OWNERSHIP STRUCTURE AND ITS EFFECTS ON OPERATING PERFORMANCE AND FIRM VALUE: EVIDENCE FROM THE CZECH REPUBLIC

By

JOEL THOMAS HARPER

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Thesis Approved:

Jim Krehbiel
Thesis Advisor

Ronald K. Miller

Janice W. Jadlow

Gary Meek

Thomas C. Collins
Dean of the Graduate College

PREFACE

This study tests the role of large blockholders and ownership concentration in the restructuring of Czech firms after the first wave of privatization. The degree to which these firms were restructured adds value to the firm. This study takes an indepth look at the former Soviet Bloc's privatization programs and contrasts other countries with the Czech program. It also looks at the subsequent developments of the Czech financial markets.

The results of the empirical tests show an overall decrease in the operating efficiency and profitablity of Czech firms in the years immediately following privatization. The results also show that ownership plays an important role in restructuring the firm. A moderate level of ownership concentration of the three largest blockholders provides has a positive relationship with the overall restructuring of the firm. In addition to ownership, size, the presence of foreign capital and joint ventures also play an important role. The last result is that these operating efficiency changes and ownership structure are priced in the Czech market and that the Czech coupon auction correctly priced firms during the auction process.

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I would like to dedicate this to those in the Czech Republic who have gone through the bitter times of communism only to see things become worse before they improved. It is because of their spirit, pride, and willingness to move forward that this research can take place. May their road ahead be as glorious as the road they have traveled.

TABLE OF CONTENTS

LIST OF TABLES

I. INTRODUCTION

After 1989, the countries of the former Soviet Bloc began two broad types of reform, political and economic. For the most part, the international community and the countries themselves agreed on the goals of these reforms. The goal of the political reform is to create a stable democracy. The goal of economic reform is to transform the centrally planned economies into market economies. These goals are echoed by Vaclav Havel, dissident-playright, now President of the Czech Republic:

> "Perhaps we can all agree that we want a state based on rule of law, one that is democratic (that is, with a pluralistic political system), peaceful, and with a prospering market economy.
>
> "Though my heart may be left of center, I have always known that the only economic system that works is a market economy, in which everything belongs to someone -- which means that someone is responsible for everything. It is a system in which complete independence and plurality of economic entities exist within a legal framework and its workings are guided chiefly by the laws of the marketplace. This is the only natural economy, the only kind that makes sense, the only one that can lead to prosperity, because it is the only one that reflects the nature of life itself."

Privatization is the centerpiece of economic reform. The central European countries had no practical or real experience to guide them through massive privatization and economic reform or to indicate what the final outcome of their choices would be. As a result, each country chose a different type of privatization plan with varying degrees of success in privatization and economic reform. The Czech Republic (CR) centered its privatization on the success of coupon privatization. The CR believed that this type of privatization would create an equitable distribution of assets to their citizens and an effective corporate governance.

Purpose of the Study

The rapid transition of the Czech Republic from a centrally planned economy to a market economy offers a unique opportunity to study issues of corporate ownership. For the purpose of this study, the change in ownership from the government to individuals and institutions under the first wave of large scale privatization program in the CR, provides a "controlled experiment" of the relationship between ownership structure, operating efficiency, and firm value. This study tests the role of large blockholders in resolving agency problems and increasing firm operating efficiency when privatizing state owned enterprises (SOEs). Unlike other Eastern European countries' privatization programs, the CR's program allowed a large number of firms, almost 1,000, to be converted simultaneously into joint stock companies without the ownership structure being predetermined. The final ownership structure permits varying degrees of ownership concentration through large blockholdings by investment funds, more dispersed ownership by individual investors, or a combination of both. In addition to differing concentration of ownership by investment funds, objectives of investment funds investing in these firms differ, but often include oversight of the restructuring of the firm. This study will discover which type of ownership structure provided the best restructuring during the first wave of mass privatization in the Czech Republic. Restructuring is measured by the effect on operating efficiencies and value.

Previous studies provide a foundation for this study. Studies by Demsetz and Lehn (1985) and Morck, Shleifer, and Vishny (1988) present conflicting in results about the relationship between ownership structure and firm value. Muscarella and Vetsuypens

(1988) test the operational changes in reverse leveraged buyouts. A study by Megginson, van Randenborgh, and Nash (1994) tests operational efficiency changes in privatized firms. More recent studies have shown the importance of large blockholders, especially institutional ownership, in reducing agency costs and increasing firm value. Privatization in the CR provides data on changes in firm ownership structure, value, and operational efficiency during the period of 1992 to 1994 enables an analysis of the effects of changes in ownership structure and ownership concentration on the firm.

Applications of the Study

The first application of this study concerns the successes of the privatization program in the Czech Republic and future government policies. This study uses data from the first wave of privatization. The third and final wave of coupon privatization occurs in 1996. What economic policy the CR will choose between now and the end of the decade depends upon the success of the privatization program. Failures and problems in the privatization programs over the previous five years will be addressed and corrected as the economy begins to develop. Successes should be encouraged. This study will try to identify the factors that determine the success or failure of privatized firms within the first two years of privatization. With this information, the CR can target the areas of the market that need reform and begin the process of making the markets more liquid and efficient.

The second application is for other former communist countries beginning privatization programs. The CR, Poland, Russia, and Hungary all launched their

privatization programs within a few years of each other. Results are still preliminary, but many believe that the CR is the most successful in the post-communist era. The remaining Eastern European and Soviet successor states that are just beginning privatization programs can look to the different privatization models of these countries, especially the CR, and adapt them to their culture and economy. Even though some of these countries have limited privatization programs, most have yet to go through comprehensive privatization. These countries can look to see which factors and processes of the CR privatization program are most important to the success of their privatization.

The third application of this research is to add to the evidence that ownership structure affects firm value. The exact relationship between ownership concentration and the effect on firm's operational efficiency and value has not been determined. This study concentrates on the role of a large outside blockholder that monitors the firm and resolves agency problems. Shleifer and Vishny (1986) present a theoretical model in which a large blockholder can increase firm value. Recent empirical studies by Brous and Kini (1994), Bathala, Moon, and Rao (1994) and others provides support for a Shleifer and Vishny type model. In the context of the Czech Republic and the restructuring of firms after privatization, this study adds to that evidence

The final application may be made to U.S. markets. The growth of mutual funds and other institutional investors in the U.S. provides an opportunity for these institutions to obtain a large ownership block in U.S. firms. Although this study does not directly address U.S. markets, it does provide evidence that institutions provide powerful monitoring of activities and management of firms they own. As U.S. markets become

more institutionalized, the role that institutions play in corporate governance can be expected to become an important public policy issue.

To provide a foundation for this research, Chapter II contains a review of existing relevant literature. Areas related to this study are agency problems and monitoring issues, corporate control and changes in ownership structure, and privatization. The chapter concludes by addressing special problems in privatizing former communist countries and a comparison between privatization programs in three countries. Chapter III describes the Czech privatization process in greater detail as well as current Czech financial markets. Hypotheses, methods to test the hypotheses, and data description and selection are presented in Chapter IV. Chapter V presents the empirical results of the hypotheses' tests and their implications for ownership structure and operating efficiency as well as the factors that lead to the successful restructuring of Czech firms. Chapter VI provides conclusions.

II. LITERATURE REVIEW

Three areas of literature are related to the conceptual framework of this study: agency and monitoring issues, corporate control and ownership structure, and privatization research. Agency problems that result from the separation of ownership and control are discussed in the first subsection. When an efficient labor market for corporate managers exists, a market resolution to agency problems exist. These would be the market for corporate control, other monitors of managers, and incentive contracts. These resolutions reduce agency problems and costs. When firms have low agency costs or monitoring costs, ownership structure does not affect firm value. A resolution to the firm's agency problem when markets are less efficient is a large blockholder or concentrated ownership structure. This is given special consideration in the first subsection. The second subsection discusses tests of the effect of ownership concentration on firm value and the effect of a market for corporate control on firm value. These studies include examination of reverse leverage buyouts to test the impact of changes in ownership concentration on changes in operating efficiency. The third subsection discusses the broad area of privatization, demonstrating both the rationale for governments to privatize, and the effect of privatization on the firm. Results show that there is an increase in operating efficiency after a firm has been privatized.

Agency Problems and Monitoring

Agency problems have received considerable attention in the finance literature. Agency problems can be divided into two broad areas: problems between owners and

managers, and problems between equityholders and debtholders. Both problems are caused by costly or inefficient monitoring. The latter agency problem manifests itself in asset substitution and under investment problems. The former, and the focus of this study, results in shirking of managerial duties, consumption of corporate resources by managers at the owner's expense, and inefficient management. Jensen and Meckling (1976) present both types of problems in their landmark paper. Agency costs of the first type can be reduced through monitoring of the manager and other control activities such as auditing, budget restrictions, establishment of incentive compensation plans or increased managerial ownership. The amount of monitoring will be determined by the cost of monitoring and the reduction in the consumption of perquisites that results from reduced by monitoring. The question of whether ownership structure affects firm value is one that has yet to be settled. Berle and Means (1933) argue that holders of corporate stock suffer if ownership is widely dispersed across a large number of shareholders because a single shareholder cannot exercise any power to oversee management performance in the corporation. Management has more freedom to use the firm's resources than it would if ownership were concentrated. If management and ownership interests do not coincide, there is a welfare loss to shareholders from a decrease in firm value.

While this problem of separation of ownership and management does exist, it does not necessarily result in lower firm value. Demsetz (1983) argues that the structure of ownership is not important in determining firm value. Shirking by management or increased consumption of amenities will not decrease firm value. These activities are paid by the managers through decreased direct compensation. If owners are the managers and

they increase consumption of amenities, the owners bear the full cost of their actions. By specializing the task of ownership and management, the cost is still born by those that use the amenities. The owners will decrease managers' compensation for an increase in shirking or on-the-job consumption by managers. Demsetz argues that the net result of a specialization in ownership may result in a reduction in on-the-job consumption and greater compensation if monitoring costs are low. If there is a difference in monitoring effectiveness or costs by owners of different firms, there will be a self-selection by managers. Those that wish to consume on-the-job will manage firms with high monitoring costs and receive less direct compensation. Those managers that do not desire high on-the-job consumption will choose firms that have low monitoring costs and pay more in direct compensation. If manager and shareholder interests still do not coincide, dispersed ownership will become concentrated enough to force a change in management. The cost of concentrating ownership may not be insignificant. This high cost would demand on going supervision of management so that a concentrated ownership structure is not necessary. This is accomplished in part by the board of directors and partly by managerial wages and the impact of the manager on corporation performance. Between the self-selection of managers, the potential for dispersed investors to become concentrated, and the monitoring by the board of directors and the market, ownership structure should not have an effect on firm value. All else being equal, firms with a dispersed ownership structure and a firm with a concentrated ownership structure should have equal values; an optimal ownership structure does not exist.

Jensen and Meckling assume that outside shareholders are rational and are not naive. That is, they will value their equity ownership at the time of issuance in order to compensate for agency costs associated with the separation of ownership and control. They also assume that all the monitoring of the firm's managers is done by the outside shareholders. This is similar to the Demsetz argument just presented. Fama (1980) presents a case where the labor market for managers monitors the managers in order to determine future wages. This market helps align managers and shareholders interests in that managers will try to maximize the value of the firm in order tol increase their future compensation. Monitoring also occurs internally between managers themselves. Lower level management can step over shirking managers above them if this type of monitoring is efficient. High level managers are monitored by the board of directors.

Fama (1980), and Fama and Jensen (1983) also show that the separation of ownership and control of the firm may improve optimal allocation of risk bearing for the owners and managers. This type of organizational structure results in the separation of decision management and decision control. The residual claim holders, stockholders, retain the function of decision control, the monitoring and the ratification of decisions. Decision management is the function of the managers of the firm. In large, complex organizations, specific knowledge to make decisions is needed, but this knowledge is diffused among several decision agents. Delegation to those that have the knowledge to make decisions, the managers, can reduce the cost of decision management.

If decision control is concentrated in one or a few individuals and monitoring is direct and simple, agency costs are reduced. When there are many residual claimants (a

diffuse ownership structure) it is costly for each to monitor decision management. In this case, it is efficient for them to delegate decision control. The function can be delegated to one of several parties. The market acts as one type of external monitor by valuing the firm. The market for corporate takeovers is another external monitor. An internal delegated monitor is the board of directors, especially those that have outside, expert members on the board.

Each argument that supporting the claim that firm value is independent of ownership structure relies on efficient, well functioning markets to resolve the agency problems associated with separation of ownership and management. As it pertains to the CR, these markets may not have achieved the efficiency required to monitor management. Many of the control mechanisms do not yet exist in the CR. If financial and corporate control markets are important in monitoring, they will eventually develop as capital, labor, and other economic markets develop.

A large outside shareholder may be a resolution to this agency problem. Shleifer and Vishny (1986) develop a theoretical model that uses a large outside shareholder as a monitor. In their model, the large shareholder has an incentive to monitor and spend resources to monitor the current management and find valuable improvements in the firm's operating strategy. The large shareholder has several ways to implement these improvements. The shareholder may use a takeover mechanism to replace current management with its own management team; it may use a proxy fight in order to achieve the same results at potentially less cost; or it may enter into "informational negotiations" with current management to implement change. They refer to the last option as the

"jawboning" mechanism. A major conclusion of this model is that when both jawboning and takeover mechanisms are available, the market value of the firm increases with the percentage of the firm owned by the large shareholder up to majority control (proposition 4). This implies that large outside shareholders serve as important monitors and as a means of change in firm's operations where valuable opportunities for efficiency changes are necessary. Institutional ownership may provide the monitoring necessary to increase the value of the firm.

Tests of Blockholder's Value. Two recent papers, Bathala, Moon, and Rao (1994) and Brous and Kini (1994), look at the role of institutional ownership in monitoring decisions and wealth effects on the firm. The first study looks at the debt policy of a firm and the role of institutional ownership as a monitor. They note that debt and management ownership serve to reduce agency costs. In addition, external monitors also reduce agency costs. They hypothesize that external monitoring substitutes for debt and managerial ownership. They find that external monitoring by institutional owners is negatively related to debt. This indicates that institutions serve as effective monitors.

Brous and Kini analyze a firm's decision to issue seasoned equity. Empirically, it has been noted that the issuance of equity is value decreasing, possibly due to the factors outlined by Myers and Majluf. Myers and Majluf present a case where managers act to increase the wealth of current shareholders. The managers can invest in a positive net present value project, but cannot finance the project internally. The method of financing determines if the project is accepted. In their analysis, the mangers will only issue equity if

they believe the share is overvalued by the market. Therefore, issuing seasoned equity serves as a signal the stock price is too high, causing a reduction in the share price in the market. High institutional ownership (high ownership concentration) should reduce this problem in two ways. First, institutional owners want to protect their investment and will discourage value decreasing decisions. Secondly, institutional owners may produce more information and reduce the asymmetry of information between insiders and outsiders. Their empirical results find a significant positive relationship between the returns surrounding seasoned equity announcement and institutional ownership. They conclude that institutional owners serve as effective monitors. Both of these studies support McConnell and Servaes (1990) claim that institutional owners serve as an efficient monitor and a positive relationship exists between firm value and institutional ownership. These findings are consistent with the notion that markets value the role of outside agents as monitors as noted by Slovin, Sushka, and Hudson (1990).

Another recent study tests the effect of creating a new blockholder on firm value and efficiency. Shome and Singh (1995) find a significantly positive impact on the value of the firm when new blockholders are formed and a net gain to the blockholder. These gains are explained by the wealth transfer from bondholders, the size of the blockholding and the identity (corporation or institution) of the blockholder. The study also finds weak evidence of hands-on monitoring of performance on an ongoing basis.

Park and Song (1995) analyze the role of blockholders when Employee Stock Ownership Plans (ESOPs) are established or expanded. If the ESOP entrenches managers, the improvement in the firm's performance is limited to firms with outside

blockholders. Park and Song conclude by stating that "the presence of a blockholder probably concerns management, either because of their close monitoring or a higher likelihood of an acquisition attempt by those blockholders." These authors find that blockholders provide valuable monitoring that increases the performance of the firm.

In restructuring privatized firms in the CR, we should find that firms with high institutional ownership (high ownership concentration) should have a higher value than firms with low institutional ownership due to effective monitoring and also due to value increasing changes in the Shleifer and Vishny sense.

Corporate Control and Ownership Structure

A test of a linear relationship between firm value and ownership concentration based on Demsetz (1983) was conducted by Demsetz and Lehn (1985). Their results find no relationship between ownership, measured by percentage of the firm owned by the five and twenty largest shareholders, and firm value. They hypothesize that other factors determine firm value other than ownership structure. One factor is size. Large firms have a larger market value per fraction of ownership, implying a larger wealth commitment by owners. If owners are risk averse, then they would diversify their holdings and reduce their ownership in the firm.

Control potential is another determinate of ownership structure. If the manager is easy to monitor, there is not a need for a large concentration of ownership. If managers are difficult to monitor, e. g. when a firm's earnings are variable and difficult to observe and predict, the ownership concentration should increase. An increase in managerial

ownership will help reduce the agency problem by aligning owners' and managers' interests. Regulation should reduce the control potential of a firm by using the government as a monitor and therefore reduce the need for ownership concentration to help monitor regulated firms. Another potential determinant of corporate ownership structure is the amenity potential, the increase in utility from ownership. This may exist in industries where there is a prestige factor associated with being an owner, such as sporting franchises or media companies. Demsetz and Lehn do find that these factors are significant in explaining ownership structure, but that ownership and firm value are not related.

Another test of ownership concentration and firm value was reported by Morck, Shleifer, and Vishny (1988). These authors analyze insider ownership concentration as opposed to all ownership concentration in Demsetz and Lehn. Two competing hypotheses of inside ownership and firm value are tested. An increase in inside ownership serves to align the interests of owners and managers. Higher levels of insider ownership will cause managers to work in the shareholder's interest. The competing hypothesis is that a large amount of inside ownership will help entrench current managers and cause them to not respond to shareholders. This is due to the fact that inside ownership neutralizes the market for corporate control as a control mechanism. The probability of the firm being taken over is reduced and managers are more secure in their job and can pursue maximization of their own welfare. Management can be entrenched with low amounts of ownership due to widely dispersed ownership of the remaining shares or because of a long term relationship of the manager with the firm, such as the case with families that started

the firm. The empirical test of firm value and insider ownership concentration is measured in a piecewise regression of Tobin's Q (a proxy for firm value) and ownership holdings of the board of directors and executive officers. They find a positive relationship between firm value and insider ownership for low levels (less than 5%) of ownership, supporting the convergence of interests hypothesis. For higher levels of ownership (between 5% and 25%), there is a negative relationship, supporting the entrenchment hypothesis. For a level of insider ownership above 25%, the relationship is again positive. The authors conclude that ownership is associated with firm value, but the relationship is not linear.

A variation of the previous study of insider ownership examines majority ownership, ownership between 50% and 100% of equity. Majority ownership allows for the possibility that the owners will expropriate or consume a substantial portion of corporate wealth. Holderness and Sheehan (1988) find abnormal positive returns around the trading of majority blocks. This result is inconsistent with expropriation by majority shareholders. They also find that executive compensation is not excessively high in majority owned firms as compared to diffuse ownership firms. However, there is a difference in returns and Tobin's Q depending on the type of majority owner. Firms who have majority ownership by an individual have systematically lower returns than firms that have majority ownership by corporations. Their major conclusions find that majority owners do not expropriate wealth, there are several implications of large block ownership, and the type of large block owner is important.

Another line of research in corporate ownership structure and the effects on firm value is corporate control and takeovers. A potential problem with research in this area

for this study is that many firms used in corporate control/takeover research do not continue to operate as an independent going concern. Many of the firms were absorbed into larger corporations or divested and sold as smaller firms. An exception to these studies is leveraged buyouts (LBOs), and especially reverse leveraged buyouts. Reverse LBOs are firms taken private through a LBO and then taken public through a stock issue. The gains from going private through a LBO may be caused by improvements in operating performance due to a more efficient operating structure and better allocation of residual claims, or because of wealth transfers from uninformed investors to informed investors. Kaplan (1989) and Smith (1990) both find operating performance improves significantly after a LBO. This indicates that gains from going private are not just mere wealth transfers, but changes due to more efficient operating structures. A LBO concentrates ownership, allowing the owners to make changes they may not have been able to make in a dispersed ownership structure.

Reverse LBOs offer a unique opportunity to analyze the changes made while the firm was privately held because the firm is required to disclose financial statements for several years of private ownership for the initial public offering (IPO). This can provide direct evidence of the effects on operating efficiency due to the LBO. Studies of reverse LBOs also test market's reaction to the "resale" of the previously bought out companies.

Several studies have analyzed reverse LBOs price performance and efficiency gains. The first of these studies was conducted by Muscarella and Vetsuypens (1990). Part of their study was to examine whether improvements in productivity and asset utilization occurred after the LBO. They also look at changes in equity value between the

LBO and the IPO. In testing changes in efficiency under private (concentrated) ownership, Muscarella and Vetsuypens look at the changes in six accounting efficiency measures: Sales, Gross Profit Margin, Operating Profit Margin, Net Profit Margin, Asset Turnover, and Sales per Employee. They find that reverse LBOs experience improvements in operating performance when compared to the performance of the firm over a time period when the firm was public and when compared to randomly selected firms over the same time period. They believe the profitability gains are due to the firms' ability to control production costs rather than increasing sales or divestiture/acquisition activity. These gains in efficiency of operations are reflected in the prices of the IPO of the reverse LBO. Comparisons of price data of the price per share paid at the time of the LBO and the price paid for share at the time of the IPO, adjusted for stock splits, etc., reveal a significant rate of return on equity. An annualized rate of return of 268% for the full sample was computed.

DeGeorge and Zeckhauser (1993) argue that reverse LBOs are subject to some informational asymmetry problems when they return to public markets. First, managers (owners) of the LBO have an incentive to manipulate performance while the firm is private and especially just prior to the public offering. Muscarella and Vetsuypens find no evidence of manager manipulation. Another problem is the timing of the IPO issue after a year in which the firm had good performance. DeGeorge and Zeckhauser find reverse LBOs perform better than continuing LBOs and other public firms on average, in the year before they go public again. They also find that in the year after going public, reverse LBOs perform worse than other firms on average. In pricing LBOs, the authors find that

the market correctly anticipates the performance of reverse LBOs. The issues are not significantly underpriced and do not underperform comparison firms over a two year horizon following the IPO.

Another study of reverse LBOs by Mian and Rosenfeld (1993) analyzes long run (three year) price performance. Over the three year horizon, they find reverse LBOs have significant positive abnormal returns which lends support to Muscarella and Vetsuypens claim that reverse LBOs undergo increases in efficiency and profitability. The abnormal returns may also be driven by takeover activity of these reverse LBOs in the three years after going public. Overall, there does not seem to be any differences in organizational or operational efficiency between firms that were taken over versus firms that were not.

In summary, although perfect markets and market resolutions to agency problems do not allow for a relationship between ownership structure and firm value, empirical studies have provided evidence of such a relationship. Studies of the reverse LBO markets provide evidence that a concentrated ownership structure does improve firm value by changing the operations of the firm so it becomes more efficient. Going public again allows the owners to capture those gains through partial liquidation of their holdings. This line of reasoning should also apply to the privatization of firms in the CR. A concentration of ownership will allow the owners to monitor more closely and make operational changes in the firm in order to improve efficiency. The gains from efficiency should be greater for firms with a high concentration of ownership, or firms that are owned and managed by those who have expertise in restructuring the current operations.

Privatization

There are two strands of privatization literature. The first area concerns the economic and social welfare (macroeconomic) issues and the sequence of privatizations. The second area is the method of privatization and the changes in the firm once it is privatized. Each area will be discussed in turn.

Macroeconomic Issues. Ramamurti (1992) notes that countries privatizing state owned enterprises (SOEs) are developing countries with high budget deficits, high foreign debt, and high dependence on agencies such as the IMF and World Bank, but not necessarily countries with poor operating performance by their SOEs. Another factor in privatization decisions is the growth and development of the private sector market which indicates it is able to take over tasks previously done by state enterprises. Privatizations occur because of country factors and not firm specific factors. The main emphasis should be on the country and not the individual firm.

Brainard (1991) and to a lesser extent Aghion (1993) point out the importance of institutions, especially banking and intermediaries in the privatization process. Without first reforming the capital markets and banks, privatization would not succeed for the lack of capital and methods to restructure industrial firms. In addition, Roland (1993) suggests that a gradual privatization has a smaller opportunity and social welfare cost and is more efficient method than a fast, massive privatization. The reasoning is that if a privatization plan is not working, it can be reversed before it becomes too costly to stop or undo. A massive privatization program cannot be easily reversed and is therefore considered

permanent. If there is uncertainty about the effects of privatization, a gradual method is preferred. However, there are dangers to partial reform and movement to a market economy. Murphy, Shleifer, and Vishny (1992) show that partial reform or privatization may lead to a distortion of prices the state charges and those set by the markets and the allocation of materials and resources between the private firms and the state owned and regulated firms. The authors recommend a "big bang" approach to price reform and privatization in the former Soviet Bloc.

Husain and Sahay (1992) consider which industries should be privatized first. The economy consists of two types of firms, upstream firms using raw materials to produce an intermediate good, and downstream firms using the intermediate goods to produce a final good. The authors conclude that given imperfect markets, high industrial concentration in firms, and trade liberalization, all of which characterize centrally planned economies of central Europe and Russia, the sector facing less uncertainty and containing a relatively less concentrated industrial structure (more firms operating in the same industry) should be privatized first.

Method of Privatization. The second area of research focuses on the method of privatization (auction, tender offer, voucher, etc.) and the gains in efficiency in the firms once privatization occurs. This area of research is more pertinent to this study. Perotti and Guney (1993) focus their study on the structure of privatization plans in non-communist countries. They observe that privatization is similar to initial public offerings (IPOs) by the current owners. In comparison to IPOs, more information is known about

SOEs, and therefore less risk and a higher price could be expected in privatizations. The empirical evidence shows otherwise. The underpricing in privatizations is even greater than in IPOs. Explanations for this include signaling of political intentions of the government to commit to the privatization plan, distributional concerns, and the method of using primarily fixed price offers instead of auction sales. The authors find using an auction in privatizing SOEs results in less underpricing than a fixed price offer, but fixed price offers are used over 80% of the time. With an auction process like that of the Czech Republic, the unerpricing is reduced. The amount of government ownership is also a factor. The government giving up controlling interest, but retaining a large share, sends a positive signal to the market. Perotti and Guney interpret this signal as a commitment by the government to guarantee the success of the privatized firm. If the privatization succeeds, and the price of shares increase, then the government can sell its remaining shares at a higher price than if it sold all the shares initially. This is similar to the arguments put forth by Leland and Pyle (1977) where the entrepreneur sends a signal of high quality by retaining a higher portion of the firm instead of using outside financing.

Distributional issues are also important in privatizations. Seth (1989) investigates privatizations in western countries such as U. K., France, and Japan and why a wide distribution of shares is desirable and how shares of privatized firms have been distributed in these countries. A wide distribution of shares may reduce stock price volatility, achieve portfolio diversification for individual investors, and reduce the risk transferred to the equity market. Seth points out that institutional investors are believed to cause stock price volatility and a wide distribution, low institutional investment, will reduce volatility. If the

goal of privatization is a wide distribution of ownership, then a fixed price offering is preferred. His study indicates privatization occurs mainly through underpriced fixed price offerings, but it does not reverse the trend of decreased ownership by individuals. A wide distribution of shares is not preferred in former Soviet Bloc countries because it does not provide effective monitoring by the owners of the firm. Lipton and Sachs gives this issue more attention and is discussed in the following section.

Prager (1992) argues that privately owned firms are more efficient than SOEs. The reason for this efficiency gain is that wealth maximization may be just one of several objectives that SOE management must meet. Public sector management is subject to intervention from political officials, employee incentive programs are not as flexible or effective in the public sector, and a soft budget constraint may encourage inefficiency in the public sector. Al-Obaidan and Scully (1991) cite political employment policy (full employment), government protection through subsidies or tariffs, and the lack of measures of manager performance as causes of inefficiency. This last reason would lead to shirking of management responsibilities and decisions. In their study, they contrast privately owned oil companies with state owned oil companies and test for three types of inefficiencies in SOEs. Using statistical regressions and estimation of production functions and efficiency frontiers, they test for technical inefficiency, scale inefficiency, and allocative inefficiency. Using a vertical integration ratio, a multinational integration ratio (foreign vs. domestic production), output (in barrels) to total assets, total revenue, and type of ownership, their results indicate that private companies have higher capital and productivity ratios than SOEs. Technical efficiency is 14% lower for a state owned oil

firm, and current output of state owned oil firms requires about half the current inputs that they use.

A recent test of firms' changes and increases in efficiency after they were privatized was done by Megginson, Nash, and van Randenborgh (1994). Their sample consisted of 61 companies from eighteen different countries, none of which included former Soviet Bloc countries. To measure changes in efficiency, profitability and structure of the privatized firms, they compared key accounting ratios before and after privatization of these firms. The thirteen ratios used fall into seven categories. Profitability is measured by return on sales, return on assets, and return on equity. Operating efficiency is measured by sales efficiency (sales/number of employees) and net income efficiency (net income/number of employees). Capital investment is measured by capital expenditures to sales and capital expenditures to assets. Output is measured by real sales (nominal sales/ consumer price index) and employment is measured by total employment. Leverage changes are measured by debt to assets and long-term debt to equity. The last category is dividend payout which is measured by dividends to sales and dividend payout ratio.

These ratios were computed for three years before privatization and for three years following privatization. The means of the ratios are compared between the two periods. They use a nonparametric signed rank test to test for significant differences between the two periods. They find significant increases in profitability, employee output, capital spending, and total employment. They also find lower leverage levels and higher dividend payout. The results strongly support that firms significantly increase operating efficiency and profitability after privatization as well as make structural changes in financing policy.

The authors also find a significant turnover rate in corporate governance as measured by new members on the board of directors. Firms that have a high turnover rate in the board of directors experienced larger increases in operating efficiency, profitability, and capital investment than firms that have a lower turnover rates in the board. However, the differences are not statistically significant.

Former Soviet Bloc Privatization Programs

The previous section reviewing privatization research does not consider many of the unique features of the privatizations in the former Soviet Bloc countries. In previous studies of privatizing SOEs, the firms were sold in developed capital markets for cash. Many of the studies also looked at or considered a limited privatization program, one in which the number of firms that were being privatized were small, or that the privatization program was conducted over a long period of time. The context in which privatizations have taken place in the former Soviet Bloc counties affects both the method of the privatizations and the outcomes.

Goals in Massive Privatization. In structuring privatization programs for the former Soviet Bloc, the IPO methods used in Western Europe and other countries would not succeed. Lipton and Sachs (1990) state four limitations of using the IPO privatizations in Eastern Europe. First, public offerings require valuation of each firm, which requires accurate and detailed information of each firm. With the number of firms to be privatized and the operating and accounting system inefficiencies of these firms, this

may not be possible. Secondly, the public cannot afford to buy the firms being privatized. The wealth the citizens of these countries hold is at most a small fraction of the true value of the firms. If the firms were sold for the true market value, most of the firms would have to be sold to foreigners, giving citizens little or no ownership in these firms, and a low probability of owning these firms in the future. Thirdly, IPO privatizations used elsewhere lead to a widely dispersed ownership which may not be desirable for the firms of Eastern Europe (this will be discussed in more detail later). Finally, Lipton and Sachs believe that relying on IPO privatizations will result in only the most profitable firms being privatized, leaving the state to continue operating the unprofitable firms.

Lipton and Sachs also present a case that the primary guide to privatization in Eastern Europe should be property rights and effective corporate governance. Previously, all firms were owned by the state and there was no private property or property rights. The privatization of these firms (mostly into joint stock companies, corporations) requires the definition of property rights and creation of markets (stock exchanges, banking system) and institutions (financial intermediaries, mutual funds, etc.) to facilitate transactions of property holders. One of the primary concerns of property rights is the potential of current managers, politicians, and workers' councils to either strengthen their claim on assets or expropriate some or a significant portion of the firms' assets to their own benefit instead of turning them over for privatization and someone else's control.

Effective corporate governance plays a dual role. First, it plays the role of reducing the potential problem of current managers or workers transferring the firm's wealth and assets for personal use. Second, it plays the role of creating an effective

management of the newly privatized assets. Communism created an economic system where sub-optimal management of firms was widespread. Many of these managers owed their position to party allegiance rather than proven, competent management. Other managers were in their position because of technical or engineering expertise which was essential to the survival of the planned economy. Lipton and Sachs suggest that corporate governance should extend from the ownership of the firms' shares of stock. Ownership of the firm should be held by households, financial intermediaries, and other nonfinancial firms. They further suggest that firms' shares should avoid an "atomistic" or small, widely dispersed ownership structure, but "divided up into tranches among various groups and financial institutions that will have an incentive to monitor the enterprise and promote sound management." They propose a split of block shares among workers, pension funds and commercial banks, and to mutual funds which are in turn owned by individuals. This recommendation is based on the belief that large blockholders are better able to monitor the firm and the political realities of Eastern Europe.

Comparison of Polish, Czech and Russian Plans. Lipton and Sachs proposed these plans in 1989 and 1990 before massive privatization began. Boycko, Shleifer, and Vishny (1994) compare the Polish, Czech, and Russian privatization experiences. Each of these countries' privatization plans had the same goals and shared some similarities, but there are some marked differences. Boycko, Shleifer, and Vishny (BSV) maintain while the primary motivation of privatization is economic, the process and methods are politically influenced. The politicizing of privatization did not sacrifice economic efficiency to a large degree.

All three countries used a mass privatization system. This was influenced by the number of companies to be privatized. Privatizing a few firms a month would take over forty years in what the CR accomplished in about a year. Within the framework of mass privatization, all three countries desired to achieve an effective corporate governance in order to monitor the firm and improve operating efficiency.

The Czech and Russian methods were more similar to each other than the Polish method. The Polish method reflected many ideas expressed by Lipton and Sachs, partly because Sachs served as an advisor to the Polish government in designing the privatization program. In the Polish system, 400 of the largest firms were divided between ten mutual funds, each firm having a 33% share owned by one fund and 3% of the shares distributed to each of the remaining nine funds. The remaining 40% of the firm was divided among the managers, workers' councils, and the government. Each Polish citizen received a share in each of the ten funds, and may trade or sell their fund shares. The funds may trade shares of firms, but their primary responsibility is to oversee the restructuring and attract foreign investment. Each firm now has a large shareholder that monitors its progress. It is important to recognize that the ownership structure of each firm was predetermined by the government.

The Czech and Russian methods relied upon the distribution of vouchers or coupons. The coupons are redeemable for shares in privatized firms and were distributed at a small nominal cost. Coupons allowed individuals to choose what firms that they want to own, and the number of shares. Both countries also allowed managers to acquire ownership shares in their firms. The risk of coupon privatization is that ownership of

firms will be widely dispersed and that there will be no large shareholders to monitor and restructure the firms. To create large shareholders, the CR and Russia encouraged the formation of investment funds and blockholders. However, the methods differed between the two countries. Russia denominated its coupons in currency units, and the coupons were allowed to trade among investors. Allowing coupons to trade accomplishes several goals. First, it lets individuals who need cash, especially the poor, to sell their coupons for current consumption needs. Secondly, it helps create large blockholders. Finally it helps develop financial markets. The largest exchange in Russia dedicated a floor area to coupons as soon as they were introduced. The coupons were auctioned for shares at different locations throughout the country. This was primarily due to the vastness of the country and the number of people participating in coupon privatization.

The Czech method created large shareholders by encouraging mutual funds, several of which have over 10% of all coupons and own a significant share in many privatized firms. In addition, the Czech government took proposals from outsiders for restructuring in addition to proposals from managers. Proposals that included active blockholders were preferred and there was an average of four proposals for each firm privatized. The best proposal was selected, and if it was the coupon auction proposal, it was set aside for the coupon auction with all firms being auctioned at the same time.

Coupons in the CR were not denominated in currency units, but in points, and were not allowed to trade. Individuals could divide their points between different firms and/or give them to investment funds to use in return for shares in the fund. Both individuals and funds participated in the coupon auction, and the auction was centralized.

Initially, three shares of every firm were valued at 100 points. The Privatization Ministry took orders for shares at those prices. If the shares were greatly oversubscribed, then the orders were sent back, the prices for the shares in points were raised and new orders were taken. If the issue was greatly undersubscribed, then the orders for shares were sent back, the prices were lowered, and new orders were taken. The method for raising or lowering prices was not public, neither were the methods in determining which firms would be raised and lowered. There were five rounds of bidding in the Czech system.

The auction process has several economic and political benefits. The auction process allocates shares to those that value them most, it produces a market valuation of companies, and it does not require politicians and bureaucrats to assign values to companies. Auctions are perceived to be much less susceptible to corruption and it gives individuals a choice in what shares to buy. Shares are allocated based on supply and demand, not on government determination. Political favors are harder to obtain because the auction is a market process, not an allocation by the state. Another benefit to this auction process is that professionals do not routinely outbid individuals. This type of auction also serves to reduce to some extent the initial underpricing (in valuing the firm, not the proceeds from sale) of privatization IPOs found by Perotti and Guney when countries use a fixed price offering. Through auctions, both the Russian and Czech methods achieved large blockholders in many firms, while allowing for varying ownership structures.

III. THE CZECH PRIVATIZATION EXPERIENCE

Czech Privatization Plans

The Czech Republic (CR) had the greatest dependence on state owned enterprises of all former Soviet Bloc countries. At the time of the "velvet revolution" in 1989 that ended the communist rule over the republic, the private sector accounted for about 4% of the GNP, with about 98% of the property in state hands. In contrast, the private sector accounted for about 19% of output in Poland, and 35% in Hungary. The CR had a comparatively longer road to travel to reach a capitalistic system.

The evolution from a SOE to private ownership has been dramatic. By the end of 1994, about 80% to 85% of the Czech economy is in private hands. The CR boasts one of the lowest inflation and unemployment rates of the former Soviet Bloc countries at 9.7% and 3.2% respectively. This is compared to 34.1% and 16.9% in Poland and 20.3% and 11.1% in Hungary. In addition, the Czech Crown has remained stable and became convertible during 1995 (since 1990, the crown's value is determined by a U.S. Dollar-German Mark mix). Some attribute these successes to the split between the CR and Slovakia which became final on December 31, 1992. The first wave of privatization was completed during 1992 before the split became finalized. After the split, the CR and Slovakia have pursued different privatization policies and plans. Slovakia drastically cut the number of firms to be privatized and increased the time frame of privatization. The CR continued with a quick, massive privatization plan, with a second auction completed in 1994, and a final auction scheduled for 1996. After the second wave, 80 to 85% of the economy was privatized.

In the CR, privatized firms fell into either small scale privatization or large and medium scale privatization. Small scale privatization included about 25,000 firms that are mainly retail shops, restaurants, hotels, and service type shops. These firms were sold in a direct public auction to Czech and Slovak citizens. The auction for small scale privatization ended in 1993 with 22,212 firms privatized.

Large scale privatization is mostly associated with the coupon system. Instead of a continual auction like that of small scale privatization, large scale privatization will be accomplished in three waves. At the beginning of each wave, interested individuals submitted proposals to the Privatization Ministry for firms scheduled to be privatized. For the first wave of privatizations that ended in 1992, there were 2,170 SOEs selected to be privatized and proposals were accepted for these firms. Proposals ranged from coupon privatization, direct sales, transfer to local municipalities, or breaking up large firms into several small ones to be sold individually. The Privatization Ministry and the National Property Fund evaluated each proposal and selected a plan for each firm, or rejected all proposals and delayed privatization of the firm. About 300 of the targeted firms did not have suitable proposals and were not privatized in the first wave. The remaining 1,860 SOEs were privatized during 1992. These firms represent about 40% of the large scale firms to be privatized in the CR. The first wave of coupon auctions privatized 1,491 SOEs. The rest were sold directly to foreign investors or privatized by other methods. For the SOEs sold to foreigners, the investors had to demonstrate some proof or give some assurances that this purchase represented a commitment to the Czech economy and not a method to buy assets cheaply and then dismantle the firm for its assets.

Volkswagen's lengthy negotiations with the Czech government and firm managers when buying Skoda is an example of this. The contract has since undergone renegotiations to settle problems that were not anticipated. In the first wave of privatization, 62% of shares were offered through coupon privatization, 15% were left in temporary possession of the National Property Fund, 11% of the shares were transferred to local municipalities, 4% were distributed for restitutional purposes. Less than 2% of shares each, 8% total shares, were for direct sales to foreign or domestic investors, intermediated sales, employee ownership, and long-term government holdings.

A little over 80% of the eligible population participated in the first wave of coupon auctions. In order to be eligible to participate, the investor must be a citizen of the republic, over 18 years old, and pay a fee to buy the coupon points. The fee was 1,000 kc (about $35 U.S.), which represented about $1,250 in book value terms of the firms being privatized. As mentioned above individuals could bid for shares of firms directly with their coupon points or could allocate their points to an investment fund in return for shares in the fund. The investment fund would bid for shares in the auctions against other funds and individuals. Individuals could also divide their coupons between the two methods or between the funds.

Initially, there were over 400 investment funds competing for coupon points. Some funds guaranteed a return of 1,000% after the first year in order to attract points from investors. Investment funds managed to collect 72% of the points available. All funds were required to register and send out a prospectus that stated the objective and strategy of the fund. Some funds characterized themselves as a branch fund, investing in

SOEs that are from the same or related industries (such as the pivo (beer) fund), while others became growth funds, investing in high risk enterprises. Other funds stated their objective as a diversified and stable fund, buying a diversified portfolio with a small percentage in many firms and no large ownership stake, while others became management funds. Management funds sought to obtain a significant stake in relatively small number of firms in order to restructure and manage the firms. Funds were initially restricted to a 20% or less ownership share of a firm, but could obtain a significant block ownership. Half the points accumulated by investment funds (36% of the total points) were controlled by the ten largest funds.

None of the firms were restructured prior to privatization. The government did not restructure for several reasons. First, government management had been ineffective to this point, and there was no indication that it would increase the value of the firm. Secondly, the CR wanted to privatize as quickly as possible and did not want to delay privatization due to restructuring the corporation. Finally, the government wanted to rely upon the investment funds and the private sector to restructure the firms. Information about the firms being privatized was a major stumbling block. In order to help reduce information asymmetry between informed and uninformed investors, the government published the list of enterprises to be privatized as well as information about each firm.

The firms being privatized in the first wave of coupon auctions had a combined book value of $10.6 billion (average book value of $7,100,000). The average firm had a labor force of 850 employees. The first wave consisted of five rounds of bidding. The initial auction price in the first round for all shares was 3 shares/100 coupons.

Subscriptions were taken and then shares sold. If the firm was oversubscribed, then one of three outcomes occured: 1, shares were either pro-rated equally; 2, the investment funds' order was reduced by up to 20% per fund with a maximum of 25% of total sales; 3, no shares were sold and a new price was set for the next round. The condition of investment funds' orders being reduced was canceled for the second wave. If the shares were undersubscribed, then there were two outcomes: 1, the subscribed shares were sold at that price, or 2, no shares were sold and the price was lowered for the next round. No orders were filled only when there was a large over or under subscription. Prices for each round were computed using an algorithm by the committee for fixing prices based on orders and prices from the previous round. At the end of each round, the results were printed in the coupon privatization newspaper, This information included the number of shares offered in the round, the number sold (if any) and the new auction price for the next round. New orders were taken for the next round. Individuals or investment funds that had not used all of their coupons could bid for the next round. At the end of the third round, the highest price was 776 times the lowest price (in coupon points). By the end of the fifth round, 93% of all shares were sold, and 99% of all coupon points were used. There were 196 Czech firms (19.8%) that sold all their shares in the five rounds of bidding.

Although investment funds were intially limited to a 20% ownership of the firm, significant blockholdings above 20% could occur. Investment funds could petition to CKP for increased ownership above the maximum, especially in the later rounds when

most individuals had spent their coupons, or an investment company could take a family of funds approach and obtain a 20% ownership in a firm in each of its funds that it offers.

The second wave of privatization was completed at the end of 1994. The second wave included 676 new firms and 185 firms which offered shares in the first wave (government selling a portion of its remaining shares). This compares to 988 firms in the first wave (the CR's share of the 1,491 after the split from Slovakia). The second wave concentrated mostly in complex and heavy industry firms, such as telecommunications, utilities, and machinery manufacturers. The third wave will be quite small compared to the first two waves and will be completed in 1996.

With the mass privatization schemes of the CR, financial markets have developed. Some banks have been privatized and are now operating as universal banks, providing underwriting of new issues and debt, commercial loans, and financial advising. An equity exchange market is also trading. The shares were physically distributed once the auction was completed. The Securities Center (SCP) kept records of the shares owned in account form. Investors received the physical shares that they owned in May and June 1993, and received the investment fund shares that they own between July 1994 and October 1994. All firms that had stock auctioned in the coupon privatization are traded on the Prague Stock Exchange. Because financial markets were relatively illiquid, changes in operations were more common than financial changes in the first year after privatization. Some financial backing was available from the state owned banks, but the loan process was similar to western loan applications and not the soft money policy during the communist

regime. Changes in operations were one of the stated objectives of the government for investment funds to accomplish.

In addition to the traditional stock exchange, an electronic parallel off-exchange market had developed called the RMS (RM refers to the place where coupons were bought). The RMS will allow individuals to directly trade their shares, both firms that are listed on the exchange and firms that are not listed. Trading takes place without the mediation of brokers, but by computerized matches. RMS computer terminals are located in many different locations around the cities and the country. To trade, an investor must have the stock or cash on deposit in an account with a bank and/or the SCP. The records are electronically kept and settled. In addition to individuals, institutions also have direct access to the electronic exchange, but large block trades will take place outside the market. Trading began on the RMS in 1993.

In summarizing the Czech experience, the mass privatization of large scale firms was successful in transferring ownership to private hands (individuals, investment funds and foreign investors). The privatization process allowed for varying ownership structures including large blockholders and numerous small investors. Cross-sectional differences in the resulting ownership structure provide a laboratory to test hypotheses concerning the relationship between ownership concentration and changes in efficiency and hypothese concerning market efficiency.

Czech Financial Markets

With two waves of voucher privatization complete, Czech financial markets play an increasingly important role. In 1994, $2.22 billion traded on the PSE. 62% of the trades were shares of privatized firms, 7% in investment fund shares, and the remaining 31% in bond issues. After shares were issued and received, trading began in June 1993 on a weekly basis in a call market format. Shares began trading daily in 1994, and a limited number of the most active shares began trading continuously in February 1996.

Both the PSE and RMS trade entirely by telecommunications. Although the PSE has a building and trading floor, trading is done by computer matches which the brokers submit from their own offices (beginning March 4, 1994) instead of placing the orders at the computer terminals located at the PSE. Trading is now done entirely on-line. The PSE trades listed and unlisted stocks. By the privatization laws, all shares are required to trade on exchanges. Listing with the PSE requires additional disclosure. The PSE will be allowed to trade only listed shares as over-the-counter markets become more developed and the massive privatization process is completed. The time frame for this switch is not definite.

Trading on the PSE Central Market is a form of a call market, in which all shares trade once a day. Prices are established in the afternoon based on orders, supply and demand, and prices from the morning trades. These prices are valid until the next trading session. Orders are due by 10:00 a.m. for trading that day. Once buy and sell orders are received, trades occur by computer matches. From conversations with PSE officials, about 90% of the orders come in between 9:45 and 10:00 a.m. The efficiency of these

matches are categorized by number 1 through 8, 1 being the highest level of trade matches, 8 being no trade matches. The trading matches and the prices for the next trading session are released in the afternoon, generally by 1:00 p.m. There are daily price limits on shares traded. Central Market trades can fluctuate ± 5%.

The PSE also has direct trading. Direct trading by brokers accounts for almost 75% of volume and value on the PSE. For all practical purposes there are no price limits on direct trades. The last reported price limit in 1994 was ± 25% of the previous days price. Direct trades are reported to the PSE and cleared by the PSE, but do not enter into the automated trading computer.

The RMS is an alternative to trading shares on the PSE and is targeted toward small and individual investors, not institutions or block trading. During 1994, over 8.3 million shares were traded at a value of 4.4 billion Czech Crowns ($170 million). Also during 1994, periodic trading of shares ended on the RMS in favor of continuous trading of shares. Trading can be done through one of 356 special clients who have on-line terminals installed on their premises or through the Trading Places of the RMS (offices that the RMS owns). Individuals can go in person to submit their order and wait for it to be processed at an RMS office, submit their orders on computer disk or by modem, or can submit their orders at a special client's office who has an RMS terminal. Before orders are executed, they are cleared by the investor's bank in case of a buy order, or with the SCP (where all stock accounts are kept) for a sell order. After the order is cleared by the investor's bank or the SCP, it becomes a valid order. In both the RMS and PSE, orders can be market orders, limit and/or stop orders.

The Czech markets utilize electronic trading in conjunction with technology with a frame of traditional markets as shown by trading on-line while having an exchange floor for trading. The views expressed by the Ministry of Finance while developing the markets, and the pride of the Czech markets is that since they have the technology and know how to create a state of the art trading system, why use traditional methods. These advances have had problems early, especially with the system requirements, such as hardware and managing the amount of orders and information. These problems have been solved for the most part, and the markets provide an opportunity to trade easily even though the markets are not as liquid as Western markets.

IV. DATA AND STATEMENT OF HYPOTHESES

Data Requirements

The data required to complete this study falls into three categories. The first is pre-privatization financial statements and privatization auction data, the second is post-privatization financial statements and market value data, and the third is post-privatization ownership data.

Data Sources. Pre-privatization financial statements and privatization auction data for the first wave of large-scale privatization was obtained from the Ministry of Finance. The Center for Coupon Privatization (CKP), a division of the Ministry of Finance, was responsible for the coupon privatization process. The CKP instructed the public on the process, the time frame, and provided information about companies in the auction and investment funds being formed. The CKP also was responsible for the logistics of the privatization process. They accepted bids of coupons for shares, decided the number of coupons per share through the committee for fixing prices, and issued the shares to new owners held by the Securities Center in account form. Data were distributed to Czech citizens in the newspaper *Kuponova Privatizace* which was issued by the CKP. These were a series of newspapers, published monthly, over the privatization process that initially described the privatization process, updated the privatization process, listed the firms and information about these firms, and then reported the auction results and listed the new rates for the following round. The financial information for the firms in the coupon privatization was originally published in May 1992. The information that is used

in this study is that issue and also the collection of all data published in book form by the CKP.

The pre-privatization information includes name, address, and brief description of business activities, the coupon identification number, the number of shares offered and the percentage of shares distributed by other methods. The additional methods include direct sale to a domestic or foreign entity, shares for restitution, shares temporarily left in the National Property Fund or Privatization Ministry, shares transferred to local municipalities, shares sold through intermediaries and shares held by the national government. Pre-privatization financial information includes: book equity value (book value of the issued shares), net business equity (assets), and the total liability of the firm as of 1991. The previous three years data, 1989, 1990, and 1991, for performance (revenue), profit, bank credit, and number of employees were also included. The firms were divided, by locale, into Czech or Slovak firms. There are a total of 988 Czech firms in the first wave of coupon privatization.

As each round (five total) of the coupon auction for these firms occurred, *Kuponova Privatizace* published the number of shares sold, if any, the number left to sell, and the new price for bids in the next round. Data of how many shares were subscribed in each round, and the information about how to allocate shares and set the next round's price were not disclosed to the public at any time during the privatization process.

The second set of data that is required is the post-privatization financial information and the market price for these firms. Whereas the pre-privatization data was centrally located and collected, post-privatization data in the years immediately following

privatization are scarce. A central depository for annual reports of corporations, the SCP, was established by the Czech government. All corporations that are listed on the Prague Stock Exchange are required to produce and send their annual reports to the SCP. The format for the annual reports are laid out in the Accounting Act (1992) and the Chart of Accounts and Accounting Procedures (1993). But in 1993, only three firms sent annual reports to the SCP (Zelenka, 1995). Part of the reason for low compliance is the lack of enforcement or penalties. Another reason for low compliance is that some corporate officers still consider information in the annual reports to be private information. In addition to the SCP, summaries of the balance sheet and profit and loss accounts (income statement) are required to be published in the *Commercial Bulletin* which is published weekly. Most firms have published their financial statements in the *Commercial Bulletin*. The financial statements in the *Commercial Bulletin* do not appear in any particular order, such as alphabetical, industry, or location, nor in any particular time frame such as end of a fiscal year, quarter, or month. Because of the difficulties in obtaining post-privatization financial data, the data that is used in this study were obtained from Aspekt Kilcullen's database. Aspekt Kilcullen is a private business research and consulting firm which has collected full or partial information on over 1,400 firms. The data they collected ranges from financial accounting data on the firm, to personal information on the firm's directors and officers. Information was gathered by collecting annual reports, *Commercial Bulletins*, surveys sent to corporate officers, and information collected by the government.

The financial data in the pre- and post-privatization periods are not directly comparable. The data from both periods are financial data and represent activities of the

firm. The data from the pre-privatization period are collected from the Office of Statistics which collected information to keep track of quotas given to the firm in a centrally planned economy. It reperesents firm activites, but not market demand or market financial information. This data differs from the post-privatization data in two ways: first, the post-privaization data is western accountind data that has been audited and is similar to U.S. financial statement data; second, the post-privatization data represents activities of firms in a market economy, not a centrally planned economy. Because of these reasons, the data is not directly comparable, but it does provide an imperfect measure of firm activities in the two time periods.

Information on the market value of shares was collected from Harvard Brokerage Services (HBS) and from the financial newspaper *Hospodarske Noviny*. Harvard Brokerage is a private financial firm which provides consulting and investment banking services. In addition, HBS is part of the holding company Harvard Capital and Control which manages the Harvard Privatization Investment Funds. These are among the largest funds in the Czech Republic. HBS provided the price data for firms traded on the Prague Stock Exchange (PSE) during December 1993 and 1994. In December 1993, there were 234 firms that traded on the PSE and 271 firms in December 1994. The average of this price data from December of each year determines the year end market value of the firms. The year end market value is used to measure a change in value from the auction data to the end of 1993 and from 1993 to the end 1994. The reason for using the average of the December prices is that the markets were not very liquid during this time and an average price will reduce the effects of illiquid trading. In 1993, trading took place two days a

week, in 1994, trading began on a daily basis, although only a limited number of firms traded weekly or daily. For firms not traded during these months, the last traded price listed on the PSE determines the market value. These prices are in the newspaper *Hospodarske Noviny*.

The final set of data that is needed is ownership information, the name of the large blockholders and the percentage that they own. This information is not required disclosure in the annual reports. The database from Aspekt contains some ownership information for some firms. This information was generally gathered through surveys sent to the firm, not through annual reports. This is the most complete data on ownership in the Czech Republic.

Sample Selection

There are 988 Czech firms in the first wave of coupon privatization, along with 503 Slovak firms. At the beginning of the first wave of coupon privatization, the Czech and Slovak Federal Republic (CSFR) still existed. It was not until January 1, 1993 that the two countries became completely independent of each other. During the first wave of privatization, Czech firms and Slovak firms were listed separately so that a distinction between firms could be made. This study begins with the sample of 988 Czech firms. Table I contains a summary of financial information for the firms. Of the 988 firms, Aspekt Kilcullen provided ownership information for 208 firms. A comparison of these 208 firms with the remaining 780 is given in Table II. In general, the firms that provided ownership information are larger with respect to number of employees, sales, profit, and

assets than firms that did not provide ownership information. However, the two sub-samples do not differ with respect to industry distribution or the price paid per share during privatization.

Table I

Descriptive Statistics of the 988 Privatized Firms from the Years 1989-1991 in thousands of Czech Crowns (29.48Kc/$ average rate during 1991)

	Mean	Standard Deviation	Maximum	Minimum
Shares available	215,048	606,734	14,754,374	2,172
Book value	351,611	1,719,925	49,181,248	2,239
Net Business Equity (assets)	426,043	2,057,039	56,038,417	2,463
Liabilities	312,983	1,013,115	13,932,252	-366,400
Average performance	502,057	1,843,966	31,308,096	705
Average profit	64,899	478,366	10,543,660	-105,818
Average bank credit	150,496	601,820	12,290,165	8
Average employees	1,024	2,016	36,593	9
Weighted price	0.0622	0.0766	0.5887	0.0010
Percent sold	0.9483	0.6340	1.0000	0.0738

Of the 208 firms with ownership information, thirteen firms are missing at least two years of pre-privatization financial data and twenty-three firms are missing both years of post-privatization financial data. These firms are deleted from the sample that is used in hypothesis testing in this study. These omitted firms do not statistically differ from the remaining 172 firms based on size of pre-privatization data on number of employees, assets or sales, nor do they differ by industry classification and coupon price of shares. Two more firms were deleted due to insufficient ownership information because they disclosed the names of the owners, but not the percentage of shares that they owned. The final sample contains 170 Czech firms. These are distributed across 16 broad Czech industry classifications, similar to SIC codes used in the U.S.

Table II

Comparison of Firms with Ownership Information with those with Missing Ownership Information

	Firms with Ownership Information (208 firms)			Firms without Ownership Information (780 firms)			Mean Test
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	T-ratio
Book Value	755,040	203,380	3,603,921	248,576	93,939	597,884	2.02
Net Business Equity	885,116	234,713	4,105,248	308,795	108,979	978,531	2.01
Liabilities	622,461	141,406	1,708,845	233,233	50,632	714,450	3.20
Average Performance	840,265	323,445	2,327,546	415,679	137,631	1,689,532	2.46
Average Profit	121,070	27,135	750,099	50,606	10,126	378,806	1.31
Average Bank Credit	297,439	62,472	1,137,955	109,656	28,959	311,041	2.36
Average Employees	1,968	923	3,628	783	429	1,212	4.64
Weighted Price	0.0604	0.0307	0.0634	0.0627	0.0308	0.0797	-0.44
Percent Sold	0.9914	0.9660	1.0564	0.9373	0.9539	0.4692	0.72

Price Index

An index was constructed to measure changes in relative value. A sample of 231 firms was drawn randomly from the 780 firms excluded based on lack of ownership data (242 firms were initially used so that the index would have 450 in the index, but 11 firms did not have price information after privatizaiton). These firms were combined with the 208 firms to construct the index. Pre-privatization data of the 231 firms is similar to the 780 firms with respect to size and industry distribution and represent the excluded sample's change in value. The comparison of these firms with the remaining 549 firms is given in Table III, and, as can be seen, the firms selected to be in the market index are representative of the 780 firms with respect to size and industry classification.

Table III

Descriptive Statistic Comparison of Firms Used to Create Index and Firms Not Included in Sample

	Firms Used in Index (231 firms)			Non Sample Firms (549 firms)			Mean Test
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	T-ratio
Book Value	279,116	100,083	728,599	235,653	90,000	533,254	0.82
Net Business Equity	308,727	112,560	807,384	308,824	104,485	1,043,203	-0.00
Liabilities	251,425	58,207	745,885	222,986	47,317	697,668	0.49
Average Performance	285,456	138,647	403,287	470,782	137,631	1,996,422	-2.08
Average Profit	29,343	9,564	59,891	59,512	10,188	449,758	-1.54
Average Bank Credit	118,066	25,406	329,131	94,213	21,083	287,783	1.91
Average Employees	733	438	915	802	425	1,317	-0.84
Weighted Price	0.0699	0.0312	0.0916	0.0596	0.0306	0.0739	1.51
Percent Sold	0.9156	0.9527	0.1153	0.9465	0.9553	0.5546	-1.24

Pre-privatization Prices. In order to measure a change in relative value from the privatization coupon price to market prices in Czech crowns, an index was created. The index of 439 firms represents the market of traded Czech firms. For each of the 439 firms, a weighted coupon privatization price is computed using the following formula:

$$p_c = \frac{\sum_{i=1}^{5} n_i c_i}{\sum_{i=1}^{5} n_i},$$

where p_c is the weighted average coupon price, n_i is the number of shares sold each round, c_i is the coupon price for each round and i is the auction round. A weighted coupon price is used because the coupon price for each firm changed each round, depending if the firm's shares were oversubscribed or undersubscribed at the previous price. For the post-privatization market price, the price is the average weekly traded prices for December of 1993 and 1994. Weekly prices are used because trading was done weekly in 1993 and only a few stocks on the PSE were traded on a daily during 1994. For stocks not traded during December 1993 or 1994, the last PSE price is used to determine market value. Of the 208 firms in the sample with ownership information, 88 firms traded in December 1993 and 89 firms traded in December 1994. Over 42% of sample firms traded during these time periods. For the other firms in the index, 48 and 49 firms traded during December 1993 and 1994, respectively. This about 21% of the nonsample firms in the index. As previously mentioned, the firms that did not trade used the last trading price on the PSE which is found in *Hospodarske Noviny*.

Equally Weighted Index. From these market prices, equally weighted and value weighted indices were created to measure changes in relative market values. The equally weighted index value is computed as the sum of the price of each of the 439 shares, $I_{E,t} = \sum_{f=1}^{439} p_{f,t}$. $I_{E,t}$ is the equally weighted index for period t (1992, 1993 and 1994) and $p_{f,t}$ is the price of each individual firm at time t. The relative value for each firm is $V_{f,t} = \frac{p_{f,t}}{I_{E,t}}$.

Value Weighted Index. The value weighted index, and therefore the relative weighted price is computed similarly to the equally weighted index, but differentiates by firm size. The value weighted index is: $I_{V,t} = \sum_{f=1}^{439} p_{f,t} n_{f,t}$, where $I_{V,t}$ is the value weighted index at time t, $n_{f,t}$ is the number of outstanding shares of firm f at time t and $p_{f,t}$ is defined as above. The relative value of the firm is $V_{f,t} = \frac{p_{f,t} n_{f,t}}{I_{V,t}}$ using the value weighted index.

Change in Tax Code

The pre-privatization and post-privatization accounting data used in this study are not directly comparable. In 1992, the Czech government instituted a new tax code that included an income tax and a value added tax (VAT) for corporations beginning in 1993. There are two main effects of these changes on the data analyzed in this study. The first is that the taxes will reduce net income. The second is that the VAT will increase prices.

The current VAT is 42% on most consumer goods. If these taxes are passed on directly to the consumer, it would lead to a 42% increase in inflation. The VAT is believed to be a major factor that caused inflation. At the same time as the institution of the VAT, prices were liberalized and the currency was tied to a basket of hard currencies. Because of the simultaneous introduction of these policies, it is difficult to determine how much inflation the VAT caused in the economy.

To correct for the net income effect, the reported tax expenses are added back to net income for 1993 and 1994 to calculate income before taxes. Income before taxes will be used in comparison of operating performance and in the analysis of post-privatization performance.

Statement of Hypotheses and Methods

Hypothesis 1. Perotti and Guney (1993) and MNR (1994) examine changes in operating efficiency from the pre-privatization to the post-privatization period. They find that firms increase operating efficiency after privatization. Their previous research did not include former Soviet Bloc countries, which are different, both in structure and environment than the SOEs of western economies. If privatized firms are more efficient than SOEs, then we should find an overall increase in operating efficiency all else equal.

The first hypothesis tests the overall effect of privatization on operating performance.

H1: Operating efficiency and profitability ratios should be better for the post-privatization period (a) than the pre-privatization period (b). Specifically:

Net Income Efficiency (NIE) = Net Income / Number of Employees

$NIE_a > NIE_b$

Real Net Income Efficiency (RNIE) = Real Net Income / Number of Employees

$RNIE_a > RNIE_b$

Sales Efficiency (SE) = Sales (performance) / Number of Employees

$SE_a > SE_b$

Real Sales Efficiency (RSE) = Real Sales (performance)/ Number of Employees

$RSE_a > RSE_b$

Return on Assets (ROA) = Net Income / Total Assets

$ROA_a > ROA_b$

Return on Sales (ROS) = Net Income / Sales (performance)

$ROS_a > ROS_b$

Real Sales (RS) = Nominal Sales (performance)/ CPI Deflator

$RS_a > RS_b$

Level of Employment = Number of Employees

$Employment_a$? $Employment_b$,

where net income in the post-privatization is net income before taxes as described above. Each of these hypotheses will be tested using a Wilcoxon nonparametric matched pair, sign rank test. This method was used by MNR, and a similar test of positive changes were used in MNR and Muscarella and Vetsuypens' test of reverse LBOs. Test results are presented in Table IV in the next chapter.

Methodology. In the Wilcoxon test, the differences in one sample are observed over time. Let Y_i be an observation of the average of the efficiency ratio on the ith firm in the post-privatization period, and X_i be the observation in the pre-privatization. Then

$$D_i = Y_i - X_i.$$

To test the differences, D_i, define the signed rank, R_i, for (X_i, Y_i) as:

R_i = the rank assigned to (X_i, Y_i) if D_i is positive

R_i = the negative of the rank assigned to (X_i, Y_i) if D_i is negative.

The test statistic is:

$$T = \frac{\sum_{i=1}^{n} R_i}{\sqrt{\sum_{i=1}^{n} R_i^2}}$$

If T is significantly different from zero, the hypothesis is rejected.

The first seven measures of efficiency are expected to increase after privatization. The expected change in employment is ambiguous. Previous studies have shown that there is an increase in operating efficiency. Often this occurs due to a smaller labor force, but MNR find that employment levels increase. In the former communist countries, SOEs often employed people that did not serve any function in the firm, but were there only to achieve full employment in the economy. One way that CR firms may achieve operating efficiency is by decreasing inputs (Al-Obdian and Scully (1991)) such as reducing employment. If the number of employees is less than before privatization, then management did not implement a structural change in operating efficiency as much as management eliminated the government's employment quotas.

Hypothesis 2. The relationship between ownership structure (concentration) and operating efficiency is examined with this data. Demsetz and Lehn (1985) proxied ownership concentration as the percentage of the firm owned by the five and by the twenty largest shareholders. Morck, Shleifer, and Vishny (1988) looked only at percentage of the firm held by insiders. This study will use an adapted version of Demsetz and Lehn's definition of ownership concentration by using the percentage of shares owned by the three largest shareholders. The reason for choosing this definition is that in the CR privatization scheme, it is highly unlikely that the largest shareholders will be managers or members of the board of directors, but more likely to be the investment funds.

Both of the previous studies test the relationship of ownership concentration and firm value. Morck, Shleifer, and Vishny use Tobin's Q as a proxy for firm value while Demsetz and Lehn use accounting profit rate. Tobin's Q cannot be obtained for these firms and the accounting profit rate will not fully capture the reorganization effects after privatization. Instead of these two variables, this study will use the ratios identified in hypothesis one that measure changes in the firm's efficiency and profitability.

H2: There is a positive relationship between ownership concentration and changes in operating efficiency and profitability ratios (as defined in H1.).

Methodology. This hypothesis will be tested using seemingly unrelated regression (SUR) methodology. There are 6 equations (M=6) in the system of equations.

$$Y_{1,t} = \beta_{11}X_{1t,1} + \beta_{12}X_{1t,2} + \ldots + \beta_{1k}X_{1t,k} + \varepsilon_{1,t},$$

$$Y_{2,t} = \beta_{21}X_{2t,1} + \beta_{22}X_{2t,2} + \ldots + \beta_{2tk}X_{2t,k} + \varepsilon_{2,t},$$

$$\vdots \qquad \vdots \qquad \vdots \qquad \vdots \qquad \vdots$$

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t},$$

where $Y_{m,t}$ is the percentage change in operating efficiency, m, for the firm, $X_{m,t}$ are the explanatory variables, $B_{m,k}$ are the estimated coefficients for the explanatory variables. To prevent colinearity, RNIE and RSE are not used in this system of equations. The SUR system is used when the errors are correlated or if the dependent variables are related in each equation. In this study, there are several measures of operating efficiency used. One ratio will not capture all of the operating changes in the firm. The ratios used in this study are related by accounting identities and should be tested using SUR. In addition the same explanatory variables are used in each equation. Using a SUR system will produce consistent estimates if the error terms are correlated. In the presence of uncorrelated error terms, the SUR system is equivalent to estimating each equation independently using ordinary least squares (OLS).

Ownership concentration's effect on changes in operating efficiency are defined and tested in a piecewise regression similar to that of Morck, Shleifer, and Vishny. The percentage of the three largest shareholders is used to determine the pivot points for the piecewise regression ownership variables. The boundaries for ownership structure are determined after the ownership data is analyzed, but are more likely to be larger than what previous studies have found because of the structure of the Czech market. These piecewise regressions will be able to better define the relationship between ownership

structure, changes in operating efficiency and firm value. While ownership concentration influences operating performance, other factors will also influence operating performance. These factors are included as control variables in the regression. These variables are firm size, government ownership, foreign ownership, and industry specific factors have all been shown to affect market valuation of firms. A size effect has been noted by Banz (1981) and Reigmanan (1981) in a market return and risk. Fama and French (1992) also found that firm size explains firm value. In organizational structure changes, a smaller firm may be easier to restructure because it is easier to control.

Government and foreign ownership will also affect restructuring and firm value. Perotti and Guney found that significant but non-controlling interest by the government signifies a commitment to the success of privatization of the firm. Foreign investment needs to be included because firms with foreign investors are more likely to have new capital or resources invested in the firm, or a transfer of new technology to the firm from western countries from their foreign investors.

Controlling for industry effects is also important. Firms that are capital intensive will be more difficult to restructure immediately due to relatively large fixed costs as compared to labor intensive industries. Another industry factor that is important is the type of product that the firms produce. An example is the Czech defense industry. The former Czechoslovakian republic produced many of the tanks, light weapons and ammunition for the former Soviet Army. With the market for these buyers gone, the defense industry has suffered more than other industries because the technology and products are not easily transferred to goods demanded in the open world market. In

addition, international pressure to stop selling military goods to third world countries has also stunted the growth and profitability of these firms.

A final variable controlling for agency costs of debt or the effects of financing decisions on operating performance the percentage of debt that the firm has. The changes in the financial structure of these firms in the two years following privatization are expected to be small since capital markets are not yet fully functioning, but changes in financial structure of the firms will change the agency costs to these firms resulting from debt. Since these agency costs are outside the scope of this study, controls for changes in financial structure are needed.

Hypothesis 2a. Another test of ownership's effect on changes in operating efficiency is a nonparametric test of differences in changes in efficiency in firms with different types of owners. Some investment funds actively managed the firms that they owned while other funds are passive. The firms that have active investment funds as one of their owners should have a larger positive change in operating efficiency. According to the Ministry of Finance's department of Capital Market Supervision, there are only three funds that register as pure management investment funds, but there are other investment funds that do supervise the management of the firms that they own. To proxy for funds that supervise their firms, the sample is divided into firms that have at least one of the thirteen largest investment funds as one of their three largest shareholders and firms that do not. The thirteen largest investment funds own 70% of the shares owned by all investment funds. This translates into roughly 50% of the shares auctioned in the first

wave of coupon privatization. Because of their size and ownership in many firms, they have the power to either directly supervise and change management because of their ownership or indirect power through their influence in the market. This leads to another hypothesis about the relationship between ownership and changes in operating efficiency:

H2a: Firms that have one of the 13 largest investment funds as large blockholders will have greater inprovement in operating efficiency and profitability ratios than firms that do not have one of these funds as owners. Specifically:

$NIE_l > NIE_o$

$SE_l > SE_o$

$ROA_l > ROA_o$

$ROS_l > ROS_o$

$RS_l > RS_o$

Emp_l ? Emp_o

where the subscripts l and o signify a large investment fund and other, respectively.

Methodology. The Mann-Whitney rank test tests the differences in two samples' means. Let X_i be the subsample of firms with a large investment fund ownership and Y_j be firms with no large fund ownership. If there are no or just a few ties in ranking the samples as one sample then the test statistic is: $T = \sum_{i=i}^{n} R(X_i)$.

If there are many ties in rank, then the test statistic is:

$$T_1 = \frac{T - n\frac{N+1}{2}}{\sqrt{\frac{nm}{N(N-1}\sum_{i=1}^{N} R_i^2 - \frac{nm(N+1)^2}{4(N-1)}}}$$

where m and n are the number of firms in each subsample and N is the total number of firms. The critical value for this test is computed using Mann-Whitney test statistics whose values have been computed and are located in tables or can be computed for larger samples. There are ninety firms in the sample of 170 that have ownership by at least one of the thirteen largest investment funds.

Hypothesis 3. The third hypothesis is that ownership concentration and the value of the changes in operating performance are reflected in the changes in the market price of the firms. The theoretical arguments presented by Shleifer and Vishny (1986) show a relationship between firm value and a large blockholder. They state for outside blockholder ownership under 50%, and when the jawboning mechanism and takeover mechanisms are available, the market value of the firm rises with percentage owned by the outside blockholder. The results of Brous and Kini (1994), Bathala, Moon, and Rao (1994), Muscarella and Vetsuypens (1990), and Morck, Shleifer, and Vishny (1988) find a relationship between ownership and value. If ownership does affect changes in operating efficiency and firm value and the Czech markets use this information to determine firm value, a relationship between ownership concentraton and firm value should exist for Czech firms.

Testing for a change in value of these firms is not a direct test. Shares were initially sold to their owners for coupons, which were basically free, but limited in quantity. A relative price in coupons was established by the auction process. Having informed investors in the form of investment funds bid for these shares assures that the "prices" reflect a value based on the information available. Due to the auction process and the existence of informed investors such as the investment funds, there should not be any firms that were sold for substantially more or less than the relative value established in coupons. The evidence for this is that 99% of the coupons were used and 93% of the available shares were sold. This indicates some degree of efficiency because the shares were allocated in such a way that most coupons and shares were allocated in the auction using a market mechanism. The price spread of 776 times the lowest price to the highest price indicates a degree of separation that reflects valuation of firms by participants in the market.

Firms privatized wholly or in part by coupon privatization must be listed on the Prague Stock Exchange and can be traded there or on the electronic RMS trading system. Currently, these shares are traded in the market which is still considered illiquid by U.S. standards, but a market value in currency price are established. Relative values and relative price changes can be determined as described earlier based on the market values and the value the shares initially sold for in coupons. This leads to the third hypothesis:

H3: There is a positive relationship between the changes in operating efficiency and profitability and changes in the relative value of the firm.

This hypothesis will be tested using a pooled cross-sectional, time series regression with the same explanatory variables used in second hypothesis. In addition to using ownership concentration, size, debt, government and foreign ownership, and an industry variable, changes in operating ratios will also be included as explanatory variables for changes in relative value.

Methodology. In the third hypothesis, the change in relative value is regressed against the independent variables to measure market efficiency. Using just the change in prices cannot be used because the coupon price is not a currency price and measuring a change in price based only on coupon price between 1992 and 1993 is not possible.

The pooled cross-sectional, time series test that will be used to test the third hypothesis takes the general form of:

$$Y_{i,t} = \beta_1 X_{it,1} + \beta_2 X_{it,2} + \ldots + \beta_{ik} X_{it,k} + \varepsilon_{i,t},$$

where Y_{it} are the changes in relative value of the ith firm for time t, X_{it} are the explanatory variables, which were used in SUR estimation in addition the changes in operating efficiency measures, and β_k are the estimated coefficients for the independent variables. Time, t = 1 or 2, is just two periods representing the two full years of operations after privatization in 1992.

Summary

These three hypotheses test the effects of privatization on changes in operating efficiency, the effects of ownership concentration and type of owner on changes in

operating efficiency, and the effect of ownership concentration and changes in efficiency on firm value. The final sample of 170 Czech firms consists of 17% of the number of firms privatized in the first wave of coupon privatization. Nonparametric and parametric techniques are used to test these hypotheses. The methods are based upon previous research of similar topics. The following chapter presents the results of these tests and an explanation of the results.

V. EMPIRICAL RESULTS

Effects of Privatization

Megginson, Nash, and van Randenborgh (1994) show that post-privatization operating efficiencies, as measured in part by net income efficiency, sales efficiency, return on assets, return on sales, and employment, improves. A univariate analysis of the Czech Republic's experience is presented in Table IV. The nonparametric Wilcoxon T test and the parametric t-test of the differences in means of a single sample. As Table IV shows, in most measures, the post-privatization period average efficiency decreased from the pre-privatization period averages.

Table IV

Tests of Mean Differences in Efficiency Ratios in Pre- and Post-Privatization periods: Wilcoxon Ranked One Sample Matched Pair Test and t-test for Paired Sample Means

	Mean		Nonparametric		Parametric	
Efficiency Ratio	Pre-privatization	Post-privatization	Wilcoxon T	p-value (one tail)	T-Ratio	p-value (one tail)
NIE	57.34	50.38	-2.87	0.003	-0.64	0.261
RNIE	43.14	22.97	-6.49	0.001	-3.55	0.000
SE	476.42	976.20	9.07	0.001	5.51	0.000
RSE	371.78	439.99	0.54	0.704	1.59	0.057
ROA	0.0900	0.0440	-7.13	0.001	-6.62	0.000
ROS	0.1204	0.0442	-7.57	0.001	-4.40	0.000
RS	680956	536052	-7.27	0.001	-3.69	0.000
EMP	1996	1214	-11.20	0.001	-6.17	0.000

NIE: Net Income Efficiency = Net Income / Number of Employees
RNIE: Real Net Income Efficiency = Real Net Income / Number of Employees
SE: Sales Efficiency = Sales (performance) / Number of Employees
RSE: Real Sales Efficiency = Real Sales (performance)/ Number of Employees
ROA: Return on Assets = Net Income / Total Assets
ROS: Return on Sales = Net Income / Sales (performance)
RS: Real Sales = Nominal Sales (performance)/ CPI Deflator
EMP: Level of Employment = Number of Employees

The test shows that average employment decreased by 782 persons from an pre-privatization period average to the post-privatization period. This is consistent with the notion that state firms were over-employed in order to help the country reach the goal of full employment. Even with the large decrease in employment, the net income and real net income efficiency ratios were significantly lower than before privatization. This demonstrates that even though the level of employment decreased, it still did not to improve efficiency. The firm did not make operational changes such as lowering other costs or increasing output, to make the firm more efficient. Other measures of efficiency changes will determine which changes the firm made after privatization.

The measure for sales efficiency improved significantly while the measure for real sales efficiency did not change significantly. The significant rise in sales efficiency was caused by the high inflation in the economy which increased nominal sales and the significant decrease in employment during this period. After accounting for inflation, real sales efficiency did not change significantly. The consumer price index for 1991 rose 57.8% to 177.2, and was 196.2, 210.4, 231.6 in 1992, 1993, and 1994, respectively. Inflation was brought about by the introduction of the value added tax (VAT), price liberalization, and the limited convertibility of the currency. Real sales efficiency measured no significant difference between the two periods.

The real net income efficiency, real sales efficiency, and employment levels indicate that employment decreased to a level to maintain the pre-privatization level of efficiency, but that operational changes did not take place and actually decreased profitability. This is

emphasized by significant decrease in return on assets and return on sales between the two periods.

In the years immediately following the first wave of coupon privatization, the firms on the whole decreased labor, but failed to improve operational efficiency and profitability as measured by these eight ratios. This test is a noisy measure of changes in operational efficiency and profiatblility beacause of the differences in the data discussed in the previous chapter. Even with the noise, it is clear that there was a decrease in efficiency after privatization. The decrease in efficiency is not necessarily due to privatization. Previous studies uniformly show the positive effect of privatization on the firm. The decrease in efficiency is due to the shcock caused by a change in the economic system. The firms before privatization were given quotas on what to produce and the quantity to produce with a guarantee of a buyer at the end of production. After the change to a market economy, the system of production and markets changed leaving the firms with no direction on operations. This change in economic systems greatly contributed to the decrease in efficiency after privatization.

A privatization process and a switch to a market economy from a planned economy does not automaticly improve the firm. The change in ownership provides an opportunity for the firm to respond to market forces and restructure, but the implementation of a market economy does not improve efficiency immediately. The market is not fully functioning and there must be other factors that influence a firm's behavior after privatization. Ownership concentration in the form of large outside blockholders is one of these factors.

Ownership Concentration and Changes in Efficiency

The Czech Republic provides a unique opportunity to test the effect of ownership concentration on changes in operating efficiency. As previously mentioned, almost 1,000 firms were privatized at the same time, each having its new ownership determined during the coupon privatization through the bidding of investment funds and individuals. Each firm has a different ownership sturcture, with different levels of ownership concentration and different owners. The new owners took on the resposibility of continuing the operations of the firm and also making improvements in operating efficiency and profitability.

Shleifer and Vishny (1986) present a theoretical model that predicts an increase in firm value with the increase in ownership by a large outside blockholder. In the case of the CR, the large outside blockholders are the investment funds. The results of several recent studies by Brous and Kini (1994), Bathala, Moon, and Rao (1994), Park and Song (1995), and Shome and Singh (1995) all find that a large outside blockholder increases the value of the firm. Demsetz and Lehn (1985) and Morck, Shleifer, and Vishny (1988) also test the effects of ownership concentration on firm value. Demsetz and Lehn test a straight linear relationship, but Morck, Shleifer and Vishny test a piecewise regression relationship.

This study tests the relationship of ownership structure and changes in operating efficiency using the ownership concentration of the three largest blockholders using a piecewise regression similar to that of Morck, Shleifer, and Vishny. The percentage of ownership of the three largest shareholders was computed . Ownership concentration was

then divided into either high ownership levels (HOWN), moderate levels of ownership (MOWN) and low levels of ownership (LOWN). This model allows for differing effects of ownership based on its concentration, not just a single linear relationship. The percentages of ownership that serve to define the ownership variables are tested using three different models. The model that is reported, Model 2, in the following tables defines these variables as:

LOWN = percentage of three largest shareholders if < 35%,
= 35%, if percentage of three largest shareholders > 35%;

MOWN = 0, if percentage of three largest shareholders < 35%,
= percentage of three largest shareholders minus 35%, if
35% < percentage of three largest shareholders < 60%,
= 25%, if percentage of three largest shareholders > 60%;

HOWN = 0, if percentage of three largest shareholders < 60%,
= percentage of three largest shareholders minus 60%, if
percentage of three largest shareholders > 60%.

These definitions are similar to the methodolgy of Morck, Shleifer, and Vishny except for the levels of concentration used to divided the variables. For Model 2, there are 30 LOWN firms, 82 MOWN firms and 58 HOWN firms.

Two additional definitions of ownership are used. Model 1 computes LOWN, MOWN, and HOWN using the same method as above, but with changes in slope, or "breaks," at 30% and 50%. Model 3 computes the ownership variables with breaks at 40% and 70%. As mentioned earlier, the reason for these much larger ownership

variables is because of the investment fund dominance in the coupon auction process. The average percentage of stock that the three largest owners held was 54.38% while the median value was 48.67%. The maximum percentage held for this sample of firms by the three largest owners is 100% and the minimum is 18.93%.

The control and additional explanatory variables are defined as follows:

LASS = the log of the firm's asset value,

DEBT = the firms debt ratio, total debt/total assets,

FC = 1 if the firm has foreign capital, 0 otherwise,

JV = 1 if the firm has a joint venture, 0 otherwise,

Ind 16 = 1, if the Czech industry classification is 16, services, 0 otherwise,

Ind 14 = 1, if the Czech industry classification is 14, trade, 0 otherwise,

Ind 12 = 1, if the industry classification is 12, utilities, 0 otherwise,

Ind 11 = 1, if the industry classification is 11, electrical engineering, 0 otherwise,

Ind 10 = 1, if the industry classification is 10, mechanical engineering, 0 otherwise,

Ind 9 = 1, if the industry classification is 9, metallurgy, 0 otherwise,

Ind 8 =1, if the industry classification is 8, construction, 0 otherwise,

Ind 6 =1, if the industry classification is 6, wood and paper, 0 otherwise,

DOC = the percentage of shares temporarily left in the National Property Fund,

POZ = special voting rights, such as veto power by the government.

ZPR = the percentage of shares sold through intermediaries,

PPT = the percentage of shares sold directly to a domestic investor,

OBC = the percentage of shares transferred to local governments and municipalities,

RES = the percentage of shares reserved for restitution claims,

TRV = the percentage of shares which the government holds because of direct interests,

PPZ = the percentage of shares sold directly to a foreign investor.

The variable LASS is used as a control variable to account for the size effects that have been reported in previous studies such as Banz (1981) and Fama and French (1992). DEBT is a control variable for other agency and monitoring problems, as well as a variable to account for financing arrangements and changes in the financial structure. The variables FC and JV are included to account for differential effects of western expertise and capital. Industry dummy variables follow the Czech classification system. Some industry classifications were not included because of the small number of firms in those industries. These effects will be included as part of the constant term.

The remaining control variables, DOC, POZ, ZPR, PPT, OBC, RES, TRV, and PPZ are alternative share distributions. Some of these, such as OBC, TRV, DOC, and RES indicate government involvement with the firm after privatization, at least in the short-run. OBC and TRV are long-term government holdings after privatization. Other variables such as PPT, PPZ, and ZPR indicate the effects of other types of sales, to a foreign investor or a strong domestic investor.

As explained in the previous chapter, the relationship between ownership concentration and changes in operating efficiency are tested in a Seemingly Unrelated

Regression (SUR) system. The reason for using the SUR is because the dependent variables (changes in operating efficiency) are related by accounting identities. The SUR uses this additonal information and the correlation of the errors terms to improve estimation of the independent variables. The Breusch-Pagan Lagrange Multiplier test confirms that the SUR system is appropriate and well specified. This test tests for a diagonal covarince matrix. If the hypothesis of a diagonal covariance matrix is rejected, then the data exhibits contemporaneous correlation and the SUR system is used. The Breusch-Pagan test statistic is:

$$\lambda = N\sum_{i=2}^{M}\sum_{j=1}^{i-1} r_{ij}^2$$

where, M is the number of equations in the SUR, N is the number of observations and r_{ij}^2 is the squared correlation coefficient of residuals. The test statistic is distributed chi-square with M(M-1)/2 degrees of freedom. For Model 2, the test statistic is 210.77 with 15 degrees of freedom. The hypothesis of a diagonal covariance matrix can be rejected at the .01 significance level. The SUR is the appropriate model.

The independent variables are the ownership variables as defined above and the control variables. All of the control variables are the same for each model, and all the explanatory variables are the same for each dependent variable in the SUR system in each model. The results are first discussed for each dependent variable (change in efficiency) equation in the SUR system, and then summarized when the SUR is discussed as a whole system with a discussion of the results. A summary table of results is given in Tables VIa and VIb at the end of the section.

SUR Estimates for Each Dependent Variable. With respect to the results for Model 2, Table Va through Table Vf report the estimated coefficients, the standard error, the t-statistic, and the p-value for each of the dependent variables. The results are discussed separately for each dependent variable. The estimates for the change in net income efficiency are shown in Table Va. The ownership variables demonstrate a change in slope related to ownership concentration. For low levels of ownership, there is a positive relationship to changes in net income efficiency, but for moderate levels of ownership the relationship is negative at a significance level of 0.05. To a lesser extent, high ownership concentration also has a positive impact on net income efficiency. This indicates that a moderate ownership structure does not help the firm in restructuring operations such as controlling costs and operating efficiency. The effects are compounded by the size of the firm. The larger the size of the firm, the greater the negative impact on net income efficiency, but the presence of an outside partner in the form of a joint venture does increase the firms change in net income efficiency.

The results for the changes in sales efficiency are reported in Table Vb. The ownership effects for change in sales efficiency are opposite from what they were for changes in net income efficiency. Lower ownership concentration reduces sales efficiency, while moderate concentration increases efficiency. In both cases, high ownership concentration (above 65%) does not have a statistically significant effect at the 5% level. The reversal of effects of ownership from net income efficiency to sales efficiency cannot be explained without looking at the entire system as a whole, or additional information about the employees of these firms. The SUR system will be discussed as a whole later in

the paper, but the link between sales, net income and employees explains the difference of ownership levels on net income efficiency and sales efficiency.

The other control variables are also interesting. As in the change in net income efficiency, asset size, log of assets (LASS), has a significantly negative effect on sales efficiency. This indicates that firm size does play an important role in the restructuring of privatized firms and that the larger the firm, the more difficult to restructure. Another interesting finding is from the industry variables. The utilities industry has a significant increase in sales efficiency, which is expected. If the level of utility sales are generally the same from year to year, with slight fluctuations, a decrease in the labor force will increase the sales efficiency if sales remain stable. The same can be true for the building industry, especially with the a constant flow of contracts from the government for construction or renovation of buildings. Firms with shares in the long-term government holdings decreased sales efficiency, but those that are temporarily left in government possession increased this ratio. A possible explanation of this is that firms that will be sold later are more aggressive in increasing sales so that the firm will be more marketable. This incentive does not exist for firms that have a significant long-term interest.

The results for the changes in return on assets portion of the SUR system are reported on Table Vc. An interesting result in the ownership variables occurs when taken in light of the previous two efficiency ratio results. In spite of a decreasing net income efficiency with moderate ownership levels, there is a positive change in return on assets. This would occur if net income increased over the post-privatization period, therefore increasing return on assets, but the level of employees the firm has increased as well. High

ownership levels have a significant negative effect on the change in the return on assets, indicating that the net income for these firms decreased.

When looking at control variables, the size of the firm is again a negative influence on changes in efficiency. This is not surprising in the measure of this ratio. Foreign partners and capital have a positive effect on the change in return on assets. Outside expertise helps firms use their assets more effectively. Within the industry variables, the services industry (Ind 16) have a significantly positive change in return on assets. This is probably due to the relatively low level of assets that service industry firms utilize. Firms with shares left in government holdings, both long-term and short-term have a significantly negative change in return on assets. In addition, firms with intermediated sale of shares and firms that were sold directly to domestic investors also have a significantly negative change in return on assets.

The next equation of the SUR system is the change in return on sales and the results are reported in Table Vd. Of the ownership level variables, only the moderate classification is significant and it is negative. This would be caused by an increase in sales without an increase in net income, or a decrease in net income. Given the significantly negative effect on net income efficiency, it is probable that firms with a moderate ownership level tend to focus on sales and not as much on the operations of the firm. In the control variables, LASS is again significantly negative. In the industry variables, the utilities industry has a positive effect on the change in return on sales, but mechanical engineering firms have a significantly negative effect.

In incorporating inflation into the way the firms restructure, the change in real sales helps explain some of the overall changes. These results are shown in Table Ve. Moderate ownership variables have a significantly positive effect on changes in real sales, but low and high ownership concentration have a significant negative effect. This would continue to lend support to the notion that firms in the Czech Republic with moderate ownership concentration levels focus on increasing sales immediately following privatization. The presence of foreign capital has a positive effect on real sales, but the engineering firms, both electrical and mechanical have a negative effect. This may indicate an decreased demand for these services and skills, or a pricing schedule that does not keep pace with inflation.

Long-term government interest has a negative effect on the change in real sales. This is in contrast to firms with local government holdings and with firms temporarily left in the NPF that will be sold later. The fact that local government improves real sales and long-term national government decreases real sales indicates that the national government does not provide the best monitoring arrangement, or that the national government systematically holds companies that will underperform.

The last measure of efficiency changes that is tested in the SUR is the changes in employment. As discussed earlier, the level of employment in privatized firms in western economies increased after privatization. It is also known that command economies often over-employed firms in order to reach the goal of full employment. The first hypothesis showed that Czech firms in this study decreased employment by almost 40% on average, which would indicate that privatized firms were over-employed and needed to reduce their

work force in order to compete in a market economy. Therefore, a decrease in employment is a sign of increasing efficiency. Low and high levels of ownership concentration have a negative effect on changes in employment. Moderate ownership levels have a positive effect on changes in employment which is contrary to expectations. Firm size, as measured by LASS, has a negative effect. This is not surprising, even considering the effects of this variable on other efficiency ratios, because the larger the

Table Va Net Income Efficiency

Estimates of the SUR regression, change in NIE dependent variable

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t}$$

Variable	Estimated Coefficient	Standard Error	T-Ratio	p-value
LOWN	0.1050	0.0310	3.39	0.001
MOWN	-0.0755	0.0237	-3.19	0.001
HOWN	0.0414	0.0213	1.94	0.052
LASS	-0.3934	0.0863	-4.56	0.000
DEBT	0.6596	0.6179	1.07	0.286
FC	0.6410	0.4060	1.58	0.114
JV	1.7487	0.7000	2.50	0.013
Ind 16	0.9429	0.6048	1.56	0.119
Ind 14	-0.7467	0.5932	-1.26	0.208
Ind 12	1.8799	0.9687	1.94	0.052
Ind 11	-0.0015	0.3545	0.00	0.997
Ind 10	-0.6345	0.3624	-1.75	0.080
Ind 9	1.5114	1.7230	0.88	0.380
Ind 8	0.3998	0.2513	1.59	0.112
Ind 6	0.1801	0.5488	0.33	0.743
DOC	-0.0426	0.0220	-1.94	0.053
POZ	-0.7804	0.7458	-1.05	0.296
ZPR	0.0000	0.0187	0.01	1.000
PPT	0.0280	0.0285	0.98	0.326
OBC	-0.0063	0.0669	-0.09	0.925
RES	0.1666	0.1156	1.44	0.150
TRZ	0.0154	0.0609	0.25	0.800
PPZ	-0.0275	0.0196	-1.40	0.160

Table Vb Sales Efficiency

Estimates of the SUR regression, change in SE dependent variable

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t}$$

Variable	Estimated Coefficient	Standard Error	T-Ratio	p-value
LOWN	-0.0294	0.0059	-4.99	0.000
MOWN	0.0057	0.0019	2.96	0.003
HOWN	0.0025	0.0015	1.64	0.101
LASS	-0.0429	0.0109	-3.95	0.000
DEBT	0.2102	0.0839	2.51	0.012
FC	0.0684	0.0358	1.91	0.056
JV	-0.0311	0.0436	-0.71	0.476
Ind 16	0.1056	0.0566	1.87	0.062
Ind 14	0.1696	0.2473	0.69	0.493
Ind 12	0.2555	0.1137	2.25	0.025
Ind 11	-0.0646	0.0501	-1.29	0.197
Ind 10	-0.0052	0.0291	-0.18	0.857
Ind 9	-0.1464	0.0477	-3.07	0.002
Ind 8	0.1289	0.0298	4.32	0.000
Ind 6	-0.0599	0.0560	-1.07	0.285
DOC	0.0048	0.0009	5.14	0.000
POZ	-0.1278	0.0266	-4.80	0.000
ZPR	-0.0035	0.0023	-1.56	0.120
PPT	0.0042	0.0029	1.46	0.146
OBC	0.0000	0.0021	0.02	0.981
RES	-0.0099	0.0043	-2.31	0.021
TRZ	-0.0085	0.0020	-4.19	0.000
PPZ	0.0024	0.0017	1.40	0.162

Table Vc Return on Assets

Estimates of the SUR regression, change in ROA dependent variable

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t}$$

Variable	Estimated Coefficient	Standard Error	T-Ratio	p-value
LOWN	-0.0085	0.0131	-0.65	0.517
MOWN	0.0433	0.0088	4.92	0.000
HOWN	-0.0387	0.0060	-6.48	0.000
LASS	-0.1074	0.0324	-3.31	0.001
DEBT	0.1252	0.2333	0.54	0.592
FC	1.0814	0.3094	3.50	0.000
JV	0.8274	0.3663	2.26	0.024
Ind 16	0.6124	0.2903	2.11	0.035
Ind 14	-0.5578	0.2901	-1.92	0.055
Ind 12	0.2463	0.2116	1.16	0.244
Ind 11	-0.2855	0.2277	-1.25	0.210
Ind 10	-0.8150	0.1602	-5.09	0.000
Ind 9	0.9215	1.2650	0.73	0.466
Ind 8	-0.2384	0.1285	-1.86	0.064
Ind 6	-0.0045	0.1804	-0.02	0.980
DOC	-0.0332	0.0049	-6.79	0.000
POZ	0.0593	0.1648	0.36	0.719
ZPR	-0.0380	0.0817	-4.65	0.000
PPT	-0.0168	0.0045	-3.72	0.000
OBC	-0.0067	0.0135	-0.50	0.619
RES	0.0799	0.0819	0.98	0.329
TRZ	-0.0744	0.0367	-2.03	0.043
PPZ	0.0087	0.0169	0.52	0.606

Table Vd Return on Sales

Estimates of the SUR regression, change in ROS dependent variable

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t}$$

Variable	Estimated Coefficient	Standard Error	T-Ratio	p-value
LOWN	0.0280	0.0269	1.04	0.298
MOWN	-0.0511	0.0193	-2.64	0.008
HOWN	0.0031	0.0112	0.28	0.780
LASS	-0.1728	0.0666	-2.59	0.010
DEBT	0.9740	0.5632	1.73	0.084
FC	0.7476	0.6146	1.22	0.224
JV	-0.2818	0.7496	-0.38	0.707
Ind 16	0.7446	0.5353	1.39	0.164
Ind 14	-0.5151	0.8750	-0.59	0.556
Ind 12	1.3672	0.5407	2.53	0.012
Ind 11	-0.3962	0.3007	-1.32	0.188
Ind 10	-0.6893	0.2426	-2.84	0.005
Ind 9	0.7579	1.2430	0.61	0.542
Ind 8	-0.0378	0.3182	-0.12	0.905
Ind 6	-0.9248	3.1660	-0.30	0.767
DOC	-0.0066	0.0085	-0.78	0.436
POZ	0.1097	0.3298	0.33	0.740
ZPR	-0.0166	0.0161	-1.03	0.303
PPT	-0.3964	0.0667	-0.59	0.552
OBC	-0.0159	0.0184	-0.86	0.388
RES	0.0361	0.0673	0.54	0.592
TRZ	-0.0014	0.0362	-0.04	0.968
PPZ	-0.0183	0.0097	-1.90	0.058

Table Ve Real Sales

Estimates of the SUR regression, change in RS dependent variable

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t}$$

Variable	Estimated Coefficient	Standard Error	T-Ratio 1871 df	p-value
LOWN	-0.0359	0.0042	-8.49	0.000
MOWN	0.0065	0.0013	5.01	0.000
HOWN	-0.0041	0.0009	-4.61	0.000
LASS	-0.0393	0.0077	-5.09	0.000
DEBT	0.0488	0.0315	1.55	0.122
FC	0.0685	0.0271	2.53	0.011
JV	-0.0010	0.0354	-0.03	0.977
Ind 16	-0.0069	0.0254	-0.27	0.786
Ind 14	0.0476	0.0962	0.50	0.620
Ind 12	-0.0643	0.0728	-1.29	0.196
Ind 11	-0.2302	0.0523	-4.41	0.000
Ind 10	-0.1456	0.0211	-6.90	0.000
Ind 9	-0.2406	0.0542	-0.44	0.657
Ind 8	0.1568	0.0330	0.48	0.634
Ind 6	-0.0496	0.0330	-1.50	0.133
DOC	0.0018	0.0007	2.71	0.007
POZ	0.0241	0.0174	1.38	0.166
ZPR	-0.0023	0.0012	-1.92	0.055
PPT	0.0010	0.0013	0.76	0.450
OBC	0.0044	0.0014	3.34	0.002
RES	0.0009	0.0044	0.20	0.844
TRZ	-0.1038	0.0019	-5.60	0.000
PPZ	-0.0009	0.0010	-0.88	0.379

Table Vf Employment

Estimates of the SUR regression, change in EMP dependent variable

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k} + \varepsilon_{m,t}$$

Variable	Estimated Coefficient	Standard Error	T-Ratio 1871 df	p-value
LOWN	-0.0261	0.0039	-6.73	0.000
MOWN	0.0026	0.0012	2.24	0.025
HOWN	-0.0017	0.0009	-1.90	0.058
LASS	-0.0646	0.0069	-9.32	0.000
DEBT	-0.0461	0.0179	-2.57	0.010
FC	0.0725	0.0225	3.23	0.001
JV	0.0238	0.0243	0.98	0.327
Ind 16	-0.1508	0.0264	-5.71	0.000
Ind 14	-0.1244	0.0277	-4.48	0.000
Ind 12	-0.0491	0.0645	-0.76	0.447
Ind 11	-0.1523	0.0312	-4.87	0.000
Ind 10	-0.1456	0.0208	-7.00	0.000
Ind 9	-0.0873	0.0325	-2.69	0.007
Ind 8	-0.1129	0.0213	-5.30	0.000
Ind 6	-0.0921	0.0304	-3.03	0.002
DOC	0.0009	0.0006	1.48	0.139
POZ	-0.0087	0.0125	-0.70	0.486
ZPR	0.0011	0.0013	0.86	0.389
PPT	0.0005	0.0008	0.62	0.538
OBC	0.0076	0.0015	5.20	0.000
RES	0.0062	0.0018	3.44	0.001
TRZ	0.0040	0.0014	2.80	0.005
PPZ	0.0007	0.0011	0.65	0.518
Constant	1.6328	0.1651	9.89	0.000

firm, the more employees it has to reduce. The presence of debt is also a negative effect. Additional monitoring by debtholders increases efficiency through the reduction of the labor force. Foreign capital has a positive effect on the change in employment. Foreign capital provides the resources to possibly expand the production of the firm. This can be seen when analyzed in conjunction of the positive effect on real sales.

It is interesting to note that the presence and level of government ownership is significantly positive. The government is reluctant to decrease the labor force, and in fact, increases the level of employment in the firms that it has ownership interests.

Overall Results for the SUR. To clarify the findings of the seemingly unrelated regression system, it is beneficial to look at the results as a whole. None of the ownership levels are consistently positively related to the operating efficiency and profitability of the firm. Each level of ownership concentration is positively related to one performance or efficiency measure. Table VIa and VIb report a summary of the SUR system. The explanatory variables are designated with a "+" or "-" to signify a significant positive or negative impact on the changes in efficiency ratios. The results are reported for an alpha level of 5% and then the window is expanded and results are reported for an alpha level of 10% in Table VIb.

If the three largest owners own a small percentage of the firm, the firm restructures short-term by reducing employment. Changes in net income efficiency are positive for LOWN, but changes in return on assets return on sales are not significant. At the same time, changes in real sales, sales efficiency, and employment are significantly

Table VIa

Combined results for the SUR system
at the 5% significance level

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k}$$

Variable	NIE	SE	ROA	ROS	RS	EMP
LOWN	+	-			-	-
MOWN	-	+	+	-	+	+
HOWN			-		-	
LASS	-	-	-	-	-	-
DEBT						-
FC			+		+	+
JV	+		+			
Ind 16			+			-
Ind 14						-
Ind 12		+		+		
Ind 11					-	-
Ind 10			-	-	-	-
Ind 9		-				-
Ind 8		+				-
Ind 6						-
DOC		+	-		+	
POZ		-				
ZPR			-			
PPT			-			
OBC					+	+
RES		-				+
TRZ		-	-		-	+
PPZ						

Table VIb

Combined results for the SUR system
at the 10% significance level

$$Y_{m,t} = \beta_{m1}X_{mt,1} + \beta_{m2}X_{mt,2} + \ldots + \beta_{mk}X_{mt,k}$$

Variable	NIE	SE	ROA	ROS	RS	EMP
LOWN	+	-			-	-
MOWN	-	+	+	-	+	+
HOWN	+		-		-	-
LASS	-	-	-	-	-	-
DEBT		+		+		-
FC		+	+		+	+
JV	+		+			
Ind 16		+	+			-
Ind 14			-			-
Ind 12	+	+		+		
Ind 11					-	-
Ind 10	-		-	-	-	-
Ind 9		-				-
Ind 8		+	-			-
Ind 6						-
DOC	-	+	-		+	
POZ		-				
ZPR			-		-	
PPT			-			
OBC					+	+
RES		-				+
TRZ		-	-		-	+
PPZ				-		

negative. This would indicate that low ownership levels achieved their changes in net income efficiency mainly through reduced labor force because net income did not increase to have a significant positive change in ROA or ROS. If the firm made operational efficiency changes that increased net income, they would be reflected in ROS and/or ROA. Since these ratios did not change significantly, the increase in net income efficiency occurred because of the decrease in employment. Low ownership concentration has a significantly positively relationhip to reduction in labor usage in the post-privatization Czech Republic, but not to any other positive operating efficiency changes.

Moderate ownership concentration, MOWN, has a positive impact on operating efficiency and profitability. In this category of ownership, changes in sale efficiency, return on assets, and real sales, and employment levels all increase. In this category changes in net income efficiency and return on sales are impacted negatively. It appears that these firms concentrated on increasing sales, not on improving the operations of the firm. However, changes in real sales, and nominal sales, are positively affected. Because of this, changes in return on sales would be more difficult to achieve, if net income did not increase by the same rate as sales. This is not to say that net income decreased (change in return on assets is positive indicating an increase in net income), just increased at a slower rate than sales. The same is true for the explanation of the negative impact for the change in net income efficiency. The change in employment is positively impacted, indicating that employment levels increased, or decreased by an amount less than LOWN and MOWN. This would have a negative impact on the change in net income efficiency.

For moderate levels of ownership, the effect on the changes in efficiency and profitability are positive. The three largest owners at this level of ownership have significant (at least 35% of the voting shares), if not complete (50% to 60% of shares), power to make changes. The SUR indicates that owners have used their influence to restructure the firm in a positive way. These firms have grown with respect to sales and employment.

Firms with the greatest concentration of ownership experienced negative changes in operating efficiency. There is a significant negative impact of this ownership structure on changes in employment, changes in real sales and the changes in return on assets. This indicates that both the level of sales and net income are decreasing after privatization. Reductions in employment produced the positive change in net income efficiency. This is somewhat surprising because the three largest shareholders own at least 60% of the shares and therefore have majority ownership. The size of the firm has been brought up as a possible explanation of this. The possibility that smaller firms tend to have a more concentrated ownership structure and that investment funds that own these firms may neglect them because of the small weight in their portfolio. To explore this possibility, the correlation between the firm's assets and the percentage ownership of the three largest owners. The value of the correlation coefficients are 0.12 indicating no significant relationship between firm size and ownership concentration.

Firm size, as measured by LASS, and other control variables are significant in SUR system and provide insight into the restructuring of the firm. Firm size has a consistent negative effect on the changes in efficiency after privatization. The larger the firm, the less

likely the firm will show improvement after privatization, regardless of ownership structure. Even though larger firms have an advantage of potentially improving efficiency (through greater reduction in emploment or greater asset utilization), the complexity of operations and beauracracy seem to prevent efficiency gains from occurring.

The presence of foreign capital or a partner in a joint venture has a positive effect on the firm after privatization. The same is true, but to a lesser extent, with debt. The presence of any of these financing arrangements provides more extensive monitoring than would otherwise occur. The type of monitoring these parties provide is different than that of the governing owners. Joint ventures and foreign capital are more likely to monitor operations of projects of which they are a part, not the final quarterly or year-end ratios. In addition, foreign capital and joint ventures provide a mechanism in order to transfer technology in the form of mechanical innovations, information, or methods. This transfer will increase the operating efficiency in addition to opening markets for sale of the firm's products.

The industry effects on firms after privatization vary, but there are some consistent results of the effects on efficiency measures across industries and on some industries across efficiency measures. With the exception of utilities, there is a negative effect of all the other industries on the change in employment. With most industries being over-employed, this finding is not surprising.

Between industries, there are significant differences in post-privatization performance. The utility and the service industries improved their performance overall, but mechanical engineering decreased efficiency in almost every measure. The better

performance of the utility industry should be expected because of the natural monopoly in which they operate. The service industry was able to improve its operations due to the relatively low assets and fixed costs that this industry has. Firms in the mechanical engineering industry performed far worse in the post-privatization period than the other industries. This may be due to the reliance of this industry on projects from the government. With the government playing a less significant role in the economy, the industries with the greatest reliance on the government will have the most difficult time after privatization. This is certainly the case in this industry. With the rest of the industries, there does not seem to be a consistent effect on the efficiency of operations and profitability.

The last set of control variables consists of indicators that identify alternative means of share distribution: shares kept by the government, shares sold to foreign and domestic investors and intermediated selling of shares. Three significant findings emerge. The first is that firms with shares owned by the government, mostly long-term direct interest like that of OBC and TRZ, have increased employment.

The second finding is that long-term direct government ownership tends to reduce the efficiency of the operations. Lipton and Sachs hypothesized that long-term government holding would not improve the firm. They believe that government oversight in the pre-privatization period caused firms to be inefficient and continued government ownership will increase the operating inefficiency. According to Liption and Sachs, governments should let the private sector and the markets weed out the bad firms during

and after the privatization process. If the state still owns firms, and continues to hold them, then there is little gain from the privatization process.

Firms that are temporarily held by the government tend to do better than long-term government ownership, especially with respect to sales. There is incentive for these firms to restructure because they will be in the private sector and the government has an incentive to restructure these firms in order to receive a additional return from them when the firms are sold. For the most part, firms with temporary government holdings, DOC, do not increase nor decrease employment, but mainly focus on increasing sales (revenue). In spite of this, these firms do not increase operating efficiency, which can be seen in the effect on changes in net income efficiency and return on assets. The conclusion from this finding is that long-term government holdings of firms is not beneficial.

The third finding is that direct sales to domestic or foreign investors (PPT or PPZ) does not have a major effect of the firm's change in efficiency. These effects may be accounted for in the variables for joint venture and foreign capital. While JV and FC are dummy variables, PPT and PPZ are the percentage of shares sold through this method. Results show that the importance is not the amount of shares sold directly to investors (revenue goes to government, not the firm), but that there is a transfer of capital and technology in the form of foreign capital or a joint venture.

In summary, the success of a firm after privatization in restructuring the operations and improving profitability depends on ownership structure, size, other outside monitoring, minimal or no long-term government direct interest, and, to some extent, industry. The optimal level of ownership is a relatively moderate concentration of the

three largest owners, about 35% to 60% of shares. This level of concentration allows for the large blockholders to have a considerable influence or control over the firm in order to make changes in the operations and increase operating efficiency and profitability, but also allow other types of ownership or monitoring, such as foreign capital and joint ventures. Low and high ownership concentration do not produce both of these factors of strength and outside monitoring. In the low ownership structure, the three largest owners do not have the power to make changes in the firm. In the high concentration, there is absolute power to make changes in the firm, but there is little room for other types of monitoring. With the growing liquidity and activity of the Czech markets, market discipline and the market for corporate control become more important. Examples of this are Michael Dingman's partnership with Viktor Kozeny as they acquired at least a 25% stake in 5 Czech companies and majority ownership in three other firms, and in the recent takeover of Plzenska banka and other mutual funds by Jan Dienstl's group of investors.

Besides ownership and monitoring factors, the other factors that determine the changes in efficiency after privatization are firm size, industry effects and long-term government interest. Firm size has a negative impact on changes in efficiency. The larger the firm, the more inefficient they are after privatization. In addition, firms that depended on the government for sales, non-consumer goods firms, the more negatively they were affected. Long-term government holdings have a negative impact on operating efficiency and performance. This indicates that the government is systematically holding firms that are underperforming, and that the government does not take an active interest in restructuring these firms. Sachs discussed one of the difficulties with a slow privatization

method is that firms that need to be privatized the most due to inefficiencies would not be because no one would buy them. This may be the same case for firms that have a long-term government interest. Privatization needs to be complete, with no long-term holdings by the government.

In contrast to long-term government holdings, short-term government holdings does not seem to have the same effect on changes in efficiency as long-term holdings. This finding is consistent with Perotti and Guney's hypothesis and results, that the government expects an increase in value for these firms, and captures this value by selling their shares after privatization has occurred.

Comparison of the Models. Since the definition and division of ownership variables are somewhat arbitrary, the outcome of the SUR may be the result of the definition of low, moderate and high ownership levels. As mentioned previously, three different models were tested. The R-Square goodness of fit measure is 0.79, 0.60, and 0.61 for Models 1, 2, and 3 repectively. The intercept term for these models are 1.33, 1.63, and 1.61 respectively, which are all significant at the .001 level. The intercept is restricted to be equal across all equations. The models are consistent in most areas, especially in the effects of the control variables. The results for ownership variables for all three models are reported in Table VII.

As previously defined, Model 1 specifies LOWN to be less than or equal to 30%, MOWN to be between 30% and 50%, and HOWN to be greater than 50%. Model 2 specifies the cutoffs at 35% and 60%, and Model 3 at 40% and 70%. Moderate levels of

ownership have an overall positive or non-negative effect on changes in efficiency and profitability for each model. In contrast, LOWN has an overall negative affect on changes in operating efficiency and performance.

Table VII

Comparison of Estimated Coefficients for the Ownership Variables for the Three Different Models at the 5% Significance Level

Ownership	NIE	SE	ROA	ROS	RS	EMP
LOWN						
Model 1	+	-			-	-
Model 2	+	-			-	-
Model 3	-	-	+	+	-	-
MOWN						
Model 1		+	+		+	+
Model 2	-	+	+	-	+	+
Model 3	-			-		
HOWN						
Model 1			-	-	-	-
Model 2			-		-	-
Model 3	-		-	+		

The difference in the three models tested is the definition of the ownership variables. The definition of these variables overlap each other between the models, which affects the estimated coefficients in these models. Overall, the signs and significance levels for the ownership variables are consistent between the models. If the estimated coefficient is significantly negative for Model 1, it is negative for Models 2 and 3. There are some exceptions to this. The major differences are between Models 1 and 3 where the definition of the ownerhip variables are further apart. For example, LOWN in Model 3 contains all

the LOWN firms and half the MOWN firms in Model 1. The differences in the coefficients in the models is caused by the overlapping of these ownership variables. Once the sign and significance for these variables change between models for a change in operating efficiency and performance equations, the change is permanent. This is consistent with the increasing percentage cutoffs in the ownership variables.

Overall, the level of ownership by the three largest shareholders have consistent effects between the three models. The results reported by Model 2 for the second hypothesis hold for all three models. The level of ownership affects changes in operations and that an effective ownership structure is one of moderate level of ownership, between 35% and 60%, by the three largest shareholders. The ownership concentration of this level restructured their firms in a positive manner after privaitzation.

Types of Owners and Restructuring

The second hypothesis that relates to ownership and restructuring is the relationship between the type of owner, one of the thirteen largest investment funds, and changes in operating efficiency and profitability. Ownership concentration is one measure of how firms are monitored by outside blockholders. Another measure of monitoring by outside blockholders is the type of owners. Investment funds controlled about 72% of the coupons of the first wave of privatization and the thirteen largest investment funds received approximately 50% of the total coupons available for the first wave. These thirteen funds have a large influence on the firms that they own and on the economy as a

whole. This hypothesis tests the differences in the firms that have at least one of the thirteen funds as one of their three largest shareholders and firms that do not.

Of the 170 firms in the sample, 90 firms had at least one of these thirteen funds as their three largest shareholders. The percentage changes in operating efficiency and profitablility of these 90 firms with ownership by these large funds are compared to those that do not. Results are reported in Table VIII.

Table VIII

Mann-Whitney test of differences in percentage changes in efficiency ratios by ownership by 13 largest investment funds

	Mean		T+	t-statistic	p-value
	Top 13 Fund	non-Top 13 Fund			
NIE	0.1783	-2.9531	8358	2.070	0.040
SE	1.2572	1.5080	7852	0.490	0.626
ROA	-0.3097	-1.3016	8379	2.135	0.034
ROS	-0.4781	-2.4620	8113	1.305	0.192
RS	-0.1216	-0.2209	8115	1.311	0.190
EMP	-0.3316	-0.3802	8226	1.658	0.098

For all measures of changes in operating efficiency and profitability except sales efficiency, firms that have one of the 13 largest investment funds as a large owner, have a more positive change in these ratios. Differences in percentage changes in net income efficiency and return on assets are greater at the .05 significance level and percentage change in employment at the .10 significance level.

These test results indicate that the type of owner is also an important factor to that of the percent owned by the large blockholder. Firms improve performance when monitored by an influential outside blockholder. These outside blockholders can exert

their influence in ways that Shleifer and Vishny (1986) describe. These methods are the jawboning method, using their votes to replace the current management with their own management team, or taking over the firm. The use or the threat of using these techniques has caused these firms to restructure the operations of the firm to a greater extent than firms without this type of owner so that profitability is increased relative to the other firms.

Efficiency Changes, Ownership, and Changes in Value

As seen in the previous section, changes in operating efficiency and profitability are affected by ownership levels and the type of owner (13 largest investment funds). Foreign capital, joint ventures, size, and government ownership also have an impact. A question that is just as important is if the developing capital markets recognize improvements in efficiency and profitability and appropriately increase the value of the firm or decreases firm value if no improvements take place. This question is a loose test of market efficiency in the Czech Republic.

To test the hypothesis that changes in efficiency are reflected in firm value, the effects of changes in efficiency and profitability are regressed against the change the relative value of the firm. The equally and value weighted index were explained at the beginning of the chapter. An index of sample and non-sample firms was created in order to capture the overall market returns, and a change in relative value measure is used. The initial price in coupons and the current price in Czech Crowns create the relative prices for the sample and index firms. A pooled cross-sectional time series regression is used to

measure the change in relative value during the 1993-94 period. Changes in efficiency and profitability are now included as explanatory variables with the ownership and control variables used in the SUR. Two other explanatory variables are included. The first is R5, a dummy variable that is one if the firm had shares available for auction in all five rounds. The second is PCTSLD, the percent of shares sold that were available for sale in the coupon auction. Both of these variables capture information revealed throughout the auction process. If R5 is zero, all the shares were sold before the final round, and by definition, PCTSLD is equal to one. But PCTSLD has additional information. The percentage sold ranges from a low of 7.38% to 100% of the shares offered. This provides information on which firms the market, investment funds and individuals alike, expected to be good investments and would make efficiency changes and increase in firm value. This information is also contained in the weighted price in terms of coupons, since the coupon price reflected the demand (the amount oversubscribed or undersubscribed at each coupon price) as determined by the Ministry of Finance during the auction process.

The variables and estimated coefficients are reported in Tables IXa and IXb for the pooled cross-sectional time series of the change in relative value. Table IXa reports the estimations for the change in relative value based on the equally weighted index, Table IXb for the value weighted index. As in the previous tables, the ownership variables used in this regression are reported for Model 2. After privatization, very few firms issued shares to the open market, but shares with alternative distributions did occur, either sales directly to domestic or foreign investors, sales through intermediaries, or shares awarded to satisfy restitution claims as measured by the variables of PPT, TRV OBC, PPZ, RES,

and the others. The change in value for both of these indices between December 1993 and December 1994 is close to -60%. This change in index value is reflected in the constant term which is significantly negative.

For both indices, changes in relative value are affected by some of the changes in operating efficiency and profitability. Changes in net income efficiency, return on sales have a significant positive effect on changes in relative value, while changes in return on assets has a significant negative effect. Changes in real sales and sales efficiency have no effect on relative value. The results are mixed in a strict sense. A positive effect is expected for all the efficiency changes, with the possible exception of employment.

The negative impact of the change in return on assets is contrary to intuition and can be explained when analyzing the control variables, especially size, proxied by the log of assets (LASS). There is a positive relationship between size and change in relative value, a positive size effect. This exists in contrast to the negative effect size has on changes in operating efficiency and profitability as reported in the SUR system. Investors prefer to hold larger, well known companies in spite of the slower rates of restructuring. Firms of smaller size had greater changes in return on assets. The size effect (LASS) dominates these two variables and explains the negative relationship found for changes in ROA.

In addition to LASS, the presence of foreign capital has a positive effect on the change in relative firm value, as it did on the change in efficiency and profitability. The same is true with firms in the service industry and utility industry. Foreign capital allows for a transfer of technology and western experience and increases firm value. The firm's

industry also is important in the change in relative value of the firm, with the service and utility industries increasing value relative to other industries.

Overall, firms with shares distributed by other means than coupon privatization experienced a significant decrease in value, both in the equally weighted and value weighted index. Other methods of share distribution include: Long-term government holdings, restitution, intermediated sales, and direct sales to domestic investors experienced decline measured by both indices. The equally weighted index also measured decreased relative value for transfers to local governments, temporary government holdings, and direct sales to foreign investors. In addition to having a negative effect on changes in operating efficiency and profitability, government holdings have a negative impact on value.

The two additional explanatory variables, R5 and PCTSLD, have a significant effect on changes in relative value. For firms that went through all five rounds of the coupon auction, there is a significant negative effect. This is also shown by a significant positive effect of PCTSLD on relative value. These variables proxy for investors' expectations about firms they bought in the auction. These expectations were correct. Firms that sold all or a high percentage of their shares (high demand) in the auction continued to increase in relative value after privatization while firms with a low percentage sold during the auction fared worse. Investors, whether through investment funds or individuals, were able to discern which firms would increase in firm value.

The last set of explanatory variables is the set of ownership variables. When measured by the equally weighted index, the level of ownership had a significant effect.

The effect on the change in relative value is the same effect that occurred for a change in operating efficiency and profitability. There is a negative effect for low and high ownership structures and a significant positive effect for a moderate ownership structure. When measured by the value weighted index, the effect is not as strong, but it is the same direction for the variables that was found in the equally weighted index. Ownership structure does affect the value, but not in a direct, linear way.

The results from the regression are consistent with the conclusion that changes in efficiency are priced in the market, and that there is a relationship between firm value and ownership structure. The change in relative firm value after privatization of these firms is positively affected by firm size, changes in net income efficiency, and return on sales, foreign capital, industry type, and a moderate concentration of ownership. Change in relative value is negatively affected by government holdings, change in return on assets, and low and high level of ownership. In addition, investor expectations of firms future value as revealed in the coupon auction are correct. Firms with a higher demand for their shares at the time of auction continued to increase in relative value compared to those firms which investors did not want. This is in addition to the price information reflected in the changing coupon prices for shares during the five rounds of the auction.

Summary

The empirical results are consistent with the hypotheses presented in the previous chapter with the exception of the first hypothesis. Ownership plays a significant role in restructuring the firm after privatization, and these changes in operating efficiency and

profitability are priced in the value of the firm. The best type of ownership structure is a moderate ownership concentration and one that has a large powerful blockholder as an owner, which was represented by one of the thirteen largest investment funds.

Besides ownership concentration, firm size, foreign capital, industry type, and other share distributions play an important role in restructuring the firm. Firm size has a significant negative impact on changes in operating efficiencies and profitiability, but foreign capital has a significant positive effect. The results also show that continued long-term governmental ownership has a negative, value decreasing effect on the firm

Table IXa

Estimates of the Pooled Cross-Sectional Time Series using the Equally Weighted Index

Variable	Estimated Coefficient	Standard Error	T-Ratio	p-value
DEMP	0.2608	0.1788	1.46	0.146
DNIE	0.0285	0.0046	6.13	0.000
DSE	-0.0700	0.0361	-1.94	0.053
DROA	-0.0168	0.0056	-3.01	0.003
DROS	0.0048	0.0014	3.43	0.001
DRS	-0.0417	0.0617	-0.68	0.499
LOWN	-0.0187	0.0060	-3.09	0.002
MOWN	0.0059	0.0029	2.07	0.039
HOWN	-0.0031	0.0019	-1.62	0.106
LASS	0.2057	0.0174	11.82	0.000
DEBT	0.1648	0.0856	1.93	0.055
FC	0.2501	0.0519	4.82	0.000
JV	-0.0576	0.0652	-0.88	0.378
IND 16	0.3580	0.0683	5.24	0.000
IND 14	0.7169	0.4290	1.67	0.096
IND 12	0.8162	0.1122	7.27	0.000
IND 11	-0.2013	0.0706	-2.85	0.005
IND 10	-0.0909	0.0597	-1.52	0.129
IND 9	0.1409	0.0873	1.62	0.108
IND 8	0.0978	0.0619	1.58	0.115
IND 6	-0.0453	0.1265	-0.36	0.721
DOC	-0.0036	0.0012	-3.04	0.003
POZ	0.0783	0.0455	1.72	0.086
ZPR	-0.0227	0.0021	-10.92	0.000
PPT	-0.0130	0.0014	-8.97	0.000
OBC	-0.0235	0.0036	-6.50	0.000
RES	-0.0218	0.0086	-2.52	0.012
TRV	-0.0202	0.0030	-6.62	0.000
PPZ	-0.0104	0.0011	-9.38	0.000
R5	-0.0920	0.0454	-2.03	0.044
PCTSLD	0.0517	0.0100	5.16	0.000
Constant	-1.7249	0.2623	-6.58	0.000

Table IXb

Estimates of the Pooled Cross-Sectional Time Series using the Value Weighted Index

Variable	Estimated Coefficient	Standard Error	T-Ratio	p-value
DEMP	0.4825	0.0870	5.54	0.000
DNIE	0.0130	0.0028	4.68	0.000
DSE	0.0034	0.0244	0.14	0.890
DROA	-0.0068	0.0029	-2.36	0.019
DROS	0.0023	0.0009	2.45	0.015
DRS	-0.0784	0.0463	-1.69	0.092
LOWN	-0.0045	0.0031	-1.44	0.150
MOWN	0.0014	0.0016	0.90	0.370
HOWN	-0.0018	0.0011	-1.69	0.093
LASS	0.1168	0.0097	12.00	0.000
DEBT	0.0757	0.0524	1.44	0.150
FC	0.1794	0.0322	5.58	0.000
JV	0.0141	0.0432	0.33	0.744
IND 16	0.3038	0.0385	7.90	0.000
IND 14	0.4447	0.3211	1.39	0.167
IND 12	0.4674	0.0782	5.98	0.000
IND 11	-0.0234	0.0397	-0.59	0.556
IND 10	0.0273	0.0338	0.81	0.420
IND 9	0.1093	0.0600	1.82	0.070
IND 8	0.1814	0.0398	4.56	0.000
IND 6	0.0158	0.0983	0.16	0.872
DOC	0.0016	0.0013	1.22	0.225
POZ	-0.0225	0.0245	-0.92	0.361
ZPR	-0.0108	0.0017	-6.27	0.000
PPT	-0.0040	0.0012	-3.25	0.001
OBC	0.0018	0.0032	0.57	0.570
RES	-0.0084	0.0035	-2.38	0.018
TRV	-0.0073	0.0019	-3.79	0.000
PPZ	-0.0010	0.0008	-1.24	0.218
R5	-0.0568	0.0289	-1.97	0.050
PCTSLD	0.0166	0.0057	2.93	0.004
Constant	-1.6714	0.1335	-12.52	0.000

VI. SUMMARY AND CONCLUSIONS

Summary

This research tests the role of concentrated ownership of large blockholders in restructuring firms after privatization in the Czech Republic. The Shleifer and Vishny theory shows that large outside blockholders monitors the firm and increases firm value by improving operations and efficiency. Empirical studies show that large blockholders do add value to the firm.

The Czech Republic's privatization program described in this study provided the opportunity of individuals to buy shares in privatized firms and to allow investment funds to collect privatization coupons and buy shares of privatized firms. This coupon privatization allowed for varying degrees of ownership concentration and the creation of large blockholders in these privatized firms. This change in ownership provides the opportunity to test the role of large blockholders and ownership concentration in the creation of firm value.

The first hypothesis tests the effect of privatization of Czech firms on the firm's operating efficiency and profitability. The empirical results show that privatization in the Czech Republic led to a decrease in operating efficiency and profitability in the years immediately following privatization. This is contrary to the experience of privatized firms in western countries. Czech firms experienced decreased changes because of an unstable economic environment of high inflation and uncertainty and the lack of market discipline in restructuring the firm.

Because of the lack of market discipline on the firm, the role of large outside blockholders becomes more important in restructuring the firm. The second hypothesis tests the role of large blockholders in restructuring the firm. The influence of blockholders is measured by ownership concentration by the three largest shareholders. The ownership is divided into three categories, low, moderate, and high levels of concentration. A seemingly unrelated regression tests the influence of owners on restructuring the firm. Changes in net income efficiency (NIE), sales efficiency (SE), return on assets (ROA), return on sales (ROS), real sales (RS), and total employment (EMP) measure restructuring of the firm after privatization.

Results of the SUR system show that ownership plays an important role if restructuring of the firm after privatization. From the results, the following conclusions can be made about the factors affecting restructuring the firm. Moderate levels of ownership, between 35% and 60% ownership by the three largest owners, is the optimal level of ownership. Moderate levels of ownership has a positive overall effect on restructuring, but low and high ownership concentrations have an overall negative effect on the firm.

In addition to ownership concentration, there are three other factors that have a major influence on changes in operating efficiency and profitability. Firm size has a significantly negative effect on all aspects of restructuring of the firm. Larger firms experience more negative changes than smaller firms. The second factor is that foreign capital has a significant impact on the restructuring by the firm. Outside monitoring, additional capital, and technology transfers help Czech firms improve operating efficiency

and profitability after privatization. The last major factor that affects restructuring is government ownership. Firms that have a long-term government interest experience significantly negative changes in operating efficiency and profitability. Privatization should be complete and government should completely divest their ownership interest. Short-term government ownership does not have the same effect.

The effect of restructuring and ownership on firm value is the final issue of this study. Ownership concentration, changes in operating efficiency and profitability, and the control variables are regressed against the changes in the firm's change in relative value. The measure of relative value includes the "prices" in the coupon auction and the traded prices on the Prague Stock Exchange. The results of this test show that changes in operating efficiency and profitability are priced by the market and that ownership concentration has an effect on change in relative firm value. The moderate ownership concentration increases relative value, but low and high concentration decreases relative value. This is consistent with the results in the second hypothesis.

In addition to restructuring changes and ownership concentration, firm size and foreign capital have a significant positive effect on relative firm value, and other types of share distribution, such as long-term government ownership or restitution, have a significantly negative effect on relative value.

The last major finding from this test is that coupon privatization participants correctly valued firms in the auction. Firms with the highest percentage of shares sold, indicating high demand and value, significantly increased in relative value after

privatization. This finding demonstrates that the Czech privatization process provided enough information to all participants to correctly value and then bid on these firms.

Applications of Findings

The first application of this study is for the privatization program in the Czech Republic. The level of ownership concentration is important in the restructuring of the firm and in increasing the value of the firm. The Czech Republic should break up high ownership concentrations (greater than 60%) and encourage moderate levels of ownership concentration. The government should also fully divest long-term holdings in firms, completely privatizing these firms. The government should also implement a policy and environment that is favorable to foreign capital and joint ventures. These policies will help firms make value increasing changes in operations.

The second application of this study is for other former communist countries. These countries should pursue an aggressive privatization program that includes participation by the citizens and the formation of large blockholders. Although the Czech plan is not feasible for every country, this program can be adapted to fit the political and social environment of the specific country. The Czech program provides information on the basic elements of large scale privatization which includes publicly available information about all the firms being privatized, an open auction process, and the market's formation of large blockholders.

The third application of this study is the addition to the current literature of ownership and firm value. This study finds support for Shleifer and Vishny's model and

support for a nonlinear relationship between ownership concentration and firm value. This relationship is similar to Morck, Shleifer, and Vishny's model. These findings conclude that ownership is important to firm value.

The final application is to the U.S. market. Although these results are not directly applicable to U.S. markets, they do show the importance of large blockholders in monitoring if not becoming active in firm management. Investment companies, pension funds, and insurance companies are able to provide a valuable monitoring service to the firm and increase the value of the firm in which they have ownership.

Future Research

The findings in this research are limited in scope and time. This research looks at only one wave of Czech privatization and analyzes the effects for a short-time period immediately following privatization. Future research possibilities include looking at the second and third waves of privatization and analyzing the restructuring for all firms for a longer time period, up to a decade, to determine the impact and the extent of privatization. The longer time period would allow for markets and firms adjust to determine the full effect of mass privatization. The inclusion of all Czech firms in a future study may provide collaborative support for these findings.

Another possible area of future research is to analyze small scale privatization and the development of small enterprise in the Czech Republic. These business sectors were not included in this research, but were an important part of the privatization process. The mot pertinent areas of this research are analyzing the new owners and what their relation

to the business was before privatization (manager, employee, supplier, retailer, or other), the performance of these firms after privatization, and the impact of new businesses in the Czech Republic.

The last area of future research is the auction process. The auction used in the large scale privatizations is not a common process, especially in the U.S. and with limited number of bidding rounds. The success of this auction in the CR provides the opportunity for research in the areas of auction efficiency and the information revealed before and during the auction, as well as the price determination of the next rounds auction prices. This is an important area of research with applications to other countries that wish to use a similar auction in privatization or with countries that are developing call financial markets.

These areas are the most important areas of research in the area of finance. There is much to learn as all fields of research and sudy watch these markets develop and experts are asked to give input and advice. It is my deepest wish that this developing market will continue to grow and the resources needed to study this market are provided in continuing fellowships and grants.

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VITA

Joel Thomas Harper

Candidate for the Degree of

Doctor of Philosophy

Thesis: OWNERSHIP STRUCTURE AND ITS EFFECTS ON OPERATING PERFORMANCE AND FIRM VALUE: EVIDENCE FROM THE CZECH REPUBLIC

Major Field: Business Administration

Biographical:

Education: Graduated from Harding University, Searcy, Arkansas, May 1991 with a Bachelor of Business Administration with a major in Economics. Completed the requirements for the Doctor of Philosophy degree with a major in Business Administration at Oklahoma State University in July 1996.

Experience: Employed as a graduate teaching associate by Oklahoma State University in the department of Finance, 1991 to present.

Professional Memberships: Financial Management Association, Eastern Finance Association, and Southwest Finance Association.

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Principal Investigator(s): Tim Krehbiel, Joel Harper

Reviewed and Processed as: Exempt

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