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PRIVATIZATION AND MANAGEMENT INCENTIVES
IN THE TRANSITION PERIOD IN EASTERN EUROPE

Klaus M. Schmidt
Monika Schnitzer

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massachusetts
institute of
technology

50 memorial drive
cambridge, mass. 02139
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Klaus M. Schmidt
Massachusetts Institute of Technology and Bonn University

Monika Schnitzer
Massachusetts Institute of Technology and Bonn University

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Abstract: The paper develops a simple theoretical framework in which the impact of different governance structures on management incentives, the efficiency of restructuring, and the social costs of the adjustment process in the transition period in Eastern Europe can be analyzed. The model shows that immediate privatization leads to strong management incentives to restructure but also to high social costs of bankruptcies and layoffs. If the government stays in control social costs will be lower. However, in this case managers face a "soft budget constraint" and have less incentives to restructured. The model also suggests which companies should be privatized first.

Keywords: Privatization, Economic Reform in Eastern Europe, Principal-Agent Theory.

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1. Introduction

Privatization is probably the most important and the most difficult element in the transformation process of the economies in Eastern Europe. Although considerable progress has been made in privatizing small and medium sized firms, the bulk of large industrial enterprises is still owned by the state. Companies of comparable size in western economies are owned and controlled within a complex system of private and public institutions which have developed over decades to their present form. It is clearly impossible to create such a system over night. The question is what governance structure should be established for these firms in the transition period, i.e. before a modern market economy with all its institutions has been developed.

Several economic advisers and academic economists have offered detailed proposals how to restructure and/or privatize these firms. Their arguments in favor or against different schemes are based on the experiences made with privatization in other countries and the basic lessons of economic theory. These arguments are most valuable to guide the transformation process. We feel, however, that at this stage some additional insights can be obtained by making these ideas more precise in formal models designed to capture the main peculiarities of the transition phase. The purpose of this paper is to develop a simple theoretical framework in which we can analyze systematically the impact of different governance structures on management incentives, the efficiency of restructuring, and the social costs of the adjustment process.

Our analysis focuses on large industrial companies. They account for a high proportion of output and employment and pose the greatest challenge for reform: many of them are overstaffed and need a lot of painful restructuring before they may become profitable, and it is difficult to find private investors for them.

We distinguish two idealtypical approaches which lead to two different governance structures for these companies in the transition period. Proponents of the market approach argue that the best way to proceed is to privatize as fast as possible by distributing the shares of large state owned companies in one way or another to the general population. Given the lack of entrepreneurs and the atomistic ownership structure resulting from a mass distribu-
tion scheme financial intermediaries (like holding companies, mutual funds, pension funds, or investment banks) will come in and play a crucial role in the transition period. They will diversify risk and actively control the managers of the companies they own.

Proponents of the *government approach* suggest that at least some coarse restructuring should be done by a government agency. Thereafter this agency should try to sell each company individually to a core investor who commits his investment to the company for several years. To find such an entrepreneur may take a considerable amount of time in which the company is owned by the state and controlled by the government agency. We describe these idealtypical approaches in more detail in Section 2.

Before we model different governance structures we have to specify the economic environment in which they are supposed to work. Our working hypothesis is that the transition period in Eastern Europe will be characterized by rapidly changing market conditions, economic and political instability, and a high degree of uncertainty about the future. Referring to well known results in contract theory we discuss what kind of incentive contracts should be used in such an environment in Section 3. Among other things we argue that stock options and performance based compensation schemes will be of limited use in the transition period, but that the threat of bankruptcy may play an important role to motivate managers to restructure their firms efficiently.

In Section 4 we introduce the formal model which captures the two idealtypical governance structures of the market and the government approach and which reflects the informal discussion of feasible incentive schemes in the transition period. The model generates two effects: First, it shows that if firms are controlled by a government agency then the social costs of the adjustment process will be lower than if a privately owned holding company is in control. The government agency will take profits from successful firms to cross-subsidize unsuccessful ones. This reduces the social costs of liquidation, but the government agency may subsidize inefficiently much and keep firms in operation which should be closed down. This delays the necessary adjustment process.

The second effect is that the manager of a firm will work harder and restructure more efficiently if his company is owned by a private holding than if it is controlled by the government agency. The reason is that the manager knows that his firm is less likely to go
bankrupt under government control. If his firm fails the government will try to rescue the firm in order to prevent the social costs of liquidation. Thus the manager faces a “soft budget constraint”: He will not carry through a painful restructuring of his firm or spend enough effort to modernize the production process because he rationally anticipates that the government will bail him out in case he fails.¹

In our model privatization is a commitment device of the government not to subsidize unsuccessful firms. A similar point has been made by Sappington and Stiglitz (1987) who argue that public ownership generally facilitates intervention by the government, while intervention is more difficult if the enterprise has been privatized. Intervention is beneficial if it allows rapid adaptation to unforeseen contingencies, but it also undermines the incentives of the management to control costs, because the government is likely to subsidize cost overruns. We try to make this argument more precise in a formal model which captures some of the distinctive features of the transition period in Eastern Europe.

In Section 5 we point out some implications of the model and discuss intermediate governance structures. For example, the government need not privatize all the firms at the same time. Our model gives some insights into which firms should be privatized immediately and which ones should be kept under the control of a government agency during the transition period. Also, the model shows that it may be beneficial for the government to keep only a fraction of the shares which yields a limited commitment not to cross-subsidize unsuccessful firms too much. A similar commitment can be obtained if the government owns no shares but assumes the right to replace the directors of a privately owned holding company. Section 6 concludes.

2. Privatization Proposals

The first step of any privatization program is the establishment of clear ownership rights. In the last years of socialism and in the early transition period the governments of most Eastern European countries gave up important ownership and control rights which are now

¹This effect is similar to the “soft budget constraint” for managers in socialist economies as described by Kornai (1980).
exercised de facto and often de jure by workers’ councils, managers and sometimes local authorities. The current situation is characterized by muddled ownership structures in which the control rights of the different stakeholder groups are ill defined and in conflict with each other.² Privatization can only go ahead with the consent of these groups. Most privatization proposals recognize this fact by offering them considerable fractions of the stock of their companies as a compensation for the loss of control.

Most economic advisers also agree that large industrial companies should be “corporatized” (or “commercialized”), i.e. they should be formally separated from the branch ministries and set up as legally independent corporations.³ Although the government still owns such a corporation it is no longer involved in the day to day activities of the firm but rather controls the strategic decisions and the performance of the management through a board of directors. Corporatization facilitates the second step, which is to transfer ownership of these companies to private investors. How this should be done, however, is very controversial.

GOALS OF PRIVATIZATION

Before we discuss alternative privatization proposals let us briefly summarize the main goals to be accomplished through corporatization and privatization in the transition period:

- **Efficient management control:** Governance structures have to be established which give managers the right incentives to run and restructure their companies efficiently.

- **Restructuring of the economy:** The large industrial firms are more vertically and horizontally integrated than comparable firms in western economies. Many of these firms are still hoarding too much labor and will have to lay off a significant fraction of their workforce. Furthermore, some companies are expected to be non viable at all and have to be closed down, either because the markets for their products have disappeared, or because their production technologies are hopelessly outdated.

- **Limit the social costs of adjustment:** Even if a large company is not expected to be profitable in the future, it may be socially inefficient to shut it down immediately. High

²This problem is particularly severe in Poland, Hungary and Russia. See Dabrowski et.al. (1991), Kornai (1990) and Shleifer and Vishny (1992).
³See e.g. Fischer (1991).
unemployment rates and the economic desolation of entire regions may have considerable negative external effects which have to be taken into account. Furthermore, social and political unrest may jeopardize the transition process as a whole.

- **Attract foreign capital and expertise:** Given the lack of domestic savings foreign investments will play an important role for economic growth. Furthermore, foreign investments are expected to lead to a transfer of technological knowledge and managerial techniques which are crucial to modernize the economy.

- **Create competitive market structures:** Some conglomerates have to be split up to reduce their market power, and the government has to regulate natural monopolies.

- **Fair initial distribution of wealth:** Since the existing capital stock is owned by the state, it is widely felt that each adult citizen has an equal claim on these assets, and that capitalism should start with an egalitarian distribution of this wealth.

- **Protect government revenues:** In all socialist countries government revenues were raised mainly through the transfer of profits to the state budget, while a tax system comparable to that in western industrialized countries did not exist. If all state owned companies were privatized before a functioning tax system has been established, the state would lose its main source of revenues.

Naturally, different privatization schemes put different weights on different objectives. However, the main distinctive feature of the different proposals is the role of the government in achieving these objectives during the transition period. Two idealtypical approaches can be distinguished. Proponents of the “market approach” believe that 40 years of socialism have shown that governments are incapable of guiding the efficient restructuring of the economy. Thus, the best way to proceed is to privatize as rapidly as possible and to leave the rest to market forces, with as little government interference as possible. In contrast to this position proponents of the “government approach” stress the lack of entrepreneurs and of established market institutions in Eastern Europe. There is no well functioning stock market and no system of experienced financial intermediaries to rely on. They claim that, given the scope of the transformation and the risks involved, a strong lead by the government is unavoidable.
In the following we will outline these two idealtypical approaches in more detail. However, most actual privatization schemes take an eclectic position. It is beyond the scope of this paper to discuss this literature and the recent developments in Eastern Europe in detail. For our purpose it is sufficient to overview the basic arguments.4

THE MARKET APPROACH:

Ownership and control rights should be transferred to private investors as fast as possible. Since privatization through initial public offerings or individual sales would take very long (see the arguments given below), a mass privatization scheme with free distribution of shares has to be employed. A minority fraction of (non-voting) shares could be given to workers and managers to compensate them for their loss of control. The government could also retain some fraction of shares as a source of future revenues, but this fraction should be either non-voting or sufficiently small that the government cannot interfere with the strategic decisions of the companies.

The majority of shares will then be distributed either directly through a voucher scheme to the general public, or indirectly to financial intermediaries like holding companies, investment banks, mutual funds, etc., which are in turn owned by the public. If a voucher scheme is employed each adult citizen can bid on a pseudo stock market for the shares of the individual companies. The problem is that there are thousands of firms to be privatized, there is very little information about their future profitability available, and the transaction costs for each citizen to acquire at least some information are high in comparison to the value of his voucher. Therefore, investment funds will enter the market and compete for the vouchers of the citizens in return for a stake in the investment fund. Most of the actual bidding on the pseudo stock market will then be done by these financial intermediaries. They will be large enough to diversify risks in their portfolios, and they will hold a significant fraction of the shares of a company so that the resulting ownership structure will not be atomistic.

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4For a survey of the different privatization proposals see Borensztein and Kumar (1991) and Fischer (1991). We do not consider proposals to give or sell the companies to their employees. For a discussion of some of the problems involved with labor managed firms see Hinds (1990). Bonin (1992) discusses the actual implementation of privatization schemes in Poland and Hungary. For the special case of Eastern Germany see Bös (1991) and Sinn (1991). An overview of the programs in other countries can be found in RFE/RL Research Report (1992).
However, the organization of a voucher scheme and of the initial pseudo stock market may be very complicated, time consuming, and involve high transaction costs. Moreover, this procedure may result in a very concentrated ownership structure, where a whole industry is controlled by a single investment fund. To avoid these problems the government could distribute the firms to be privatized directly to some financial intermediaries (let us call them "holding companies"). Their portfolios could be designed such that competitors in the same industry are allocated to different holdings. Furthermore, for each holding there should be some other holding companies with similar portfolios in order to facilitate relative performance evaluations. The holdings are owned by the general public: each adult citizen gets an equal share of them which he can disentangle and trade on the stock market.

Both procedures allow for a rapid privatization of the whole economy and start with a fair initial distribution of wealth. The restructuring of the economy is then left to the market. The stock market should operate freely from the very beginning. A manager of a holding company or investment fund can be given an incentive contract which conditions his salary on the absolute and relative performance of his portfolio. Thus he has an incentive to actively monitor and control the managers of "his" companies, and to maximize the value of his portfolio. In particular he is supposed to shut down unprofitable firms, and to split up conglomerates if they are too much vertically integrated. Furthermore, he will sell a firm to domestic or foreign investors if he gets an offer which is higher than the stock price of the company. A manager of an individual firm will be actively controlled by the financial intermediaries and will have additional incentives through stock options and the threat of bankruptcy. He will try to attract foreign capital and expertise in order to maximize the probability of survival and the profits of his firm.

To ensure competitive market conditions the government should commit to a free trade policy. As far as non-tradables or natural monopolies are concerned, antitrust laws and regulatory authorities as in western economies will be necessary.

The social costs of adjustment will be very high during the transition period, but they are unavoidable. The government should not interfere with the market to slow down the process,

\footnote{For a discussion of the mechanics of the voucher scheme which is being used in Czechoslovakia see Brada (1992).}
but rather deal with these costs directly by granting unemployment benefits and subsidizing retraining and regional development. Government revenues should come predominantly from taxes.

The Government Approach:

Before any privatization takes place the government should undertake some coarse restructuring itself. Conglomerates and monopolies are broken up to avoid anticompetitive behaviour in the future. Grossly overstaffed companies are slimmed down to make them more attractive for private investors. If a company is hopelessly unprofitable it should be shut down by the government.

Again some fraction of the stock of each company may be given away or sold at a discount to workers and managers (this could be conditional on future privatization), and the government could retain a minority stake for itself. Then the government tries to sell the majority of the shares of each firm to private investors. Some companies may be sold through initial public offerings on the stock market. If there are several investors interested in buying the entire company the government could auction it off. In smaller companies highly leveraged management buyouts are also possible. However, in many cases the government will have to look actively for a potential buyer, domestic or foreign, and to bargain with him on the terms of privatization. To reduce the social costs of future layoffs the government could insist on employment and/or investment guarantees to be given by the private owner in exchange for a lower price, the cancellation of outstanding debt, the guarantee of future subsidies, or other privileges.\(^6\)

The sale of each individual firm will be a difficult and time consuming process. There is no reliable way to estimate the market value of a company. Since these firms operated in the past under severely distorted prices, trade structures and management objectives, an estimate of the value of the enterprise cannot be based on past experience. If the government sells them too cheaply, it loses potential revenues and creates “unfair” windfall profits for the lucky investors. If it bargains too hard, potential buyers may lose interest. Given the lack of domestic savings and entrepreneurs it will often be difficult to find a potential buyer

at all, in particular for the biggest conglomerates which need a lot of painful restructuring and huge investments before they may become profitable.

Thus, the privatization process will take a considerable amount of time (at least 5 to 10 years until the majority of the large industrial companies is sold). In the meantime the firms are run as joint stock companies, owned by the state and controlled by a board of directors which is selected by a government agency. The board monitors and controls the management and tries to induce profit maximizing behavior. If the company is unprofitable it can go bankrupt. However, the government will take the social costs of liquidation into account and may subsidize the firm in order to smooth the adjustment process.

The revenues from privatization and the profits of the state owned companies can be used to reduce social adjustment costs in the transition period. The rest may either be distributed to the population or be retained by the government to reduce current and future taxes.

3. Management Incentives

In this section we take a closer look at what kind of incentives can be given to managers under the different proposals. This discussion prepares the ground for the assumptions made in the formal analysis of the efficiency of production and restructuring under different governance structures. There are three different kinds of managers that have to be distinguished: First, there are the managers who run the individual firms and who have to carry out the painful restructuring during the transition period. Second, if the individual firms are owned by financial intermediaries (which we will call "holdings" for simplicity, even though all the arguments given below apply for mutual funds, pension funds, or investment banks as well), then the managers of the holding company have to monitor and control the firms in their portfolio. We will call these managers "directors" in order to distinguish them from the managers on the firm level. Third, if the individual firms have not been privatized yet they are owned by the state and controlled by a government agency. The managers of this agency will be called "administrators". In the following we discuss which kind of incentive
mechanisms can be given to each of these groups under the conditions of the transition period in Eastern Europe.\(^7\)

**Incentives on the Firm Level**

The standard approach to give a manager the right incentives to invest and to produce efficiently is to link his salary to his performance by offering bonuses and/or stock options. *Bonuses* are conditional on accounting data (e.g. profits, revenues, output, etc.) and can be used by both, privatized and state owned companies. However, they have several severe drawbacks. First, under rapidly changing exogenous conditions there is no "baseline" of enterprise performance, and no one knows what good performance will be. Second, bonuses distort incentives because they do not condition on the long-term value enhancement of the firm but rather on profits or revenues of the current period. Thus they discourage a long-term strategy to restructure the company. Third, in the transition period the environment of the enterprises will be very noisy: input and output prices will change rapidly, political decisions will have a major impact on the profitability of many markets, and the macroeconomic instability imposes additional risks. This noise is reflected in the accounting data which is therefore a poor measure of management performance. Finally, the accounting system in Eastern European companies is still in its infancy and there are few accountants trained to deal with modern corporations. Thus the data will also be inaccurate and may be subject to manipulation.

*Stock options* can only be used if a company has already been privatized and if its shares are traded on the stock market. In contrast to bonuses they do not distort incentives because they condition on the stock market evaluation of the value of the company. However, in the transition period they will be of limited use too. First, a well functioning stock market does not yet exist and will take some time to develop. Second, in the transition period the environment of the companies will be constantly changing which has a much stronger impact on the long term prospects of the company than variations in the performance of the management. Thus, market analysts will concentrate on predicting changes of the market conditions rather than on monitoring managers. Furthermore, given the lack of reliable and undistorted

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\(^7\)For a more detailed survey on different incentive mechanisms and in particular the role of the stock market see the excellent discussion in Tirole (1991).
accounting data, it is also very difficult for market analysts to assess how efficiently a firm is run. Thus, in the transition period share prices will contain very little information about the performance of a manager, but rather reflect the noise of his environment. Making the manager’s salary very responsive to the stock price gives only weak incentives to increase efficiency but exposes him to a lot of risk. Therefore, the manager should be given a flat incentive scheme.8

Managers are also motivated by career concerns. If the managerial labor market observes a signal about the manager’s performance, this signal will be used to update the market evaluation of the manager’s ability. Thus it will influence his outside job prospects and his salary. Unfortunately the signal will again contain a lot of noise in the transition period, and there is little a company can do to improve this mechanism.

Another important device which disciplines managers is the threat of bankruptcy. If a firm goes bankrupt the manager loses his job and the rents and perquisites associated with controlling the company. Furthermore, the event of bankruptcy gives a strong signal about the manager’s ability to the managerial labor market, lowering his future job prospects. Since bankruptcy is a serious possibility for firms which do not adapt fast enough to rapidly changing market conditions in the transition period, this threat can give powerful incentives to both, managers of privatized and of state-owned companies.

Takeovers are only possible if the company has already been privatized. The standard argument is that if the management is incompetent or inefficient, share prices will be lower than the potential value of the firm. Thus, a raider could take it over, replace the incumbent management, thereby increasing the value of the company, and make a profit. However, even in western economies the role of takeovers as a device to discipline managers is limited and controversial.9 In the transition period there is the additional problem of a lack of domestic

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8For a formal model of this argument see Holmström and Milgrom (1987). Milgrom and Roberts (1992, p. 221) summarize the results of the literature on performance pay in the “Incentive Intensity Principle”: The optimal intensity of incentives depends on four factors: the incremental profits created by additional effort, the precision with which the desired activities can be assessed, the agent’s risk tolerance, and the agent’s responsiveness to incentives.” Our main argument here is that during the transition period the measurement precision will be so poor that the incentive intensity has to be very small. For an interesting application of this principle in a western industrialized country see Ghemawat (1992).

9See Shleifer and Summers (1988) and Schnitzer (1992) for possible negative side effects of takeovers on the incentives of managers and other stakeholders.
savings and entrepreneurs. Furthermore, the banking system is hardly developed, making it difficult to finance a leveraged takeover.

Finally, managers can be monitored and controlled by the board of directors or by a government agency. From the experience in western economies it seems unlikely that these supervisory institutions are able to exercise a tight control of the efficiency of the manager’s operations. However, they can replace an obviously incompetent manager, and they can enforce major strategic decisions, e.g. whether or not to liquidate the firm.

**Incentives for Directors of Holding Companies**

While there is little scope for *stock market incentives* on the firm level, this is not the case for financial intermediaries. A holding company pools firms of many different industries in its portfolio, which reduces the volatility of its own stock price. Thus, stock options expose the directors of the holding to less risk than the manager of a firm. Furthermore, by having several holding companies with similar portfolios it is possible to give financial incentives based on relative performance evaluations.

The threat of bankruptcy or of a takeover, however, will play no significant role for managerial incentives. These events are very unlikely given the size of the holdings.

The directors of financial intermediaries may be subject to *governmental control*. This can be beneficial if a grossly incompetent management team has to be replaced. On the other hand, the more the government can intervene the more it will impose its own objectives on the holding. For example, the government could press the directors not to shut down an unprofitable enterprise. Since the losses have to be paid by the holding this policy expropriates the shareholders of the holding.

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11Relative performance evaluations can be very useful to filter out noise and thus to reduce the risk the manager has to bear. See Holmström (1982).
12An interesting example for such a policy is the Treuhandanstalt. Although the Treuhand is not a joint stock company owned by East German shareholders, the profits of the Treuhand are supposed to be distributed to East German savers, as a compensation for their losses during monetary unification. Detlef Rohwedder, the Treuhand’s first chief executive, estimated the revenues from privatization to be 600 billion DM. However, in order to get employment and investment guarantees the Treuhand has reduced its prices so much, that even though it has only sold the most profitable enterprises up to now, it already runs a deficit (which will be covered by the government). See Dornbusch and Wolf (1991).
Incentives for Administrators of a Government Agency

It is very difficult to give administrators of a government agency an incentive to care about efficiency. The main difference to directors of a holding company is that for a government agency there is no stock market, no possibility of takeovers or bankruptcy, and no performance based compensation. Administrators receive a fixed salary and will behave like bureaucrats, trying to increase their budget and their sphere of influence. However, they have career concerns and do react to political pressures. For example, the higher the political pressure not to close down a firm the harder they will try to find cross-subsidies to rescue it.

Summary

In the transition period in Eastern Europe there are only limited possibilities to give efficient incentives to managers. On the firm level incentives will come mainly from the threat of bankruptcy and the career concerns of the managers. Privately owned financial intermediaries can use the stock market to base the compensation of their directors on stock options and relative performance evaluations. In a government agency administrators will behave like bureaucrats and react to political pressure.

4. A Simple Model

In this section we want to compare two different governance structures in the transition period: a privately owned holding company and a government agency. These institutions reflect the two idealtypical cases of the market approach and the government approach described in Section 2. The theoretical insights obtained from this analysis will also be useful to better understand the intermediate proposals. The model focuses on the incentives for the manager of a firm to restructure efficiently, and on the decision of the directors or administrators on whether or not to keep an unprofitable firm in operation. We do not consider the incentive of a government agency to sell the companies to private investors after the transition period.

Consider a set of $n$ firms, indexed by $i = 1, \ldots, n$, all of which are either controlled
by a holding company or by a government agency. There may be many other firms in the economy which are run by different holding companies and/or different government agencies. In this section we take the portfolio of the $n$ firms as given. In Section 5 we address the question how to optimally structure this portfolio.

Each of the $n$ firms is run by a manager. In the transition period the environment of these firms changes rapidly. How well a firm adjusts to new market conditions depends on the effort of the manager to restructure his firm efficiently. We model this in a highly stylized way: For each firm $i$ there are two states of the world, called “success” and “failure”. If a firm succeeds its expected net present value from staying in business, denoted by $V_i$, is higher than its liquidation value, which we denote by $V_i^L$. If it fails, however, its liquidation value exceeds $V_i$. Thus, there are only two possible realizations of $V_i$, $V_i \in \{\underline{V}_i, \overline{V}_i\}$, with $\underline{V}_i < V_i^L < \overline{V}_i$. The probability of success, $p_i(a_i)$, is a function of an “action” $a_i$ taken by the manager. A natural interpretation is that $a_i$ reflects the effort manager $i$ spends to reorganize his company. His effort is measured in units of utility costs for the manager, i.e. if the manager spends effort $a_i$ he incurs the disutility $a_i$, $a_i \in \mathbb{R}_0^+$. The notion of “effort” is quite general here. Suppose e.g. that the reorganization involves to lay off redundant workers, or to shut down a division of the firm in order to buy from a more efficient outside supplier. These restructurings are painful to the manager because he has to carry them through against the resistance of the workers. Or suppose that the manager has to actively look for foreign expertise and investors. This takes time and effort, the manager has to adapt to a different business culture, and he may lose part of the control of his company.

**Assumption:** The probability of success, $p_i(a_i)$, is increasing and strictly concave in $a_i$, with $0 < p_i(a_i) < 1$ for all $a_i \in \mathbb{R}_0^+$. The $p_i(a_i)$ are stochastically independent across firms.$^{14}$

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$^{13}$Note that we are not concerned about bankruptcy of the firm but rather about liquidation. A firm which produces at average variable costs which are smaller than the market price may go bankrupt because it cannot pay off its creditors. However, this firm would not be liquidated. Either the banks will forgive part of the debt, or a new-owner buys the firm’s capital at a reduced-price, but in both cases it is kept in operation. To avoid these cases we define $V_i$ as the net present value of expected future revenues minus future costs, not including capital costs which have been committed in the past. We are grateful to Josef Brada for pointing this out to us.

$^{14}$Stochastic independence of the $p_i(\cdot)$ is clearly not realistic. However, allowing for correlation between firms does not affect our results and does not yield any additional insights.
If the net present value of a firm is smaller than its liquidation value, then a profit maximizing owner will shut it down and sell off its assets. In a frictionless world the assets will be redeployed to their next best use, and workers and managers will find employment at the going wage in other industries. In this case the owner bears all the costs of failure of his firm. However, this is not a realistic scenario for the transition period in Eastern Europe. The liquidation of a large industrial company may have considerable external effects which are not taken into account by a profit-maximizing owner:

- Due to the high level of general unemployment workers and managers will have a hard time to find new jobs in other sectors, and their human resources may be left unused for an extended amount of time. Even if they find another job, their firm specific human capital is lost. Furthermore, if the company dominates a town or an entire region, part of their physical assets (in particular real estate) will be devalued.

- Outsiders to the firm may also be affected: the liquidation of a large industrial company affects its suppliers in other sectors of the economy which may also be forced in liquidation, it may cause the economic decline of the town or region dominated by the firm, and it may lead to social unrest which increases macroeconomic and political instability.

It will be useful to distinguish between workers, manager and the rest of the society. Let $\Delta_i^w$ be the utility loss incurred by workers if their company $i$ is liquidated, and $\Delta_i^m$ and $\Delta_i^s$ be the respective utility loss of the manager and of the rest of society. The total social cost of liquidation of firm $i$ is denoted by $\Delta_i = \Delta_i^w + \Delta_i^m + \Delta_i^s$. The amount of these welfare losses is assumed to be positive and exogenously given. Thus, from a welfare maximising point of view, a firm that failed should be liquidated if and only if $V_i^L - V_i > \Delta_i$.\(^{15}\)

What are the incentives of the manager of firm $i$ to work hard? His effort is unobservable, so his wage cannot be made contingent on $a_i$. Furthermore, we argued in Section 3 that there is little scope for bonuses and stock options in the transition period. Thus, we assume that the manager gets a fixed salary, the net present value of which is denoted by $w$. He may have

\(^{15}\)Note that the social cost of not liquidating is exactly $V_i^L - V_i$. The firm could have generated $V_i^L$ in liquidation, while its (possibly negative) profits are only $V_i < V_i^L$ if it is kept in operation.
an incentive to spend some effort because of career concerns. We do not incorporate this into the model, but take it as exogenously given, assuming that this incentive induces some minimal level of effort, \( a_i \), which we normalize to 0. The manager may be induced to work harder than \( a_i = 0 \) in order to reduce the probability that his firm is liquidated. If his firm is closed down, he incurs a utility loss \( \Delta_i^m \). Let \( x_i \in \{0, 1\} \) denote the decision whether to close down firm \( i \) (\( x_i = 0 \)) or whether to keep it in operation (\( x_i = 1 \)). Then the manager’s utility function is given by\(^{16}\)

\[
U_i = w_i - (1 - x_i)\Delta_i^m - a_i .
\]

The board of directors is not involved in the day to day operations of the manager. In particular, we assume that the board cannot observe \( a_i \), the effort level of the manager. However, the board does observe the realization of \( V_i \), and the board takes the long-term decision whether the company is shut down or kept in operation.

The incentives of the board of directors depend on the governance structure employed in the transition period. If the firm is privatized and owned by a holding company, then the directors of the holding dominate the board and decide whether or not to shut down an unprofitable firm. In this case the shares of the individual firms and of the holding are traded on the stock market. As we argued in Section 3 the directors of the holding should be rewarded with stock options and according to relative performance evaluations. We assume that these incentives are powerful enough to induce them to shut down a firm which loses money.\(^{17}\)

If the company is owned by the state the administrators of a government agency control the board. Since the company is not traded on the stock market, share prices cannot be used to give incentives. The managers of the government agency will receive fixed salaries and are essentially bureaucrats. What are their objectives? They do not want to transfer the money they control to the general budget, but rather want to use it to maximize their

\(^{16}\)Recall, that without loss of generality we have scaled \( a_i \) such that the utility function of manager \( i \) is linear in \( a_i \). This formulation has the advantage that we have to impose assumptions only on the shape of \( p_i(\cdot) \) but not on the shape of the effort cost function.

\(^{17}\)It may be that the incentive to do so is not strong enough. For example, the manager of the holding may receive private benefits from sitting on the board, so that he has an interest in keeping this position. Or he may be bribed by the manager and collude with the firm. Although these are serious concerns, we do not consider them in the formal model.
sphere of influence. Thus they will try to spend the profits of the firms that succeeded to those which failed in order to stay in control of them. Furthermore, the managers of the government agency are sensitive to political pressure. For each firm that failed there will be a pressure group urging the government agency to keep this particular firm alive. As a first approximation we assume that the political pressure is proportional to the social cost of liquidation of each firm. So the government agency will try to minimize the social costs of liquidations. Note that the objectives of the government and of the administrators partly coincide. If a firm fails and the social cost of liquidation is bigger than the net present value of its future losses, then both want to keep it in operation. However, the administrators also want to subsidize firms which should be closed down.

Can the government interfere with the policy of its agency, and in particular, can it prevent wasteful subsidies? If the government had detailed information about the profits and losses of each individual firm so that it could control cross-subsidization, then this might be possible. In practice, however, this information will be incomplete. On grounds of realism we assume that the government has no effective control of the agency. However, our main results are unaffected if we make the opposite assumption that the government can perfectly control its agency. We will comment on this possibility as we go along.

The time structure of the model is summarized in Figure 1.

![Figure 1: Time structure of the model](image)

18 This is a very rough approximation. Typically, the political pressure is higher if there is a small but well organized group which is strongly affected by the decision, and lower, if the social costs of the decision are widely spread out across society. Thus it might be more realistic to assume that the political pressure depends only on $\Delta_i^w + \Delta_i^m$, but not on $\Delta_i^c$. This would yield an additional distortion under government control.
The socially optimal allocation

As a benchmark consider the (unconstrained) first best allocation. At date 2 social welfare associated with firm \( i \) is given by:

\[
W_i = \begin{cases} 
V_i - a_i & \text{if } x_i = 1 \\
V_i^L - \Delta_i - a_i & \text{if } x_i = 0 
\end{cases}
\] (2)

Clearly, no firm with \( V_i > V_i^L \) should be closed down. If \( V_i < V_i^L \), firm \( i \) should be liquidated if and only if \( V_i^L - \Delta_i > \bar{V}_i \), i.e., if the expected future losses are bigger than the social costs of liquidation.

The welfare maximizing effort level of the manager satisfies

\[
a_i^{FB} \in \text{arg max}_{a_i \in \mathbb{R}_+^*} \{ p_i(a_i) \cdot \bar{V}_i + (1 - p_i(a_i)) \cdot \max \{ V_i^L - \Delta_i, \bar{V}_i \} - a_i \} .
\] (3)

Given that \( p_i(a_i) \) is strictly concave, \( a_i^{FB} \) is uniquely defined by the first order condition:

\[
p'_i(a_i^{FB}) \cdot \min \{ \bar{V}_i - V_i^L + \Delta_i, \bar{V}_i - \bar{V}_i \} = 1,
\] (4)
i.e. the manager should increase his level of effort until the marginal social benefit equals his marginal cost.

Private control: the case of a holding

The director of the holding company gets part of his salary from stock options which give him an incentive to maximize the profits of the holding. Thus, at date 2 he will shut down a firm (choose \( x_i = 0 \)) if and only if \( V_i < V_i^L \), i.e. if the firm is privately unprofitable. He does not take into account the external effect of his decisions on society (i.e. the social costs of liquidation borne by workers, manager and the rest of society), so there will be inefficiently many liquidations.

Consider now the decision of the manager at date 1 on how much effort to spend. The manager anticipates that \( x_i^p = 0 \) iff \( V_i < V_i^L \), so he chooses \( a_i^p \) such that

\[
a_i^p \in \text{arg max}_{a_i \in \mathbb{R}_+^*} \{ w - (1 - p_i(a_i)) \Delta_i^m - a_i \}
\] (5)

His utility maximizing effort level is uniquely characterized by

\[
p'_i(a_i^p) \Delta_i^m = 1,
\] (6)
i.e. the manager equals marginal *private* benefits with marginal costs. Suppose that \( V_i^L - \Delta_i \geq V_i \), i.e. it would be socially efficient to shut down the firm in case of a failure. Comparing (6) and (4) it is clear that

\[
\Delta_i^m < \min \left\{ \bar{V}_i - V_i^L + \Delta_i, \bar{V}_i - V_i \right\} = \bar{V}_i - V_i^L + \Delta_i ,
\]

(7)

because \( \bar{V}_i > V_i^L \) and \( \Delta_i = \Delta_i^w + \Delta_i^m + \Delta_i^s \). Hence, concavity of \( p_i(\cdot) \) implies that \( a_i^p < a_i^{FB} \), so the manager spends too little effort as compared to the first best. If \( V_i^L - \Delta_i < V_i \) the result may be ambiguous. However, we consider large companies, so it is most likely that the manager’s rent is small as compared to the difference in net present values of the company, so that

\[
\Delta_i^m < \bar{V}_i - V_i .
\]

(8)

Thus, the manager is likely to spend inefficiently little effort in this case too.\(^1\)

Although the outcome is clearly inefficient as compared to the first best, the more interesting question is how it compares with what would have happened under government control.

**Government control: the case of a government agency**

At date 2 the government agency has to decide which firms to close down subject to the constraint that the subsidies which have to be paid to keep negative net present value firms alive do not exceed the profits earned by profitable firms. The idea is that the government agency can take the positive net present values of the profitable firms to cross-subsidize the losses of some companies that failed. In practice, profits and losses are flows, and there may be a liquidity problem if the government agency does not have access to a perfect capital market. We do not consider this problem formally. One way to think about it is to assume that at date 2 (i.e. after the transition period) the government agency sells or closes down all companies. A profitable firm can be sold for its net present value, so it yields a revenue \( \bar{V}_i \). This money is used to commit subsidies to unprofitable firms which are sold for an effectively negative price. If the sum of the revenues obtained from selling the successful firms exceeds the sum of subsidies which have to be committed to keep all unsuccessful firms in operation,

\(^1\)If \( \Delta_i^m > \bar{V}_i - V_i \) the manager works too hard. Recall that we are in the case where it would be efficient to keep the company in operation after it failed, but where the holding will close it down. Thus, under private control the manager’s rent is lost in case of a failure, while in the first best case the loss is only \( \bar{V}_i - V_i \). Therefore the manager’s private return to an increase in effort is bigger than the social return.
then the surplus is transferred to the state budget.\textsuperscript{20} Thus the government agency faces the following standard discrete linear programming problem:

\[
\min_{\{x_i\}} \sum_{i=1}^{n} (1 - x_i) \Delta_i \quad (9) \\
\text{s.t.} \sum_{i=1}^{n} x_i V_i + (1 - x_i) V_i^L \geq 0.
\]

Ignoring the integer problem this program has a straightforward solution:\textsuperscript{21} Keep all firms with \( V_i > V_i^L \) in operation. Index the firms that failed by \( j \in \{1, \ldots, f\} \), such that

\[
\frac{\Delta_j}{V_j^L - V_j} \geq \frac{\Delta_{j+1}}{V_{j+1}^L - V_{j+1}},
\]

and subsidize them in the order of their indices until the budget is exhausted. Note that the order of subsidization is socially efficient. However, the amount of subsidies paid to the firms is inefficient. Two cases can be distinguished:

- The budget of the government agency is exhausted before all firms which failed but satisfy \( V_j^L - V_j < \Delta_j \) have been subsidized, so too many firms are closed down. However, since there are less inefficient liquidations than under private control, the outcome is socially more efficient than the one induced by the holding company.

- The budget exceeds the amount of subsidies necessary for these firms, so some enterprises will be kept alive although they should have been closed down. In this case the efficiency comparison with the holding company is ambiguous. Note that if the government could control wasteful subsidies this case would never arise.

Consider now the decision problem of manager \( i \) at date 1. His action \( a_i \) determines the probability \( p_i(a_i) \) with which his firm succeeds. If it succeeds he will keep his rent \( \Delta_i^m \) for sure. In case of a failure, his firm may or may not be closed down depending on whether the government agency has enough funds left to help him out of trouble.

\textsuperscript{20}The German Treuhandanstalt is a good example for such a policy.

\textsuperscript{21}This program is a classical "knapsack" program. A computational problem may arise because \( x_i \) is restricted to be in \( \{0, 1\} \). See e.g. Dantzig (1963), ch. 26, on how this problem can be solved. The solution is standard and not interesting in our context.
Given that firm $i$ failed there are $2^n - 1$ possible outcomes of successes and failures of all other firms. The probability of each outcome depends on $a_{-i} = \{a_1, \ldots, a_{i-1}, a_{i+1}, \ldots, a_n\}$. Let $L_i$ be the set of outcomes which lead to a liquidation of firm $i$ and let $q_i(a_{-i}) = \text{Prob}(L_i \mid a_{-i})$ be the probability that firm $i$ will be shut down if it fails. Then the manager's problem is to pick $a_i$ such that

$$a_i \in \arg \max_{a_i \in \mathbb{R}_+} \left\{ w - [1 - p_i(a_i)] \cdot q_i(a_{-i}) \cdot \Delta_i^m - a_i \right\}$$  \hspace{1cm} (11)$$

In equilibrium the utility maximizing level of effort for manager $i$, denoted by $a^*_i$, is uniquely characterized by the FOC

$$p'_i(a^*_i) \cdot q_i(a^*_{-i}) \cdot \Delta_i^m = 1.$$  \hspace{1cm} (12)$$

Comparing (12) to (6) it is clear that

$$q_i(a^*_{-i}) \cdot \Delta_i^m \leq \Delta_i^m.$$  \hspace{1cm} (13)$$

Note that (13) holds with equality only if it is certain that the government agency will not have the funds to subsidize firm $i$. In this case there is no difference between private and government control. However, if (13) holds with strict inequality, then $p'_i(a^*_i) > p'_i(a^*^p)$ and concavity of $p_i(\cdot)$ implies that the manager spends less effort if his firm is controlled by the government agency than if it is owned by the private holding. He foresees that even if he fails the government agency will help him out of trouble with probability $(1 - q_i)$ which diminishes his incentive to restructure efficiently.

5. Implications of the Model

Both governance structures generate an inefficient allocation as compared to the "first best". The inefficiency results from the impossibility to perfectly align the incentives of the managers with social welfare maximization. The manager of a privately controlled holding company will maximize private profits and shut down more firms than is socially efficient. The manager of a government agency will shut down less firms, but he is inclined to subsidize as much as possible, so in this case the number of liquidations may be too small. Under both regimes the manager of an individual firm is likely to spend an inefficient low amount of effort.
But he will work harder if his company is privately controlled than under the control of a government agency. Government control leads to a “soft budget constraint” for the manager. He rationally anticipates that the government agency will try to help him out of trouble because liquidation of his firm involves high social costs. Privatization hardens his budget constraint. Under private control the manager knows that a private owner, who does not care about social welfare, will not subsidize his losses.

In the model privatization is a commitment device of the government. If the firm is under private control there will be no cross-subsidization from other firms. The question arises, whether this commitment is credible. If the government is concerned about the social costs of liquidation of a particular firm it could step in and subsidize the losses of this firm, so that it will not be closed down by the holding. There are clearly some cases in which this is going to happen, but it can only happen to a limited extend. The reason is that these subsidies have to come from the general budget. The government cannot expropriate shareholders of the holding company by transferring directly the profits of successful firms to the unsuccessful ones which is only possible if these firms are owned by the state.\(^\text{22}\) In the transition period the budget will be tight, the government will be credit rationed on international capital markets, and there will be a strong pressure from international organizations like the IMF or the World Bank not to undermine macroeconomic stability by giving soft credits to unprofitable firms or by financing the budget deficit through the central bank. Thus, the scope for subsidies is limited.\(^\text{23}\) Furthermore, to the degree that subsidies from the general budget are feasible, they would probably also be paid to the government agency. Thus, they affect both regimes symmetrically and do not alter the basic trade-off.

**HOW TO STRUCTURE THE PORTFOLIO OF FIRMS**

Not all the firms have to be privatized at the same time. The government could give some of them to private holding companies and leave the rest for some time under the control of government agencies. If it does so, which firms should be privatized first?

\(^\text{22}\)However, the government could partially expropriate stockholders by increasing the tax rate on corporate profits. Goldfeld and Quandt (1991) analyze the impact of such a policy on input demands of the firm.

\(^\text{23}\)This argument does not hold for the case of Germany. For a more subtle argument why privatization in western industrialized countries can be a commitment device to restrict the amount of subsidies see Schmidt (1990). For other models of the soft-budget constraint see Goldfeld and Quandt (1991) and Schaffer (1989).
Our model suggests that all the firms with $V_i^L - V_i > \Delta_i$ should go immediately to private holdings. If these firms fail the social costs of liquidation are smaller than the expected future losses, so they should not be kept alive. Under the control of a government agency there is a positive probability that such a firm fails and that there are enough funds left to subsidize it. This is socially wasteful and it weakens the incentive of the manager to work hard. The holding company on the other hand will not hesitate to close down this firm in case of a failure. This is not only socially efficient, it also gives a stronger incentive to the manager to restructure, so the probability of failure is smaller.

What can be said about firms which are more important for social welfare, i.e. when $V_i^L - V_i < \Delta_i$. In this case expected social welfare under private control is higher than under government control if and only if

$$W_i^P = p_i(a_i^p)V_i + (1 - p_i(a_i^p)) \cdot [V_i^L - \Delta_i] - a_i^p$$
$$> p_i(a_i^q)V_i + (1 - p_i(a_i^q)) \cdot [(1 - q_i)V_i + q_i(V_i^L - \Delta_i)] - a_i^q = W_i^g$$

(14)

where $a_i^p$ and $a_i^q$ are characterized by (6) and (12) respectively. Suppose that $q_i$ is close to 1, i.e. the probability that the government agency will have the funds to rescue the firm is small. In this case there is little difference between governmental and private control. Under both governance structures the firm will be closed down if it fails and the incentives for the manager are the same. Now suppose that $q_i$ is considerably smaller than 1. In this case the manager’s incentives are weaker under government control, so $a_i^q < a_i^p$ and $p_i(a_i^q) < p_i(a_i^p)$. However, if the firm fails it will be cross subsidized with probability $(1 - q_i)$ which is socially efficient.

As can be seen from (14) private control is more likely to be optimal if (i) the prize in case of success $(\bar{V}_i)$ is high, if (ii) the incentive effect is strong $(p_i(a_i^p) - p_i(a_i^q)$ large), or if (iii) the net social loss of liquidation $V_i - V_i^L + \Delta_i$ is small. The intuition for this result is straightforward. First, if $\bar{V}_i$ is large, then it is very important that the firm is succesful. So the manager should be given an incentive to increase the probability of success, even if this is only possible at the price of considerable social costs in case of failure. On the other hand, if $\bar{V}_i$ is small, then it is more important to prevent the social costs of liquidation rather than to give better incentives to the manager. Secondly, if the action of the manager has a strong impact on the probability of success, then his incentives are more important than in
the case where his action hardly affects the prospects of the firm. Finally, if the social cost of shutting down the firm is not much bigger than the social cost of keeping it in operation then it is more important to give better incentives to the manager than to prevent future liquidation.

To summarize, there are two kinds of firms which should be privatized immediately:

- firms with little social significance which should not be subsidized anyway in case of a failure.

- firms for which the incentives of the manager are very important: either because efficient restructuring by the manager has a strong impact on the probability of success or because the firm will be very profitable if it succeeds.

On the other hand, firms which have either very high social costs of liquidation or which will fail anyway no matter how hard the manager works should be kept under governmental control. Note that this will often include the firms which would have been subsidized by the government even if they were under the private control of a holding.

When the government structures the portfolios of the holdings and of the government agencies it will also take revenue considerations into account. If a company with high expected profits is given to a holding, then these profits are lost as a source of revenue for a government agency. This is desirable if the government wants to limit wasteful subsidies of its agencies. However, if the government is afraid that there will not be enough funds available to cross-subsidize, it will give this firm to a government agency as a source of revenue, even if from the firm’s point of view immediate privatization would have been optimal.24

**Intermediate governance structures**

Two proposals by Lipton and Sachs (1990) and Blanchard et.al. (1991), which have found considerable attention in the literature, can be seen as intermediate governance structures which yield a limited commitment of the government not to subsidize too much. *Lipton and Sachs (1990)* suggest that the government agency keeps 25 to 30% of the shares which, in

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24 This may be an important reason why most governments in Eastern Europe do not want to privatize “natural” monopolies, but rather keep them in state ownership and protect their profits by restricting market entry.
the long run, should be sold to a core investor. Thus, only part of the profits of successful firms goes to the government agency and can be used for cross-subsidization. This reduces the probability that the government agency subsidizes too much and hardens the budget constraint for the manager at least to some extend.

Blanchard et al. (1991) favor privately owned holding companies the managers of which are appointed and can be fired by the government. The holding managers are given some incentives to maximize profits (through stock options), but they will also respond to the pressure of the government which can replace them. Thus they will probably prevent the socially most costly liquidations. In some cases this is desirable. However there will also be cases where a harder budget constraint would have improved social welfare. The advantage of this scheme is that the government cannot force the holding managers to cross-subsidize too much, because of the political pressure of the shareholders of the holding who do not want to be expropriated.

6. Conclusions

The model is oversimplistic in many respects. In particular, it assumes that there are only two possible outcomes for each firm, success and failure, and that for each of these outcomes the size of the firm and the number of employees is given. In reality there will be a continuum of possible outcomes and the board of directors and the manager will have considerable discretion about how much labor to employ. For example, the government agency could force a profitable firm to keep an inefficient amount of workers in order to reduce the social costs of layoffs and additional unemployment. Or it could subsidize an unprofitable firm to a limited extend, so that only a fraction of the original company will survive. A thorough analysis of these possibilities with a more detailed and complicated model is an important project for future research. However, we believe that the basic trade-off derived in our very simple model will carry over to more complex cases: government control will lead to more cross-subsidization and less social costs than private control, but it will have adverse effects on management incentives. Managers anticipate that the budget constraint under government control is soft, so they will spend less effort to restructure efficiently.
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