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*Spinoffs, Privatization and Corporate
Performance in Emerging Markets*

By: Jan Hanousek, Evzen Kocenda and Jan Svejnar

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Jan Hanousek*

Evzen Kocenda*

Jan Svejnar**

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Abstract

We use new firm-level data to examine the effects of spinoffs and privatization on corporate performance in a rapidly emerging market economy. Unlike the existing literature, which analyzes spinoffs almost exclusively in advanced economies, we control for accompanying ownership changes and the fact that spinoffs and ownership are endogenous variables. We find that spinoffs increase the firm's profitability but do not alter its scale of operations, while the effect of privatization depends on the resulting ownership structure – sometime improving performance and sometime bringing about decline that is consistent with tunneling (looting) by managers or (partial) owners. The effects of privatization are hence much less clear-cut than suggested in earlier studies. Methodologically, our study provides evidence that it is important to control for changes in ownership when analyzing spinoffs and generally to control for endogeneity, selection and data attrition when analyzing the effects of spinoffs and privatization.

Keywords: Spinoffs, breakups, privatization, corporate performance, endogeneity.

JEL Classification: D23, G32, G34, L20, M21, P47

* CERGE-EI, Prague; CEPR and WDI

** Michigan Business School and Department of Economics, University of Michigan; CERGE-EI, CEPR, IZA, and WDI

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1. Introduction

Corporate spinoffs play an important part in advanced market economies and they have been widely researched in the literature. Hausman, Tardiff, and Belinfante (1993) for instance show in the US context that the breakup of a nationwide telephone company into several units brought about opportunity for gains in economic efficiency. There is also evidence that parent companies experience positive cumulative abnormal excess returns at the announcement of the spinoff (e.g., Hite and Owers, 1983, Miles and Rosenfeld, 1983, Schipper and Smith, 1983), and that both the spun-off units and parent firms have positive abnormal returns after spinoff and experience significantly more takeovers than similar firms with no spinoffs (Cusatis, Miles, and Woolridge, 1993).¹ Woo, Willard, and Daelenbach (1992) and Daley, Mehrotra, and Sivakumar (1997) show that spin-offs record improvements in operating performance, while Ahn and Denis (2004) argue that post-spinoff there is an improvement in investment efficiency and Dittmar and Shivdasani (2003) find that after the spinoff parent companies improve internal allocation of capital and increase their rate of investment. Similarly, Gertner, Powers, and Scharfstein (2002) report that spinoffs increase the efficiency of capital allocation, while Hite and Owers (1983), Rosenfeld (1984) and Desai and Jain (1999) note that spinoffs improve managerial efficiency by reducing the potential for misallocation of capital, eliminating cross-subsidies, and enabling improved investment decisions. Krishnaswami and Subramaniam (1999) analyze spinoffs from the point of view of information asymmetry² and suggest that many spinoffs are motivated by the desire to mitigate the information asymmetry problem. Maxwell and Rao (2003), on the other hand, show that spinoffs are viewed negatively in the bond markets and that part of the overall gain associated with spinoffs is in fact a wealth transfer from bondholders to stock holders. Overall, the literature suggests that in the advanced economies spinoffs increase value but also have important distributional effects.³

From the methodological standpoint, the literature has important limitations in that the studies implicitly treat spinoffs as exogenous rather than using for example instrumental variable

¹ McConnell, Ozbilgin, and Wahal (2001) investigate whether a strategy of buying spun-off firms once they begin trading as independent stocks provide a way to earn excess returns and they conclude negatively.

² Information asymmetry in the market is understood in the context of profitability and efficiency of different divisions of the firm. It was found that firms engaged in spin-offs have higher levels of information asymmetry about their value than their industry- and size-matched counterparts.

³ There is also an important literature on the opposite phenomenon of spinoffs and breakups, namely mergers. As Focarelli and Panetta (2003) indicate, while the short-term welfare effects of mergers appear to be negative, the long-term effects may be positive.

estimation to control for their endogeneity, and in many studies the data do not permit researchers to compare the performance of the spun-off units before and after the spinoffs. Moreover, while Cusatis, Miles, and Woolridge (1993) provide evidence that changes in ownership structure after the spinoffs affect positively the firm's rate of return, the rest of the literature does not control for ownership changes that occur with spinoffs. These endogeneity and omitted variable problems may have produced biased estimates of the effects of spinoffs. We address these issues in the present study.

Spinoffs are also important in the transition and emerging market economies. They are frequently observed together with privatization and the two phenomena represent a key form of corporate restructuring as enterprises break up into two or more units. In this context, it may be hypothesized that spinoffs and privatization improve corporate performance as the new firms strive to gain reputation and introduce superior governance. Given the underdeveloped legal framework in many emerging markets, however, spinoffs and privatization may also be mechanisms for self-enrichment of managers through tunneling (looting). By the same token, as the institutional and legal setting improves, spinoffs and some forms of ownership may improve performance by serving as disciplining devices for management. The theoretical model developed by Chemmanur and Yan (2004) is relevant in this setting because it shows how spinoffs may increase the probability of a takeover by value-improving management that enhances operating performance after the spinoff. Similarly, Cusatis, Miles, and Woolridge's (1993) evidence from an advanced country context that ownership structure after the spinoffs affects positively the firm's rate of return suggests that the challenge is to estimate the respective effects of spinoffs and ownership changes when assessing post-spinoff performance.

Although spinoffs and breakups are important phenomena in the transition and emerging market economies, a lack of adequate data has prevented researchers from analyzing them. The exception is Lizal, Singer and Svejnar (2001) who use Czech data from the start of the transition and show that small and medium sized spinoffs have positive effects on productive efficiency and profitability of both the parent companies and spun-off units in the year when the spinoff occurs. They also find the effect to be less significant in the subsequent year – presumably because of increased competition and/or tunneling by managers. The Lizal, Singer and Svejnar (2001) paper offers only limited evidence, however, as the authors do not know the identity of firms and have to use indirect methods to identify spinoffs and link the spun-off units to the

parent firms. Moreover, the data allows the authors to follow the firms only during the year of the spinoff (1991) and in the following year (1992). This hence prevents them from evaluating the medium-term effects of spinoffs and from estimating the effects of privatization. Finally, similarly to the literature on advanced market economies, Lizal, Singer and Svejnar (2001) do not have the necessary data to analyze the difference in performance before and after the breakups.

The literature on the effects of privatization in the transition and emerging market economies is substantial (see e.g., Megginson and Netter, 2001, and Djankov and Murrell, 2002, for surveys). However, most studies do not control adequately for the fact that firms are unlikely to be assigned for privatization at random and the estimated effects may hence be biased (see Gupta, Ham and Svejnar, 1999). In particular, Djankov and Murrell (2002) point out that 47% of the studies surveyed in their paper do not control for endogeneity or selection problems at all, while Gupta, Ham and Svejnar (1999) show that even studies that use a fixed effects or difference in differences approach may yield biased estimates in the absence of using appropriate instrumental variables (IVs). Finally, DeWenter and Malatesta (2001) show that profitability improves immediately before privatization, but the evidence on subsequent improvement under private ownership is mixed. Overall, the early literature has been quite sanguine about the positive effects of privatization on performance, while recent studies suggest that an analytically rigorous reassessment may be in order.

In this paper, we use a new firm-level data set from a model transition economy (Czech Republic) to estimate the respective effects of spinoffs and privatization on corporate performance. The dataset is unique in that we know the identity of firms and observe values of indicators of corporate performance for the spun-off units (representing all parts of the parent company) both before and after the breakup of the parent firm. We also have the corresponding data for firms that did not experience spinoffs. This permits us to carry out an analysis that could not be performed for spinoffs in either the advanced or emerging market context before. Moreover, since we have data for variables from the pre-transition period when central planners exogenously set the values of many firm-level variables, we can construct credible instrumental variables to control for the possible endogeneity of both spinoffs and changes in ownership. Methodologically, we also advance the literature by being able to employ for a part of our analysis the difference-in-differences (DID) estimation that represents an appealing approach for

evaluating outcomes before and after a specific treatment. The DID approach has not been used in the literature on spinoffs because pre-spinoff performance data on spun-off units have not been available.

The Czech Republic constitutes a particularly good laboratory for analyzing the effects of spinoffs and privatization on financial and economic performance in emerging markets. During the late 1980s and early-to-mid 1990s the country had many features found in other emerging market economies, but the variation in the values of the relevant variables was much greater. Hence, while emerging market economies are usually characterized by a transition from significant to less pronounced state ownership, with spinoffs being one of the mechanisms of corporate restructuring, in the Czech Republic these processes were much more pronounced. The country started in 1990 as an almost completely state-owned, controlled and trade-protected economy, with its corporate sector being dominated by large SOE conglomerates. It rapidly opened itself to trade, liberalized prices and by 1995 it was transformed into an overwhelmingly privately-owned market economy. In the process, most of the large SOE conglomerates were broken up and the number of the medium and large industrial firms more than tripled on account of numerous spinoffs, as well as entry of newly created firms.

The structural and institutional features observed in the emerging market economies in general, and the Czech Republic in particular, lead us to test two competing hypotheses with respect to spinoffs and privatization:

1. Spinoffs and privatization have a positive effect on the performance of the resulting units by eliminating prior inefficiencies such as diseconomies of scale of large SOE conglomerates, weak managerial incentives, information asymmetries, and a lack of focus on core competence.⁴
2. The effects of spinoffs and privatization on performance are negative on account of tunneling (looting) by managers and/or (partial) owners in the presence of waning government control, unclear property rights and corporate governance, and weak market-oriented legal framework.

With respect to privatization, we also explore whether the nature of the effect depends on the type of new ownership structure. In particular, we are able to distinguish the extent to which each

⁴ See Prahalad and Hamel (1990).

firm is owned by an industrial firm, financial company, individual owner, or state, and we can estimate the effect of different ownership patterns on corporate performance.⁵

We find that spinoffs and privatization have a number of significant but also some insignificant effects on corporate performance. The average spinoff increases the firm's profitability and scale of operations (sales), while the effect of privatization very much depends on the resulting ownership structure. The overall evidence for spinoffs is consistent with our first hypothesis, namely that spinoffs have a positive effect on performance. Reducing state ownership is positive for some performance indicators but insignificant or even negative for others. Industrial firms as owners improve or do not hamper performance and in that sense they behave consistently with our first hypothesis. Financial companies and individuals as owners are mostly associated with no improvement and in some cases significant declines in performance, thus providing evidence that is consistent with tunneling (looting) by managers and/or owners. The effects of privatization are hence much less positive and clear-cut than was suggested in many of the early studies. Methodologically, our study shows that it is important to control for changes in ownership when analyzing the effect of spinoffs and to control for endogeneity, selection and data attrition when analyzing the effects of spinoffs and privatization.

The paper is structured as follows. In Section 2 we present the institutional setting underlying our analysis, while in Section 3 we discuss our data, variables and the method for identifying spinoffs. Section 4 describes our estimating framework and Section 5 presents our empirical results. We conclude in Section 6.

2. The Institutional Setting

In this section we briefly outline the main features of the institutional setting underlying the spinoffs and privatization in the Czech Republic. The spinoffs took place mostly during the privatization program that was carried out in the first half of the 1990s under three different schemes: restitution, small-scale privatization and large-scale privatization. The first two schemes started in 1990 and were most important during the early years of the transition. Large-scale privatization, by far the most important scheme, began in 1991 and was completed in early

⁵ Hanousek, Kočenda, and Svejnar (2004) provide a literature review on the topic of ownership structure and performance and suggest hypotheses about the effects of particular types of owner on firm performance.

1995.⁶ The large privatization program allowed for various privatization techniques. Small firms were usually auctioned or sold in tenders. Many medium businesses were sold in tenders or to predetermined buyers in direct sales. Most large and many medium firms were transformed into joint stock companies and their shares were distributed through voucher privatization (almost one-half of the total number of all shares of all joint stock companies was privatized in the voucher scheme), sold in public auctions or to strategic partners, or transferred to municipalities. The voucher scheme was part of the large-scale privatization process and two waves of voucher privatization took place in 1992-93 and 1993-94, respectively.⁷ The early post-privatization ownership structure emerged as shares from the first and second wave were distributed in 1993 and early 1995 respectively. There was also a significant post-privatization wave of share trading (often swapping of large blocks of shares off the official stock market) among large shareholders during this period.

Privatization of each enterprise was based on an officially accepted privatization project. The management of each enterprise was obliged by law to submit a privatization proposal, but any domestic or foreign firm, institution or individual could present a competing privatization project. In reality, there was more than one privatization proposal submitted for numerous enterprises. All proposals were to be considered on an equal footing by the privatization authorities, which worked with the investors to ensure that the final submitted proposals reflected at least in part government objectives in terms of ownership structure and other characteristics. Each project proposal had to contain recent economic and financial information about the enterprise and describe the proposed method of privatization, as well as the proposed organization of the privatized enterprise.⁸

The decisions regarding spinoffs were taken by the relevant government ministries in conjunction with the government privatization authority. The decision for each firm was based on the winning privatization project that outlined the proposed framework for the spinoff(s). Tables 1 and 2 summarize information about the privatization projects.⁹ The tables show that the

⁶ The privatization process has been extensively described and analyzed. See e.g., Svejnar and Singer (1994), Kotrba (1995), Coffee (1996), Kočenda (1999), and Filer and Hanousek (2000).

⁷ For firm analysis on issues of ownership, control, and performance after large-scale privatization see Hanousek, Kocenda, and Svejnar (2004).

⁸ For more details see Kotrba and Svejnar (1994) who offer a description of the privatization projects.

⁹ Privatization of each state owned firm was decided on the basis of an officially accepted privatization project. According to the law, all state owned enterprises were selected either for the first or the second privatization wave, or they were temporarily exempted. Each selected firm had to submit an official privatization proposal that was

interest to privatize originated from management as well as other parties since on average almost 5 projects were submitted per firm. The projects were approved at an average rate of 2 per firm, reflecting the spinoffs as well as government objectives. Since management was obliged to submit a privatization proposal, it comes as no surprise that 25% of projects came from this source. Independent bidders that wanted to privatize by purchasing (a part of) a firm submitted two fifth (39%) of all projects. There are no other sizable categories of project proposers.

3. Data, Identification of Spinoffs, and Definitions of Variables

The data were compiled by the authors from Aspekt, a commercial database, and from the archives of the Ministry of Privatization and the National Property Fund of the Czech Republic. The data allow us to identify unambiguously the parent enterprises and all the post-spinoff units related to the 1991-1992 surge of spinoffs.¹⁰ Unlike Lizal, Singer, and Svejnar (2001), we can hence directly observe the spinoffs and we also have a larger sample. Our data set contains 131 spun-off units, corresponding to 44 parent companies, and 780 firms that did not experienced any spinoff (the control group). The spinoffs result from breakups of the parent firms and all the spun-off units receive new tax identification numbers and have the same rights to use the brand and/or trade name of the former master enterprise. Based on the identified ownership structure available from our data, we assign firm ownership to the following categories of owners: the state, industrial firm, individual owner, or financial company.¹¹

The dataset is also unique in that we have pre spinoff data for both parent enterprises and the spun-off units. This means that we have performance data and firm characteristics of spun-off units after the spinoff, but also during the time when they were parts of the original parent enterprise. We use this information in constructing variables measuring the size of the spinoff and in our difference in differences analysis.

The firms in our data set were slated by the government for privatization in the first wave of the voucher scheme. For each firm we have detailed information derived from all the proposed privatization projects that were submitted to the government before privatization. This includes

usually crafted by the firm's management under the tutelage (and responsibility) of its sectoral ministry. Any domestic or foreign corporate body or individual was allowed to present a competing project that was to be considered on an equal footing to the official one.

¹⁰ Most spinoffs took place in 1991.

¹¹ The category financial company includes ownership by banks, privatization investment funds, and financial intermediaries/brokerages.

the relevant information about the spinoff, the links between the parent company and spun-off units, the privatization scheme, and information on assets, liabilities, profit, sales and number of employees in 1990. The number of privatization projects submitted for any given firm is *per se* an important factor for our analysis since for many SOEs there were several privatization projects submitted and each privatization project reflected the structure of the firm, manager's motives, degree of investor interest, and expected future performance of the firm. For many firms, however, a number of proposals were submitted for privatizing a particular small asset that was not connected with the firm's production activity (e.g., the firm's recreational facility). In order to avoid mixing these privatization projects with those covering principal productive activities, we only consider projects aiming at privatizing 5% or more of the enterprise's assets. Table 3 displays the available pre-spinoff 1990 economic indicators for the spun-off units, parent firms and firms in the control group.

We also have data on the structure of share ownership among various domestic and foreign parties as proposed in the winning privatization projects. The share ownership variables include the share that the government intended to keep for the short vs. long term. Short-term government ownership reflects the expectation that the government would be able to sell appreciated shares shortly after privatization, while long-term government ownership indicates an expectation of slower appreciation of the value of the privatized firm and/or its strategic character in the economy. Parts of the shares retained by the government were also classified as intended for restitution or future sale through an intermediary (see Table 4 for data on the allocation of shares for other purposes than voucher privatization).¹²

Characteristics of geographic and industry location of the firms are summarized in Table 5. The frequency of firms in the various regions indicates that firms were distributed relatively evenly across the country. The only exception was the less developed region of Southern Bohemia where one observes few firms. Table 5 also indicates that industry is heavily concentrated in the capital of Prague that is situated in the middle of Central Bohemia, whose relatively low proportion of firms reflects the fact that many firms are in Prague. Most of the firms belong to the sector of heavy machinery; this proportion conforms to the former structure of the Czech economy under the command system. Naturally, the firms in this sector were most

¹² Mean proportion of shares allocated to various owners (other than through voucher scheme) sum-up to 15.7% for spun-off units and 15.5% for the control group of firms.

in need of restructuring and the breakups of large conglomerates were the start of this process. We exclude firms in the forestry sector since these represent rather atypical examples of privatization.¹³

In analyzing corporate performance after the wave of spinoffs and privatization, we use economic and financial indicators for the period 1995-1996. The spinoffs that we analyze occurred in 1991-92, the accompanying privatization in 1992-93, and the distribution of shares of the privatized firms and the major post-privatization swaps of shares in 1993-94. Since for some of the firms the transfer of ownership rights ended in 1994 or very early 1995, we take 1995 to be the first year after spinoffs and privatization that truly reflects the new corporate and ownership structure. Moreover, by 1995 the quality of the reported accounting and economic data starts approaching international standards. Finally, using data for both 1995 and 1996 allows us to test for time-varying effects of spinoffs and privatization. Hence, in our estimation, we use data on early enterprise performance from 1990, firms splits from 1991-2 and post-spinoff, post-privatization performance from 1995-96.

Our data permit us to use three indicators of corporate performance in our main model: unit labor cost measured by labor costs over sales (labor costs/sales), operating profit over labor costs (profit/labor costs), and operating profit per share (profit/equity). Our main analysis is hence based on a measure of (labor) cost effectiveness and two direct measures of profitability. Finally, in our DID analysis we are able to use sales as a measure of scale of operation.

4. The Estimating Framework

Before presenting our formal model, we outline its stylized form in Figure 1. As may be seen from the figure, the pre-spinoff initial conditions, the nature of the breakup of the parent firm and the change in ownership may all affect subsequent corporate performance. Moreover, the pre-spinoff, pre-privatization conditions are also likely to influence the nature of the spinoff and the form of privatization. Therefore, in analyzing the effects of spinoffs, we benefit from the fact that we are able to identify the parent company as well as the spun-off units, and we have

¹³ Under the command system, forests were in state hands and majority of forested land is still managed by state. Relatively minor forest estates were returned in the restitution process, while the rest was subject to fierce acquisition interests of small groups of hunters in rural areas that wanted to maintain their former past-time activities intact. Many of the privatization projects and decisions linked to forests were subject to delays and political pressures due to various restitution claims. Some have not been implemented to date.

acceptable instrumental variables with which to control for the fact that spinoffs may be systematically related to unobserved firm characteristics rather than being carried out at random.

We consider the shares of pre-spinoff capital and labor that each spun-off unit appropriates from the parent firm at the time of the spinoff to be the key indicators of the extent of each spinoff. As a result, we use the 1990 ratio of capital in the spun-off firm to total capital in the former parent enterprise dK_i and the 1990 ratio of the number of employees in the spun-off firm to the total number of employees in the former parent enterprise dL_i as explanatory variables capturing the size of the spinoff in the performance equations. Both shares are to a large extent given by the organizational structure of the parent firm before the split. As may be seen from Figure 2, most spinoffs took over both labor and capital from the pre-spinoff firm, with the largest concentration of observations being in the segment where spun-off units are endowed with up to 40% of capital and labor of the former parent firm. It is also clear from Figure 2, however, that a significant number of spinoffs were quite labor- or capital-intensive. Finally, the economic situation in the parent enterprise before the split also contains other rich information that we take into account in our analysis.

Formally, we estimate the following model of corporate performance:

$$\pi_i = \alpha_0 X_i + \alpha_1 S_i + \beta OWN(s)_i + \gamma OWN(ns)_i + \chi dL_i + \delta dK_i + \varepsilon_i \quad (1)$$

where index i denotes firms, π_i is a measure of corporate performance of firm i after the spinoffs and privatization occurred (1995-96), X_i captures the pre-spinoff, pre-privatization (1990) economic situation in the parent firm measured by assets, liabilities, sales, profit, and number of employees, and S_i is a dummy variable coded 1 if the enterprise is a spun-off unit and 0 if it is a firm that did not experience a breakup. Variables $OWN(s)_i$ and $OWN(ns)_i$ measure the post-privatization (1995-96) ownership structure in companies that experienced spinoffs and those that did not, respectively, while β and γ are the associated coefficients. Finally, ε_i is the error term.

Endogeneity of Spinoffs and Ownership

As we discussed earlier, spinoffs and changes in ownership structure may be correlated with firms' unobserved characteristics. As a result, we treat spinoffs and ownership as endogenous and apply instrumental variable (IV) estimation. The advantage of the IV procedure

over the more efficient maximum likelihood estimation (MLE) is that it is more robust and does not require numerical integration in the presence of the dummy and share variables for spinoffs and ownership. In particular, we use the following logit model to estimate the probability of a spinoff occurring:

$$S_i = f(NP_i, \sum_{j=1}^3 (DE_i)^j, POWN_i, REG_i, \sum_{j=1}^2 (PP_i)^j, \sum_{j=1}^3 (PTNS_i)^j) + v_i \quad (2)$$

where S_i is equal to 1 if company i is a spun-off unit and 0 otherwise, NP_i refers to the number of privatization projects submitted to the government in 1991, DE_i captures how much the size of each firm deviates in 1990 from the standard in the market economies (discussed below), $POWN_i$ stands for the ownership structure proposed in 1991 in the winning privatization project (expressed in percentage intended for ownership type defined by categories listed in Table 4), REG_i represents a set of seven regional dummy variables, PP_i measures the profitability of the (parent) firm in 1990, and $PTNS_i$ represents the total number of shares in the parent firm in 1990. The effects of variables such as the firm's distance from the mean (median) OECD size, profitability, and total number of shares may be nonlinear and we hence use a Taylor series expansion of the second and third order to obtain a specification that can take into account potential nonlinearities (the order of expansion is denoted by j in equation (2)).

The variable DE_i is measured as the number of employees in a firm in 1990 minus the number of employees in a (weighted) average firm in a given industrial sector in the OECD economies at the time (see Kumar, Rajan and Zingales, 1999).¹⁴ We take the mean OECD firm size as a benchmark because the transition countries declared their commitment to move towards a standard market economy and many, including the Czech Republic, succeeded in joining the OECD soon after the start of the transition. One of the determining factors for a spinoff is therefore likely to be the size of the firms that emerged from the centrally planned system, relative to the size of firms in established market (OECD) economies. Since the planners preferred large firms, the value of DE_i is typically, but not always, positive.

We use the following regression to instrument the ownership structure observed in 1995 and 1996:

¹⁴ We have used both the mean and median firm size and the results are similar. The mean and median numbers of employees by industrial sector in OECD countries are given in Table 2 of Kumar et al. (1999).

$$OWN_i = f(NP_i, POWN_i, REG_i, IND_i, \sum_{j=1}^3 (PTNS_i)^j, \sum_{j=1}^3 (AP_i)^j, \sum_{j=1}^3 (PIFh_i, Ith_i)^j) + \zeta_i \quad (3)$$

where IND_i are one-digit industry dummies, $PTNS_i$ is the total number of shares (the share of each company was set at the same nominal value before the large-scale privatization), and AP_i is the average price per share of company i in the voucher privatization scheme. $PIFh_i$ and Ith_i are the shares of company i allocated to privatization investment funds and individual investors, respectively, during the large-scale privatization in 1992. The effects of variables such as the firm's total number of shares and shares allocated to the institutional and individual investors may be nonlinear, and we hence use a Taylor series expansion of the third order to obtain a specification that can take into account potential nonlinearities.

Selection Bias Due to Attrition

In estimating equation (1), we may experience a selection bias because about 24% of firms observed in 1990 do not report data for 1995-96. The bias may be present despite the fact that attrition occurred similarly in the groups of firms that experienced spinoffs and those that did not. We therefore use the Hausman (1978) procedure to correct for this bias by estimating a selection equation and inserting the resulting inverse Mills' ratio into equation (1).

The selection probit equation is specified as follows:¹⁵

$$M_i = g(AP_i, \sum_{j=1}^3 (PTNS_i)^j, PIFh_i, V_i, IND_i) + \eta_i \quad (4)$$

where M_i equals zero if company i has missing performance data in 1995-1996, V_i refers to the percentage of company shares sold in voucher scheme, IND_i is a set of one-digit industrial sector dummy variables, and the other variables are as defined earlier. Estimated coefficients from this auxiliary probit regression are available upon request.¹⁶

¹⁵ The logit specification in equation (2) resulted from standard Hausman correction procedure. In specification (3) we can use either probit or logit. We prefer logit, since it is less sensitive to the actual distribution of the error term. For the sake of consistency we employed both methods and found them to yield similar results.

¹⁶ The goodness of fit, measured by an adjusted R^2 , ranges from 0.09 to 0.1. Note that goodness of fit is not an issue here because specification (3) is a correction equation. In this case poor fit could be interpreted as resulting from the fact that missing observations in equation (1) are randomly distributed.

Difference-in-Differences (DID)

For one key performance variable – sales -- we have comparable 1990 and 1995-96 data on the spun-off units within the parent firms and firms that did not experience spinoffs.¹⁷ For sales (a measure of restructuring tied to the scale of operations), we can hence use the DID method of estimation as an alternative to equation (1), taking the spinoff and privatization as the *treatment* variables that may alter the performance of the firm.¹⁸

The DID estimation may also be motivated by the data pattern depicted in Figure 3. The data relate the dK_i and dL_i of each spun-off firm to the change in its sales between 1990 and 1995-96, with a positive change being denoted by a triangle and a negative one by a minus sign. The solid and broken lines depict the trends in the location of the positive and negative changes in performance, respectively. Firms with improving performance exhibit higher initial capital/labor ratios than firms whose performance worsened over time. Differences in slopes of these two trend lines were statistically significant at 1% percent level.

Taking into account other variables, our specification of the DID model is

$$\Delta\pi_i = \alpha\Delta S_i + \beta\Delta OWN(s)_i + \gamma\Delta OWN(ns)_i + \chi dL_i + \delta dK_i + \phi MR_i + \varepsilon_i \quad (5)$$

where $\Delta\pi_i$ is a measure of the difference in sales between 1990 and 1995-96 and ΔOWN_i captures the change in ownership structure between 1990 and 1995-96, where 100% state ownership is the pre-spinoff and pre-privatization original ownership.¹⁹ Since we use the DID approach, ΔOWN_i represents diminished share of state control as compared to pre-privatization stage, and coefficients β and γ capture interaction between split and subsequent

¹⁷ The problem that we face with respect to other variables is that the (communist) variable definitions in 1990 differ dramatically from the (international) definitions in 1995-96. For example, unsold inventories were included as part of a firm's profit in 1990 but not in 1995-96, and artificial invoicing was common in 1990 as invoiced products were included in profit and improved the firm's image. Thus, using profit in the DID estimation would most likely yield distorted results. In the period after privatization (from the end of 1994 on) accounting rules conforming to the international (IAP) standard were already in place. They are different from those used prior to 1991 when majority of spinoffs took place.

¹⁸ In equation (1) we control for the 1990 values of key performance variables by including them as regressors X_i , but we do not constrain the dependent variable to be in the form of a difference between the 1995-96 and 1990 values.

¹⁹ We use the pre-spinoff, pre-privatization ownership structure in 1990 and the post-spinoff, post-privatization one in 1995 and 1996. Privatization of firms within the first wave of the voucher scheme was concluded in 1993 and 1994, but it was not until 1995 that new owners could affect ownership structure or execute sovereign corporate governance in privatized and spun-off firms.

change in ownership structure. Finally, MR_i is the Mills' ratio from the Heckman correction (equation 3) and as in specification (1), we use dK_i and dL_i as explanatory variables.

The validity of DID estimates may be affected by the potential endogeneity of the treatment variables, in our case spinoffs and privatization (see Besley and Case, 1994). To overcome this problem, we use the approach and variables as defined in equations (2) and (3), respectively. Since shares of labor and capital interact with the process of a spinoff, we also instrument the capital and labor ratios. The instrumental variables that we use are the industry-specific average dK and dL for groups of firms that did not experience spinoffs. Due to the absence of spinoff, the size of these firms can be considered as appropriate one with respect to ratios of labor and capital in a particular sector. Moreover, the computed average is not correlated with the error term in equation (5) that considers only firms where spinoff occurred. Furthermore, we use the series of average dK and dL for groups of all firms across various industry sectors. This average ratio is computed for all firms within a sector with each firm experiencing spinoff consecutively omitted one at a time so that a large set of averages is available. Omitting a firm that experienced spinoff eliminates potential correlation with the error term and an average constructed this way is by definition a valid instrument. Finally, we also use one-digit industry dummy variables as instruments.

The DID estimates may also be biased as a result of serial correlation (Bertrand, Duflo and Mullainathan, 2004). Fortunately, in our case this is unlikely to be a serious problem because the time dimension of our panel data is very short and the cross-section dimension quite large. Nevertheless, to check the sensitivity of our results, we have also generated estimates based on data that were aggregated into one observation before the treatment and one observation after the treatment. The results are not materially different.

4. Empirical Results

The estimated coefficients of equation (1) are reported in Table 7. We started by estimating the effect of the extent of a spinoff by interacting the share of labor dL as well as the share of capital dK in the spun-off unit with annual dummy variables for 1995 and 1996, respectively. This time-varying coefficient specification generated similar 1995 and 1996 point estimates of the corresponding coefficients (Table A1 in the Appendix). We have therefore performed F-tests to verify whether the separate effects for 1995 and 1996 could be constrained

into a single coefficient for each variable. In all cases, we have been able to accept the restricted model. In Table 7, we hence report estimates from this more parsimonious specification.

In view of the discrepancy between the specification of Cusatis, Miles, and Woolridge (1993), who control for ownership changes in analyzing spinoffs and the rest of the spinoff literature that does not, we have tested whether our data permit us to exclude the ownership variables from the estimating equations. The relevant F-tests indicate that specifications that exclude the ownership variables are mis-specified. The results hence suggest that analyses of spinoffs ought to take into account the accompanying changes in the ownership structure.

Finally, the Hausman (1978) tests for endogeneity of spinoffs and ownership indicate that the IV method is superior to OLS in all regressions, and in Tables 7 and 8 we hence report the IV estimates.²⁰ These tests suggest that the literature on spinoffs needs to take into account the fact that spinoffs and ownership changes may be endogenously determined rather than brought about by a random assignment.

The estimated coefficient on S in Table 7 indicates that the base effect of spinoffs is insignificant for labor cost/sales, but positive and statistically significant for profit/labor costs and profit/equity. Holding the relative factor intensity of the spinoffs constant, the base performance effect of spinoffs is hence positive for the two measures of profitability, but insignificant for the unit labor cost.

The effect of spinoffs on profit/equity varies significantly with both dL and dK , the effect on labor cost/sales varies with dK only and the effect on profit/labor cost is invariant with respect to the labor and capital intensity of the spun-off unit. In particular, the effect of dL is positive and significant on profit/equity and insignificant on labor costs/sales and profit/labor cost. The effect of increasing the spinoff in terms of the labor share of the original parent firm is hence to increase or leave unaffected the spun-off unit's profitability and leave unchanged its unit labor cost.

The semi-elasticity of labor costs/sales with respect to dK is negative, suggesting that larger spinoffs in terms of the share of capital appropriated from the parent firm are more efficient in that they decrease the unit labor cost of the spun-off firm. As was the case with dL , the effect of dK on profit/labor cost is insignificant. However, its effect on profit/equity is

²⁰ We do not have an excessive number of instruments and our regressions pass the test of over-identifying restrictions.

negative and significant. The effect of increasing a spinoff's share of parent firm's capital is hence to enlarge the spun off firms' (labor) cost efficiency and decrease or leave unaffected its profitability.

Given that the effects of spinoffs vary in terms of the base effect and the size of the spinoff in terms of dL and dK , it is informative to calculate the mean effect of spinoffs on each indicator of performance. When we take into account the effect of S and evaluate the performance effects of spinoffs at the mean values of dL and dK , using the estimated variance-covariance matrix, we find that the mean effects and corresponding standard errors are -0.010 (0.029) for the labor cost/sales, 1.011 (0.505) for profit/labor cost, and 0.170 (0.066) for profit/equity. The three effects point in the direction of spinoffs reducing costs and increasing profitability. However, only the average effects on the profitability indicators are statistically significant because the statistical significance of the base effect S dominates in the calculation of the statistical significance the average effect. The average spinoff therefore has a positive and statistically significant effect on both measures of profitability, and a statistically insignificant negative effect on the unit labor cost. Given that the average value of profit/labor cost and profit/equity equal to 0.317 and 0.132, respectively, the mean effect of spinoffs on profitability of firms is large.

The effects of ownership changes on performance vary with the type of owner and whether or not the firm is a spinoff. With the ownership coefficients and standard errors in Table 7 being multiplied by a factor of 100 for ease of interpretation and dispersed ownership serving as the base,²¹ one can see that the extent of state ownership does not much affect performance in either type of firm. The only effects of state ownership that are statistically significant or somewhat close to being significant are the negative effects on the two measures of profitability in firms without spinoffs. Reducing state ownership during large scale privatization hence brings limited positive effects on the profitability of firms that did not experience spinoffs, while the effect on spun-off units is insignificant.

Ownership of firms by an industrial company has positive or insignificant effects on performance (relative to dispersed ownership). Greater ownership by an industrial company decreases labor costs/sales in both the spun off units and firms that do not experience spinoffs,

²¹ Dispersed ownership, with no type of owner having more than 10% of the shares is the base contained in the constant term.

and it also increases profit/equity in firms without spinoffs. With other effects being insignificant, industrial firms as new owners hence improve cost efficiency and leave unchanged or improve profitability.

Financial companies and individuals, on the other hand, appear to be owners that do not improve and in several aspects reduce efficiency. Financial companies have a negative effect on both measures of profitability in the spinoffs and also a positive effect on unit labor cost in firms without spinoffs. Greater ownership by individuals has a similarly non-positive effect, with the coefficients being mostly insignificant, the effect on profit/labor cost being negative for spinoffs and the effect on unit labor cost being positive for firms without spinoffs.

In Table 8 we report the DID estimates that capture the effect of spinoffs and privatization on (growth of) sales. The base effect of spinoffs is large (18%), positive and statistically significant at a 7% two-tail test level. The coefficients on dL and dK are insignificant and the strong positive effect of spinoffs on the scale of operations (proxied by the logarithm of sales) hence does not vary with the size of the spinoff. This finding broadens the support for our conclusions based on the estimates of equation (1) that spinoffs have a positive effect on corporate performance.

The effects of changes in ownership structure are varied. A greater reduction of state ownership results in greater sales in spun-off units but lower sales in firms without spinoffs. In the case of spinoffs, the effect of reducing state ownership stands out against the uniform effect of all other types of ownership. In the case of firms without spinoffs, there is no significant sales effect associated with ownership by an industrial company, but there is a negative sales effect associated with ownership by financial companies and individuals.

5. Conclusions

Our study, based on new data from a rapidly emerging market economy (the Czech Republic), suggests that spinoffs and changes in ownership have a number of significant but also some insignificant effects on the performance of firms. We show that spinoffs increase the firm's indicators of profitability and scale of operations (sales), but do not reduce in a significant way its unit labor cost. The performance effects of privatization depend on the resulting ownership structure and on whether or not the firm experienced a spinoff. In particular, smaller state ownership does not result in uniform and widespread improvements in performance. It has a

weakly significant positive effect on profitability of firms without spinoffs, relative to other types of ownership, but other effects are insignificant or mixed. Industrial firms as owners reduce the unit labor cost and leave unchanged or increase profitability. Greater ownership by financial companies or individuals reduces profitability in spun-off firms and increases unit labor cost and reduces sales in firms without spinoffs.

The overall evidence for spinoffs is hence consistent with our first hypothesis, namely that spinoffs have a positive effect on performance – presumably by eliminating prior inefficiencies such as diseconomies of scale of large SOE conglomerates, weak managerial incentives, information asymmetries, and a lack of focus on core competence. The effect of privatization is much less straightforward. Reducing state ownership *per se* is positive for some performance indicators in the case of firms without spinoffs, but it is less so in the spun-off units. Industrial firms as owners improve or do not hamper performance and in that sense they behave consistently with our first hypotheses. Financial companies and individuals as owners are mostly associated with no improvement and in some cases significant declines in performance, thus providing evidence that is consistent with our second hypothesis related to tunneling (looting) by managers and/or owners in the presence of waning government controls, unclear corporate governance, and weak market-oriented legal framework. The effects of privatization are hence much less positive and clear-cut than was suggested in many of the early studies.

Methodologically, our study provides strong evidence that it is important (a) to take into account changes in ownership when analyzing the effect of spinoffs, and (b) to control for endogeneity, selection and data attrition when analyzing the effects of spinoffs and privatization.

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Figure 1
A Stylized Model of a Corporate Spinoff

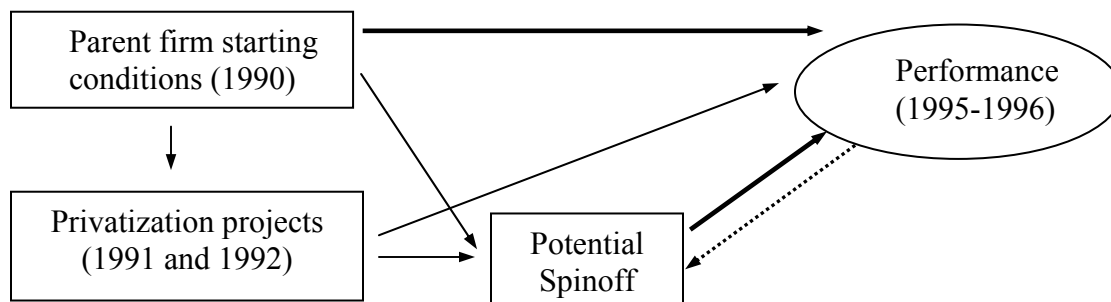


Figure 2
Shares of Labor and Capital Spun-off from the Parent Firm at the time of the Split

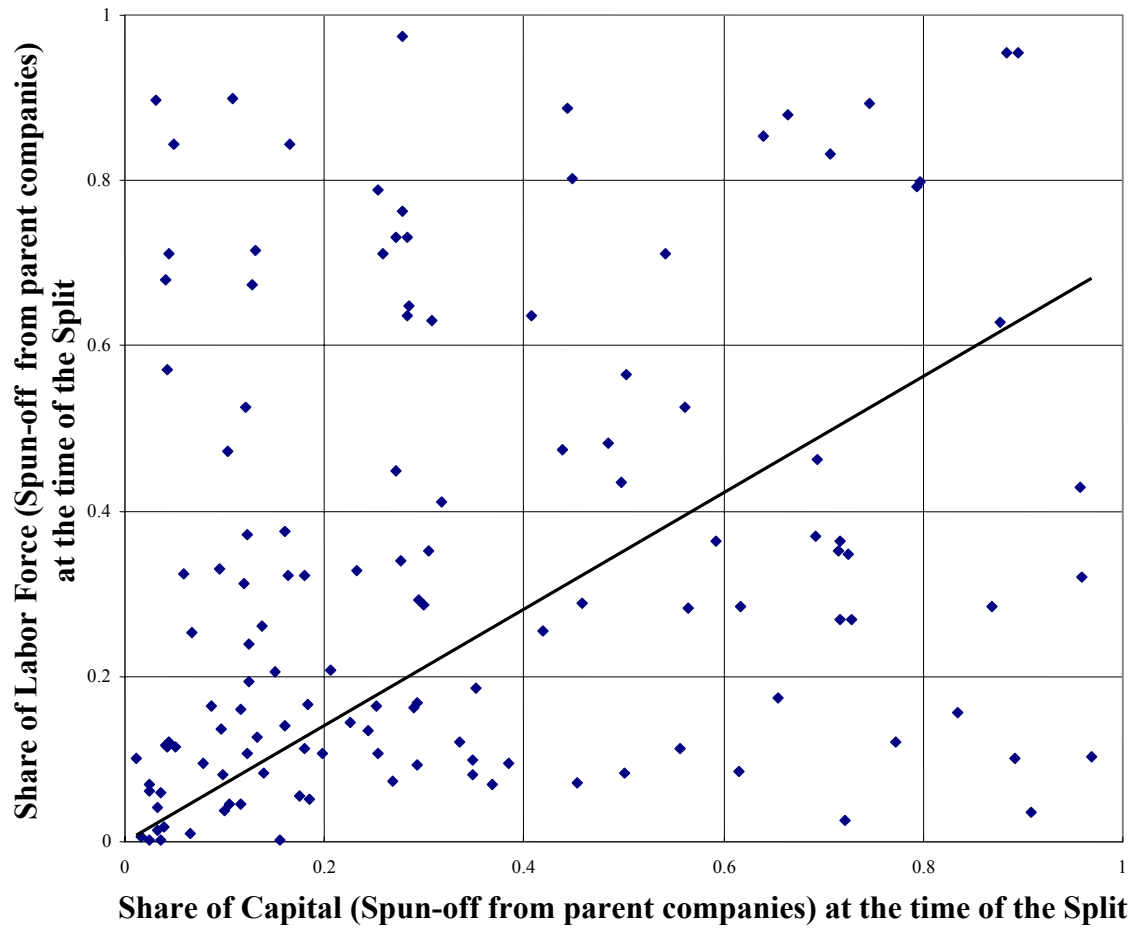


Figure 3

Change in Sales from the Pre-spinoff to the Post-spinoff Period

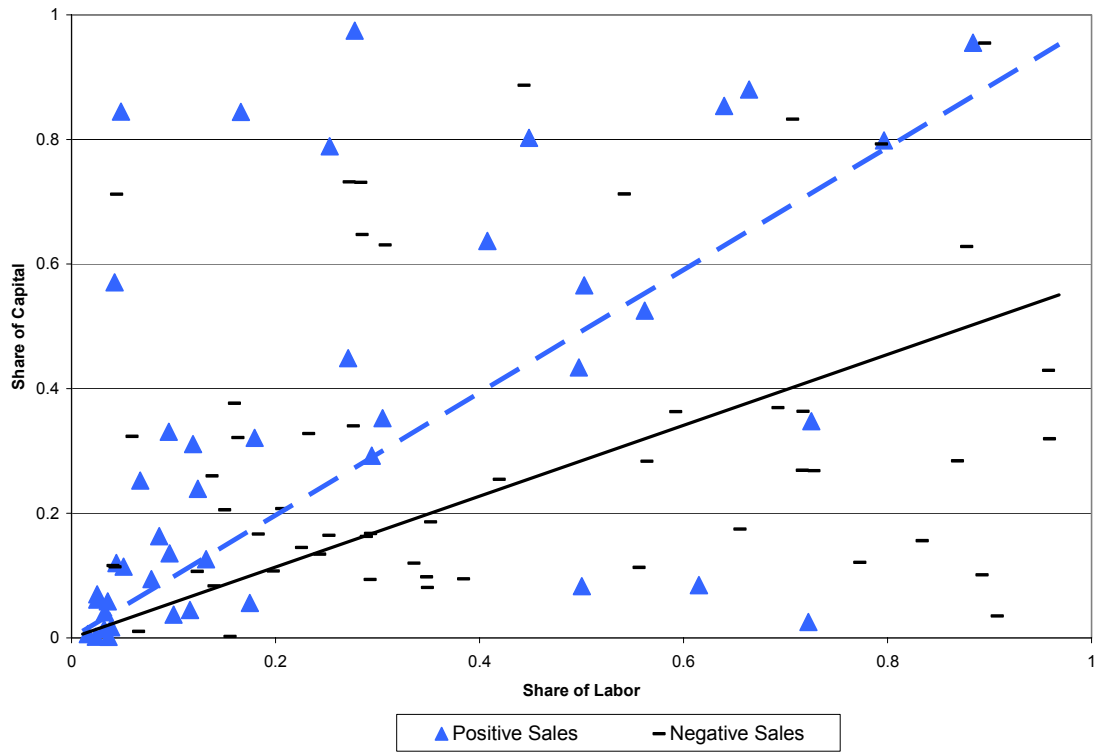


Table 1
 Summary Statistics on Projects to Privatize Enterprises in the First
 Wave of the Czech Voucher Scheme

	No. of Projects	No. of Firms	No. of Projects per Firm
Projects Submitted	11349	2404	4.7
Decision Reached	10514	2128	4.9
Projects Approved	3669	1963	1.9
Projects Rejected	6845	165	41.5
Remaining to be Decided	935	276	3.4

Source: Ministry of
Finance

Table 2
Proposers of Privatization Projects in the Czech Republic

Project Submitted by	Total	Percentage
Management of Company	2813	25
Management of Plants	450	4
Bidders for Purchase of Company	4388	39
District Privatization Commission	788	7
Restitution Claimants	450	4
Local Government	450	4
Consulting Firms	338	3
Others	1575	14
Total	11252	100

Source: Kotrba and Svejnar (1994)

1. Bidders for purchase of company are proposers of competing projects who wish to purchase the company.
2. Consulting firms submit projects proposing sales to other entities or applying to get a contract for organizing a tender or auction.

Table 3
Summary Statistics of Pre-Spinoff Indicators in 1990

	Mean	Std. Dev.	Min	Max	Median	No.of Firms
<i>Parent Enterprises</i>						44
Profit	171.1	0.4	-271.8	2,050.2	20.2	44
Sales	1,847.8	2.7	60.0	14,500.0	686.1	44
Employment	2,435	3,729	175	23,138	1,334	44
Assets	1,930.0	8.6	47.2	57,600.0	331.1	44
Liabilities	431.9	0.9	2.9	5,787.4	140.8	44
No. of Spinoffs	2.98	1.5	2	9	2	44
No. of Projects ¹	8.98	12.2	1	77	5	44
<i>Firms without Spinoffs</i>						780
Profit	73.7	0.7	-612.8	16,700.0	5.6	778
Sales	828.4	2.8	1.5	50,800.0	213.5	779
Employment	1,156	3,049	3	49,701	402	780
Assets	313.4	0.8	2.2	9,391.4	105.5	780
Liabilities	232.1	0.8	0.1	14,400.0	53.6	717
No. of Projects ¹	2.96	4.4	1	41	1	780
<i>Spun-off Units</i>						131
Profit	57.9	0.2	-267.2	1,874.4	4.7	130
Sales	620.6	1.5	6.2	13,100.0	133.9	131
Employment	818	1,901	23	17,880	294	131
Assets	648.2	4.3	15.8	49,200.0	78.1	131
Liabilities	157.0	0.5	0.1	5,295.1	27.7	121

¹Original projects were assigned only to the master firms and to control group. Hence no information on number of projects is available for spun-off units.

All financial indicators are expressed in mn. CZK (average exchange rate in period studied \$1=30CZK)

Table 4
Proposed Allocation of Shares Among Privatizing Parties in the Winning Projects (in %)

		Mean	Std. Dev.	Min	Max
<i>Spun-off Units</i>	Foreign Owner	1.15	6.75	0	51
	Domestic Owner	2.15	9.52	0	52
	Restitution	0.46	2.44	0	18
	Fund of National Property (Temporary)	8.30	14.74	0	57
	Fund of National Property (Permanent)	0.12	0.51	0	3
	Sale throughout Intermediary	0.34	2.34	0	20
	Municipality Transfer	3.21	8.20	0	67
	Other	0.00	0.00	0	0
<i>Firms without Spinoffs</i>	Foreign Owner	1.74	9.08	0	75
	Domestic Owner	4.28	14.42	0	84
	Restitution	0.41	2.70	0	58
	Fund of National Property (Temporary)	5.98	13.19	0	82
	Fund of National Property (Permanent)	0.28	3.07	0	45
	Sale throughout Intermediary	1.83	7.66	0	72
	Municipality Transfer	0.88	2.34	0	20
	Other	0.07	0.94	0	16
<i>Full Sample</i>	Foreign Owner	1.66	8.78	0	75
	Domestic Owner	3.97	13.84	0	84
	Restitution	0.42	2.66	0	58
	Fund of National Property (Temporary)	6.31	13.44	0	82
	Fund of National Property (Permanent)	0.26	2.85	0	45
	Sale throughout Intermediary	1.62	7.16	0	72
	Municipality Transfer	1.22	3.87	0	67
	Other	0.06	0.87	0	16

Note: The number of observation is equal to 131 for spun-off snits, 780 for control group and 911 for the full sample.

Table 5
Industrial Sectors and Regional Distribution of the Firms Studied

Variable	Spun-off Units	Control Group	Full Sample
<i>Regions</i>			
Prague	12.2%	20.4%	19.2%
Central Bohemia	6.1%	8.5%	8.1%
Southern Bohemia	2.3%	6.5%	5.9%
Western Bohemia	13.7%	8.2%	9.0%
Northern Bohemia	9.9%	11.7%	11.4%
Eastern Bohemia	12.2%	11.5%	11.6%
Southern Moravia	22.9%	18.5%	19.1%
Northern Moravia	20.6%	14.7%	15.6%
<i>Industrial Sectors</i>			
Agriculture	1.5%	1.4%	1.4%
Heavy Machinery	48.9%	34.6%	36.7%
Light Machinery	13.0%	19.6%	18.7%
Constructions	12.2%	21.5%	20.2%
Transportation	2.3%	2.4%	2.4%
Trade	3.1%	12.1%	10.8%
R & D	1.5%	1.9%	1.9%
Services	13.0%	4.0%	5.3%
Financial	4.6%	2.4%	2.7%

Note: The number of observation is equal to 131 for spun-off units, 780 for firms without spinoffs and 911 for the full sample.

Table 6
Summary Statistics of Performance Indicators: 1995-1996

		Mean	Std. Dev.	Min	Max	Num. Firms
1995						
<i>Spun-off Units</i>	Labor Costs	96.4	0.27	1.12	2,405	91
	Sales	1,067.5	5.35	1.59	50,570	91
	Profit/ Labor Costs	0.5	1.20	-2.70	7	91
	Profit / Equity	0.1	0.2	-0.3	0.9	91
<i>Firms without Spin-offs</i>	Labor Costs	82.6	0.14	0.90	2,229	538
	Sales	558.8	1.72	0.27	29,872	538
	Profit/ Labor Costs	0.3	0.89	-2.89	7	538
	Profit / Equity	0.1	0.2	-0.3	0.9	538
<i>Full Sample</i>	Labor Costs	84.6	0.17	0.90	2,405	629
	Sales	632.4	2.58	0.27	50,570	629
	Profit/ Labor Costs	0.3	0.95	-2.89	7	629
	Profit / Equity	0.1	0.2	-0.3	0.9	629
1996						
<i>Spun-off Units</i>	Labor Costs	112.5	0.32	4.73	2,818	86
	Sales	1,210.9	6.03	2.08	55,495	86
	Profit/ Labor Costs	0.4	1.01	-2.36	6	86
	Profit / Equity	0.1	0.2	-0.3	0.9	86
<i>Firms without Spin-offs</i>	Labor Costs	91.4	0.16	0.60	2,415	522
	Sales	536.4	1.20	0.16	17,423	522
	Profit/ Labor Costs	0.3	0.76	-2.38	6	522
	Profit / Equity	0.1	0.2	-0.3	0.9	522
<i>Full Sample</i>	Labor Costs	94.3	0.19	0.60	2,818	608
	Sales	631.8	2.53	0.16	55,495	608
	Profit/ Labor Costs	0.3	0.80	-2.38	6	608
	Profit / Equity	0.1	0.2	-0.3	0.9	608

Labor Costs and Sales are expressed in million CZK. Exchange rates at the end of 1995 and 1996 were \$1=26.6 CZK and \$1=27.3 CZK, respectively.

Table 7
Effects of Spinoffs and Changes in Ownership Structure on Performance
(Instrumental Variable (IV) Estimates; Standard Errors in Parentheses)

Dependent Variable:	Labor Costs/ Sales	Profit/ Labor Costs	Profit/Equity
<i>Effects of Spinoffs</i>			
<i>S(Base Effect)</i>	-0.009 (0.028)	0.991 ⁵ (0.460)	0.174 ¹ (0.066)
<i>dL (Share of Original Labor Force)</i>	0.018 (0.033)	0.153 (0.164)	0.073 ¹⁰ (0.039)
<i>dK (Share of Original Capital)</i>	-0.529 ⁵ (0.027)	0.026 (0.247)	-0.074 ¹⁰ (0.042)
<i>Effects of Ownership Structure: Spun-off Units</i>			
<i>Industrial firm</i>	-0.693 ¹ (0.264)	-2.302 (2.408)	-0.603 (0.442)
<i>Financial company</i>	0.332 (0.301)	-8.248 ⁵ (3.808)	-1.310 ⁵ (0.573)
<i>Individual owner</i>	0.111 (0.669)	-18.628 ⁵ (9.518)	-1.878 (1.471)
<i>State</i>	0.303 (0.558)	-8.631 (6.596)	-1.297 (1.227)
<i>Effect of Ownership Structure: Control Group of Firms with No Spinoffs</i>			
<i>Industrial firm</i>	-0.45 ¹ (0.109)	0.853 (0.600)	0.731 ¹ (0.235)
<i>Financial company</i>	0.277 ⁵ (0.121)	0.096 (0.722)	-0.098 (0.321)
<i>Individual owner</i>	0.445 ¹⁰ (0.263)	-1.794 (1.680)	0.016 (0.756)
<i>State</i>	0.233 (0.234)	-2.638 ¹⁰ (1.507)	-1.388 (0.861)
<i>Constant</i>	0.241 ¹ (0.021)	1.201 ¹ (0.270)	0.290 ⁵ (0.129)
<i>Mills' Ratio</i>	0.033 (0.028)	-1.225 (0.282)	-0.270 ⁵ (0.129)
<i>Pre-split performance indicators</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>R-square</i>	0.061	0.072	0.153
<i>Adjusted R-square</i>	0.047	0.058	0.140
<i>Number of Observations</i>	1280	1279	1234
<i>Hausman test (degree of freedom)</i>	102.3 (6)	48.9 (8)	422.9 (7)
<i>Upper tail area</i>	< 0.01	< 0.01	< 0.01

Note: Since after a spinoff and subsequent privatization the state only reduces its share, the coefficients associated with state ownership refer to a reduction of state ownership

1= Significant at 1% statistical test level.

5 = Significant at 5% statistical test level.

10 = Significant at 10% statistical test level.

Table 8
Effect of Split-related Characteristics on Performance
Difference in Difference Instrumental Variable (IV) Estimates
(Standard errors in parentheses)

	<i>ln Sales</i>
	IV
<i>Effects of Spinoffs</i>	
<i>s(Base Effect)</i>	18.213 ¹⁰ (9.828)
<i>dL (Share of Original Labor Force)</i>	0.022 (0.168)
<i>dK (Share of Original Capital)</i>	-0.092 (0.082)
<i>Effects of Ownership Structure: Spun-off Units</i>	
<i>Industrial firm</i>	7.251 (4.731)
<i>Financial company</i>	1.313 (5.372)
<i>Individual owner</i>	8.741 (11.416)
<i>State</i>	-17.099 ¹⁰ (9.849)
<i>Effect of Ownership Structure: Control Group of Firms with No Spinoffs</i>	
<i>Industrial firm</i>	0.270 (1.533)
<i>Financial company</i>	-5.688 ¹ (1.454)
<i>Individual owner</i>	-5.902 ¹⁰ (3.507)
<i>State</i>	2.299 ¹ (0.291)
<i>Mills' Ratio</i>	-5.211 ¹ (0.431)
<i>R-square</i>	0.130
<i>Adjusted R-square</i>	0.122
<i>Number of Observations</i>	1347
<i>Hausman test (degree of freedom)</i>	22.238
<i>Upper tail area</i>	< 0.01

We instrument for both split and ownership (IV).

Note: Since we define all ownership categories in terms of a change in ownership between 1995-6 and 1990, the state ownership variable refers to the reduction of the state's share while for the remaining categories this difference reflects an increase.

1= Significant at 1% stat. test level.

5 = Significant at 5% stat. test level.

10 = Significant at 10% stat. test level.

Appendix

Table A1:
Time-varying Coefficient Estimates of the Effects of Spinoffs and
Changes in Ownership Structure on Performance
(Instrumental Variable (IV) Estimates; Standard Errors in Parentheses)

<i>Dependent Variables:</i>	Labor Costs/ Sales	Profit/ Labor Costs	Profit per Equity
<i>Effects of Spinoffs</i>			
<i>S (Base Effect)</i>	-0.009 (0.028)	0.997 5 (0.464)	0.175 1 (0.066)
<i>dL (Share of Labor Force)</i>			
<i>1995 Effect</i>	0.340 (0.456)	-0.022 (0.222)	0.076 (0.053)
<i>1996 Effect</i>	0.001 (0.047)	0.338 (0.231)	0.067 (0.062)
<i>dK (Share of Capital)</i>			
<i>1995 Effect</i>	-0.054 (0.038)	0.278 (0.364)	-0.057 (0.055)
<i>1996 Effect</i>	-0.050 (0.040)	-0.229 (0.304)	-0.090 (0.057)
<i>Effects of Ownership Structure: Spinoff Units</i>			
<i>Industrial firm</i>	-0.691 1 (0.266)	-2.328 (2.423)	-0.606 (0.446)
<i>Financial company</i>	0.331 (0.303)	-8.265 5 (3.835)	-1.315 5 (0.576)
<i>Individual owner</i>	0.097 (0.671)	-18.658 5 (9.551)	-1.904 (1.471)
<i>State</i>	0.302 (0.562)	-8.647 (6.623)	-1.312 (1.224)
<i>Effect of Ownership Structure: Control Group of Firms with No Spinoffs</i>			
<i>Industrial firm</i>	-0.45 1 (0.109)	0.85 (0.601)	0.730 1 (0.235)
<i>Financial company</i>	0.278 5 (0.121)	0.105 (0.722)	-0.096 (0.321)
<i>Individual owner</i>	0.447 (0.263)	-1.780 (1.681)	0.018 (0.756)
<i>State</i>	0.233 (0.233)	-2.657 10 (1.507)	-1.388 10 (0.861)
<i>Constant</i>	0.241 1 (0.028)	1.199 1 (0.270)	0.289 5 (0.129)
<i>Mills Ratio</i>	0.033 (0.029)	-1.224 1 (0.282)	-0.269 5 (0.129)
<i>Pre-split performance indicators</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>R-square</i>	0.061	0.073	0.153
<i>Adjusted R-square</i>	0.045	0.058	0.138
<i>Number of Observations</i>	1280	1279	1234
<i>Hausman test (degree of freedom)</i>	40.2 (6)	107.2 (7)	32.2 (7)
<i>Upper tail area</i>	< 0.01	< 0.01	< 0.01

Note: Since after a spinoff and subsequent privatization the state only reduces its share, the coefficients associated with state ownership refer to a reduction of state ownership

1= Significant at 1% stat. test level.

5 = Significant at 5% stat. test level

10 = Significant at 10% stat. test level.

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