Political Selection of Firms into Privatization Programs.

Evidence from Romanian Comprehensive Data[*]

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Abstract

Exploiting a unique institutional feature of the early Romanian privatization setup, when a group of firms was explicitly barred from any privatization, we test how politicians select firms into privatization. Using comprehensive data that includes all firms inherited from socialism, we estimate the relation between pre-privatization firm characteristics – the information known to politicians at the time of decision making – and the effect of privatization on employment, efficiency and wages. With the estimated coefficients we simulate the effect of privatization on non-privatizable and privatizable firms separately, including in the latter group both actually privatized and not privatized enterprises. The simulations show that politicians expected privatization to increase the employment of the privatizable group by 7 – 10 percent, and to decrease it in the non-privatizable group by 10 – 30 percent, depending on the first-stage estimation method, OLS or matching combined with OLS. We do not find such discrepancies in the expected change in firm efficiency; the simulated efficiency effect of privatization is large and positive for both groups of firms, and it 52 – 65 percent for non-privatizable, and 41 – 43 percent for the privatizable firms. The analysis does not support the hypothesis that wages played an important role in privatization decisions. Our study suggests that employment concerns played the key role in selecting firms for privatization, even if efficiency gains had to be sacrificed.

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1. Introduction

The effects of privatization on firm behavior have stimulated a large amount of research (Megginson and Netter; 2001; Djankov and Murrell, 2002; Estrin et al., 2009), but the selection of state owned enterprises (SOEs) into privatization programs, which is the precondition of privatization, has received much less attention. Nevertheless, in the recent years there have been a small, but growing number of studies focusing on the motivations of politicians and bureaucrats materialized in decisions about allowing or banning firms to become private, or of sequencing of privatization.[1] This paper contributes to this literature by analyzing Romanian firm-level data to assess the relative importance of three factors that most likely played a crucial role in selecting firms into privatization programs: efficiency enhancement of the old socialist production sector and two factors directly influencing workers' well being, employment and wages.

A peculiar institutional feature of the Romanian privatization program permits us to distinguish between SOEs that were slated to or banned from becoming private. In 1990, in advance of launching any privatization program, the Romanian government selected about 370 SOEs and prohibited their transfer to private owners. The ban was lifted more than seven years later, after the left-wing party governing between 1990 and 1996 lost the elections.[2] This feature permits the unambiguous separation of firms slated for privatization from those that the government decided to keep in long term ownership, even if the privatizable firms were not actually privatized. Indeed, our data reveal how important the ex-ante separation of privatizable and non-privatizable companies is: only one-quarter of the privatizable group was actually privatized by the end of the political cycle we study.

To assess politicians' objectives, we propose an alternative method to those papers that have analyzed this question with the help of microeconomic data (listed in footnote 1). Instead of estimating the effects of pre-privatization characteristics on the probability of being selected into the privatizable group (or on sequencing of privatization), we use information on the effect of actual privatizations on firm behavior and simulate the

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[1] Bortolotti et al. (2003) provide a cross-country analysis of the factors that influence privatization decisions. Gupta et al. (2008) test sequencing in Czech privatization, Huyghebaert and Quan (forthcoming) analyze sequencing of SIPs in China. Guo and Yao (2005), De Fraja and Roberts (2008), Dinc and Gupta (2005) and Liu and Woo (2007) analyze which factors influenced the selection of firms into privatization programs in China, Poland and India, respectively.

[2] We have to set the time span over which politicians were interested in the effects of privatization. The political cycle is a natural choice for this time period: as politicians are interested in reelection, they arguably want to maximize public welfare around the time of elections. During this period the government changed several times, but the leading party and its symbolic figure, President Iliescu, was in office throughout the whole period.

relationship between pre-privatization firm characteristics and the effect of privatization on both privatizable and non-privatizable firms. First, we estimate how the effect of privatization on employment, firm efficiency and wages varies in function of pre-privatization firm characteristics – the information known to politicians when they decided which firm could be transferred into private ownership. To describe the firms before privatization, we use a large set of variables, including employment, value of total assets, firm efficiency, wages, the share of exports in revenues, and the share of overdue payments in revenues (in a number of specifications we also allow for selection on unobservable firm attributes). Then we use the estimated partial effects to simulate the employment, efficiency and wage effects of privatization for the privatizable and non-privatizable firms separately (including in the first group both actually privatized and not yet privatized firms). The comparison of the simulated effects for the two groups of firms indicates that those firms, which were expected to shed employment as a consequence of privatization were sheltered from privatization programs even though their expected efficiency increase was large. The simulated wage effects are very small for the two groups, suggesting that wage effects of privatization did not play a major role in privatization decisions.

We believe that this method has several advantages over the ones used in earlier research, but it also has drawbacks. Its main benefit is that we do not have to make conjectures about the relation between pre-privatization characteristics and the effects of privatization, as we estimate these relations directly from the data. The method's main disadvantage is that it hinges upon the assumption that the effect of privatization has the same pattern across privatizable and non-privatizable firms, a common assumption in simulation exercises. Although we control for many pre-privatization characteristics and their interactions in the first-stage regressions as well as for unobserved heterogeneity, we still cannot be sure that this assumption holds. We also have to assume that politicians have rational expectations and they foresee what would happen to SOEs after privatization conditional on their pre-privatization characteristics. While we acknowledge these shortcomings, we believe that this method is a useful complement to those used in other papers which analyze the political selection of firms.

Besides the new method, another difference between this paper and the ones written so far is the economic environment in which privatizations took place. The four countries studied so far – China, the Czech Republic, India and Poland – did not have massive employment declines when privatization decisions were made. Romania differs from these countries as employment fell by about ten percent between 1992 and 1996, the period of

interest of this paper (Romanian Statistical Yearbook, 1997). It is likely that politicians faced different constraints in such economic environment than in countries which did not experience large employment reductions.

A possible shortcoming of the analysis is that it focuses on only three objectives, while others, such as revenue maximization, reputation concerns or bribe collection might also have played a role in privatization decisions. The potential importance of these factors notwithstanding, we argue that the design of the early Romanian privatization program was such that these objectives were of secondary importance, as we discuss in the next section in length. The institutional setting of early Romanian privatization therefore helps us to assess the importance of the expected effect of privatization on firm efficiency, employment and wages in the objectives of politicians, and the results are not contaminated by the exclusion of other objectives which we cannot, or at least cannot directly take into account because of lack of data on privatization prices or bribes.

In the next section we discuss politicians' objectives in privatization programs and their relevance in the Romanian context. Section 3 presents the data and the institutional setting of the early Romanian privatization. The simulation method is discussed in Section 4, followed by the results in Section 5. The last section concludes.

2. Political Objectives in Privatization Programs

How do politicians choose which firms to privatize? While economists have frequently recommended privatization as a tool for firm restructuring and depolitization, the designers of privatization programs act in response to a much broader set of political objectives and face a number of constraints.

An expected advantage of privatization is the efficiency improvement of SOEs, which has been modeled (e.g., Sappington and Stiglitz, 1987; Schmidt, 1996) and tested empirically (e.g., Megginson et al., 1994; Brown et al., 2006). This effect may come about through several channels, such as hardening the budget constraint of privatized firms or boosting the direct interest of the new owners in profits (Asaftei et al., 2008; Boycko et al., 1996). Politicians assess the efficiency improvement of firms positively for several reasons. First and perhaps most important, only efficient firms are viable, especially if privatization is accompanied by deregulation of markets and therefore an increase in the competitive pressure on firms (as happened in many developed countries, and also in the early years of transition). Second, efficiency improvement may result in increased revenues for the state budget through increased corporate taxes, or sales taxes if the firm grows and boosts up revenues.

Hard budget constraints – the reduction of state transfer to loss making SOEs – also decrease the burden on the state budget.[3] Increased tax revenues are useful for politicians as they can be used to pursue social or political objectives, including tax reductions, support of the welfare system or investments in infrastructure, all having positive effects on chances of reelection.

Employment and wages, two variables that have a direct effect on voter well-being, may also be choice variables for politicians, either for equity reasons or vote maximization (as these two are observationally equivalent, we do not distinguish between them). If privatization results in layoffs and declining real wages, it will have a negative effect on worker welfare (at least in the short run) and also on the number of votes that can be collected by the governing parties in the following election. Empirical studies do not support the idea of massive employment and wage reductions after privatization (e.g., Brown et al., forthcoming; Megginson et al., 1994), but the ex ante expectations of researchers and policy makers seem to have been quite negative. Theoretical papers suggest that employment and wages are likely to fall after privatization (Boycko et al., 1996; Haskel and Szymanski, 1993), and politicians might well be inclined to believe this opinion. Megginson (2005, p. 389), for example, notes that "all governments fear lay-offs resulting privatization." These suggest that despite the lack of hard evidence on the negative employment and wage effects of privatization, loss of jobs and wages was a serious concern of politicians and it is likely to have shaped privatization policies. The reluctance to privatize firms with high chances of employment or wage declines can be exacerbated by incumbent employees' reactions, who may resist privatization for fearing the loss of their job (Druk Gal and Yaari, 2006). This fear need not be realistic – it is enough if workers expect this to be the result of privatization (Lipton and Sachs, 1990). If the economy is in recession – as it was in Romania in the studied period – the political cost of employment reduction may be large. Ceteris paribus, the reduction of employment or the wage bill also has a negative effect on fiscal stance, because of lower income and payroll tax revenues and higher social transfers associated with unemployment.

Other political objectives influencing privatization decisions include revenues resulting from the sale of enterprises, another income for the state budget (Bortolotti et al.,

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[3] Bortolotti et al. (2003) establish the relation between privatization and high public debt and fiscal deficit. Gehlbach (2007) shows how the need for tax revenues alters the government's attitude towards the new economic sector in a transition economy, if the ability to collect taxes differs between this and the old socialist sector.

2003). Politicians may also use firms to bestow political patronage (López-de-Silanes et al., 1997). Instead of maximizing the state budget, they may maximize their own wealth by collecting bribes (Shleifer, 1998). The need to make reforms attractive to investors and the population might also play a role in delaying or banning certain types of firms from becoming private: if the government predicts that the privatization of certain firms would involve large costs, it might be a good strategy to delay or explicitly forbid their transfer to private hands in order not to undermine support for reforms.[4]

In this paper we focus only on efficiency, employment and wage considerations of politicians. In the Romanian context, however, the limited number of objectives does not seem to us to be a large drawback. First, these objectives are among the most important ones that induced governments to privatize or keep firms in state ownership not only in Romania but all over the world, although other factors discussed above also influence privatization decisions. It is possible that these factors also played a role in the Romanian case, but we argue that they were of secondary importance in the early privatization process and not taking them into account may bias the results only to a small extent. Out of all privatizations involving firms with at least 10 employees, about 90 percent of privatizations completed between 1992 and 1996 were management-employee buyouts (MEBOs).[5] In this privatization program the shares of the SOEs were sold to their employees at highly subsidized prices, usually involving a loan from a state-owned bank at negative real interest rates (Earle and Telegdy, 2002). Most privatizations, therefore, did not bring any revenues to the government. Bribes might have been paid in order to influence privatization decisions, as investors could make side payments for lower share prices, and the management of the company might also paid politicians not to let the company be sold to outside investors, in which case the management would have faced the threat of being replaced by the new owners. It is unlikely, however, that such bribes played a dominant role in the case of a MEBO privatization where the role of outside investors was small. It is also unlikely that reputation concerns played an important role in the Romanian case, as only a small fraction, about 30 percent of the privatizable firms ended up in private hands by 1996, the end of the first political cycle. To study revenue and bribe considerations of politicians directly, we

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[4] See Dewatripont and Roland (1995). Earle and Gehlbach (2003) analyze how participation in the Czech Mass Privatization Program affected the support of the population for the reformist government. Huyghebaert and Quan (forthcoming) show that reputation concerns were important determinants in the selection of SOEs to Chinese SIPs.

[5] Firms that were sold directly to outside investors were small, the employment size of the median firm being only 36 in 1992.

would need to measure privatization prices and bribes, which we cannot do due to lack of available information. To test reputation concerns, information on the privatization price is also necessary as both the quality of the company and the price asked for it determine the likeliness of privatization. The fact that factors that we cannot measure – revenue considerations, bribes and reputation concerns – are unlikely to have played an important role during the period we study, makes it less likely that our estimates are contaminated with omitted variable bias.

3. Data and Institutional Background

3.1 Data construction

In this paper we use data from two years, 1992 and 1996. The year of 1992 is the first year when firm-level data are available. Privatization barely started in this year, so the information can be considered pre-privatization for most of the firms. In our sample only 12 firms were privatized, most of them in the last two months of the year, showing that the data from the first year of the analysis is contaminated by privatization effects to a very small extent.[6] 1996 is the end of the first political cycle, and it is thus a natural choice for the end of the period we study. Non-privatizable SOEs were assigned a special legal form (called *Regii Autonome* in Romanian), and we use this variable to distinguish privatizable and non-privatizable firms.

Our data come from several sources. The value of sales, employment, the value of overdue payments, net income, the wage bill and the value of tangible assets were drawn from the Ministry of Finance dataset, which provides information for most firms inherited from the communist regime in 1992, and for all Romanian enterprises for 1996. Industry classification and legal form of firms were drawn from the Romanian Enterprise Registry, a comprehensive database of all Romanian enterprises. Employment and sales were also available in these data, and we used the two sources to clean these variables by comparing their values across sources and their evolution in time. Other cleaning procedures involved the removal of spurious changes in the industry code and legal form. As with any large panel data, these also suffer from spurious entry and exit of firms, as well as reregistrations without firm boundary changes (in which case the firm appears in the data as a new entity). We improved the longitudinal links by looking for possible connections for each entering and

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[6] If the managers of the SOEs foresaw privatization, there may be a pre-privatization effect already in 1992 which may bias the results (Aghion et al., 1994; Roland and Sekkat, 2000).

exiting firm with at least 50 employees. For this procedure, we used firm name, industry, region and size. Many of the firms, however, were reorganized during the four years we study, which resulted in split-ups and other boundary changes. We are not able to follow these firms across time and therefore we cannot include them in the analysis. Sales and net income were deflated by two-digit implicit deflators to reflect the price changes faced by firms, while wages by the consumer price index to filter out price changes affecting workers' welfare.

The main source of ownership data is the State Ownership Fund (SOF) Transactions Database, which has information on the year of transaction, percent of ownership transferred and the type of buyer for each privatization transaction of about 6,000 SOEs for the period of 1992-1996. Some of these firms were inherited directly from the socialist period while others were created by using the assets of these firms. Those firms from the SOF portfolio that had no privatization transactions were identified with the help of another database, which contains the ownership structure of the firms in 1996. For those firms which were not part of the SOF portfolio, we used the ownership information from the Romanian Enterprise Registry, which indicates whether the firm was 100 percent, majority or minority state-owned, or totally private. Using all this information on the ownership structure of the firms, we constructed a dummy variable for each year indicating whether the firm was majority private or majority state-owned.

From the resulting dataset we selected those firms which existed in both 1992 and 1996 and had any indication of state ownership (either existed in the SOF portfolio or the ownership dummy from the Romanian Enterprise Registry indicated state ownership). In order to compare privatizable and non-privatizable firms which are as similar as possible, we kept in the analysis only those 2-digit industries by the NACE classification which contain at least one non-privatizable and one privatized firm.[7] We also dropped firms with employment less than ten and more than 36,000, as the non-privatizable set does not have firms smaller than 10 (123 firms) and the largest employment size of the privatizable firms is 35,655 (2 firms). The 3,079 firms left in the data consist the target population for the analysis. We dropped those firms which had missing values for the variables included in the analysis (238 firms). We also removed those firms for which the data indicated that their labor productivity or wages increased (decreased) 10 times between 92 and 96 (45 observations). The final

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[7] The NACE codes of these industries are 22, 24, 36, 40, 41, 45, 51, 52, 55, 60, 63, 64, 70, 73, 74, 90, and 92. Agriculture contained 5 non-privatizable firms, but their share in the industry did not reach 0.05 percent, and hence we excluded this industry from the analysis.

dataset contains 2,796 firms. In some robustness checks we replace labor productivity with return on assets (net income over the value of tangible assets) and in this case the sample size is 2,310. We also check whether our results are sensitive to sample construction.

3.2 Selection of Firms into the Privatization Program

Similarly to other countries from the region, the reorganization of SOEs in Romania started with their corporatization. Already in 1991, before launching any privatization program, about 8,300 SOEs were reorganized as joint-stock companies; the shares of about 6,000 were transferred in a 70-30 percent ratio to the portfolios of the organizations that were responsible for their privatization: the State Ownership Fund (SOF) and one of the five Private Ownership Funds.[8] About 2,300 SOEs remained under the supervision of branch ministries. These firms were mostly small (in our data their median employment size is only 22 in 1992), but some large firms were also left in this group. The privatization of the firms in this second group started quite early and many of them became private. We do not include them in a separate category, but group them together with the firms in the SOF portfolio and consider them all privatizable (but we check whether our results change if we exclude them from the analysis).

A number of companies were not corporatized, and transfer of their ownership to private owners was explicitly prohibited. These firms, called *Regii Autonome*, remained under the supervision of the relevant branch ministries. The declared criteria upon which firms were selected into the non-privatizable group are rather vague: according to Law 15 on State Enterprise Reorganization (1990), "(*Regii Autonome*) are organized and operate within the economy's strategic branches…as well as in other fields of activity established by the Government" (Art 2). The law therefore left considerable discretion to politicians and state bureaucrats to decide which firms to render privatizable and which not. This is crucial for our analysis, as we draw conclusions about politicians' objectives by comparing the *Regii* with the privatizable enterprises.

The non-privatizable group was not numerous, but the companies included were large on average. In 1992, in the data including all firms there are 365 such firms with average employment size over 3,000. The number of employees working in these firms was over one

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[8] The Private Ownership Funds (POFs) were founded by the government and they were responsible for transferring the shares of the companies from their portfolio directly to the population in a voucher privatization program. In practice they were quite passive, as they did not have any real decision making power since they possessed only a minority of the shares of the companies in their portfolios. For this reason, we consider the POF shares as state owned. For a discussion of the POFs, see Earle and Telegdy (1998).

million, which makes up 20 percent of total SOE employment. The share of the non-privatizable firms in the total sales of SOEs was also 20 percent, while their share in the total state-owned assets was much larger: their total capital made up as much as 44 percent of the capital of all SOEs in 1992.

As discussed in the previous section, there were many reorganizations taking place between 1992 and 1996, and many of the firms – among them non-privatizable – exit the data. We can follow between 1992 and 1996 169 non-privatizable and 2,627 privatizable firms, as Table 1 shows. Non-privatizable firms are indeed concentrated in branches that are often considered "strategic." Almost one-third of them are in the energy sector, another one-third in water distribution, 15 percent in transportation, and 6.5 percent in utilities. Each of these economic branches, however, contains a significant proportion of privatizable firms, and other sectors of the economy, such as manufacturing, construction and services also have non-privatizable firms. Therefore, despite that economic branch had a large weight in the selection process of firms into privatization programs, it was not the only factor as industry itself does not entirely explain the selection of firms into privatizable and non- privatizable groups.

Table 1 also presents the descriptive statistics of the variables of interest. In 1992, the first year in the data, the average employment size of the non-privatizable firms from our sample is 1,402, while that of privatizable firms is 457. The mean difference is significant at the one-percent level. Total assets show an even larger size difference than employment, as on average, non-privatizable firms have more than 11 times more assets than privatizable firms. Average wages (the firm's total wage bill divided by the number of employees) were very similar in the two groups of firms. Measured by labor productivity (defined as the ratio of value of sales to average employment), privatizable firms were about twice as productive. Return on assets (the ratio between net income and the value of assets) is 1.4 percent for non-privatizable and 4.3 percent for the privatizable group on average. The share of exports in the firm's revenues is also larger in the privatizable firms by about 3 times. The ratio of payments overdue to the value of sales is over 10 percent in the non-privatizable firms, and 7 percent in the privatizable ones.[9] The difference in means across the two groups of firms of these variables is significantly different from zero for all variables but wages, and mostly at the one-percent level, the two exceptions are export share and labor productivity, for which the mean difference is significant only at the 5- and 10-percent level, respectively. The

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[9] This variable exists only in 1993, and it includes overdue payments to suppliers and creditors, as well as overdue tax payments.

comparison of the unconditional means therefore suggests that pre-privatization firm size, efficiency (measured by either labor productivity or ROA), exporting and overdue payments played a role in the selection of firms into privatization programs, while wages did not. It is also important to mention that despite the large differences in the mean values of employment and firm performance variables, the distributions of employment and productivity overlap across the two groups of firms.[10]

To take the effect of all variables into account at the same time, we estimate a probit specification similar to those used in other studies (De Fraja and Roberts, 2008; Gupta et al., 2008; Liu et al., 2007). The dependent variable indicates whether the firm is privatizable or not, and the regressors are firm characteristics in 1992 (employment, wage, labor productivity, return on assets, the ratio of payments overdue to sales) as well as two-digit industry dummies.[11] The hypothesis that the estimated coefficients of all regressors are jointly equal to zero is rejected by the Wald test at any level of significance, providing support that these variables indeed played a role in the selection of firms into privatization. Table 2 shows that employment size had a negative effect on the probability of being in the privatizable group: the estimated coefficient is negative and highly significant. The firm at the 10th percentile of the employment distribution has a 0.3 percent chance to be in the non-privatizable group, while this probability is 4.4 percent for the firm at the 90th percentile (the other variables being set at their means). ROA had a positive effect on being in the privatizable group, while labor productivity did not have any effect. The estimated coefficients for the other regressors are not different from zero in statistical terms. The efficiency result is similar to the finding of Gupta et al. (2008) and Dinc and Gupta (2007), but Dinc and Gupta (2007) find that larger firms are more likely to be privatized in India. The result that wages are not a determinant of the selection of firms into privatization is also at odds with Dinc and Gupta (2007) and Liu et al. (2007).

The privatization process started quite late in Romania. Although the Law of Privatization was passed in mid-1991, privatization of enterprises gained speed only in 1993-94. We consider a firm as being privatized by 1996 if it became majority private in 1995 or

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[10] The 75th percentile of the employment distribution of privatizable firms is larger than the employment size of the median non-privatizable firm, and the 25th percentile of the non-privatizable employment distribution is smaller than the median privatizable firm's employment. The same applies to the distribution of labor productivity.

[11] We do not include capital in this regression, as it is strongly correlated with employment and both measure firm size. Unlike in this specification, we cannot include two-digit industry controls in the first-step regression in the simulation analysis, as the non-privatizable and the actually privatized companies have different industrial composition.

before, to permit privatization to take its effect on firm behavior. By this criterion, 683 firms from the sample were privatized, which make up 26 percent of the privatizable firms. The overwhelming majority of privatizations by 1996 were MEBOs – in the sample used in this study over 90 percent of the firms were sold by this method.

4. Empirical Method

We use information on privatization outcomes to simulate the effect of privatization on the privatizable and non-privatizable firms separately. First we establish the relation between the effect of privatization and the 1992 characteristics of the firms – the information available to policy makers when deciding which firm to become privatizable and which not. The estimation equation used to obtain the effect of privatization as a function of pre-privatization firm characteristics is the following:

$$\Delta y_{92\text{-}96,i} = \beta_0 + \beta_1 X_{92,i} + \beta_2 PO_i X_{92,i} + \beta_3 PO_i + \varepsilon_i, \qquad (1)$$

where i indexes firms, $\Delta y_{92\text{-}96}$ is the 1992-1996 change of the variable of interest, which is log employment, efficiency (measured as labor productivity) and average wage. $PO = 1$ if the firm was majority privatized by the end of 1995, and zero otherwise, $X_{92,i}$ is a vector of firm i's 1992 characteristics and ε_i is the residual. In particular, X_{92} includes log employment, total capital, efficiency, average wage, the share of exports and payments overdue in the firm's total sales and industrial dummies. For the estimation of the industry effects, we need to have enough privatized firms in each industry category included in the regression, and also non-privatizable ones in the second step, when we do the simulation of the privatization effects. As neither of these groups are very numerous, we control for rather broad industrial categories in the first stage regression, and include three dummies: construction, transportation and other services, the omitted category being the group of industrial firms (in a robustness check we include two-digit industry controls). In order to allow a flexible functional form between pre-privatization firm characteristics and the effect of privatization, we also include in X_{92} interactions between industry dummies and all the other variables, and interactions between the variables themselves. As a robustness check, we also include squared terms of the continuous variables.

It is crucial for the estimation what we assume about the information set of the politicians at the time of decision making, and we employ two approaches. First, the identifying assumption is that decision makers used only observable pre-privatization characteristics of SOEs to infer the effects of privatization on firm behavior. This seems to us a realistic assumption: given the large number of firms to decide about, it is unlikely that

decision makers had more information on firms than what was shown in firms' books. In accordance with this assumption, we estimate the first step regression by ordinary least squares (OLS), which does not take into account the effect of unobservable firm characteristics. We cannot be sure, however, whether politicians indeed used only observable firm characteristics in the selection process for at least two reasons. First, they might have indeed used unobservable firm characteristics, despite the large number of firms they had to deal with. Second, politicians might have foreseen that private investors select firms based on unobservable characteristics, and buy only those firms that have larger potential for growth or those that do not need massive restructuring which involves layoffs.[12] If they were aware of this selection process, they could also take it into account when they selected firms into privatization.

To control (at least partially) for such selection effects, in our second approach, we use nearest neighbor matching with replacement before running the first stage regression, and in the probit regression which computes the propensity score we include the 1992 values of the dependent variables, to account for the unobservable variation of these variables across firms. More specifically, the dependent variable in the probit regression is a dummy indicating whether the firm was privatized by 1995, and the set of explanatory variables are the 1992 value of the following: log employment, capital, labor productivity, average wage, return on assets, net income, export share and overdue payments in firm revenues, and two-digit industries (overdue payments are available only for 1993).

Having obtained the estimated effects of the pre-privatization firm-level variables on post-privatization outcomes, we construct the counterfactual of the effect of privatization for each firm by multiplying pre-privatization characteristics with the estimated effects, and compare the average hypothetical privatization effect between non-privatizable and privatizable firms (including in the latter group both the actually privatized and the not privatized ones). In particular, with the help of the estimated parameters from equation (1) we compute the simulated effect of privatization between 1992 and 1996 for each firm separately:

$$\Delta \hat{y}_i = \hat{\beta}_2 X_{92,i} \qquad (2)$$

Then we construct the average difference between non-privatizable and privatizable firms (the privatizable group including both privatized and not yet privatized companies):

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[12] On the selection of firms by future owners see, e.g., Brown et al. (2006, forthcoming).

$$\Delta^2 \hat{y} = \Delta \overline{\hat{y}}^{NPRIV} - \Delta \overline{\hat{y}}^{PRIV} \,. \tag{3}$$

This statistic shows the difference in the hypothetical effects of privatization between the two groups, and we use it to assess the motivations of decision makers. This method permits us to jointly analyze the employment, efficiency and wage effects of privatization, which in turn allows us to draw conclusions on the relative importance of these variables in politicians' objectives. If, for example, $\Delta^2 emp < 0$ and $\Delta^2 eff > 0$, this would imply that politicians were more concerned about the employment effects of privatization than about efficiency gains, as they blocked the privatization of those firms that were expected to have negative employment effects subsequent to ownership change, even if these firms would have gained efficiency as a consequence of privatization.

5. Results

The Relation between Initial Firm Characteristics and the Privatization Effect

Table 3 presents the estimated coefficients of the first-step regression with OLS, using Equation 1. In the table we present only the coefficients of the interaction terms between privatization and initial firm characteristics, the partial effects used in the simulation (the coefficients of the variables without interactions with privatization are presented in Appendix Table A1). Many of the estimated effects are statistically insignificant, but the F-statistics show that the estimated effects are jointly significant. To start with the employment growth regression, the overall privatization effect is negative, but it greatly varies by industry – the interaction terms between privatization and industry dummies have various magnitudes. Initial size (measured by employment or value of capital) has a negative effect on privatization-induced employment growth. Initial employment size has the smallest negative effect among industrial firms, and the largest in other services, while initial capital size hampers privatization-induced growth the most in industry, and it has a positive effect in construction (the effect is statistically significant). Pre-privatization efficiency has a negative effect on employment growth, while wages have a positive effect in all economic sectors with the exception of other services.[13] The share of exports in revenues, usually considered as a proxy for firm quality, is positively correlated with employment growth and the estimated coefficient is large and significant, perhaps because the presence of the firm in international markets allows expansion. Contrary to export share, the share of overdue payments in

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[13] The apparent contradiction that high wages are associated with faster employment increase can be explained by wages being correlated with the quality of the workforce, and firm expansion may be easier if the workers are of high-quality type.

revenues is negatively correlated with the effect of privatization on employment growth (these coefficients are also statistically significant). The three-way interactions show that large and capital intensive firms are less likely to grow, while large and efficient firms tend to grow further if they are privatized. The composite effects of employment-wage and employment-export share are negative, and of employment-overdue payments is positive. Ceteris paribus, high wage firms with large capital endowment and overdue payments increase their employment after privatization, while those with high wages and exports share decrease it. Finally, large firms which are present in the international markets increase their employment as a consequence of privatization.

The effects of pre-privatization firm characteristics on the privatization-induced efficiency enhancement are shown in Column 2 of Table 3. The estimated coefficient of the privatization dummy is large, and its interactions with economic activity reveal that this effect is positive in all sectors of the economy (as the difference between the main privatization effect and the interactions with industry dummies is always positive). Initial employment and capital size have negative effects on productivity growth: large firms are probably harder to turn over. Ceteris paribus, initial efficiency affects positively the effect of privatization on efficiency growth in three out of four industrial categories (the effects are significant in transportation and other services), while initial wages have a negative effect on efficiency growth. The effect of exporting is positive in all industries except for other services, but the effects are not different from zero statistically, except in the case of other services. Overdue payments have a negative effect on the efficiency effect of privatization, with the exception of transportation firms, the only significant coefficient. The interaction terms between employment and the other continuous variables mostly have a negative estimated effect, with the exception of employment-export share, where the effect is large and negative. Interactions with initial efficiency show that firms with large initial capital size and high level of efficiency or overdue payments experienced smaller efficiency growth. The wage-capital, wage-overdue payments and export share-capital interactions have all large, positive estimated effects, while high wage exporting firms have a smaller privatization effect, ceteris paribus.

The regression results for the final dependent variable, change in the average wage are shown in Column 3 of the table. The overall privatization effect is negative in each economic branch and the main effect is statistically significant. Initial employment size has a significantly positive effect on privatization-induced wage growth, while initial capital size has a negative effect. Efficiency and initial wages are positively correlated with the wage

effects of privatization (the coefficients are significant for most industries). Export share and overdue payments, on the contrary, have negative effects. The interactions between the continuous variables show that those interactions where employment is present all have small estimated coefficients. This also applies for the interactions with efficiency, with the exception of efficiency-export share interactions, where the estimated effect is positive. Finally, high wage firms with large overdue payments also have a larger wage growth than other firms.

After running the first step regression with simple OLS, we turn to the specification that takes into account not only the initial observable, but also unobservable firm characteristics. The estimated coefficients of the probit regression are presented in Table 4, and they show that the probability of being privatized does not depend on employment size, but capital size affects it negatively. More efficient firms – measured by both labor productivity, return on assets or the share of exports – are more likely to be privatized, which demonstrates cherry picking of the future private owners. Wages also play a positive role in the selection of firms into privatization, while the amount of profits and overdue payments do not.

Having estimated the propensity score, we perform a nearest neighbor matching with replacement.[14] The absolute value of the normalized difference between privatized and control firms of the regressors in the probit equation is always smaller than 0.06, which shows that the two sets of firms are statistically similar pre-treatment (Imbens and Wooldrige, 2009). On the matched sample we run Equation (1), which now takes into account selection on unobservables. The estimated coefficients for employment, productivity and wage growth are presented in Table 5. The signs of the partial effects of the initial firm characteristics on privatization induced employment growth have the same sign as in Table 3 for many interactions, except for the following: initial employment size and efficiency have positive effects, as well as overdue payments. Employment interacted with export share also has a positive effect, while wages interacted with overdue payments have a negative partial effect. Turning to the determinants of the productivity effect of privatization, the results based on the matched sample are different from the simple OLS estimations for the overall privatization effect (as the effect is smaller), for initial capital size (the effect is larger), for wages (the

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[14] To improve the overlap in covariate distributions, we follow the method developed by Crump et al. (2009), and compute the parameter under (over) which the propensity score is too close to zero (one) to provide a good fit. In these data the parameter is 0.094, and we drop the firms which propensity score is less than 0.094 or more than 0.906.

effect becomes positive), and for overdue payments, which are strongly positive in this estimation. Employment-wage and wage-export share interactions both have a positive effect on efficiency growth, while employment-overdue payments, efficiency-export share, and wage-overdue payments have all negative estimated coefficients. The coefficients of the wage equation are the most similar to the estimated effects with simple OLS. In this case only the effect of export share is different, which turns positive.

   Simulation of the Effect of Privatization

       With the help of these estimated effects we compute the expected effect of privatization for the non-privatizable and privatizable groups and the mean difference between these effect, using Equations 2 and 3. The results, presented in Table 6 show that if politicians chose firms to be privatized by only looking at observable characteristics, they believed that transfer of all privatizable firms into private hands would have increased their employment by 7 percent, while the non-privatizable firms would have suffered a loss of 30 percent. The diverse privatization effect on employment is further underlined by the high statistical significance of the mean difference between the two groups. Contrary to the employment effect, the expected efficiency effect of privatization is positive for both privatizable and non-privatizable groups. The simulated efficiency increase for the non-privatizable firms is almost 65 percent, and for the privatizable ones 43 percent. The simulated effect of privatization on the growth rate of wages is one percent in the non-privatizable group and less than half percent among privatizable firms. Although the difference between them is statistically significant, the magnitude of the simulated wage effect is so small that it is likely that wages did not play an important role in the privatization decisions of politicians. When we take into account selection on unobservables in the first step regression, the results are similar qualitatively, but the magnitudes differ. The simulated employment effect of privatization drops to -10.4 percent in the non-privatizable group and it increases to 10.8 percent in the privatizable group. The efficiency effect of privatization declines for both groups of firms, but they are still large and positive: 52.4 percent for the non-privatizable, and 41.5 percent for the privatizable group. The simulation of the wage effects of privatization remains essentially unchanged. To summarize, the simulations show that politicians were more concerned with the negative effect of privatization on employment than with efficiency improvement, and they protected labor even if they had to sacrifice substantial productivity gains. Wages do not seem to play an important role in the selection of firms into privatization programs.

The expected employment reduction of the non-privatizable group is large not only in proportions but also in absolute terms. The total employment of non-privatizable firms was over one million in 1992. If we apply the expected employment effect of privatization on the whole group, the number of jobs destroyed after privatization would have been about 100 or 300 thousand. This is large, compared for example with the number of unemployed in the national economy, which was 790.9 thousand in 1996 (International Labour Organization Databases). The aggregate statistics also provide support for the result that politicians were more concerned about job losses than wage declines: between 1992 and 1996 the number of employed persons fell by ten percent (from 10,458 thousand to 9,379 thousand), while average real wages did not change (Romanian Statistical Yearbook, 1997, p. 125 and 176).

To test the robustness of our results, we compute the hypothetical effect of privatization for several different samples and specifications. As a first check, we replace labor productivity with return on assets (ROA). Corporate taxes, and therefore government revenues are tied to profits and it is possible that profits were in the utility function of politicians instead of labor productivity. Profits, however, are not very reliable, especially in early transition and for this reason our preferred variable is labor productivity (we prefer labor productivity also because profits in 1996 are missing in a larger number of firms than labor productivity). Second, we exclude overdue payments from the first stage regression, as they are available only in 1993 and thus this variable might be contaminated with privatization effects. Third, to allow for more flexibility in the first-stage regression, we include squared employment, capital, efficiency, wages, export share, and overdue payments both in levels and interacted with privatization.

We also test whether changes in the sample affect the results. First, we exclude firms that were under the subordination of the ministries and therefore their status regarding privatizability is unclear, as discussed in Section 3.2. Second, we drop those firms that were privatized already in 1992 and thus the first year of the study might be contaminated with privatization effects. Third, we add back firms to the sample which were removed because they were outliers in productivity or wages, or due to size restrictions. We also included two digit industry controls (but we kept the original interactions between industries and the continuous variables unchanged), to test whether the results are driven by the aggregated industrial categories we use in the first stage. Finally, we control whether strategic industries drive the results, and we drop all firms from energy and water distribution, those two economic sectors which contain about 60 percent of non-privatizable enterprises.

The difference of the simulated effect of privatization between non-privatizable and privatizable firms for these robustness checks is shown in Table 7, and they demonstrate that the results do not change qualitatively after these modifications: the expected employment effect is always smaller for the non-privatizable firms than for the privatizable ones, the efficiency effect is almost always larger, and wage effects are very similar. It is worth mentioning that in all of the 16 robustness checks the simulated employment effect is always negative for non-privatizable, and positive for the privatizable firms with the sole exception of the specification when we control for two-digit industries and perform matching in the first step. In this regression the employment effect is negative for both groups of firms, but even in this case, when the estimates are very noisy, the simulated employment effect is much smaller for non-privatizable than for privatizable companies.

One potential problem of this analysis is that the simulated differences between the privatization effect for the non-privatizable and privatizable groups are driven by selection into privatization. Although we control for many pre-privatization characteristics and for selection bias as well, we cannot rule out the possibility that selection drives the results, and the difference in the privatization effect is not between privatizable and non-privatizable firms but between actually privatized and not privatized firms. For example, as most of the new owners in the privatized firms in Romania are the employees of the firm, it is possible that they bought up those firms in which maintaining the employment level was easy. In this case the difference in the simulated privatization effects may not arise between the privatizable and not-privatizable firms, but between the privatized and not privatized ones. To investigate this possibility, we disaggregate the privatizable group into privatizable, but not privatized and actually privatized firms, and rerun the simulations. Indeed, the results in Table 8 show that the two privatizable groups differ, as the privatized firms have a larger employment growth and smaller efficiency growth than the privatizable, but not privatized firms (the mean difference in the effects is shown in Appendix Table A3). Nevertheless, the simulated privatization effects of the two privatizable groups are always employment enhancing and the efficiency effects are positive and large for each group, while the simulated wage effects are very small. Therefore, our base results hold for privatized and not-yet privatized firms separately.

6. Conclusions

Privatization has been one of the most important policies that shaped the economies of many countries in the last three decades. Taking advantage of comprehensive data and the

fact that a group of state-owned firms was explicitly barred from privatization in Romania, we analyzed the prerequisite for privatization: the political selection of firms into privatization programs. We apply simulation methods to estimate the expected employment, efficiency and wage effects of privatization on the political sorting of firms into privatization programs. Taking advantage of the actual privatizations, we first estimate the effect of privatization as a function of firm-level pre-privatization characteristics with OLS and nearest neighbor matching combined with OLS, to take into account selection on unobservable firm attributes. With the estimated effects we simulate the privatization effect for privatizable and non-privatizable firms, and find that employment concerns were of primary importance, even if efficiency gains had to be sacrificed. The expected employment effect of privatization is negative for the non-privatizable and positive for the privatizable group, the magnitude being -30 and -10 percent for the first, and 7 or 11 percent for the second group, depending on the first-stage estimation method. Efficiency increase, on the contrary, is large and positive in both groups of firms. Wages do not seem to have played a role in the political selection of firms into the privatization program, as the simulated effects are very small, regardless of firm status. These results are robust to different specifications in the first step regression, to the use of different measures of firm efficiency, and to various samples of firms.

While our results are very robust, several factors may weaken them, which we list below. The crucial assumption in the simulation is that firms that have not become private would have behaved in the same way as privatized firms should they have been privatized. This is a common problem in any simulation study, and we tried to mitigate it by augmenting the regression with different cross-terms to control for observable characteristics as well as possible, and we also try to account for unobserved heterogeneity. Nevertheless, we cannot be sure how successful we were in controlling for observed and unobserved firm attributes. When we disaggregate the privatizable group into privatized and not privatized, the main results hold, which provides some evidence that this bias is probably not very large, at least it does not affect qualitatively the analysis of political selection of firms into privatization programs.

Second, the privatizations are mainly MEBOs, and it is questionable how the results can be applied to privatization methods that lead to more conventional ownership structures, such as firms controlled by outside investors. It is indeed likely that firm behavior under the control of the management and employees is different from outside ownership (Bonin et al., 1993; Earle and Estrin, 1996). In particular, it is possible that the employee-owners would sacrifice efficiency increase if it caused employment reduction, while this behavior is less

likely to happen in an enterprise controlled by outside investors. On the other hand, if outside owners are more efficient in reducing the overall cost level of the firm, this may contribute to employment increase through the scale effect. Furthermore, if they are more entrepreneurial and expand the firm's markets, this may also increase their demand for labor. Therefore, it is unclear a priori what the effects of privatization are in the case of sales to outside owners and how they relate to MEBO privatizations. Empirical evidence on MEBO privatization is also scarce.[15] For the analysis of the political selection of firms into privatization it is more important, however, that if decision makers foresaw that privatizations will mostly be MEBOs, they could use this knowledge when selecting firms into privatization. In the case of Romania there is some evidence that the early privatization program was prepared to be mostly MEBO. In a pilot privatization program launched in 1992, out of the 22 companies finally privatized, 15 were exclusively and 4 partially MEBOs (Earle and Telegdy, 1998). Nevertheless, we cannot be sure that decision makers knew this already in 1991, when they selected firms into privatization programs.

The analysis, similar to previous research, provides evidence that privatization is a political process and that efficiency enhancement is only one of the factors which influence the decisions of politicians when they select firms into privatization programs. In Romania, where jobs were destroyed and employment fell in the whole country, politicians sensed the large political costs of further job destruction; their main concern was not the efficiency enhancement of firms but the preservation of employment at any price.

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[15] Two papers that synthesize our knowledge about the effects of privatization (Estrin et al., 2009; Djankov and Murrell, 2002) state that the effect of insider ownership on firm performance is mostly positive in Central and Eastern European countries, but the effect is usually insignificantly different from zero. The only evidence for the effects MEBO privatization in Romania is in Earle and Telegdy (2002), who find that firms transferred to its employees increased labor productivity, but the effect is smaller than of outsider privatization. Frydman et al. (1999) conclude that insider privatization does not enhance productivity, while outside privatization does, and there is only weak evidence that the employment levels are different at firms under the two ownership structures. Smith et al. (1997) study the productivity effects of insider ownership in Slovenia, and find that insider ownership increases total factor productivity (but the effect is not significant).

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Table 1: Non-Privatizable and Privatizable Firm Characteristics in 1992

	Non-privatizable	Privatizable	Mean difference
Employment	1,402	457	945***
	(288.9)	(17.9)	(101.6)
Total Capital	21,107	1,814	19,294***
	(5,870.6)	(137.6)	(1,580.5)
Wage	290	303	-13
	(10.8)	(3.3)	(13.2)
Labor productivity	2,092	4,066	-1,973*
	(318.3)	(283.0)	(1,118.9)
Return on Assets	0.014	0.043	-0.029***
	(0.005)	(0.002)	(0.008)
Export share	0.014	0.034	-0.021**
	(0.006)	(0.003)	(0.011)
Payments overdue	0.103	0.070	0.033***
	(0.011)	(0.003)	(0.012)
Industry			Percent non-privatizable
Manufacturing	7	255	2.7
Energy	51	28	64.6
Water distribution	49	13	79.0
Construction	7	524	1.3
Transportation	25	506	4.7
Utilities	11	12	47.8
Other services	19	1,288	1.5
Total	169	2,627	6.0

Notes: Mean difference represents the difference between the average value of non-privatizable and privatizable firms. Labor productivity and wages are measured in thousands of 1992 Lei, total capital is measured in millions of 1992 Lei. NACE codes included in industries: manufacturing (22, 24, 36); energy (40); water distribution (41); construction (45); transportation (60, 63, 64); utilities (90); other services (51, 52, 55, 70, 73, 74, 92). *** = significant at the 1-percent level; * significant at the 10-percent level.

Table 2: Selection of Firms into Privatization Programs

Variable	Coefficient
Employment	-0.012***
	(0.002)
Wage	-0.001
	(0.007)
Labor Productivity	-0.005
	(0.004)
ROA	0.059**
	(0.031)
Export share	0.007
	(0.017)
Payments overdue	0.022
	(0.017)
Mean privatizable	0.940

Notes: N = 2,796. Probit estimates, the coefficients show marginal effects at the means of the regressors (robust standard errors in parenthesis). Dependent variable = 1 if the firm is privatizable, = 0 if not. The variables are from 1992 except for overdue payments which is from 1993. The regression includes two-digit industry controls. Pseudo R^2 = 0.220. Excluded industrial dummy: industry. *** = significant at the 1-percent level; ** = significant at the 5-percent level.

Table 3: Effect of Pre-Privatization Characteristics on Privatization Outcomes

	Δ Employment	Δ Efficiency	Δ Wage
Private (PO)	-0.526	4.587	-0.756*
	(8.103)	(6.012)	(0.425)
Construction*PO	-0.353	0.982	-0.040
	(3.704)	(2.492)	(0.162)
Transportation*PO	-1.863	-4.128	0.231
	(4.272)	(2.778)	(0.218)
Other services*PO	3.936	-2.216	-0.157
	(3.510)	(2.247)	(0.172)
Employment*PO	-0.085	-0.280	0.106
	(1.298)	(0.921)	(0.071)
Employment* Construction *PO	-0.083	0.135	0.028***
	(0.159)	(0.137)	(0.009)
Employment* Transportation *PO	-0.164	0.243	0.035***
	(0.246)	(0.153)	(0.012)
Employment* Other services*PO	-0.235	0.064	0.017**
	(0.146)	(0.120)	(0.008)
Capital*PO	-0.223	-0.481	-0.122**
	(0.946)	(0.670)	(0.056)
Capital * Construction *PO	0.327**	-0.083	-0.015
	(0.133)	(0.117)	(0.010)
Capital * Transportation *PO	0.186	-0.167	-0.028***
	(0.172)	(0.121)	(0.011)
Capital * Other services*PO	0.162	0.058	-0.003
	(0.107)	(0.087)	(0.007)
Efficiency*PO	-0.249	-0.072	0.121**
	(0.972)	(0.684)	(0.051)
Efficiency* Construction *PO	-0.393	0.286	0.012
	(0.246)	(0.218)	(0.023)
Efficiency* Transportation *PO	0.121	0.540**	0.039**
	(0.263)	(0.211)	(0.016)
Efficiency* Other services*PO	0.049	0.416***	0.025**
	(0.150)	(0.146)	(0.010)
Wage*PO	0.441	-0.143	0.113**
	(0.977)	(0.755)	(0.053)
Wage* Construction *PO	0.213	-0.441	-0.017
	(0.467)	(0.343)	(0.028)
Wage* Transportation *PO	0.063	-0.046	-0.066**
	(0.611)	(0.400)	(0.032)
Wage*Other services*PO	-0.495	-0.201	-0.014
	(0.411)	(0.292)	(0.022)

Table 3 continued

	Δ Employment	Δ Efficiency	Δ Wage
Export share*PO	11.008**	0.992	-0.111
	(5.022)	(4.512)	(0.260)
Export share * Construction *PO	1.279	0.263	-0.028
	(1.345)	(1.146)	(0.054)
Export share * Transportation *PO	0.326	-0.039	0.015
	(0.578)	(0.418)	(0.036)
Export share *Other services*PO	1.772*	-1.641**	-0.099*
	(0.981)	(0.800)	(0.058)
Overdue*PO	-9.632**	-0.508	-0.342
	(4.371)	(3.904)	(0.267)
Overdue * Construction *PO	-2.071**	-0.347	0.034
	(0.933)	(0.722)	(0.055)
Overdue * Transportation *PO	-0.401	2.251**	0.006
	(1.125)	(1.082)	(0.106)
Overdue *Other services*PO	-1.250	0.254	0.017
	(0.843)	(0.623)	(0.058)
Employment*Capital*PO	-0.039**	-0.003	0.000
	(0.017)	(0.016)	(0.001)
Employment*Efficiency*PO	0.143***	0.044	-0.000
	(0.038)	(0.036)	(0.003)
Employment*Wage*PO	-0.083	-0.018	-0.015
	(0.157)	(0.113)	(0.009)
Employment*Export share*PO	0.036	-0.394*	0.005
	(0.283)	(0.230)	(0.020)
Employment* Overdue *PO	0.283	0.010	-0.011
	(0.258)	(0.222)	(0.015)
Efficiency*Capital*PO	-0.047**	-0.058***	-0.001
	(0.021)	(0.022)	(0.002)
Efficiency*Wage *PO	-0.020	-0.034	-0.016***
	(0.113)	(0.079)	(0.006)
Efficiency*Export share*PO	-0.177	0.036	0.032*
	(0.239)	(0.216)	(0.017)
Efficiency *Overdue*PO	0.221	-0.240	-0.017
	(0.184)	(0.176)	(0.011)
Wage*Capital*PO	0.066	0.120	0.016**
	(0.113)	(0.082)	(0.007)
Wage*Export share*PO	-1.289**	-0.300	-0.014
	(0.578)	(0.537)	(0.032)
Wage *Overdue*PO	0.847	0.250	0.056*
	(0.572)	(0.514)	(0.032)
Export share*Capital*PO	0.149	0.449**	-0.005
	(0.194)	(0.200)	(0.015)
R^2	0.239	0.367	0.352

Note: N = 2,796. The dependent variables are log differences between 1992 and 96. The regressions include all variables without interaction with privatization (the coefficients and standard errors are reported in Appendix Table A1). Robust standard errors in parentheses. *** = significant at the 1-percent level; ** = significant at the 5-percent level; * = significant at the 10-percent level.

Table 4: Selection of Firms into Privatization

Variable	Coefficient
Employment 92	0.015
	(0.013)
Capital 92	-0.071***
	(0.011)
Efficiency 92	0.097***
	(0.016)
Wage 92	0.080***
	(0.030)
Return on Assets 92	0.203**
	(0.090)
Net Income 92	-0.000
	(0.000)
Overdue Payments	-0.053
	(0.052)
Export Share	0.213***
	(0.070)
Mean Privatized	0.244

Notes: $N = 2{,}796$. Probit estimates, the coefficients show marginal effects (robust standard errors in parenthesis). Pseudo $R^2 = 0.152$. Dependent variable = 1 if the firm is privatized by 1995, = 0 if not. Controls for two-digit industrial dummies added. *** = significant at the 1-percent level; ** = significant at the 5-percent level.

Table 5: Effect of Pre-Privatization Characteristics on Privatization Outcomes Matched Sample

	Δ Employment	Δ Efficiency	Δ Wage
Private (PO)	-18.194	2.461	-1.028
	(11.288)	(11.953)	(0.846)
Construction*PO	1.048	-3.387	-0.122
	(4.952)	(4.476)	(0.282)
Transportation*PO	6.638	-10.780**	-0.134
	(5.627)	(5.046)	(0.413)
Other services*PO	6.260	-6.568	-0.238
	(4.883)	(4.325)	(0.313)
Employment*PO	1.032	-1.378	0.102
	(1.462)	(1.585)	(0.112)
Employment* Construction *PO	-0.219	0.122	0.032***
	(0.190)	(0.168)	(0.012)
Employment* Transportation *PO	-0.458*	0.047	0.021
	(0.269)	(0.226)	(0.016)
Employment* Other services*PO	-0.524***	-0.021	0.021*
	(0.183)	(0.160)	(0.012)
Capital*PO	-0.932	0.055	-0.124
	(1.254)	(1.082)	(0.081)
Capital * Construction *PO	0.208	0.010	-0.005
	(0.180)	(0.149)	(0.013)
Capital * Transportation *PO	0.222	-0.006	-0.006
	(0.207)	(0.181)	(0.015)
Capital * Other services*PO	0.232	0.119	0.001
	(0.156)	(0.127)	(0.010)
Efficiency*PO	1.406	0.701	0.172
	(1.481)	(1.367)	(0.105)
Efficiency* Construction *PO	-0.105	0.449*	0.015
	(0.313)	(0.263)	(0.028)
Efficiency* Transportation *PO	0.244	0.866***	0.023
	(0.318)	(0.323)	(0.023)
Efficiency* Other services*PO	0.153	0.656***	0.020
	(0.212)	(0.196)	(0.015)
Wage*PO	2.625**	0.411	0.151
	(1.331)	(1.427)	(0.100)
Wage* Construction *PO	-0.021	-0.063	-0.017
	(0.597)	(0.606)	(0.042)
Wage* Transportation *PO	-0.872	0.544	-0.016
	(0.708)	(0.692)	(0.058)
Wage*Other services*PO	-0.707	0.175	-0.003
	(0.553)	(0.572)	(0.039)

Table 5 continued

	Δ Employment	Δ Efficiency	Δ Wage
Export share*PO	4.982	-3.441	0.033
	(7.452)	(6.499)	(0.456)
Export share * Construction *PO	-0.001	2.195**	0.004
	(1.023)	(1.118)	(0.075)
Export share * Transportation *PO	0.274	-0.971	0.030
	(0.617)	(0.650)	(0.047)
Export share *Other services*PO	0.564	-2.669**	-0.065
	(1.135)	(1.130)	(0.065)
Overdue*PO	10.368	9.549	-0.133
	(10.931)	(8.298)	(0.494)
Overdue * Construction *PO	-1.751*	-2.577***	-0.077
	(1.044)	(0.901)	(0.083)
Overdue * Transportation *PO	-3.359**	0.783	-0.052
	(1.318)	(1.321)	(0.139)
Overdue *Other services*PO	-0.362	-1.592*	-0.001
	(1.039)	(0.922)	(0.084)
Employment*Capital*PO	-0.032	-0.006	0.000
	(0.023)	(0.022)	(0.002)
Employment*Efficiency*PO	0.164***	0.017	-0.001
	(0.044)	(0.046)	(0.004)
Employment*Wage*PO	-0.233	0.141	-0.014
	(0.178)	(0.186)	(0.013)
Employment*Export share*PO	-0.156	-0.359	0.012
	(0.375)	(0.471)	(0.027)
Employment* Overdue *PO	0.195	-0.304	-0.023
	(0.314)	(0.282)	(0.019)
Efficiency*Capital*PO	-0.066***	-0.008	0.000
	(0.025)	(0.026)	(0.002)
Efficiency*Wage *PO	-0.244	-0.178	-0.023*
	(0.171)	(0.158)	(0.012)
Efficiency*Export share*PO	-0.108	-0.144	0.029
	(0.419)	(0.410)	(0.030)
Efficiency *Overdue*PO	-0.054	-0.449	-0.046***
	(0.260)	(0.277)	(0.016)
Wage*Capital*PO	0.179	0.013	0.015
	(0.149)	(0.128)	(0.010)
Wage*Export share*PO	-0.609	0.373	-0.041
	(0.815)	(0.775)	(0.055)
Wage *Overdue*PO	-1.205	-0.350	0.074
	(1.222)	(1.071)	(0.060)
Export share*Capital*PO	0.266	0.488	0.004
	(0.303)	(0.373)	(0.024)
R^2	0.278	0.440	0.300

Note: N = 1,403. The dependent variables are log differences between 1992 and 96. The regressions include all variables without interaction with privatization (the coefficients and standard errors are reported in Appendix Table A2). Robust standard errors in parentheses. *** = significant at the 1-percent level; ** = significant at the 5-percent level; * = significant at the 10-percent level.

Table 6: Simulated Effect of Privatization on Employment, Firm Efficiency and Wages

Variable	Non-privatizable	Privatizable	Mean Difference	Non-privatizable	Privatizable	Mean Difference
	First Step: OLS			First Step: Matching with OLS		
Employment	-0.302	0.069	-0.371***	-0.104	0.108	-0.212***
	(0.038)	(0.006)	(0.025)	(0.040)	(0.007)	(0.030)
Efficiency	0.648	0.433	-0.215***	0.524	0.415	0.109***
	(0.025)	(0.005)	(0.020)	(0.041)	(0.007)	(0.030)
Wages	0.010	0.004	0.006***	0.008	0.004	0.004**
	(0.002)	(0.000)	(0.001)	(0.002)	(0.000)	(0.002)

Note: N = 169 for non-privatizable, 2,627 for privatizable firms. The table presents the average simulated effect of privatization (the hypothetical percentage change of the variable) for non-privatizable and privatizable firms. Mean difference = difference in the hypothetical privatization effect between non-privatizable and privatizable firms. *** = significant at the 1-percent level.

Table 7: Robustness Checks

	Mean Difference						Number of Firms	
	Employment	Efficiency	Wage	Employment	Efficiency	Wage	Non-privatizable	Privatizable
	First Step: OLS			First Step: Matching with OLS				
Efficiency measured by ROA.	-0.338***	0.106***	0.006***	-0.222***	0.198***	-0.002	143	2,167
	(0.030)	(0.010)	(0.002)	(0.029)	(0.016)	(0.002)		
Payments overdue taken out from first-stage regression.	-0.345***	0.254***	0.010***	-0.208***	0.166***	0.011***	169	2,627
	(0.022)	(0.019)	(0.001)	(0.024)	(0.027)	(0.001)		
Emp^2, Eff^2 and Wage^2 added to first stage regression.	-0.492***	0.101***	0.002*	-0.786***	-0.240***	-0.012***	169	2,627
	(0.027)	(0.021)	(0.001)	(0.090)	(0.097)	(0.005)		
Firms with unclear privatization status taken out.	-0.445***	0.288***	0.014***	-0.318***	0.260***	-0.004*	169	2,422
	(0.025)	(0.019)	(0.001)	(0.029)	(0.029)	(0.002)		
Firms privatized in 1992 taken out.	-0.376***	0.245***	0.005***	-0.213***	0.162***	0.003*	169	2,615
	(0.024)	(0.020)	(0.001)	(0.030)	(0.031)	(0.002)		
Whole sample.	-0.315***	0.265***	0.001	-0.304***	0.076**	-0.003	173	2,793
	(0.026)	(0.020)	(0.002)	(0.030)	(0.031)	(0.002)		
Two digit industry controls added.	-0.444***	-0.112***	0.009***	-0.604***	-0.256***	0.004	169	2,627
	(0.026)	(0.019)	(0.002)	(0.104)	(0.071)	(0.004)		
Firms from energy and water distribution taken out.	-0.410***	0.105***	-0.008***	-0.299***	0.113***	0.001	69	2,586
	(0.038)	(0.030)	(0.002)	(0.046)	(0.044)	(0.002)		

Note: The table presents the mean difference of the simulated privatization effect between non-privatizable and privatizable firms (standard errors in parenthesis). *** = significant at the 1-percent level; ** = significant at the 5-percent level; * = significant at the 10-percent level.

Table 8: Simulated Effect of Privatization for Non-privatizable, Privatizable and Not Privatized, and Privatized Firms

	Non-privatizable (1)	Privatizable, not privatized (2)	Privatizable, privatized (3)	Mean Difference (1) – (2)	Mean Difference (1) – (3)	Non-privatizable (1)	Privatizable, not privatized (2)	Privatizable, privatized (3)	Mean Difference (1) – (2)	Mean Difference (1) – (3)
	First Step: OLS					First Step: Matching with OLS				
Employment	-0.302	0.037	0.161	-0.339***	-0.464***	-0.104	0.096	0.143	-0.200***	-0.247***
	(0.038)	(0.008)	(0.010)	(0.026)	(0.027)	(0.040)	(0.008)	(0.014)	(0.030)	(0.034)
Efficiency	0.648	0.463	0.347	0.185***	0.300***	0.524	0.454	0.303	0.069***	0.221***
	(0.025)	(0.005)	(0.010)	(0.019)	(0.024)	(0.041)	(0.007)	(0.017)	(0.028)	(0.040)
Wage	0.010	0.004	0.003	0.006***	0.007***	0.008	0.005	0.001	0.003**	0.006***
	(0.002)	(0.000)	(0.001)	(0.001)	(0.002)	(0.002)	(0.000)	(0.000)	(0.001)	(0.002)

Note: N = 169 for non-privatizable, 1,944 for privatizable but not privatized and 683 for privatized firms. The table presents the average simulated effect of privatization (the hypothetical percentage change of the variable) for non-privatizable, privatizable and not privatized, and privatized firms. *** = significant at the 1-percent level.

Appendix Table A1: Effect of Pre-Privatization Characteristics on Privatization Outcomes: Coefficients without Interactions with Privatization

	Δ Employment	Δ Efficiency	Δ Wage
Construction	1.431	3.498**	0.140
	(1.500)	(1.470)	(0.089)
Transportation	-3.052**	2.403*	0.057
	(1.464)	(1.368)	(0.087)
Other services	-5.520***	4.440***	0.018
	(1.535)	(1.420)	(0.082)
Employment	-1.040*	-1.076**	-0.138***
	(0.537)	(0.496)	(0.029)
Employment* Construction	-0.021	-0.018	-0.001
	(0.080)	(0.064)	(0.004)
Employment* Transportation	0.135**	-0.115*	0.001
	(0.068)	(0.059)	(0.005)
Employment* Other services	0.080	-0.036	0.008**
	(0.065)	(0.053)	(0.004)
Capital	0.818**	1.208***	0.104***
	(0.363)	(0.333)	(0.021)
Capital * Construction	-0.043	0.052	0.002
	(0.059)	(0.047)	(0.003)
Capital * Transportation	-0.151***	0.122***	0.009**
	(0.049)	(0.046)	(0.004)
Capital * Other services	-0.097**	0.010	-0.003
	(0.047)	(0.040)	(0.003)
Efficiency	1.177***	-1.036***	-0.083***
	(0.392)	(0.396)	(0.021)
Efficiency* Construction	0.248**	-0.156	-0.005
	(0.124)	(0.130)	(0.007)
Efficiency* Transportation	-0.026	-0.229**	-0.015**
	(0.118)	(0.107)	(0.007)
Efficiency* Other services	-0.170**	-0.029	-0.031***
	(0.086)	(0.092)	(0.005)
Wage	0.532	-0.343	-0.209***
	(0.431)	(0.461)	(0.025)
Wage* Construction	-0.329	-0.299	-0.013
	(0.233)	(0.208)	(0.014)
Wage* Transportation	0.400*	-0.187	-0.001
	(0.239)	(0.193)	(0.014)
Wage*Other services	0.806***	-0.502***	0.021*
	(0.226)	(0.191)	(0.012)

Table A1 continued

	Δ Employment	Δ Efficiency	Δ Wage
Export share	-5.677*	-3.607	-0.323**
	(3.165)	(3.094)	(0.164)
Export share * Construction	-2.208**	-0.057	-0.022
	(1.120)	(0.661)	(0.028)
Export share * Transportation	-0.538	0.358	0.014
	(0.373)	(0.280)	(0.022)
Export share *Other services	-1.893***	0.748	0.062*
	(0.619)	(0.570)	(0.035)
Overdue	-0.881	-3.339	0.135
	(3.087)	(2.931)	(0.149)
Overdue * Construction	0.364	0.212	0.030
	(0.615)	(0.366)	(0.035)
Overdue * Transportation	0.138	0.908***	0.043
	(0.491)	(0.352)	(0.034)
Overdue *Other services	-0.438	-0.204	0.039
	(0.459)	(0.300)	(0.032)
Employment*Capital	0.005	0.014**	0.001*
	(0.006)	(0.007)	(0.000)
Employment*Efficiency	-0.086***	-0.029	-0.011***
	(0.021)	(0.023)	(0.001)
Employment*Wage	0.168**	0.144**	0.025***
	(0.068)	(0.062)	(0.004)
Employment*Export share	-0.076	0.130	0.018*
	(0.177)	(0.148)	(0.010)
Employment* Overdue	-0.253*	-0.155	-0.008
	(0.130)	(0.114)	(0.006)
Efficiency*Capital	0.045***	0.018	0.007***
	(0.013)	(0.016)	(0.001)
Efficiency*Wage	-0.107**	0.105**	0.015***
	(0.043)	(0.044)	(0.002)
Efficiency*Export share	-0.069	-0.201	-0.016*
	(0.145)	(0.147)	(0.009)
Efficiency *Overdue	0.142	0.101	-0.003
	(0.153)	(0.155)	(0.008)
Wage*Capital	-0.110**	-0.166***	-0.018***
	(0.046)	(0.042)	(0.003)
Wage*Export share	0.845**	0.547	0.044*
	(0.421)	(0.400)	(0.023)
Wage *Overdue	0.069	0.377	-0.011
	(0.396)	(0.362)	(0.016)
Export share*Capital	-0.010	-0.037	-0.007
	(0.107)	(0.115)	(0.007)
R^2	0.239	0.367	0.352

Note: N = 2,796. The table presents the coefficients of the regression bases on Equation (1) without the interactions with privatization. The dependent variables are log differences between 1992 and 96. The coefficients or the interactions with privatizations are reported in Table 3. Robust standard errors in parentheses. *** = significant at the 1-percent level; ** = significant at the 5-percent level; * = significant at the 10-percent level.

Appendix Table A2: Effect of Pre-Privatization Characteristics on Privatization Outcomes: Matched Sample

	Δ Employment	Δ Efficiency	Δ Wage
Construction	4.154	9.378**	0.171
	(2.556)	(3.931)	(0.237)
Transportation	-0.891	11.138***	0.224
	(2.899)	(3.915)	(0.248)
Other services	-3.582	10.342***	-0.020
	(2.826)	(3.886)	(0.240)
Employment	-1.424*	0.359	-0.094
	(0.771)	(1.105)	(0.078)
Employment* Construction	-0.092	-0.062	-0.003
	(0.125)	(0.108)	(0.008)
Employment* Transportation	-0.002	0.003	0.014
	(0.161)	(0.144)	(0.012)
Employment* Other services	0.171	-0.087	0.007
	(0.115)	(0.109)	(0.008)
Capital	0.530	0.430	0.074
	(0.617)	(0.585)	(0.048)
Capital * Construction	0.199*	-0.007	-0.009
	(0.114)	(0.095)	(0.007)
Capital * Transportation	0.111	0.098	-0.012
	(0.137)	(0.122)	(0.010)
Capital * Other services	0.063	0.059	-0.011
	(0.103)	(0.094)	(0.007)
Efficiency	0.252	-1.269	-0.063
	(0.931)	(0.968)	(0.067)
Efficiency* Construction	-0.070	-0.435**	-0.012
	(0.173)	(0.179)	(0.012)
Efficiency* Transportation	-0.447**	-0.622**	-0.003
	(0.221)	(0.243)	(0.017)
Efficiency* Other services	-0.388***	-0.387***	-0.026**
	(0.129)	(0.142)	(0.011)
Wage	-1.058	-0.347	-0.182**
	(0.720)	(1.060)	(0.071)
Wage* Construction	-0.495	-0.741	-0.003
	(0.344)	(0.531)	(0.032)
Wage* Transportation	0.415	-1.001*	-0.026
	(0.384)	(0.555)	(0.035)
Wage*Other services	0.606*	-0.942*	0.027
	(0.349)	(0.520)	(0.031)

Table A2 continued

	Δ Employment	Δ Efficiency	Δ Wage
Export share	-7.131*	0.162	-0.508**
	(3.880)	(4.501)	(0.252)
Export share * Construction	-1.677***	-1.018	-0.025
	(0.613)	(0.703)	(0.056)
Export share * Transportation	-0.948**	1.013*	-0.012
	(0.397)	(0.536)	(0.035)
Export share *Other services	-1.953***	1.663*	0.025
	(0.460)	(0.850)	(0.032)
Overdue	-17.525*	-14.729*	-0.152
	(10.475)	(7.826)	(0.448)
Overdue * Construction	-0.186	2.404***	0.147**
	(0.759)	(0.638)	(0.071)
Overdue * Transportation	2.287**	3.430***	0.174*
	(1.032)	(0.941)	(0.091)
Overdue *Other services	-1.350*	1.349*	0.049
	(0.775)	(0.711)	(0.072)
Employment*Capital	0.017	0.017	0.001
	(0.013)	(0.014)	(0.001)
Employment*Efficiency	-0.128***	-0.000	-0.011***
	(0.030)	(0.034)	(0.002)
Employment*Wage	0.260***	-0.047	0.020**
	(0.090)	(0.126)	(0.009)
Employment*Export share	-0.116	0.168	0.010
	(0.270)	(0.416)	(0.019)
Employment* Overdue	-0.143	0.165	0.004
	(0.226)	(0.195)	(0.014)
Efficiency*Capital	0.048***	-0.034	0.006***
	(0.017)	(0.020)	(0.001)
Efficiency*Wage	0.060	0.195*	0.013*
	(0.107)	(0.108)	(0.008)
Efficiency*Export share	-0.198	0.095	-0.016
	(0.245)	(0.317)	(0.016)
Efficiency *Overdue	0.404*	0.353	0.027*
	(0.231)	(0.261)	(0.014)
Wage*Capital	-0.121*	-0.037	-0.014**
	(0.073)	(0.069)	(0.006)
Wage*Export share	1.149**	-0.050	0.082***
	(0.483)	(0.575)	(0.031)
Wage *Overdue	1.754	1.102	-0.021
	(1.160)	(0.995)	(0.054)
Export share*Capital	0.059	-0.256	-0.019
	(0.183)	(0.303)	(0.013)
R^2	0.278	0.440	0.300

Note: N = 1,403. The table presents the coefficients of the regression bases on Equation (1) without the interactions with privatization for the matched sample. The dependent variables are log differences between 1992 and 96. The coefficients or the interactions with privatizations are reported in Table 5. Robust standard errors in parentheses. *** = significant at the 1-percent level; ** = significant at the 5-percent level; * = significant at the 10-percent level.

Appendix Table A3: Comparison of the Simulated Effect of Privatization between Privatizable and Not Privatized, and Privatized Firms

	Privatizable, not privatized	Privatizable, privatized	Mean Difference	Privatizable, not privatized	Privatizable, privatized	Mean Difference
	First Step: OLS			First Step: Matching with OLS		
Employment	0.037	0.161	-0.125***	0.096	0.143	-0.048***
	(0.008)	(0.010)	(0.013)	(0.008)	(0.014)	(0.016)
Efficiency	0.463	0.347	0.116***	0.454	0.303	0.152***
	(0.005)	(0.010)	(0.011)	(0.007)	(0.017)	(0.016)
Wage	0.004	0.003	0.001	0.005	0.001	0.003***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)

Note: N = 1,944 for privatizable but not privatized and 683 for privatized firms. The table presents the average simulated effect of privatization (the hypothetical percentage change of the variable) for privatizable and not privatized, and privatized firms. *** = significant at the 1-percent level.