Efficiency of mass privatization vs. gradual privatization: Owner and seller effects on performance of companies in Slovenia

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I. Introduction

According to the recent World Bank comprehensive report[1] on lessons learnt in the first ten years of economic transition from plan to market, the ideal privatization strategy is to transfer assets as rapidly as possible to concentrated owners through open, fair and transparent methods. However, the report admits that is difficult to achieve on a large scale in a short period as the privatization to diffuse owners and insiders is appealing on equity grounds, and in several countries this was the only way to make private ownership politically acceptable. The main issue then is whether these intermediate ways of privatization accelerate or retard the eventual takeover of the enterprise by the "right" kind of investors. Might it not have been preferable to keep the assets in state hands, waiting to identify and than sell the enterprises to viable strategic investors? The World Bank report goes further by saying "Navigating between continued state ownership with eroding control rights and a transfer to ineffective new private owners with an inadequate institutional framework is possibly one of the most difficult challenges confronting policymakers in charge of privatization."

Table 1:
Quality of privatization in terms of company performance on the scale from 0 to 3

	Initial period	Owner effects	Seller effects	Long run
Gradual case-by-case privatization	**0**	**0**	**3**	**3**
Rapid mass privatization	**0**	**1**	**2**	**3**

The key policy choice in privatization for countries in transition is schematically presented in Table 1, where privatization can improve company performance from 0 to 3 in one, two or more steps. A rapid case-by-case privatization, which would improve performance of all companies to be privatized in one single step, is not a realistic policy choice for countries in transition. Given a large number of companies to be privatized, a case-by-case approach is by definition gradual in transitional economies: while some companies get privatized (with seller effects on performance 3), many stay in continued state ownership (with owner effects on performance 0). Alternatively, mass privatization transfer ownership quickly and free of charge to new ineffective private owners (with limited initial positive owner effects on performance 1), while further improvements are expected only after the secondary sales by mass privatization institutions (with seller effects on performance 2).

It is expected that the temporary owner effects on performance are stronger in mass privatization (performance 1 vs. 0), while the seller effects on performance are stronger in gradual case-by-case privatization (performance 3 vs. 2). In selling companies, mass privatization institutions are considering only the purchase price. On the other side, the

[1] Transition – The first ten years: analysis and lessons for Eastern Europe and former Soviet Union, The World Bank; 2002 (pages 72-73).

selling governments can take into account the restructuring needs of an individual enterprise in selecting the appropriate new private owner, which is expected to assure better post privatization performance. Therefore, the advantage of mass privatization is the speed of privatization captured by the temporary owner effects, while the advantage of gradual privatization is the quality of privatization captured by the seller effects. The overall effects of rapid private sector led mass privatization versus gradual government led privatization then depends on the relative importance of the owner and seller effects. When the temporary owner effects are dominating, mass privatization should be better (at the beginning of the process and if "temporary" ownership last for many years). When the seller effects are dominating, gradual privatization should be better.

It is clearly presented in Table 1 that a relevant comparison of the two privatization methods can be done only by taking into account all companies initially included in both programs. The standard research approach, comparing performance of companies temporary owned by mass privatization institutions (with performance 1) and companies sold by the government in gradual privatization (with performance 3) is not appropriate. The effects of gradual privatization are overvalued as non-privatized companies are excluded, while the effects of mass privatization are undervalued as companies sold by mass privatization institutions are excluded. It is further proposed that companies temporary owned by mass privatization institutions should be compared with non-privatized companies and companies privatized by the government in a standard way with companies sold by mass privatization institutions.

Difference between owner effects and seller effects in privatization has been somehow overlooked in the recent economic literature and economic policies of countries in transition. Originally, mass privatization methods were adopted in those countries as politically acceptable and practical solutions to rapid privatization of the entire enterprise sector. Initial ownership structures were intended as transitional, whereas optimal would be set up gradually and would result from secondary transactions. Thus, the recognition that mass privatization institutions like privatization funds are not good owners should not be surprising, as ownership was not their intended role. It is more important whether privatization funds are good and fast sellers[2].

There are two additional important conditions presented in Table 1 that are necessary for a meaningful empirical analysis of the two policy choices. First, the initial performance of companies selected for gradual and mass privatization should be the same (with initial performance 0). In real life this is almost never the case and the issue of selection bias or simultaneity between company performance and chosen privatization method should be explicitly dealt with in the empirical analysis of company level data. Differences in initial conditions and macroeconomic environment are also the main reasons why studies comparing economic performance of the entire enterprise sector between countries with rapid privatization and gradual privatization can tell us so little about this difficult policy choice. Second, the selection of the time period is crucial for comparative analysis of the various effects of the two privatization methods on performance of companies. In the functioning market economy all privatized companies should eventually find the appropriate owners in the long run and they should be equally efficient irrespective of the initial privatization method (with performance 3).

[2] In early days of transition this was rather obvious at least to privatization officials in the transition countries. Their first international conference on the topic, held in Prague in 1993 was titled: "Investment Funds as Intermediaries of Privatization". Proceeding were later published in a book under the same title (see Simoneti, Triška (Eds), CEEPN, 1994).

Therefore, the time horizon is crucial not only to analyze the temporary owner and final seller effects within each method, but to compare overall effects on performance between the two methods as well.

A traditional approach to examining the relation between ownership type and performance of companies prevails in the literature on economic transition. The recent extensive survey of empirical studies on corporate restructuring after privatization for most of the countries in transition can be found in Djankov and Murrel (2002) or Havrylyshyn and McGettingen (1999). We propose a new analytical approach for studying these policy issues by examing separately the owner and the seller effects on performance of firms in various non-traditional privatization and restructuring programs. In the rest of the paper we apply this new approach to Slovenia and empirically verify how effectively initial owners from mass privatization (funds, insiders and small shareholders) perform the role of temporary owners in comparison to the government and its agencies. In addition, we analyze how effective are initial owners from mass privatization as sellers in post-privatization period in comparison to the government and its agencies being directly the final seller to strategic investors.

II. Owner vs. seller effects on performance in Slovenia

In Slovenia socially-owned companies had a choice to participate in government-led restructuring program before privatization or enter directly into the mass privatization program. Initially, the restructuring program was managed through governmental restructuring agency (called Development Fund of Slovenia) that become a temporary owner of those companies with the mandate to first restructure and later privatize these companies. The original idea was that restructuring efforts would be limited to short term financial restructuring and to external governmental support for dealing with excessive employment and debts in these companies. Later on, additional troubled companies were taken over directly or indirectly by the government, its restructuring objectives become much broader and its direct or indirect ownership role lasted much longer than originally planed.

In both, government pre-privatization restructuring programs and mass privatization programs in Slovenia, we have in a way only temporary owners who are responsible to find the appropriate final owners for each company in the next stage. In the first case, temporary owner and final seller is directly the government or governmental restructuring agency. In the second case, the initial owners and final sellers are funds, insiders and small shareholders which obtained shares in exchange for vouchers. We can compare whether governmental or private institutional solutions are superior. In Slovenia, temporary ownership by the government and funds tends to be longer than expected. Therefore, it is important to know how well perform companies that are in »temporary« ownership of the government versus those that are in "temporary" ownership of initial owners from mass privatization.

Most of socially-owned companies chose to enter directly into mass privatization program without any prior restructuring. Shares of these companies were distributed free of charge to insiders, privatization funds, two para-state funds and citizens at large. In this study all mass privatized companies are divided into listed and non-listed companies. The ownership structure in these two groups of companies is rather similar, only that in listed companies the ownership share of insiders is smaller at the expense of

the bigger share of small financial investors. On the other hand, the corporate governance regime and institutional framework for secondary transactions is very different[3]. In non-listed companies initial shareholders had to relay on voice in corporate governance, while in listed companies there is much better information available and additional possibility for transparent exit on the market for shares. In non-listed companies secondary sales to strategic investors (takeovers) are taking place in a non-transparent way, while in listed companies these transactions are public and had to be completed through obligatory public bids.

The concept of transformation matrix was originally developed for companies included in mass privatization in Slovenia to study and present the quality and speed of ownership transformation after mass privatization[4]. A transformation matrix is constructed by taking into account the initial and final ownership categorization of companies. In this paper we group initially the companies into those that were mass privatized as listed (L) or non-listed (N) and those that were taken over by the governmental institutions for pre-privatization restructuring (G). The transformation matrix provides for distribution of these companies into the companies that remained in the same category (LL, NN, GG) and into the companies that were subject of secondary transactions (LS, NS, GS) or even more narrowly subject of the sale to strategic investors (LSt, NSt, GSt):

3 More about different methods of privatization in Slovenia could be found in Dubey and Vodopivec (1995), Prašnikar (1999, 2000), Smith et al (1997) and Simoneti et al (2001).

4 More details on transformation matrix for companies from mass privatization in Slovenia could be found in Simoneti et al (2001).

L	=	LL	+	LS(LSt)
N	=	NN	+	NS(NSt)
G	=	GG	+	GS(GSt)

The change of performance of L, N and G companies indicate the effectiveness of individual programs: mass privatization with listing on the stock-exchange, mass privatization with no listing on the stock-exchange and government-sponsored pre-privatization restructuring program. Both, owner and seller effects are present here simultaneously as we do not distinguish between companies that stayed in the same group (diagonal companies) and those that were subject of secondary transactions (off-diagonal companies).

The change in performance of LL, NN and GG companies (diagonal companies) reflect primarily the owner effects. Therefore, to find out who is better temporary owner, governmental institutions or initial owners from mass privatization, we should compare the change in performance of LL, NN and GG companies.

The change in performance of LS, NS and GS companies (off-diagonal companies) reflect primarily the seller effects. Therefore, to find out who is better privatization agent, governmental institutions or initial owner from mass privatization, we should compare the change in performance of LS, NS and GS companies. We can study also who is better final seller to strategic investors by comparing performance of companies sold to strategic buyers that were initially grouped as listed, non-listed or governmental (LSt, NSt, GSt).

Using this simple transformation matrix we can generate relevant ownership dummies for individual companies to be used in econometric analysis. For our sample of 479 Slovenian companies included in all three programs for which data on initial and final ownership is available, as well as accounting data for the period 1994-2001, the transformation matrix is presented in Table 2. We can observe that the most intensive changes in ownership structure are in G companies (54,93% of companies stay in the same ownership) and the least intensive changes are visible in L companies (85,07% of companies stay in the same ownership). Similarly is the intensity of the sales to strategic investors: 22,54% of G companies, 18,18% of N companies and only 13,44% of L companies were sold to strategic investors until the end of 1999.

<Insert Table 2>

III. Survival bias and simultaneity of privatization methods

Before proceeding with the empirical research of the impact of different ownership structure on performance of firm, some methodological issues regarding the dataset should be clarified. In this section, we discuss the econometric procedures to deal with two possible biases that our dataset might be subject to. We first discuss the problem of classical selection bias as in our estimations in Section IV we are dealing with a truncated panel of Slovenian firms while the inferences are made to the whole population. Subsequently, we refer to the issue of simultaneity between company's performance and ownership structure.

The estimations of performance of companies that undergone privatization or government-led restructuring is subject to the so called "survival bias", which is the classical sample selection bias problem extensively dealt with in the econometric literature (cf. Amemiya 1984 and Wooldridge 2002 for excellent surveys of the literature). In our case the survival bias arises due to the fact that the estimations of our models of the efficiency of different privatization methods (see Section IV) are performed on a truncated panel of Slovenian companies that survived throughout the period 1995-2001 while neglecting the companies that dropped from our sample. The selection of surviving companies in our panel is not random as drop-outs from the sample consist mostly of the companies that went bankrupt or were merged with other companies, which is obviously determined endogenously through companies' past performance. Making inferences on the overall efficiency of mass privatization and government-led restructuring without accounting for the fact that we are dealing with a truncated sample of companies that survived might produce biased coefficients. We deal with this problem using the Heckman two-step method proposed in Heckman (1979). In the Heckman procedure, the bias that results from using non-randomly selected samples is dealt with as an ordinary specification bias arising due to omitted variables problem. Heckman proposes to use estimated values of the omitted variables (which when omitted from the model give rise to the specification error) as regressors in the basic model.[5] Hence, in the first step we account for the probability s_{it2} [0, 1] that a company will survive throughout the period 1995-2001 conditional on its structural characteristics in 1994. The following probit equation has been estimated using 1994 data:

$$(1) \qquad \Pr(s_{it2} = 1 \mid \mathbf{X}_{it1}) = F(\mathbf{X}_{it1}\psi_1),$$

where the error terms are assumed to be IID and normally distributed, thus $F(\cdot)$ is a cumulative distribution function of the standard normal distribution. $\mathbf{X}_{it1}$ (i = 1,…,n) is a matrix of structural characteristics. These are individual equity to assets ratio, i.e. an indicator of indebtedness, EBITDA to sales ratio, i.e. financial performance, sales to labor ratio, i.e. labor productivity, and export to sales ratio, i.e. export propensity. The results in Table 3 indicate that companies that survived throughout 1995-2001 period differed significantly from their non-survived counterparts in 1994 in terms of export propensity and financial performance. No differences among them, however, were found in terms of individual labor productivity and indebtedness.

[5] Note that there are several possible ways of dealing with the problem of sample selection. One possibility is to treat the omitted variables as unobserved individual firm specific effects that are correlated with the error term in the basic model. This method is useful, for example, when studying efficiency of different programs, when individuals can be observed or not in different time periods according to their ability to qualify in the pre-qualification procedure. In the panel data framework, one can effectively deal with this problem of missing values for some cross-section units using the fixed effects estimator (see Wooldridge 2002). In our case the problem, however, is different as we deal with a truncated but balanced panel of companies that survived throughout the period 1994-2001. Another possibility is to use firms' pre-privatization performance indicators in order to control for omitted variables. In our case, the problem of this approach lies in the fact that there exists only one pre-privatization time period that can be used for this purpose. This, however, poses a serious problem in estimation of our main model due to the dynamic specification of the model, which requires dynamic instrumentalization when using the GMM approach. According to above limitations, the Heckman approach seems to be a preferable approach in our case.

<Insert Table 3>

In the second step, following Amemiya (1984), the predicted values based on estimated coefficient from the above estimations, are used in order to calculate a vector of so called inverse Mills' ratios[6] for individual companies. The latter then enters as a controlling variable in the estimation of the privatization method selection mechanism.

In analyzing the performance of companies after privatization/restructuring it has to be taken into account that the selection of privatization method is not exogenous but depended on operational characteristics of companies. At the time of privatization the performance of companies influences the selection of ownership structure. For example, in Slovenia there was a strong bias in selection of privatization methods due to principle of autonomy of companies in choosing among the available privatization methods (see Vodopivec and Dubey (1995), Smith, Vodopivec, Boeh-Cheol Cin (1997), Simoneti et al (2001)). Any evaluation of individual model of privatization is therefore biased, if the endogenous selection mechanism among different privatization models is not explicitly taken into account. Similar simultaneity bias was found in the Czech mass privatization by Marcineien and Wijenbergen (1997) and taken into account in empirical studies by Weiss and Nikitin (1998) and Kočenda and Valachy (2001). The simultaneity bias was also confirmed for Polish privatization (see Claessens and Djankov (1998)).

There are several ways to deal empirically with this issue. Djankov and Murrel (2002) in their quantitative survey on privatization in transition countries offer good overview how different researchers dealt with the privatization simultaneity bias problem. In the first group of studies lagged performance variables are simply used as explanatory variables. In the second group of studies regressions are run using the differences in performance variables instead of levels in order to wipe out the individual specific effects, which, however, does not solve the problem of simultaneity between firm performance and ownership structure. In the third group of studies the selection mechanism is explicitly accounted for and incorporated into the model.

In the present paper we control for the endogeneity of the privatization method selection by referring to individual performance of companies in the pre-privatization period. The data on initial performance of the survived companies 1994 in fact confirm significant differences among companies with different ownership structure. Table 4 presents the initial characteristics of the companies in the sample grouped into *G*, *L* and *N* ownership categories. Listed companies are by far the largest in terms of labor force, assets and sales. Capital intensity (assets per employee) is also the highest in listed companies. Productivity of assets and labor is the highest in non-listed companies. The highest indebtedness is in government-owned companies and the lowest in listed companies. Export propensity is the highest in listed companies, followed by government-owned companies. According to the financial performance indicators (EBITDA to sales, EBIT to sales, net profit to sales), the best companies were listed on the stock-exchange and the worst were selected for governmental restructuring program, which is the expected outcome.

[6] Inverse Mills' ratios are calculated as the ratios between the normal density and its cumulative density function. Note that calculation of the inverse Mills' ratios is different for treated and nontreated observations.

<Insert Table 4>

The procedure to control for this privatization method selection mechanism is similar to the one used in the survival bias mechanism. In the first step, the probability of companies to choose one of the three possible ownership forms (mass privatization with listing, mass privatization with no listing and pre-privatization restructuring) is being estimated. The probability p_{it} of companies to choose one of the three possible ownership forms is conditional both on their operational characteristics in 1994 as well as on their survival bias. The probability p_{it} is being estimated using the following nested multinomial logit model:

$$\Pr(p_{it} = 1 | \mathrm{Z}_{it}, \mathrm{M}_{it2}) = G(\omega \mathrm{Z}_{it} + \tau \mathrm{M}_{it2}), \quad (2)$$

where Z_{it} is a matrix of operational characteristics of companies and M_{it2} is a vector of inverse Mills' ratios from the survival mechanism. We assume that errors are IID distributed and have independent extreme-value distribution. The controlling variables contained in Z_{it} are sales and labor (which control for the size of companies), assets to sales ratio (which controls for capital intensity) and value added to labor ratio (which controls for technological advancement of companies). Vector of inverse Mills' ratios from survival bias mechanism, M_{it2}, is included into the privatization method selection mechanism in order to control for the survival bias. Note that this variable therefore controls also for initial differences in indebtedness, financial performance, labor productivity and export propensity among companies with different ownership structure. Indeed, the results from the multinomial estimations in the Table 5 confirm that the latter differences are essential in our case. In addition, significant differences between listed and non-listed companies are found in terms of the size, capital intensity and technological advancement. On the other hand, significant differences between listed and restructured-by-government companies are found only in terms of capital intensity and survival bias. The latter, however, implies that the companies restructured by the government were initially less export oriented, more indebted and had worse financial performance.

<Insert Table 5>

Similarly to the survival bias correction approach, the predicted values based on estimated coefficient from the multinomial logit model are being used to calculate the inverse Mills ratios for each of the companies. In the second step, a vector of these correction factors is included in our basic models of economic performance (see next section) in order to control for omitted variables.

IV. Models of economic performance

To study economic efficiency we use the concept of total factor productivity (TFP) growth model. We exploit the panel data for a set of mass privatized companies and nationalized companies. Consider the following TFP growth accounting model:[7]

$$(3) \qquad y_{it} = a_{it} + \alpha k_{it} + \beta l_{it} + \delta_t + (\eta_i + v_{it} + m_{it}), \qquad r = \alpha+\beta \neq 1$$

$$v_{it} = \rho v_{i,t-1} + e_{it} \qquad |\rho| < 1$$

$$e_{it}, m_{it} \sim \text{MA}(0)$$

where a_{it} is a productivity shock that depends on various factors (such as ownership structure and changes in ownership structure), y_{it} is log sales, k_{it} and l_{it} are log capital stock and log labor inputs (there is no restriction on constant returns to scale), δ_t is a year specific intercept. Of the error components, η_i is an unobserved firm-specific effect, v_{it} is an autoregressive (productivity) shock, and m_{it} represents serially uncorrelated measurement errors. Note that both labor (l_{it}) and capital (k_{it}) are potentially correlated with firm-specific effects (η_i) as well as with both productivity shocks (e_{it}) and measurement errors (m_{it}).

The central point of our research is focused on estimating the productivity shock a_{it} where we believe that it is largely determined by the impact of the ownership structure and changes in ownership structure. Suppose that the firm's productivity shocks a_{it} are determined as:

$$(4) \qquad a_{it} = f(L_{it}, N_{it}, G_{it}, LL_{it}, NN_{it}, GG_{it}, LS_{it}, NS_{it}, GS_{it})$$

where elements of a_{it} are the elements of the transformation matrix; i.e. *L, N* and *G* stand for listed, non-listed and government owned companies in each time period, respectively; *LL*, *NN* and *SS* indicate companies that remained in the same category and *LS*, *NS* and *GS* indicate companies that were the subject of secondary transaction.

Another issue here is the importance of dynamic processes in the economy since many economic relationships are dynamic in nature and should be modeled as such. This is especially true for growth accounting models where present growth is correlated with the past performance of the company. The time dimension of panel data enable us to capture the dynamics of adjustment by inclusion of lagged dependent as well as lagged independent variables.

A dynamic version of the growth model (4) can then be written as:

$$(5) \qquad y_{it} = \rho y_{i,t-1} + \alpha k_{it} - \rho\alpha k_{i,t-1} + \beta l_{it} - \rho\beta l_{i,t-1} + (\delta_t - \rho\delta_{t-1})$$
$$+(\gamma a_{it} - \rho\gamma a_{i,t-1} + \eta_i(1-\rho) + e_{it} + m_{it} - \rho m_{i,t-1}).$$

However, when estimating dynamic models based on growth accounting, one should take into account the inherent endogenous structure of the model. This means that not only present and lagged dependent variables are correlated, but lagged dependent variable (sales) might be correlated with present dependent variables (inputs); i.e. past

[7] Note that we use the Blundell and Bond (1999) notations.

performance determines demand for inputs in the present period. This simultaneity problem should be explicitly controlled for in econometric estimations.

The OLS estimator is unbiased and consistent when all explanatory variables are exogenous and are uncorrelated with the individual specific effects. This, however, is not the case in our model, which includes lagged variables. One can show that the OLS estimator will be seriously biased due to correlation of the lagged dependent variable with the individual specific effects as well as with the independent variables. This is due to the fact that y_{it} is a function of η_i in (3), and then $y_{i,t-1}$ is also a function of η_i. As a consequence, $y_{i,t-1}$ is correlated with the error term, which renders the OLS estimator biased and inconsistent, even if the v_{it} and m_{it} in (2) are not serially correlated. This holds also whether the individual effects are considered fixed or random (see Hsiao 1986, Baltagi 1995, Wooldridge 2002). There are several ways of controlling for this unobserved heterogeneity and simultaneity. One way is to include exogenous variables into the first-order autoregressive process. This, in turn, reduces the bias in the OLS estimator, but its magnitude still remains positive. Another way of controlling for the simultaneity is apply the Anderson-Hsiao instrumental variable approach. We may first-differentiate our model (4) in order to eliminate η_i, which is the source of the bias in the OLS estimator. Then we may take the second lag of the level ($y_{i,t-2}$) and the first difference of this second lag ($\Delta y_{i,t-2}$) as possible instruments for $\Delta y_{i,t-1}$, since both are correlated with it ($\Delta y_{i,t-1} = y_{i,t-1} - y_{i,t-2}$) but uncorrelated with the error term Δu_{it} ($= u_{it} - u_{i,t-1}$). This approach, though consistent, is not efficient since it does not take into account all the available moment conditions (i.e. restrictions on the covariances between regressors and the error term).

Hence, a natural choice of approach that allows for controlling for the unobserved heterogeneity and simultaneity in (5) is the application of GMM (general method of moments) estimators. As shown by Arellano and Bond (1991, 1998), Arellano and Bover (1995) and Blundell and Bond (1998, 1999), an application of the system GMM estimators is a more appropriate approach to dynamic panel data than using difference GMM estimators. Our model will be estimated in first differences in order to obtain estimates of coefficients on growth performance of privatized companies as well as to eliminate unobserved firm-specific effects. Since lagged level instruments used in diff-GMM approach are shown to be weak instruments for first-differenced equation, we apply sys-GMM approach, which in addition to lagged levels uses also lagged first-differences as instruments for equations in levels. As model is estimated in first differences, corresponding instruments for Δx_{i3} are x_{i1} and Δx_{i1} (where x stands generally for all included variables), and so on for higher time periods. This allows for a larger set of lagged levels and first-differences instruments and therefore to exploit fully all of the available moment conditions. Hence, the system GMM approach maximizes both the consistency as well as the efficiency of the applied estimator.

V. Empirical results

In this section we discuss the results of our estimated models of economic performance of companies that undergone different privatization programs. In all of subsequent estimations the TFP growth model as specified in (5) has been estimated using the 1995-2001 data for 479 privatized companies. We compare static as well as dynamic specifications of the model, where in all specifications the survival bias as well

as the simultaneity between company's performance and the privatization method selected have been controlled for by including the vectors of inverse Mills' ratios into main TFP models.

In the first model, we test the overall efficiency of individual privatization programs by comparing the TFP growth of companies according to their initial ownership structure in 1995. Table 6 shows that in the static model mass privatized companies (N and L) show significantly higher TFP growth than companies taken over by the government, but there is evident a problem of autocorrelation of residuals (see AR(1) and AR(2) tests). In the dynamic model this problem is solved (see AR(2) test) and the results are clear: mass privatization with listing or no listing is superior to government pre-privatization program.

<Insert Table 6>

The estimated values of the coefficients for ownership dummy variables N and L allow us to conclude that the growth of TFP in the period 1995-2001 is typically higher in mass privatized companies than in those companies that were initially taken over for restructuring and privatization by the government and its agencies. Separate testing for diagonal and off-diagonal companies is supposed to show whether these results are due to better ownership effects or/and seller effects by the initial owners from mass privatization.

<Insert Table 7>

The changes in performance of LL, NN and GG companies (diagonal companies) reflects primarily who is better temporary owner, government and its restructuring institutions or initial owners from mass privatization. Results in Table 7 reveal that in both, static and dynamic specification of the model TFP growth in the period 1995-2001 is higher in companies controlled by initial (diagonal) owners from mass privatization.

<Insert Table 8>

<Insert Table 9>

By comparing the performance in off-diagonal companies (LS, NS, GS) or in companies sold to strategic investors (LSt, NSt, GSt) we examine who is a better seller. Mass privatization institutions in Slovenia (mostly funds) are blamed for using only price criteria in making selling decisions, while government institutions are supposed to care also about employment, investments and further development of the company in making privatization decisions. The surprising results from Slovenian data for 1995-2001 is that mass privatization institutions are better sellers since they sell companies with higher TFP growth than the government does (see Table 8). Even when only sales to strategic investors are considered, TFP growth is higher in the companies that are sold by initial owners from mass privatization than in the companies sold by the government directly (see Table 9). The above results, hence, clearly demonstrate that the efficiency of different privatization programs in terms of the owner and seller effects in Slovenia is clearly

pointing towards the mass privatization (with listing or non-listing). Comparison of efficiency of different privatization programs does not justify the arguments in favor of the government-led restructuring and postponed privatization.

VI. Conclusions

After privatization based on free distribution of shares (mass privatization) it is expected that many initial owners will sell their shares to "true" owners in the secondary privatization. Thus, the recognition that privatization funds are not good owners should not be surprising, as long-term ownership was not their intended role. It is more important whether privatization funds are good sellers. Positive effects of mass privatization are thus not shown only by companies remaining in control of initial owners (the owner effects of mass privatization) but also by the companies that have already gone through secondary privatization (the seller effects of mass privatization).

By empirically separating the owner from seller effects on performance in mass privatizated companies we can get more relevant comparison between various mass privatization programs and traditional approaches to privatization. Companies temporary owned by mass privatization institutions should be compared with non-privatized companies and companies privatized by the government in a standard way with companies sold by mass privatization institution.

For Slovenia, we compared mass privatization programs for listed and non-listed companies with government led pre-privatization restructuring program. We find out that mass privatization institutions are better temporary owners and better sellers to strategic investors than the government and its institutions. Companies owned/sold by mass privatization institutions experience better economic performance in comparison to companies owned/sold by the government. Results are particularly strong using the TFP model where both static and dynamic versions of the model were studied, with simultaneity and heterogeneity problems explicitly controlled for using Sys-GMM approach to panel data. The strong bias in the construction of our samples of data, since the survival of companies in the period 1995-2001 and preselection of different methods by companies are affected by their past performance, was explicitly controlled for using the Heckman two-step method.

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Table 2
Transformation matrix since completed mass privatization untill the end of 1999 and distribution of companies in the ownership groups

n = 479

	Government	**Non-Listed**	**Listed**	**Strategic**	**Total**
Government	**39**	11	5	16	**71**
Non-Listed	8	**260**	11	62	**341**
Listed	1	0	**57**	9	**67**
Total	**48**	**271**	**73**	**87**	**479**

in %, n = 479

	Government	**Non-Listed**	**Listed**	**Strategic**	**Total**
Government	**54,93**	15,49	7,04	22,54	**100**
Non-Listed	2,34	**76,25**	3,23	18,18	**100**
Listed	1,49	0	**85,07**	13,44	**100**
Total	**10,02**	**56,58**	**15,24**	**18,16**	**100**

Table 3

Evaluation of the survival mechanism using probit model (base group=companies that survived throughout 1994-2001; data for 1994)

	Coef.	**z-stat.**
Parameters of survived companies in the 1995-2001 sample		
Equity/Assets	0,240	1,22
EBITDA/Sales	***2,494	4,71
Sales/Labor	-8,47E-07	-0,39
Export/Sales	**0,305	1,95
Const.	-0,139	-0,95
Observations		847
LR Chi^2 (4)		33,49
Prob > Chi^2		0,0000
Pseudo R^2		0,028

*** and ** indicate statistical significance of coefficients at 1 and 5 per cent, respectivelly

Table 4
Characteristics of companies initially grouped as government (G), listed (L) and non-listed (N), mean values, 1995

n = 479

	1995		
	Government	**Listed**	**Non-Listed**
Number of employees	232	506	244
Assets in 000 SIT	4.043.934	11.279.311	2.464.759
Sales in 000 SIT	2.572.042	7.833.165	2.521.501
Asset per employees in 000 SIT	16.929	33.637	12.551
Sales per employees in 000 SIT	10.462	12.911	13.309
Sales to assets	0,92	0,86	1,28
Share of capital in assets	55,9%	71,1%	60,3%
Share of export in sales	27,9%	32,1%	24,0%
EBITDA to sales	4,8%	7,1%	4,2%
EBIT to sales	-2,1%	-1,2%	-0,8%
Net profit to sales	-2,8%	1,1%	0,6%
Number of companies	71	67	341

Table 5
Evaluation of the privatization method selection mechanism using nested multinominal logit model (base group=listed companies in mass privatization, data for 1994)

	Coef.	z-stat.
Parameters of selection of non-listed companies in mass privatization		
Mills ratios from survival bias	***17,274	3,66
Sales	***-1,23E-07	-2,76
Labor	0,0002	0,63
Assets/Sales	***-0,00002	-3,52
Value added/Labor	***0,0005	3,30
Const.	***-9,187	-3,729
Sector Dummies	yes	
Parameters of selection of companies in government pre-privatization program		
Mills ratios from survival bias	**10,997	1,88
Sales	-6,09E-08	-1,07
Labor	-0,00006	-0,09
Assets/Sales	**-0,00001	-2,24
Value added/Labor	0,0002	1,43
Const.	**-6,146	-2,01
Sector Dummies	yes	
Observations		479
LR Chi^2 (4)		158,20
Prob > Chi^2		0,0000
Pseudo R^2		0,206

*** and ** indicate statistical significance of coefficients at 1 and 5 per cent respectivelly

Table 6
Cummulative owner and seller effects in comapnies mass privatized as listed (L) and non-listed (N) in comparison to nationalized companies (G)

	Static model (OLS)		**Dynamic model SYS-GMM**	
	Coef.	**t-value**	**Coef.**	**t-value**
y (-1)			***0,720	10,80
Assets	***0,243	7,11	***0,558	3,93
Assets (-1)			***-0,512	-3,83
Labor	***0,553	6,76	***0,697	4,78
Labor (-1)			***-0,402	-3,17
L	***1,647	3,81	**1,024	2,03
N	***1,604	3,87	*0,969	1,92
lamp 1	*-0,332	-1,86	*-0,452	-1,62
lamp 2	**-0,300	-1,99	-0,395	-1,42
lamp 3	***0,676	3,47	0,181	0,58
Const.	yes		yes	
Time dummies	yes		yes	
Sector dummies	yes		yes	
R2	0,350			
Observations	3353		3353	
AR (1)	-3,872 [0,000]**		-5,579 [0,000]**	
AR (2)	-1,915 [0,055]		1,885 [0,059]	

***, ** and * indicate statistical significance of coefficients at 1, 5 and 10 per cent respectively; Dependent variable *y* = production, the model is estimated in log first differences; Reference group = G companies

Table 7
Owner effects in listed (LL) and non-listed companies (NN) in comparison to government controled companies (GG)

	Static model (OLS)		Dynamic model SYS-GMM	
	Coef.	**t-value**	**Coef.**	**t-value**
y (-1)			***0,668	9,73
Assets	***0,226	5,62	***0,598	4,28
Assets (-1)			***-0,553	-4,32
Labor	***0,601	6,84	***0,796	5,55
Labor (-1)			***-0,465	-4,19
LL	***1,385	3,17	*0,941	1,67
NN	***1,386	3,23	*0,958	1,70
lamp 1	-0,273	-1,33	-0,172	-0,67
lamp 2	-0,272	-1,58	-0,175	-0,66
lamp 3	***0,570	3,02	0,414	1,13
Const.	yes		yes	
Time dummies	yes		yes	
Sector dummies	yes		yes	
R2	0,387			
Observations	2492		2492	
AR (1)	-3,042 [0,002]**		-2,574 [0,010]*	
AR (2)	-1,542 [0,123]		1,258 [0,208]	

***, ** and * indicate statistical significance of coefficients at 1, 5 and 10 per cent respectively; Dependent variable *y* = production, the model is estimated in log first differences; Reference group = GG companies

Table 8
Seller effects in companies sold as listed (LS) and non-listed (NS) in comparison to companies sold by the government (GS)

	Static model (OLS)		Dynamic model SYS-GMM	
	Coef.	**t-value**	**Coef.**	**t-value**
y (-1)			***0,837	9,62
Assets	***0,324	5,13	**0,392	2,24
Assets (-1)			**-0,343	-2,33
Labor	***0,373	2,73	*0,316	1,72
Labor (-1)			-0,167	-1,59
LS	***2,618	2,64	***3,910	3,43
NS	***2,432	2,80	***3,434	3,07
lamp 1	-0,395	-1,16	*-0,138	-0,21
lamp 2	-0,263	-0,902	*0,144	0,21
lamp 3	**1,234	2,35	**2,282	2,12
Const.	yes		yes	
Time dummies	yes		yes	
Sector dummies	yes		yes	
R2	0,288			
Observations	861		861	
AR (1)	-3,092 [0,002]**		-4,226 [0,000]**	
AR (2)	-1,692 [0,091]		-0,832 [0,405]	

***, ** and * indicate statistical significance of coefficients at 1, 5 and 10 per cent respectively; Dependent variable *y* = production, the model is estimated in log first differences; Reference group = GS companies

Table 9
Seller effects in companies sold to strategic investors from listed (LSt) and non-listed (NSt) companies in comparison to companies sold by the government to strategic investors (GSt)

	Static model (OLS)		Dynamic model SYS-GMM	
	Coef.	**t-value**	**Coef.**	**t-value**
y (-1)			***0,889	9,25
Assets	***0,279	3,86	0,248	1,36
Assets (1)			-0,271	-1,39
Labor	**0,447	2,44	**0,574	2,29
Labor (-1)			-0,369	-1,60
LSt	***3,848	2,96	**4,499	2,45
NSt	***3,475	3,14	**4,025	2,27
lamp 1	**-1,108	-2,26	-1,162	-0,80
lamp 2	**-0,816	-2,07	-0,802	-0,56
lamp 3	**1,307	2,08	1,630	0,97
Const.	yes		yes	
Time dummies	yes		yes	
Sector dummies	yes		yes	
R2	0,321			
Observations	609		609	
AR (1)	-2,068 [0,039]*		-2,614 [0,009]**	
AR (2)	-1,461 [0,144]		-0,490 [0,624]	

***, ** and * indicate statistical significance of coefficients at 1, 5 and 10 per cent respectively; Dependent variable *y* = production, the model is estimated in log first differences; Reference group = GSt companies