

Effect of Enterprise Break-Ups on Performance: Case of Former Yugoslav Republic of Macedonia

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CASE OF FORMER YUGOSLAV REPUBLIC OF MACEDONIA**

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**EFFECT OF ENTERPRISE BREAK-UPS ON PERFORMANCE:
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Abstract

The empirical transition literature on the comparison of restructuring prior to privatization is quite limited. Macedonia is a specific case among transition economies where a large number of break-ups occurred at the beginning of privatization. Using firm-level data, we estimate the effects of the break-ups of enterprises on the subsequent performance of the “master enterprises” and spun off divisions during the period of privatization. We estimate the performance effects by comparing the performance of enterprises that remained intact to the performance of enterprises that experienced spin-offs and the newly established subsidiaries. The goal is to provide empirical evidence on the issue of the effect of pre-privatization restructuring. Our results suggest that the breakups were not guided by efficiency or performance goals but rather managerial self-interests.

Empirická literatura zabývající se porovnáváním výsledku restrukturalizace před privatizací není rozsáhlá a sama Makedonie je specifickým případem mezi transformacními ekonomikami neboť na počátku privatizace zde došlo k značnému počtu rozpadu podniku. S využitím dat na podnikové úrovni porovnáváme efekt rozpadu podniku na výkonnost vzniklých následníků, a to jak tzv. materského podniku, tak odštěpených jednotek po následné privatizaci. Vliv na výkonnost odhadujeme pomocí porovnání výkonnosti podniku, u kterých nedošlo k rozpadu, spolu s výkonností jak materských podniku tak s výkonností nové vzniklých jednotek. Naším cílem je poskytnout další empirické poznatky o restrukturalizaci předcházející privatizaci. Naše výsledky ukazují, že rozpady podniku nebyly motivovány výkonnostními cíli ale spíše soukromými zájmy manažeru.

JEL Classifications: D21, D24, L11, P11

1. Introduction

As the Central and East European (CEE) countries embarked on the transition from a planned to a market economy in the 1990s, the restructuring of state and socially owned enterprises (SOEs) became a major policy issue in the region. One of the most important forms of restructuring observed during the CEE transition was the massive breakup of SOEs since it leads to (1) altering (reducing) the size of firms, (2) increasing the number of firms, and, finally (3) allows to bring in new management. As analyzed in Lizal et al. (1995, 2001) for Czechoslovakia, many divisions (subsidiaries) of SOEs applied to their supervisory ministries for permission to break away from their “master enterprise.”¹ In Macedonia, which became independent in 1991, the break-ups occurred more spontaneously and without any supervision of government or its officials. A phenomenal wave of spin-offs occurred at the beginning of the 1990’s, giving rise to a large number of new firms led by new top management. In this respect, Macedonia is another specific case among transition economies where large numbers of break-ups occurred at the beginning of privatization.

The most important question that arises is whether the break-ups have systematic economic effects by improving or worsening the performance of the spun off subsidiaries and/or the remaining master enterprises. CEE countries have displayed major problems with management’s appropriation of profit and asset stripping in the presence of weak ownership and legal frameworks (Lizal et al., 1995, 2001; Ellerman, 1998; Weiss and Nikitin, 1998; Stiglitz, 1999; Shleifer and Treisman, 2000). Moreover, the timing of many break-ups and the way the privatization of SOEs has been conducted in Macedonia, where insiders were able to become new owners², indicate that there might be a systematic correlation between the spin-offs and method of privatization adopted. As suggested by many descriptive studies (see, for example, Markovska, 2000) with a limited general empirical evidence, the rent-seeking behavior of managers in Macedonia resulted in asset-stripping and siphoning-of of profits. Our analysis is based on balance sheet and income statement data for the period of 1991-1999 and fills an important gap in understanding the Macedonian way of pre-war transition; it also represents an important policy-relevant study for main economic policy decision-makers in Macedonia. Moreover, our findings on Macedonian enterprises should be of general interest in the transition

¹ However, as was pointed out by Kotrba (1995) in the case of the Czech Republic, the process of enterprise breakups had a significant role in the determination of the structure of the following privatization program.

² As reported in Prasnikař et al (2002), it was more likely that firms with more employees but less capital per worker chose the internal privatization method, as it was cheaper for employees to buy such a firm. Moreover, internally privatized firms were more efficient at the

context, especially if directly comparable to Lizal et al. (2001), in providing additional evidence on early restructuring and its subsequent effect on enterprise performance in an environment where the institutional structure and legal protection were very weak.

Our study is new in several aspects and enhances the insight on breakups in transition economies provided by Lizal et al. (1995, 2001). First, our data cover all breakups that occurred as these changes were well documented by state agencies. Thus, our data is unambiguous in this respect and covers all changes. In addition, we possess data on multiple breakups when the original enterprises split into more than two new entities. Such types of fragmentation are more frequent than simple spin-off of a new firm. These specifics of our data guarantees that our results are more robust than those of Lizal et al. (2001), who limited their study to spin-offs of a single subsidiary from the master enterprise due to lack of documentation of the splits in Czechoslovakia. Third, our time span is almost a decade long thus sufficient enough to separate pre- and post-split periods, although we have excluded years of hyperinflation and war turmoil. Finally, although Macedonia is a country that has not been subject to many economic studies yet, we are able to use data on all Macedonian enterprises.

2. A Conceptual Framework for Breakups

The tradeoff between transaction costs via markets and the internal inefficiencies within organizations is the main focus of the literature on the desirability of takeovers, mergers, and break-ups of firms in market economies.³ The relevant studies in the transition context focus on the bargaining between the key decision-makers that are managers, government officials (politicians), workers, and new private owners.⁴ The institutional information suggests that the management of either the master enterprise or the subsidiary initiated breakups and spin-offs or the split was a result of mutual bargaining and agreement.

Conceptualizing the process, the literature conventionally assumes that the compensation of the top management of the firm before the break-up is an increasing function of performance

time of privatization although their efficiency deteriorated after privatization.

³ See e.g., Coase (1937), Alchian and Demsetz (1972), Williamson (1975, 1985), Chandler (1990), Klein et al. (1978), Grossman and Hart (1986), Lichtenberg and Siegel (1987), Ravenscraft and Scherer (1987), Hart and Moore (1990), Kaplan and Weisbach (1992), and Radner and van Zandt (1992).

⁴ See e.g., Aghion et al. (1994), Shleifer and Vishny (1994), Prasnikař et al. (1994), and Lizal et al. (1995, 2001). The internal privatization methods such as employee buy-out and management buy-out were widely adopted in the privatization process in former Yugoslav countries. Slovenia and Macedonia are two examples where the majority of firms in privatization processes chose internal privatization, as documented by Domadenik et al. (2001), Prasnikař and Gregorić (2002), Markovska et al. (2002) and Prasnikař et al. (2002).

of the entire firm, while after the split it is a positive function of the performance of the remaining master enterprise only. Analogously, the compensation of the management of a subsidiary before the spin-off is an increasing function of performance of the entire firm, adjusted for the relative importance of the subsidiary, but it becomes a positive function of the performance of the subsidiary only after the split. Rational behavior of managers (whose utility solely depends on the performance of the enterprise) in this setting yields two competing hypotheses:

1. *Break-ups occur because the top managers of the SOEs discard poorly performing divisions in order to improve the performance of the (remaining) master enterprises, or*
2. *Break-ups are observed because managers of the divisions (subsidiaries) of SOEs spin more efficient units away from the master enterprises.*

Since the firms under central planning were often artificially large, we also allow for the situation in which the enterprises suffered from diseconomies of scale. In case of inefficiencies of scale the performance of both post-split remaining units can be improved by unbundling (split). Thus, there is also a third scenario:

3. *Break-ups result in superior performance of both the spun off units and the remaining master enterprises and occur because the large former SOEs suffer from diseconomies of scale.*

Nevertheless, various studies and anecdotal evidence suggest that the above outlined scenarios 1.-3. are far from reality in transition economies. As government control over management remained weak in the absence of a solid legal framework, appropriation of profit and asset stripping by managers has become a serious problem in Macedonia as in other transition countries. This phenomenon manifested itself in the creation of by-pass enterprises⁵ to siphon off the profits of the former SOEs via newly established enterprises.⁶ Moreover, as the methods of privatization allowed for managerial buy-out and since smaller firms with less so-called socially owned capital were evaluated at a lower price than before the spin off, management could pursue the spin-off strategy to increase the probability of a successful buy-

⁵ Please note that the concept of so-called by-pass enterprises established in the literature on Slovenia does not really apply to Macedonia despite the common roots of Macedonian and Slovenian economies in the former Yugoslavia.

⁶ Djankov and Murrell (2002) report that in an environment where negligent or fraudulent behavior by managers (maximizing their own utility function) is severely punished when uncovered, managers have the choice of working hard and getting bonuses or slacking off and living off their salary alone. In contrast, where bad behavior goes unpunished, managers have the choice of stripping enterprise assets (also in the form of spin offs and being privatised by themselves) and getting a huge windfall now, as opposed to working hard through the years and receiving compensation through bonuses. The evidence in Black et al. (2000) shows that many Russian managers chose the first "option."

out, although it was inefficient from the economic point of view and both units; master and subsidiary firms perform worse than before the spin-off. Finally, a fourth hypothesis is:

*4. Break-ups occur because managers of master firm and/or subsidiaries anticipate increase in future private benefits even if their unit and the master enterprise perform worse as a result of the break-up.*⁷

In this fourth scenario the utility of managers of divisions and master firm does not depend on the performance of their firms and the pursuit of managerial private goals worsens enterprise performance.⁸ Such strategy provides evidence against the classical models when the managerial utility is assumed to be aligned with the firm's performance.

The four hypotheses hence provide a rationale for observing the following four outcomes: (i) the effect of a break-up on performance is positive for the master enterprise and negative for the subsidiary (Hypothesis 1), (ii) the effect is positive for the subsidiary and negative for the master firm (Hypothesis 2), (iii) the effect is positive for both the master enterprise and the subsidiary (Hypothesis 3), and (iv) the effect is negative for both units (Hypothesis 4). The magnitude of the effects implied by hypotheses 1 - 4 will of course depend on the overall economic environment.

Table 1 below shows how the possible empirical outcomes on performance are linked with the mentioned hypotheses. In italics we denote the possible situation when the spin-off was initiated in order to "move" the inefficiencies to the other unit (so the effect is nil on the "initiator" unit). This can be due to many reasons, namely as an outcome of bargaining or strategic behavior of the unit with Nil effect (most likely initiator of the split). We discuss the bargaining process and its possible outcomes later.

Table 1 Empirical Outcomes and Hypotheses Support

Effect on Master?			
	Negative	Nil	Positive
?Effect on Subsidiary			
Negative	H4	H4, <i>H1</i>	H1
Nil	H4, <i>H2</i>	<i>H1, H2, H4</i>	H1
Positive	H2	H2	H3

Italics denote possible outcome with bargaining or strategic behavior of the unit with Nil effect.

⁷ While our first three hypotheses are identical to those introduced by the Lizal et al. (2001), the last one is more general and also includes their original hypothesis as a special case.

⁸ Prasnikar et al. (1998) report that effect of early restructuring via by-passes for Slovenian firms was mostly positive. The firms (or top managers of these firms) that established by-passes were more likely to behave in the profit-maximization manner like their western counterparts compared to other SOEs. In those cases pursuing managerial goals led to improved enterprise

In the Appendix 1 we outline a simple analysis that is in line with the analysis of Lizal et al. (2001) that yields the predictions of the first two hypotheses outlined in the introduction. The last hypothesis involves special behavioral motivation, which is not formally incorporated into the theoretical model as it violates the classical assumptions of managerial motivation being derived only from the enterprise performance. However, the empirical analysis allows us to discover this effect and we discuss it in conjunction with another model of the breakups as well. Individual units of SOEs could spin off from their master enterprises. In our empirical work we have been able to identify about 66 cases of such a split, mostly with multiple subsidiaries emerging (overall 130 new firms emerged from the 66 master enterprises).

We can always assume that if subsidiaries (masters) suffered from the split and the master part (subsidiary) benefited, the respective management was able to design compensation schemes enabling the benefits of splits to be shared (see Lizal et al. 1995). For an observed split to be motivated by compensation uniformly related to the relative performance \mathbf{p} of firms either $\mathbf{p}^{M+S} < \mathbf{p}^S$ or $\mathbf{p}^{M+S} < \mathbf{p}^M$ has to hold, where subscript M denotes master enterprise, S subsidiary and M+S the whole firm before the split.

It can be shown that if we allow for bargaining with side-payments between subsidiary and master managements, the implications of the model do not change. The bargaining model of Lizal et al. (1995) shows that if the managerial benefits from the split are relatively small, the managers can decide not to split. However, if the (private) benefits are large, these dominate any possible side-payment and the optimal strategy is always to split. Therefore, in the case of side-payments (and bargaining over these) we would have just slight hysteresis around the point of no or relatively small private benefits with comparison to efficiency measures. Other implications of the model remain unchanged.

3. Institutional Framework

3.1. Macroeconomic Transition in the Nineties

Macedonian transition path in the nineteen nineties could be described as a zigzag development. After declaring its independence in 1991, Macedonia lost more than 60 percent of its markets due to the dissolution of former Yugoslavia, and inherited high inflation that reached 86 percent per month in April 1992. Macedonia started the reforming process as one of the poorest region of former Yugoslavia with significant external debt and an “old-fashioned” structure of its economy. A macroeconomic stabilization program was not introduced until 1993. It was based on a restrictive monetary policy, strict fiscal discipline, a policy of a managed

performance as well.

floating exchange rate and wage control. Although the stabilization policy was relatively successful, and pro-market structural reforms were carried out gradually, they were inconsistently implemented. For example, between 1994 and 1999 the strategy of privatization was changed several times leading to a lack of transparency. Commercial banks continued to finance failing firms, leading to the continuation of soft-budget constraints (Drummond, 2000). Additional difficulties involved the unfavorable foreign political and economic circumstances that faced Macedonia after declaring its independence, including an economic embargo by Greece in a dispute over the country's name and national flag, and UN sanctions against neighboring Serbia. As a result, Macedonia became a very important trade network for supplying Kosovo and Serbia, mostly based on the development of an informal economy and war profiteering. The revolt of the Albanian population (accounting for more than 22% of total population) represented a major crisis for the country in 2001. In the aftermath of this rebellion, the Albanian “minority” was given more rights, reflected also in the parliamentary elections in the autumn of 2002.

The economy was plagued by an increasing current account deficit, and by an extremely high rate of unemployment that reached 36 percent in 1997. Promising results were not achieved until 1996-1999: inflation fell to 2.6 percent in 1996, and prices even continued to drop in 1998 and 1999. In the years 2000 through 2002, the inflation was 5.8, 5.5 and 3.8% respectively. GDP only started to rise following many years of recession after 1996.⁹ A drop in GDP of 4.1% in 2001 was due to the drop in almost all sectors, save general government consumption. The GDP is expected to achieve an average growth of 3.7% per year in the next five-year period.

NATO's attacks on a major trading partner, Serbia,¹⁰ in 1999 during the Kosovo crisis significantly weakened the Macedonian economy. Exports and imports of goods and services fell dramatically, as did flows on the capital account. After the Kosovo crisis was over, a new spurt of growth began with the help of the international community. However, these positive developments were again interrupted when an internal insurgency broke out in early 2001. Despite the ongoing crisis in the region, the budget deficit turned into a surplus in 1999 and the state was able to begin to repay its external debt. The country maintained a budget surplus in 2000; however, in 2001 the budget was again in deep deficit, reaching as much as 6% of GDP. This was mainly due to increased government expenditures and lower budget revenues because

⁹ 1.2% growth of GDP in 1996, 1.4% in 1997, 2.9% in 1998, 2.7% in 1999, and 4.5% in 2000 is mostly due to construction, communication and trade industry development, especially because of the SME sector's growth. The growth of industry production was negative throughout 1999, but achieved a noticeable 8% (manufacturing even 9.4%) growth in 2000.

¹⁰ Together with Montenegro, Serbia accounts for 23% of total Macedonian export. Main

of the Kosovo crisis. Nevertheless, the country was able to lower its total external debt also in 2001, with inflows of funds from direct foreign investment that rose almost threefold in comparison with the previous year.

3.2. Privatization Process

The privatization of socially owned enterprises (SOEs) started in 1989 with so-called Markovic Law on Transformation of Enterprises with Social Capital that applied in all the regions of former Yugoslavia. This privatization had mainly involved the sale of shares to employees, and so a substantial internally owned shareholding base already existed in many firms.¹¹ There was also a significant presence of foreign owned capital resulting from joint-ventures. There were many cases in which there was external ownership of shares by other firms arising from the organization of large socially owned companies into holding companies, or through the disintegration of large conglomerates into separate but inter-related firms. These processes, which were intensive in the late 1980s, gave rise to a substantial amount of external cross-ownership between firms. However, “social” capital remained as a major portion of most firms' capital base, and the need for privatization, or “ownership transformation”, as it was called by the Yugoslav policy makers, remained. The main privatization wave was in the period of 1994-1996 after the new Privatization Law was enacted.

Following the new Privatization Law (1993), the Macedonian government pursued a mixed privatization strategy that allowed firms to choose between a variety of methods of privatization: employee buy-out (EBO)¹², sale of a firm or part of it, leveraged management buy-out/ buy-in (MBO/MBI), the issue of shares for additional investment, debt/equity swaps, leasing, sale of assets and privatization of a firm in bankruptcy. Firms that had not opted for voluntary privatization by 1995, which included most medium sized and large firms, became subject to compulsory privatization by the Privatization Agency. Those firms were mainly privatized using internal buy-out (especially management buy-out) under special buy-out conditions. Managers were required to put up only 10 percent of the purchase price with the

export articles are food, beverages, tobacco; miscellaneous manufactures, iron and steel.

¹¹ Of all former Yugoslav republics, Macedonia had carried out the 1989 Yugoslav Law on Social Capital with the greatest vigor. In consequence, the share of private capital in Macedonia already accounted for 18 percent of the total capital of socially-owned firms in 1991, while the Yugoslav average in that year was only 2 percent (Markovska, 2001).

¹² The EBO method was mainly designed for small firms' privatization, and was largely carried out in 1994 and 1995. Under an EBO, employees were offered discounts of 30 percent plus a further 1 percent for each year of employment in the firm. The maximum amount that could be bought by any one employee was limited to EURO 12,500. For ancillary units such as hotels and restaurants, discounts of 50 percent were made available.

remainder to be paid in installments over ten years. Typically, the most profitable, or potentially profitable, enterprises were sold to managers at substantial discounts, often on the basis of severely undervalued asset valuations. Weaker and smaller enterprises were sold to employees often at more inflated valuations of assets. The main methods of privatization adopted therefore were management and employee buy-outs, with management buy-outs being the most prevalent in terms of both employment and the value of equity involved.¹³

External ownership was mostly formed through four different ways. First, the privatization law automatically acknowledged the ownership of firms domiciled in former Yugoslav republics over their business units in Macedonia. Second, firms with huge losses were mostly privatized to banks through debt-to-equity swaps or through the leasing out of assets. Third, some firms were sold off to foreign investors. This has mostly involved acquisitions of firms that have competitive advantages by world standards. Fourth, a very common method of privatization was the establishment of “spin-off” or subsidiary firms. Those firms, among other things, also provided re-employment possibilities for unemployed workers¹⁴. Since their owners, the ‘parent’ firms, chose both internal and external methods of privatization it is extremely difficult to classify the resulting subsidiary firms in one group or another. After starting relatively late, the privatization program was carried out quickly and was largely completed by the end of 1997, by which time over one thousand enterprises had been fully privatized and only 234 remained in the privatization process.

The present ownership structure in privatized Macedonian firms still reflects the privatization model chosen and is dispersed among National Pension funds, domestic and foreign enterprises and employees. The specific privatization method and an unfavorable corporate governance system with high decision-making power of workers and managers impede the faster restructuring of Macedonian firms.

4. The Empirical Analysis

4.1. The Econometric Models

Our empirical strategy is to estimate the performance effect of a spin-off by comparing the performance of enterprises that were present throughout the period, but did not experience any spin-offs, to the performance of (1) the newly spun off subsidiaries and (2) the master enterprises that did experience spin-offs. The method is based on comparing the performance of a treatment group (enterprises involved in a break-up) to a control group (enterprises not

¹³ Management buyouts accounted for EURO 0.65 billion of assets out of a total value of assets of privatized enterprises of EURO 1.75 billion.

undergoing a break-up). As the method controls for the relevant pre-spin-off conditions in these firms it allows to control for the initial stage the firms evolved from prior the split.

Enterprise performance p may be measured in a number of ways. To provide a relatively broad set of tests and comparison to results for Czechoslovakian firms (Lizal et al, 2001), we start with three performance indicators:

- 1) Value Added/Labor,
- 2) Profit/Labor,
- 3) Profitability (Profit/Capital).

Profitability is the traditional and most widely used measure of performance. The two alternative measures (scaled by labor) should check how sensitive the findings are to these different measures of performance in the context of labor-managed firm hypotheses (see e.g., Ward, 1958; Vanek, 1970; and Prasnikar et al., 1994). There are at least two reasons for also using value added per worker as a performance variable. Value added per worker is a measure of productive efficiency of the firm when we analyze the impact of break-ups on value added per worker while controlling for variables that approximate an arbitrary production function. In this sense our analysis may be seen as testing the impact of break-ups on productive efficiency. Value added per worker is also traditionally assumed to be one of the likely objective functions of labor-managed firms. Workers (insiders) are widely believed to have gained influence in enterprises during the transition (e.g., Blanchard, 1997; and Burda, 1993). Micro-evidence also indicates that they tend to appropriate a significant portion of value added (Prasnikar and Svejnar, 1998) in the former Yugoslavia. An analysis of the impact of break-ups on value added per worker is useful as it measures the impact on what is often an important objective of the firm.

We also try other indicators that might capture the motivation of managers and/or effect of the split. In the empirical analysis we have include measures that tackle cost efficiency and productivity (constraint by market):

- 4) Costs/Labor, and
- 5) Sales/Labor.

The effect of the split can be captured by allowing the expected future performance to be a function of two sets of arguments:

$$E(\pi_{\text{aftersplit}}) = \pi(\text{spin-off characteristics} \mid \text{pre-spin-off characteristics}),$$

¹⁴ For an example see Bartlett (1997).

where the spin-off characteristics capture the effect of the spin-off, and the pre-split characteristics are firm-specific indicators that represent the available information from which the expectations of future performance of the enterprise might be inferred.

Using data on the spun off subsidiaries and master enterprises that experienced break-ups as well as those that did not (control group), we estimate coefficient of interest \mathbf{a} , and vector \mathbf{b} in the following model:

$$\mathbf{p}_i = \mathbf{b}' X_i + \mathbf{a} d_i + e_i, \quad (1)$$

where index \mathbf{i} denotes firms, \mathbf{p}_i is a relative measure of enterprise performance, X_i are variables controlling for pre-split conditions, \mathbf{d}_i is a dummy variable indicating the split. The empirical specification also includes time, industrial, and other dummies if necessary.

Ordinary least squares (OLS) would generate consistent estimates of the parameter of interest \mathbf{a} and vector \mathbf{b} if the unobserved random characteristics of an enterprise did not influence the occurrence of a spin-off. However, the process of determination of \mathbf{d}_i (split) is most likely correlated with unobserved characteristics of the enterprise, such as the ability of management, know-how or bargaining. As a result, we should expect that

$$E(e_i/d_i) \neq 0 \quad (2).$$

The error term in equation (1) is likely to be correlated with \mathbf{d}_i , and OLS estimates are in this case inconsistent. The solution to this problem is a standard one (see e.g., Madalla, 1983; or Heckman and Singer, 1985). The simplest and most robust approach utilizes the use of instrumental variables (IVs), where the instruments for \mathbf{d}_i are variables that are correlated with \mathbf{d}_i but not with e_i . In theory, maximum likelihood estimation (MLE) is more efficient, but it is sensitive to misspecification. Therefore, we selected the more robust IV approach.

Our vector of control variables consists of the following variables and their transformations that are able to approximate arbitrary functions: labor (number of employees), capital (we work with both Taylor approximation and with the trans-log model terms), and can be augmented with industry dummy variables for industry groups and time dummies. The simple and flexible additive form represents a second-order approximation to any production (performance) function.

The crucial task is to link the IV method with the institutional environment, described in section 3, such that the method gives the best (consistent and efficient) results to assess the treatment effect. As the error term is likely to be correlated with some regressors we need to find relevant instruments. However, the proper choice of instruments, which is crucial for success, depends on the institutional environment that drives the changes in the enterprise structure. The

other issue is the empirical specification of the estimated equation that has to be in line with the institutional frameworks as well.

The safe instruments, which are available, come from the privatization agency and are related to the socialist characteristics (i.e., centrally-planned variables that the enterprises inherited from the past) and hence are not correlated with the error term:

- Social capital, capital nominated for privatization, capital transferred to the state fund prior privatization and total book value of the capital;
- Technology (like industry dummies);
- Regional location (Skopje, main cities, rural areas).

As our analysis of the institutional framework suggested, the relevant instruments could also be:

- Method of privatization (we could expect that managers as the main decision makers in the privatization process in the firm anticipated the method of privatization (internal or external) before it was formally applied, initiated spin-offs of more profitable units in order to privatize it by MBO or, vice versa, spun off less profitable units in order to privatize master enterprise; the choice of privatization might play an important role in explaining spin-offs),
- The performance indicators (sufficiently lagged) before spin-off occurred might be the best instruments (as well as interacted with industry dummies).

The validity of the additional instruments needs to be verified, e.g., tested using the Hausman test whether the results using richer sets differ substantially. Our empirical estimation shows that the method of privatization is always a valid instrument (with a single-case exception of costs/labor in 1998 due to the significant change in the non-reported coefficients), the sufficiently lagged values (early nineteen nineties) cannot be perceived as a “consistent set.”¹⁵

4.2. Data Description

Our empirical analysis is based on data for all enterprises in Macedonia, apart from agriculture, that underwent the process of privatization in the period of 1994-1999 and that submitted financial statements to the Agency for Payment Operations.

¹⁵ In order to provide the full set of results we have also included the results based on the questionable enlarged instrument set with 1991/1992 values. It is worth mentioning that the visible difference in the coefficients of interests is only in the case of sales/labor (Table 7), in all other cases the coefficients of interests seems to be similar to the ones from the safe instrument set since the differences are mainly in the coefficients we are not interested in.

Of the total of 1,167 enterprises, 36 were immediately removed from the sample because they were liquidated early in the process. 402 enterprises, that haven't been identified as a master or spun-off unit, had missing data in one or more years and were omitted from the sample.¹⁶ Our final sample consists of 729 enterprises, of which 530 represent a control group of firms that experienced no spin-off during the period under study, 67 firms are identified as master and the remaining 132 firms as subsidiary enterprises.

As identification of spin-offs represents the main focus of our study, the procedure needs additional justification. However, the data set contains no explicit indicator of the breakups. In identifying breakups we used an additional base provided by the Macedonian Agency for Privatization. The firms were obliged to present a brief history of the firm when submitting their privatization program to the Agency in order to obtain approval for privatization. However, those reports describe firms' history only up to 1991. Going carefully through those reports, we managed to identify 25 pairs of master and spun-off subsidiaries that occurred at the beginning of the 1990s. Before the first wave of privatization started (Markovic privatization in 1989) breakups almost never happened. We identified the remaining 42 master enterprises by examining data on labor and capital through the period very carefully. Most of the spin-offs occurred in 1994 and 1995 before the privatization program for firms was enforced.

The total sample includes enterprises from all industries of the Macedonian economy that were subject to privatization, except agriculture, and covers the period 1991-1999 but without any data for 1993 as firms were not obliged to report anything in that year. Due to that and the fact that in 1991 and 1992 the inflation exceeded any reasonable number, we are going to use only data for the 1994-1999 period. However, the 1991-1992 data is a valuable source of pre-split information.

According to the privatization outcome, we divided the sample into two broad groups: a) privatized by internal owners; and b) privatized by external owners. Within the first group, we have the following subgroups: employee buy-outs *by design*, and employee buy-outs *by*

¹⁶ In order to verify we are not contaminating our results with sample-selection bias due to large number of omitted observations we have run the Heckman 2-step method to correct for this possible flaw. It turned out that the sample selection is not an issue in this case. First, we tried two specifications of the first step of sample selection correction. Both specifications had exactly the same predictive power (71.5% of correct prediction) and the richer specification with industry-controls could be collapsed to the simpler one on 1% level of significance (but not on 5% level). In both models the firm size was a significant predictor of inclusion/exclusion. Nevertheless, the inverse Mills ratio was never significant for the simpler model in any 2nd step of the estimation, while the richer model yielded significant coefficient at inverse Mills ratio on 5% level just 4 times out of the all runs reported in Tables 4-8. Therefore, we conclude that the non-reporting had no link to sample-selection and we report the more efficient results that are

*outcome*¹⁷. The first subgroup comprises 199, whereas the second subgroup encompasses 338 firms. The second subgroup is not only the most numerous but it also dominates the Macedonian privatization outcome according to other parameters, too. Externally owned firms were divided into four groups. The first group includes firms privatized to foreign firms (20 cases), while the second represent firms established by firms from the former Yugoslavia whose ownership was simply acknowledged and have been privatized from the very beginning of the process (85 cases). The third group is the group of *subsidiaries* of other firms (64 cases). Other external owners acquired stakes in firms mostly through debt to equity swaps or leasing (22 firms).

Table 2: Chosen privatization method for all privatized and sampled firms

Privatization method	Population (%)	Sample (%)
Internal	71.4	73.6
Employee buy-out	39.3	37.0
Other internal methods	60.7	63.0
External	28.6	26.4
Foreign owners	9.0	10.4
Ex-Yugoslav owners	48.0	44.5
Daughter firms	33.1	33.5
Other external methods	9.9	11.6

Comparing distribution of privatization method adopted by firms in our sample to all privatized firms we see that there are not many differences and we can say that our sample is quite representative.

The summary statistics, shown in Table A1 in the Table Appendix, report that the average company analyzed in our sample employed 242 employees in 1994 and 178 employees in 1999; while the average value of fixed assets per worker was MKD 0.434 million and 0.821

not based on the Heckman 2-step method.

¹⁷ EBO was designed as a model according to the privatization law only for small enterprises (enterprises with less than 50 employees, and with relatively small assets and annual turnover, specifically defined by the law). According to this model, the employees had the first right of refusal of the EBO model. Only if they did not exercise this right (which had happened very rarely), outsiders could be invited. Unlike this model, in some of the other models which were publicly announced aimed at attracting investors from the outside, it turned out that the only bidders were the employees who would have prepared a privatization bid to purchase the company, utilizing all general advantages (e.g. discounts given by law), as well as insider knowledge and their position in the company. The second subgroup is referred to as EBO by outcome.

million (1994 prices) in 1994 and 1999, respectively. Value added per worker dropped significantly during the period from MKD 1.312 million to 0.375 million (1994 prices) in 1994 and 1999, respectively.

Comparing firms that experienced spin-offs to control group of firms shows that the first group was much larger on average through the whole period in terms of labor but less capital intensive. Interestingly, value added per worker at the beginning of the period was, on average, almost three times higher in the firms that didn't experience spin-offs compared to master firms but the difference decreased through the whole period with only 65% higher at the end of the period. Spun-off firms were, on average, smaller employing 175 workers in 1994 and less capital intensive. Their value added per employee has a downward trend through the period under study.

Table 3: Privatization methods chosen by different groups of firms

		Privatization method						Total
		EBO	Internal other	Foreign	EX-YU	Daughter	External other	
No spin-offs	N	167	220	17	83	40	5	532
	%	31.39	41.35	3.20	15.60	7.52	0.94	100
Master	N	9	50	2	1	1	3	66
	%	13.64	75.76	3.03	1.52	1.52	4.55	100
Spun-offs	N	23	68	1	1	23	14	130
	%	17.69	52.31	0.77	0.77	17.69	10.77	100
Total		199	338	20	85	64	22	728

Table 3 shows that firms experiencing spin-offs were more likely to adopt internal privatization methods compared to the control group of firms. Interestingly, firms that didn't experienced spin-offs, were, more than average, privatized by employees as EBO at the very beginning of privatization, and to external owners. Master enterprises ended up owned by internal owners, while spun-off units were, above average, privatized using leasing or debt-equity-swap (other external methods).

5. Estimation Results

We have estimated the equation (1) for the listed indicators of performance. Our strategy was to provide results that should verify the theoretical foundations. The empirical estimates of

the effect of the split are shown in Table 4 - Table 8. Other parameter estimates (those which are not of our interest) are not reported. Each table is constructed for different performance indicators, while within the tables the estimators differ in the definition of instrumental sets as well as in the “time-frame” and inclusion/exclusion of privatization dummies. Although the 1991 data cannot be really used as the pre-split characteristics because of the extreme inflation in these years, they also cannot serve as instruments for the characteristics of the split in measures not involving sales (the Hausman test in the majority of cases indicate invalidity of 1991/92 values as instruments). The notion that the hyperinflation makes the link with future outcomes nil (i.e., these characteristics are likely to be uncorrelated with the error term in equation (1) capturing the performance in the late nineties as well) while it can still hold information (like people’s sentiment towards that firm) that could affect the decision on and occurrence of the split is rejected by the Hausman test. As mentioned earlier, the safe instrument set comprises data from the Macedonian Privatization Agency – including social capital, shares allocated to the pension fund, total capital, i.e., values characterizing the enterprise that were exogenously set either by the central planer or by the privatization authority.

The method of privatization as instrument set is another option we explored. *A priori*, we admit that these instruments might not be perceived as exogenous. However, the method of privatization was prescribed by the law and decided on by the government. In this case, the decisions on the means of privatization were not in the hands of insiders and are likely to be uncorrelated with the unobserved characteristics. On the other hand, given the law was established and known well before any split could take place (Markovic Law was passed in 1989 and Macedonian Privatization Law was passed in 1993), the managers could initiate or block split in order to push the firm into a category of privatization they preferred – in this case the instruments would not be valid. Yet, the regression results show that the results are not sensitive to this instrument and the Hausman favors the validity of privatization instruments so the former argument receives strong empirical support.

In all cases we use the 1994 values as the best pre-split characteristics we have, also note that in 1994 the hyperinflation was already under control (see Table A4), i.e., this is the vector X of pre-treatment characteristics. The 1995 data is from the year of the splits, thus we never use them in order not to contaminate our results. We use 1996-99 values respectively as the post-split characteristics (LHS of equation (1)).

The structure of the Tables 4-8 is as follows: In each double-column for a given set of instruments are coefficients associated with the dummy indicating split for the master (first sub-column) and for the subsidiaries (second sub-column) listed according to the year of the

comparison. All models use 1994 data as pre-split characteristics. The standard errors are in parentheses and stars denote the conventional statistical significance.

Let us briefly discuss the particular result of each performance indicator. Table 4 lists the results of profit per labor comparison. The effect is nil or most likely negative on the master firm since the coefficients are in general insignificantly negative and often significantly negative (also in the case of small safe instrument set). We can safely conclude that the effect is negative on the subsidiary in the years 1996-1999 since with the exception of three instrumental sets, there are always at least two subsidiary coefficients negative out of the four years. In addition, the most significant results are those based on safe instrument set and all coefficients (with one exception close to zero) in all specifications are negative or significantly negative.

The value added per labor results are shown in Table 5. Here we can again clearly see a similar pattern as in the case of profit per labor, but more pronounced. There is again a clear pattern showing irrespective of the instrumental set that the effect of a split was nil for the master enterprises in most cases (however, there are two significant negative coefficients for the safe instrument set). The effect on subsidiaries is mostly significantly negative, irrespective of the instrument set, and the only remaining insignificant coefficient using the safe instrument set is also negative.

In Table 6 coefficients for the total cost per labor are shown. Here the results are less clear although a consistent pattern exists as well. The effect of a split is likely to be negative on the subsidiaries with about one fourth of coefficients significantly negative (negative effect means reduction of costs) and nil or positive for the master enterprises. The coefficients capturing the effect of split on the master are mostly positive, although only three are significantly positive.

The effect on profit per capital is negative for subsidiaries in all years although mostly insignificantly; the coefficients are shown in Table 7. The effect on master enterprises is again mostly insignificantly negative (partly significant in case of privatization instruments). This is the only measure when the 1991/1992 values were accepted as valid instruments for 1996, 1997, and 1999. Yet, we would rather focus on the results using the safe instruments and instruments not rejected in other specifications.

The last set of results is related to the sales per employee; Table 8. This is the only set of results where we do observe significant differences depending on the instrument sets also in the coefficients of interest. Indeed, the Hausman test rejects the validity of 1991/1992 values as instruments. The prevailing effect on master enterprises is positive in the case of the safe instrument set and in the case when the instrument set does not contain the 1991/92 values.

(There are, however, significant negative coefficients in cases when the past values are in the instrument set). On the other hand, the effect on subsidiary is mostly insignificantly negative irrespective of the instrument set.

To sum up, the sales per labor shows a different sensitivity pattern to the instrument set compared to all other performance measures in the coefficients of interest. The results are quite robust and the pattern is quite stable over specifications, years and instrument sets.

6. Conclusions

Our analysis of Macedonia, which is a specific case among transition economies where large number of break-ups occurred at the beginning of privatization, shows that there are systemic effects of breakups on the performance. Using firm-level data, we estimated the effects of the break-ups of enterprises on the subsequent performance of the “master enterprises” and spun off divisions during the period of privatization. We have estimated the performance effects by comparing the performance of enterprises that remained intact to the performance of enterprises that experienced spin-offs and the newly established subsidiaries.

We have found that the newly established subsidiaries perform worse than the control group with respect to all measures used while the master enterprises seems to vary between being intact or (less) harmed. Both types seem to be harmed in case of value added per labor, although the safe-instruments suggest that the negative effect was not always affecting the master enterprise. On the contrary the master enterprises seem to be unaffected or mildly negatively affected in case of value per labor while the subsidiaries unambiguously suffered according to this measure. Both master enterprises and subsidiaries do not differ significantly from the control group in case of total costs per labor, although there are signals that the subsidiaries could slightly cut total costs per labor while the masters could increase their spending. Thus, the subsidiaries have lower total costs per labor compared to the control group and master enterprises. Also both master enterprises and subsidiaries are not different from the control group in terms of profit per capital although the subsidiaries seem to be negatively affected. Finally, the masters benefited from the split in terms of sales per labor compared to the control group while the subsidiaries were most likely harmed (but the coefficients are insignificant).

We should note that the 1991 and 1992 values do not seem to be valid instruments. To conclude, the empirical results do not favor unanimously one of the four hypotheses outlined in the beginning of the article. Nevertheless, given the fact that subsidiaries have lower profitability per worker and value added per worker although they have reduced total costs per worker and

the master enterprises have higher sales per worker and mildly suffered (profit per labor) or were not affected according to other measures (value added per worker, total costs per labor, profit per capital), *ceteris paribus*, we can infer that hypothesis (iv) receives a strong support while hypothesis (i) is plausible but with much less empirical support.

While hypothesis (iv) is evidence of tunneling or asset stripping, hypothesis (i) can be a sign of two phenomena stemming from the design of Macedonian privatization.

In general, hypothesis (i) means that the break-ups occur because the top managers of the SOEs discard poorly performing divisions in order to improve the performance of the (remaining) master enterprises (in case of sales per labor), or take actions that harm the subsidiaries (all measures) and harm (profit per labor) or do not help the remaining master firm (all remaining measures). In this light the poorer profit per capital performance can be economically well explained - if the master enterprises try to keep as much capital as possible during the spin-off then its capital stock would be higher and hence the profit per capital appears lower. This means that the master firm keeps more capital than the common portion would be for that type of firm and, consequently, the profit per capital decreases while the other measures of performance might not be so adversely affected or may even improve.

An alternative of labor shedding that is also in line with the institutional setup of Macedonian privatization leads to a similar outcome. The master enterprise sheds unwanted labor using overstuffed subsidiaries. This would also manifest itself by deterioration of performance measures per labor of the subsidiaries while helping the master enterprise in these measures.

Appendix 1 - A Simple Model of Enterprise Breakups

Let us start with the motivation for applying for a split on the part of the management of a subsidiary. We distinguish the relevant part of the enterprise by superscripts, where \mathbf{M} denotes the master enterprise from which a subsidiary \mathbf{S} has split, and $\mathbf{M+S}$ refers to the whole enterprise before the split. Assume that the compensation of the management of subsidiary before the split is an increasing function of performance (say in terms of profits or output) of a firm before the split $\varphi^{\mathbf{M+S}}$, multiplied by some coefficient \mathbf{a} derived from the relative importance of the subsidiary for the whole firm. We can, for example, define \mathbf{a} in terms of the number of employees, i.e., $\mathbf{a} = \mathbf{N}^{\mathbf{S}}/\mathbf{N}^{\mathbf{M+S}}$ (or capital, $\mathbf{a} = \mathbf{K}^{\mathbf{S}}/\mathbf{K}^{\mathbf{M+S}}$). Hence the subsidiary management compensation is $\mathbf{f}(\mathbf{a}\varphi^{\mathbf{M+S}})$. We also assume that, if the split is approved, the compensation of the management of the subsidiary will be the same function of the profit of the subsidiary itself, i.e., $\mathbf{f}(\varphi^{\mathbf{S}})$.¹⁸ Obviously, the subsidiary management will apply (and we can observe the split motivated by subsidiary) only if $\mathbf{f}(\mathbf{a}\varphi^{\mathbf{M+S}}) < \mathbf{f}(\varphi^{\mathbf{S}})$. It clearly follows that the management of subsidiary is motivated to apply for the split (and the split can be initiated by the subsidiary's management) only if $\mathbf{a}\varphi^{\mathbf{M+S}} < \varphi^{\mathbf{S}}$. If \mathbf{a} is determined by the number of employees it can be transformed into $\varphi^{\mathbf{M+S}}/\mathbf{N}^{\mathbf{M+S}} < \varphi^{\mathbf{S}}/\mathbf{N}^{\mathbf{S}}$. Since for the estimation it is useful to work in relative terms, we can state the condition as $\mathbf{p}^{\mathbf{M+S}} < \mathbf{p}^{\mathbf{S}}$, where \mathbf{p} stands for the relative performance measure, and in our example, when the base was employment, is $\mathbf{p}^i = \varphi^i/\mathbf{N}^i$.

If the split is initiated by the master enterprise, the obvious requirement is that $\mathbf{f}(\varphi^{\mathbf{M+S}}) < \mathbf{f}(\varphi^{\mathbf{M}})$ and so $\varphi^{\mathbf{M+S}} < \varphi^{\mathbf{M}}$. We could homogenize the performance measure by dividing it by some measure of the scale of the firm as before. The last inequality normalized by the by number of employees is $\varphi^{\mathbf{M+S}}/\mathbf{N}^{\mathbf{M}} < \varphi^{\mathbf{M}}/\mathbf{N}^{\mathbf{M}}$. Since $\mathbf{N}^{\mathbf{M+S}} > \mathbf{N}^{\mathbf{M}}$, we can simplify the condition using for the denominators number of scales relevant to numerators, i.e., $\varphi^{\mathbf{M+S}}/\mathbf{N}^{\mathbf{M+S}} < \varphi^{\mathbf{M}}/\mathbf{N}^{\mathbf{M}}$, and in relative terms $\mathbf{p}^{\mathbf{M+S}} < \mathbf{p}^{\mathbf{M}}$. We can always assume that if subsidiaries suffered from the split and the master parts benefited, the respective management was able to design compensation schemes enabling the benefits of splits to be shared (see Lizal et al. 1995).

We can conclude that for an observed split to be motivated by compensation uniformly related to the (relative) performance of firms either $\mathbf{p}^{\mathbf{M+S}} < \mathbf{p}^{\mathbf{S}}$ or $\mathbf{p}^{\mathbf{M+S}} < \mathbf{p}^{\mathbf{M}}$ has to hold.¹⁹

¹⁸ Therefore, we assume that the state uses the same formula to derive management compensation in all enterprises. A more relaxed interpretation would be that we assume that the differences in the transformation of profits into management compensation are not very significant across firms. As to the nature of function $\mathbf{f}(\cdot)$, one would intuitively assume that it would be a concave and increasing function of its argument.

¹⁹ Moreover, here is also clearly visible that the setting of the model enables us to test also for Hypothesis 3, when both $\mathbf{p}^{\mathbf{M+S}} < \mathbf{p}^{\mathbf{S}}$ and $\mathbf{p}^{\mathbf{M+S}} < \mathbf{p}^{\mathbf{M}}$ has to hold. The “perverse”, i.e., private

For the empirical analysis of the effects of breakups on the performance of subsidiaries and master enterprises experiencing splits it is necessary to assume that management has rational expectations of performance with or without a split conditioned on the state of the enterprises before the split. The background of the analysis of splits we use is this simple theoretical model that is in line with model of Lizal et al. (2001) and therefore the results are directly comparable.

benefit, (Hypothesis 4) behavioral motivation of managers is inconsistent with the model based on the link between performance and reward. However, this can be only in case when $\mathbf{p}^{M+S} \geq \mathbf{p}^S$ and $\mathbf{p}^{M+S} \geq \mathbf{p}^M$ – loss or no gain in terms of performance indicator is observed but the split was pursued. However, it could be also a combination of inequality and equality, e.g., no gain for master and worse performance for subsidiary, etc. This is the reason why our approach is able to reveal in the empirical part behavior that should be never observed if there is a positive monotonic link between performance and managerial reward and no other managerial benefits can be obtained (i.e., privatize the enterprise).

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Table Appendix

Table A1: Means of selected variables for total sample

Year	Total	1994	1995	1996	1997	1998	1999
Number of employees	233.2951	242.8729	222.7914	208.0936	198.9557	198.9557	178.6865
Fixed assets per employee	719692.9	434085.8	469161.9	1175942	650995	650995	821127.1
Gross wage per employee	162091.9	167599.2	168392.1	169669.2	165114.3	165114.3	169688.7
Total sales per employee	1530417	1651301	1538560	1392326	1526453	1526453	1619678
Profit per employee	-3027.065	-597.338	-4844.65	-50858.8	-17421.3	-17421.3	-14880.2
Total costs per employee	675246.5	542144.8	536943.7	580312.4	546818.7	546818.7	1461998
Value added per employee	1060716	1312217	1207442	1048664	1186170	1186170	374932.5

Table A2A: Means of selected performance indicators by groups of firms

Year	1994	1995	1996	1997	1998	1999
Firms that didn't experience breakups						
Number of employees	205.242	193.7089	183.7302	171.8046	167.0247	163.6484
Fixed assets per employee	459254.3	490413	1369942	667655.2	716642.3	899575.1
Gross wage per employee	175566.5	180744.5	182664	178242.7	176954.6	185011.1
Total sales per employee	1871826	1776147	1596696	1845815	1718896	1977166
Profit per employee	10045.98	3.934.303	-48710.85	-10502.79	-11294.68	1.080.317
Total costs per employee	576254.3	582001.4	625444.6	583185.5	616118	1780822
Value added per employee	1507903	1414733	1231076	1482487	1323028	434164.3
Master firms						
Number of employees	671.6897	584.7069	487.7797	490.0635	363.8154	356.2308
Fixed assets per employee	423006	497411.5	702091.4	887981.6	800336.8	817212.3
Gross wage per employee	134742.7	129395.4	133104.4	132189.2	125218	130695.5
Total sales per employee	818797.2	680072.3	824879.5	761939.5	461520.6	692849.5
Profit per employee	-36483.18	-48313.81	-88302.36	-51364.11	-76276.53	-76502.54
Total costs per employee	426573.7	384486.9	460007.9	513894.1	464086.7	608797.4
Value added per employee	564917.2	465379.9	543982.1	438943.9	173089.5	263244.8
Spun-off firms						
Number of employees	175.838	156.0476	165.369	161.9725	158.5143	146.3874
Fixed assets per employee	271691.7	323415	347071.9	437010.6	453434.2	464656.5
Gross wage per employee	139195.8	121939.1	117537.4	124634.9	120603.1	123070.9
Total sales per employee	804825.9	719941.1	567103.1	520508.7	617125.4	542319.2
Profit per employee	-44816.4	-26981.46	-37421.66	-29074.91	-37057.22	-50797.68
Total costs per employee	400875.6	374547.6	394556.1	400690.4	405241.4	517177
Value added per employee	567800.8	490878.6	317356.2	277650.4	358032.1	171769.9

Table A2B Means of basic deflated variables by groups of firms

Control Group								
	1991	1992	1994	1995	1996	1997	1998	1999
Labor	322	254	205	193	183	171	167	163
Fixed ass.	247.0	189.0	99.0	98.4	98.4	104.0	99.8	106.0
Total ass.	531.0	341.0	240.0	236.0	243.0	256.0	267.0	256.0
Capital	292.0	212.0	110.0	114.0	119.0	123.0	122.0	127.0
Depreciation	14.1	11.5	8.5	8.0	7.7	7.6	7.2	7.0
Gross Wage	62.9	25.3	34.8	33.6	31.8	30.7	30.4	30.3
Sales	406.0	186.0	171.0	173.0	164.0	181.0	176.0	209.0
Profit	19.9	5.9	.716	4.1	-.621	3.0	2.7	4.6
Mater. Costs	148.0	85.1	83.8	87.2	83.9	88.3	93.9	144.0
Total Costs	225.0	122.0	127.0	129.0	123.0	127.0	132.0	181.0
Value Added	258.0	101.0	87.3	85.5	80.6	93.1	82.3	65.4
Master Firms								
Labor	1012	850	671	584	487	490	364	356
Fixed ass.	461.0	464.0	216.0	202.0	229.0	235.0	219.0	219.0
Total ass.	1260	896.0	637.0	725.0	778.0	807.0	757.0	638.0
Capital	504.0	493.0	240.0	249.0	327.0	309.0	278.0	311.0
Depreciation	27.1	19.2	19.1	17.6	18.7	16.0	13.2	12.8
Gross Wage	135.0	72.5	79.8	72.0	60.8	54.9	42.9	43.0
Sales	812.0	496.0	473.0	364.0	363.0	271.0	187.0	222.0
Profit	12.4	5.3	-30.4	-18.3	-39.9	-19.8	-31.3	-33.4
Mater. Costs	363.0	237.0	176.0	143.0	161.0	157.0	139.0	146.0
Total Costs	525.0	329.0	275.0	233.0	241.0	228.0	196.0	201.0
Value Added	450.0	259.0	297.0	221.0	202.0	114.0	47.3	76.5
Subsidiaries								
Labor	225	196	175	156	165	161	158	146
Fixed ass.	178.0	162.0	64.0	56.0	59.2	58.0	59.4	60.7
Total ass.	337.0	225.0	141.0	157.0	170.0	201.0	208.0	163.0
Capital	152.0	106.0	47.9	54.7	61.8	73.8	80.8	83.2
Depreciation	15.2	9.3	5.8	4.5	5.5	4.7	4.4	4.1
Gross Wage	37.5	22.5	24.1	19.6	18.8	18.5	18.3	18.3
Sales	232.0	108.0	117.0	97.3	103.0	92.1	106.0	123.0
Profit	-7.3	-10.3	-13.8	-5.2	-14.6	-9.3	-4.5	-9.0
Mater. Costs	185.0	60.7	34.6	40.3	68.1	56.6	64.7	91.0
Total Costs	238.0	92.5	64.5	64.5	92.4	79.8	87.5	113.0
Value Added	46.9	47.6	82.5	57.0	34.9	35.6	41.8	32.6

$$p_i^{Year} = b X_i^{1994} + a_M D_i^{Master} + a_S D_i^{Subsidiary} + e_i$$

TABLE 4 EFFECT OF A SPLIT ON PROFIT/LABOR OF MASTER AND SUBSIDIARY

Year	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.
1996	-4.19**	-0.13	-3.90*	0.02	-1.91	-6.69*	-1.56	-4.52**	-4.06	-0.64	-3.89*	-0.10	-9.84*	-4.41*	-1.87	-6.68**
	(2.11)	(0.69)	(2.05)	(0.70)	(2.10)	(3.62)	(1.47)	(2.62)	(4.28)	(0.96)	(2.00)	(0.69)	(5.42)	(2.29)	(1.80)	(3.72)
1997	3.63	-1.24	3.35	-1.18	1.68	-5.26*	2.06	-5.10**	1.93	-1.02	3.35	-1.23	-12.12*	-4.50*	1.63	-5.22**
	(2.69)	(0.84)	(2.54)	(0.83)	(1.95)	(2.86)	(1.48)	(2.33)	(4.58)	(0.90)	(2.54)	(0.84)	(7.33)	(2.73)	(1.65)	(2.82)
1998	1.17	-1.17	0.55	-1.23	0.23	-4.78	1.04	-5.99**	-2.03	-0.93	0.53	-1.21*	-12.28*	-4.50	1.44	-5.51
	(2.32)	(0.70)	(2.20)	(0.69)	(2.57)	(3.90)	(1.94)	(3.09)	(3.85)	(0.81)	(2.23)	(0.71)	(7.52)	(2.92)	(2.26)	(3.92)
1999	-0.02	-1.67**	-0.63	-1.73**	-0.58	-8.90**	0.14	-8.82***	0.54	-1.28	-0.62	-1.67**	-16.51**	-5.54*	0.46	-9.52**
	(2.54)	(0.75)	(2.48)	(0.77)	(2.81)	(4.30)	(2.16)	(3.50)	(4.06)	(0.84)	(2.46)	(0.76)	(8.25)	(3.32)	(2.44)	(4.34)
Privatization Dummies	Yes		No		Yes		No		Yes		No		Yes		No	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		No		Yes	
Year 91/92 is Instrument	Yes		Yes		No		No		Yes		Yes		No		No	
Privatization is Instrument	Yes		Yes		Yes		Yes		No		No		No		No	

Note:

***, **, * denotes significant coefficient at 1%, 5%, and 10%, respectively.

Standard errors in parentheses

Hausman test always accepts privatization dummies as valid instruments on any conventional level.

Hausman test always rejects 1991/1992 values as valid instruments on any conventional level, with exception of year 1997.

$$p_i^{Year} = b X_i^{1994} + a_M D_i^{Master} + a_S D_i^{Subsidiary} + e_i$$

TABLE 5 EFFECT OF A SPLIT ON VALUE ADDED/LABOR OF MASTER AND SUBSIDIARY

Year	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.
1996	-3.00	-1.38	-3.09	-1.35	-2.69	-9.52**	-1.59	-8.94**	-3.89	-1.73	-3.08	-1.37	-11.40*	-6.65**	-1.80	-10.51**
	(2.63)	(0.86)	(2.52)	(0.86)	(2.59)	(4.46)	(2.08)	(3.72)	(5.13)	(1.15)	(2.50)	(0.86)	(6.76)	(2.85)	(2.31)	(4.76)
1997	3.38	-2.01**	3.00	-2.01**	0.91	-7.31**	2.28	-8.50***	2.52	-1.63	3.01	-2.03**	-9.93	-6.54**	2.11	-7.86**
	(3.06)	(0.95)	(2.92)	(0.96)	(2.17)	(3.18)	(1.99)	(3.13)	(5.29)	(1.04)	(2.91)	(0.96)	(7.74)	(2.88)	(1.96)	(3.35)
1998	1.37	-2.34***	0.29	-2.51***	0.29	-7.09	2.03	-10.51***	-0.23	-1.77*	0.28	-2.42***	-11.11	-7.03**	2.66	-8.70*
	(2.96)	(0.89)	(2.86)	(0.90)	(3.39)	(5.15)	(2.63)	(4.18)	(5.16)	(1.09)	(2.89)	(0.92)	(8.49)	(3.30)	(3.04)	(5.28)
1999	-1.15	-3.02***	-2.26	-3.16***	-0.91	-11.44*	0.73	-12.14***	0.28	-2.34**	-2.25	-3.05***	-17.97*	-7.87**	1.27	-12.72**
	(3.33)	(0.99)	(3.27)	(1.01)	(3.75)	(5.74)	(2.78)	(4.51)	(5.52)	(1.15)	(3.25)	(1.01)	(9.41)	(3.78)	(3.26)	(5.80)
Privatization Dummies	Yes		No		Yes		No		Yes		No		Yes		No	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		No		Yes	
Year 91/92 is Instrument	Yes		Yes		No		No		Yes		Yes		No		No	
Privatization is Instrument	Yes		Yes		Yes		Yes		No		No		No		No	

Note:

***, **, * denotes significant coefficient at 1%, 5%, and 10%, respectively.

Standard errors in parentheses

Hausman test always accepts privatization dummies as valid instruments on any conventional level.

Hausman test always rejects 1991/1992 values as valid instruments on any conventional level.

$$p_i^{Year} = b X_i^{1994} + a_M D_i^{Master} + a_S D_i^{Subsidiary} + e_i$$

TABLE 6 EFFECT OF A SPLIT ON TOTAL COSTS/LABOR OF MASTER AND SUBSIDIARY

Year	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.
1996	0.21 (0.89)	-0.53* (0.29)	-0.52 (0.88)	-0.61** (0.30)	0.43 (0.72)	-1.50 (1.24)	0.22 (0.59)	-1.95** (1.05)	-0.82 (1.52)	-0.43 (0.34)	-0.52 (0.88)	-0.58* (0.30)	-1.90 (1.93)	-0.57 (0.82)	0.23 (0.58)	-1.79 (1.20)
1997	1.09 (1.04)	-0.43 (0.32)	0.17 (1.02)	-0.49 (0.33)	1.18 (1.25)	-1.93 (1.83)	0.98 (1.07)	-3.08** (1.68)	1.37 (1.74)	-0.33 (0.34)	0.17 (1.04)	-0.46 (0.34)	2.21 (3.78)	-1.06 (1.40)	1.15 (1.12)	-2.25 (1.92)
1998	1.26 (1.14)	-0.65* (0.34)	0.26 (1.14)	-0.73** (0.36)	1.85** (0.78)	-1.86 (1.19)	1.49* (0.77)	-2.65** (1.23)	1.02 (1.89)	-0.45 (0.40)	0.27 (1.14)	-0.66* (0.36)	0.59 (2.30)	-1.37 (0.88)	1.50** (0.71)	-2.01* (1.23)
1999	0.83 (2.80)	-2.02** (0.83)	-2.63 (2.94)	-2.44*** (0.91)	3.35 (4.27)	-1.80 (6.54)	4.83 (3.43)	-4.39 (5.57)	5.23 (5.79)	-0.93 (1.20)	-2.68 (2.97)	-2.46*** (0.92)	3.41 (12.91)	-3.61 (5.12)	5.29 (3.79)	-2.76 (6.71)
Privatization Dummies	Yes		No		Yes		No		Yes		No		Yes		No	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		No		Yes	
Year 91/92 is Instrument	Yes		Yes		No		No		Yes		Yes		No		No	
Privatization is Instrument	Yes		Yes		Yes		Yes		No		No		No		No	

Note:

***, **, * denotes significant coefficient at 1%, 5%, and 10%, respectively.

Standard errors in parentheses

Hausman test always accepts privatization dummies as valid instruments on any conventional level, with exception of year 1998.

Hausman test always rejects 1991/1992 values as valid instruments on any conventional level, with exception of year 1996.

$$p_i^{Year} = b X_i^{1994} + a_M D_i^{Master} + a_S D_i^{Subsidiary} + e_i$$

TABLE 7 EFFECT OF A SPLIT ON PROFIT/CAPITAL OF MASTER AND SUBSIDIARY

Year	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.
1996	-1.80*	-0.46	-1.73*	-0.42	-2.36***	-2.35	-2.13***	-1.95	-1.22	-0.17	-1.73*	-0.44	-4.25	-3.35***	-2.24	-2.32
	(1.09)	(0.36)	(1.05)	(0.36)	(0.90)	(1.55)	(0.72)	(1.28)	(2.18)	(0.50)	(1.04)	(0.36)	(2.77)	(1.17)	(0.76)	(1.56)
1997	0.89	-0.48	1.06	-0.47	-0.11	-1.81	-0.09	-2.05**	-0.71	-0.40	1.06	-0.45	-2.84	-1.59*	-0.13	-1.69
	(1.02)	(0.32)	(0.97)	(0.32)	(0.81)	(1.18)	(0.62)	(0.98)	(1.87)	(0.39)	(0.97)	(0.32)	(2.26)	(0.93)	(0.63)	(1.13)
1998	0.05	-0.39	-0.08	-0.42	-3.12*	-1.45	-3.94***	-1.02	-3.30*	-0.51	-0.08	-0.40	0.04	-4.20**	-3.95	-1.01
	(1.03)	(0.33)	(0.97)	(0.32)	(1.79)	(2.59)	(1.33)	(2.14)	(1.95)	(0.41)	(0.97)	(0.33)	(5.33)	(2.05)	(1.40)	(2.52)
1999	16.17	1.67	19.35	1.33	-5.12	-13.83	1.43	-22.61	10.04	-0.67	19.27	1.30	-21.32	-19.23	2.08	-13.58
	(43.69)	(13.69)	(41.32)	(13.53)	(22.44)	(33.00)	(17.47)	(28.79)	(69.93)	(14.78)	(41.41)	(13.66)	(62.63)	(24.89)	(18.08)	(33.16)
Privatization Dummies	Yes		No		Yes		No		Yes		No		Yes		No	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		No		Yes	
Year 91/92 is Instrument	Yes		Yes		No		No		Yes		Yes		No		No	
Privatization is Instrument	Yes		Yes		Yes		Yes		No		No		No		No	

Note:

***, **, * denotes significant coefficient at 1%, 5%, and 10%, respectively.

Standard errors in parentheses

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Hausman test always accepts 1991/1992 values as valid instruments on any conventional level, with exception of year 1998.

$$p_i^{Year} = b X_i^{1994} + a_M D_i^{Master} + a_S D_i^{Subsidiary} + e_i$$

TABLE 8 EFFECT OF A SPLIT ON SALES/LABOR OF MASTER AND SUBSIDIARY

Year	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.	Master	Subsid.
1996	-0.59 (2.43)	-2.30*** (0.79)	-4.25* (2.57)	-2.98*** (0.88)	3.79 (3.67)	-4.64 (6.31)	4.97* (3.04)	-6.46 (5.43)	2.16 (5.22)	-1.18 (1.17)	-4.29 (2.69)	-2.83*** (0.93)	3.55 (11.06)	-3.32 (4.66)	4.98* (2.96)	-5.79 (6.10)
1997	-1.36 (3.51)	-1.96* (1.09)	-5.30 (3.47)	-2.56** (1.14)	8.83 (5.90)	-3.02 (8.66)	10.27** (4.65)	-4.67 (7.31)	6.86 (8.48)	-0.64 (1.67)	-5.35 (3.78)	-2.36** (1.25)	13.31 (22.45)	-6.72 (8.34)	10.37** (4.82)	-4.07 (8.22)
1998	-1.24 (2.53)	-2.04*** (0.77)	-4.41* (2.56)	-2.50*** (0.80)	10.03** (4.76)	-1.81 (7.22)	10.79*** (3.97)	-2.76 (6.31)	3.41 (5.37)	-1.01 (1.13)	-4.50* (2.69)	-2.32*** (0.85)	4.28 (15.80)	-6.88 (6.13)	10.79*** (4.02)	-2.81 (6.98)
1999	0.96 (3.13)	-2.51*** (0.93)	-3.13 (3.27)	-2.94*** (1.01)	3.07 (4.46)	-2.89 (6.83)	4.52 (3.59)	-5.25 (5.82)	4.04 (6.15)	-1.37 (1.28)	-3.18 (3.32)	-2.98*** (1.03)	-1.81 (13.13)	-4.67 (5.28)	4.92 (3.89)	-3.94 (6.91)
Privatization Dummies	Yes		No		Yes		No		Yes		No		Yes		No	
Industry Dummies	Yes		Yes		Yes		Yes		Yes		Yes		No		Yes	
Year 91/92 Instrument	Yes		Yes		No		No		Yes		Yes		No		No	
Privatization Instrument	Yes		Yes		Yes		Yes		No		No		No		No	

Note:

***, **, * denotes significant coefficient at 1%, 5%, and 10%, respectively.

Standard errors in parentheses

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