior of SOEs in the former Czechoslovakia is analyzed by Lizal et al. (1995, 2001). On privatization policies see, e.g., Frydman et al (1994), Svejnar and Singer (1994), Svejnar (1995), Kotrba (1995) or Earle and Telegdy (1998).

[9] After price liberalization, the Czech Republic reduced inflation to about 10% throughout most of the 1990s, as compared to a more gradual reduction from about 20% to 10% in Hungary, 40% to 12% in Poland and 20% to 10% in Slovakia. During most years in the 1990s, the Czech government ran a 1-2% budget deficit, compared to a 5-8% deficit in Hungary, a 2-5% deficit in Poland and a 0-5% deficit in Slovakia. Finally, until the recession in the late 1990s, the Czech Republic maintained

mid-to-late 1990s. The crisis stemmed form excessive lending to firms for non-viable investment projects and an underdeveloped legal framework, weak enforcement of existing laws and high reliance of firms on bank credit for capital exacerbated it.

Between 1992 and 1995, the Czech Republic carried out a massive privatization of its economy. It started in January 1990, as part of the former Czechoslovakia, from a position of virtually total state ownership. In 1989 only 1.2% of the labor force and 2% of all registered assets belonged to the private sector, and in 1990 only 4% of the gross domestic product was attributed to the private sector (Svejnar, 1995). Yet, by the end of 1995, about 75% of all assets had been privatized as a result of three main initiatives. First, between 1990 and 1991 shops, restaurants, housing, and other properties were restituted to previous owners. Second, between 1991 and 1993 small firms and services were privatized in a small-scale privatization program. Third, most medium and large state-owned enterprises were privatized in a large-scale privatization program, which was divided into two waves (Svejnar, 1995). Firms were approved for privatization in the first wave at the end of April 1992 and shares were made available to new owners at the end of May 1993. In the second wave, the privatization projects were approved at the end of 1993 and shares were made available to new owners toward the end of 1995.

The large-scale privatization program employed several privatization methods. The most common was a transformation of firms into joint stock companies and the subsequent privatization of their shares (accounting for about 77% of government's privatization revenues). In terms of share value, 20% to 30% of all the shares of joint stock companies were sold to foreign and domestic buyers for cash through direct sales, via tenders, or through financial intermediaries (World Bank, 1999). In some firms a fraction of shares was sold for cash, and another fraction was distributed through a voucher privatization scheme.

The voucher privatization scheme was an important component of each wave of the large-scale

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its unemployment rate below 5%, while the unemployment rate in the other three economies reached double digits. During the

privatization program. Under this scheme every Czech citizen over eighteen could buy a book of vouchers and use the voucher points to bid directly for shares, or he/she could transfer the points to investment privatization funds (IPFs) that bid for shares on their behalf. In the first wave nearly two-thirds of the participating public invested their vouchers in nearly 450 IPFs, with the 14 largest IPFs collecting over 78% of the voucher points remitted to the funds (World Bank, 1999). Many of the largest funds were created and operated by local banks that temporarily remained majority state-owned. The control of the largest IPFs by majority state-owned banks was an unexpected outcome for the Czech government since it, unlike the Polish government, left the creation of IPFs to market forces. There is every indication that the government expected voucher privatization to constitute a legitimate transfer of ownership to private owners (World Bank, 1999).

The government also retained shares averaging 20% to 25% of the share value being privatized. Some of these shares were used to meet restitution claims, while the rest were sold subsequently in the secondary market or to strategic foreign and domestic investors (World Bank, 1999).

Overall, the Czech privatization program rapidly converted a large number of SOEs into firms with varying degrees of private ownership and different corporate forms. The process created an important group of partially and fully foreign-owned firms, as well as firms with varying forms and degrees of domestic private ownership. The Czech economy hence provides an excellent laboratory in which one can study the effects of various forms of privatization and changes in corporate structure on firms' performance. In view of the rapid privatization in most of the transition economies, an understanding the privatization effects of the various types of firms in the Czech Republic is useful for gaining a broader understanding of these effects in the transition economies in general.

**3. Data and Basic Statistical Findings**

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1996-2000 recession, the Czech unemployment rate peaked at 9.8% in January 2000.

The Czech Statistical Office (CSO) collected the data set we use. It covers all industrial firms employing more than 25 people in the 1992-94 and 1997-98 periods, and all industrial firms with more than 100 employees in 1995 and 1996. The 1998 data come from a preliminary file and do not include all firms with fewer than 100 employees.[10] The data were collected in quarterly or monthly intervals, depending on the size of the enterprise and the reported variables. We have combined the monthly and quarterly data so as to maximize the number of quarterly observations.

While the CSO is very professional, the data set contained some inconsistencies.[11] We have therefore performed a number of consistency checks.[12] In imposing these consistency criteria, about 10 percent of the observations were dropped, leaving us with a data set of approximately 84,000 quarterly observations.[13] In terms of the total number of firms (and quarterly observations) used in regressions, our data set covers 1867 firms (6947 quarterly observations) in the 1992-93 sub-panel, 2315 firms (7570 quarterly observations) in the 1993-94 sub-panel, 1922 firms (6991 quarterly observations) in the 1994-95 sub-panel, 1969 firms (7349 quarterly observations) in the 1995-96 sub-panel, 1861 firms (6975 quarterly observations) in the 1996-97 sub-panel, and 1799 firms (6651 quarterly observations) in the 1997-98 sub-panel.

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[10] In 1995 and 1996, the Czech Statistical office temporarily changed its methodology and collected data only for firms with 100 or more employees.

[11] The CSO is regarded as one of the most professional statistical offices in the former Soviet bloc.

[12] These checks are similar to those used by Lízal et al. (2001) and Lízal (1999). They are based on logical and economic limits and definitions: firm's capital at the start and end of each quarter should be positive; the average labor force in a given quarter should be more than 20 employees; investment should be non-negative (there were no negative values of investment reported in our data set); production should be positive; depreciation should be positive and less than the total capital value; investment should be smaller than the end-of-the-period capital stock; average wage should be higher than 2000 crowns/month (minimum wage in1992); sales should be non-negative; and one-year lagged production, sales and labor should be non-negative or missing. We note that due to historical factors, the Czech accounting system belongs to the Continental family of accounting systems. It is similar, though not identical to the system of International Accounting Standards. Our checks of variable definitions indicate that the relevant data are adequate for our analytical purposes.

[13] One large firm that met the nine criteria reported a 90 percent drop in output during the third quarter of 1993. This deviation affected the summary statistics (see, e.g., the large coefficient and standard deviation in 1993:Q3 investment/production in Table 3) and some regression estimates. We have therefore eliminated this observation from the data set. Data on capital stock are unavailable for 1992, and we thus use the 1992 data only for estimations that do not require the capital stock variable. Finally, it should be noted that the consistency checks revealed that data quality was improving slightly over the 1992-98 period.

As may be seen in Table 2, our data contain important information about the ownership and legal/corporate status of the firms. However, in order to exploit this information in a panel format and thus exploit the information inherent in the changes of the legal status and ownership, we have to overcome certain difficulties. In particular, changes in the legal form or ownership of firms were often associated with changes in the identification numbers of firms. Researchers can only identify firms by their identification numbers, and changes in the legal status or ownership are hence from the analytical standpoint indistinguishable from the births of new firms, breakups and spin-offs, or mergers. As a result, once a firm disappeared from our sample, we had to look for the appearance of a new firm that would have the same or similar capital stock, labor force and industry affiliation. Through this process, we have been able to identify over 120 of these identity changes. We are naturally aware that the inability to track fully the evolution of ownership and legal status over time imposes limits on our analysis. Nevertheless, we are able to exploit the ownership and legal form information in a number of ways and since we control for various sources of fixed effects and selection bias, we argue below that our results do not suffer from these limitations.

The CSO classified firms into ownership categories by majority ownership. Hence, a firm is for instance classified as being privately owned if it is more than fifty percent privately owned. When none of the types of owners (private owners, cooperative members, state, or foreign owners) have a majority stake, the firm is classified as having mixed ownership. We use this classification to examine the effects of different forms of ownership on performance.

The legal status reflects the particular type of corporate governance and legal obligations associated with each form of registration. It also captures the relative financial and bureaucratic ease of establishing a given type of firm. Understanding the legal (corporate) status is important because different countries placed different emphasis on privatization and corporatization of state-owned firms during the transition. For instance, while the Czech Republic and Russia focused on rapid privatization,

Poland stressed early corporatization and slower privatization of state-owned firms. The relative merits of these different approaches continue to be debated.

In the Czech Republic, as in other Central European countries, individual, cooperative and limited liability categories tend to contain smaller firms that were started with relatively low initial capital base. In contrast, joint-stock companies tend to be larger in size. The state-owned and mixed ownership firms each have a similar average firm size in both the limited liability and joint-stock legal status. Finally, state-owned/state-enterprises tend to be relatively small, averaging less than one-half of the employees of other state-owned firms.[14] Corporate governance in smaller firms is relatively straightforward as ownership and management usually overlap. In state-controlled firms the government appoints and controls managers, while in private firms the decisions are made by the largest shareholder(s). Finally, in cooperatives all coop members elect the managers.

From Table 2 it is clear that in terms of the number of quarterly observations, the most important ownership-legal status category is that of privately-owned/limited liability companies (28,697 observations). It is followed by state-owned/joint-stock companies (12,170), privately-owned/joint stock companies (9,091), state-owned/state-enterprises (7,154), foreign-owned/limited liability companies (5,995), cooperatively-owned/cooperatives (5,461), privately-owned/individual businesses (5,355), mixed ownership/joint-stock companies (5,226), and foreign-owned/joint-stock companies (2,218). These nine categories, plus mixed ownership/limited liability firms (652), state-owned/limited liability companies (616), and "other firms" category constitute the twelve types of firms whose performance we analyze.

Tables A1 and A2 in the Appendix give the evolution over time of the numbers of observations in the legal status and ownership categories, respectively. As may be seen from Table A1, over time there was the expected decrease in the number and share of state enterprises and an increase in the

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[14] Detailed descriptive tables may be obtained from the authors upon request.

number and share of limited liability and joint stock companies. The number of cooperatives appears to have stayed steady or declined slightly between the early 1990s and late 1990s. The time series related to the number of cooperatives, limited liability companies and especially individually registered firms is of course affected by the fact that firms with fewer than 100 employees were excluded from the data set in 1995, 1996 and to some extent also in 1998. In terms of ownership, the data in Table A2 complement the picture by showing that the number and share of state-owned firms declined between the early and late 1990s, while the number and share of foreign-owned, mixed and domestic privately-owned firms increased. The number of cooperatives again appears to have held steady or declined slightly between the early 1990s and 1998.

The distribution of observations across industries, not reported in a tabular form, is quite broad, with 15 percent of observations being in the food industry, 13 percent in the machinery industry, 12 percent in the metal product industry, 7 percent in the furniture industry, and 6 percent in the processing of non-metallic minerals and textile industries. Each of the remaining industry groups has less than 5 percent of all observations.

The focus of our analysis is the effect of ownership change. In Table 3A, we therefore present the 1992-98 transition matrix of the flows of firms across the principal ownership categories. As may be seen from the table, our data set captures 1269 fundamental changes of ownership.[15] The most frequent change is the shift in 820 firms from majority state ownership to other ownership forms -- majority privatization in a broad sense. Of these 820 cases, the state ceded majority ownership but no other type of owner became a majority owner in 412 cases, while domestic private owners gained majority control in 334 cases and foreign owners obtained majority in 66 firms. The privatization process hence resulted in an almost even mixture of concentrated and dispersed ownership by type of

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[15] Note that ownership changes that do not involve the loss or gain of majority ownership of a given type of owners are not recorded as changes in ownership. These observations remain in their original category if the original type of owner retains

owner, with new types of majority ownership accounting for about one-half of the total number of recorded cases and privatizations in which no new type of an owner having a majority also accounting for about one-half.

In Tables 3B1-5 we present the ownership transition matrices separately by year. As may be seen from these tables, our observations are in line with the timing of the voucher scheme and the process of large-scale privatization in general. Most changes in ownership are observed between a given quarter in 1993 and the same quarter in 1994 (1993-94), corresponding to the distribution of shares in the first wave, and between a given quarter in 1995 and the same quarter in 1996 (1995-96), corresponding to the distribution of shares in the second wave (see e.g. Filer and Hanousek, 2001). This correspondence of the data with the real world situation is reassuring because it has not been obvious in some of the other studies.[16]

The summary statistics of the most relevant variables, expressed as the average of annual quarter to quarter rates of change, are presented for all firms, as well as for SOEs and private firms, respectively, in Table 4. (Additional statistics are presented on a quarterly basis in Appendix Tables A3 and A4.) As may be seen from Table 4, the firms have on average generated growth in production, labor productivity and wages, and they have also experienced falling profitability, employment and capital stock. These average statistics include the effects of the economic downturns in the early and late 1990s, as well as the short-lived boom of the mid 1990s (Table 1). A comparison of these statistics between the SOEs and private firms indicates that except for investment the rates of change go in the same direction but tend to be more pronounced in the private firms than in the SOEs. The exception is the average wage, which grew faster in the SOEs than in the private firms. Investment is also an exception in that it grew in the SOEs and fell in the private firms. The last two results are consistent

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50 percent of shares or more, and they remain in the "mixed" category of no type of owner loses or gains the majority of shares during the 1992-98 period.

with Lizal and Svejnar's (2002) findings that the SOEs (and some former SOEs) operated under soft budget constraints, while the smaller private firms were credit rationed. Overall, the summary statistics are also affected by the fact that the composition of ownership was changing during the 1992-98 period, with more private firms being observed in the mid and late 1990s, while the SOEs dominated the scene in the early to mid 1990s.

## 4. The Estimating Framework

We estimate several equations that allow us to draw conclusions about the effects of privatization on corporate performance and compare our results to those obtained in other studies. Consider an ownership group fixed-effects model used by Frydman et al. (1999), which applies the standard panel data procedure and takes privatization as a treatment variable (Ashenfelter and Card, 1985, Heckman and Holtz, 1989). Lizal et al. (2001) to evaluate the effect of breakups and spinoffs on performance for instance used a similar approach. The procedure compares the performance of privatized firms (those with the treatment) against the SOEs (non-treated firms, or control group). In this paper, we also distinguish the type of treatment according the type of the new owner. In particular, we allow for the fact that privatization to a domestic private owner may constitute a different treatment than privatization to a foreign investor. This approach allows us to decompose the overall effect of privatization with respect to the means of privatization. The basic equation of this ownership group fixed-effects (FE) model has a form:

$$y_{ijt} = a_j + b_j P_{ijt} + g_j X_{ijt-k} + c_t D_t + m M_{it} + e_{ijt} . \qquad (1)$$

The subscript $j$ denotes the ownership/legal form category (at the beginning of the analyzed period), $i$ is the firm index, and $t$ is the time index. The selected performance indicator is denoted $y$ (growth or

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[16] In Frydman et al's (1999) analysis of the first wave of the Czech large-scale privatization, many of the sampled firms for instance appear to have been privatized before the shares were distributed in 1992.

its logarithmic approximation). *P* is the set of treatment variables (domestic and foreign private ownership), *D* denotes time dummies, and *X* is a set of control variables. The time subscript is *t-k* shows the number of lags imposed on the control variable(s) *X*.

We have considered two basic options with respect to *X*. *X* may reflect the state that existed prior to privatization (a relatively large *k*) and thus controls for a possible selection bias within the ownership groups, or *X* reflects the situation at the start of the time period for which the growth rate is computed (*k*=1) and controls for the effect of an already attained level.[17] In the present paper, we report results based on the latter specification, which is also the one used by Frydman et al. (1999). In fact, Frydman et al. (1999) proxy the *X* vector by a one period lagged level of the given performance indicator so that $y_t = (X_t - X_{t-1})/X_{t-1}$ and $X_{t-1}$ is a regressor. Analogously, we use $lnX_t - lnX_{t-1}$ as the dependent variable and $lnX_{t-1}$ as a regressor. Our specification corresponds directly to a partial adjustment model and the coefficient on $lnX_{t-1}$ reflects the speed of adjustment. We compare the results of this model to a complete adjustment (static) model that excludes $lnX_{t-1}$ from the right hand side of an equation such as (1).

Within our rate of change equation, we measure the effect of ownership on performance in two ways. The immediate (defensive restructuring) effect is captured by the coefficient on a change in a given (state) ownership dummy variable, while the long-term (strategic restructuring) effect is captured by a coefficient on a given ownership dummy variable.

During some quarters we are missing profit, capital, investment or other data for some of the firms and therefore the set of firms on which we run the performance equations is somewhat smaller than the original one. In order to control for possible selection bias stemming from this switch to a smaller data set, we first run a Heckman-type probit equation, predicting the probability of the firm being included in the sample on the basis of output, profit, industry dummy variables and firm type

variables. The resulting inverse Mills ratio *M* is included as an explanatory variable in the performance change equation. Naturally, coefficients ***b*** are the parameters of our main interest, with $\mu$ being the other parameter that are estimated.

In order to control for firm-specific heterogeneity, we also re-estimate equation (1) using a firm-specific fixed effects (mean deviation or within group) specification: [18]

$$y_{ijt} = \boldsymbol{a}_i + \boldsymbol{b}_j P_{ijt} + \boldsymbol{g} X_{ijt-k} + \boldsymbol{d} D_t + \boldsymbol{m} M_{it} + \boldsymbol{e}_{ijt} \tag{2}$$

Since we have quarterly data, we could use a simple quarterly growth rate $y_t = (X_t - X_{t-1})/X_{t-1}$ or a year-on-year quarterly growth $y_t = (X_t - X_{t-4})/X_{t-4}$ as the dependent variable. It turns out that the results are not affected by this choice. Since the sample size does not impose severe limits on our analysis, we opted for the more robust year-on-year definition.[19] We have also estimated the model with two different approaches to the growth rate, namely exact calculation $y_t = (X_t - X_{t-1})/X_{t-1}$ and logarithmic approximation $y_t = \ln X_t - \ln X_{t-1}$. Both models performed equally well and we report the logarithmic version.

In order to check for the robustness of the basic results implied by the models of Frydman et al. (1999), we provide a broad spectrum of competing models on can derive under different assumptions of the determinants of the firm growth. We have considered various types of additional models that could be used to asses the effect of corporate ownership change on the performance. For example, suppose that the performance is determined as

$$\ln X_{ijt} = \boldsymbol{a'}_i (\text{or } a' \ln X_{ij0}) + \boldsymbol{a}_i t (\text{or } a \ln X_{ij0}\, t) + \boldsymbol{b'}_j P_{jt} + \boldsymbol{b}_j P_{jt}\, t + \boldsymbol{g} X_{ijt-1} + \boldsymbol{g} X_{ijt-1} t + \boldsymbol{d} D_t + \boldsymbol{e}_{ijt,}$$

which in the first difference yields something like

$$\ln X_{ijt} - \ln X_{ijt-1} = \boldsymbol{a}_i\ (\text{or } a \ln X_{ij0}) + \boldsymbol{b'}_j (P_{jt} - P_{jt-1}) + \boldsymbol{b}_j (P_{jt}\, t - P_{jt-1}\, (t-1)) + \boldsymbol{g} (X_{ijt-1} - X_{ijt-2})$$

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[17] For example, with *k*=1, *X* being the level of the performance variable for which the growth rate is computed and *P* being the change from state to private ownership (treatment), one obtains the simple specification of Frydman et al. (1999).

[18] Our estimates almost always reject the group fixed effect in favor of individual fixed effect, i.e., $\alpha_j \neq \alpha_i\ \forall\ i \in j$.

$$+ gX_{ijt-1}t - X_{ijt-2}(t-1)) + d(D_t - D_{t-1}) + e_{ijt} - e_{ijt-1.} \qquad (3)$$

Recall, that logarithmic approximation of growth $y_t = \ln X_t - \ln X_{t-1}$ is on the LHS of this equation. The next simpler model leaves out the one period lagged level of performance interacted with time

$$\ln X_{ijt} = a'_i \text{ (or } a'\ln X_{ij0}) + a_i t(\text{or } a\ln X_{ij0}\, t) + b'_j P_{jt} + b_j P_{jt}\, t + gX_{ijt-1} + dD_t + e_{ijt.}$$

And it yields

$$\ln X_{ijt} - \ln X_{ijt-1} = a_i \text{ (or } a\ln X_{ij0}) + b'_j(P_{jt} - P_{jt-1}) + b_j(P_{jt}\, t - P_{jt-1}\,(t-1)) + g(X_{ijt-1} - X_{ijt-2})$$

$$+ d(D_t - D_{t-1}) + e_{ijt} - e_{ijt-1} \qquad (4)$$

The next simplification leaves out the one period lagged level of performance

$$\ln X_{ijt} = a'_i \text{ (or } a'\ln X_{ij0}) + a_i t(\text{or } a\ln X_{ij0}\, t) + b'_j P_{jt} + b_j P_{jt}\, t + dD_t + e_{ijt.}$$

And it yields

$$\ln X_{ijt} - \ln X_{ijt-1} = a_i \text{ (or } a\ln X_{ij0}) + b'_j(P_{jt} - P_{jt-1}) + b_j(P_{jt}\, t - P_{jt-1}\,(t-1)) + d(D_t - D_{t-1}) +$$

$$e_{ijt} - e_{ijt-1.} \qquad (5)$$

Finally, the simplest effect of P, with the one period lagged level of performance, is given by

$$\ln X_{ijt} = a'_i \text{ (or } a'\ln X_{ij0}) + a_i t(\text{or } a\ln X_{ij0}\, t) + b'_j P_{jt} + gX_{ijt-1} + dD_t + e_{ijt}$$

which yields

$$\ln X_{ijt} - \ln X_{ijt-1} = a_i(\text{or } a\ln X_{ij0}) + b'_j(P_{jt} - P_{jt-1}) + g(X_{ijt-1} - X_{ijt-2}) + d(D_t - D_{t-1}) + e_{ijt} - e_{ijt-1} \quad (6)$$

and without lagged performance

$$\ln X_{ijt} = a'_i \text{ (or } a'\ln X_{ij0}) + a_i t(\text{or } a\ln X_{ij0}\, t) + b'_j P_{jt} + dD_t + e_{ijt.}$$

And this finally yields

$$\ln X_{ijt} - \ln X_{ijt-1} = a_i \text{ (or } a\ln X_{ij0}) + b'_j(P_{jt} - P_{jt-1}) + d(D_t - D_{t-1}) + e_{ijt} - e_{ijt-1.} \qquad (7)$$

Recall, that the term on the left-hand side of the equations (3)-(7) is a logarithmic approximation of

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[19] Recall the high seasonality of the data.

growth $y_t = \ln X_t - \ln X_{t-1}$. These equations (1)-(7) are the underlying specifications of the models we estimate. For the sake of exposition and comparison we discuss the Frydman et al. (1999) approach in detail while the more complicated models are just summarized.

## 5. Empirical Estimates

In Table 5, we present our estimates of simplest case of Frydman et al. (1999), using the 1992-98 quarterly data and examining the relative performance effects of foreign and domestic private ownership of firms.[20] As may be seen from the table, the partial adjustment specification that includes the lagged level of the performance measure is in most cases statistically preferred to the complete adjustment specification that excludes it. Moreover, the ownership group fixed-effects were rejected in favor of the firm-specific fixed effects. This contradicts the specification used by Frydman et al. (1999) who were using the group-effects with lagged performance measure or individual fixed effect without the lagged performance variable control. In our discussion of the results, we focus on the preferred partial adjustment specification.

As may be seen from the first row of Table 5, privatization has no immediate effect on production. The long-term effect on production is also nil in the case of domestic private ownership, but it is positive at 17% in the case of a foreign investor. This evidence provides support for the argument that foreign owners tend to incorporate the acquired firm into their distribution networks and hence have no problems finding the markets for the firm's products.

In the case of profitability, there is a large long-term decline in profits if the firm has been privatized to a domestic owner, while the effect of privatization to a foreign entity is huge and positive. In terms of employment, there is a positive significant immediate effect associated with privatization

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[20] The 1992 data are used for lagged values of regressors when necessary. The corresponding individual (firm-specific) fixed effects coefficients may be obtained from the authors upon request.

and privatization to a foreign owner leads to a further positive long-term effect. This is consistent with the foreign ownership resulting in higher production. The wage bill is not affected if the new owner is a domestic one, but foreign owners bring about a long-term increase in the wage bill. Privatization has an immediate negative effect of 1.7% on the average wage, but the long-term wage effect is positive at 1% in the domestic private and 5.2% in the foreign owned firms. The growth of the wage bill per unit of production decreases in long-term with privatization to both domestic and foreign owners. The foreign owners are able to reduce the ratio faster than the domestic owners despite the fact that they allow much faster growth of the wage bill.

There is a positive long-term effect on the growth of investment, with the effect being much higher in the case of privatization to the foreign owners. The capital stock increases immediately after privatization, but then its rate of growth declines in the domestic private firms and grows in the foreign owned ones.

The rate of growth of both cost per unit of production and material costs per unit of production remains unchanged in the case of domestic private owners, but it decreases in the case of foreign owners. Similarly, the rate of growth of both value added and value added per labor remains unchanged with domestic private owners but rises rapidly if the firm is privatized to foreign owners.

The full results of all models for the whole time span available are provided in the lengthy Table 6 and Table 7, which employs the specifications in non-logarithmic form for the sake of comparison.[21] Let us summarize the major outcomes and trends we can see. While the short term effect are somehow mixed and not giving a clear picture, the long term effects that define the ability of the enterprises to catch-up the leaders on the world market, give quite robust results. No matter the specification and selected performance measure, we might conclude that

**State ownership <= Domestic Private ownership <= Foreign ownership**,

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[21] We consider the non-log version is less successful since the estimated effects are generally less significant.

where the sign <= means performs worse or equally, ceteris paribus. Not only this relation holds. Also, when you look at the evolution of the gap in the performance growth, the difference between state and foreign as well as foreign and domestic private ownership is not closing up but widening over the analyzed period. This implies that the foreign-owned firms not only grow faster but also that the speed of the growth is increasing much more compared to the other types of ownership. These results are much more pronounced in the log-version (Table 6) than in the non-log-version (Table 7) of our models (1) to (7), however, the inequality up to the degree of significance, holds for all types of models and performances.

## 6. Conclusions

Our analysis of the effects of privatization on numerous performance indicators demonstrates that foreign owners unambiguously improve long-term performance of the former state-owned enterprises. These owners improve profitability by expanding production and value added, reducing average costs while boosting investment, and improving labor productivity in the presence of increases in employment and wages.

The results with respect to privatization to domestic owners are much less impressive. Privatization to domestic owners generates a negative long-term effect on profit, insignificant effect on production, value added, employment, labor productivity, wage bill, and costs per unit of production. The only positive effect is detected with respect to investment, average wage and production per worker. Our study hence provides strong support for the hypothesis that foreign investment improves corporate performance, but it provides very sobering evidence with respect to the hypothesis that privatization to domestic owners improves performance.

Our next strategy is to explore the differences that might exists between various types of ownership at given type of ownership change since this might shed light on the striking long-term

deterioration of state owned and domestically owned firms. Second, we generate separate estimates for larger and smaller firms to see if the performance change varies with size across the various categories of firms.

The policy implication is, however, clear even at this stage of analysis. Since our study hence provides strong support for the hypothesis that foreign investment improves corporate performance, but it provides very sobering evidence with respect to the hypothesis that privatization to domestic owners improves performance, we can safely conclude that from the long-term perspective privatization methods preferring new foreign owners dominate the privatization to the domestic owners. However, we should note that the privatization to the domestic owners in the Czech Republic favored a lot methods that brought no new capital into the firms and even leveraged them further on with the new privatization debts. Further on, as other studies show, these firms faced soft budget constraints and were not really forced to restructure. Moreover, the capital that was provided via the banking sector (the predominant source of capital of the domestic owners) was extremely expensive and further increased the leverage of the former state-owned firms. These facts are well supported by Lizal (2001), who compared three competing models of principal cause of the distress.[22] While corporate governance does not receive much support in ownership structure, it is well supported by the indicator of voucher privatization, which can be interpreted in certain setups as a different measure of the corporate governance structure. When fully controlling for the composition of debt and liabilities, the firms from voucher privatization were less likely to go bankrupt. This can be interpreted as an indication of a soft budget constraint. There was quite a substantial role of bank debt/assets that increased the probability of bankruptcy. When he specification did not fully controlled for the composition of the financial state,

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[22] 1. Neoclassical model. In this case bankruptcy is a good thing since it frees badly allocated resources. This is a "restructuring" case when the bankrupt has the wrong mixture of assets;

2. Financial model. The bankrupt has the right mixture of assets but the wrong financial structure; and

3. Corporate governance model. Here, the bankrupt has the right mixture of assets and financial structure but is badly managed. In this case bankruptcy is an inefficient way of solving the problem. More efficient is to fire the management.

the voucher privatization firms were more likely to face financial distress leading to bankruptcy. Lizal (2001) interprets this as a result of poorer performance due to the initial stage or less capable management (i.e., corporate governance). He also ruled out the effect of initial conditions. This lead him to the policy conclusion that the voucher scheme leads to poorer corporate governance (while the ownership structure does not necessarily have this effect) and therefore these firms are more likely to go bankrupt, ceteris paribus. On the other hand, since these former large SOEs selected for the voucher privatization scheme are safer from bankruptcy in distress than other firms with a similar debt structure, there is other limited evidence for soft budget constraints on these firms.

Our study further supports these findings in the long-term perspective of future development of firms. Although we posses quite different data than Lizal (2001), covering all the industrial firms, we can interpret our result similarly. These the main causes of the inferior effect of domestic ownership seems to underline our results as well and hence our policy recommendation does not contradict recommendation of Lizal (2001).

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