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STATE CONTROL, OWNERSHIP TRANSFORMATION AND FIRM RESTRUCTURING: THE CASE OF HUNGARY

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SUMMARY*

This study examines the effects of ownership transformation from the state to the private sector on firm performance in the post-privatization period using annual census-type data of Hungarian enterprises for the early 2000s. The empirical methodology designed to overcome the data limitations arising from an insufficient observation period effectively captured restructuring efforts by new owners and company managers and provided strong empirical evidence of the close relationship between ownership transformation and firm performance.

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INTRODUCTION

The privatization of public enterprises is becoming increasingly common throughout the world due to the globalization of market principles. This process began in the West with the U.K. as it adopted a denationalization program under the leadership of Margaret Thatcher, and it then spread to other industrialized states and developing countries. At the end of the 20th Century, when state socialism came to an end, privatization became an overriding trend in the international political and economic arena. The perception of the boundary separating public and private enterprises has changed considerably in the last 20 years. The denationalization process has grown steadily, even in such sectors as post services and social securities services, which were once believed be traditional state-run businesses.

The philosophical foundation of the widespread privatization of public enterprises currently observed in many countries lies in the high degree of trust in the overwhelming advantage of private over public ownership in terms of efficiency. Many citizens now expect that the transfer of public firms to private owners could alleviate the financial burden of the state as well as significantly improve the management efficiency of privatized firms themselves, contributing significantly to the betterment of society. Accordingly, it becomes an important subject of contemporary economics to ascertain whether such an expectation is feasible. In response to this demand, many studies pioneered by Megginson, Nash, and van Randenborgh (1994) and Boubakri and Cosset (1998) were conducted, which repeatedly verified the positive change in firm performance before and after privatization through case analyses of industrialized and developing countries. In addition, it is almost certain that the effect was observed in enterprise privatization in former socialist states, including Russia (Djankov and Murrell 2002, Iwasaki 2007a).

On the other hand, however, most of the previous studies fall short in identifying whether these effects are due to the privatization process itself or to other factors (Omran 2004). Furthermore, many studies focusing on the effect of a new ownership structure on a firm's performance following privatization fail to identify a statistically significant relationship between the two elements. This is particularly so for studies covering transition economies (Dewenter and Malatesta 2001, Harper 2002, Megginson 2005, Aussenegg and Jelic 2007). Therefore, despite the strong belief of economists in the superiority of the private sector over the state regarding ownership structure, no empirical study on privatization has presented a definitive conclusion regarding this point.

Using annual census-type data of Hungarian enterprises for the early 2000s, we analyze the impact of ownership transformation from the state to the private sector on firm performance in the post-privatization period. Unlike Russia and the Czech Republic, Hungary avoided giving away public assets to private interests as much as possible and, instead, thoroughly pursued the direct sale of public assets to strategic investors, including foreigners. This privatization

strategy was, in principle, applied to all industries across the country. As a result, almost all of 1,859 former socialist enterprises designated in 1990 as to-be-privatized firms had become completely privately owned or liquidated by the end of the 1990s.[1] This policy approach and the accumulated experience during the large-scale privatization period were substantially passed on to the privatization process in the early 2000s, leading to the steady privatization of dozens of government-owned companies left in the portfolio of the Hungarian Privatization and State Holding Company (ÁPV Rt.) and other public firms, mainly through open bidding. Due to this firm policy of the Hungarian government, the share of state-owned enterprises (SOEs) in the total number of employees and total added-value for 2002 (2005) shrank to 15.0% (12.0%) and 17.6% (15.6%), respectively, suggesting that the state sector is now playing only a supplementary role in the Hungarian national economy (KSH 2003, 2006).

Unlike the early transitional period, which witnessed an economic crisis triggered by the collapse of the COMECON system and large-scale institutional changes leading toward a market economy, the early 2000s is a suitable time to investigate the relationship between the privatization and firm performance in Hungary because of the stability of the social and economic circumstances and the legal system at the time. Furthermore, as explained later, the data we employ cover almost all business firms, including SOEs, therefore ensuring the representation of the Hungarian corporate sector. The data available, however, limits any study of performance among these companies to two years after privatization. An insufficient observation period poses a significant obstacle to empirical analysis of the effects of privatization policies.

To deal with this problem, we present a new empirical approach, which nearly ensures to identify the impacts of ownership transformation even if short-term data are used. The essence of the proposed methodology is to reject the null-hypothesis that the effects of ownership transformation are zero by regressing a variety of performance indices into the scale and the type of ownership transformation and then synthesizing the estimates (effect size) using meta-analysis techniques, in order to fully capture restructuring efforts by new owners and managers of privatized enterprises. Although meta-analysis is a statistical method basically designed to combine estimates across independent research studies, it is also quite effective in summarizing various tests conducted within a single study (Hunter and Schmidt 2004). The approach in this study focuses on the latter function of meta-analysis. Because everything is self-contained when conducting meta-analysis, we can prevent the so-called publication bias and other problems from occurring due to the lack of commonality of model structures and variables. Moreover, the researcher's arbitrariness can be effectively eliminated by setting no limitations on the firm performance to be analyzed.

Our empirical analysis confirmed that the ownership transformation from the state to the private sector has statistically

[1] There are many studies of enterprise privatization in Hungary during its early transition period: for the institutional framework and history of the privatization policies in Hungary, see Mihályi (1998), Macher (2000), Szanyi (2000), Major (2003) and Voszka (2003), and, for the evaluation of the privatization policies, see Bartlett (2000), Mihályi (2001), Hanley, King and János (2001), and Báger and Kovácz (2004).

and economically significant impacts on post-privatization firm performance in Hungary. We also found that there are clear differences in the performance improvement effects among privatization implemented with no lower limit on the scale of ownership transformation, privatization with strategic control rights, and full privatization. Moreover, we found that the ownership transformation to foreign investors has greater positive impacts on firm performance than that to domestic investors. These results were obtained with due consideration to the selection bias of the privatization decision by the Hungarian government and acquisitions by foreign investors and by controlling other potential determinants on firm performance in the post-privatization period. The advantage of using regression coefficients in meta-analysis over using odds rates or single correlation coefficients is that multivariate regression makes it easier to take such analytical measures when estimating the effect size of ownership transformation.

The remainder of this paper is organized as follows. *Section 1* presents testable hypotheses. *Section 2* describes the data employed for this study. *Section 3* reviews our empirical methodology. *Section 4* presents the empirical results. *Section 5* concludes.

1) Ownership Transformation and Firm Performance: Testable Hypotheses

Theoretically, privatization gain originates in the context of the relative inefficiency of the state compared with the private sector. From a political viewpoint, public enterprises should pursue strategies to achieve the public or political objectives of the politicians and bureaucrats who control them. However, such management goals often conflict with profit maximization, distorting the incentive structure and the constraints regarding company managers (Shleifer and Vishny 1994). As seen in the fact that government subsidies are more likely to be criticized by tax payers and opposition parties when they are paid to specific private firms than when they are provided to public entities, privatization raises transaction costs for the use of political influences over firms' decision-making, thereby inhibiting intervention by politicians and bureaucrats and promoting firm restructuring (Sappington and Stiglitz 1987).

From the viewpoint of corporate finance and firm organization, the governance structure in SOEs is particularly problematic. For instance, the lack of transferability of the property rights of public firms inhibits the capitalization of future consequences into current transfer prices, resulting in damaging incentives for managerial supervision by residual claimants (De Allesi 1980). In addition, although the cash flow of SOEs ultimately belongs to the taxpayer, each share is trivial, which prevents citizens from organizing to overcome the free-rider problem and, hence, from exercising their influence over control-holding managers (Bennedsen 2000). Moreover, compared with private firms, public companies are effectively protected from the threat of takeover and bankruptcy. As long as the government announces that no financial crisis is at hand, management discipline and budget constraints in SOEs are in-

evitably looser (Haskel and Szymanski 1992, OECD 2005). Furthermore, the fact that SOEs are remote from both capital and managerial markets poses a serious impediment to the development of managerial discipline and to securing effective monitoring from the outside. Transfer of ownership to the private sector greatly alleviates these governance problems and thus functions as a political measure for creating more effective control (Goldstein 1997).

Nevertheless, some argue that private companies do not always outperform public ones (Boardman, Eckel, and Vining 1986, Kole and Mulherin 1997, Kwoca 2005, Ang and Ding 2006). It is also likely that some state regulations and administrative measures may make it possible for SOEs to achieve better performance than private firms operating in the same product market, and the fact that SOEs are fully government-dependent may give more confidence to markets and customers than private firms do, *ceteris paribus*. Normally, privatization is involved with the partial or complete removal of favorable conditions to state firms. There is no guarantee that privatized firms can achieve the same performance as they previously did under state protection, even after facing the worsening of the managerial environment in the above sense. As LaPorta and Lopez-de-Silanes (1999) suggest, the financial and operating performance of privatized enterprises tends to converge to that of private firms. This rule is also assumed to be applicable when SOEs have an advantage over private firms. Accordingly, we present a neutral hypothesis with respect to the effects of ownership transformation on firm performance:

> Hypothesis H_1: Ownership transformation from state to private owners changes the financial and operating performance of privatized firms towards reducing the gap between the state and the private sector.

On the other hand, the effect of ownership transformation on post-privatization performance is not a monotonic increasing function for the degree of privatization even if there is room to seek privatization gains. Boycko, Shleifer and Vishny (1996) argue that privatization works when strategic control rights transfer from the state (or politicians) to managers. To achieve this goal, private investors must acquire at least a majority of ownership.[2] In fact, many earlier studies report that privatized firms exhibited stronger performance improvements after their majority control was sold by the government (Eckel, Eckel, and Singal 1997, D'Souza and Megginson, 1999, Boubakri, Cosset, and Gueghami 2005, Omran 2007, Chen *et al.* 2008). Renunciation of strategic control by the state sends a good signal to company managers and private investors that it has no further intention of intensive political intervention and future re-nationalization, increasing the motivation of managers and private owners for firm restructuring.

Nevertheless, the retention of strategic control rights by private entities does not provide a satisfactory solution, although it makes it significantly easier for private investors to resist government interventions that are likely to damage the corporate value or to have a negative impact on profit maximization. As

[2] As in other OECD countries, the Corporate Law in Hungary stipulates that simple majority voting is the standard decision-making procedure, except for matters requiring an extraordinary resolution (*2006. évi IV. törvény – a gazdasági társaságokról 20 § (6)*).

Broadman and Vining (1989) argue, partial privatization is still not sufficient to eliminate conflicts of interest between the government and the private sector. Empirical evidence that private firms outperform not only SOEs but also mixed enterprises is considered to support this statement (Vining and Broadman 1992, Majumdar 1996, Konings 1997). Based on the above discussions, we derive the following hypothesis with respect to the marginal effects of ownership transformation on the financial and operating performance of privatized firms:

> Hypothesis H_2: The marginal effects of the transfer of strategic control rights on post-privatization firm performance are larger than those of ownership transformation without a lower limit, and the marginal effects of full privatization surpass those of partial privatization.

The effects of ownership transformation are also greatly affected by the types of new ownership. In this regard, foreign participation can be a strong driving force for the restructuring of newly privatized firms. Foreign investors have a great deal of potential to provide enterprises acquired from the state with sophisticated expertise, including management know-how and production technologies accumulated in developed countries, as well as with greater access to new markets and new capital resources. In addition, they have a strong tendency to demand accountability in accordance with international standards from company managers in an effort to assess their performance on the basis of strict criteria (Dyck 2001, D'Souza, Megginson and Nash 2005b). With these advantages, foreign owners are highly likely to make remarkable positive contributions to former socialist economies, which are characterized by poor management and production techniques, a closed domestic market, an underdeveloped financial system, and a weak corporate governance system. In fact, many researchers find a positive causality between foreign participation in management and firm performance in transition economies (Frydman *et al.* 1999, Kocenda and Svejnar 2002, Weill 2003, Yudaeva *et al.* 2003, Hanousek, Kočenda, and Svejnar 2007). There are also many studies reporting similar empirical results with respect to Hungary (Szekeres 2001, Novák 2002, Hamar 2004, Hasan and Marton 2003, Perotti and Vesnaver 2004, Makó 2005, Brown, Earle, and Telegdy 2006, Colombo and Stanca 2006, Iwasaki 2007b).

In contrast to foreign investors, domestic investors in the post-communist states are more sensitive to political influence from regional governments and local magnates as well as more prone to be motivated by interests other than profit maximization, such as the attainment of social prestige or a relationship with local citizens. Furthermore, it has been repeatedly pointed out from both the theoretical and empirical perspectives that insiders, who often buy out privatized enterprises in transitional countries, are quite problematic as key players in corporate restructuring aimed at the improvement of profitability and productivity (Aoki and Kim 1995, Blanchard and Aghion 1996, Li 1998, Filatotchev, Wright, and Bleaney 1999, Megginson and Netter 2001). We, therefore, will test the following hypothesis with respect to the

relationship between types of investors and firm performance:

> Hypotheses H_3: Ownership transformation to foreign investors has larger positive impacts on improvement in the financial and operating performance of privatized firms than that to domestic investors.

From the next section onwards, we will verify the three hypotheses discussed above by combining large-scale panel data of Hungarian firms and a new empirical methodology.

2) DATA

The data underlying our empirical analysis are annual census-type data of Hungarian firms, which were compiled from financial statements associated with tax reporting submitted to the National Tax Authority in Hungary by legal entities using double-sided bookkeeping. The observation period is four years from 2002 through 2005. The data cover all industries and contain basic information of each entry, including the NACE 4-digit industrial classification, annual average number of employees, and total assets, sales, and other financial indices. In addition, the locations of firms are identical to the extent that they are divided into the capital region, including Budapest and Pest County, the western region, made up of nine counties, and the eastern region, comprising nine counties.[3]

[3] For details, see notes in *Table 1*. Due to the state regulation on the disclosure of official census data, more specific location information is not available for our research.

Information about ownership structure includes the total amount of capital (subscribed equity) at the end of the calendar year and its share of state, domestic, and foreign private investors. The data, therefore, allow us to know the timing and scale of ownership transformation from the state to the private sector. In this paper, the following definition applies: privatization has been carried out in year t if there was a relative decrease in the proportion of state ownership between the previous and current years.

All nominal values are deflated with the base year being 2002. As Sgard (2001) and Claessens and Djankov (2002) indicate, firm-specific price indices are not available in Hungary. Hence, following the steps taken by these two studies, we use the consumer price index, the industrial producer price index, and the investment price index reported by the Hungarian Central Statistical Office as alternative deflators.

Although the data are basically reliable, a number of values are missing, and unrealistic or inconsistent input values are included. To correct this problem, we carefully cleaned the data to remove inconsistencies and to eliminate samples containing missing values and, hence, posing an impediment to our empirical analysis.

The data form an unbalanced panel having additional new entry and exit of enterprises during the observation period. Since we have no information concerning these firms, none of these samples was used in the empirical analysis. In this regard, nothing was found to indicate that samples containing missing and abnormal values and newly entering and exiting enterprises were much more biased to-

ward certain categories of firms in terms of industrial sector, firm size, location, and financial performance than other samples.

With regard to the sample group for 2002, *Table 1* shows the total number of enterprises, the basic statistics of the number of employees and equity capital, and the composition by region and industrial sector for both private firms and SOEs. This table also reports the frequency distribution of the proportion of state ownership in the latter. One-man companies are excluded because ownership structure is not a crucial issue for corporate management in these firms. As a result of the extensive data cleaning and exclusion of one-man companies, 99,315 firms were left out in our dataset. This is about half the number of samples in the original data. According to official statistics, the 98,367 private firms and 948 SOEs covered here account for 84.2% of all private firms and 81.6% of all public enterprises in Hungary, respectively, in terms of the total number of employees in 2002.

In *Table 1*, we can also confirm the following: first, the average size of SOEs is larger than that of private firms in terms of both the number of employees and the amount of equity capital; second, the degree of geographical concentration of SOEs in the capital region is slightly moderate compared with that of private firms; and third, the share of the agriculture, forestry, and hunting and fishing sector in the industrial composition of SOEs is as much as 20% higher than that of private firms, whereas the share of wholesale and retail trade companies in the total number of SOEs is 18% lower than that of private firms. Furthermore, *Table 1* reveals that more than half of SOEs are 100% government-owned and firms with less than 50% state ownership account for only 27% of all SOEs. We take these facts into account in the empirical analysis.

3) Empirical Methodology

As pointed out by Kocenda and Svejnar (2003), using a small and unrepresentative samples of firms as well as a short observation period could pose a serious impediment to empirically examining the effects of privatization policies in developing and transition economies. With the development of state statistical systems and private company information services, the problems associated with short observation periods and small samples are diminishing because of the increasing availability of large-scale sample sets. Although solutions are being found to overcome the short observations, the real difficulty is with the type of firm to be observed rather than with the observers. In other words, the shorter life cycles of firms and the more frequent changes in company profiles in developing and transitional countries than in developed countries are major obstacles to tracing the effects of enterprise privatization from a mid- and long-term perspective. The other related issue is the scarcity and distortion of information concerning the management and performance of SOEs, especially in former socialist states. This defect considerably limits the application of the empirical method advocated by Megginson, Nash, and van Randenborgh (1994) into transition economies for the detection of privatization gains through comparing firm performance before and after

privatization. Unfortunately, there seems to be no instant solution to this situation.

Researchers often attempt to identify privatization gains by looking at changes in profitability and productivity in a narrow sense. This approach makes a lot of sense because those changes are directly related to improvements in corporate value and shareholder wealth. However, if profitability or productivity is increased as a result of multifaceted improvements in business strategies, firm organization, and production systems, the use of short-term observation data may lead to the failure to detect the end products of those managerial efforts. With this in mind, an empirical study should be conducted to cover a broad range of performance indices, including short-term ones, which are more operational for new owners and managers of ex-state companies, focusing on the byproduct of the process of firm restructuring at hand. By covering as many performance indices as practicable, the statistical power of hypothesis tests is also expected to be enhanced due to increased information about the effects of ownership transformation on firm performance. This is the reason that we perform panel data regressions taking a variety of performance indices as dependent variables and then synthesize these estimates using meta-analysis techniques to examine the testable hypotheses presented in Section 1.

Our empirical analysis broadly consists of five stages. At the first stage, as a prerequisite for verifying hypothesis H_1, we conduct comparative analysis using descriptive statistics of 100% SOEs and private firms in order to identify in which aspects of firm performance state ownership is inferior or superior to private ownership. This procedure aims to identify the potential source of privatization gains. The comparison is carried out between 499 fully government-funded companies listed on *Table 1* and approximately 90,000 private firms whose distribution of firm sizes, locations, and industrial compositions is, for the most part, identical to that of the above fully SOEs. We exclude mixed enterprises, in which ownership structure and firm performance are highly likely to be determined endogenously, from all stages of our empirical analysis because the main research interest in this study lies in how the exogenous privatization decision made by the government affects firm performance in the post-privatization period.

The comparison is made with respect to a total of 23 financial and operating indices from 5 areas routinely utilized by company executives and investment analysts worldwide, including Hungary. They consist of the following: (i) 7 indices of profitability (ordinary income to total assets (ROI)/value-added to sales/operating income to sales/ordinary income to sales/return on equity (ROE)/return on total assets (ROA)/ordinary income on equity); (ii) 7 indices of productivity (value-added per employee/operating income per employee/ordinary income per employee/sales per employee/sales to employment/sales to total costs/fixed investment efficiency); (iii) 2 indices of financial ability (total assets turnover/fixed assets turnover); (iv) 2 indices of financial soundness (fixed ratio/capital adequacy ratio (CAR)); and (v) 5 indices of firm growth (sales growth/value-added growth/operating income growth/ordinary income growth/total assets growth).[4] The number

[4] The following indices are defined as shown: fixed investment efficiency = value-added/total fixed

of employees and average employee salary are not investigated, since it is theoretically unclear how a change in these two variables would affect the corporate restructuring of privatized firms in contemporary Hungary after the dozen years since the collapse of the communist regime.

The second stage traces when and how much ownership of which companies was transferred to the private sector among the above 499 SOEs in the 3 years from 2003 to 2005. At this stage, in order to identify the presence and extent of selection bias regarding the privatization decision of the government and foreign participation in the management of privatized firms, we carry out univariate comparisons of the privatized firms and remaining SOEs and the firms acquired by domestic investors and those by foreign investors in terms of pre-privatization company size and firm performance. We also perform multivariate regression, taking the probability of privatization and that of foreign acquisition as dependent variables.

In the third stage, we conduct a panel estimation of the impact of ownership transformation on post-privatization firm performance. The 23 performance indices reported above are regressed into the scale and type of ownership transformation while controlling the other potential determinants. We estimate the following regression equation:

$$y_{it} = \mu + \alpha x_i + \gamma' Z_i + \delta_i + \varepsilon_{it}, \quad Z_i = (z_{i1}, \ldots, z_{iK}), \qquad (1)$$

where y_{it} represents firm i's performance for year t, x_i is an ownership variable, Z_i is a $K \times 1$ vector of control variables, μ is a constant term, α and γ are parameters of interest to be estimated, δ_i is the individual effects, and ε_{it} is an error term.[5] The regression model taking an ownership variable with no lower limit to the scale of ownership transformation is Model I. We use the estimation results of this model to examine hypothesis H_1. We also estimate Model II, in which limitations are placed on the scope of ownership variables to be investigated into the impact of the transfer of strategic control rights (i.e., 50% or more ownership), and Model III, which is exclusively applied to the cases of full privatization. The estimation results of the latter two regression models are used for verifying hypothesis H_2 with those of Model I. To test hypothesis H_3 regarding the relationship between types of new ownership and firm performance, we estimate Model IV and Model V, which regress post-privatization firm performance into an ownership transformation ratio to domestic investors and foreign investors, respectively, and compare the estimates of these two models.

Further, according to Claessens and Djankov (2002), who documented changes in the performance of over 6,000 firms in seven Eastern European countries in the early 1990s, it takes several years for the privatization benefits at the firm level to become noticeable. The panel data used in this study deals with time lags of up to two years. Thereupon, with regard to Model I, we estimate a regression equation that takes the ownership transformation ratio in the current year (x_{it}) as an ownership variable and call it Model Ia. We also perform estimations of Models Ib and Ic, which regress firm performance into a one-year lag ownership variable (x_{it-1}) and a two-year lag ownership variable (x_{it-2}),

assets; total (fixed) assets turnover = sales/total assets (fixed assets); and fixed ratio = total fixed assets/equity capital.

[5] We hypothesize that no change in ownership structure had been made for two years before privatization.

respectively. We label these three regression equations as the Model I family. The same estimation procedure is adopted for Models II to V. Consequently, our panel estimation is based on a total of 15 types of regression equations classified into one of 5 model families.

In order to fully identify the effects of ownership transformation, our regression model controls the following potential determinants of firm performance: the sales share of each firm to represent its position in the product market; the median of the dependent variable for the sector each firm belongs to, calculated from about 10,000 effective samples, to capture the sector's market fluctuation; the sales-based Herfindahl index to proxy for the degree of market concentration of the sector each firm belongs to; industry fixed effects; time effects; and region-specific fixed effects. The firm's market position, the market fluctuation and market concentration level of the sector it belongs to, and industry fixed effects are all based on the NACE two-digit level. In addition, to avoid simultaneous bias with the dependent variable, a predetermined variable for the previous term is used for the firm's market position and the degree of market concentration of the sector it belongs to.

We estimate the above regression models using three panel estimators: fixed effects, random effects, and pooled OLS with cluster effects on the NACE two-digit level.

The fourth stage synthesizes the regression coefficients of ownership variables using the estimation results of models selected on the basis of the Hausman test to test the random-effects assumption and the Breusch-Pagan test to test the null-hypothesis that the variance of the individual effects is zero. We set the critical value for both of these specification tests at the 10% level of significance.

The following method is applied for synthesizing regression coefficients. Suppose there are N independent studies. Here, the "effect size" estimate of the n-th study is labeled as T_n, and the corresponding population and standard deviation, as θ_n and s_n, respectively (n=1, …, N). We assume that estimate T_n is normally distributed ($T_n \sim N(\theta_n, s_n^2)$). We also assume that $\theta_1 = \theta_2 = \ldots = \theta_N = \theta$, implying that each study in a meta-analysis estimates the common underlying population effect and the estimates differ only by random sampling errors. An asymptotically efficient estimator of the unknown true population parameter θ is a weighted mean by the inverse variance of each estimate:

$$\overline{T} = \sum_{n=1}^{N} w_n T_n \Big/ \sum_{n=1}^{N} w_n , \qquad (2)$$

where $w_n = 1/v_n$ and $v_n = s_n^2$. The variance of $\overline{T}$ is given by:

$$\mathrm{var}(\overline{T}) = 1 \Big/ \sum_{n=1}^{N} w_n . \qquad (3)$$

This is the meta fixed-effects model. In order to utilize this method, we need to confirm that the estimates are homogeneous. A homogeneity test uses the statistic:

$$H_T = \sum_{n=1}^{N} w_n (T_n - \overline{T})^2 , \qquad (4)$$

which has a Chi-square distribution with N-1 degrees of freedom. The null-hypothesis is rejected if H_T exceeds the critical value. In this case, we assume that heterogeneity exists among the studies and adapt a random-effects model that incorporates the sampling variation due to an underlying population of effect sizes as well as the study-level sampling error. If the deviation between estimates is expressed as δ_θ^2, the unconditional variance of the n-th estimate is given by $v_n^u = (v_n + \delta_\theta^2)$. In the meta random-effects model, the population θ is estimated by replacing the

weight w_n with the weight $w_n^u = 1/v_n^u$ in Eq. (2).[6] For the between-studies variance component, we use the method-of-moment estimator computed by the next equation using the value of the homogeneity test statistic H_T obtained from Eq. (4):

$$\hat{\delta}_\theta^2 = \frac{H_T - (N-1)}{\sum_{n=1}^{N} w_n^u - (\sum_{n=1}^{N} w_n^{u\,2} \Big/ \sum_{n=1}^{N} w_n^u)}. \quad (5)$$

In other words, the fourth stage verifies the testable hypotheses on the basis of the value of the synthesized regression coefficients and its statistical significance by adopting either the meta fixed-effects model or the meta random-effects model according to the results of the homogeneity test. At this stage, we also make use of the *p*-value combination method and the vote-counting method, both of which are more conventional meta-analysis techniques, to supplement the results from the synthesis of regression coefficients.[7]

At the last fifth stage, we conduct a meta-regression analysis.[8] This quantitative method has a great advantage in strictly interpreting the differences in the results of panel estimation, and, thus, it can be an effective means for supplementing the results of meta-analysis at the fourth stage. We estimate the following meta-regression model:

$$T_n = \beta_0 + \sum_{m=1}^{M} \beta_m W_{nm} + e_n, \quad n = 1,...,N, \quad (6)$$

where β_0 represents the effects of ownership transformation under the default conditions (W_{nm}=0), W_{nm} is a meta-independent variable including the characteristics of the panel regression model and observations that are considered to create differences in estimation results, β_m denotes a meta-regression coefficient to be estimated, and e_n is an error term.

To reexamine our testable hypotheses, we use dummy variables that identify whether the dependent variable y_{it} in the panel regression model is a superior or inferior performance index to private firms in comparison with fully SOEs as well as dummy variables that capture the differences in the scale and type of ownership transformation. In addition, we check the sensitivity of the overall estimation results of the panel regressions by incorporating into the meta-regression model such independent variables that capture the time lags of the ownership variables, the industrial sector, the qualitative difference in performance indices, and the difference in panel estimators, and a dummy variable, which is equal to one if an effect size is obtained from the regression model selected according to the model specification tests, as well as the number of observations used in the panel estimation.

To estimate meta-regression models, most preceding studies have employed one or a combination of a weighted least square (WLS) estimator with the number of observations or standard errors as analytical weights, a meta random-effects estimator using the restricted maximum likelihood (RML) method or the non-iterative moment method, or a meta mixed-effects estimator using the RML method. In order to check the robustness

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[6] This means that the meta fixed-effect model is a special case based on the assumption that $\delta_\theta^2 = 0$.

[7] For more details on the meta-analysis methods, see Hedges and Olkin (1985), Hedges (1992), and Keef and Roberts (2004).

[8] Called "the regression analysis of regression analyses" (Stanley and Jarrell, 1989), this method is now increasingly applied in economics to summarize the empirical literature. Among the recent studies using this technique are those by Nelson (2006), Connor and Bolotova (2006), Brander, Van Beukering, and Cesar (2007), and Doucouliagos and Paldam (2008). In the literature on transition economies, Fidrmuc and Korhonen (2006) practice this method.

of the estimation results, we adopt all five of these estimators. We also perform regressions by using all panel estimates as the dependent variables and by exclusively using the estimates of models selected by the specification tests.

4) Results

Tables 1 through *8* present the main results of our empirical analyses. In this section, we summarize and interpret these results as well as explain the methodological procedure in detail.

A. Performance Comparison between Private and Full State-Owned Enterprises

Table 2 shows univariate comparisons between private and fully SOEs using 23 performance indices. According to the results covering the entire corporate sector (panel A), Hungary's SOEs are generally inferior to its private firms. In fact, 18 of the 23 indices demonstrated the superiority of private firms over SOEs at the 10% or lower significance level either by a *t*-test or a Wilcoxon rank-sum test. These indices are hereinafter referred to as the "SOE-inferior indices." This is one of the political reasons that the Hungarian government has been and is still promoting the privatization of public firms.

Nevertheless, when looking into the four individual sectors (panels B-E), performance gaps between fully SOEs and private firms vary significantly from industry to industry. For example, in the service sector, 13 of the 23 performance indices apply to the SOE-inferior indices, whereas, in the agriculture, forestry, hunting, and fishing sector, only 7 indices apply. In addition, no particular common trend is observed among the four sectors regarding the structure of the comparison results. On the other hand, turning to the performance indices showing the statistically significant superiority of SOEs over private firms (hereinafter "SOE-superior indices"), the capital adequacy ratio for SOEs is much higher than that for private firms in all sectors. Furthermore, in the agriculture, forestry, hunting, and fishing sector, SOEs outperform private firms in six performance indices, and, in the manufacturing sector, SOEs perform better than private firms in terms of the ordinary income-to-equity ratio. Moreover, there are 42 test results demonstrating no statistically significant performance gaps between the two corporate sectors (hereinafter "difference-insignificant indices"), accounting for 46% of all results. As discussed in Section I, if a privatization gain can be attributed to the comparative inefficiency of public firms, the effects of enterprise privatization are considered to have become noticeable in more limited situations than expected in Hungary of the early 2000s.

B. Privatization Process of State-Owned Enterprises and Selection Bias

Table 3 shows that, of 499 companies that were fully government-owned as of the end of 2002, 313, or 62.7%, partially or entirely transferred their property rights to the private sector over the three years up to 2005. This table also shows that most of these firms were privatized in 2003. This is probably due to the policies adopted

by the Hungarian government[9] facing the need to restructure public finance and to further promote deregulation in the domestic market toward EU accession in 2004.[10] This provides a favorable condition for measuring the time-lag effects of ownership transformation for two consecutive terms.

The statistics on the scale of ownership transformation indicate that a vast majority of these 313 SOEs, including 24, or 7.7%, acquired by foreign investors, are fully privatized. Looking at the regional and industrial compositions of privatized firms, we confirm that the sales of public enterprises were conducted in all industries on a nationwide scale. This reveals that the Hungarian government had been consistent in actively pursuing ownership transformation to strategic investors beyond industrial and regional boundaries.

Nevertheless, because the government's privatization decision is a highly political matter and because the sale of SOEs is also influenced by bidding private investors, a statistically significant bias may occur between privatized firms and the remaining SOEs. Hence, in measuring the effects of ownership transformation on firm performance in the post-privatization period, it is indispensable to know the presence and extent of the selection bias. In the case of this research, we should also consider possible differences in behavioral patterns between domestic and foreign investors.

To evaluate these aspects, we compare privatized firms and remaining SOEs and privatized firms acquired by domestic investors and those acquired by foreign investors in 2003 in terms of company size and firm performance in the previous year. According to the results presented in *Table 4*, the company size of privatized firms is much smaller than that of the remaining SOEs, while the firm performance of the former is better than that of the latter, especially in terms of productivity and financial ability indices (panel A). Similarly, firms acquired by foreign investors are larger in size than firms acquired by domestic investors, while, by and large, the latter outperform the former (panel B).

To test whether the above relationships can appear when controlling other factors simultaneously, we perform probit regressions taking a discrete variable, which assigns a value of 1 to privatized firms or firms acquired by foreign investors in 2003 as the dependent variable. As independent variables, we employ the natural logarithm of total assets for 2002 to proxy for company size before privatization and a dummy variable, which takes a value of 1 for firms whose operating income was negative for 2002, as well as the six performance indices which differed at the 10% or lower significance level between the groups compared in *Table 4*. We also use dummy variables to capture the fixed effects of firm locations in the western and eastern regions and a dummy variable with a value of one if the firms operating in traditional public

[9] In May 2002, Péter Medgyessy formed a coalition government of the Hungarian Socialist Party (MSZP) and the Alliance of Free Democrats (SZDSZ) as a result of the fourth post-communist parliamentary elections. Aiming at early fulfillment of Hungary's EU accession and entry into the EURO zone, the Medgyessy administration took political measures to promote market-oriented structural reform and tight fiscal policies.

[10] All four enterprises, which had experienced privatizations twice until 2005, transferred more than 50% of their property rights to private investors at the first privatization, whereas they sold a much smaller percentage (8-12%) at the second privatization.

sectors[11] as control variables.[12] We estimate a regression model of the probability of being acquired by foreign investors using the two-step probit maximum likelihood estimator with the probability of privatization being the dependent variable at the first stage. *Table 5* presents the results of our regressions. The signs of the independent variables estimated with statistical significance at the 10% or lower level correspond to the results of the univariate comparison shown in *Table 4*. These findings strongly suggest the presence of selection bias in the Hungarian government's privatization decision as well as certain differences between domestic and foreign investors in terms of their behavior when purchasing state firms.[13]

C. Panel Estimation of the Effects of Ownership Transformation

In performing the panel estimation of the effects of ownership transformation, we take four measures to deal with the selection bias of privatization decision and acquisition by foreign investors. First, in our panel regressions, we do not use the level of firm performance, but, rather, the rate of its annual change as the dependent variable for the 18 indices of profitability, productivity, financial ability, and soundness. Secondly, we control the level of the dependent variable in the previous year, since the past performance level may strongly affect the range of the growth rate of the relevant performance index as a result of management efforts for the current term. Thirdly, to control firm size, we use the natural logarithm of total assets as an independent variable. Fourthly, we exclude every sample falling outside the mean ± 2 standard deviations of all samples with respect to the level of the performance index for 2002 to be analyzed.[14]

We performed regressions using the panel data on 411 firms from the agriculture, forestry, hunting, and fishing, the manufacturing, the construction, and the service sectors, which made up for 82% of the 499 SOEs listed in *Table 3*. We carried out a total of 4,140 estimation trials (*i.e.*, 15 types of regression equations defined in Section 3×23 types of performance indices ×3 types of panel estimators ×4 industrial sectors). Two-hundred and ninety-seven estimations of the Model V family were not successful due to the small sample size of the firms acquired by foreign investors or lack of data; hence, we did not adopt the corresponding estimates of the Model IV family for comparison of the two models on the same estimation basis. Consequently, we obtained a total of 3,546 estimates of ownership variables. The meta-analyses in the following two subsections use these 3,546 estimates. With respect to the composition by the panel estimator of the

[11] These sectors refer to the mining of uranium and thorium ores (NACE12); electricity, gas, steam, and hot water supply (40); collection, purification, and distribution of water (41); transport via railways (60.1); post and courier activities (64.1); central banking (65.11); public administration and defense and compulsory social security (75); education (80), health and social work (85), and sewage and refuse disposal, sanitation, and similar activities (90).

[12] The largest correlation coefficient between these independent variables in all combinations, including the 6 performance indices, is 0.41, well below the threshold of 0.70 for possible multicollinearity.

[13] Almost the same results were obtained by conducting the analyses reported in *Tables 4* and *5* while excluding all firms privatized in 2004 and onwards from the remaining SOEs as of 2003.

[14] The actual number of outliers excluded by this criterion is less than 0.5% of all samples in all cases, suggesting the significant homogeneity of Hungarian SOEs in firm performance.

1,182 models selected by the Hausman and Breusch-Pagan specification tests, 962, or 81.4%, are pooled OLS estimators, 153, or 12.9%, are random-effects estimators, and the remaining 67, or 5.7%, are fixed-effects estimators. These findings suggest that our panel regression model is well formulated in the sense that there is little need for distinguishing individual firm effects as fixed effects or random effects.

D. Synthesis of Regression Coefficients

Synthesis of regression coefficients is performed using the estimation results of the selected models according to the type of model family and the type of investor as well as by each of the three categories of performance index: the SOE-inferior, the SOE-superior, and the difference-insignificant. The results are detailed in *Table 6*. In addition to the synthesized values of regression coefficients based on the meta fixed-effects models and the meta random-effects models and the values of homogeneity tests, this table also presents the asymptotic *z*-values to test the null-hypothesis that the synthesized effect size is zero, the combined *p*-value obtained using the inverse Chi-square method and the inverse normal method,[15] and the results of the vote-counting method.

If hypothesis H_1 is true, we expect that the synthesized effect size of Model I family based on the SOE-inferior indices is significantly positive due to the sources of privatization gains, whereas those based on the SOE-superior indices are negative. We also predict that it is more difficult to detect the positive effects of ownership transformation through meta-analyses based on the difference-insignificant indices than through those based on the SOE-inferior indices. If hypothesis H_2 is empirically supported, the synthesized effect size of Model II family whose scope of application is limited to the cases of transfer of strategic control rights should exceed those of the Model I family, which covers the ownership transformation effects without a lower limit, and further, the synthesized effect size of the Model III family, which tracks only the effects of full privatization, should be superior to those of the former two models. In addition, if hypothesis H_3 is correct, the synthesized effect size of ownership transformation to foreign investors (Model V family) will surpass those of ownership transformation to domestic investors (Model IV family).

The results shown in *Table 6* strongly support the above predictions. With the exception of ownership transformation to domestic investors using the difference-insignificant indices, we refer to the synthesized effect sizes based on the meta random-effects model to verify the hypotheses because the null-hypothesis is rejected by the homogeneity test at the 5% or lower significance level. The synthesized effect size for the Model I family based on the SOE-inferior indices is positively estimated at the 1% level, whereas that based on the SOE-superior indices is negative at the 1% level and that based on the difference-insignificant indices is statistically insignificant. Similar results are also obtained when comparing the synthesized effect sizes of other models. By comparing

[15] If $p_1, p_2, \ldots, p_N$ are *p*-values of N estimates, the inverse Chi-square method uses the statistic: $-2\sum_{n=1}^{N}\log(p_n)$, which has a Chi-square distribution with $2N$ degree of freedom, and the inverse normal method uses the statistic: $1/\sqrt{N}\cdot\sum_{n=1}^{N}\Phi^{-1}(p_n)$, which has the normal distribution. $\Phi(\cdot)$ represents the standard normal distribution function (Hedges 1992).

the results for the Model I, II, and III families, we confirm that the synthesized effect sizes of ownership transformation without a lower limit are always smaller than those of transfer of strategic control rights, and those of full privatization are always larger than those of partial privatization. Furthermore, the comparison of the synthesized effect sizes of the Model IV and Model V families indicates that the effects of ownership transformation to foreign investors are greatly superior to those to domestic investors except for the case of the SOE-superior indices. Although we do not go into detail here due to space limitations, the results from the *p*-value combination procedure and the vote-counting method also, by and large, support the conclusions derived from the meta-analysis of regression coefficients.[16]

E. Meta-Regression Analysis

Table 7 contains the definitions and descriptive statistics of the variables used in the meta-regression analysis. The estimation results are presented in *Table 8*. Models [1] through [5] show the estimation results from the meta-regression models covering all panel estimates, and Models [6] through [10] show the estimation results using only the estimates of the selected models.

The results strongly support hypothesis H_1. In 7 of the 10 models, with the difference-insignificant indices as the default category, the dummy variables denoting that an SOE-inferior index is used as a dependent variable for the panel estimation have positive signs at the 10% or lower significance level, while the dummy variables designating the use of an SOE-superior index are significantly negative in 8 models. Similarly, hypothesis H_3 is supported by the results in which the dummy variables identifying the panel estimates on the effects of ownership transformation to foreign investors are positively estimated in 9 models. On the other hand, although all of the dummy variables relating to the effects of transfer of strategic control rights and those of full privatization have positive signs excluding one case in Model [1], they are not statistically robust enough to be used as supporting evidence for hypothesis H_2.

The estimation results of other meta-independent variables suggest the following four points with respect to the sensitivity of the panel estimation: 1) The effects of ownership transformation tend to wane over time. 2) No statistically robust differences are observed in the industrial sectors and the qualitative categories of the performance indices. 3) Although no apparent bias is seen in the overall estimation results arising from the differences among panel estimators, the random-effects estimators in the selected models tend to be more biased downward than OLS and the fixed-effects estimators. 4) The estimates of the selected models have no significant bias in comparison to those of the unselected models. The second point is particularly interesting from the viewpoint of policy implication.

5) CONCLUSIONS

In this study, we empirically examined the effects of ownership transformation from

[16] See Coggin and Hunter (1993) for how to interpret the results from the vote-counting method.

the state to the private sector on post-privatization firm performance focusing on the Hungarian enterprises in the early 2000s. We used annual census-type data compiled by the Hungarian National Tax Authority for the empirical analyses. Although this dataset presents an ample sample size in cross-section, it allowed us to trace the performance changes for up to two years after privatization. The short observation period is a serious obstacle to the detection of the privatization effects. We attempted to overcome this data constraint by combining the panel estimation regressing various performance indices into the scale and type of ownership transformation with the meta-analysis of the regression coefficients. This empirical methodology made it possible to wholly capture restructuring efforts of new owners and managers, leading to the successful detection of the statistically significant effects of ownership transformation. That is, the synthesis of regression coefficients of the ownership variables provided supporting evidence for all three testable hypotheses presented in Section I, and the results of the meta-regression analysis verified hypotheses H_1 and H_3.

The most important lesson from this research is that to detect the effects of ownership transformation, it is necessary to identify the potential sources of privatization gains. It was revealed that in Hungary at the beginning of the 21st Century, the performance gaps between public and private enterprises were more limited than had been anticipated. This fact in itself is considered to be on the positive side of the systemic transformation to a market economy in this country. Yet, if it is impossible to know in advance in what aspects SOEs are inferior to private firms in performance, we might have overlooked the effects of ownership transformation that actually existed. In fact, according to *Table 6*, the null-hypothesis that the synthesized effect size of the Model I family is zero cannot be rejected (z=0.01) when covering all performance indices. We expect that the feasibility of detecting the privatization effects will improve significantly if the potential source of privatization gains can be identified beforehand.

Another interesting finding in this paper is the fact that foreign investors outperform domestic investors in a short period of time with regard to medium and small-sized SOEs sold in the early 2000s, reminding us of the large-scale privatization period when foreign direct investment made a critical contribution to the restructuring of large Hungarian corporations (Makó and Illéssy 2007). Moreover, according to the empirical results reported in the previous section, unlike in the 1990s, foreign investors bought and successfully restructured the public enterprises that had not been in good financial condition before privatization. This constitutes counterevidence to the view that the effects of foreign participation in management of privatized firms are overestimated due to selection bias that drives foreign investors to select good companies for investment. If an appropriate policy framework is in place, there may be still plenty of room left for Hungary, the largest foreign capital recipient among the former socialist countries, to be able to receive further benefits from foreign direct investment.

* * * * *

Table 1
Comparison of Private and State Corporate Sectors, 2002

This table compares 98,367 private firms and 948 state-owned enteprises (SOEs) using annual census-type data for 2002 which were compiled from financial statements associated with tax reports submitted to the Hungarian National Tax Authority in Hungary by legal entities using double-sided bookkeeping. The western region consists of the following nine counties: Győr-Moson-Sopron; Komárom-Esztergom; Vas; Veszprém; Fejér; Zala; Somogy; Tolna; and Baranya. The eastern region also consists of nine counties: Nógrád; Bács-Kiskun; Csongrád; Békés; Jász-Nagykun-Szolnok; Hajdú-Bihar; Szabolcs-Szatmár-Bereg; Borsod-Abaúj-Zemplén; and Heves. The composition by industrial sector is based on the Classification of Economic Activities in the European Community (NACE). Other industries include public administration and defense and compulsory social security; education; health and social work; other community, social, and personal service activities; and household activities.

	A. Private firms	B. SOEs
Number of firms	98 367	948
Annual average number of employees (persons)		
Total	1 497 832	255 960
Mean	15	270***
Median	4	19†††
Equity capital		
Total (billion HUFs)	4 360	1 592
Mean (thousand HUFs)	44 325	1,679,550***
Median (thousand HUFs)	3 000	60,864†††
Composition by region (actual number/proportion)[a]		
Capital region (Budapest and Pest County)	44 422/0,45	392/0,41
Western region	25 883/0,26	254/0,27
Eastern region	28 062/0,29	302/0,32
Composition by industrial sector (actual number/proportion)[b]		
Agriculture, forestry, hunting, and fishing	4 095/0,04	226/0,24
Mining and quarrying	192/0,00	3/0,00
Manufacturing	17 490/0,18	116/0,12
Electricity, gas, and water supply	305/0,00	30/0,03
Construction	10 605/0,11	80/0,08
Wholesale and retail trade	30 255/0,31	122/0,13
Hotels and restaurants	4 780/0,05	18/0,02
Transport, storage, and communication	4 681/0,05	56/0,06
Financial intermediation	1 004/0,01	30/0,03
Real estate and renting	15 855/0,16	175/0,18
Other industries	9 105/0,09	92/0,10
Share of state ownership (actual number/proportion)		
1-25%	-	147/0,16
26-50%	-	101/0,11
51-75%	-	83/0,09
76-99%	-	118/0,12
100%	-	499/0,53

[a] Test for equality: χ^2=6.7446, p=0.034.

[b] Test for equality: χ^2=1246.8518, p=0.000.

*** denotes that the difference between privave firms and SOEs is significant at the 1% level by the t-test.

††† denotes that the difference between private firms and SOEs is significant at the 1% level by the Wilcoxon rank-sum test.

Table 2
Firm Performance Comparison of Private and Fully State-Owned Enterprises, 2002

This table presents the results of a univariate firm performance comparison of approximately 90,000 private and 499 fully state-owned enterprises (SOEs) using annual census-type data of Hungarian firms available for 2002 and 2003 in terms of 23 financial and operating performance indices. The 23 indices consist of five groups: profitability; productivity; financial ability; financial soundness; and firm growth. The following indices are defined as follows: fixed investment efficiency = value-added / total fixed assets; total (fixed) assets turnover = sales / total assets (fixed assets); and fixed ratio = total fixed assets / equity capital. All nominal values are deflated with the base year being 2002 using the consumer price index, the industrial producer price index, and the investment price index reported by the Hungarian Central Statistical Office as deflators when we compute the firm growth indices. The service sector includes wholesale and retail trade; hotels and restaurants; transport, storage, and communications; and real estate and renting. The SOE-inferior (SOE-superior) indices denote the financial and operating performance indices in which the mean or median for fully SOEs regarding the relevant indices are inferior (superior) to those for private firms with statistical significance at the 10% or lower level. The difference-insignificant indices refer to those that do not satisfy these conditions.

		A. Whole corporate sector		B. Agriculture, forestry, hunting, and fishing		C. Manufacturing		D. Construction		E. Services	
		Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs
Profitability											
Ordinary income to total assets (ROI)	Mean		-0,311		-0,170		-0,230		-0,502		-0,305
	Median	Δ 0,016	0,002 †††	Δ 0,029	0,008 †		0,029	0,043	0,025	0,010	Δ 0,010 -0,005 †††
			-0,334		-0,467		0,020		-0,104		-0,491
Value-added to sales	Mean	Δ 0,018	-0,239 ***		-0,135		0,116	0,154	Δ 0,112	-0,308 **	0,003 -0,155
	Median		0,198	0,222	▼ 0,152	0,318 †††		0,255	0,305	Δ 0,190	0,140 †† 0,168 0,183
Operating income to sales	Mean		-0,344	-0,679	-0,339	0,024	Δ -0,287	-1,662 **	-0,253	-0,157	-0,372 -0,793
	Median		0,016	0,015	0,032	0,017		0,020	0,029	0,014	0,017 0,014 0,009
Ordinary income to sales	Mean	Δ -0,419	-1,213 ***		-0,390	0,035	Δ -0,303	-1,159 *	-0,271	-0,210	Δ -0,446 -1,136 ***
	Median	Δ 0,017	0,007 †††	Δ 0,045	0,015 ††		0,023	0,029	0,016	0,011	Δ 0,014 0,002 †††
Return on equity capital (ROE)	Mean		6,123	1,938	5,338	1,449	5,033	13,228	2,917	-1,029	4,249 2,522
	Median	Δ 0,089	0,034 ††		0,108	0,036	0,122	0,104	0,099	0,025	0,051 0,024
Return on total assets (ROA)	Mean		-0,390	-0,262	-0,222	-0,457	-0,339	0,011	-0,683	-0,085	-0,392 -0,394
	Median	Δ 0,019	0,009 ††		0,020	0,016	0,024	0,037	0,019	0,009	0,012 0,007
Ordinary income on equity capital	Mean		2,167	1,065	2,487	1,384	▼ 2,062	12,062 ***	0,808	-1,410	1,842 1,273
	Median	Δ 0,054	0,003 †††	Δ 0,124	0,027 †		0,120	0,127	Δ 0,100	0,015 ††	Δ 0,032 -0,010 †††

		A. Whole corporate sector		B. Agriculture, forestry, hunting, and fishing		C. Manufacturing		D. Construction		E. Services	
		Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs
Productivity											
Value -added per employee[a]	Mean	△ 2287	1233 ***	1375	1660	2232	2541	△ 1784	867 **	△ 2389	1215 ***
	Median	1327	1426	▼ 1107	1670 ††	1451	2147	△ 1215	1046 ††	1318	1354
Operating income per employee[a]	Mean	△ 590	-392 ***	525	-84	467	1099	340	580	△ 643	-1209 ***
	Median	86	86	196	90	85	241	62	137	69	52
Ordinary income per employee[a]	Mean	△ 540	-483 ***	658	-213	490	1010	393	94	△ 610	-763 ***
	Median	△ 105	29 †††	△ 328	66 †††	128	75	101	91	△ 90	1 †††
Sales per employee[a]	Mean	△ 14681	12636 *	△ 13852	7643 *	11502	12540	12420	12616	16673	14386
	Median	△ 6088	5597 †	△ 7123	5792 †	5721	6822	△ 5969	4344 †	6727	5903
Sales to employment	Mean	42,421	25,271	49,282	14,788	27,692	7,394	37,611	11,280	46,587	35,686
	Median	△ 6,780	3,325 †††	△ 7,370	3,176 †††	△ 5,345	3,410 †††	△ 6,878	2,614 †††	△ 7,746	4,278 †††
Sales to total costs	Mean	△ 1,133	1,003 ***	1,066	1,007	△ 1,088	0,997 *	△ 1,079	0,838 ***	△ 1,130	1,049 ***
	Median	△ 1,051	1,018 †††	1,014	0,998	1,063	1,054	△ 1,046	0,935 †††	△ 1,045	1,026 †††
Fixed investment efficiency	Mean	△ 2,576	1,446 **	0,649	0,065	2,698	3,471	△ 3,269	0,819 **	△ 2,748	1,423 *
	Median	△ 0,932	0,592 †††	▼ 0,309	0,536 ††	1,191	1,347	△ 1,444	0,119 †††	△ 0,893	0,775 †
Financial ability											
Total assets turnover	Mean	3,622	3,236	2,348	2,868	2,851	2,236	5,756	5,312	3,609	3,425
	Median	△ 1,545	1,127 †††	0,871	0,891	1,593	1,393	△ 2,044	0,788 †††	△ 1,558	1,235 †
Fixed assets turnover	Mean	△ 15,362	8,237 ***	5,115	2,485	10,848	11,329	△ 17,487	3,043 ***	19,405	12,223
	Median	△ 4,610	1,946 †††	2,159	1,880	4,456	4,648	△ 7,397	0,615 †††	△ 5,529	2,008 †††
Financial soundness											
Fixed ratio	Mean	△ 19,426	7,997 **	18,796	2,742	15,334	1,846	15,528	1,198	21,692	17,203
	Median	△ 2,485	1,328 †††	△ 2,781	1,802 ††	△ 2,502	0,879 †††	△ 2,485	1,185 †††	2,509	1,730
Capital adequacy ratio (CAR)	Mean	▼ 0,184	0,281 ***	▼ 0,189	0,318 ***	▼ 0,184	0,282 ***	▼ 0,177	0,419 ***	▼ 0,190	0,245 ***
	Median	▼ 0,092	0,231 †††	▼ 0,103	0,283 †††	▼ 0,100	0,242 †††	▼ 0,088	0,448 †††	▼ 0,097	0,178 †††
Firm growth[b]											
Sales growth	Mean	2,040	0,902	1,079	0,011	1,397	-0,030	2,157	-0,233	2,174	2,321
	Median	△ 0,051	0,002 †††	-0,022	0,025	0,021	-0,005	△ 0,058	-0,239 †††	0,051	0,024
Value-added growth	Mean	△ 1,488	-1,244 ***	0,910	-0,011	1,174	-1,074	△ 2,053	-4,155 ***	△ 1,500	-0,980 *
	Median	△ 0,063	-0,034 †††	-0,035	-0,001	△ 0,032	-0,034 †	△ 0,038	-0,432 †††	0,063	0,052

		A. Whole corporate sector		B. Agriculture, forestry, hunting, and fishing		C. Manufacturing		D. Construction		E. Services	
		Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs	Private firms	Fully SOEs
Operating income growth	Mean	0,190	-0,815	-0,154	0,240	Δ 0,223	-9,835	0,248	-0,636	0,052	-4,972
	Median	0,023	0,044	▼ -0,192	0,085 †	0,010	-0,285	-0,033	-0,282	0,030	0,046
Ordinary income growth	Mean	0,121	-0,420	-0,078	0,456	0,276	-4,568	0,232	-0,548	-0,037	0,520
	Median	0,038	-0,055	▼ -0,166	-0,041 †	Δ 0,025	-0,451 ††	-0,046	-0,103	0,054	0,195
Total assets growth	Mean	1,292	0,116	1,021	0,034	0,844	0,085	1,722	0,051	1,290	0,104
	Median	0,021	0,007	0,008	0,028	0,026	0,004	0,040	0,071	Δ 0,009	-0,015 †
Classification of performance indices (actual number/proportion)											
SOE-inferior indices (Δ)		18/0,78		7/0,30		8/0,35		12/0,52		13/0,57	
SOE-superior indices (▼)		1/0,04		6/0,26		2/0,09		1/0,04		1/0,04	
Difference-insignificant indices (no sign)		4/0,17		10/0,43		13/0,57		10/0,43		9/0,39	

[a] The unit is one thousand HUFs.

[b] Real growth rate for 2002-03

***, **, * Significant at the 1, 5, and 10% levels, respectively, by the *t*-test.

†††, ††, † Significant at the 1, 5, and 10% levels, respectively, by the Wilcoxon rank-sum test.

Δ denotes that private firms are superior to full SOEs with statistical significance at the 10% or lower level.

▼ denotes that private firms are inferior to full SOEs with statistical significance at the 10% or lower level.

Table 3
Privatization Process of State-Owned Enterprises, 2002–2005

This table traces the privatization process of state-owned enterprises (SOEs) from 2002 through 2005 using annual census-type data of Hungarian firms. The western region consists of the following nine counties: Győr-Moson-Sopron; Komárom-Esztergom; Vas; Veszprém; Fejér; Zala; Somogy; Tolna; and Baranya. The eastern region also consists of nine counties: Nógrád; Bács-Kiskun; Csongrád; Békés; Jász-Nagykun-Szolnok; Hajdú-Bihar; Szabolcs-Szatmár-Bereg; Borsod-Abaúj-Zemplén; and Heves. The composition by industrial sector is based on the Classification of Economic Activities in the European Community (NACE). Other industries include public administration and defense and compulsory social security; education; health and social work; other community, social, and personal service activities; and household activities.

		2002	2003	2004	2005
Number of fully SOEs		499	223	203	186
Number of privatized firms		0	276	23	18
Number of firms acquired by domestic investors		0	262	21	17
Number of firms acquired by foreign investors		0	20	3	1
Number of firms that experienced privatization twice		0	0	3	1
Accumulated number of privatized firms		0	276	296	313
Scale of ownership transformation					
All privatized firms	Mean	-	0,99	0,84	0,82
	Median	-	1,00	1,00	1,00
Firms acquired by domestic investors	Mean	-	0,98	0,81	0,81
	Median	-	1,00	1,00	1,00
Firms acquired by foreign investors	Mean	-	0,80	0,83	1,00
	Median	-	1,00	1,00	1,00
Frequency distribution of the scale of ownership transformation (actual number/proportion)					
1-10%		-	0/0,00	2/0,09	2 /0,11
11-25%		-	2/0,01	0/0,00	1 /0,06
26-50%		-	1/0,00	1/0,04	0 /0,00
51-75%		-	1/0,00	2/0,09	2 /0,11
76-99%		-	0/0,00	4/0,17	1 /0,06
100%		-	272/0,99	14/0,61	12 /0,67
Composition of privatized firms by region (actual number/proportion)[a]					
Capital region (Budapest and Pest County)		287/0,58	160/0,58	11/0,48	10/0,56
Western region		95/0,19	55/0,20	9/0,39	1/0,06
Eastern region		117/0,23	61/0,22	3/0,13	7/0,39
Composition of privatized firms by industrial sector (actual number/proportion)[a]					
Agriculture, forestry, hunting, and fishing		43/0,09	12/0,04	1/0,04	2/0,11
Mining and quarrying		3/0,01	0/0,00	0/0,00	1/0,06
Manufacturing		63/0,13	32/0,12	4/0,17	4/0,22
Electricity, gas, and water supply		5/0,01	1/0,00	0/0,00	1/0,06
Construction		72/0,14	29/0,11	3/0,13	2/0,11
Wholesale and retail trade		86/0,17	79/0,29	4/0,17	0/0,00
Hotels and restaurants		16/0,03	16/0,06	0/0,00	0/0,00
Transport, storage, and communications		19/0,04	11/0,04	0/0,00	1/0,06
Financial intermediation		11/0,02	3/0,01	1/0,04	0/0,00
Real estate and renting		112/0,22	63/0,23	7/0,30	7/0,39
Other industries		69/0,14	30/0,11	3/0,13	0/0,00

[a] The data for 2002 are the breakdown of state enterprises.

Table 4

Comparison between Privatized Firms and Remaining State-Owned Enterprises and between Firms Acquired by Domestic Investors and Those Acquired by Foreign Investors

This table presents the results of a univariate comparison of firms privatized in 2003 and remaining state-owned enterprises (SOEs) and firms acquired by domestic investors and those acquired by foreign investors as a result of the enterprise privatization conducted in 2003 in terms of pre-privatization company size and firm performance in 2002. The purpose is to identify the presence and extent of selection bias regarding the privatization decision of the Hungarian government and the acquisition of privatized firms by foreign investors in comparison with those by domestic investors. We use annual census-type data of Hungarian firms for 2002 and 2003. The sample is the same as that in Table 3.

		A. Comparison of privatized firms and remaining SOEs			B. Comparison of firms acquired by domestic investors and those acquired by foreign investors		
		Privatized firms		SOEs	Domestic investors		Foreign investors
Company size							
Total number of employees	Mean	▼	16,558	677,833	▼	14,863	46,909
(persons)	Median	▼	3	61 †††		3	5
Total sales[a]	Mean	▼	143304	3420213		138589	226004
	Median	▼	18917	355055 †††		18652	36188
Total asset[a]	Mean	▼	167591	11000000	▼	129251	658348
	Median	▼	10093	569656 †††	▼	9322	27826 †††
Profitability							
Ordinary income to total assets	Mean	▼	-0,319	-0,019		-0,338	-0,084
(ROI)	Median		0,002	0,004		0,010	-0,050
Value-added to sales	Mean	Δ	0,050	-5,356		0,029	0,416
	Median		0,173	0,274	▼	0,165	0,356 †
Operating income to sales	Mean		-0,450	-20,561		-0,467	-0,155
	Median		0,017	0,016		0,017	0,018
Ordinary income to sales	Mean		-0,472	-20,682		-0,484	-0,260
	Median		0,009	0,008		0,010	-0,006
Return on equity capital (ROE)	Mean		7,148	0,410		7,677	0,625
	Median		0,096	0,027	Δ	0,120	-0,087 †
Return on total assets (ROA)	Mean	▼	-0,145	-0,003		-0,152	-0,055
	Median		0,017	0,009	Δ	0,024	-0,019 ††
Ordinary income on equity	Mean		3,801	0,219		5,029	-11,300
capital	Median		0,014	0,011	Δ	0,029	-0,213 †
Productivity							
Value-added per employee[a]	Mean		3197	285		3166	3774
	Median		1417	1629		1417	986
Operating income per	Mean		-902	-5952		-987	636
employee[a]	Median		109	92		116	39
Ordinary income per	Mean	Δ	846	-5244 *		1027	-2390
employee[a]	Median		43	31	Δ	50	-504 †
Sales per employee[a]	Mean	Δ	17152	10376		17063	18841
	Median	Δ	6963	5571 ††		6999	4031
Sales to employment	Mean	Δ	48,086	10,622		50,422	7,025
	Median	Δ	6,706	2,204 †††	Δ	6,864	2,550 ††
Sales to total costs	Mean	Δ	1,149	0,872	▼	1,110	1,823
	Median	Δ	1,032	0,961 †††		1,035	1,017
Fixed investment efficiency	Mean		1,435	-1,282		1,505	0,295
	Median	Δ	0,825	0,372 ††		0,947	0,024
Financial ability							
Total assets turnover	Mean	Δ	4,494	1,023		4,679	1,251
	Median	Δ	1,778	0,773 †††	Δ	1,847	0,318 †††
Fixed assets turnover	Mean	Δ	10,200	4,361		10,773	0,849
	Median	Δ	4,894	1,539 †††	Δ	5,714	0,127 ††
Financial soundness							
Fixed ratio	Mean	Δ	11,550	2,815		12,074	6,412
	Median	Δ	1,951	1,266 †††		1,800	6,909
Capital adequacy ratio (CAR)	Mean	▼	0,273	0,368		0,269	0,330
	Median	▼	0,167	0,309 †††		0,163	0,292

[a] The unit is thousand HUFs. ***, **, * Significant at the 1, 5, and 10% levels, respectively, by the *t*-test. †††, ††, † Significant at the 1, 5, and 10% levels, respectively, by the Wilcoxon rank-sum test.

Δ denotes that privatized firms (those acquired by domestic investors) are superior to SOEs (those acquired by foreign investors) with statistical significance at the 10% or lower level.

▼ denotes that privatized firms (those acquired by domestic investors) are inferior to SOEs (those acquired by foreign investors) with statistical significance at the 10% or lower level.

Table 5

Regression Analysis of Privatization Decision and Acquisition of Privatized Firms by Foreign Investors

This table presents the results of regression analyses on the presence and extent of selection bias regarding the privatization decisions made by the Hungarian government and the acquisition of privatized firms by foreign investors in comparison with that by domestic investors. Models [1] to [3] take the probability of privatization as a dependent variable and are estimated using a probit maximum likelihood (ML) estimator. Models [4] to [6] take the probability of privatization and the probability of being acquired by foreign investors as dependent variables of the first and second stage of regression, respectively. We estimated models [4] to [6] using the two-step probit ML estimator. As independent variables, we employ the natural logarithm of total assets for 2002 to proxy for company size before privatization and a dummy variable, which takes one for the firms whose operating income was negative for 2002 as well as the six performance indices that differed at the 10% or lower significance level among the groups compared in Table IV. We also use dummy variables to control the fixed effects of the firm locations in the western and eastern regions and a dummy variable with a value of one if the firms were operating in traditional public sectors. The *t*-values are reported in parentheses beneath the regression coefficients. The Wald test tests the null-hypothesis that all coefficients are jointly zero. All SOE samples used for the estimation of regression models are the same in Tables 3 and 4.

Dependent variable	A. Probability of privatization			B. Probability of being acquired by foreign investors		
Estimator	Probit ML			Two-step probit ML		
Model	[1]	[2]	[3]	[4]	[5]	[6]
Pre-privatization company size						
Total assets (natural logarithm)	-0,409 *** (-9,55)	-0,470 *** (-10,54)	-0,476 * (-5,88)	0,334 ** (2,00)	0,420 * (5,22)	3,817 * (1,78)
Pre-privatization firm performance						
Firms with negative operating income		-0,344 * (-1,87)			0,796 * (2,87)	
Value-added to sales			0,082 (0,73)			3,787 ** (2,10)
Return on total assets (ROA)			-1,409 (-1,21)			-8,301 ** (-2,21)
Ordinary income per employee			0,000 1 * (1,77)			-0,000 2 (-1,00)
Sales to total costs			0,594 * (1,85)			-7,655 *** (-2,84)
Total assets turnover			0,274 * (1,95)			-3,208 ** (-2,07)
Fixed ratio			0,056 ** (2,19)			-0,340 (-1,37)
Location						
Western region	-0,032 (-0,18)	-0,118 (-0,63)	-0,202 (-0,62)	0,312 (0,95)	0,320 (1,22)	0,004 (0,08)
Eastern region	0,051 (0,30)	-0,034 (-0,19)	0,209 (0,78)	-0,194 (-0,72)	-0,220 (-0,83)	-1,765 (-1,42)
Industrial sectors						
Traditional public sectors	-1,036 *** (-5,05)	-1,009 *** (-5,12)	-0,838 * (-1,85)	0,449 (0,51)	0,601 (1,18)	-0,177 ** (-2,27)
Const.	4,866 *** (9,66)	5,738 *** (10,93)	4,348 * (4,68)	0,000 (0,00)	-5,503 * (-8,44)	0,682 * (1,88)
N	499	477	196	499	477	196
N (The second stage)	-	-	-	223	210	124
Pseudo R^2	0,41	0,44	0,40	-	-	-
Log likelihood	-203,60	-183,92	-65,09	-269,30	-244,58	-7,26
Wald test	126,93 ***	124,08 ***	57,94 *	17,09 *	48,85 *	24,70 ***

Table 6
Meta-Analysis of the Effects of Ownership Transformation on Firm Performance

This table presents the results of the synthesis of the regression coefficients (effect sizes) of ownership variables estimated by the panel data regression analysis conducted as the third stage of our empirical analysis. Also presented are the results of supplemental analyses using the *p*-value combination method and the vote-counting method - more traditional meta-analysis techniques. See Section 3 for details of the meta-analysis methods. Here, we employ the estimates of regression models selected according to the Hausman test and the Breusch-Pagan test. The critical value for both of these specification tests is set at the 10% level. We verify the testable hypothesis presented in Section I based on the value of synthesized regression coefficients and its statistical significance adopting either the meta fixed-effects model or the meta random-effects model according to the results of the homogeneity test. The SOE-inferior (SOE-superior) indices denote the financial and operating performance indices, in which the means or medians for fully SOEs regarding the relevant indices in Table 2 are inferior (superior) to those for private firms with statistical significance at the 10% or lower level. The difference-insignificant indices refer to those indices that do not satisfy these conditions.

	Synthesis of regression coefficients			*p*-value combination method		Vote-counting method			*N*
	Meta fixed-effects (asymptotic *z*-value)[a]	Meta random-effects (asymptotic *z*-value)[a]	Homogeneity test	Inverse Chi-square method	Inverse normal method	Proportion of positive to negative estimates (*z*-value)[b]	Number of positively significant estimates (one-sided *z*-value)[c]	Number of negatively significant estimates (one-sided *z*-value)[c]	
A. All performance indices									
Ownership transformation without a lower limit (Model I family)	-0.000 (-0,23)	0,000 (0,01)	1459,143***	710,656***	5,801***	172/107*** (4,09)	33/276 (1,08)	24/276 (-0,72)	276
Transfer of strategic control rights family) (Model II	-0,001 (-0,58)	0,002 (0,02)	1490,377***	710,000***	5,803***	171/105*** (3,97)	33/276 (1,08)	23/276 (-0,92)	276
Full privatization (Model III family)	-0,004* (-1,68)	0,052*** (2,92)	1682,125***	746,838***	5,854***	177/99*** (4,70)	36/276** (1,69)	16/276 (-2,33)	276
Ownership transformation to domestic investors (Model IV family)	-0.000 (-0,76)	-0,005 (-0,90)	294,200***	489,676***	4,707***	110/67*** (3,23)	19/177 (0,33)	9/177 (-2,18)	177
Ownership transformation to foreign investors (Model V family)	-0,041* (-1,89)	0,274*** (3,75)	699,528***	444,988***	4,694***	107/70*** (2,78)	28/177*** (2,58)	11/177 (-1,68)	177
B. SOE-inferior indices									
Ownership transformation without a lower limit (Model I family)	0,005** (2,08)	0,069*** (4,41)	551,471***	312,164***	3,861***	77/43*** (3,10)	16/120 (1,22)	6/120 (-1,83)	120
Transfer of strategic control rights (Model II family)	0,009*** (3,72)	0,078*** (4,34)	530,535***	313,094***	3,867***	77/43*** (3,10)	16/120 (1,22)	5/120 (-2,13)	120
Full privatization (Model III family)	0,013*** (4,08)	0,117*** (4,99)	499,806***	311,135***	3,897***	80/40*** (3,65)	13/120 (0,30)	3/120 (-2,74)	120
Ownership transformation to domestic investors (Model IV family)	-0.000 (-0,76)	0,040** (2,20)	105,037**	204,332***	3,067***	47/29** (2,06)	7/76 (-0,23)	3/76 (-1,76)	76

	Synthesis of regression coefficients			*p*-value combination method		Vote-counting method			*N*
	Meta fixed-effects (asymptotic *z*-value)[a]	Meta random-effects (asymptotic *z*-value)[a]	Homogeneity test	Inverse Chi-square method	Inverse normal method	Proportion of positive to negative estimates (*z*-value)[b]	Number of positively significant estimates (one-sided *z*-value)[c]	Number of negatively significant estimates (one-sided *z*-value)[c]	
Ownership transformation to foreign investors (Model V family)	-0,021 (-0,60)	0,466*** (3,93)	313,841***	220,249***	3,096***	49/27** (2,52)	14/76*** (2,45)	6/76 (-0,61)	76
C. SOE-superior indices									
Ownership transformation without a lower limit (Model I family)	-0,036*** (-5,67)	-0,105*** (-3,03)	282,294***	57,344	1,744*	13/17 (-0,73)	3/30 (0,00)	9/30*** (3,65)	30
Transfer of strategic control rights (Model II family)	-0,045*** (-7,32)	-0,089*** (-2,57)	312,985***	57,463	1,745*	13/17 (-0,73)	3/30 (0,00)	9/30*** (3,65)	30
Full privatization (Model III family)	-0,069*** (-12,20)	-0,041 (-1,06)	539,425***	68,870	1,772*	13/17 (-0,73)	5/30 (1,22)	9/30*** (3,65)	30
Ownership transformation to domestic investors (Model IV family)	-0,001 (-0,46)	-0,032*** (-2,82)	79,697***	28,087	1,094	5/7 (-0,58)	1/12 (-0,19)	6/12*** (4,62)	12
Ownership transformation to foreign investors (Model V family)	-0,041 (-1,21)	-0,044 (-0,82)	18,374*	19,662	1,125	5/7 (-0,58)	1/12 (-0,19)	2/12 (0,77)	12
D. Difference-insignificant indices									
Ownership transformation without a lower limit (Model I family)	-0,018 (-1,42)	-0,044 (-0,82)	586,949***	341,148***	3,967***	82/44*** (3,39)	14/126 (0,42)	9/126 (-1,07)	126
Transfer of strategic control rights (Model II family)	-0,009 (-0,56)	-0,038 (-0,61)	579,511***	339,442***	3,962***	81/45*** (3,21)	14/126 (0,42)	9/126 (-1,07)	126
Full privatization (Model III family)	0,018* (1,88)	0,073 (1,35)	476,781***	366,833***	3,996***	84/42*** (3,74)	18/126** (1,60)	4/126 (-2,55)	126
Ownership transformation to domestic investors (Model IV family)	0,043*** (2,66)	0,148*** (3,42)	102,168	257,257***	3,403***	58/31*** (2,86)	11/89 (0,74)	0/89 (-3,14)	89
Ownership transformation to foreign investors (Model V family)	-0,087* (-1,71)	0,395** (2,36)	366,141***	205,077**	3,346***	53/36* (1,80)	13/89* (1,45)	3/89 (-2,08)	89

[a] Null-hypothesis: The synthesized effect size is zero.

[b] Null-hypothesis: The proportion of positive to negative estimates is 50/50.

[c] Null-hypothesis: The proportion of estimates with statistical significance at the 10% or lower level is less than 10%.

***, **, * Significant at the 1, 5, and 10% levels, respectively.

Table 7
Definitions and Descriptive Statistics of the Variables Used in the Meta-Regression Analysis

This table contains the details of the definitions and descriptive statistics of the variables used in the meta-regression analysis, the estimation results from which are reported in Table 8. The SOE-inferior (SOE-superior) indices denote the financial and operating performance indices, in which the means or medians for full SOEs regarding the relevant indices in Table 2 are inferior (superior) to those for private firms with statistical significance at the 10% or lower level. The elements of each of the four index groups correspond with those in Table 2. CV and BD denote a continuous variable and a binary dummy variable, respectively. S.D. denotes the standard deviation.

Variable name	Definition	Mean	S. D.	Median
Effects of ownership transformation (dependent variable)	CV: Regression coefficients of ownership variables (effect sizes)	0,451	7,748	0,161
SOE-inferior indices	BD: 1 = if an SOE-inferior index is used as a dependent variable	0,433	0,496	0
SOE-superior indices	BD: 1 = if an SOE-superior index is used as a dependent variable	0,096	0,295	0
Transfer of strategic control rights	BD: 1 = An estimate of the effects of 50% or higher ownership transformation	0,234	0,423	0
Full privatization	BD: 1 = An estimate of the effects of full privatization	0,234	0,423	0
Ownership transformation to domestic investors	BD: 1 = An estimate of the effects of ownership transformation to domestic investors	0,150	0,357	0
Ownership transformation to foreign investors	BD: 1 = An estimate of the effects of ownership transformation to foreign investors	0,150	0,357	0
One-year lag	BD: 1 = An estimate of the one-year lag effects of ownership transformation	0,335	0,472	0
Two-year lag	BD: 1 = An estimate of the two-year lag effects of ownership transformation	0,330	0,470	0
Manufacturing	BD: 1 = if samples are manufacturing enterprises	0,292	0,455	0
Construction	BD: 1 = if samples are construction enterprises	0,246	0,431	0
Services	BD: 1 = if samples are service enterprises	0,287	0,452	0
Productivity index group	BD: 1 = if a productivity index is used as a dependent variable	0,283	0,450	0
Financial ability index group	BD: 1 = if a financial ability index is used as a dependent variable	0,085	0,278	0
Financial soundness index group	BD: 1 = if a financial soundness index is used as a dependent variable	0,085	0,278	0
Firm growth index group	BD: 1 = if a firm growth index is used as a dependent variable	0,228	0,420	0
Fixed-effects estimator	BD: 1 = if a fixed-effects estimator is used	0,333	0,471	0
Random-effects estimator	BD: 1 = if a random-effects estimator is used	0,333	0,471	0
Selected models	BD: 1 = An estimate obtained from regression models selected by the model specification tests	0,333	0,471	0
Number of observations	CV: A natural logarithm of the number of observations used in a panel estimation	5,352	0,647	5,142

Table 8
Meta-Regression Analysis

This table presents the estimation results of meta-regression models that take the effects of ownership transformation on post-privatization firm performance estimated by panel regression analyses conducted as the third stage of the empirical analysis as dependent variables. The dependent variable is regressed into meta-independent variables having the characteristics of the regression model and observations that are considered to create differences in panel estimation results. To estimate the meta-regression models, we use five estimators for a robustness check: (1) weighted least square (WLS) estimator with number of observations as analytical weights; (2) WLS estimator with standard errors as analytical weights; (3) meta random-effects estimator using the restricted maximum likelihood method (RML); (4) meta random-effects estimator using the non-iterative moment method (MM); (5) meta mixed-effects estimator using the RML method. Models [1] through [5] are the estimation results from the meta-regression models covering all panel estimates, and Models [6] through [10] are the estimation results using only the estimates of the selected models according to the model specification tests. The meta mixed-effects models assume heterogeneity between different performance indices. The definitions and descriptive statistics of the variables used in the estimations are listed in Table 7. The *F*-test and the Wald test test the null-hypothesis that all coefficients are jointly zero.

Dependent variable	Effects of ownership transformation (all models)					Effects of ownership tranformation (selected models)				
Estimator	WLS [M]	WLS [s.e.]	Random effects RML	Random effects MM	Mixed effects RML	WLS [M]	WLS [s.e.]	Random effects RML	Random effects MM	Mixed effects RML
Independent variable (default category)/model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Effects of ownership transformation in default conditions (intercept)	2,527*** (3,45)	17,837 (1,36)	0,149*** (4,70)	0,178** (2,09)	0,123 (0,03)	2,255** (2,44)	11,130 (0,39)	0,047 (0,47)	0,061 (0,36)	4,065 (0,60)
Performance differences (difference-insignificant indices)										
SOE-inferior indices	0,144 (0,54)	0,056 (0,11)	0,010*** (2,89)	0,046*** (4,42)	1,481*** (4,73)	0,707* (1,67)	2,430*** (3,22)	0,038*** (3,46)	0,065*** (2,96)	0,675 (1,33)
SOE-superior indices	-0,399 (-0,60)	-5,192** (-2,49)	-0,137*** (-8,84)	-0,149*** (-9,21)	-1,087* (-1,66)	-0,759* (-1,71)	-2,259* (-1,82)	-0,324*** (-9,81)	-0,192*** (-6,23)	-0,946 (-0,90)
Scale of ownership transformation (privatization without lower limit)										
Transfer of strategic control rights	-0,009 (-0,02)	1,209* (1,75)	0,008*** (3,91)	0,005 (0,47)	0,015 (0,04)	0,005 (0,01)	0,030 (0,03)	0,001 (0,34)	0,001 (0,03)	0,007 (0,01)
Full privatization	0,051 (0,14)	0,425 (0,61)	0,006** (2,54)	0,021** (2,12)	0,137 (0,37)	0,093 (0,16)	0,792 (0,78)	0,006 (1,59)	0,044** (2,11)	0,184 (0,31)
Types of ownership transformation (no classification)										
Ownership transformation to domestic investors	-0,229 (-0,59)	-0,475 (-0,61)	-0,015*** (-7,45)	0,013 (1,07)	-0,079 (-0,19)	-0,449 (-0,72)	-2,843** (-2,47)	-0,001 (-0,33)	0,008 (0,31)	-0,221 (-0,32)
Ownership transformation to foreign investors	1,700*** (4,35)	2,153*** (2,64)	0,063*** (3,81)	0,054*** (2,62)	1,379*** (3,25)	2,622*** (4,19)	7,991*** (6,03)	0,006 (0,25)	0,006** (2,18)	2,390*** (3,48)

Dependent variable	Effects of ownership transformation (all models)					Effects of ownership tranformation (selected models)				
Estimator	WLS [M]	WLS [s.e.]	Random effects RML	Random effects MM	Mixed effects RML	WLS [M]	WLS [s.e.]	Random effects RML	Random effects MM	Mixed effects RML
Independent variable (default category)/model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Time-lag effects (no lag)										
One-year lag	-1,860***	-3,292***	-0,007***	-0,075***	-0,811***	-1,658***	-1,760	-0,007**	-0,121***	-0,711
	(-6,33)	(-5,05)	(-3,40)	(-8,17)	(-2,66)	(-3,52)	(-1,49)	(-2,01)	(-6,51)	(-1,44)
Two-year lag	-3,178***	-14,771***	0,004*	-0,021**	-2,890***	-2,500***	-12,784***	-0,006**	-0,026	-2,564***
	(-6,78)	(-8,07)	(1,69)	(-2,25)	(-9,44)	(-5,30)	(-4,99)	(-2,16)	(-1,34)	(-5,17)
Industrial sector (agriculture, forestry, hunting, and fishing)										
Manufacturing	0,457	5,154***	-0,034***	-0,021*	0,627	0,361	4,841*	0,066***	0,102***	0,111
	(0,82)	(3,24)	(-4,08)	(-1,80)	(1,33)	(0,40)	(1,84)	(6,68)	(4,00)	(0,14)
Construction	-1,185**	0,021	-0,059***	-0,091***	-1,242**	-0,439	-5,696*	0,034***	0,026	-0,692
	(-2,13)	(0,01)	(-7,94)	(-6,32)	(-2,20)	(-0,49)	(-1,65)	(2,66)	(0,90)	(-0,77)
Services	-0,215	9,142**	-0,070***	-0,023	-0,708	0,257	-8,633	0,067**	0,107*	-1,310
	(-0,43)	(1,96)	(-6,76)	(-0,83)	(-0,48)	(0,32)	(-0,86)	(2,01)	(1,89)	(-0,57)
Independent variable (default category)/model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Performance index group (profitability index group)										
Productivity index group	-0,232	-3,159***	0,028***	0,010	-0,691	-0,278	1,329	-0,030***	0,035	-0,300
	(-0,72)	(-4,01)	(4,84)	(0,54)	(-0,60)	(-0,54)	(0,96)	(-3,40)	(1,15)	(-0,25)
Financial ability index group	-0,746	-3,017	0,010	-0,103***	-0,930	-0,991	0,529	-0,107***	-0,083**	-0,568
	(-1,46)	(-1,03)	(1,55)	(-5,08)	(-0,54)	(-1,21)	(0,12)	(-6,82)	(-2,33)	(-0,31)
Financial soundness index group	-0,512	-5,105	0,104***	0,067***	-1,174	-0,718	-3,024	0,142***	0,085**	-1,023
	(-0,75)	(-0,98)	(13,09)	(3,27)	(-0,67)	(-0,63)	(-0,34)	(10,16)	(2,27)	(-0,53)
Firm growth index group	-0,383	-2,152***	0,048***	0,016	-0,464	-0,683	-2,320***	-0,030***	0,017	-0,668
	(-1,22)	(-3,43)	(7,84)	(0,88)	(-0,37)	(-1,35)	(-2,62)	(-2,64)	(0,55)	(-0,52)
Estimators (pooled OLS estimator)										
Fixed-effects estimator	-0,335	0,390	0,056***	0,026***	0,029	0,204	-2,147	0,109***	0,139***	0,479
	(-0,66)	(0,29)	(7,61)	(2,62)	(0,07)	(0,16)	(-0,58)	(7,09)	(5,97)	(0,45)
Random-effects estimator	0,056	0,963	0,038***	0,001	-0,002	-0,799	-10,071***	-0,137***	-0,100**	0,214
	(0,11)	(0,76)	(6,45)	(0,08)	(-0,01)	(-0,97)	(-6,82)	(-4,86)	(-2,46)	(0,30)
Selected models (non-selected models)	0,083	-1,063	0,039	-0,005	0,012	-	-	-	-	-
	(0,17)	(-0,84)	(0,77)	(-0,57)	(0,03)					
Number of observations	-	-2,220	0,021***	-0,021	0,256	-	3,573	-0,006	-0,021	1,062
		(-0,82)	(3,03)	(-1,20)	(0,28)		(0,60)	(-0,29)	(-0,63)	(0,76)

Dependent variable	Effects of ownership transformation (all models)					Effects of ownership tranformation (selected models)				
Estimator	WLS [M]	WLS [s.e.]	Random effects RML	Random effects MM	Mixed effects RML	WLS [M]	WLS [s.e.]	Random effects RML	Random effects MM	Mixed effects RML
Independent variable (default category)/model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
N	3546	3546	3546	3546	3546	1182	1182	1182	1182	1182
Adjusted R^2	0,042	0,214	-	-	-	0,042	0,225	-	-	-
F-test	9,57***	51,66***	-	-	-	4,02***	20,10***	-	-	-
Wald test	-	-	1137,89***	555,36***	157,79***	-	-	1114,88***	257,57***	52,37***

***, **, * Significant at the 1, 5, and 10% levels, respectively.

REFERENCES

Aoki, Masahiko, and Hyung-Ki Kim, eds., 1995, *Corporate Governance in Transitional Economies: Insider Control and the Role of Banks* (World Bank: Washington, D.C.).

Ang, James S., and David K. Ding, 2006, Government ownership and the performance of government-linked companies: The case of Singapore, *Journal of Multinational Financial Management* 16, 64–88.

Aussenegg, Wolfgang, and Ranko Jelic, 2007, The operating performance of newly privatized firms in Central European transition economies, *European Financial Management* 13, 853–879.

Bágér, Gusztáv, and Kovács Árpád, 2004, A magyarországi privatizáció néhány tanulsága, *Fejlesztés és Finanszírozás* 4, 27–37. (in Hungarian)

Bartlett, David, 2000, Foreign direct investment and privatization policy: The causes and consequences of Hungary's route to capitalism; in Hancock, Donald M., and John Logue, eds.: *Transitions to Capitalism and Democracy in Russia and Central Europe: Achievements, Problems, Prospects, Greenwood* (Praeger: Westport, Conn.).

Bennedsen, Morten, 2000, Political ownership, *Journal of Public Economics* 76, 559–581.

Blanchard, O., and P. Aghion, 1996, On insider privatization, *European Economic Review* 40, 759–766.

Boardman, Anthony, Catherine Eckel, and Aidan Vining, 1986, The advantages and disadvantages of mixed enterprises, *Research in International Business and International Relations* 1, 221–244.

Boardman, Anthony E., and Aidan R. Vining, 1989, Ownership and performance in competitive environments: A comparison of the performance of private, mixed, and state-owned enterprises, *Journal of Law and Economics* 32, 1–33.

Boubakri, Narjess, and Jean-Claude Cosset, 1998, The financial and operating performance of newly privatized firms: Evidence from developing countries, *Journal of Finance* 53, 1081–1110.

Boubakri, Narjess, Jean-Claude Cosset, Omrane Guedhami, 2005, Postprivatization corporate governance: The role of ownership structure and investor protection, *Journal of Financial Economics* 76, 369–399.

Boycko, Maxim, Andrei Shleifer, and Robert W. Vishny, 1996, A theory of privatization, *Economic Journal* 106, 309–319.

Brander, Luke M., Pieter Van Beukering, and Herman S. J. Cesar, 2007, The recreational value of coral reefs: A meta-analysis, *Ecological Economics* 63, 209–218.

Brown, David J., John S. Earle, and Álmos Telegdy, 2006, The productivity effects of privatization: Longitudinal estimates from Hungary, Romania, Russia, and Ukraine, *Journal of Political Economy* 114, 61–99.

Coggin, Daniel T., and John E. Hunter, 1993, A meta-analysis of mutual fund performance, *Review of Quantitative Finance and Accounting* 3, 189–201.

Chen, Gongmeng, Michael Firth, Yu Xin, and Liping Xu, 2008, Control transfers, privatization, and corporate performance: Efficiency gains in China's listed companies, *Journal of Financial and Quantitative Analysis* 43, 161–190.

Claessens, Stijn, and Simeon Djankov, 2002, Privatization benefits in Eastern Europe, *Journal of Public Economics* 83, 307–324.

Colombo, Emilio, and Luca Stanca, 2006, Investment decisions and the soft budget constraint: Evidence from a large panel of Hungarian firms, *Economics of Transition* 14, 171–198.

Connor, John M., and Yuliya Bolotova, 2006, Cartel overcharges: Survey and meta-analysis, *International Journal of Industrial Organization* 24, 1109–1137.

De Allesi, Louis, 1980, The economics of property rights: A review of the evidence, *Research in Law and Economics* 2, 1–47.

Dewenter, Kathryn L., and Paul H. Malatesta, 2001, State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity, *American Economic Review* 91, 320–334.

Djankov, Simeon, and Peter Murrell, 2002, Enterprise restructuring in transition: A quantitative survey, *Journal of Economic Literature* 40, 739–792.

Doucouliagos, Hristos, and Martin Paldam, 2008, Aid effectiveness on growth: A meta study, *European Journal of Political Economy* 24, 1–24.

D'Souza, Juliet, William Megginson, and Robert Nash, 2005, Effect of institutional and firm-specific characteristics on postprivatization performance: Evidence from developed countries, *Journal of Corporate Finance* 11, 747–766.

Dyck, Alexander, 2001, Privatization and corporate governance: Principles, evidence, and future challenges, *The World Bank Research Observer* 16, 59–84.

Eckel, Catherine, Doug Eckel, and Vijay Singal, 1997, Privatization and efficiency: Industry effects of the sales of British Airways, *Journal of Financial Economics* 43, 275–298.

Fidrmuc, Jarko, and Likka Korhonen, 2006, Meta-analysis of the business cycle correlation between the euro area and the CEECs, *Journal of Comparative Economies* 34, 518–537.

Filatotchev, Igor, Mike Wright, and Michael Bleaney, 1999, Privatization, insider control and managerial entrenchment in Russia, *Economics of Transition* 7, 481–504.

Frydman, Roman, Cheryl Gray, Marek Hessel, and Andrzej Rapaczynski, 1999, When does privatization work? The impact of private ownership on corporate performance in the transition economies, *Quarterly Journal of Economics* 114, 1153–1191.

Goldstein, Michael A., 1997, Privatization success and failure: Finance theory and regulation in the transition economies of Albania and the Czech Republic, *Managerial and Decision Economics* 18, 529–544.

Hamar, Judit, 2004, Tőkevonzó-képességünk alakulasa és a multinacionális cégek szerepe a Magyar gazdaság technológiai és strukturális felzárkozásában, *Külgazdaság*, május, 39–63. (in Hungarian)

Hanousek, Jan, Evžen Kočenda, and Jan Svejnar, 2007, Origin and concentration: Corporate ownership, control and performance in firms after privatization, *Economics of Transition* 15, 1–31.

Hanley, Eric, Lawrence King, and István Tóth János, 2002, The state, international agencies, and property transformation in postcommunist Hungary, *American Journal of Sociology* 108, 129–167.

Hasan, Iftekhar, and Katherin Marton, 2003, Development and efficiency of the banking sector in a transitional economy: Hungarian experience, *Journal of Banking and Finance* 27, 2249–2271.

Haskel, Jonathan, and Stefan Szymanski, 1992, A bargaining theory of privatization, *Annals of Public and Cooperative Economics* 63, 207–227.

Harper, Joel T., 2002, The performance of privatized firms in the Czech Republic, *Journal of Banking and Finance* 26, 621–649.

Hedges, Larry V., 1992, Meta-analysis, *Journal of Educational Statistics* 17, 279–296.

Hedges, Larry V., and Ingram Olkin, 1985, *Statistical Methods for Meta-Analysis* (Academic Press, London).

Hunter, John E., and Frank L. Schmidt, 2004, *Methods of Meta-Analysis: Correcting Error and Bias in Research Findings* (Sage Publications, Thousand Oaks).

Iwasaki, Ichiro, 2007a, Enterprise reform and corporate governance in Russia: A Quantitative Survey, *Journal of Economic Surveys* 21, 849–902.

Iwasaki, Ichiro, 2007b, Corporate restructuring and the role of foreign direct investment in Hungary; in Dallago, Bruno, and Ichiro Iwasaki, eds., *Corporate Restructuring and Governance in Transition Economies* (Palgrave Macmillan, Basingstoke).

Keef, Stephen P., and Leigh A. Roberts, 2004, The meta-analysis of partial effect sizes, *British Journal of Mathematical and Statistical Psychology* 57, 97–129.

Kocenda, Evzen, and Jan Svejnar, 2002, The effects of ownership forms and concentration on firm performance after large-scale privatization, Working paper No. 471, William Davidson Institute, University of Michigan Business School.

Kocenda, Evzen, and Jan Svejnar, 2003, Ownership and firm performance after large-scale privatization, Discussion paper No. 4143, Center for Economic Policy Research.

Kole, Stacey R., and J. Harold Mulherin, 1997, The government as a shareholder: A case from the United States, *Journal of Law and Economics* 40, 1–22.

Konings, Jozef, 1997, Firm growth and ownership in transition economies, *Economics Letters* 55, 413–418.

KSH (Központi Statistikai Hivatal), 2003, *Magyar statistikai évkönyv 2003* (KSH, Budapest). (in Hungarian)

KSH (Központi Statistikai Hivatal), 2006, *Magyar statistikai évkönyv 2006* (KSH, Budapest). (in Hungarian)

Kwoca, John E. Jr., 2005, The comparative advantage of public ownership: Evidence from U.S. electric utilities, *Canadian Journal of Economics* 38, 622–640.

La Porta, Rafael, and Florencio López-de-Silanes, 1999, The benefits of privatization: Evidence from Mexico, *Quarterly Journal of Economics* 114, 1193–1242.

Li, David D., 1998, Insider control and the soft budget constraint: A simple theory, *Economics Letters* 61, 307–311.

Macher, Ákos, 2000, *Adatok és tények a magyar privatizációról 1990-1999* (Állami Privatizációs és Vagyonkezelő Rt., Budapest). (in Hungarian)

Major, Iván, 2003, Privatization in Hungary and its aftermath; in Parker, David, and David Saal, eds., *International Handbook on Privatization* (Edward Elgar, Cheltenham and Northampton).

Majumdar, Sumit K., 1996, Assessing comparative efficiency of the state-owned, mixed, and private sector in Indian industry, *Public Choice* 96, 1–24.

Makó, Csaba, 2005, Neo- instead of post-Fordism: The transformation of labor processes in Hungary, *International Journal of Human Resource Management* 16, 277–289.

Makó, Csaba, and Miklós Illéssy, 2007, Economic modernization in Hungary: Between path dependency and path creation; in Makó, Csaba, Hans Moerel, Miklós Illéssy, and Pétel Csizmadia, eds., *Working It Out? – The Labor Process and Employment Relations in the New Economy* (Akadémiai Kiadó, Budapest).

Megginson, William L., 2005, *The Financial Economics of Privatization* (Oxford University Press, New York).

Megginson, William L., Robert C. Nash, and Matthias van Randenborgh, 1994, The financial and operating performance of newly privatized firms: An international empirical analysis, *Journal of Finance* 49, 403–452.

Megginson, William L., and Jeffry M. Netter, 2001, From state to market: A survey of empirical studies on privatization, *Journal of Economic Literature* 39, 321–389.

Mihályi, Péter, 1998, *A Magyar privatizáció krónikája 1989-1997* (Közgazdasági és Jogi Könyvkiadó, Budapest). (in Hungarian)

Mihályi, Péter, 2001, Foreign direct investment in Hungary: The post-communist privatization story re-considered, *Acta Oeconomica* 51, 107–129.

Nelson, Jon P., 2006, Cigarette advertising regulation: A meta-analysis, *International Review of Law and Economics* 26, 195–226.

Novák, Csaba, 2002, Hatékonyságnövekedés és külföldi tulajdon a Magyar feldolgozóiparban: keresztmetszeti becslések, *Külgazdaság*, május, 41–52. (in Hungarian)

OECD (Organization for Economic Co-operation and Development), 2005, *Corporate Governance of State-Owned Enterprises: A Survey of OECD Countries* (OECD, Paris).

Omran, Mohammed, 2004, The performance of state-owned enterprises and newly privatized firms: Does privatization really matter? *World Development* 32, 1019–1041.

Omran, Mohammed, 2007, Privatization, state ownership, and bank performance in Egypt, *World Development* 35, 714–733.

Perotti, Enrico C., and Luka Vesnaver, 2004, Enterprise finance and investment in listed Hungarian firms, *Journal of Comparative Economics* 32, 73–87.

Sappington, David E. M., and Joseph E. Stiglitz, 1987, Privatization, information and incentives, *Journal of Policy Analysis and Management* 6, 567–585.

Sgard, Jérôme, 2001, Direct foreign investments and productivity growth in Hungarian firms, 1992-1999, Working paper No. 425, William Davidson Institute, University of Michigan Business School.

Shelifer, Andrei, and Robert Vishny, 1994, Politicians and firms, *Quarterly Journal of Economics* 109, 995–1025.

Stanley, T. D., and Stephen B. Jarrell, 1989, Meta-regression analysis: A quantitative method of literature surveys, *Journal of Economic Surveys* 3, 61–170.

Szanyi, Miklós, 2000, *Csőd, felszámolás, végelszámolás mint a privatizáció módja* (Állami Privatizációs és Vagyonkezelő Rt., Budapest). (in Hungarian)

Szekeres, V., 2001, Foreign capital and economic development in Hungary, *Acta Oeconomica* 51, 363–383.

Vining, Aidan R., and Anthony E. Boardman, 1992, Ownership versus competition: Efficiency in public enterprise, *Public Choice* 73, 205–239.

Voszka, Éva, 2003, Ownership and corporate governance in the Hungarian large enterprise sector; in Federowicz, Michał, and Ruth A. Aguilera, eds., *Corporate Governance in a Changing Economic and Political Environment: Trajectories of Institutional Change* (Palgrave Macmillan, Basingstoke).

Weill, Laurent, 2003, Banking efficiency in transition economies: The role of foreign ownership, *Economics of Transition* 11, 569–592.

Yudaeva, Ksenia, Konstantin Kozlov, Natalia Melentieva and Natalia Ponomareva, 2003, Does foreing ownership matter? The Russian experience, Economics of Transition 11, 383–40.