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## A castle built on sand: the effects of mass privatization on stock market creation in transition economies

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Zuzana Fungáčová and Jan Hanousek

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The effects of mass privatization on stock  
market creation in transition economies



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Zuzana Fungáčová\* and Jan Hanousek\*\*

## A castle built on sand: The effects of mass privatization on stock market creation in transition economies

### Abstract

This paper deals with the relationship between mass privatization and stock market development in transition economies. The link is investigated empirically using a panel of data that includes most transition countries. Our results confirm the hypothesis that mass privatization exerted a negative influence on stock market functioning over the short and medium term. Further, it appears that stock markets in countries with mass privatization were initially perceived as mere byproducts of the privatization process. Such stock markets typically not only failed in their core mission of providing capital for the corporate sector, but generated negative investor sentiment and did little to catalyze economic growth.

**JEL Classifications:** G15, G28, P34

**Keywords:** privatization, mass privatization, emerging stock markets, stock market

\* CERGE-EI, Prague

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Zuzana Fungáčová and Jan Hanousek

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### Tiivistelmä

Tässä työssä tutkitaan massayksityistämisen ja osakemarkkinoiden kehittymisen välistä yhteyttä siirtymätalouksissa. Tutkimuksessa käytetty paneeliaineisto kattaa useimmat siirtymätaloudet. Tuloksien mukaan massayksityistäminen on haitannut osakemarkkinoiden kehitystä lyhyellä ja keskipitkällä aikavälillä. Näyttää myös siltä, että massayksityistämisen valinneissa maissa osakemarkkinoiden katsottiin alussa olevan vain yksityistämisen sivutuote. Tällaiset osakemarkkinat eivät yleensä onnistuneet välittämään pääomia yrityssectorille. Lisäksi tällaisten osakemarkkinoiden maine oli huono, eivätkä markkinat edistäneet taloudellista kasvua.

Asiasanat: yksityistäminen, kehittyvien talouksien osakemarkkinat, osakemarkkinat

# 1 Introduction

General consensus has it that stock markets enhance economic growth by providing an important source of financing for viable investment projects. In developed economies, stock markets promote economic development by providing investors with a potential exit mechanism and offering liquidity in ways that encourage diversification. They also supply firms with access to capital and generate information about the quality of potential investments. Empirical studies confirm these relationships and show evidence of a positive correlation between stock market development and economic growth.<sup>1</sup> One would expect, therefore, that stock markets exert a positive influence on growth – even in the bank-driven financial systems of transition countries.<sup>2</sup>

Many studies confirm the overall positive impact of privatization on the functioning of transition economies (Djankov and Murrell, 2002),<sup>3</sup> but the specific beneficial mechanisms are not well understood. Privatization outcomes depend on numerous factors, including initial conditions, political legacies and other country-specific factors, as well as the chosen privatization method and the speed, sequencing, and timing of privatization in the context of the overall transition process.<sup>4</sup>

Privatization also profoundly affects the financial sector. Financial systems, which have no real function in the planned economy, must be developed from scratch during the transition process. As Bonin and Wachtel (2002) note, financial sectors in all transition countries continue to be relatively underdeveloped compared to the overall level of development of their economies. The capital needed for restructuring of transition economies (World Bank, 1996) has been far greater than initially weak, undercapitalized domestic banks could provide. The possibilities of firms to finance their investment activities was further limited by the inability of most to generate sufficient profits to finance the restructuring through retained earnings, a situation that suggests a great deal of reliance on equity financing. Thus, functioning stock markets became a necessity for firms in transition

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<sup>1</sup> See e.g. King and Levine (1993), Levine and Zervos (1998), Rousseau and Wachtel (2000), and Beck and Levine (2004).

<sup>2</sup> Korhonen et al. (2000) argue that stock markets in both market-based and bank-driven systems provide economic agents with valuable information about prices in the economy and offer a means of reallocating risk.

<sup>3</sup> Hanousek, Kočenda, and Švejnar (2004) challenge results claiming a generally strong positive impact of privatization on transition economies.

<sup>4</sup> See World Bank (1996), Gupta, Ham and Švejnar (2000) and Godoy and Stiglitz (2006).

economies seeking capital. Development and regulation of these markets belong among the key issues that indicate the progress of reforms<sup>5</sup>.

Besides their role in raising capital, stock markets have also contributed to the rearrangement of ownership structures in transition economies. Despite the importance of stock markets, the connection between privatization and stock market development has received little attention. In a study on the impact of the privatization process on the development of local stock markets, Perotti and Oijen (2001) argue that the resolution of political risk through sustained privatization is an important source of growth in the emerging stock markets. They show this on a sample of emerging markets where privatization using stock markets took place in the 1980s. Stock markets in these countries were working before the actual privatization and the privatization method was dependent on the functioning stock market. This connection between privatization and stock markets, unfortunately, cannot be directly applied to transition economies where privatization methods varied widely across countries and stock markets were not in place before privatization measures were introduced. The focus of this research in transition countries has so far been on the positive effect of privatization on growth<sup>6</sup>, while the relation between privatization methods and newly established stock markets in transition countries has received little discussion.

Due to the large variety of privatization methods implemented (Brada, 1996), their relation to emerging stock markets also varies considerably. It is thus essential to consider the advantages and disadvantages of different methods *ex ante*, i.e. from the perspective of decision-makers at the beginning of transition.

The direct sales of state companies on its surface would seem straightforward answer to privatization. It immediately assigns a new owner, raises money for the state, and brings in fresh investment for the company. The unfortunate reality, however, was that the pool of potential bidders was quite limited in transition countries. When combined with the information disadvantage faced by outsiders, this approach proved rather inefficient. Moreover, direct sales of state assets apparently do not affect stock markets at the time of sale, and possibly thereafter. In contrast, privatization of state assets through the stock market opens the field to a large number of bidders. As observed by Perotti and van Oijen

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<sup>5</sup> Development and regulation of stock markets are now tracked as key indicators of progress in reform. The EBRD has constructed indicators reflecting progress of the financial system reform in transition countries. For more details see EBRD Transition Reports 1995–2003.

<sup>6</sup> For more details see e.g. Bennett et al. (2004).

(2001), it also contributes positively to the stock market functioning through the resolution of political risk.

Privatizing state assets by auction can also attract a large group of bidders and the successful ones get control of the company directly. This method is typically reserved for privatization of smaller non-listed entities. Indeed, auctions do not even require the existence of a stock market.

Full implementation of mass privatization requires a functioning stock market.<sup>7</sup> In most mass privatizations, shares of privatized companies were placed on the market by administrative decision. This procedure ignored standard listing requirements, which caused investors familiar with traditional regulated stock markets to shy away. The proponents of mass privatizations incorrectly assumed that an increase in the number of publicly traded companies would automatically result in higher market liquidity. Ultimately, the markets rejected the imposition and lagged behind those stock markets in transition countries that had evolved gradually and organically.<sup>8</sup>

We consider this lag to be the price these economies have paid for establishing stock markets as a “byproduct” of mass privatization. The key difference is that when privatization through direct sale or auction fails to produce a desirable outcome, a single company is hurt; when a mass privatization program fails, the entire market suffers.

The primary objective of this research, therefore, is to empirically investigate the connection between the privatization method implemented and subsequent stock market development. Considering the entire transition process with an emphasis on the country’s institutional setting and legal framework reveal the costs implied by mass privatization with respect to stock market creation. Our aim is both to describe the situation in transition countries and determine the influence of privatization on the stock market using available data.

The paper is structured as follows. Section 2 provides an overview of stock market development in transition countries and discusses privatization methods in connection with stock market emergence and development. In section 3, we discuss hypotheses, specifica-

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<sup>7</sup> Oddly, the reverse argument was made at the beginning of transition, i.e. mass privatization was required to promote the establishment of stock markets (Mejstřík, 1997).

<sup>8</sup> According to Bloomberg’s tracking of the major stock indices, growth of returns in countries with mass privatizations generally stagnated or even decreased in the year following the beginning of trading (-58% in the Czech Republic in 1995 and -70% in Romania in 1998). Figures for countries that did not have mass privatizations show a clear upward trend in returns (1,081% in Poland in 1996 and 55% in Hungary in 1996).

tions of estimated equations, and the data used. Section 4 summarizes and interprets our results. Section 5 concludes.

## 2 Large-scale privatization and stock market development in transition economies

According to the EBRD Transition Report 1995, the development of the securities market in transition countries “has so far been largely shaped by the nature of privatization programs” (p.164), although privatization methods in transition countries were rarely driven by the objective of developing a modern capital market (EBRD Transition Report 1997). Nevertheless, stock market development implies some connection between the privatization method employed and stock market functioning. This connection has been generally overlooked in the literature dealing with the emergence and development of stock markets in transition economies.<sup>9</sup> Not only do certain privatization methods require the immediate existence of a stock market, but they also determine the post-privatization ownership structure. Based on the initial ownership structure further trading evolves, and in this way the privatization method becomes a mechanism that predetermines the functioning of an emerging stock market (Czech Republic: Capital Market Review, 1999).

Although some stock markets in transition countries were reestablished after decades,<sup>10</sup> it can be said that all had to be built from scratch. Stock exchanges emerged at different stages of the transition process depending on the country. In some, stock exchanges were launched in the early 1990s; others were established in the mid- or late 1990s. Even today, a few transition countries lack fully functioning stock markets. Stock exchanges typically got an early start in countries where mass privatization was not implemented as a primary method: e.g. Slovenia and Hungary in 1990, and Poland in 1991. Stock exchanges were created in Czech Republic, Slovakia and Lithuania in 1993 in conjunction with mass

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<sup>9</sup> Claessens et al. (2000) were among the first to note the importance of institutions and law for stock market development. Subsequent key papers (Pajuste, 2002; Bonin and Wachtel, 2002; Claessens et al., 2003; Berglof and Bolton, 2003) rely heavily on the paper’s findings, extending them to e.g. financial system architecture, corporate governance, and European integration. Even so, the influence of the privatization method is never taken into account.

<sup>10</sup> The formation of securities markets began in 1990–1991 with the reestablishment of exchanges in Bulgaria, Croatia, Hungary, Poland, and Slovenia. In 1993, the Prague Stock Exchange was reopened (EBRD Transition Report 1995).

privatization programs. In nearly all cases, transition stock exchanges continue to be plagued by low liquidity: only securities of a few important companies are traded frequently on each market (Wagner and Iakova, 2001; Bodin and Wachtel, 2002; Bakker and Gross, 2004). Transition stock exchanges are also characterized by insufficient regulation, institutional fragility, and poor protection of minority shareholder rights. All of these features relate to legal and institutional frameworks that did not exist when most of these stock markets were established (EBRD, 1998; Bonin and Wachtel, 2002).

In this respect the impetus for stock market development in transition countries differed significantly. In some countries, the formation was an inseparable part of the transformation strategy and was, together with the legal framework for securities trading, planned well in advance. In other instances, stock markets emerged because they were necessary to supplement other reforms, most often mass privatization. This has had consequences for how these markets developed. “Planned” stock markets, despite their volatility, grew gradually with a clear upward sloping trend. The other exchanges overheated in their early years, forcing them to retrench and start over in the late 1990s.<sup>11</sup>

These differing paths of development fit two general patterns: “top-down” and “bottom-up” approaches (Simoneti, 1997). In the top-down approach, the government takes the initiative (World Bank, 1996) and the necessary laws and regulations are put in place before trading starts. Development begins at the high end of the market with only a small number of high-quality stocks initially traded. These securities are offered through traditional voluntary IPOs on the stock exchange. Trading in such stocks tends to be fairly liquid and as the market develops the number of stocks traded grows. This evolution has dominated in both countries that never had mandatory listing of securities in the aftermath of privatization (e.g. Hungary) and in countries where the stock markets were created well before mass privatization began (Poland). Stock markets created this “standard” way typically develop because economic conditions require it; the supply of capital for restructuring from other sources is limited.<sup>12</sup>

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<sup>11</sup> The amount of stocks traded as a percent of GDP increased significantly within the first three years of stock exchange functioning in countries where mass privatization was implemented (Czech Republic, Lithuania, Slovakia), then decreased substantially. These exchanges have recovered only in recent years. On the other hand, in countries without mass privatization (e.g. Hungary), the value of stocks traded has increased gradually over time (from WDI database).

<sup>12</sup> In this respect, the role of banks in the economy is important. In the Czech Republic, companies were able to obtain loans from a bank relatively easily (soft budget constraint). In Hungary, in contrast, it was quite difficult to obtain resources from a bank, so stock market development was pushed from the inside.

In the bottom-up approach, supply and demand form the rules that govern the market. There are only minimal, if any, regulations established before trading commences. Where rules and institutions develop with the market (World Bank, 1996), there is necessarily an unregulated market at the start before the rules are set.<sup>13</sup> This situation was typical for economies where shares were mandatorily listed following the implementation of mass privatizations.<sup>14</sup> The natural outcome of such privatization was a large number of stocks listed on the stock exchange governed by minimal regulation. Since such markets were required to facilitate quick transfer of ownership, the development of a stock market was nearly spontaneous and responded solely to the trading needs generated by privatization (Fine and Karlova, 1998). Taking this statement to the extreme, it is possible to consider stock markets as a byproduct of mass privatization.

Simoneti (1997) distinguishes two bottom-up scenarios. Under the first, stocks of all companies are traded on the public market, enabled through minimal regulatory standards (Czech Republic, Slovakia). As regulation gradually strengthens, some companies find themselves unable to meet these requirements and leave the public market. The second scenario materializes when a certain limited number of securities are traded publicly and are subject to strict regulation. The remaining firms remain “quasi-public” and are subject to relatively weak regulation (e.g. Slovenia). This dual approach allows the stock market to develop simultaneously at the high and low end of the market.

The top-down and bottom-up approaches to stock market creation relate to various modifications of the main privatization methods implemented in certain countries (see Table A.1 in the appendix). Case-by-case privatization took the form of direct sales or share issue privatization, similar to initial public offerings in the private sector (Brada, 1996). Stock markets in countries using case-by-case privatization tended to emerge gradually and originate through voluntary IPOs initiated either by share issue privatization or by firms already acquired by new owners searching for additional capital resources (especially if the supply of capital for restructuring from other sources is limited).

Voucher privatization, on the other hand, merely resulted in a formal change of ownership from the state to a large number of uninformed shareholders with no experience in managing such assets. The ineffectiveness connected with state ownership was transferred to a group of “quasi-owners” with relatively short planning horizons and who did

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<sup>13</sup> A good example is the creation of the Securities Exchange Committee (SEC) in the Czech Republic in 1998, five years after trading on the Prague Stock Exchange started.

not think strategically.<sup>15</sup> Given how poorly voucher privatizations were conducted, they can hardly be considered “deep” in the sense defined by Zinnes et al. (2001).<sup>16</sup> It caused serious problems that were either dismissed as temporary (i.e. they would be solved by the power of the market<sup>17</sup>) or that were not accounted for when privatization was undertaken. Voucher privatization failed to generate the new capital necessary to restructure companies strategically or concentrate ownership.

### 3 Methodology

Our null hypothesis states that mass privatization in transition countries did not affect the development of stock markets. The alternative claims that mass privatization has influenced stock market development. More specifically, we expect mass privatization to have a negative influence on stock market functioning. The formal model specification accounts for the effect of privatization together with the country effect as follows:

$$market\_ind_{i,t} = \alpha_i \cdot country_i + \beta_1 \cdot priv_{i,t} + \beta_2 \cdot t \cdot priv_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where the relevant group of variables is defined as follows:

- *market\_ind* stands for an indicator of stock market development (market capitalization, turnover ratio, value traded, and new capital raised);
- *country* stands for a country dummy variable;
- *priv* is a dummy variable that equals 1 if voucher privatization was implemented in a given country (as the primary or secondary privatization method under the EBRD classification), and 0 if another privatization method was implemented;
- *t* stands for linear trend that is added to the privatization dummy.

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<sup>14</sup> For details on various mass privatization models, see Estrin and Stone (1997).

<sup>15</sup> These owners were survival-oriented, focused only on sustaining current cash flow (World Bank 1996). Since the immediate liquidation value of such companies was often higher than the net present value of future investments (Lízal and Švejnar, 2001), it was more profitable for “quasi-owners” to strip the company’s assets.

<sup>16</sup> Zinnes et al. (2001) argue that “privatization involving change-of-title alone is not enough to generate economic performance improvements” (p. 147). “Deep” privatization should include institutional and “agency”-related reforms as well.

This specification includes mass privatization dummies with and without linear trend. The dummy variable without trend is meant to uncover the average effect of mass privatization on the stock market. The dummy with linear trend anticipates the evolving impact of privatization during the transition period as ownership structures of privatized companies are consolidated. Such ownership changes typically took several years and, in the majority of cases, were intermediated by the stock market. Thus, most trades that took place on the stock exchanges depended heavily on the privatization method and its progress. By considering both dummy variables, we hope to investigate the interaction of the initial effect of privatization and its evolution over time.

Since the implementation of mass privatization usually took several years, its impact on stock markets is typically not observed in the first year of privatization. Therefore, except the contemporaneous effect of privatization ( $priv_t$ ), we also estimate two other modifications of our basic model that include privatization dummy with a one-year ( $priv_{t-1}$ ) and a two-year lag ( $priv_{t-2}$ ).

The estimation and testing are done in the framework of the analysis of variance. We estimate the effect of privatization on stock market development by considering privatization and country effects together (equation 1). We control only for privatization and country effects at this stage as our first objective is to uncover if the effect of privatization is present in the data, i.e. if privatization has had any influence at all on stock market development in transition countries. While controlling for country effects may be considered an overly broad variable, it contains all the country specific characteristics for which we seek to account. It is a far more general indicator than select economic variables. By casting a wide net, we avoid the problem of possible model misspecification, since it is especially challenging in the case of transition countries to identify those economic variables crucial to stock market development.<sup>18</sup>

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<sup>17</sup> Mutual privatization funds were expected to contribute to active corporate governance after the shares of formerly state enterprises were distributed in mass privatization.

<sup>18</sup> One of the most important determinants in this respect is bank lending, which reflects an alternative source of funding for companies. We consider it part of the country effect at this stage because bank sector development and privatization were at different phases of development in individual countries and it was significantly influenced by various factors connected to the transition process. When more data from transition countries eventually becomes available, we hope to conduct a similar analysis with specific economic variables that seem to influence stock market development.

### 3.1 Data description

Our data come primarily from the World Development Database (available from the World Bank). Where indicated, the data set is supplemented by data from the World Federation of Exchanges and local stock exchange figures. Dummy variables for mass privatization are constructed based on different issues of the Transition Report published by the EBRD. A definition and brief description of the most important variables used in this study are provided in Table A.2 and Table A.3 in the appendix.

To investigate whether and to what extent privatization methods in transition economies influenced the emergence and development of stock markets, we examine a sample of former communist countries. Most of the 27 states in Central and Eastern Europe and Central Asia considered transition economies are included in our sample.<sup>19</sup> The list of countries and variables covered is provided in Table A.4 in the appendix.

The time period under consideration covers the transition from 1990 to 2003. Unfortunately, the data vary across countries, so only an unbalanced panel data set is available. Moreover, some transition countries have not proceeded far enough in the transition process to make it possible to investigate links with stock market development. In other words, this unbalanced panel is the result of “true” missing values and an absence of observations in countries without stock markets.<sup>20</sup>

The panel is further unbalanced by the quality of the available data. Although data exist for certain countries, care must be taken to examine the data before using them. Where necessary, they need to be cleaned up for further estimations because the nature of transition economies leads to observations that cannot be included in the data set. It is, however, impossible to stipulate the exact criteria for our decisions as they are primarily based on original country data. Moreover, the estimation results may be easily spoiled by growth rates recorded in the thousands of percent in cases where a newly created stock exchange traded during a time period shorter than one year or where several years went by before trading was actually initiated.<sup>21</sup> Moreover, we need to account for frequent organ-

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<sup>19</sup> It is not possible to include all transition countries as relevant data are not available in all cases.

<sup>20</sup> We do not assign a “zero” value for countries where there was no stock market at the beginning of transition. Such an approach would result in an artificially balanced panel. While this would not change the estimated coefficients, t-statistics could be affected significantly and through them the results of the overall hypothesis testing.

<sup>21</sup> We see this in Croatia (stock market founded in 1994, but no active trading until 1996), Latvia (founded in 1993, trading launched in 1995; the situation began to normalize in 1996), Lithuania (trading officially started in 1993, but the figures are very low until 1995; the situation begins to normalize in 1996), Moldova

izational changes on the stock exchanges and other exogenous factors (e.g. the Russian financial crisis in 1998) that may have influenced actual figures.<sup>22</sup> Another exogenous influence was Russia's 1998 financial crisis. All of these problems were taken into account when cleaning the data and constructing the actual data set. Observations that could potentially damage the analysis have either been omitted or remedied by creating suitable dummy variables.

We measure stock market development using the standard indicators of market size and liquidity.<sup>23</sup> Market capitalization reflects the total value of domestic shares listed on a particular stock exchange and ideally also shows the importance of financing through equity issues. Under mass privatization with mandatory stock listing, however, this figure can be significantly inflated when the majority of stocks listed are traded occasionally or not at all. In contrast, the indicators of liquidity reflect real stock market activity and are not spoiled by a high number of non-traded stocks.

We employ two measures of liquidity. The value traded equals the value of trading divided by GDP. The second measure is the market turnover ratio defined as the value of stocks traded divided by the value of listed stocks. The turnover ratio, which is unaffected by price changes, reflects the real situation on the market.

In the context of transition economies, we also find it important to add a variable of new capital raised as a further measure of stock market development. Although this measure reflects the market function of providing financial resources for enterprises, it suffers from two serious shortcomings. First, the number of IPOs, especially in comparison to market capitalization, is insignificant in transition countries. Second, data on new capital raised in the context of transition economies do not necessarily reflect the true situation. As the following section indicates, this can influence the results.

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(official launch in 1995, but trading active only from 1997), and Romania (started operations in 1995, but moderate trading only from 1997).

<sup>22</sup> These include the merger of several exchanges into a new entity (Kazakhstan in 1997, Bulgaria in 1998), the decision of stock exchange authorities to list a certain group of securities not previously listed (Latvia in 1999), macroeconomic development in a given country (Poland in 1993), and trading system enhancements initiated by the stock exchange and liberalization of block trading (Lithuania in 1997).

<sup>23</sup> These have been used in studies investigating the development of stock markets and its connection to economic growth (Levine and Zervos, 1998; Demirguc-Kunt and Maksimovic, 1998; Rousseau and Wachtel, 2000; Beck and Levine, 2004).

## 4 Estimation results

The outcome of our estimation is discussed according to the stock market indicators used as dependent variables.

- MARKET CAPITALIZATION TO GDP

Results showing the influence of mass privatization on market capitalization as a percentage of GDP are provided in Table 1.

Table 1 Results of ANOVA for market capitalization to GDP as dependent variable, pooled data

Dependent variable	MARKET CAPITALIZATION TO GDP		
Model specification	Privatization and country effect		
	Coefficient	P-value	R <sup>2</sup> fixed effects
<i>Contemporaneous effect</i>			
Privatization dummy (priv)	-0.56	[0.821]	0.64
Privatization dummy with trend (t.priv)	1.61	[0.000]	
<i>One year lag</i>			
Privatization dummy (priv)	1.3	[0.539]	0.64
Privatization dummy with trend (t.priv)	1.57	[0.000]	
<i>Two years lag</i>			
Privatization dummy (priv)	3.33	[0.062]	0.65
Privatization dummy with trend (t.priv)	1.47	[0.000]	
Observation/country	151/20		

Country characteristics contribute a great deal to explaining the variability of the model. The R<sup>2</sup> measure of the estimated model has improved from several percentage points when the privatization effect is considered in isolation to over 60% when country characteristics are taken into account.<sup>24</sup> This confirms our expectations shaped by the fact that the economic environment in individual transition economies varied considerably, especially with respect to the different initial conditions and sequencing of reforms. The use of lagged privatization dummies (up to two years) provides more significant estimates. They indicate privatization did not greatly influence stock markets initially.

The estimated coefficients are positive and mostly significant. This shows the positive influence of mass privatization on market capitalization. The coefficients for dummies including linear trend are all significant, thus showing the evolving influence of mass pri-

<sup>24</sup> Detailed results are available upon request.

vatization on stock market development. The significance of the privatization dummy without trend further indicates that there was a sudden change in market capitalization following the implementation of the mass privatization scheme. As expected, this was positive due to the fact that the shares of privatized companies were simply put on the market in the majority of countries.

Although not all the coefficients in our specification were significant, including the privatization dummy with and without trend (most probably due to their possible correlation), there is a visible trend. Country specifications have improved the model and both with and without trend dummies exhibit positive coefficients consistent with our hypothesis. Nevertheless, in this case only the trend dummy remains significant and it seems that except for the case with a two-year lag, the dummy without trend adds no explanatory power. All in all, our expectations are confirmed as to the positive sign and significance of estimated coefficients when market capitalization serves as an explanatory variable.

- GROWTH IN STOCKS TRADED

In line with our expectations, the impact of privatization on the growth in value of stocks traded is mostly significant when country characteristics are taken into account. While most coefficients are significant, the  $R^2$  measure reaches only one third of the value for market capitalization. We posit that the value of stocks traded in comparison to market capitalization was likely influenced by privatization only indirectly or that privatization may to some extent be correlated with the country effect.

Table 2 Results of ANOVA for growth in value of stocks traded as dependent variable, pooled data

Dependent variable	GROWTH IN STOCKS TRADED		
Model specification	Privatization and country effect		
	Coefficient	P-value	R <sup>2</sup> fixed effects
<i>Contemporaneous effect</i>			
Privatization dummy (priv)	0.29	[0.558]	0.22
Privatization dummy with trend (t.priv)	-0.24	[0.001]	
<i>One year lag</i>			
Privatization dummy (priv)	1.60	[0.001]	0.23
Privatization dummy with trend (t.priv)	-0.29	[0.000]	
<i>Two years lag</i>			
Privatization dummy (priv)	1.24	[0.005]	0.23
Privatization dummy with trend (t.priv)	-0.30	[0.000]	
Observation/country	102/17		

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As Table 2 reveals, the immediate effect of privatization on stock trading statistics is positive. The introduction of huge numbers of new shares to the stock exchange leads to optimism and higher volumes of stocks traded. As the ownership structure consolidates and there is no more space for the speculation of investment funds and other intermediaries over the medium run, however, the influence of privatization becomes less positive. Thus, trading as an indicator of stock market liquidity crucial for healthy stock market development is, in fact, negatively influenced by mass privatization and traditional stock market development is thwarted.

This negative long-run effect is also reflected in significant results for the privatization dummy variable that only includes linear trend. This is significant even without considering country effects, which once again supports our hypothesis about the long-lasting influence of privatization. Yet, while this effect can be observed in the long run, we do not consider it permanent; it relates solely to the transition period. Recent development of stock indices in major transition countries supports this statement.<sup>25</sup> Despite initial problems and related costs, market forces have tended to win out over the long run and contribute to the stabilization of stock markets in transition economies.

- TURNOVER RATIO

This is another indicator of stock market functioning that supports our previous results and the initial hypothesis. We consider the following outcome even more important, especially due to the better quality of the chosen turnover ratio indicator which is not spoiled by price changes or by a high number of listed companies after privatization, and which reflects the true liquidity of the market.

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<sup>25</sup> The Prague Stock Exchange index PX50 recovered to its initial 1994 level of 1,000 only in 2004.

Table 3: Results of ANOVA for turnover ratio as dependent variable, pooled data

Dependent variable	TURNOVER RATIO		
Model specification	Privatization and country effect		
	Coefficient	P-value	R <sup>2</sup> fixed effects
<i>Contemporaneous effect</i>			
Privatization dummy (priv)	-41.87	[0.082]	0.44
Privatization dummy with trend (t.priv)	-4.22	[0.009]	
<i>One year lag</i>			
Privatization dummy (priv)	-28.71	[0.135]	0.43
Privatization dummy with trend (t.priv)	-4.32	[0.011]	
<i>Two years lag</i>			
Privatization dummy (priv)	-32.26	[0.022]	0.43
Privatization dummy with trend (t.priv)	-3.91	[0.028]	
Observation/country	111/18		

Table 3 shows that with the exception of one coefficient, all estimated coefficients are significant.<sup>26</sup> All estimated coefficients for turnover ratio are negative, which only substantiates the unfavorable influence of privatization on stock markets. The model's specification further shows that the negative effect holds true for both the initial effect and over time.

- NEW CAPITAL RAISED

In comparison to turnover ratio, as Table 4 shows, the new capital raised variable provides us with no new significant parameters. Without considering country effects no coefficients are significant, and the overall results for new capital raised seem to be quite ambiguous, possibly due to the unclear nature of the data on new capital raised and to problems with its measurement in transition countries.

<sup>26</sup> Again, all detailed results are available upon request.

Table 4: Results of ANOVA for new capital raised as dependent variable, pooled data

Dependent variable	NEW CAPITAL RAISED		
Model specification	Privatization and country effect		
	Coefficient	P-value	R <sup>2</sup> fixed effects
<i>Contemporaneous effect</i>			
Privatization dummy (priv)	-0.010	[0.205]	0.35
Privatization dummy with trend (t.priv)	-0.001	[0.205]	
<i>One year lag</i>			
Privatization dummy (priv)	-0.020	[0.047]	0.67
Privatization dummy with trend (t.priv)	0.000	[0.982]	
<i>Two years lag</i>			
Privatization dummy (priv)	-0.010	[0.131]	0.38
Privatization dummy with trend (t.priv)	0.000	[0.561]	
Observation/country	81/14		

Another possible problem is the relatively low number of observations, especially in comparison to other dependent variables used. One may even question the appropriateness of the new capital raised indicator for bank-based financial systems that traditionally tend to prevail in transition economies. We are aware of these shortcomings, but nevertheless we consider the new capital raised variable important in fulfilling the basic function of a stock market, so it is included in our analysis. Its importance has increased over time as IPOs on the stock markets of transition countries have become more common.

#### 4.1 Robustness check

In all of the above-described estimations, we included a dummy variable for the 1998 Russian crisis to check the robustness of the results. As the influence of the crisis on all transition countries was not strong, this dummy did not figure significantly in our estimations.

Yet another modification of the basic model is the inclusion of a quadratic trend. We have considered a privatization dummy including quadratic trend alone, as well as its interaction with a privatization dummy without a trend component. Results reveal the same pattern as when including linear trend, which again points to the robustness of our results.

In our view, the simple estimation procedure performed above is appropriate both with respect to the data sample we have available and to the main objective of our investigation – uncovering a possible connection between mass privatization and stock market

development. Data sufficiency problems occur if we want to include the development of stock markets over time as an inseparable part of the transition process. In such a case, we would need to add a trend for each country's development. This kind of estimation is not possible with the small data sample as we have presently available. When more data is available, we expect further research in this area will be feasible.

## 5 Conclusions

We used available data from a majority of transition economies to prove empirically our hypothesis that mass privatization influenced stock market development and exerted a negative impact on stock market functioning. The results of our estimation, which accounted for privatization method and country effects, validated the hypothesis in the short and medium run. Moreover, the connection between mass privatization and stock market development was confirmed using different indicators of stock market development. In accordance with our expectations, market capitalization to GDP increased suddenly following mass privatization. Our liquidity indicators confirmed that most shares traded occasionally or not at all, as the value of stocks traded and the turnover ratio exhibited negative coefficients for the privatization dummy. This trend was quite visible over the medium term.

These results further imply that in countries using mass privatization approaches, the stock market was established and perceived only as a byproduct of the privatization process. These stock markets did not initially fulfill their main economic function of providing capital resources to enterprises. Such non-transparent markets offering thousands of securities naturally diminished investor confidence and did little to jump-start economic growth in transition economies. Despite such an unfavorable beginning, the main stock indices in transition economies have shown improvement recently. It seems that resources in the transition economies would have been used more efficiently had a more careful approach to stock market creation been adopted.

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Table A.1. Primary and secondary privatization method implemented in transition countries

Country	Primary method			Secondary method		
	Direct sales	MEBOs	Vouchers	Direct sales	MEBOs	Vouchers
Albania		*				*
Armenia	99→		→99		*	
Azerbaijan <sup>X</sup>	01→		*	*		2001→
Belarus		*				*
Bosnia and Herzegovina			*(99→)	*(99→)		
Bulgaria	*					*
Croatia		*				*
Czech Republic			*	*		
Estonia	*					*
FYR Macedonia		*		*		
Georgia			*	*		
Hungary	*				*	
Kazakhstan	99→		*	*		99→
Kyrgyz Republic			*		*	
Latvia	99→		*	*		99→
Lithuania			*	*		
Moldova			*	*		
Poland	*				*	
Romania		*		*		
Russia			*	*		
Serbia and Montenegro	Serbia		Monten.	*		
Slovak Republic	*					*
Slovenia		*				*
Tajikistan	99, 2002→	98, 2001		2000, 2001	2002→	98, 99
Turkmenistan		*		*		
Ukraine			*		*	
Uzbekistan		*		*		

Source: EBRD Transition Reports (1998–2004)

Note: MEBO = management employee buyout.

Data for Serbia and Montenegro are available only from 2003

X – Direct sales in Azerbaijan in the form of cash auctions were used in 2000 and after 2002.

Table A.2. Definitions and data sources of the variables included in the analysis

VARIABLE NAME	SOURCE	DEFINITION
Market capitalization to GDP	WDI database (based on Standard & Poor's <i>Emerging Stock Markets Factbook</i> )	Share price times number of shares outstanding (% of GDP)
Growth of value traded	WDI database (based on Standard & Poor's <i>Emerging Stock Markets Factbook</i> )	Value traded refers to total value of shares traded during period (% of GDP)
Turnover ratio	WDI database; (based on Standard & Poor's <i>Emerging Stock Markets Factbook</i> )	Total value of shares traded during period divided by average market capitalization for period.
New capital raised	<a href="http://www.fibv.com">http://www.fibv.com</a>	capital raised by all listed companies (% of market capitalization)
Mass privatization dummy variable	EBRD, taxonomy of mass privatization	dummy variable that equals one starting from the period when mass privatization was implemented as the primary or secondary privatization method in a given country (value 0 before it started)

Table A.3. Main descriptive statistics of stock market indicators used in the analysis

Variable	Obs.	Country	Observation/country			Mean	Standard deviation	Median	Min	Max
			average	min	max					
Market capitalization to GDP	151	20	7.55	2	13	10.8	10.66	7.9	0.004	53.2
Growth in stocks traded (% of GDP)	102	17	6	1	12	0.6	2.81	-0.1	-1.0	25.1
Turnover ratio	111	18	6.17	1	12	39	49.62	23.1	0.02	348
New capital raised to market capitalization	81	14	5.79	2	9	0.001	0.005	2.8e-6	0	0.04

Source: Estimation data set, authors' calculations.

Table A.4. Number of observations for different variables and transition countries included in the analysis

Country/ variable	Market capitalization to GDP	Stocks traded Growth	Turnover ratio	New capital raised	Mass privatization primary	Mass privatization secondary
Albania	x	X	x	x	x	9
Armenia	5	X	4	x	6	x
Azerbaijan	2	X	x	2	4	3
Belarus	x	X	x	x	x	10
Bosnia and Herzegovina	x	X	x	x	4	x
Bulgaria	8	4	4	7	x	8
Croatia	8	7	7	2	x	6
Czech Republic	10	9	9	9	12	
Estonia	7	6	6	5	x	10
FYR Macedonia	6	5	3	x	x	x
Georgia	x	X	0	x	9	x
Hungary	13	12	11	9	x	x
Kazakhstan	5	3	3	2	5	5
Kyrgyz Republic	2	X	1	x	10	x
Latvia	8	5	7	6	6	5
Lithuania	8	6	7	6	13	x
Moldova	5	3	2	x	11	x
Poland	12	9	12	9	x	x
Romania	9	7	7	6	x	9
Russia	12	9	8	2	12	x
Slovak Republic	10	9	9	7	x	12
Slovenia	10	1	6	9	x	10
Tajikistan	x	0	x	x	x	2
Turkmenistan	x	0	x	x	x	x
Ukraine	7	5	5	x	9	x
Uzbekistan	4	2	x	x	x	x
No. of observations	151	102	111	81	101	89
No. of countries	20	17	18	14	12	12

Sources: WDI database, The World Federation of Exchanges, EBRD Transition Reports

Note: "x" indicates data are unavailable.

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