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Ownership and Performance of Lithuanian Enterprises

David A. Grigorian

Does private ownership improve on corporate performance in a developing institutional environment? In Lithuania commercial transfer of state property to private owners has significantly improved enterprises' revenue and export performance.

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Summary findings

Grigorian presents some evidence of improved corporate performance in Lithuania for the period 1995–97. His question: Were these improvements in any way caused by privatization and changes in the environment in which enterprises operate?

He presents evidence of correlation between ownership and enterprise performance as measured by increased revenues and improved export performance. Controlling for preselection bias increases the magnitude and significance of private share ownership, which indicates negative selection bias at privatization. On the other hand, (expected) subsidies seem to contribute negatively to enterprise performance. However, the study finds no clear evidence of the effect of market competition on performance indicators in the short run.

Grigorian's is the first study to analyze the consequences of commercial (as opposed to mass) privatization in Central and Eastern European countries.

This paper — a product of the Private and Financial Sectors Development Sector Unit, Europe and Central Asia Region — is part of a larger effort in the region to study enterprise restructuring in transition. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Darlene Brown, room H6-084, telephone 202-473-3542, fax 202-522-0073, email address dbrown@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. The author may be contacted at dgrigorian@worldbank.org. May 2000. (40 pages)

OWNERSHIP AND PERFORMANCE OF LITHUANIAN ENTERPRISES

David A. Grigorian[*]

Email: Dgrigorian@worldbank.org

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[*] - ECSPF, The World Bank and PhD Candidate, Department of Economics, University of Maryland at College Park. I thank Simeon Djankov, Ulrich Hewer, Alex Voicu, Ying Lin, conference participants in St. Louis, Missouri for helpful comments, and Alma Rutkauskiene (Lithuanian Department of Statistics) for making the dataset available.

Ownership and Performance of Lithuanian Enterprises

I. Background

The large body of literature on enterprise restructuring in Transition Economies is composed primarily of studies based on evidence from Central and East European (CEE) countries[1]. So far very little effort has been made to understand the post-privatization performance in countries of the former Soviet Union (FSU), outside Russia[2]. The reason is perhaps that the privatization and restructuring in FSU countries lagged somewhat behind of that in CEE countries. In addition, the absence of established systems of data collection is believed to be at least partly responsible for the lack of research in the area.

The paper intends to provide an overview of the privatization process in Lithuania and to look for potential patterns in the link between enterprise performance and ownership. The main question posed in the paper is whether observed improvements in enterprise performance are in any way caused by privatization and changes in business environment in which enterprises operate.

Researching post-privatization enterprise performance in Lithuania is of significant interest for a number of reasons. Before the collapse of Soviet Union, Lithuanian economy was highly integrated into Soviet economy. Enterprises were almost never involved in marketing and distribution of their products. Export and import were channeled through central planning agencies in Moscow. Since regaining its independence in 1991, Lithuania has made significant progress in developing its private institutions. The 1991 Law on Privatization originated the distribution of vouchers to the population. The distributional approach to state property transformation (i.e. voucher or mass privatization) received wide support from the public. It was believed that a high speed of privatization would ensure the success of economic reforms creating more

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[1] See for exapmle Pinto *et al.* (1993), Frydman *et al.* (1997), Smith *et al.* (1997), Pohl *et al.* (1997) among others.

[2] Exceptions are Estrin and Rosevear (1999) and Djankon (1999). For the case of Russia see Barberis *et al.* (1996), Earle and Estrin (1997), Linz and Krueger (1998) among others. Anderson, Lee and Murrell (1999) and Andeson, Korsun and Murrell (1999) are

favorable conditions for foreign investment while a cash-based commercial privatization program to be introduced at a latter stage would compensate the shortcomings of mass privatization. However, despite being a mass privatization program by nature, the resulting (Stage I) privatization program of 1991-1995 largely favored incumbent workers and management. (See Section III for an extended discussion).

The study of Lithuania allows us to re-examine post-privatization restructuring in an economy that was integrated into the Soviet economic system more than the CEE countries. The advantage of Lithuania is the longer history of privatization and restructuring relative to other FSU countries and the relatively high quality of data. However, one should be aware that the Baltics are in many respects different from the other FSU countries because of their historical heritage, proximity to the West, and shorter tenure of Soviet rule.

The paper is structured in the following way. Section II review empirical literature on the relationship between state ownership and enterprise performance. Section III provides an overview of privatization process in Lithuania and examines some stylized facts in post-privatization ownership distribution and corporate control. Section IV describes the dataset used in the analysis and provides basic indication of improved performance of enterprises, and the link between ownership and performance. The econometric model and regression results are discussed in Section V. Finally, Section VI concludes.

II. State Ownership

There has by now grown a large body of empirical literature explaining different patterns in enterprise performance in the Transition Economies. Researchers usually study the set of issues related to state vs. private ownership bearing in mind the fundamental differences in incentive structures and constraints facing state and private owners. The underlying assumption for the effect of ownership on performance is that (concentrated outside) private owners have all the incentives and the ability to take measures aimed at

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notable exceptions as they touch upon privatization and restructuring in a former Soviet block country outside of CEE and FSU, Mongolia.

the increase of operational efficiency of the enterprise. On the other hand, since (in the context of transition from plan to market) for most enterprises privatization will imply losing any existing subsidies and state protection (including output distribution network), one would expect private firms to adopt more aggressive restructuring strategy and hence demonstrate better performance. Consequently, one would expect a significant difference between private and state owned firms in terms of performance and restructuring activity.

The difference in performance between state and private (privatized) firms in Shleifer and Vishny (1994) view is due to the fact that politicians are likely to impose a number of objectives on the management of a state firm other than common profit maximization. In particular they argue that it is in politicians' direct interest to push for employment maximization, hence less employment restructuring and fewer layoffs in state firms.

Frydman *et al.* (1997, 1998a) distinguish between revenue and cost performance of enterprises. Following Shleifer and Vishny, they believe that it is the inability of state firms to layoff workers (due to politicization of decision making) that undermines the cost performance of state enterprises[3]. On the other hand, the difference in revenue performance between state and private firms is largely determined by lack of incentives (hence different attitudes towards risk taking), different degrees of accountability, and lack of human (managerial) capital[4]. However they conclude that overall privatization is more effective in improving revenue rather than cost performance of enterprises.

Yet in some countries state ownership has proven to be at least as efficient as private ownership in terms of stimulating enterprise performance and restructuring. Earle and Estrin (1997) and Linz and Krueger (1998) report no significant differences between the effect of state and private ownership on performance in Russia. Anderson, Lee and Murrell (1999) study on Mongolia finds that state ownership outperformed both insider

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[3] They show empirically that this is true in particular where there is significant active state involvement/interest in the monitoring of the enterprise (see Frydman *et al.* (1998a), Table 1).

[4] However they do not find conclusive evidence in support of their human capital argument: the managers of state firms in their sample were not statistically different from their private sector counterparts when a number of human capital characeristics

and outsider private ownership in terms of its effect on a number of performance indicators when endogeneity of ownership is controlled for. Authors argue that the state has both the necessary experience and incentives to oversee restructuring while private owners are either too dispersed (outsiders) or do not have efficiency as the main goal (insiders).

However, this seems to be particularly true for the countries with underdeveloped legal and regulatory framework, unsound business environment, and weak contract enforcement. And as Nellis (1999) notes "the further east one travels, the more the required supporting, larger economic process of financial discipline, competition and freedom of entry have not been attended to". Perhaps a more extreme view of the importance of institutional factors is the one presented by Tandon (1995) who argues that it is the level of competition and not the ownership that effects performance and efficiency. Slightly less restrictive argument is put forward by Stiglitz (1998) who believes that conditions under which a privatized company "pursues a full range of social objectives...are highly restrictive, corresponding closely to highly restrictive conditions under which the fundamental theorems of welfare economics were established". Thus, I hypothesize, it is the failure of these conditions (free and costless exchange, competitive markets and households, enforcement of transactions, etc.) to prevail in some Transition Economies, that effectively undermines the effectiveness of private (privatized) enterprise performance, among other social objectives, vis-à-vis that of state enterprises[5].

The link between business environment (or more precisely, lack thereof) and economic performance in a planned economy has been studied by Janos Kornai. In what by now has become a classical work, Kornai (1980) coined the state where enterprises enjoyed a variety of state-originated subsidies and privileges as *soft budget constraint*. The phenomenon was not specific to any enterprise or sector, but instead was fairly widespread and transparent across the Socialist Block. Kornai argued that soft budget

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(education, age, tenure, etc.) were accounted for. In fact, managerial skills seem to play an important role in both cost and revenue performance of enterprises.

[5] Here the word *effectiveness* is used in a very broad economic sense, including level of output, productivity, cost efficiency and other performance indicators, that can be used to make judgements about welfare implications of a firm's production activities.

constraints were associated with poor performance of enterprises since they did not create the financial discipline and accountability necessary for efficiency and growth.

However, in the present day transition context, it is not at all clear whether state ownership is necessarily complementary to the use of subsidies, and if so, whether subsidies have been detrimental to the efficiency of enterprises. A potential link between state support and performance (opposite to what has been pointed out by Kornai) arises because generally the state is known to extend preferential treatment to enterprises it controls (by offering state contracts, protection from import competition, participation in state subsidized programs, etc.), which have a potential of benefiting the enterprises (at least in the short run) in the presence of shrinking markets and collapsing trade links[6]. In any case, this dictates the necessity of accounting for direct state support (along with controlling for the effect of state share on performance indicators) if we were to judge the full extent of state ownership of and assistance to enterprises, and account for the differences in the business environments where state and private firms operate. There is some empirical evidence from Transition Economies demonstrating the importance of hard budget constraints in disciplining enterprises and improving performance (see Estrin *et al.* (1995), Pinto *et al.* (1993), etc).

On the other hand, however, Earle and Estrin (1998) report no (negative) relationship between state assistance (and in particular, state subsidies) and labor productivity for their sample of Russian enterprises. In their research on Mongolia, Anderson *et al.* (1999) also find no conclusive evidence of the effect of (perceived) state support on performance. These results should be treated with caution and by no means interpreted as suggesting a general performance-improving role of state subsidies. The emerging conclusion (which still has to be tested in the series of forthcoming papers) might well be that, in the presence of generally weak business environment, benefits associated with state support (in terms of preserving output levels and thus improving short run measures of productivity from what they might have been, had there not been

[6] Potential positive effect of subsides are likely to be detectable in some performance indicators (sales, exports) but not in the others (total factor productivity, cost efficiency), suggesting that subsidies might be helpful in keeping enterprises afloat rather than improving their efficiency.

any state support) might outweigh the costs of moral hazard (also associated with state support)[7].

III. Privatization in Lithuania[8]

General Background

Since regaining its independence in 1990 Lithuania has made significant progress in developing private market institutions. The private sector's share of GDP currently accounts for over 70 percent. Part of this growth undoubtedly came from new established enterprises, yet most of it has been attributed to privatized entities.

The Government showed a firm commitment to voucher privatization and after the Law on Privatization was adopted in February 1991 distribution of vouchers to the population began. However, distribution of property under the adopted privatization scheme did not start until September 1991 when relevant privatization agencies were established[9].

An important feature of state property transformation in Lithuania was the dominant role played by investment vouchers. The latter might have been (1) used for privatization of industrial enterprises, housing, and land, (2) exchanged for shares in Investment Stock Companies, or (3) sold for cash[10]. The main argument of opponents of mass privatization was that the scheme will fail to form effective private owners and provide appropriate corporate governance. However arguments like the speed of

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[7] Since policy implications of this conclusion might be very important and politically sensitive, the issue will be given careful treatment in the subsequent papers. As a starting point it should be noted that including the amount of subsidies as a regressor in the performance regressions is likely to bias the estimated coefficients for at least two reasons: (1) subsidies could be endogenous to performance, and (2) subsidies might be correlated with state share ownership in the firm.

[8] I thank Diana Sutkaityte (Swedish Trade Consul, Vilnius, Lithuania) for providing in-depth information on Lithuanian Privatization and allowing me to use products of her own research in this Section.

[9] The Central Privatization Commission (CPC) was the state agency charged with the management of privatization process until the end of voucher privatization in July 1995. The wide network of local privatization commissions and agencies were coordinated by the CPC through the Privatization Department of the Ministry of Economics.

privatization, equity and fairness, and the necessity to compensate citizens for low wages during the socialist regime were brought up to support the mass privatization scheme. Finally, two thirds of state owned property was put up for privatization to be carried out in two stages: Stage I - mass privatization for vouchers, Litas and foreign currency, and Stage II - commercial privatization for Litas and foreign currency

Stage I - Mass Privatization

There were more than 8,000 state enterprises before privatization in Lithuania. After four subsequent revaluations the total value of state assets was estimated at Lt 13.6 billion. The initial privatization program involved 6,644 enterprises (82 percent of all enterprises) with Lt 9.8 Billion in total assets. More than 5,700 enterprises (with Lt 7 billion worth of state capital in book value) were offered using four basic initial privatization methods: share offerings, auctions, best business plan competitions and cash sales.

The vouchers were distributed to population via voucher accounts with the state Savings Bank. The nominal value of the vouchers received depended on an individual's age and was indexed several times during the program. A total of Lt 10.5 billion of investment vouchers had been distributed to nearly 2.5 million citizens. Around 93 percent of vouchers were used. Of that amount 65 percent were used for privatization of enterprises, 19 percent for housing privatization, with the residual used for agricultural enterprises and land[11]. The first stage of privatization ended in July 1995[12].

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[10] At the beginning trading of privatization vouchers was prohibited. It was legalized only in 1993 after Government's decree on State One -Time Payments and Other Special Compensations.

[11] Initially, vouchers and other special compensation notes which were not used in the privatization process should have been turned in exchange for government securities. However, the Government subsequently announced that this will not be implemented since it has already accumulated a sizeable internal debt and its further increase will not be considered. Instead, in order to collect the amount of unclaimed investment vouchers, a number of large enterprises were added to the privatization list.

[12] The first stage was scheduled to come to a finish by the end of 1992. It turned out, however, that a large amount of vouchers were still held by the public. Furthermore, the introduction of national currency was postponed, and the National Stock Exchange was established only in September 1993. As a result the first stage of privatization lasted until mid-1995. On the legislative side, a new Law on Privatization was adopted and put to work in February 1993. This resulted in the only significant change in the process of

Table 1. Use of investment vouchers in Lithuania as of September 1995

State properties offered through auctions and best-business-plan competitions were both fully subscribed. Meanwhile, the results of privatization in enterprises which were subject to share offerings (2,920 units worth Lt 2631 million) and cash sales (46 units worth Lt 27.6 million) were as follows: 91 and 66 percent in terms of state capital, and 99 and 65 percent of units offered respectively.

Both speed and scope of privatization reached their peak by the end of 1992. At that time figures already were quite impressive: 54 percent of enterprises and 30 percent of assets sold. In short, out of all successful privatization deals, 15 percent by number and 3 percent in terms of capital were concluded during the last four months of 1991, while for the following years the yearly figures were 39 and 27 percent in 1992, 22 and 31 percent in 1993, 15 and 26 percent in 1994, and 9 and 13 percent for the first half of 1995.

Small scale privatization

Privatization of approximately three-quarters of small enterprises offered for privatization (2,000 out of 2,727) was completed by mid 1993. 651 small business entities were privatized through the first four months of privatization between September and December 1991, over 1200 during 1992 and about 350 in the first half of 1993. Privatization of the remaining quarter of small entities (about 700 units) lasted until the end of voucher privatization in July 1995. In total, 2,727 small entities were sold through auctions collecting Lt 165 million. Additionally, 33 small enterprises in the service sector were sold at open foreign currency auctions for total of Lt 17.6 million.

Large scale privatization

Public share offering was the major privatization method since September 1991. Most of privatization deals including 51 percent by number of privatized units and 91 percent in terms of state capital transferred to private ownership were concluded using this method.

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privatization: it allowed insiders to hold 50 percent of shares instead of originally allocated 30 percent (the additional 20 percent did not carry voting rights however). This

During public subscription of shares for nearly 3,000 enterprises over Lt 5.8 billion worth vouchers were used for shares with a total nominal face value of Lt 2.6 billion (see Table 1). The standard subscription scheme was applied in all sectors, except agriculture, forestry, housing and some specialized activities[13]. Most share offerings occurred in Industry (25 percent), Construction (19.8 percent) and Trade (21 percent).

Privatization tenders, or so-called best business plan competitions, were carried out only in cases when public subscription of shares or sale of controlling blocks failed to attract buyers at auctions. Between 1993 and 1995 there were 15 large industrial enterprises privatized by tenders for nearly Lt 500 million.

In addition, since 1993 privatization authorities have organized *foreign currency open tenders* where investors were invited to submit their bids. Within this framework, 14 international tenders were announced, for individual entities ranging from small and average size to a monopoly in the respective field (e.g. tobacco factory). Controlling shares in only four of these units were sold to strategic foreign investors[14] while others remained unsold or were subsequently acquired by domestic (cash) bidders. After completion of voucher privatization in 1995, all further sales were open to both foreign and local buyers without any restrictions.

Stage II - Commercial Privatization

As it became clear that the goals of the first stage of privatization were achieved, transition to commercial methods of privatization became justified on the grounds of achieving allocative efficiency. However this transition was coupled with a worsening

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was believed to have further reduced the speed of privatization through limiting outside participation.

[13] The principal mechanism for public share offerings remained largely unchanged until July 1995. The bidding process was designed as follows: shares were initially offered at a fixed price related to the book value of the enterprise. Bidding was considered over if the subscription reached 80 percent and did not exceed 110 percent of the number of shares offered. Otherwise, a price adjustment procedure was applied to equate demand and supply within the predefined range and with the same selling price for all buyers. A minimum of 5 percent of this price was due to be paid in cash. However, cash payments could not exceed 50 percent of the vouchers paid.

[14] These sales yielded USD 30 million with investment pledges of no less than USD 100 million.

macroeconomic situation and a deteriorating financial state of both state and privatized enterprises. As a result, privatization of large infrastructure enterprises (valued approximately at Lt 3.4 billion) was originally postponed until year 2000[15]. Yet insiders were allowed to acquire up to 10 percent of shares in these enterprises. In addition, only insider privatization was allowed (and limited to 30 percent of shares) in strategic enterprises worth total Lt 3.4 billion. Thus only the remaining non-strategic portion (200 enterprises worth Lt 3 billion in book value terms) was to be put up for cash sale during second stage of privatization[16].

Thus 47 and 272 enterprises were privatized for total amount of Lt 3.2 and Lt 80.9 million in 1996 and 1997 respectively (no privatization took place in 1995 under commercial privatization program).

Commercial Privatization Law

The new Law on Privatization of State Property defining the strategy of the second stage of privatization was adopted in July 4, 1995 and became operational on September 15, 1995[17]. This privatization program was based on sales for Litas and foreign currency and put more emphasis on finding strategic investors for the remaining large SOEs. The Law stated that shares or any property owned by state or municipality except residential dwellings owned by municipalities can be subject to privatization. The Law also lifted the ban on foreign land ownership.

Privatization Agents

On the state level there were two institutions charged with privatization: Lithuanian State Privatization Agency (LSPA) and Privatization Commission. LSPA was the

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[15] However, privatization of large infrastructure companies already began in 1998.

[16] From total number of about 3,000 enterprises/assets only in about 200 of them the state held majority shares. In the remaining enterprises the state share reached 10 percent on average. In these enterprises the state had practically lost control over management and the state shares had (marginal) value in terms of governance only in cases when additional votes were needed for existing parties to reach majority.

[17] The old Law on Voucher Privatization however remained in place for privatization deals approved before September 15, 1995. The new Law was influenced by experience

implementing agency acting on behalf of the Government. The Privatization Commission in turn was appointed by Parliament and played mainly a supervisory role over the LSPA.

Privatization Procedure

In summary the steps could be outlined as follows:

1. preparation (by LSPA) of the annual list of enterprises to be privatized with subsequent approval by the Government;
2. preparation of detailed privatization program for each enterprise and its approval by Privatization Commission;
3. announcing the program in the Privatization Bulletin and elsewhere in the media;
4. public offering organized by LSPA or with assistance from the National Stock Exchange;
5. approval of privatization outcome by the Privatization Commission
6. signing ownership transfer titles by LSPA with subsequent approval by the Privatization Commission.

Should the first privatization attempt fail, the program was repeated or a new program approved. Otherwise the entity would be removed from the privatization list.

Methods of privatization

Unlike the mass privatization, the new law ensured sufficient diversity of methods. The following ones were made available for use during Stage II privatization[18]: public tender, public auction, lease with the right to purchase, direct bargaining, and public offering of shares.

However, there were several restrictions on using any particular method of privatization. *Public tender* was to be used only by enterprises valued at more than Lt 50 thousand if, in addition, the state had a majority shareholding. *Lease with the right to purchase* applied to physical property such as equipment, buildings, but not to shares.

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obtained during voucher privatization including attempts to fight corruption and other illegal activities.

Use of *direct bargaining* was restricted to cases when auction or tender failed to pick a winner, however, there was at least one potential purchaser. *Auctions* were primarily used when the entire state package was up for sale, especially in cases of minority state holdings. If a Joint Stock Company was public, *share offerings* were to be done through the National Stock Exchange [19]. The following section presents some stylized facts observed concerning post-privatization corporate control in Lithuania.

Stylized Facts

- *Insider Ownership:* Although privileges for insiders were insignificant in the beginning of privatization, they expanded as the process continued (note the 1993 Law on Privatization) and management/employee buyout became a more popular method of enterprise privatization at least for the first stage of privatization of 1991-1995. This resulted in insider-controlled corporate structures in many privatized enterprises.
- *Outsider Ownership:* The privatization program in Lithuania has resulted in too little corporate governance by strategic owners capable of bringing about enterprise restructuring and participating actively in corporate control. Bearing in mind the role institutional investors played in the privatization process, it was expected that they would have significant impact on enterprise restructuring and corporate governance. But this turned out to be true only in some cases. Limited financial and human resources as well as information asymmetries, among other reasons, prevented outsider monitoring from being as efficient as it otherwise might have been.

Investment Stock Companies (ISC): Investment Funds (called Investment Stock Companies) emerged in Lithuania after voucher privatization program. They were legally authorized under a Government decree in October 1991. All ISCs started off as closed-end funds and were engaged in collecting privatization vouchers and investing them in privatized companies. Originally they were allowed to trade shares of companies

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[18] The main methods of the second stage were intended to be international tenders and public offerings through Stock Exchange to encourage foreign participation.

[19] The new Law on Privatization was passed on November 4, 1997, which abandoned some shortcomings of the law from 1995. The major change was an establishing of a "one-stop shop" - State Property Fund (SPF) - whose functions, besides

only on the Stock Exchange. Subsequently, however, ISCs introduced block share tradings among themselves which, if done with no parallel cash payments necessary, need not go through the Exchange.

At initial stages of mass privatization, some large ISCs have taken the form of holding companies and tried to exert corporate governance. In some cases they had enough influence to replace existing management. However, in general, this influence was limited because the number of enterprises in which any one investment company (or group of ISCs) has controlling interest is quite small. There is evidence that, in cases when several ISCs together owned a particular enterprise, they co-operated to form a controlling block. Although at the beginning of privatization in Lithuania ISCs were forming their portfolios somewhat incidentally (based on availability), they tended to increase concentration of their holdings as more privatizations took off.

Banks: Contrary to ISCs, enterprise restructuring by banks has been limited because of legal restraints. Commercial banks were not permitted to participate in the equity of joint stock companies. Consequently they were not in the position to oversee the restructuring of the enterprises directly, but in some cases did so indirectly through their lending policies.

- *State Ownership:* On the other hand, the state practically lost control in partially privatized enterprises. From total number of about 3,000 enterprises and assets, in which the state still retained some ownership rights after first stage of privatization, only about 200 of them were majority state owned. (The latter were privatized during second stage in 1995-1997). In the remaining enterprises the state share reached 10% on average. In these enterprises the state had practically lost control over management and state shares had only marginal value in terms of governance in cases when additional votes were needed for an existing party to reach effective majority.

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denationalization, include management of residual state shares and monitoring of implementation of purchase agreements.

IV. Data Description

The data to be used in the analysis is collected by the Lithuanian Department of Statistics and covers the period of 1995-1997. The dataset is unique as it contains information on over 5,300 small, medium and large enterprises for each year in Lithuania with very detailed and consistent coverage of financial data[20]. Along with Balance Sheet and Income Statement data, the set contains information on employment, ownership structure, regional as well as sectoral division of enterprises. We have every reason to assume that the sample is not statistically different from the entire population of enterprises, which is being monitored by the Lithuanian Department of Statistics. It should be noted that the dataset covers approximately 35 percent of economically active population (labor force) in Lithuania for 1997.

Distribution of enterprises by number of workers is provided in Table 2. The average size of the enterprises has dropped by more than 20 percent since 1995 owing primarily to reduction in the number of large enterprises (over 200 employees) in the sample from 555 in 1995 to 465 in 1997. It is important to note that there is a consistent increase in the share of enterprises with number of workers between 10 and 50.

Table 2. Basic Employment Statistics

Table 3 shows some productivity indicators for a balanced panel of 5,139 enterprises for 1996-1997 by sectors. An interesting pattern emerges here: all five sectors have cut their employment levels by amounts ranging from 2.8 to 25 percent in 1997 while enjoying considerable increases in labor productivity measures. The highest average real increase in Value Added per worker was registered in Utilities (over 50 percent) with the lowest being in Manufacturing (16 percent). However the relative ranking changes for Revenue-per-worker figures with the highest increase of 25.3 percent observed in Manufacturing and the lowest of 13.4 percent in Utilities. While in general this could be viewed as a sign of successful restructuring by enterprises, further analysis of the data is needed to

[20] After excluding observations with missing values for Total Assets, Revenues, or Employment the set still contains 5,799, 5,347 and 7,185 observations for 1995, 1996 and 1997 respectively.

determine whether there are significant difference in the restructuring behavior (as measured here by layoffs) between state and privatized enterprises.

Table 3. Some Performance Indicators for Balanced Panel by Sectors, 1996-1997

Another pattern is worth noting here. A brief look at Revenue (total as well as per worker) figures vis-à-vis Value Added suggests that costs of non-labor inputs for Manufacturing and Others have gone up disproportionately higher compared to their corresponding output prices. In contrast, output prices for Utilities, Construction and Services increased by more than their respective non-labor input prices, thus generating higher growth of Value Added than that of Revenues.

Table 4, in turn, looks at performance indicators of enterprises with various degrees of state participation. An interesting picture emerges as one looks at the Revenue-per-worker figures: for 1996, enterprises with more than 50 percent (but less than 100 percent) state ownership recorded more than 45 percent higher revenue per worker than their fully state owned counterparts. The figure reaches 180 percent when fully state owned companies are compared to those with less than 20 percent state participation. The difference is even more pronounced for 1997 where revenue per unit of labor for the enterprises with less than 20 percent state ownership is more than three times greater than that of enterprises fully owned by the state. Yet the results in the third column are believed to be seriously biased because of inclusion of *de novo* enterprises. In addition, improvement in labor productivity might be a result of changes in capital-to-labor ratio which cannot practically be detected unless we control for the amount of capital used in the production process.

Table 4. Relationship between Revenue performance and State Share, 1995-1997

The following sections treat these problems seriously.

V. The Model

Let us assume that enterprise productivity is determined by a functional relationship

$$y_i = F(X_i) + \varepsilon_i \qquad i = 1, \ldots\ldots N; \qquad (1)$$

where $\mathbf{X}_i$ is a K dimensional set of observed characteristics (technology, competition, ownership, industry type, etc.) affecting productivity and ε_i is the error term which includes characteristics unobserved by the researcher. Assuming further a linear functional relationship for $F(\cdot)$ produces:

$$y_i = X_i\beta + \varepsilon_i \qquad (2)$$

If elements of $\{\mathbf{X}_i, \varepsilon_i\}$ are not correlated, the OLS will produce consistent estimates of vector $\boldsymbol{\beta}$. However, if they are not independent OLS estimates of coefficients will not be consistent. It is important to see in this regard where a possible correlation between elements of X and ε could be coming from. Assume that something that affects enterprise performance also affected, say, the privatization outcome and thus private share ownership at privatization - a variable included in X. Since the omitted or missing variable in question is not a part of X, it will have to be a part of ε, thus creating correlation between X and ε. In reality it is not unreasonable to assume that ownership mix as well as ownership concentration are likely to be endogenous to, or jointly determined with, enterprise performance. It might be argued that "better" firms are more likely to have large foreign (as well as insider) ownership (see Smith *et al.* (1997) for discussion). Similarly, the state might choose to privatize better companies earlier and undertake restructuring in the remaining ones (which are perhaps being viewed as non-competitive in the new environment). In any of these cases, even though the change in ownership per se does not lead to a change in behavior, a positive correlation between ownership and performance variables will be observed[21]. Moreover, if any of the

[21] The selection bias would perhaps be harder to detect in insider, particularly in managerially, owned enterprises. The reason is because knowing that the enterprise will be subjected to a MEBO (management-employee buyout), managers of a "good" enterprise have every incentive to understate the true value of the company (by

variables that jointly determine both enterprise performance and ownership structure at privatization (e.g. old technology and capital stock, thin market for enterprise's output, etc.) were missing from equation (2), the OLS estimates would not be consistent.

Controlling for endogeneity associated with selection of enterprises for privatization is particularly important for commercial (Stage II, for-cash) as opposed to mass (Stage I, voucher) privatization schemes. The reasoning behind this is quite intuitive. Although as pointed out above the state has kept on average 10 percent of residual shareholding in enterprises privatized under mass privatization scheme, the decision to put an enterprise (or an asset) up for privatization (under Stage I) was unlikely to be dependent on any performance related criteria but was in fact based on the size (i.e. small and medium as opposed to large) and sectoral considerations (i.e. Services vs. Energy, etc). Collective evidence suggests that there had been very little pre-selection of enterprises carried out under Stage I before they were (fully or partially) privatized. On the other hand, the decision to privatize an enterprise under Stage II privatization scheme was largely dependent upon factors like strategic importance of the enterprise for the state, availability of "right" strategic investors, and the state's ability to raise funds both at privatization (sales value) and in the future (tax receipts) – all predominantly performance related indicators. Failing to control for selection bias introduced by the state supposedly picking enterprises for privatization, will lead to severe problems in estimation.

From a variety of methods available to provide consistent estimates of regression coefficients in equation (2), we will employ a linear instrumental variable estimator (2SLS)[22]. (We will nevertheless use conventional OLS estimates as a benchmark

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underreporting revenues/profits or even supressing output) which they will be offered to buy at a later date. Thus even though the enterprise is "good" and is subsequently privatized to insiders (i.e. the "true" selection bias), it becomes hard to determine the extent of the bias, due to understated enterprise performance/value indicators.

[22] A quick refresher look at basic properties of linear instrumental variable estimator and restrictions imposed on the set of instruments might be useful at this stage. Let Z be an M dimensional set of instruments. If the system is exactly identified (i.e. M = K), or in other words if inverse of (Z'X) exists, the instrumental variable estimate of regression coefficients can be presented as: $\hat{\beta}_{IV} = (Z'X)^{-1}Z'Y$.

comparison case). The analysis will consist of two steps. First, we will focus on the determinants of ownership structure by regressing private ownership share on a set of instruments - potential determinants of ownership structure at privatization. Next, the fitted (estimated) values of private ownership variable from the first stage will be used to estimate the effect of ownership on enterprise performance[23]. This two stage approach will utilize a set of pre-privatization characteristics to be discussed below. Significant differences between OLS and 2SLS estimates will be indicative of selection bias discussed above. More formally it can be tested by the Hausman (1978) test or the omitted variables (OV) version of the same test.

However, it should be noted that, although the 2SLS estimator used in this case will be a consistent estimator of regression coefficients, it will not be an efficient one. Moreover, the asymptotic covariance matrix will be larger, the smaller the correlation is between ownership variable and different instruments. To put it differently, the regression results will be as good as the choice of instruments themselves.

Following Anderson, Lee and Murrell (1999) we specify the second stage regression equation in the following manner:

In this case the set of instruments will have to satisfy the following two requirements:

(1) plim (Z'X)/T exists and nonsingular, and

(2) plim (Z'ε)/T = 0

However, in case when M > K (i.e. we have more instruments than variables to be instrumented), a choice of K linear combinations of M instruments should be selected, for which an obvious candidate is the fitted value of X from the regression of X on Z. Noting that the later can be presented as $\hat{X} = Z(Z'Z)^{-1}Z'X$ the Two Stage Least Squares estimates - a variant of IV estimates presented above - of regression coefficients will be as follows: $\hat{\beta}_{2SLS} = [X'Z(Z'Z)^{-1}Z'X]^{-1}X'Z(Z'Z)^{-1}Z'Y$.

It can be shown that this is identical to $\hat{\beta}_{IV}$ in case if the inverse of (Z'X) exists. In the case of 2SLS the requirement (1) above translates into one for correlation between Z and X, with higher correlation leading to a lower asymptotic variance-covariance matrix. (Note that here we can not talk about minimum asymptotic efficiency because of a potentially large number of Z's available).

[23] For ways of accounting for the selection bias in the recent Transition literature see Anderson, Lee and Murrell (1999), Barberis *et al* (1996), Earle and Estrin (1997), Earle (1998), etc.

$$y_i = \ln Performanc\ e_{i.} = \gamma_0 + \gamma_1 \ln K_i + \gamma_2 \ln L_i + \gamma_3 ESPROWN_i + \sum_{d=1}^{D} \gamma'_{4d} BE_{id} + \sum_{l=1}^{L} \gamma'_{5l} D_{il} + u_i \quad (3)$$

$$(i = 1, \ldots..N;\ d = 1,\ldots..D;\ l = 1,\ldots\ldots L;)$$

where y_i is the logarithm of underlying performance indicator of i^{th} firm, $ESPROWN_i$ is the estimated share of private ownership from the first-stage regression, BE_i vector of variables describing business environment (which in our case includes measures of product market competition and state support), D_i is a set of industry dummies, and u_i is the error term. The following section discusses the choice of dependent variable in Equation 3.

Measuring Dependent Variable

The corporate governance literature on developed market economies has used a variety of alternative ways to measure enterprise performance. A number of authors (e.g. Demsetz and Lehn (1985), McConnel and Servaes (1990), Morck *et al.* (1988), and Shleifer and Vishny (1986)) have provided insights for using accounting profits, stock market prices, and Tobin's Q as measures of performance in a developed market setting. However, as plausible as they are for measuring enterprise performance in the context of developed market economies, they are either unavailable on a wide enough scale (Stock Market prices, Tobin's Q) or simply unreliable (accounting profits) in the Transition context.

Another critical issue in this regard is the choice of level vs. change in performance indicator – a topic that has been in the center of debate in the recent Transition literature. A list of studies which use change of performance indicator as a dependent variable includes Claessens and Djankov (1998), Weiss and Nikitin (1998), Frydman *et al.* (1997, 1998b), etc. On the other hand Anderson, Lee and Murrell (1999), Claessens and Djankov (1999a), Smith *et al.* (1997) use level of dependent variable. However it should be noted that specifications which use change in dependent variable as a performance indicator (hereafter, *change* specification) contain a serious pitfall which seems to have been overlooked by the advocates of that approach. Quite logically, the issue of an appropriate price deflator is the first one to be addressed when *change* specification is

picked up in favor of *level* one. At the times of rapid economic transformation, such as the one observed in Eastern Europe and FSU, drastic changes in product range and product quality from year to year are very common. Not accounting for changes in range and, most importantly quality of new products, while calculating the price deflator (and subsequently inflation), will introduce the so-called New Product and Quality Biases, which are known to overstate the "true" movement in price level[24]. It is not very difficult to see that the bias becomes larger the greater the speed of transformation and technological change[25]. With this in mind, we argue that using disaggregated industry-level price deflator (so calculated) to determine the change in real output (in a rapidly changing Transition Economy) is bound to understate the extent of change in the performance measures of faster growing/transforming industries and subsequently the overall effect of ownership on performance.

A fairly intuitive approach to choosing between level and change specifications was recommended by Earle and Estrin (1998), and Earle (1998). Instead of imposing either measure of dependent variable, they let "data decide" the appropriate specification to be used by including a lagged (pre-privatization) level of dependent variable (in their case labor productivity) as a regressor. They estimate the coefficient to be around 0.45 and significantly different from 1, upon which they reject the specification where the dependent variable is the change in the performance indicator. However, if an important variable is omitted from the regression, the validity of their test would be seriously undermined by the bias in both the regression coefficients and the standard errors[26]. We will follow this approach as a complementary one and focus on results which are not dependent on equation specification. Equation 3 can then be re-written as follows:

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[24] The idea behind these biases is quite simple: a part of the inflation we observe is due to the improved quality of products (better computers and better cars) and a larger variety of subsitutes available. Inflation would have been less if we could account for better quality and larger variety of products.

[25] I owe this insight to my discussions with Gerhard Pohl.

[26] This might be the case expecially when the specifics of the production function are omitted from the estimation. Inclusion of lagged dependent variable as a remedy in this case is as good as the assumption of unchanged (pre- and post-privatization) capital to labor ratio itself.

$$y_i = \ln(Performanc\,e_{97})_i = \gamma_0 + \gamma_1 \ln(Lag.Performanc\,e_{95})_i + \gamma_2 TotAst_i$$
$$+ \gamma_3 ESPROWN_i + \sum_{d=1}^{D} \gamma'_{4d} BE_{id} + \sum_{l=1}^{L} \gamma'_{5l} D_{il} + u_i \qquad (4)$$

where $Lag.Performance_{95}$ is the lagged value of dependent variable, and *TotAst* is the book value of total assets to capture the size effect.

Bearing in mind the above discussion and restrictions imposed by the dataset, the following indicators of enterprise performance will be used in the analysis: the level of sales and exports in Equation 3 and labor productivity (measured as revenue per labor) in Equation 4. Using exports as a dependent variable in Equation 3 has a very intuitive justification. Although being a part of sales, volume of exports contains additional information in that it provides an indication of *quality-adjusted* output. It can be argued that *ceteris paribus* non-zero level of exports is indicative of better quality of enterprise's output bearing in mind the amount of "quality control" and competition that exporters are likely to face in foreign markets. The following sections justify the selection of instruments and sample size to be used in the analysis.

Choice of Instruments

As discussed above, the primary objectives for selecting instruments is their high correlation with Private Share Ownership at privatization and no correlation with the error term in the performance equation. The choice of instruments should come from understanding of privatization process and the factors that might have determined state's willingness to privatize the enterprise and subsequently the choice of residual state shareholding. Obviously, the variety of factors possibly affecting state's interest in preserving some degree of ownership in an enterprise might range from (pre-privatization) profitability of the enterprise, level of employment generated and financial viability/solvency to strategic importance of the enterprise, among other things.

With this in mind, I have selected the following variables as instruments for Private Share Ownership at privatization: level of employment, share of energy and fuel in total operating cost, share of long-term liabilities in total liabilities, and (dummy variable for) subsidies. Most importantly, note that apart from being plausible determinants of ownership structure at privatization, the above choice of instruments also satisfies

condition $\text{plim}(Z'\varepsilon)/T = 0$. This is guaranteed by the fact that these instruments are not determinants of current (post-privatization) enterprise performance, and hence cannot be a part of ε if left unaccounted for in equation (2).

It is relatively straightforward to argue for the viability of using above variables as instruments. [Before describing the instruments in details, note that 1995 values of all instruments were used to predict private share ownership at privatization in 1996 and (in some cases) 1997]. Including level of *Employment* as an instrument intends to capture the scale effect and, through this, the interest of the state in preserving ownership of that particular enterprise. Politicians might be reluctant to privatize an enterprise with a large labor force fearing that they will lose support base after enterprise is privatized and some workers are laid off. *Share of Energy and Fuel in Total Operating Cost* intends to measure the energy efficiency of the enterprise. Holding enterprise size and type of production constant this indicator is likely to contain information about technological advancement of the enterprise and hence current and future competitiveness of its products on the market. Including *Share of Long-term liabilities in total liabilities* should account for financial structure of enterprises and be indicative of enterprise's ability to raise long-term funds. A skeptical reader might argue that in an environment of directed (and perhaps subsidized) state credit to state owned enterprises, this ratio would be meaningless if measured before privatization. However to the extent that a part of the credit to enterprises was extended by privately owned banks and state owned banks competing with the former on the market for credits, the enterprise's share of long term loans will contain information about solvency, output, competitiveness, as seen by those creditors. Including an indicator of state backing of enterprises measured by a dummy variable for *Subsidies* is intended to quantify the interest of the state in further preserving ownership of the enterprise.

Even if the above measures (individually or jointly) might influence the state's decision to privatize an enterprise) only marginally, they should carry significant weight in potential private owner's objective function and hence determine the share of private ownership once the enterprise is offered for privatization. Finally, including industry dummies as instruments was thought to capture state's preferences in preserving

ownership in some sectors which are perceived strategic. The following section justifies the choice of variables describing the business environment.

Measuring Indicators of Business Environment

To quantify market competition faced by enterprises, we will attempt to use Herfindahl index (H-index) based on sales in 2-digit industries of which the dataset has 37. Sleuwaegen and Dehandschutter (1986) show that performance of H-index is superior to that of concentration ratios (share of N largest firms in the market) when sectors/markets with high concentration are common. In addition, the H-index would be a more accurate measure of concentration in cases when a number of large enterprises are left out of the sample. With this in mind, I calculated H-index for 37 sectors based on sales/revenues reported by 7,200 enterprises contained in 1997 sample. Although covering a broad base of enterprises (over 60 percent of enterprises reporting to Lithuanian Department of Statistics) and sectors in Lithuania, this measure is not without problems. First of all, it fails to account for the share of imported goods in the market and thus the competition faced by domestic producers from foreign firms exporting to Lithuanian markets. Not accounting for this effect is bound to overstate the market share of each enterprise and understate its effect on efficiency and performance. This bias will be greater the larger the share of imported goods in total market for that particular good.

Second, market share and hence market concentration can be endogenous to performance. It can be argued, that being determined by central planners decisions, market structure at initial stages of Transition can be treated as exogenous. Yet it would be less accurate to do so at a later stage when market-based incentives and mechanisms worked their way to improved performance and subsequently to market share of enterprises. However in our case, the extent of potential endogeneity of H-index will be significantly reduced in the final sub-sample of 618 enterprises used in the analysis (see below for the selection criteria) because of the large number of enterprises removed from the initial sample of 7,200.

There are at least two reasons for using lagged (as opposed to contemporaneous) values of subsidies as a dependent variable in the regressions to account for state support. First of all, using lagged value of subsidies is likely to eliminate any potential

endogeneity of state support with respect to current performance. Second, if history is of any guidance for enterprise management, using lagged values of subsidies would be a way to capture the effect of *expected* state support and hence necessity to restructure[27]. This will be a good measure of expected subsidies (and to a great extent also the overall softness of budget constraint) particularly for enterprises that continue being fully state owned throughout 1995-1997. However there is still a problem with subsidies being jointly determined with ownership. In other words, some enterprises might face hard budget constraints after they are privatized, which creates a problem in measuring the relative importance of the effects of private ownership and business environment on performance[28].

Unfortunately using subsidies (lagged or contemporaneous) would provide only limited information about the extent of state support to enterprises and the softness of budget constraints. A more complete analysis would have to include (1) arrears that enterprises are allowed to run on various accounts (tax, social security, wages, etc), (2) cost reductions associated with subsidized credits and other inputs, (3) special contracts, among other direct and indirect ways to favor enterprises. Unfortunately the available data prevents us from keeping a complete account of state assistance to enterprises and so lagged values of subsidies will be used to proxy the full extent of state support and softness of budget constraint.

Selection of Sample Size

The choice of the sample size for regression analysis is a crucial one here. Bearing in mind the importance of explaining the ownership structure at privatization (i.e. the first stage regression), only enterprises for which private share ownership at privatization can be "explained" by available pre-privatization values of instruments were selected. Since the data is available for 1995-1997 only, 1995 was set aside to provide data for

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[27] Kornai (1998) and subsequently Anderson, Korsun and Murrell (1999) emphasize the *expectational* component of softness of budget constraint. They argue that decision to restructure is largely a function of expected (rather than current) state support in times when the enterprise is in trouble.

[28] Controlling for endogeneity of variables describing business environment lies beyond the scope of current paper and will be attempted by subsequent research.

instruments. Subsequently, only the enterprises which were (state owned in 1995 and) privatized in 1996 and (in a few cases also) 1997 were chosen. Private share ownership at privatization (1996) was first regressed on the set of instruments discussed above. The estimated values of 1996 share of private ownership were then used as an explanatory variable in the regression of 1997 performance on potential determinants of it. Enterprises reporting 100 percent state ownership throughout 1995-1997 were also included in the sample as benchmark against which the performance of privatized enterprises were to be judged. Thus the only sample selection criteria applied in our case boils down to choosing enterprises which reported 100 percent state ownership in 1995. These enterprises were subsequently either privatized in 1996-1997 or remained state owned throughout 1996-1997. Note that doing so restricts the sample to a number of enterprises that took part in commercial (Stage II, 1996-1997) privatization only (of course, along with fully state owned enterprises). Since the decision to include an enterprise into the Stage I or Stage II privatization largely depended on the size of the enterprise, its "strategic importance" and industry type and hence is exogenous to the privatization outcome, our focusing on Stage II privatization does not introduce any bias in estimation procedure which (an otherwise endogenous) sample selection criteria are known to generate. It will instead allow us to judge the outcome and success of Commercial Privatization alone as far as the effect of private ownership on performance is concerned.

Using lagged (1996) estimated value of share of private ownership in the second-stage equation (trying to explain 1997 performance) appears to have at least two advantages. First, it allows for the effect of private ownership to work its way through the performance. It might be argued that using contemporaneous measures of (estimated) private share ownership to explain performance would understate the effect of former because of the time required for the new ownership to undertake measures necessary to boost production and efficiency. Second, it reduces the effect of bias introduced by the possible endogeneity of ownership. Although 1997 performance is likely to be correlated with lagged (1995 or 1996) performance (the latter being a potential determinant of ownership structure), in a world of incomplete information and underdeveloped capital markets in Transition, it is implausible to assume that 1996 ownership structure would

directly depend on 1997 performance[29]. Yet as tempting as it might be to think that using lagged (as opposed to contemporaneous) values of ownership variable would eliminate the underlying endogeneity, it would merely reduce the extent of the bias primarily because of the above mentioned correlation.

Table 5 contains the distribution of enterprises by ownership type and years of privatization. Out of 618 enterprises to be used in the analysis 238 were privatized in 1996 with private share ownership averaging at 80 percent of capital. The state further reduced its shareholding in those 238 enterprises in 1997 bringing it down to 18 percent of capital on average from 20 percent. Out of 374 enterprise which continued to be fully state owned as of 1996, 54 were privatized in 1997 with state still holding 24 percent ownership on average in those enterprises. For these 54 enterprises private ownership share as of 1997 was used as a dependent variable in the first-stage regression. Subsequently a dummy variable *DUMMY97* (which takes value of 1 if the enterprise is privatized in 1997) was introduced in the second-stage regression to account for any unobserved differences between enterprise privatized in 1996 and 1997[30].

Regression Results

The results of estimation of Equations 3 and 4 are contained in Table 6 and 7 respectively. It is perhaps logical to start this section with a formal justification of using linear instrumental variables approach to estimate Equation 3. The OV version of Hausman (1978) test rejected the null hypothesis that the OLS and 2SLS estimates of

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[29] Expectations and ability to forecast play important role here. For instance if the state foresees that an enterprise could boost its output in 1997 either as a result of a relatively straightforward measure (e.g. management change) or its strengthening monopoly position on the market, it is likelier that the state will hold on to the enterprise and not privatize it. On the contrary, if potential private owners evaluate profit potential of an enterprise in 1997 as low, this is likely to keep them away from buying shares in this enterprise *ceteris paribus*, even if it is up for privatization.

[30] Note that for these 54 enterprises 1997 value of private share ownership (i.e. private ownership at privatization) was used during both stages of the analysis. The results of estimation (where enterprises privatized in 1997 were treated as fully state owned as of 1996) are not significantly different from those reported (where enterprises privatized in 1997 were treated as privatized and a dummy variable DUMMY97 was included) and can be obtained from author upon request.

regression coefficients are identical (under H_0: $\beta^{OLS} = \beta^{2SLS}$)[31], which by itself implies a failure to accept the hypothesis of no contemporaneous correlation between error term and the regressors. Having said this, OLS estimates of coefficients in Equation 3 would be inconsistent which establishes the need to estimate them by (among other alternatives) a linear instrumental variables approach (2SLS). Summary statistics from the first stage regression equation are reported on the bottom of Table 6. Both the fit of regression and F-test of zero values for instrumental variables used in the regression suggest a strong fit for share of private ownership at privatization. The estimated values of private share ownership were then used throughout the analysis in estimating Equations 3 and 4. In both cases I reported the results of OLS in parallel with 2SLS to be able to draw some conclusions based on the contrast of estimated coefficients. The results are definitely worth paying some attention to.

The effect of estimated share of private ownership on performance of enterprises in the sample appears to be positive and highly significant in all four regressions reported in Table 6. However the difference between the coefficients on private share ownership under OLS and 2SLS is striking. Almost nine fold change in the magnitude of the effect of private share ownership on sales suggests presence of a pre-selection bias in privatization process which was based perhaps on performance and financial characteristics of enterprises. The direction of the change is indicative of a negative bias, that is the state preserving ownership in better performing enterprises and privatizing the under-performing ones. This might be contrary to expectations of most of the readers who would expect state to find it difficult to privatize under-performing enterprises and hence put the better performing ones up for privatization first. However this should not look counterintuitive if by 1996 the (to-be privatized) enterprises were to largely restructure (and put their books in order) and as a result become attractive for private owners. Should this be the case, of course, the state's decision to privatize relatively under-performing enterprises (which are nevertheless attracting private owners) for sale first is by no means counterintuitive.

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[31] The F-statistic for joint insignificance of instruments included in the equation (3)

Yet, a pessimistic reader could argue that one thing leading to this econometric result could be a high concentration of enterprises with zero private ownership in the sample. In order to test this hypothesis and check for the robustness of the results, I eliminated fully state owned enterprises from the sample and run the regression with a sub-sample of privatized enterprises only. Results came to support the presence of a negative selection bias at privatization: the coefficient on Private Share Ownership in Equation 3 increased almost two fold from 0.48 to 0.95 after 2SLS was applied[32]. The difference in change of coefficients (i.e. nine fold when the full sample was used, and two fold when only privatized enterprises are used) suggests that presence of enterprise in the sub-sample (of privatized enterprises) is only a reflection of the state's decision to hold residual ownership, as opposed to the (most important) decision to privatize vs. to keep, and therefore could only be viewed as lower bound of the privatization bias (if the extent of the bias is to be measured by the difference of coefficients between OLS and 2SLS).

On the other hand, the effect of subsidies appears negative and highly significant at least in the case when sales were taken as performance indicator. An obvious interpretation of the results would be that enterprises that received subsidies in 1996, and thus as hypothesized above, were not forced to restructure hard enough, performed worse in 1997. The effect of subsidies on exports is also negative and significant at 20 percent confidence level when OLS is used but loses its significance after 2SLS is applied (column 4). In both cases subsidies either become less significant or lose significance after controlling for selection bias, suggesting that there is in fact some link between ownership and subsidies hypothesized above.

The coefficients on market concentration do not produce any evidence of the effect of market structure on domestic sales: the coefficients are imprecisely estimated and change the signs in 2SLS regressions (Table 5 and 6). A possible conclusion here is that competition does not affect *short-run* measures of productivity of enterprises because there is not enough time for competition to induce efficiency enhancing pressures on

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equals 24.54, with critical value of $F_{[4, 602]}$ being equal to 2.37. A similar test for specification (4) resulted in value of F-statistic to be 3.46 which still leads to rejection of null hypothesis of no correlation between error term and the regressors.

[32] Results of these regressions are not reported but could be obtained from the author upon request.

enterprises. Another channel through which competition is unlikely to induce efficiency and growth was presented in Aghion *et al.* (1997). The authors demonstrate that when agency costs within innovating firms become sufficiently important the positive effect of competition is reversed, and so we are back to Schumpeterian view that market competition is detrimental to growth.

However, surprisingly enough, the pattern of coefficients on market competition is drastically different when exports are used as a dependent variable. The coefficients are positive and highly significant suggesting perhaps that market concentration or lack of competition and near-monopoly power makes it more likely for enterprises to export. [These results should look particularly trustworthy since there is no correlation between level of exports and H-index (at least not inherent in the way the H-index was calculated), as it might be the case between sales and H-index]. However surprising, I believe this result has an explanation which is based on the ability of monopolists to extract monopoly rents. In the presence of transaction costs associated with exporting goods abroad (marketing abroad, export license, etc.), it could be argued that rents will make it more likely for enterprise to be able to overcome the fixed export barriers - much like in the classical Schumpeterian argument about the link between monopoly rents, R&D and growth.

It should be noted that the estimation provide economically meaningful values for coefficients on logarithms of capital and labor in all four regressions reported in Table 6, suggesting (an almost) constant returns to scale production function in capital and labor[33]. However, share of capital in exports seems to be larger than share of capital in general revenues, suggesting that exported goods are more capital intensive than sales in general. Generally for all regressions, the estimation provides rather remarkable fit with included variables capable of explaining from 51 to almost 70 percent of variation in dependent variable.

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[33] I also tried to measure the curvature of production function by entering squared values of LnK and ln$L$ into regression equations. In almost all cases the signs of the coefficients came out negative suggesting declining marginal product of both labor and capital, with the exception of export regression where marginal product of capital was estimated to be positive. Results can be obtained from author upon request.

Finally, there appears to be no significant difference in performance between enterprises privatized in 1996 and those privatized in 1997: although the coefficient on *DUMMY97* is positive, it is highly insignificant in all regressions.

Our results from estimating Equation 4 appear to lend support for the level (as opposed to change) specification discussed above (Table 7). Although positive, the coefficients on lagged dependent variable are statistically different from unity and hence reject the change specification in favor of the level one. Coefficients of greatest interest appear to provide consistent parents across both specifications used. As in Equation 3, private share ownership contributes positively and significantly to enterprise performance. Similar to previous case, the coefficient on Private Share Ownership has increased ten fold after the selection has been controlled.

VI. Conclusion

Lithuania offers an interesting case of a country 'in between' Central and Eastern Europe - where privatization and restructuring were largely successful in bringing about better enterprise performance and effective corporate governance - and the Commonwealth of Independent States - where allegedly very little of it has taken place. The paper provided a review of Lithuanian Privatization process. It presented some evidence of improved corporate performance in Lithuania over 1995-1997. But the main question posed in the paper was whether these improvements were in any way caused by privatization and transfer of state ownership and changes in business environment in which enterprises operate.

The focus of analytical section of the paper was Lithuanian Commercial Privatization program of 1996-1997. The intention was to check whether private ownership matters at all in an environment where market institutions are at a relatively advanced stages of development and business environment is friendlier than during early stages of Transition process. This study contrasts with others in a sense that it offers a rigorous treatment of econometric problems which become particularly severe when Commercial (for-cash) privatization programs are being studied. It is in fact the first study to analyze consequences of a Commercial (as opposed to a Mass) Privatization

program in Central and East European countries by using relatively recent data from Lithuania.

(Without differentiating between types of private owners), I conclude that (Commercial) transfer of state property to private owners in Lithuania has brought about significant change in enterprise performance measured by increased revenues and improved export performance. The results suggest a negative bias in selection of enterprises for privatization. When controlled for this observed phenomena, the effect of private share ownership becomes larger and increases its significance. Studies based on data from early privatization programs from countries in Transition (predominantly Mass Privatization programs) usually report moderate changes in the magnitude of coefficient on private share ownership after selection bias is being controlled for. The fact that magnitude of coefficients on private ownership increased significantly (nine fold) after controlling for enterprise selection prior to privatization, emphasizes the vitality of controlling for selection bias when a Commercial case-by-case privatization is being studied. On the other hand, expected subsidies seem to contribute negatively and in some case significantly to performance indicators. However the paper finds no clear evidence of the effect of market competition (measured by Herfindahl index) on performance indicators in the short-run. The paper has a number of shortcomings. An apparent drawback of the above analysis is that it does not account for the fundamental differences between various types of private owners, e.g. insiders vs. outsiders, foreign vs. domestic, and institutional vs. non-institutional private owners. Second, it does not account for potential endogeneity in variables describing business environment which might somewhat bias the estimated results. These and related issues will be addressed in the follow-up paper. Even so, policy implication of these results, I believe, are still useful not only for Lithuania, but also for other FSU countries that lag behind in their effort to privatize state owned enterprises and achieve output and productivity gains.

Table 1.

Use of investment vouchers in Lithuania as of September 1995

Use of investment vouchers	Million Litas	Percent
Total	9802	93
Public subscription of shares	5,833	55.3
Tenders	415	4
Auctions	165	1.6
Privatization of residual state ownership in JSCs	392	3.7
Housing	2,042	19.4
Agricultural enterprises	410	4
Land	545	5

Source: Lithuanian Department of Statistics, September 1995.

Table 2.

Basic Employment Statistics

				Number of Enterprises with:			
	Number of Enterprises*	Number of Employees	Employees per Enterprise**	*Less than 10 employees*	*Between 10 and 50 employees*	*Between 50 and 200 employees*	*Over 200 employees*
1995	*5,807*	*583,753*	*101*	*686*	*3,091*	*1,476*	*555*
				(11.8%)	*(53.2%)*	*(25.4%)*	*(9.6%)*
1996	*5,347*	*543,691*	*102*	*305*	*3,101*	*1,435*	*506*
				(5.7%)	*(58.0%)*	*(26.8%)*	*(9.5%)*
1997	*7,185*	*560,394*	*78*	*449*	*4,645*	*1,626*	*465*
				(6.2%)	*(64.6%)*	*(22.6%)*	*(6.5%)*

* - Enterprises with missing values for Total Assets, Revenues, or Employment were excluded from the sample. ** - Unweighted average.

Table 3.

Some Performance Indicators for Balanced Panel by Sectors, 1996-1997

Sectors		Revenue Million Litas	Value Added Million Litas	Employment	Revenue per Worker	Value Added per worker
	1996	12,414	3,306	214,683	57,826	15,400
Manufacturing	**1997**	15,050	3,719.5	200,962	74,892	18,509
	Real % change	*17.0*	*8.3*	*-6.4*	*25.3*	*16.0*
	1996	4,461	765	43,213	103,233	17,696
Utilities	**1997**	3,994	897	32,396	123,276	27,690
	Real % change	*-16.5*	*11.3*	*-25.0*	*13.4*	*50.5*
	1996	2,390	888	63,804	37,465	13,911
Construction	**1997**	3,072	1,165	61,895	49,627	18,824
	Real % change	*18.7*	*21.5*	*-3.0*	*22.7*	*25.5*
	1996	14,855	2,718	170,571	87,088	15,933
Services	**1997**	17,844	3,420	165,811	107,619	20,628
	Real % change	*11.6*	*17.4*	*-2.8*	*15.1*	*21.0*
	1996	970	403	29,491	32,900	13,653
Others	**1997**	1,169	4782	27,941	41,842	17,103
	Real % change	*12.0*	*10.2*	*-5.3*	*18.7*	*16.8*

Note: There are 1,345 enterprises in Manufacturing, 124 in Utilities, 707 in Construction, 2,465 in Services, and 498 in Others. PPI based inflation of 4.2, 6.0, 9.8, 8.5 and 8.5 percent were used to establish the rate of real growth in Manufacturing, Utilities, Construction, Services and Others respectively.

Table 4.
Relationship between Revenue performance and State Share, 1995-1997

		State Share		
		100% State Owned	More than 50% State Owned*	Less than 20% State Owned
1997	Revenue per Employee	31,700	43,864	95,931
	Number of Enterprises	596	265	5,939
1996	Revenue per Employee	32,528	47,455	91,353
	Number of Enterprises	648	257	4,112
1995	Revenue per Employee	32,163	38,088	81,420
	Number of Enterprises	958	239	4,259

* - This group does not include 100% state owned companies. Figures are in 1995 Litas.

Table 5.
Distribution of Enterprises by Types of Ownership and Years of Privatization

	1995	**1996**	**1997**
Fully State Owned	618	380	326
Privatized in 1996	-	238	238
Mean of Private Share Ownership	-	*0.80*	*0.82*
Std of Private Share Ownership	-	*0.31*	*0.30*
Privatized in 1997	-	-	54
Mean of Private Share Ownership	-	-	*0.76*
Std of Private Share Ownership	-	-	*0.33*
TOTAL	618	618	618

Table 6.

OLS and 2SLS Estimation of Equation 3

	Dependent Variable: Log of Sales in 1997		Dependent Variable: Log of Exports in 1997	
	OLS	2SLS	OLS	2SLS
Constant	6.10***	6.19***	-10.1***	-9.62***
	(15.77)	(10.88)	(-11.0)	(-9.14)
Private Ownership	0.28***	2.51***	1.09***	3.87***
	(3.24)	(4.49)	(5.28)	(3.73)
Ln*K*	0.40***	0.37***	0.58***	0.50***
	(12.26)	(7.41)	(7.38)	(5.50)
Ln*L*	0.50***	0.57***	0.22**	0.33***
	(10.56)	(7.97)	(1.999)	(2.49)
Subsidies in 1996	-0.000013***	-0.00001**	-0.000012	-0.00001
	(-3.97)	(-1.96)	(-1.56)	(-0.80)
Market Concentration	-0.143	0.49	3.36***	3.93***
	(-0.35)	(0.79)	(3.45)	(3.40)
Dummy97	0.035	0.06	0.08	0.36
	(0.29)	(0.33)	(0.27)	(1.09)
Industry dummies included	Yes	Yes	Yes	Yes
Adjusted R-sq.	0.691	0.515	0.574	0.510
Number of Observations	618	618	612	612
First Stage Regression				
Adjusted R-sq.		0.30		0.30
F-statistic for zero IVs		30.6***		30.6***
OV version of Hausman Test		24.54***		5.56***
Critical Value for F-statistic		2.37		2.37

T-statistics in parenthesis. ***, ** and * indicate significance at 1, 5 and 10 percent confidence levels respectively.

Table 7.

OLS and 2SLS Estimation of Equation 4

	Dependent Variable: Logarithm of Sales per Labor in 1997	
	OLS	IV
Constant	2.28***	2.50***
	(9.06)	(8.15)
Private Ownership	0.091	0.96***
	(1.56)	(3.22)
Ln(*Sales/Labor*$_{1995}$)	0.59***	0.57***
	(32.9)	(25.1)
Total Assets	0.000	0.000
	(0.81)	(0.39)
Subsidies in 1996	-0.00001**	-0.00000
	(-2.12)	(-1.38)
Dummy97	0.025	0.03
	(0.31)	(0.33)
Market Concentration	-0.24	0.03
	(-0.89)	(0.09)
Industry dummies included	Yes	Yes
Adjusted R-sq.	0.66	0.59
Number of Observations	618	618

T-statistics in parenthesis. ***, ** and * indicate significance at 1, 5 and 10 percent confidence levels respectively.

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