12-20-2001

Employee Ownership after Privatization: Governance Institutions and Firm Performance in Romania

John S. Earle
W.E. Upjohn Institute for Employment Research

Álmos Telegdy
Central European University

Employee Ownership After Privatization:

Governance Institutions and Firm Performance in Romania*

John S. Earle
Upjohn Institute for Employment Research
Central European University
Earle@we.upjohninst.org

Almos Telegdy
Central European University
Budapest University of Economic Sciences
Telegdya@ceu.hu

December 20, 2001

Abstract

This paper studies the governance institutions and performance consequences of privatization through management-employee buyout (MEBO) in Romania. Detailed firm-level survey data are used to analyze ownership rights practices concerning voting, dividend payment, and sales of shares, and to study the continued role of the state through restructuring restrictions in the privatization contracts, difficulties in installment payment, and possible renationalization of shares. Comprehensive privatization and registry data are used to estimate the productivity performance of industrial MEBOs, compared with mass transfers to dispersed individuals, sales to domestic and foreign blockholders, and continued ownership by the state. We find that the ownership structure of Romanian MEBOs tends to favor employees rather than managers, their institutional design frequently contains elements of producer cooperatives, they face significant contractual restrictions on restructuring, and there has been only slight "degeneration" in ownership in the years since privatization. Estimates of productivity growth equations imply that MEBOs have clearly out-paced state ownership, while falling short of blockholder ownership.

*The research reported in this paper was supported by the Phare ACE Programme of the European Commission. The views expressed in the paper in no way reflect those of the Commission or of its Services.

1. Introduction

Privatization through transfer or sale to company employees has been among the most widespread and the most controversial of policy choices in the transition economies. Only very few governments attempting to transform their economies from administratively planned to market-driven have entirely eschewed the use of preferential privatization to employees. With the exception of the Czech Republic and Slovakia, where few shareholdings were granted to firm employees, most other countries – from Poland to Romania, Russia, Slovenia, Ukraine, Central Asia, and China – saw employees becoming company owners on a large scale, particularly at the beginning of the privatization process. Even in Hungary, where the predominant method of denationalization involved sales to blockholder investors, a sizable number of firms had shares transferred to employees, both in small giveaways and in larger control stakes, particularly through the use of Employee Stock Ownership Plans ("MRP" in Hungarian).

Its apparent popularity in the region notwithstanding, "insider privatization" has come in for considerable criticism from outside observers and policy analysts. The standard list of complaints includes the alleged incompetence of the existing management and employees to restructure the firm successfully, the particular difficulty in downsizing in the presence of excessive employment levels, and the lack of capital for restructuring exacerbated by agency problems with outside lenders. Many observers have concluded that privatization to employees will not bring about any improvement – and some that it may even worsen the firm's situation – relative to continued state ownership.[1] Others have viewed privatization to employees more positively, emphasizing the possible incentive effects of worker participation and the advantages of involving "stakeholders" in the transition process.[2]

The debate over the desirability of this privatization method has been informed by only scant empirical evidence, however. Smith, Cin and Vodopivec (1997) is one of the few systematic studies of the association of employee ownership with firm performance, although it relies on data (for Slovenia) only through 1992. Frydman *et al.*'s (1999) study

[1] See Lipton and Sachs (1991), Frydman and Rapaczynski (1994), Black, Kraakman, and Tarrasova (2000), for example.
[2] For instance, Ellerman (1993), Weitzmann (1993), and Stiglitz (2000).

of privatized firms in Poland, the Czech Republic and Hungary contains very few employee-owned companies, and the data end in 1993. Studies of Russia, including Earle and Estrin (1997), have also generally relied on small samples pertaining to a very short post-privatization period. Furthermore, the literature on privatization to employees in Eastern Europe and the former Soviet Union has tended to pay little attention to the institutional peculiarities of the employee-owned firms that have come into being in these countries. Yet economic theory going back to at least Meade (1972) and more recently in Ben-Ner and Jones (1995), and empirical research on Western forms of employee ownership and participation (e.g., Conte and Svejnar, 1990; or the review in Bonin, Jones, and Putterman, 1993), has emphasized that the behavior of labor-managed firms will vary with their institutional setup.

This paper attempts to contribute to our understanding of employee ownership by analyzing the institutions and performance consequences of privatization in Romania. Our approach to understanding the institutional practices relies on a survey we have conducted of about 100 firms privatized through the method labelled in Romania as "Management-Employee Buyout." The survey questionnaire was designed to assess the MEBO-privatized firms' structure and practices concerning the Employees' Organization and rights of voting, dividend receipt, and tradability of shares; thus it builds on research by Ben-Ner and Jones (1995) and Earle and Estrin (1996). The survey questionnaire also elicited information on the extent of continued involvement of the state in the putatively privatized firms, both through explicit contractual restrictions and on the threat of renationalization that could follow any failure to meet the schedule of installment payments to complete the buyout.

With respect to analyzing the productivity impact of employee ownership after privatization, we use a different database, one that we have constructed from several sources and that is unusual in enabling us to measure virtually all privatization transactions concerning the corporatized enterprises during the 1992-98 period in Romania and to draw inferences concerning employees and other types of acquiring owners. To compare the impact of owner-types on firm performance, we have linked the ownership information with panel data containing basic information on industrial firms for each year from 1992 to 1999. Thus, unlike previous studies of the impact of

privatization to employees in most countries, we are able to provide estimates based on a large sample including nearly the entire surviving population of industrial joint-stock companies eligible for privatization in Romania – 93 percent of such companies in 1999 – and containing longitudinal information data spanning the period from before privatization took place until well after much of it had occurred.

Our empirical strategy in this estimation follows the broader literature on firm performance and employee ownership in the choice of the dependent variable and the set of controlling covariates. We employ a variety of alternative econometric techniques to control for potential selection bias and measurement error. Subject to the constraints of the data, which despite their richness concerning the post-privatization ownership structure are rather limited in financial and operating information, we investigate possible problems of endogeneity in the determination of the ownership variables. We also consider alternative specifications of the functional form through which ownership affects firm performance, in particular by estimating both linear equations based on proportionate shareholdings and threshold models of majority privatization and of the type of the largest owner (a specification commonly adopted in the literature). In the latter specification, our use of time-invariant group effects controls for pre-privatization differences in performance and permits an assessment of the magnitude of such differences.

Section 2 describes the Romanian privatization process and post-privatization ownership structure, with a focus on the program of Management and Employee Buyouts. Section 3 presents our analysis of survey data concerning the property rights practices and relationship with the state for a sample of about 100 firms. Section 4 presents our econometric specifications, and Section 5 reports our estimation findings, including comparisons with the findings of related studies using similar data and techniques in other countries. Section 6 concludes, while the detailed description of the construction of the databases is relegated to an Appendix.

2. Privatization Policies and Ownership Outcomes

This section briefly analyses the Romanian privatization policies and presents our computations, based on the database we have constructed, of the post-privatization ownership structure. Our chief purpose is to analyze the implications of the privatization policies for corporate governance in order to motivate hypotheses concerning the effects of the policies on firm performance, but the results in this section also represent the first comprehensive picture of the results of privatization for industrial ownership in Romania. The section begins by recounting the initial selection of state-owned enterprises (SOEs) for corporatization and eventual privatization, the set of companies that constitutes the sample analyzed in this paper. We then go on to describe the three major methods of privatization employed in Romania – management-employee buyout (MEBO), mass privatization program (MPP), and sales of blocks of shares – and the consequences of these methods for corporate governance and ownership structure. Throughout we refer to three alternative perspectives on the ownership structure: the conditional distribution of ownership by type at the end of 1998 (shown in Table 1), the evolution of the unconditional mean by owner-type from end-1992 to end-1998 (Table 2), and the evolution of the incidence of the largest owner-type over the same period (Table 3).[3]

Corporatization and Residual State Ownership

Similarly to most other transition economies, the process of large and medium-sized enterprise reform in Romania began with corporatization of the SOEs, in order to make possible their transfer to multiple owners. In Romania the legal conversion took place relatively quickly, already in 1990, when the SOEs were divided into two groups: *regii autonome* and *commercial companies*. The former group, designated as "strategic," was relatively small in number (about 400 companies), although estimates suggest that the included companies were large (accounting for 47 percent of total SOE assets, according to Romanian Development Agency, 1997).[4]

The second group of firms, nearly all of which were reorganized as open joint-stock companies, is the focus of attention in this paper. The shares in these corporatized

[3] Our ownership data run only through end of 1998, while we have performance information for the firms in 1999 as well. The data sources and construction are described in the Appendix.

entities were subsequently placed in a newly established State Ownership Fund (SOF) and one of five Private Ownership Funds (POFs), in a ratio of 70:30 percent. The SOF's organization and governance resembled those of Ministries of Privatization and State Property Funds in other transition economies. The POFs, however, were more unusual. Despite their name, they remained state-governed, their boards of directors appointed by the Government subject to the approval of both houses of Parliament, and their nominal owners, approximately 18 million Romanian citizens, without any effective means of control. Thus, we treat the POFs as a separate category – neither private, nor state – in the empirical analysis.[5]

As presented in Table 1, our database contains 2354 industrial firms in SOF ownership in 1992, when the privatization process began. Most of these (1822 firms, 77 percent of the total) still had some state ownership at the end of 1998, and indeed the SOF holding, conditional on being present in these firms, was 46.9 percent at the mean and 50.9 at the median. The unconditional mean, the evolution of which we have calculated in Table 2, fell from 70 percent at the beginning of 1992 (69.7 at the end of the year) to 36.3 percent at the end of 1998. As a percentage of firms by largest owner-type, the SOF share fell from 100 to 47.6 percent, as reported in Table 3. Concerning POF ownership, 941 firms were partially POF-owned at the end of 1998, with a conditional mean of 20.1 percent. The POF has almost always been a minority owner, and only 32 of these firms were majority POF-owned. Starting from the 30 percent handed over to them in 1991, the POF share declined to 8.0 by the end of 1998 (Table 2); they were never the largest owner in any but a tiny number of firms (Table 3).

Insert Tables 1-3 about here.

The Romanian Privatization Law of 1991 and associated regulations charged the SOF with the privatization of all the shares in its portfolio within seven years, although the Law provided little guidance on how this was supposed to be accomplished,

---

[4] Calculations from the Romanian Enterprise Registry (all registered firms with more than three employees) provide further evidence on the large size of the *regii*: in 1992, their average employment was 2988 (357 firms), compared to an overall Romanian average of 145 (38,833 firms).

[5] Earle and Sapatoru (1993 and 1994) describe the legal basis and incentives of the SOF and POFs. In 1996-97, the POFs were converted into funds (known in Romanian as "SIFs"), but their governance remained nontransparent, each of them having several million small shareholders and rules preventing ownership concentration, and we shall continue to refer to them as POFs for simplicity. See Negrescu (2000) for more discussion of the POF/SIFs.

specifying only a very general list of possible methods to be employed. In practice, however, there have been three fairly specific methods dominating Romanian privatization: management-employee buyout (MEBO), the mass privatization program (MPP), and block sales of shares to outside investors. Sales were intended to be the primary method from the beginning, but the MEBO method already received some encouragement in the Privatization Law's provision for preferential terms for managers and employees, which included right of first refusal and installment payments at very low interest rates, preferences that were expanded and extended in later legislation.[6] The MPP was adopted a bit later, in 1995, as part of attempts to "accelerate" the rate of property transfer.

The Management-Employee Buyout (MEBO) Method

As discussed in the introduction, privatization through transfers (giveaways or sales at low prices) to employees have been common but controversial in transition economies, due to their relative ease of administrative and political implementation, but they are also frequently alleged to be ill-suited to the restructuring demands of the transition. On the one hand, insider privatization may improve work incentives, company loyalty, and support for restructuring, and if ownership is widely dispersed among employees it may facilitate takeovers by outsiders. On the other hand, employees may lack the necessary skills, capital, access to markets and technologies necessary to turn their firms around, and corporate governance by employees may function particularly poorly when the firm requires difficult restructuring choices involving disparate distributional impacts within the firm.

While such standard arguments might have some relevance for every form of employee ownership in the transition economies, the Romanian MEBOs also have some significant institutional peculiarities. These stem largely from the legal requirement, in order to obtain the payment preferences, that the employees establish an employees' association to hold the shares and exercise most ownership rights during the repayment period of 3-5 years. During this period, the unpaid shares may not be resold, limiting the

[6] MEBOs began in earnest in 1993, but a law formalizing the practices was adopted only in 1994; see Munteanu (1997) for a detailed discussion. After 1996, sales to employees were no longer formally referred to as "MEBOs," but the institutional arrangements remained the same.

possibility for concentration or takeovers that might improve governance.[7] Moreover, the Romanian privatization contracts often included restrictions, also valid for the repayment period, on changes in the firm's employment level and main product. The complicated governance and limitations on restructuring that resulted from these arrangements may have further attenuated any potentially positive effects of privatization on these firms' performance.

Table 1 shows that a total of 858 industrial firms – over a third of all industrial firms in the SOF portfolio – had undergone MEBO transactions by the end of 1998, reaching a mean employee stake of 64.9 percent and a median of 70.6 percent. In addition to the institutional peculiarities discussed above, therefore, insider privatization in Romania also differs from that in other transition economies in the magnitude of the insider share in the affected firms. Unlike most share transfers to employees in Hungary and Poland, and to an even greater degree than in Russia, the Romanian MEBOs tended to result in overwhelming employee ownership: usually the entire SOF stake of 70 percent, although there were also some cases of minority participation (sometimes combined together with other methods, mass privatization or a block sale, described below).[8]

Table 2 displays the evolution of ownership over 1992-98. MEBOs were most common in the years 1994 and 1995, although employees continued to buy out their companies through 1998, the last year in our ownership data. Second only to the SOF, MEBO participants were the largest owner-type in 24.5 percent of the firms at the end of 1998, as shown in Table 3. Measured either as the average percentage of shares privatized or the largest private owner-type, MEBO has been the single most important privatization method in Romania. The MEBOs therefore provide an interesting opportunity to test the effect of dominant employee ownership in a large number of privatized firms.

The Mass Privatization Program

[7] Anecdotal evidence suggests that voting within the employee association is sometimes according to one-member one-vote rather than by shareholding, suggesting that MEBO firms are hybrid organizations, part public corporation and part producer cooperative.

[8] See Earle and Estrin (1996) for a comparative discussion. The fraction obtained by insiders in Romanian MEBOs was frequently 100 percent, as the POFs often sold their shares simultaneously with the SOF.

A second major method was mass or voucher privatization. As elsewhere in Eastern Europe, the rationale for this method was to increase the speed of privatization by overcoming the problems of insufficient demand due to low domestic savings and reluctance of foreign investors (e.g., Earle, Frydman and Rapaczynski, 1993; Boycko, Shleifer and Vishny, 1994). The programs, frequently labeled "mass privatization," were also intended to jump-start domestic equity markets with a rapid release of shares. On the other hand, such programs run the risk of highly dispersed ownership structures, a problem normally addressed through the creation of intermediaries – either by the state as part of the program (e.g., in Poland), or by private parties competing for individuals' vouchers (e.g., in Czechoslovakia). Although there has been rather little empirical evidence on the effects of these programs, a number of authors have been highly critical of them.[9]

The Romanian mass privatization program (MPP), carried out in 1995-96, provides an opportunity to estimate the effects of a rather extreme form of voucher privatization: one that ensured maximal dispersion of ownership by prohibiting the trading of vouchers and the formation of intermediaries. The potential benefits of the program may also have been reduced by the large stake kept by the state: in most companies included in the program, only 60 percent of the shares were offered, while in those deemed "strategic" (which tended to be relatively large firms) the figure was only 49 percent. Even these percentages were reached in very few companies, due to the peculiar asymmetry of the treatment of excess demand and excess supply by the allocation procedure: oversubscription resulted in *pro rata* allocation, while undersubscription resulted in untransferred shares.[10] As Table 1 shows, a total of 1727 industrial firms were included in the program, with a mean of 24.5 percent and a median of 18.4 percent privatized; only about one-sixth of the firms in the program were majority privatized.

The consequence was inevitably an ownership structure heavily dominated by the state (often retaining the majority stake) facing a highly dispersed group of private owners. Any hope for a positive impact of this program would seem to rely on an

[9] See, e.g., Stiglitz (1999), Black, Kraakman and Tarrassova (2000), Kornai (2000), and Roland (2000).
[10] Earle and Telegdy (1998) report details of the MPP procedures.

indirect mechanism: either through secondary sales leading to increased private ownership concentration, through share trading increasing information about firm performance and therefore managerial incentives,[11] or through some complementarity with other owners, particularly blockholders that purchased shares through a direct sale. In such cases, the MPP may still have had a positive effect, despite its design.

Shares in the MPP were taken both from the SOF and the five POFs, but the latter could regain some shares if citizen-participants in the MPP exercised their option to place their vouchers with one of them. On average, by the program's design, the POFs were net losers from this procedure: as shown in Table 2, their mean share dropped from 23.8 percent at the end of 1995 to 9.2 percent a year later. Both before the MPP and subsequently, the POFs have also sold shares from their portfolios, resulting in a reduction of their stake to only 8.1 percent by the end of 1998. Frequently, such sales were organized in conjunction with SOF privatization sales.

Privatization through Sales to Outsiders

The third major class of privatization method employed in Romania has involved case-by-case sales of large blocks of shares to outside investors. The most important type of sales method has been closed-bid tender, in which not only the offered price but also the business plan, investment and employment promises, and other considerations are taken into account by the SOF in selecting the buyer. These considerations are then frequently reflected in provisions of the privatization contract that restrict post-privatization behavior, as in the MEBO privatizations (Negrescu, 2000). Although the Romanian policymakers may feel themselves politically constrained to ensure continued employment and operation of the firms, such restrictions could have reduced restructuring in the companies privatized through block sales, reducing the potential benefits of privatization.[12]

Moreover, the sales method has a number of intrinsic problems that tend to make it slow and uncertain. First, multi-criteria tenders naturally involve a lack of transparency in the process, as there are no announced or pre-determined weights for the various

[11] After the MPP, the companies were listed on either the Bucharest Stock Exchange or RASDAQ (the Romanian over-the-counter market).

[12] Unfortunately, our database does not permit us to measure these restrictions for each company separately.

aspects of the bid and potential participants are left guessing as to the tradeoffs among them. The bids are not publicly revealed after the tender either, making it difficult to monitor the SOF's decisions. Because of the lack of an objective criterion and the nontransparency of the process, the selection decision can be easily manipulated, creating the appearance, if not always the reality, of corruption. Indeed, even a perfectly clean process organized by perfectly honest, well-intentioned bureaucrats can be hijacked by corruption charges, as there is little defense against charges of favoritism. Opposition parties are quick to exploit the possibility to score points against the government, and the bureaucrats, fearing charges of corruption and with few incentives to privatize aggressively, tend to act very cautiously. Of course, the problems are magnified to the extent that the bureaucrats are less than perfect and act as rent-seekers by seeking bribes in the privatization process and colluding with the enterprise managers to strip assets before privatization. Political battles may also erupt over the fulfillment of the contractual restrictions, resulting in the canceling of privatization contracts, effectively in renationalization.[13] The cumulative effect is to further reduce demand and make sales more difficult as potential investors become still more reluctant to participate in the uncertain environment.

These difficulties are reflected in the pace of privatization through sales, which has been slow, similar to the experience of most other transition economies, although the Romanian privatization policy specified them as the primary method from the very beginning of the process in 1991.[14] Nonetheless, the data contain a sufficient number of observations on sales for us to be able to evaluate their impact on firm performance. As shown in Table 1, 476 firms underwent large blocks sales by the end of 1998 (378 to domestic investors and 98 to foreigners). Most of these blocks were quite large: an average of 52.7 and 56.6 percent to domestic and foreign investors, respectively (42.3 and 51.0 at the median). Concerning majority ownership, 245 firms had either domestic or foreign investors in the majority, while one or the other type was the largest type (not necessarily majority) in 12.6 percent of the firms (Table 3); most of these were domestic

[13] Our database shows that annulments of transactions are much more common for sales than for MEBOs, and non-existent for MPP transfers.

owners (9.3 percent), and foreign investors were dominant in only 3.3 percent of the firms.

To summarize our analysis of ownership results, by the end of 1998 the state's share in the corporatized industrial companies had fallen to 36.3 percent on average. Most of the companies with private ownership became majority private. The most prevalent types of new owners were employees (23.6 percent on average) obtaining shares through MEBOs. Second came the participants of the Mass Privatization Program (18.2 percent on average), who may also have included employees. Concentrated outsiders – domestic and foreign – were present in 476 (20 percent) of the companies, but again the average in this group of firms was a majority stake. In more than three-quarters of all firms, the SOF retained some ownership stake; within this group, the average state share was quite high, at 46.9 percent. The heterogeneity of the Romanian privatization methods thus produced an interesting testing ground for examining the impact of alternative ownership structures on firm performance.

At the same time, our analysis has also highlighted reasons why privatization may have had little or no effect in Romania, or at least had fewer benefits than if it had been optimally designed. Each of the privatization methods created possible corporate governance problems (insider control, dispersion of shareholdings, contractual restrictions) that might have blocked or reduced the new owners' incentives to restructure and raise productivity. An additional factor that could have weakened the impact of privatization, sometimes cited in studies of privatization in other transition economies, is the general business environment: if property rights are not respected and enforcement of contracts and corporate governance rules is poor, then the new owners may expect little return from their investments and restructuring efforts. [15] The business environment in Romania has come in for frequent criticism, for instance in the EBRD's regular grading of transition economies according to their "institutional performance." EBRD (2000, p. 21) awarded Romania a score only slightly ahead of Russia and well behind Hungary, Poland, and the Czech Republic, although none of the economies were considered to

[14] Eastern Germany, Hungary and Estonia, each of which had clear advantages in selling to outsiders, are partial exceptions to the generally slow rate of privatization through sales in transition economies, although the pace was criticized even in these three countries.

have reached "a standard that would not look out of place in an industrialized market economy" (p. 16). Regardless of the exact rankings, our point is that it is not a foregone conclusion that privatization under such conditions, even sales to foreign investors, would yield substantial benefits: the question can only be decided through empirical analysis. This point should be borne in mind when we discuss our econometric comparisons of MEBO-privatized firms with other ownership forms below.

3. Inside the Insider-Controlled Firm

The previous section reported on the post-privatization ownership structure of Romanian firms, including the fraction of shares transferred to employees through MEBOs, but data limitations prevented it from a deeper analysis of the distribution of shares among managers and workers of various types. Nor were we, with the comprehensive data, able to describe the institutional framework for employee ownership in Romania, the ways property rights and governance and exercised in practice. To address these issues, this section reports our analysis of survey data for 100 firms that were privatized by the MEBO method in the early years of transition, 1993 or 1994.[16] Our main purpose is to understand aspects of these firms' governance that may shed light on the effectiveness of employee ownership in dealing with the complex restructuring problems of economic transition. These aspects include the employees' organization, or PAS, and how voting, trading, and cash flow rights are exercised. They also include the role of the state, particularly restrictions in the privatization contract on changes in the level of employment and main activity of the firms. A further restriction concerned the sale of shares, which if it occurred at a higher price than the heavily subsidized price at which insiders could buy the firm's shares, the difference between the two prices was supposed to be paid back to the state. The speed at which employee-owned firms "degenerate," or convert themselves into conventional outside-owned organizations, has been one of the biggest controversies in the transition (Aghion and Blanchard, 1996, provide a formal analysis), and the sales restriction might be expected to reduce the rate of such conversions. Here again, however, empirical evidence has been lacking. Our

[15] See Anderson *et al* (1999) for this argument with respect to Mongolia. Black *et al* (2000) argue that the lack of institutional development in Russia has led to asset-stripping post-privatization.
[16] The main features of the survey are described in the Appendix.

data permit us to provide some evidence for the Romanian case through information on changes in the ownership structure of MEBO firms in our sample, results that are presented toward the end of this section.

Table 4 displays the 1995 ownership structure of the sample firms, including the distribution for each type of shareholder. Unlike other countries, where insider privatization involved only part of the shares, sometimes only a minority total shareholding, the MEBO firms were overwhelmingly dominated by employees: on average, they owned 94.8 percent of the firms, and the minimum holding was over 50 percent and the tenth percentile was 85.4. As a consequence, outsider shareholders had very small ownership stakes, on average owning only 4.6 percent of the shares. The survey questionnaire raised the possibility that not even all of these shareholders are genuine outsiders by inquiring whether any of them were former employees of the firm who had obtained their shares through the MEBO privatization. It turns out that, among the owners who were not current employees, retirees had 0.8 percent of the shares, while other former employees 1 percent. The maximum holdings of these two types of former employees were only 6.8 and 13 percent, respectively, and only a minority of the firms had such owners. Outside investors who were neither current nor former employee owners held 2.8 percent ownership on average and this type of ownership is even less prevalent: the 75th percentile was still zero. The other major type of owner, the state had almost no ownership in these firms.

The survey questionnaire also permits a number of types of employee-shareholders to be distinguished. On average, managers of these firms owned 30.9 percent of the shares in 1995. But the extent of managerial ownership varied widely: from a minimum holding of 2 percent to a maximum of 81.4. Non-managerial employees owned approximately twice as much on average as did managers (62.7 percent), although the magnitude also varied, from 8.9 percent to almost 100 percent. While over 60 percent of firms were majority-owned by non-managerial employees, only about 20 percent were majority-managerially owned.

The survey also requested separate information on the holdings of non-production and production workers, and of skilled and unskilled workers among the latter. The average holdings of production and non-production were quite similar in 1995, both

categories owning around one-third of the firm's shares. Among production workers, it turned out that there were few workers classified as unskilled in the sample firms, skilled workers were reported to own 31.9 percent while unskilled had only 2.9 percent on average. The similar holdings of production workers and skilled workers show, that few workers are classified as unskilled workers. Finally, there are some shares remaining with the PAS, not owned by any individual: 1.2 percent on average.

Insert Table 4 about here

The results from similar calculations for the holdings of various owner-types, but conditioned on positive shareholding, are shown in Table 5. Significant differences concern only the categories of unskilled workers, PAS, and outside owners. Unskilled workers were owners in 59 companies, and their average shareholding was 4.4 percent and on the median they owned 2 percent of the firm's shares. This shows that the ownership stake of unskilled workers was small but unevenly distributed among firms: while in most of the firms it was zero, in one firm they owned 45 percent of the shares. Shares held by the PAS existed in only six companies, but in these the PAS' proportion was 18.1 percent on average. The conditional ownership table is most informative for outside owners, who were present in only a part of the companies and thus the conditional and unconditional statistics differ significantly. Former employees of the company who retired owned shares in 39 firms (43.5 percent of the total number of firms), with a small percent: 1.8 percent on average, and 6.8 percent at the maximum. Other former employees held larger ownership stakes (3.9 percent on average and 13 percent at the maximum). Outside investors were present in only 20 companies, suggesting much higher ownership conditional on ownership than implied by the unconditional statistics, but their holding was still only 12.9 percent of the shares at the mean, and 6.0 at the median, in those 20 companies. In no case did outside investors have a majority of the shares. Finally, our data suggest that the state did not keep dominant control in firms that underwent an early MEBO privatization. For our sample, the state continued to be an owner in only 2 firms, in one holding10 percent through a POF, and in the other 44 percent through the SOF.

Insert Table 5 about here

Our analysis of ownership structure has shown that employee ownership dominates every MEBO firm, although the particular type of employee accounting for most of the shares varies across firms. But how are these shareholdings connected with influence over the firm's behavior? Besides the voting rights themselves, the key to understanding corporate governance in the MEBO-privatized firms is the PAS, the organization which carries through the negotiation with the SOF and POF, determines the distribution of shares, assumes the responsibility for the repayment of the loan which financed the purchase, and exercises voting rights for the shares under its control (which may be defined different across firms). The legislation did not determine even the principles of distribution of shares, leaving substantial variation across firms in the division of voting rights between individual employees and the PAS. Table 6 summarizes our results for 1995: 58.5 percent of the shares were voted individually, and 36.3 by the PAS. Managers had a slightly greater tendency to be able to vote their shares individually, as they accounted for 20 percent of the shares on average, and non-managerial employees for 38.6 percent. The table also shows the holdings of non-production and production workers, and skilled-unskilled workers, as the previous two tables. Except for unskilled workers, the other types of insiders voted individually at least some of the shares in about 70 percent of the firms. The percentiles show that individual voting rights tended to be clustered: the 25^{th} percentile was zero, and on the median the groups of insiders voted for 12 – 13 percent of the shares, with the exception of the large group of non-production workers, who had over 30 percent of voting rights on the median. However, the 75^{th} percentile was already around 30 percent of each owner-type, the exception being the unskilled workers again.

The PAS voted for 36.3 percent of the shares on average and 0 on the median, showing that its voting power tended to be bi-modal at the extremes. Indeed, the PAS voting share, conditional on it being positive, was 78.7 percent at the mean and 93.8 percent at the median. Thus, a large fraction of the 45.7 percent of the companies in which the PAS had positive voting power were dominated by this organization, or the members of the PAS who can control it. The distribution of shares (and voting rights) within the PAS was similar to overall shareholdings, which may be caused by the even distribution of the subscribed shares across PAS and non-PAS: as the credit is repaid,

each group receives the shares proportionally to their subscriptions, at least in many companies. The only visible difference between individual voting rights and within-PAS voting rights is that in the latter voting rights were even more concentrated in dominant types: at the median all types owned nothing, but holdings above the 75th percentile are quite large.

All the MEBO-privatized firms are formally organized as joint-stock companies, with voting in the general shareholders' meeting according to one share – one vote. But the law did not prescribe this rule, or any particular rule, for voting within the PAS, an important issue since the board of directors of the PAS is elected by its members, rather than being appointed as in a conventional ESOP. As discussed above, the PAS itself exercised voting rights for many shares, thus the PAS board could in effect determine how all PAS shares would be voted at the general meeting. With this motivation, our survey questionnaire asked about the voting system used for PAS decision-making. Table 7 shows that two voting structures existed: one member – one vote system at 43.6 percent of the companies, while the rest used voting rights according to the subscribed shares. The practice of one voting right per member is a central feature of the producer cooperative, as described by Bonin, Jones, and Putterman (1993), and our survey shows that around half the MEBO firms share this characteristic.

Insert Table 7 about here

Furthermore, the PAS also appears to have had control over the tradability of shares. Outsiders have been completely excluded from acquiring shares still held in the PAS, and even transactions among insiders have required PAS approval; with respect to shares outside the PAS, the situation is less clear. The restrictions on tradability (exacerbated by state policy requiring any profits on share sales to be paid to the SOF) are also common in producer cooperatives, and in closed joint stock, limited liability, and other privately held firms. Thus, the configurations of ownership rights in MEBO firms place their institutional form somewhere in the space between traditional producer cooperatives, majority ESOP firms, managerial buyouts (MBOs) and open joint stock companies, with the precise point in the space varying across firms. As the firms share some of the characteristics of each of these organizational forms, their behavior is likely to represent composite influences, a weighted average of the behaviors that would be

exhibited by each of the ideal types, with the weights determined by ownership structure and institutional practices.

The firms closest to the producer cooperative form would be those in which the PAS had a majority of shares and voting is according to one member – one vote. Out of the 91 firms in our sample for which we have complete ownership information, 18 are in this category (19.8 percent). The firms closest to MBOs would be those in which managers directly possessed more shares than either non-managerial employees and the PAS, or if within the PAS members vote according to their holdings and the total holding of managers (that is, individual holdings and holding within the PAS) are greater than non-managerial holdings.[17] According to this classification, there are 18 MBOs in the sample (19.8 percent). Other types are closer to majority ESOP or open joint stock companies, depending on the size of the PAS; there are 55 firms are in this residual category (60.4 percent).

Our survey also collected information on the concentration of share ownership by type of owner, motivated by potential problems of collective action within homogeneous groups and of conflict where some heterogeneity of interest exists.[18] We measure concentration of shares in two ways. Table 8 and 9 present two measures of concentration: the percentage of shares owned per person within each owner-type and the percentage of shares owned by each of the four managers and non-managerial employees owning the most shares, respectively.

Insert Tables 8 and 9 about here

Shares per capita varied widely among types of shareholders. Among insiders, there was some correlation between the position in the company and the shares per person. Managers voted individually for 6.3 percent of shares on average, followed by non-production workers at 1.9 percent and production workers at 0.7 percent. Skilled workers voted 0.7 percent on average, while unskilled workers' average was only 0.4 percent. Within the PAS a similar structure can be observed. Perhaps most striking is the

[17] The underlying assumption here is that if in the PAS members vote according to the subscribed shares, their voting power is actually the sum of their shares, since they may support the same position in both meetings (PAS and the general meeting of shareholders). This assumption may be wrong if the voting structure follows a pyramid, with a group dominating the PAS having a minority overall.

[18] Hansmann (1990) discusses the costs of reaching an agreement.

average shareholding of outside investors. On average, they own only 5.5 percent of the shares, and the median value is only 1.2 percent.

Turning to the four-owner concentration measure, the aggregate holding of the four managers with the largest ownership stake, shown in Table 9 is rather high, 28.1 percent on average. Although non-managerial employees as a group owned much more, the same figure for them is only 11 percent. At the median, managers owned 21 percent, and the maximum value was 84 percent, which shows that there were firms clearly dominated by the managers. The four largest non-managerial employee-owners never had a majority of the shares, their maximum aggregate holding being only 42 percent.

Although the state did not keep a large ownership stake in the MEBO firms, the privatization contract contained restrictions concerning change in the level of employment, the main activity of the firm and sale of assets. Table 10 shows that almost all firms had such restrictions and that they were imposed for substantial lengths of time: the average firm was not permitted to change the level of employment for 2.1 years, the to change the major activity for 4.9 years, and to sell assets for 5.5 years. The maximum value of the length of restrictions show that there were firms which were restricted for 8 – 10 years. The last column shows that out of the 66 firms for which we have data in 1998, 6 – 7 percent still had restrictions.

Insert Table 10 about here

A final issue we take up in this brief introduction to our survey results is the controversy over the speed of "degeneration" of ownership: how fast outsiders will buy up the firm? The last two tables presented in this section show the ownership structure of a subsample of the firms presented so far, the voting rights of insiders and the changes in the ownership structure between 1995 and end of 1998. Table 11 shows the ownership structure of 69 firms for which we have this information. Insiders still held the vast majority of shares: on average, they held 87.5 percent, and at the median 100 percent. Managers and non-managerial employees had 29.2 and 58.5 percent on average, respectively. Although insiders clearly dominate most of the firm, some outsider ownership penetrated the MEBO firms: 33.3 percent of the firms had some outsider ownership by 1998. For the whole sample, outsiders owned 12.2 percent of the firms' shares. Domestic individuals were the most prevalent type, present in 20.3 percent of the

firms, but usually with holdings under 50 percent. Domestic firms, foreigners and POF/SIFs were present in 6 – 9 percent of the companies only, the first two having rather large average holdings, while the latter owned only a trivial fraction of the shares. The state owned small shareholdings in 4 companies.

Insert Table 11 about here

Table 12 presents the ownership structure of the same sample of firms for 1995 and 1998. The tendency in these 62 firms was for a decline in employee ownership and a rise in outside ownership, but on average the changes are not very dramatic. From an average value of 94.5, insiders holdings fell only 7.3 percent, reaching 87.2 percent at the end of 1998. The PAS (which was maintained in 18 companies, out of 64), lost much of its voting: from 36.1 percent in 1995 it decreased approximately by half, to 18.6 percent. The voting system of the PAS also changed: only 2 organizations use a one-member one-vote procedure. As the PAS paid back its loan and distributed the company's shares to subscribers, both managers and non-managerial employees increased individual holdings, and decreased their holdings within the PAS. This process is particularly dramatic in the case of managers, who decreased their PAS holdings from 11.7 to 2.8 percent. Outsiders increased their holding by more than half, from 5.4 to 12.6 percent on average.

Insert Table 12 about here

By 1998, therefore, the character of the MEBO-privatized firms in our sample had shifted somewhat. Out of the 69 firms for which we have complete ownership information, none were still producer cooperatives. 18 were dominated by their managers (26.1 percent), 43 by the non-managerial employees (62.3 percent), and 7 are outsider-dominated (10.4 percent). In one firm workers and managers have the same holdings and this holding is larger than the percent of shares owned by outsiders. If the results for our sample are representative of the population of firms initially bought out by their employees, it suggests that nearly all of them remained employee-dominated, even several years after their privatization. And although the producer cooperative element had diminished, as had the role of the state – at least in terms of formal contractual restrictions, these elements were quite strong in the earlier post-privatization years. How

these considerations affected the performance of these companies is an empirical question, one to which we turn in the next section.

4. Empirical Specification

The central question of this paper concerns the effects of privatization through management-employee buyout, relative to alternative methods of privatization and to continued state ownership, on firm performance. In this section, we describe the econometric approach we employ to estimate these effects, beginning with a discussion of our measure of firm performance, the dependent variable in our analysis. Second, we present our specifications of ownership structure – our independent variables of interest – and of the control variables we include in the equations to help us identify the ownership effects. The specification of ownership structure is motivated by our earlier discussion of Romanian privatization methods, while our selection of control variables follows the standard literature on the privatization-performance relationship. The final part of this section describes the set of alternative estimation methods we employ to control for measurement error, unobserved heterogeneity and possible selection bias in the ownership data generating process. Each technique has advantages, and our approach therefore is to employ a range of methods in order to assess the robustness of the findings. The results from the estimations are reported in Section 5, below, while our sources and construction of the database are described in the Appendix.

Our empirical strategy follows the literature in estimating reduced form equations for firm performance as a function of ownership, while trying to account for potential problems of heterogeneity (observed and unobserved) and simultaneity bias.[19] Using a model for panel data, in which i indexes firms and t indexes time periods (years), we estimate equations of the following form:

$$P_{it} = \beta_0 + \beta_1 OWN_{it} + \beta_2 X_{it} + u_{it}, \qquad (1)$$

where P_{it} is a measure of firm performance, OWN_{it} captures ownership (sometimes as a vector of variables), X_{it} is a vector of covariates, and u_{it} is a residual.

[19] See the surveys by Djankov and Murrell (2000) and Megginson and Netter (2001).

A first estimation issue concerns the measurement of firm performance. In this paper, we analyze labor productivity growth, a dependent variable employed in much of the prior research on firm performance.[20] While it would be desirable to examine other performance indicators, such as profitability, Tobin's "Q" or total factor productivity (TFP), the available data unfortunately do not permit us to measure these variables. Indeed, while our data on the privatization process are quite rich and detailed, the only other available information on firms is limited to their employment and revenue in the years 1992-99, as well as their industry and region. Without a measure of the capital stock or other inputs, we cannot estimate TFP.[21] While TFP would provide a more encompassing measure of productive efficiency, labor productivity has the advantage that it reflects changes in the capital stock due to investment, which may itself demonstrate superior performance in the poorly functioning capital market environment of Eastern Europe.

On the other hand, labor productivity may be influenced by unmeasured variables such as capital, material inputs, and technology. Therefore, we specify the dependent variable as labor productivity growth, which differences away any fixed firm-specific characteristics that affect the level of labor productivity. As discussed below, we also control for industry, size, and the lagged level of labor productivity to take into account other differences across firms such as capital-labor ratios; in some specifications we also include fixed firm effects or group effects (for ownership types).

Table 13 shows summary statistics for the levels of average employment, real value of sales (in thousand 1992 lei), and labor productivity. According to the data, average employment in industrial enterprises dropped every year by 8-17 percent, except for 1996, when the fall was around 4 percent. Over the whole period, the cumulative drop was 55.7 percent on average. The real value of sales and labor productivity displayed much more volatile patterns, rising in some years and falling in others.

Insert Table 13 about here.

---

[20] Studies using labor productivity level or growth as the dependent variable include Anderson *et al* (2000), Boubakri and Cosset (1998), Carlin *et al* (2001), Claessens and Djankov (1999a,b), Djankov (1999b,c), D'Souza and Megginson (1999), Earle (1998), Earle and Estrin (1997), Frydman *et al* (1999), Megginson *et al* (1994), Pohl *et al* (1997), and Weiss and Nikitin (1998).

[21] Anderson *et* al (2000), Claessens *et al* (1997), Piesse and Thirtle (2000), and Smith *et al* (1997) estimate total factor productivity functions.

Next we turn to our specification of the ownership structure, OWN_{it}. The literature on privatization together with our analysis of the Romanian privatization programs in Sections 2 and 3 suggest several alternative ways of specifying the ownership variables. A first approach is based on the proportion of shares in private ownership of various types.[22] As discussed above, our data permit us to distinguish insiders, mass privatization participants, and domestic and foreign investors who purchase blocks of shares; another category represents unidentifiable "other" owners in the database who could not be identified, but who have very small shareholdings. An alternative specification involves a threshold or critical level of ownership, below and above which an increase in shareholding has zero marginal impact; here this threshold is defined as the largest type of owner.[23]

Turning to the control variables, X_{it}, we are interested in accounting for heterogeneity in performance, P_{it}, that may also be correlated with our variables of interest, OWN_{it}. A first problem involves mismeasurement in labor productivity arising if firms differ systematically with respect to their production functions and levels of investment, and capital-labor ratios. This suggests that industry effects (we specify 14 categories) and firm size (a proxy for capital intensity) should be included; we measure size as employment, lagged to avoid endogeneity problems. Firms may also differ in their set-up costs, quality of equipment, and technology. Again these are likely to be correlated with industry and size, and we also include the lagged level of labor productivity in X_{it}, and in some specifications firm-specific fixed effects.[24]

A second problem involves initial conditions and the magnitude of the demand shock faced by the firm, as the state cut its orders drastically and customer and supply chains broke down (Blanchard and Kremer, 1997). A firm with better initial conditions may have been more cushioned from the impact of competition, while a greater shock suggests that firms may have greater difficulty adjusting and maintaining productivity.

---

[22] All the firms in the SOF portfolio, and therefore in our database, are share companies.

[23] This specification is similar to that estimated by Frydman *et al* (1999), and it differs from the "dominant ownership" approach of Earle and Estrin (1997) and others, which requires that the "dominant" shareholding exceed some minimum (e.g., 40 percent).

[24] The lagged level of productivity is frequently included in productivity and productivity growth equations (e.g., Anderson *et al*, 2000; Earle, 1998; Frydman *et al*, 1999). Another argument for controlling for it is the possibility that it is more difficult, other things equal, to increase productivity if it is already high than if it is low.

We hypothesize that firms facing a greater demand shock will have more difficulty maintaining productive efficiency, due to the costs of laying off workers, unbundling equipment and other capital, etc. These shocks may be correlated with industry and region, and they likely vary across years. We include year, industry, and region (6 categories) effects under the assumption that these may be correlated with unobserved shocks to a firm's productivity; and it is frequently argued that larger firms face more difficult adjustments, thus lagged employment is useful here as well. The region effects also may reflect market conditions in a firm's environment: particularly for declining firms, maintaining productivity may be easier when the industry and region is growing, facilitating the release of workers and capital to other firms. Finally, the region effects may also account for differences in relative input prices that could lead to different allocation of factors of production within firms.

These conceptual arguments suggest that such characteristics as industry, region, size, and year may be correlated with firm performance. But these variables may well be related to ownership as well, due to patterns of both the shares offered by the SOF and the demands of various types of new owners. To examine whether such relationships are statistically significant in our data, we regressed our share ownership variables (percentage private and percentage held by largest private owner-type in alternative specifications) on groups of industry, region, size-category and year dummies. Each group of dummies was jointly significant in every equation, nearly always at the 1 percent significance level, suggesting the importance of including them as controls.[25]

With these specifications of the dependent variable, the post-privatization ownership, and the controls, the basic estimating equation is

$$\begin{aligned} \text{Log}\,(S_{it}/E_{it})-\text{Log}\,(S_{it-1}/E_{it-1}) \;=\; & \beta_0 + \beta_{11}ForeignShare_{it} + \beta_{12}DomesticShare_{it} \\ & + \beta_{13}MEBOShare_{it} + \beta_{14}MassShare_{it} + \beta_{15}OtherShare_{it} + \beta_{16}POFShare_{it} \\ & + \beta_2\text{Log}(S_{it-1}/E_{it-1}) + \beta_3\text{Log}E_{it-1} + \\ & \Sigma_{t=1}\beta_t YEAR_t + \Sigma_{j=1}\beta_j IND_{ij} + \Sigma_{k=1}\beta_k REG_{ik} + u_{it}, \end{aligned} \tag{2}$$

[25] The coefficients from these equations reflect both the supply-side considerations of SOF offerings and the patterns of demand by potential new owners, with higher rates of privatization in the food, printing and publishing, furniture, footware, textile, and other sectors of light industry, and low rates of privatization in heavy industrial sectors such as mining, wood, chemicals, metallurgy, and machine building.

where S_{it} is sales of firm i in year t, E_{it} is the corresponding employment, $YEAR_t$ represent year effects (t = 1993,...,1999), IND_{ij} are industry effects (j = 1,..,14), REG_{ik} are region effects (k = 1,...6), the β are parameters to be estimated, u_{it} reflects unmeasured factors, and the sum of the share variables plus the state shareholding equals one.

Even with such controls, it is possible that there is still some unmeasured heterogeneity correlated both with ownership and performance. To take this into account, we estimate some models including firm fixed-effects, so that the estimating equation is the following:

$$\begin{aligned}\text{Log}\,(S_{it}/E_{it})-\text{Log}\,(S_{it-1}/E_{it-1}) &= \beta_i + \beta_{11}ForeignShare_{it} + \beta_{12}DomesticShare_{it} \\ &+ \beta_{13}MEBOShare_{it} + \beta_{14}MassShare_{it} + \beta_{15}OtherShare_{it} + \beta_{16}POFShare_{it} \\ &+ \beta_2\text{Log}(S_{it-1}/E_{it-1}) + \beta_3\text{Log}E_{it-1} + \Sigma_{t=1}\beta_t YEAR_t + u_{it}, \qquad (3)\end{aligned}$$

where β_i is a vector of firm fixed effects.

In these models, the estimates of β_{11} to β_{16} reflect the effects of the "within-firm" variation of ownership by permitting each firm to have a separate intercept. Thus, any systematic variation across firms in the rate of its labor productivity growth will not contaminate the parameter estimates. The firm fixed effects also help to control for possible endogeneity of ownership, resulting for instance from any tendency for firms with higher productivity growth to be privatized. As long as the unobserved component of productivity growth associated with the privatization propensity is fixed over time, then the inclusion of firm effects completely controls for selection bias.

We also estimate analogous equations with dummies representing largest non-state owner (*ForeignDummy*, *DomesticDummy*, *MEBODummy*, *MassDummy*, *OtherDummy*, and *POFDummy*). In these models, we include group effects in the equations, so that the estimating equation is:

$$\begin{aligned}\text{Log}\,(S_{it}/E_{it})-\text{Log}\,(S_{it-1}/E_{it-1}) &= \gamma_0 + \gamma_{01}ForeignEver_i + \gamma_{02}DomesticEver_i + \gamma_{03}MEBOEver_i \\ &+ \gamma_{04}MassEver_i + \gamma_{05}OtherEver_i + \gamma_{06}POFEver_i \\ &+ \gamma_{11}ForeignDummy_{it} + \gamma_{12}DomesticDummy_{it} + \gamma_{13}MEBODummy_{it} \\ &+ \gamma_{14}MassDummy_{it} + \gamma_{15}OtherDummy_{it} + \gamma_{16}POFDummy_{it} \\ &+ \gamma_2\text{Log}(S_{it-1}/E_{it-1}) + \gamma_3\text{Log}E_{it-1} + \Sigma_{t=1}\gamma_t YEAR_t + \Sigma_{j=1}\gamma_j IND_{ij} + \Sigma_{k=1}\gamma_k REG_{ik} + v_{it}, \qquad (4)\end{aligned}$$

where the group effects ($ForeignEver_i$, etc.) are constant over time, the γ are parameters to be estimated and v_{it} represent the residuals associated with this specification of ownership. This method imposes a stronger restriction than the firm fixed-effects specification, but also has the advantage of permitting some inferences to be drawn concerning the pre-privatization performance of firms subsequently privatized. For instance, in equation (4) above, γ_{03} represents the difference between the labor productivity growth of firms that have not yet been but will be MEBO-privatized in the future and that of firms that are never MEBO-privatized (within our sample period); if better performing firms tend to be sold to their employees, then γ_{03} should be positive. γ_{13}, on the other hand, represents the post-privatization change in labor productivity growth relative to the pre-privatization growth rate of firms that are eventually observed to be MEBO-privatized; if MEBO privatization is pure selection (on time-invariant criteria), then γ_{13} should be zero. More generally, the parameters ($\gamma_{01},...,\gamma_{06}$) represent the labor productivity performance of the firm prior to its acquisition by the given owner-type, relative to firms remaining in state ownership. The group effects may be interpreted as estimates of the selection bias into each ownership category, while the coefficients on the largest owner dummies ($\gamma_{11},...,\gamma_{16}$) reflect the change in performance associated with ownership change.

Our efforts to control for selection bias notwithstanding, a residual possibility concerns some dynamic selection mechanism whereby firms with greater possibilities for raising productivity growth have greater or smaller probabilities of being privatized and of being acquired by different types of private owners. Such a selection mechanism could arise, for instance, if there is some characteristic of firms, their "quality," that is observable to buyers or to the SOF, but not to the researcher. Note that this characteristic can relate neither to the level of firm performance (e.g., labor productivity) nor to the growth of performance (e.g., labor productivity growth), as our use of fixed firm effects in growth equations would eliminate the impact of such a characteristic. Rather, the characteristic would have to involve an ability to accelerate productivity, and it would have to be independent of all of our control variables. Such selection may seem implausible, but it would be desirable to check for it if data were available to instrument changes in the ownership structure. Instruments would need to be correlated with

ownership change but not with labor productivity growth, a tall order. Unfortunately, our analysis uses all the variables in our database, and we have no appropriate instruments for such an investigation. This problem faces all studies of privatization and firm performance, of course, including studies that treat selection bias through fixed effects, and the possibility of such a dynamic selection mechanism should be borne in mind in interpreting results.[26]

A final issue concerns measurement error. Although we have carefully constructed and cleaned our data, some significant outliers remain, and we cannot be sure whether these represent true differences across firms or simply noise associated with most large firm-level databases. Moreover, the fixed effects procedure we employ in some specifications is especially sensitive to measurement error, as within-firm estimates may exacerbate the noise to signal ratio. For this reasons, and to establish the robustness of our results, we estimate all equations using both ordinary least squares and least absolute deviations, or median regression. This latter procedure puts equal weight on all observations regardless of how far they lie from the regression line; large outliers do not influence the estimates as they would using OLS.

5. Empirical Results

We examine the association between ownership and productivity growth starting with simple descriptive statistics and tests of differences of means across ownership categories, and then moving on to the estimates of the regression equations specified in the previous section. Table 14 provides the first results, showing the mean productivity growth of firm-years grouped according to the dominant owner of the firm, using the categories defined in the previous section. "State" and "Private" refer to majority ownership, while the disaggregated private groups ("Foreign," "Domestic," MEBO" and "Mass") categorize firms according to their largest private owner type. Firm-year observations when the state was majority owner experienced a productivity decline (-.024

[26] Smith *et al* (1997) use contemporaneous financial indicators (exports, sales, profits, wage bonus and debts) to instrument employee and foreign ownership in TFP regressions. Anderson *et al* (2000) exploit details of the privatization process to instrument ownership in Mongolia, and Earle (1998) instruments ownership with privatization method and other variables in Russia. None of these studies uses group or fixed effects.

at the mean), while privately owned firms increased on average (.012); the difference is statistically significant at the 1 percent level.

Turning to the disaggregated private categories, both MEBO- and mass-owned firms experience average productivity declines (-.007 and -.014), and the difference from state-owned firms is not statistically significant. Firms in years when the dominant owner was a domestic or foreign blockholder, however, increased log labor productivity significantly (.118 and .178, respectively), and the differences relative to state ownership are highly significant.

Insert Table 14 about here.

These descriptive statistics take no account, however, of possible omitted variable and selection biases in estimating the performance-ownership relationship. Before turning to the regression estimates, in which other factors are included as controls, it is useful to look for evidence of selection bias, which may arise, for instance if inherently more efficient firms are privatized more easily and have a higher probability of obtaining active owners (such as concentrated external investors). A first test of the possible selection bias is reported in Table 15, where we compute the pre-privatization productivity growth rates for firms that are subsequently privatized, and compare them with the growth rate for firms never privatized (within our observation period). The first column of the table contains the average annual productivity growth for firms which never became majority private, while the other columns refer to firm-years previous to becoming majority private, or previous to becoming dominated by a particular type of owner (using the same categories and definitions as in Table 14). The mean growth rates lie in a narrow range (-.032 to .008), and the t-test of the difference in the means (relative to the category of never majority private) is in no case significant. The small differences in the means for firms that subsequently become foreign or domestic-investor owned are particularly striking compared with the differences in their post-privatization performance reported in Table 14. This crude test reveals no evidence of selection bias in the privatization process.

Insert Table 15 about here.

Next we turn to the regression results, which control for third factors that may influence both firm performance and ownership. Table 16 contains estimates of

Equations (2) and (3). Each type of private shareholding is estimated to have positive and significant effects, with the foreign and domestic blockholder share coefficients ranging from .274 to .423. The estimations do not provide a consistent ranking of domestic and foreign investors, as the OLS estimation produces a larger impact of foreign ownership, the fixed-effects specification a larger impact of domestic ownership, and the median regression approximately equal impacts of foreign and domestic ownership.

Insert Table 16 about here.

Both types of blockholders display distinctly better performance than do MEBOs and mass participants, but it is noteworthy that the shares of the latter two owner-types nonetheless always have positive and significant coefficients at the 1-percent level, with the range of estimates falling between .108 and .190. The difference in the estimated effects of these two types is not large, and their relative ranking varies across specifications: in the OLS and fixed effects the coefficient of *MassShare* is larger, while in the LAD regression *MEBOShare* has a larger coefficient. *POFShare* and *OtherShare* also have positive, significant estimated coefficients.[27]

Table 17 reports the results of the models in which ownership is specified as a categorical variable and in which we also include group effects, as discussed in Section 4. The Equation (4) estimates show positive group effects for foreign and MEBO privatizations, suggesting that firms with higher pre-privatization productivity growth rates are more likely to be privatized by these methods (both *ForeignEver* and *MEBOEver* have positive, significant estimated coefficients in both regression models), while the OLS model (but not the LAD) produces some evidence of slightly higher pre-privatization productivity growth in *DomesticEver*. Similar to the results for share ownership, we find that foreign and domestic blockholders have the largest impacts, relative to their pre-privatization performance, while the effects of MEBO and mass participants are smaller but still positive. Among the identified owner-types,

[27] Out of the 18 firms in which "others" were the majority owners (see Table 1), we were able to obtain some additional information on seven that were listed on the Bucharest Stock Exchange or Rasdaq, the over-the-counter market. Three of them had large outside blockholders, one of which was foreign, one had several smaller outsiders and three had the insiders' organization as the dominant owner. The presence of outside owners may be the reason that this ownership has large, positive and significant estimated coefficients.

ForeignDummy and *DomesticDummy* have the largest coefficients, and *MEBODummy* and *MassDummy* coefficients are smaller, while all are highly statistically significant.[28] *Insert Table 17 about here.*

Thus, the evidence from the dummy variable models is quite consistent with that from the share ownership models: privatization to external investors, whether foreign or domestic, is associated with higher labor productivity growth than privatization to MEBOs or mass program participants; all forms of privatization appear to dominate continued state ownership. While our analysis has shown that these results are robust across a variety of specifications of the estimating equations, a possible objection to the large estimated impact of outside investor ownership is that the sample of observations on this group of firms is relatively small and tends to be concentrated towards the end of the sample period, as we showed in Table 3. But the number of observations is still sufficient to derive meaningful estimates: 395 firm-years for firms dominated by domestic investors, and 128 dominated by foreigners. Of these, 219 of the domestic-dominated firms are for the year 1998 and 176 beforehand, while 77 foreign-dominated observations are for the year 1998 and the other 51 beforehand.[29]

How do our results relate to the findings of other studies? First of all, it should be pointed out that there are almost no comparable studies for Romania. The only other econometric analysis of the effect of privatization in Romania is included in Claessens, Djankov and Pohl's (1997) study of seven transitional countries. For their Romanian subsample, they estimate a positive effect on total factor productivity growth of a dummy for whether a firm was privatized. Their observation period runs only through 1995, by which time little privatization had occurred, however, and they are not able to distinguish different types of private ownership, nor the levels of shareholdings.

---

[28] Estimating Equation (7) with firm fixed effects resulted in a somewhat higher MEBO dummy coefficient (.101), but only trivial differences for the foreign, domestic and mass dummy coefficients relative to Table 10. *OtherDummy* has the largest estimated impact in both the fixed effects and group effects specifications estimated with OLS (although not with LAD), possibly because of the outside investor ownership discussed in footnote 31.

[29] To check whether our results are affected by the relatively short period for the firms privatized through these means in 1998, we re-estimated equations (6) and (7) dropping these firms from the sample, thus including only firms with at least two years of observations under their new ownership structure. This exercise produced results that were qualitatively similar to those in Table 9 and 10, although standard errors were slightly higher.

Indeed there are few comparable studies for other transition economies, as most research in this area has been undertaken with small samples of firms observed only shortly after their privatization process began. Among such studies, Earle (1998) estimates labor productivity equations for about 150 Russian enterprises, finding a positive coefficient on private share ownership; when types of private ownership are disaggregated, OLS regressions show a larger impact of managerial than other types of ownership, but in instrumental variable specifications concentrated outside owners have the biggest impact, consistent with the results shown here. Smith, Cin and Vodopivec (1997) analyze the effect of privatization to employees and foreign investors in Slovenia, finding positive impacts of both on the contemporaneous level of total factor productivity, but the data cover only the very early years from 1989 to 1992 and the regression sample includes very few observations on foreign ownership. Weiss and Nikitin (1998) find a positive impact of ownership by non-fund blockholders on a number of performance indicators, including labor productivity, using data through 1996 on a sample of 697 Czech firms, although they do not estimate the impact of voucher privatization *per se*. Anderson *et al* (2000) is somewhat unusual in finding little effect of privatization in a study of about 150 mass-privatized firms in Mongolia, although again the time span is short (running only through 1995). A final example, Frydman *et al*'s (1999) analysis of around 200 firms in Central Europe, estimates an impact on productivity growth of .043 for a dummy variable representing private ownership and .164 for private domestic financial firms, although neither foreign investors nor private domestic nonfinancial firms have statistically significant effects. Their data run only through 1993, however, making it difficult to draw strong conclusions.

6. Conclusion

The debates over how privatization affects firm performance, which privatization method works best, and which type of owner is the most suited for carrying out restructuring, have been long and heated. Yet there have been remarkably few studies that have analyzed the privatization-performance relationship using panel data from a large sample of firms containing information for periods both before and after

privatization. Indeed, given that privatization policies are typically so prominent and controversial, we know remarkably little about their outcomes in the transition economies: there are few studies for any country of Central and Eastern Europe that provide a comprehensive description of the post-privatization ownership structure and its consequences for firm behavior.

In this paper, we have focussed on a particular form of privatization – management-employee buyout – and we have argued that Romania offers an interesting ground for research for three reasons: First, it has been possible to construct a data set containing high quality and nearly complete information on the privatization process for corporatized industrial enterprises. Second, MEBO privatization was widespread and it involved some interesting institutional set-ups that repay investigation. Third, although MEBOs have dominated overall, variants of the other major types of privatization policies are also represented, resulting not only in firms dominated by employees, but also others with significant stakes held by dispersed outsiders, domestic blockholders, foreign blockholders and the state.

Our analysis of the effects of Romania's privatization policies on industrial enterprises had three components: the ownership structure resulting from privatization, the corporate governance characteristics of privatized firms, and the association of ownership structure with enterprise productivity performance. Our analysis of the ownership results showed that the state retains a dominant role in many Romanian firms: in more than three-quarters, the SOF retained some ownership stake, and the average stake was 46.9 percent within this group. A scant majority (53.8 percent) of the firms originally slated for privatization in 1992 had become majority private by 1998. The most prevalent types of new private owners were employees (23.6 percent on average), buying out their firms through MEBOS, and participants of the Mass Privatization Program (18.2 percent on average). Concentrated outsiders – domestic and foreign – were present in only 476 (20 percent) of the companies, but the average in this group of firms was a majority stake.

Our discussion of the privatization methods and their ownership outcomes highlighted possible corporate governance problems that might have reduced the potential benefits of all methods of privatization in Romania. While it seems plausible

that sales to outside blockholders would be most likely to raise firm efficiency, we have argued that even these investors may be handicapped by contractual restrictions and other impediments to restructuring posed by Romanian policies and the business environment. Concerning MEBOs, our analysis suggests that the impact of employee ownership, relative to continued state ownership, may be reduced by the continued role of the state and certain aspects of the institutional design of the MEBO privatization process. Finally, the highly dispersed ownership structure resulting from the mass privatization suggests that MPP participants may be unlikely to contribute much to corporate governance, although secondary transactions might have created some concentration (which we unfortunately cannot observe).

Despite the corporate governance problems resulting from peculiarities of the privatization policy design, our empirical findings provide substantial evidence that MEBO privatization, as well as the other methods, has had a positive and substantial effect on the growth of labor productivity in Romania. As we have shown, the statistical significance of these effects remain robust across alternative specifications, although the point estimates do fluctuate depending on the estimation method employed. Our work strongly supports the proposition that outsider blockholders are the most effective owners, and that among them, there is some tendency for foreigners to have the largest positive impact on the firms. The estimated regression coefficients on disaggregated outsider owners (MPP participants) and on MEBO participants are also positive and statistically significant, although the point estimates are distinctly smaller than those of the outside blockholders. Thus the data provide evidence that even MEBOs and dispersed outside owners have a positive impact, relative to continued state ownership.

Why we find that the MEBO and MPP privatizations may have yielded improved performance is a subject on which our data permits us only to speculate, but we shall do so nevertheless. First, we should recall that our ownership measures pertain only to the privatization transactions, and we do not observe subsequent secondary sales of shares. Perhaps the employees and other individuals acquiring small quantities of shares through these programs were quick to sell them, and possibly some concentrated owners – outsiders or managers – have emerged and begun restructuring, although we are unable to observe this process. According to our analysis of survey data in Section 3, the evolution

of ownership in MEBO firms has been slow, probably due at least in part to institutional restrictions on share trading, but it may still have been somewhat effective. Second, share prices on secondary sales, particularly in an organized exchange – either the Bucharest Stock Exchange or the over-the-counter RASDAQ could possibly provide additional information to outside blockholders on firm performance, suggesting some complementarity between outside blockholder ownership with dispersed investor trading. Third, perhaps the individuals acquiring shares through the MPP were in fact employees, adding to the concentration of ownership in the MEBO-privatized companies. Fourth, there may be selection bias such that firms with better potential were included in the MEBOs and MPP, as discussed in Section 5 above. Finally, the data may contain measurement error in either labor productivity or (less likely) in the ownership structure variables, creating a spurious correlation. Such measurement error would have to be biased such that MEBO and MPP firms have upward-biased productivity measures, as uncorrelated measurement error would produce simply larger standard errors (for measurement error in productivity) or downward bias in the coefficients (for measurement error in ownership).

In closing, the evidence suggests that privatization through MEBO, despite a number of institutional peculiarities and continued involvement by the state, has been successful in raising productivity growth. While the results also imply that sales to outside investors – whether domestic or foreign – have produced still much better performance, the MEBO privatizations appear to have been much easier to accomplish, particularly for a country so devoid of market institutions and skills, such as Romania in the early 1990s. Perhaps the later investor sales built on a base of privatization through MEBO that would have otherwise been difficult to achieve. Although we cannot say with assurance whether the block sales program would have been able to get off the ground if it were not for the earlier MEBOs, it does seem safe to say that, at least in Romania, privatization to employees did play a useful role in the transition process.

Appendix A: Construction of the Database

A1. Construction of Ownership Time Series

Our analysis is based on unpublished data from multiple sources that we have linked together. The information on the ownership of the initially state-owned joint-stock companies is compiled from seven databases: the SOF (State Ownership Fund) Transactions Database, the SOF Portfolio Database,[30] and one database for each of the five POFs. Table 13 lists the databases, the types of the company they have information on, and the relevant variables for our analysis.

Insert Table 13 about here.

From these sources, we were able to construct a nearly complete evolution of the ownership of all initially state-owned enterprises (except companies excluded from the SOF portfolio, most notably the *regii autonome*, which were not originally slated for privatization). Incomplete information in these files, however, forced us to make a number of assumptions, especially about the date of privatization and about holdings of the POFs, as we discuss below. We should also point out that the SOF has been responsible for privatizing the shares only of joint-stock ("commercial") companies, thus excluding spin-offs of shops or assets from the parent companies. In this appendix, we report the construction of ownership time-series, our imputations when information was incomplete, and cleaning procedures.

Our starting-point in developing the ownership time-series is a data set from the SOF that we call the "Transactions Database." For all share sale transactions carried out by the SOF, this file contains the date, percentage transferred and type of buyer. Four types of buyers can be distinguished in these data: employee association, domestic individuals, domestic institutions, and foreigners. The employee association is the legal group of employees acquiring shares in a MEBO transaction, while the other three types can be assumed to be non-employee outsiders.[31]

This database does not contain, however, companies that had no sales transaction at all. Among such companies are those still 100 percent state-owned, and those privatized only through the Mass Privatization Program. We added these companies from a second SOF source: the "Portfolio Database." This database does not report information on the date of transaction, but this did not present any difficulty in the case of MPP privatization, because all the MPP transfers took place in 1996. The database has additional information on shares transferred directly to managers and "others," which we describe below. After matching the companies with sales transactions with the totally state-owned and the MPP firms, we obtained 8,988 companies, the total number of initially state-owned companies.

The Transactions Database also does not provide information on the status of shares initially transferred to the POFs, 30 percent in each converted joint-stock

[30] Together, they provide information on the ownership structure of over 8,900 companies, all initially state-owned firms which were in the SOF's portfolio. (*Regii autonome* are not included, because they belonged to the branch ministry and later a number of them were transferred to the local authorities, but the SOF never had them in its portfolio).

[31] The data do not allow further disaggregation; for instance, different types of domestic institutions are not distinguishable.

company. Although they have been putatively private since their formation in 1991, we believe it is important to distinguish the POFs from other types of owners, thus the next step in the construction of the time series was to estimate the sales of shares by these organizations. A first step relied on a variable from the portfolio database: the percentage of shares sold by the POFs from 1992 to 1996, before these organizations were transformed into SIFs, as we discuss in Section 2.[32] The number of companies where the POF is reported to have sales is relatively small, 1633. We cleaned the variable first, because there were companies in which the POF is reported to have sold more than 30 percent, which is impossible according to the Romanian privatization laws. If the POF sale was above 35 percent (14 cases), we set the POF sale to zero, while if it was between 30-35 percent (11 cases), we set it to 30 percent, the maximum amount the POF could have owned.

Because the data did not include the transaction date of POF sales, nor the type of buyer, we had to make several assumptions in order to include them in the time-series. First, we assumed that the POF always sold at the same time and to the same buyer as the SOF. Thus, if there were any sales reported in the SOF database between 1992-1996, the POF sales were included there. If the SOF privatized shares of a company on more than one date, or to multiple buyers, the percentage of the shares the POF sold was split among the SOF sales, weighted by the shares transferred by the SOF in each sale. For the majority of firms with POF sales during 1992-96, the SOF also privatized: 87 percent of the firms where the POF did some privatization had also SOF sales. For the firms that did not have SOF sales (212 firms), we distributed the POF sales evenly among the years 1993-1996, and assumed it was bought up by "others," an ownership category where we included all transactions for which the type of buyer was neither reported nor possible to impute.[33] By this procedure, we computed the POF's ownership for the end 1992-1996 by subtracting the total yearly privatization from 30, the percentage of the shares that the POF received initially.

We also estimated the ownership time-series for the SIF holdings (Financial Investment Funds, the organizations into which the POFs were transformed after 1996).[34] We took this information from five portfolio databases (one for each POF). These data were available only for the end of 1998, except in the case of POF Moldova, for which it was provided also for the end of 1997.[35] We combined these information with the POF holdings in 1996, which we already used for the construction of the POF time series before 1996.

We computed the POF holdings in the following way: for the POF holdings in 1996 we used the POF information, and for the few cases when this variable was missing (0.3 percent of total), we made the 1996 POF holding equal with the POF holding which was the closest in time (1997 for POF Moldova, 1998 for the others). For the four POFs which did not have information for 1997, we imputed it by comparing the holdings in

---

[32] Not only is this information on the POF privatization rather incomplete, but the variable itself is incomplete, according to a SOF official.

[33] We did not distribute the POF sales over 1992, because in this year privatization hardly began: except of pilot privatizations (21 firms) and one other took place.

[34] For simplicity, we continue to call them POFs.

[35] Out of the 2825 firms that existed in the POF portfolio data, 179 were not in the SOF database. These may be acquisitions of the POFs other than state-owned companies. We did not add these companies to the time-series.

1996 with those in 1998. If there was no difference between them, the case for 83.0 percent of the companies, we computed the 1997 POF holding as being equal to these holdings. If there was a difference, we computed the POF holding for 1997 as the average of 1996 and 1998 holdings, and we added the difference to the "others" category, where we included all transactions where we did not know the type of owner.

The Portfolio Database contains two more variables representing two types of transactions: managerial shares and "others," as mentioned above. The managerial shares resulted from the Law on the Management Contract (66/93), issued in the second part of 1993, and concern only 400 companies with a mean of only 0.5 percent in this subset. In the absence of further information, we therefore distributed these shares evenly over the years 1994-1998, and summed it with the employee association shares to the MEBOs' share. The "others" variable is positive for 227 companies with a mean of 25.6 percent. According to a SOF official, this variable probably indicates capital increases after privatization, but there is no information on which type of owner acquired these shares. Thus, we cumulated them together with the several types of unknown owners to create a miscellaneous and unknown category, distributing them evenly over 1993-1998.

Due to internal inconsistencies, for a number of cases the sum of the total privatization and the POF holdings by end 1998 exceeded 100 percent. If it was more than 110, we dropped the case (222 companies). If it was between 100-110, we rescaled it to 100. The residual category is state ownership.

A2. Construction of the Performance Variable and Final Sample

We drew the basic firm variables (activity code, number of employees and real value of sales[36]) from the 1992-1999 Romanian Enterprise Registries, which is supposed to contain all registered firms. We built up our database from eight different files, one for each year. Our version of these data are restricted to firms with a minimum of five employees. After adding employment and sales figures to the ownership information, we constructed our final sample by selecting all industrial firms (2354 cases).

Table 14 shows the resulting database, combining the ownership and registry information. The "percentage of firms" refers to the firms with non-missing performance data as a percentage of those with ownership information. Missing values are not a large problem in these data. Table 15 shows the distribution of firms by industrial branch: the largest categories are food industry (21.5 percent), textiles and clothing (14.4 percent) and machine building and transportation equipment (12.9 percent).

Insert Table 14-15 about here.

Appendix B: Description of the Sample Used in Section 3

The sample of firms analyzed in Section 3 was drawn from a list of all firms privatized by MEBO until March 4, 1994. Of 360 companies on the list, 101 were interviewed in 1995 and early 1996, 28 percent of the total. Sample choice strove for

[36] We deflated sales by 4-digit level PPIs, when these were available: out of a total of 367 industrial 4-digit activity codes, 75 are missing for 1993-98. The number of missing PPIs for 1999 is 91. These were replaced by 2-digit CAEN codes. For two types of activities the PPIs were not computed: calculator production (since 1997), and recycling (for all years). In these two cases we used the industry-level PPI.

representativeness along the dimensions of region, industry and size. In 1998, a follow-up survey was carried out to update the information from these firms. The sample follow-up decreased to 72 because of non-responses and liquidations.

References

Aghion, Philippe, and Olivier Blanchard (1996), "On Insider Privatization." *European Economic Reivew*, Vol. 40, pp. 759-66.

Anderson, James H., Young Lee, and Peter Murrell (2000), "Competition and Privatization Amidst Weak Institutions: Evidence from Mongolia." *Economic Inquiry*, Vol. 38(4), 527-49.

Ben-Ner, Avner, and Derek C. Jones (1995), "Employee Participation, Ownership, and Productivity: A Theoretical Framework." *Industrial Relations*, Vol. 34(4), October.

Black, Bernard, Reiner Kraakman, and Anna Tarrassova (2000), "Russian Privatization and Corporate Governance: What Went Wrong?" *Stanford Law Review*, Vol. 52.

Blanchard, Olivier, and Michael Kremer (1997), "Disorganization." *Quarterly Journal of Economics*, CXII, 1091-1126, November.

Bonin, John P., Derek C. Jones, and Louis Putterman (1993), "Theoretical and Empirical Studies of Producer Cooperatives: Will Ever the Twain Meet?" *Journal of Economic Literature*, Vol. 31, 1290-320.

Boubakri, Narjess, and Jean-Claude Cosset (1998), "The Financial and Operating Performance of Newly Privatized Firms: Evidence from Developing Countries." *Journal of Finance*, Vol. 53, 1081-110.

Boycko, Maxim, Andrei Shleifer, and Robert W. Vishny (1994), "Voucher Privatization." *Journal of Financial Economics*, Vol. 35(2), 249-66, April.

Carlin, Wendy, Saul Estrin, and Mark Schaffer (1999), "Measuring Progress in Transition and Towards EU Accession. A Comparison of Manufacturing Firms in Poland, Romania and Spain." CERT Discussion Paper No. 99/22, January.

Carlin, Wendy, Steven Fries, Mark E. Schaffer, and Paul Seabright (2001), "Competition and Enterprise Performance in Transition Economies: Evidence from a Cross-Country Survey." CEPR Discussion Paper No. 2840, June.

Claessens, Stijn, and Simeon Djankov (1999a), "Enterprise Performance and Management Turnover in the Czech Republic." *European Economic Review*, Vol. 43(4-6), 1115-24, April.

Claessens, Stijn, and Simeon Djankov (1999b), "Ownership Concentration and Corporate Performance in the Czech Republic." *Journal of Comparative Economics*, Vol. 27, 498-513.

Claessens, Stijn, Simeon Djankov, and Gerhard Pohl (1997), "Determinants of Performance of Manufacturing Firms in Seven European Transition Economies." Davidson Institute Working Paper No. 74, February.

Conte, Michael, and Jan Svejnar, "The Performance Effects of Employee Ownership Plans." In Alan S. Blinder, ed., *Paying for Productivity*, Brookings Institution, Washington, D.C., 143-81.

Djankov, Simeon (1999a), "The Enterprise Isolation Program in Romania." *Journal of Comparative Economics*, Vol. 27, pp. 281-293.

Djankov, Simeon (1999b), "Restructuring of Insider-Dominated Firms." *Economics of Transition*, Vol. 7(2), 467-79, June.

Djankov, Simeon (1999c), "Ownership Structure and Enterprise Restructuring in Six Newly Independent States." *Comparative Economic Studies*, Vol. 41(1), 75-95.

Djankov, Simeon, and Peter Murrell (2000), "Enterprise Restructuring in Transition: A Quantitative Survey." Draft of April 17.

D'Souza, Juliet, and William L. Megginson (1999), "The Financial and Operating Performance of Newly Privatized Firms in the 1990s." *Journal of Finance*, Vol. 54, 1397-438.

Earle, John S., (1998), "Post-Privatization Ownership Structure and Productivity in Russian Industrial Enterprises." SITE Working Paper, Stockholm.

Earle, John S., and Saul Estrin (1996), "Worker Ownership in Transition." In Roman Frydman, Cheryl W. Gray, and Andrzej Rapaczynski (editors), *Corporate Governance in Central Europe and Russia. Insiders and the State*, Budapest: World Bank and CEU Press.

Earle, John S., and Saul Estrin (1997), "After Voucher Privatization: The Structure of Corproate Ownership in Russian Manufacturing Industry." CEPR Discussion Paper No. 1736, December.

Earle, John S., Roman Frydman and Andrzej Rapaczynski (1993), "Notes on Voucher Privatization Programs in Eastern Europe." In *The New Europe: Evolving Economic and Financial Systems in East and West*, Donald E. Fair and Robert J. Raymond (eds.), Kluwer Academic Press.

Earle John S., and Dańa Sapatoru (1993), "Privatization in a Hypercentralized Economy: The Case of Romania." In John S. Earle, Roman Frydman and Andrzej Rapaczynski, Eds., *Privatization in the Transition to a Market Economy: Studies of Preconditions and Policies in Eastern Europe*. London: Pinter Publishers, and New York: St. Martin's Press.

Earle John S., and Dana Sapatoru (1994), "Incentive Contracts, Corporate Governance, and Privatization Funds in Romania." *Atlantic Economic Journal*, Vol 22(2), 61-79.

Earle, John S., and Álmos Telegdy (1998), "The Results of 'Mass Privatization' in Romania: A First Empirical Study." *Economics of Transition*, Vol. 6(2), 313-32.

Estrin, Saul, Derek Jones and Jan Svejnar (1987), "The Performance Effects of Employee Ownership Plans," *Journal of Comparative Economics*, Vol. 11(1), 40-61, March.

Ellerman, David (1993), "Management and Employee Buy-Outs in Central and Eastern Europe: Introduction." In David Ellerman, editor, *Management and Employee Buy-Outs as a Technique of Privatization*, Central and Eastern European Privatization Network.

European Bank for Reconstruction and Development (2000), *Transition Report 2000: Employment, Skills and Transition*. London: European Bank for Reconstruction and Development.

Frydman, Roman, Cheryl W. 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*, Vol. CXIV(4), 1153-92.

Frydman, Roman and Andzrej Rapaczynski (1994), *Privatization in Eastern Europe: is the State Witherning Away?* Central European University Press, Budapest.

Hansmann, Henry (1990), "When Does Worker Ownership Work? ESOPs, Law Firms, Codetermination, and Economic Democracy." *Yale Law Journal*, Vol. 99, 1749-1816.

Konings, Jozef (1997), "Competition and Firm Performance in Transition Economies: Evidence from Firm Level Surveys in Slovenia, Hungary and Romania." CEPR Discussion Paper No. 1770, December.

Konings, Jozef and Alexander Repkin (1998), "How Efficient are Firms in Transition Countries? Firm-Level Evidence from Bulgaria and Romania." CEPR Discussion Paper No. 1839.

Kornai, Janos (2000), "Ten Years after 'The Road to a Free Economy': The Author's Self-Evaluation." Paper for the World Bank Annual Conference on Development Economics, Washington DC.

Lipton, David, and Jeffrey D. Sachs (1990), "Privatization in Eastern Europe: The Case of Poland." *Brookings Papers on Economic Activity*, Vol. 2, 293-333.

Megginson, William L., Robert Nash, and Matthias van Randenborgh (1994), "The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis." *Journal of Finance*, Vol. 49, 403-52.

Megginson, William L., and Jeffry M. Netter (2001), "From State to Market: a Survey of Empirical Studies on Privatization." *Journal of Economic Literature*, Vol. XXXIX, 321-89.

Munteanu, Costea (1997), "Employee Share-Ownership in Romania: The Main Path to Privatization." In Milica Uvalic and Vaugham, Eds., *Privatization Surprises in Transition Economies: Employee-Ownership in Central and Eastern Europe*, Cheltenham, U.K., and Lyme, N.H.: Elgar.

Negrescu, Dragos (2000), "A Decade of Privatization in Romania." In Christof Ruhl and Daniel Daianu, Eds., *The Economic Transition in Romania: Past, Present, and Future*, Bucharest: World Bank and Romanian Center for Economic Policies.

Piesse, Jenifer, and Colin Thirtle (2000), "A Stochastic Frontier Approach to Firm Level Efficiency, Technological Change and Productivity during the Early Transition in Hungary." *Journal of Comparative Economics*, Vol. 28, 473-501.

Pohl, Gerhard, Robert E. Anderson, and Simeon Djankov (1997), "Privatization and Restructuring in Central and Eastern Europe: Evidence and Policy Options." Working paper, World Bank.

Romanian Development Agency (1997), *Romania Yes – An Investment Guide.*

Roland, Gerard (2000), "Corporate Governance and Transition Economies: Lessons from Transition." Paper presented at the World Bank Annual Conference on Development Economics, Washington DC.

Smith, Stephen C., Beom-Cheol Cin, and Milan Vodopivec (1997), "Privatization Incidence, Ownership Forms, and Firm Performance: Evidence from Slovenia." *Journal of Comparative Economics*, Vol. 25, 158-79.

Stiglitz, Joseph (1999), "Wither Reform? Ten Years of the Transition." Paper presented at the World Bank Annual Conference on Development Economics, Washington DC.

Weiss, Andrew, and Georgiy Nikitin (1998), "Effects of Ownership by Investment Funds on the Performance of Czech Firms." Working paper, Boston University.

Weitzman, Martin (1993), "How Not to Privatize." In Mario Baldassarri, Luigi Paganetto and Edmund Phelps, Eds., *Privatization Processes in Eastern Europe*. New York: St. Martin's Press.

Tables

Table 1: Post-Privatization Ownership Structure, End-1998
(percent ownership conditional on a non-zero share in the firm)

Type of Owner	Mean ownership (percent)	Median ownership (percent)	Number of firms with owner-type	Number of firms with majority ownership
Foreign	56.6	51.0	98	72
Domestic	52.7	42.3	378	173
MEBO	64.9	70.6	858	519
Mass	24.5	18.4	1747	296
Other	10.4	1.2	693	18
POF	20.1	18.6	941	32
State	46.9	50.9	1822	935

Total number of firms: 2354

Notes: MEBO = employees who obtained shares through Management-Employee Buyouts, Mass = individuals who obtained shares within the Mass Privatization Program, Other = owners not classifiable with available information.

Table 2: Evolution of the Ownership Structure
(average percent at year-end)

Type of Owner	1992	1993	1994	1995	1996	1997	1998
Foreign	0.1	0.1	0.2	0.2	0.3	0.9	2.4
Domestic	0.0	0.0	0.4	0.6	2.3	4.1	8.5
MEBO	0.2	3.0	9.6	17.5	21.3	22.1	23.6
Mass	0.0	0.0	0.0	0.0	18.2	18.2	18.2
Other	0.0	0.4	0.8	1.2	1.3	2.1	3.1
Total private	**0.4**	**3.6**	**11.0**	**19.6**	**43.4**	**47.3**	**55.7**
POF	29.8	28.7	26.4	23.9	9.1	8.7	8.0
State	69.7	67.7	62.6	56.5	47.5	44.0	36.3
N.B. Percentage of firms majority private*	0.4	3.3	10.3	18.4	38.7	43.8	53.8

Number of firms: 2354

Notes: MEBO = employees who obtained shares through Management-Employee Buyouts, Mass = individuals who obtained shares within the Mass Privatization Program, Other = owners not classifiable with available information.

*Percentage of firms with more than 50 percent of shares privately owned

Table 3: Distribution of Firms by Largest Owner-Type
(percent of firms at year-end)

Type of Owner	1992	1993	1994	1995	1996	1997	1998
Foreign	0.1	0.1	0.1	0.3	0.3	1.2	3.3
Domestic	0.1	0.1	0.5	0.8	2.1	3.9	9.3
MEBO	0.2	3.0	9.7	17.4	21.5	22.3	24.5
Mass	0.0	0.0	0.0	0.0	13.5	14.0	14.2
Other	0.0	0.0	0.0	0.0	0.2	0.5	1.0
POF	0.0	0.0	0.0	0.0	0.1	0.2	0.2
State	99.6	96.7	89.7	81.6	62.3	58.0	47.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Number of firms: 2354

Notes: MEBO = employees who obtained shares through Management-Employee Buyouts, Mass = individuals who obtained shares within the Mass Privatization Program, Other = owners not classifiable with available information.

Table 4: Ownership Structure, 1995

Type of owner	Mean	Std. dev.	Min.	P10	P25	P50	P75	P90	Max.
INSIDERS, of which	94.8	10.8	50.5	85.4	95.6	99.3	100.0	100.0	100.0
Managers	30.9	20.8	2.0	7.5	13.1	26.2	45.0	59.5	81.4
Non-man. empl.	62.7	22.1	8.9	33.3	45.8	64.6	82.0	91.2	98.0
Non-prod. w.	27.8	20.0	2.6	7.5	13.8	21.6	38.0	54.0	89.5
Prod. w.	34.8	22.7	0.0	4.6	18.0	33.7	49.4	68.0	92.0
Skilled	31.9	22.2	0.0	2.0	15.9	29.7	46.8	66.0	92.0
Unskilled	2.9	6.0	0.0	0.0	0.0	1.0	3.0	7.3	45.0
PAS, not distributed	1.2	6.9	0.0	0.0	0.0	0.0	0.0	0.0	56.9
OUTSIDERS, of which	4.6	9.4	0.0	0.0	0.0	0.9	4.3	13.0	44.9
Retirees, former empl.	0.8	1.5	0.0	0.0	0.0	0.0	1.0	2.7	6.8
Other former empl.	1.0	2.5	0.0	0.0	0.0	0.0	0.4	3.8	13.0
Investors	2.8	8.8	0.0	0.0	0.0	0.0	0.0	7.0	42.0
STATE	0.6	4.7	0.0	0.0	0.0	0.0	0.0	0.0	44.0

Number of firms: 91

Table 5: Ownership Structure 1995, Conditional on Non-Zero Ownership

Type of owner	Mean	Std. dev.	Min.	P50	Max.	No. of firms	Perc. of firms
INSIDERS, of which	94.8	10.8	50.5	99.3	100.0	91	100.0
Managers	30.8	20.8	2.0	26.2	81.4	91	100.0
Non-man. empl.	62.7	22.1	8.9	64.6	98.0	91	100.0
Non-prod. w.	27.8	20.0	2.6	21.6	89.5	91	100.0
Prod. w.	35.2	22.6	0.5	33.9	92.0	90	98.9
Skilled	33.0	21.7	0.5	31.0	92.0	88	96.7
Unskilled	4.4	7.0	0.1	2.0	45.0	59	64.8
PAS, not distributed	18.1	22.1	0.5	8.5	56.9	6	6.6
OUTSIDERS, of which	7.6	11.0	0.1	3.2	44.9	55	60.9
Retirees, former empl.	1.8	1.8	0.1	1.0	6.8	39	43.5
Other former empl.	3.9	3.5	0.3	2.9	13.0	24	27.2
Investors	12.9	15.0	0.5	6.0	42.0	20	22.8
STATE	27.0	24.0	10.0	27.0	44.0	2	2.2
SOF	44.0	na	44.0	44.0	44.0	1	1.1
POF	10.0	na	10.0	10.0	10.0	1	1.1

Number of firms: 91

Table 6: Voting Rights of Insiders

Type of owner	Mean	Std. dev.	Min	p10	p25	p50	p75	p90	Max	Perc. with pos. own.
TOTAL INSIDERS	94.8	10.8	50.5	85.4	95.6	99.3	100.0	100.0	100.0	100.0
Voted individually	58.5	43.5	0.0	0.0	0.0	76.5	100.0	100.0	100.0	71.4
Managers	19.9	22.4	0.0	0.0	0.0	12.5	29.2	53.4	81.4	71.4
Non-man. empl.	38.6	33.6	0.0	0.0	0.0	30.7	72.0	89.6	98.0	71.4
Non-prod. w.	16.9	18.5	0.0	0.0	0.0	12	27.2	41.0	89.5	71.4
Prod. w.	21.6	24.4	0.0	0.0	0.0	13.1	34.5	64.8	92.0	70.3
Skilled	19.7	23.0	0.0	0.0	0.0	12.3	31.5	56.5	92.0	68.5
Unskilled	1.9	4.7	0.0	0.0	0.0	0.0	1.5	5.0	35.0	47.8
Voted by the PAS	36.3	42.8	0.0	0.0	0.0	0.0	93.0	99.4	100.0	45.7
Managers	11.0	16.8	0.0	0.0	0.0	0.0	17.5	37.0	71.9	44.6
Non-man. empl.	24.2	31.4	0.0	0.0	0.0	0.0	45.8	82.0	94.4	44.6
Non-prod. w.	10.9	18.4	0.0	0.0	0.0	0.0	17.8	32.0	88.7	44.6
Prod. w.	13.2	20.5	0.0	0.0	0.0	0.0	26.0	44.0	81.0	43.5
Skilled	12.2	19.5	0.0	0.0	0.0	0.0	25.0	40.2	79.3	41.3
Unskilled	0.9	2.9	0.0	0.0	0.0	0.0	0.1	1.8	19.1	26.1

Number of firms: 91

Table 7: Voting system of the PAS

Voting arrangement	Percent of firms
One vote per member	43.6
Votes according to the subscribed shares	56.4

Number of firms: 101

Table 8: Average Voting Rights within Types of Owners

	Mean	Std. dev.	Min.	p10	p25	p50	p75	p90	Max.	Perc. with pos. own.
Employees, of which	1.3	1.4	0.0	0.1	0.4	1.0	1.7	3.6	7.1	69.0
Managers	6.3	7.2	0.0	0.7	2.1	4.5	7.5	13.3	39.0	65.0
Non-man. empl.	0.9	1.1	0.0	0.1	0.3	0.6	1.1	2.5	5.5	65.0
Non-prod. w.	1.9	2.4	0.0	0.2	0.5	1.1	2.4	4.5	14.4	65.0
Prod. w.	0.7	0.8	0.0	0.1	0.2	0.4	0.7	1.7	3.6	65.0
Skilled	0.7	0.8	0.0	0.1	0.2	0.4	0.7	2.0	3.6	63.0
Unskilled	0.4	0.5	0.0	0.0	0.1	0.3	0.5	1.0	2.3	43.0
Within PAS	1.0	1.1	0.0	0.1	0.3	0.6	1.3	2.8	5.0	46.0
Managers	4.0	4.0	0.1	0.6	1.4	2.1	6.4	10.7	15.0	41.0
Non-man. empl.	0.8	0.9	0.0	0.1	0.2	0.4	1.2	1.8	4.3	41.0
Non-prod. w.	2.4	6.4	0.0	0.1	0.3	0.7	1.4	4.8	39.7	41.0
Prod. w.	0.6	0.8	0.0	0.1	0.2	0.3	0.8	1.5	4.3	41.0
Skilled	0.7	0.8	0.0	0.0	0.2	0.4	0.8	1.6	4.3	39.0
Unskilled	0.5	0.7	0.0	0.0	0.1	0.2	0.5	1.9	2.8	24.0
Outsiders, of which	1.5	3.3	0.0	0.0	0.2	0.5	1.4	2.9	21.0	59.0
Retirees, former empl.	0.6	0.9	0.0	0.0	0.1	0.3	0.9	1.7	4.4	43.0
Other former empl.	0.7	0.8	0.0	0.1	0.1	0.4	0.8	1.7	3.0	25.0
Investors	5.5	9.5	0.1	0.2	0.2	1.2	5.4	18.0	38.0	21.0

Note: Number of firms: 100. Voting rights per capita defined as the percentage of shares over the number of persons in the ownership category.

Table 9: Aggregate Holding of Four Largest Holders, Managers and Non-Managerial Employees

Type of owner	Mean	Std. dev.	Min.	P10	P25	P50	P75	P90	Max.
Managers	28.1	22.1	0.0	5.0	10.0	21.0	45.0	62.3	84.0
Non-man empl	11.0	8.6	1.0	3.0	5.0	8.6	14.0	23.2	42.0

Number of firms: 99

Table 10: Length of Contractual Restrictions

Restriction	Mean	Std. Dev.	Min.	Median	Max.	Percent of firms in 1998
Change in employment	2.1	1.4	0	2	8	7.6
Change in major activity	4.9	2.1	0	5	10	6.1
Sale of assets	5.5	1.9	0	6	10	6.6

Number of firms: 101. The length of restriction is measured in years. The last column shows the percentage of the 66 firms in the 1998 sample that still had restrictions.

Table 11: Ownership Structure in 1998

Type of owner	Mean	Std. dev.	Min	P10	P25	P50	P75	P90	Max	Perc. with pos. own.	Cond. mean
INSIDERS, of which	87.5	24.6	0.0	48.0	85.3	100.0	100.0	100.0	100.0	98.6	88.8
Managers	29.2	24.0	0.0	2.8	7.5	20.0	50.8	65.0	98.0	95.7	30.5
Non-man. empl.	58.5	27.2	0.0	20.7	39.0	60.0	84.3	93.0	97.6	97.1	60.3
OUTSIDERS, of which	12.2	24.7	0.0	0.0	0.0	0.0	14.7	52.0	100.0	33.3	36.7
Banks	0.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0	11.8	1.4	11.8
SIF	0.4	1.6	0.0	0.0	0.0	0.0	0.0	0.0	9.0	7.2	5.4
Firms	4.5	18.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0	8.7	51.6
Individuals	5.5	12.8	0.0	0.0	0.0	0.0	0.0	23.0	57.3	20.3	29.0
Foreigners	1.7	9.3	0.0	0.0	0.0	0.0	0.0	0.0	73.0	5.8	29.6
STATE	0.2	1.3	0.0	0.0	0.0	0.0	0.0	0.0	10.0	5.8	3.8

Number of firms: 69. The last column shows the mean conditional on positive ownership.

Table 12: Degeneration of Employee Ownership, 1995 to 1998

	1995		1998	
Type of owner	Mean	Std. dev.	Mean	Std. dev.
INSIDERS, of which	94.5	10.7	87.2	25.7
Managers	20.7	23.8	26.6	25.3
Non-managerial employees	37.6	33.5	42.1	32.5
PAS	36.1	43.9	18.6	36.9
Managers	11.7	17.9	2.8	10.3
Non man. emp	23.3	30.8	16.0	32.7
OUTSIDERS, of which	5.4	10.2	12.6	25.8
STATE	0.2	1.3	0.2	1.3

Number of firms: 62

Table 13: Summary Statistics for Employment, Real Sales and Labor Productivity

		1992	1993	1994	1995	1996	1997	1998	1999
Employment	Mean	1154.3	1045.5	898.9	836.1	788.9	733.8	622.2	514.4
	Std. Dev.	1778.0	1707.1	1587.2	1558.8	1908.7	1451.6	1266.8	1083.8
Real sales	Mean	2072.1	2328.0	1864.1	1962.2	1908.7	1750.6	1477.2	1256.8
	Std. Dev.	5188.2	7931.6	7980.2	9096.5	8481.6	9132.1	8413.3	6310.0
Labor productivity	Mean	2.07	2.01	1.69	1.87	1.89	1.73	1.71	1.86
	Std. Dev.	2.87	2.75	2.38	2.47	2.39	2.32	2.69	2.49
Productivity growth	Mean	NA	0.43	-0.90	0.28	0.39	-0.03	0.06	0.24
	Std. Dev.	NA	4.22	0.62	2.30	12.75	0.48	0.99	1.16
Number of firms		1931	1924	2048	2050	2108	2129	2134	2139

Notes: Real value of sales expressed in thousands of 1992 lei. Productivity growth expressed in proportions.
NA: not applicable.

Table 14: Productivity Growth by Largest Owner

	State	Private	Foreign	Domestic	MEBO	Mass
Mean	-0.024	0.012**	0.178**	0.118**	-0.007	-0.014
(t-stat)		(4.03)	(2.79)	(4.73)	(1.75)	(0.64)
N	10857	3670	113	353	13028	11752

Notes: Firm-year observations. "State" and "Private" refer to majority ownership, while the disaggregated private ownership categories refer to largest shareholding. Absolute value of t-statistics in parentheses test the difference of means of each private owner type relative to majority state. Labor productivity growth is measured as the log of the ratio of labor productivity for year t to that for year t-1. Ownership is measured at end of year t-1. ** = significant at 1 percent level.

Table 15: Pre-Privatization Productivity Growth by Future Owner-Type

	Never majority private	Private after year t	Foreign after year t	Domestic after year t	MEBO after year t	Mass after year t
Mean	-0.032	-0.012	0.008	-0.013	0.000	-0.033
(t-stat)		(1.75)	(1.55)	(0.98)	(1.91)	(0.06)
N	4526	3207	320	812	966	929

Notes: Firm-year observations included only if state was largest owner in the given year. Absolute value of t-statistics in parentheses test the difference of means of each largest owner type relative to never majority private. Labor productivity growth is measured as the log of the ratio of labor productivity for year t to that for year t-1. Ownership is measured at end of year t-1.

Table 16: Estimated Impact of Types of Owners on Productivity Growth

	Estimation method					
	OLS		Median		Fixed effects	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
ForeignShare	0.423**	0.101	0.274**	0.046	0.352**	**0.072**
DomesticShare	0.319**	0.048	0.276**	0.027	0.403**	0.040
MEBOShare	0.161**	0.017	0.114**	0.011	0.178**	0.021
MassShare	0.174**	0.034	0.108**	0.023	0.190**	0.036
OtherShare	0.263**	0.074	0.179**	0.053	0.300**	0.106
POFShare	0.167**	0.040	0.114**	0.030	0.264**	**0.047**
R^2	0.150		0.079		0.350	

Number of observations: 14,532.

Notes: Dependent variable = labor productivity growth. R^2: R-sq for OLS, pseudo R-sq for median regression, R-sq within for fixed effects. Robust standard errors for OLS. All regressions include controls for previous performance, employment size and year effects. OLS and median regressions also include controls for region (6 categories) and industry (14 categories). ** = significant at 1 percent level.

Table 17: Estimated Impact of Largest Owner-Type on Productivity Growth Using Group Effects

	Estimation method			
	OLS		Median	
	Coeff.	Std. Error	Coeff.	Std. Error
ForeignEver	0.083**	0.022	0.048**	0.020
DomesticEver	0.032*	0.015	-0.003	0.013
MEBOEver	0.062**	0.013	0.036**	0.011
MassEver	0.000	0.014	0.001	0.012
OtherEver	0.040	0.051	0.083*	0.036
POFEver	0.040	0.052	0.060	0.073
ForeignDummy	0.191**	0.072	0.140**	0.040
DomesticDummy	0.157**	0.033	0.159**	0.024
MEBODummy	0.055**	0.016	0.042**	0.014
MassDummy	0.082**	0.021	0.060**	0.018
POFDummy	0.113	0.096	0.048	0.117
OtherDummy	0.261**	0.101	0.097	0.073
R^2	0.451		0.079	

Number of observations: 14,532.

Notes: Dependent variable = labor productivity growth. R^2: R-sq for OLS, pseudo R-sq for median regression, R-sq within for fixed effects. Robust standard errors for OLS. All regressions include controls for previous performance, employment size and year effects. OLS and median regressions also include controls for region (6 categories) and industry (14 categories). ** = significant at 1 percent level. * = significant at 5 percent level.

Table 18: Sources of the Data

Database	Companies in the Database	Relevant Variables
SOF Transactions Database	All sales that the SOF completed since the beginning of its activity by 1999:I.	Date of transaction County Percent of shares transacted Book value of the firm Method of privatization Type of buyer
SOF Portfolio Database	Surviving population of companies in the SOF portfolio.	County Industry code Percent owned by the SOF Percent sold by the POF by the end of the MPP Percent owned by the POF after the MPP Percent owned directly by managers Percent owned by "others" Percent distributed in the MPP
POF Crisana-Banat	Companies with POF holding in December 1998.	POF holding in December 1998
POF Moldova	Companies with POF holding in 1997 and 1998.	POF holding in December 1997 and 1998
POF Muntenia	Companies with POF holding in 1998.	POF holding in December 1998
POF Oltenia	Companies with POF holding in 1998.	POF holding in December 1998
POF Transilvania	Companies with POF holding in 1998.	POF holding in December 1998
Romanian Enterprise Registry 1992-1999 (one database for each year)	All registered enterprises with at least 5 employees at the end of the given year.	County Industry Sales Number of employees

Note: firm ID included in all databases

Table 19: Number of Firms with Complete Ownership, Employment and Sales Data

Year	1992	1993	1994	1995	1996	1997	1998	1999
Number of firms	1931	2074	2115	2134	2179	2183	2202	2168
Percent of firms	82.0	88.1	89.8	90.7	92.6	92.7	93.5	92.1

Total number of firms: 2354

Table 20. Distribution of Firms by Industry

Industry	Number of firms	Percent of firms
	Percent of firms	
Extraction, energy, water supply	131	5.6
Food	509	21.6
Textiles, clothing	338	14.4
Leather, footwear	53	2.2
Wood, paper	108	4.6
Polygraphy	76	3.2
Chemistry, plastics, rubber	159	6.8
Ceramics	151	6.4
Metallurgy	69	2.9
Metallic constructions	186	7.9
Machine building and transportation equip.	300	12.7
Electrical and optical equip.	83	3.5
Furniture and other unclassified	146	6.2
Recycling	45	1.9
Total	**2354**	**100.0**