

Asset Sales to Private Equity Funds – Shareholder Value Maximization on the Sell-Side?

Stefan Morkötter / David Oesch***

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Abstract

In this paper, we analyze the question of whether companies that sell assets to private equity funds experience higher abnormal returns than companies that sell assets to buyers with strategic interests. Moreover, we investigate whether companies that sell assets to private equity investors have different changes in systematic risks than companies that sell to strategic buyers. Using data for asset sales in Germany, Switzerland and Austria and employing event study methodology, we find that the announcement of asset sales generally generates positive abnormal returns with the transactions where there is a private equity buyer having significantly higher abnormal returns compared to transactions where there is a strategic buyer. On the other hand, we find no evidence of changes in systematic risk, neither for the sample consisting of all transactions nor for the sub-samples of sales to private equity funds and strategic buyers, respectively.

Keywords: Private Equity, Asset Sales, Event Studies

JEL Classification: F 39, G12, G14

* Dr. Stefan Morkötter, Assistant Professor, Swiss Institute of Banking and Finance (s/bf), University of St. Gallen (HSG), Rosenbergstrasse 52, CH-9000 St. Gallen, phone: +41 71 224 7755, fax: +41 71 224 7088, stefan.morkoetter@unisg.ch.

** David Oesch, Swiss Institute of Banking and Finance (s/bf), University of St. Gallen (HSG), Rosenbergstrasse 52, CH-9000 St. Gallen, phone: +41 71 224 7028, fax: +41 71 224 7088, david.oesch@unisg.ch.

I. Introduction

We analyse how asset sales to private equity funds affect the risk and return of the shareholders of the selling entity. Specifically, we argue that asset sales to private equity investors lead to shareholder maximization on the sell-side. Shareholder value maximization is defined as the highest price obtained by the company throughout the sales process. We argue that private equity investors are able and willing to pay higher prices than other bidders, with other bidders being defined as strategic buyers that act in our paper as a control group. Since this argument is not directly tractable, we use abnormal returns of sell-side shareholders after the announcement date of asset sales as a proxy. Take for example Linde's sale of its forklift division (Kion) to a private equity fund. Our aim is to investigate whether this asset sale - if at all - positively or negatively impacts the share price of Linde and if the sales price - and linked to it the stock price reaction to the transaction's announcement - would have been different, if Linde would have sold the forklift division to a strategic buyer.

The main contribution of our paper is that, on the basis of an event study approach, sell-side shareholders indeed experience significantly higher abnormal returns following the announcement of asset sales to private equity investors compared to the case of strategic buyers. Asset sales to private equity investors generate an abnormal return of 3.25% on a day -1 basis, whereas asset sales to strategic buyers generate a significant lower abnormal return of 1.52% on a day -1 basis. Our empirical results rely on a novel data set of 628 asset sales, which is divided into 314 asset sales to private equity investors and 314 asset sales to strategic buyers. The analysed asset sales took place in Austria, Germany and Switzerland between 1993 and 2007. Moreover, we also investigate changes in the sell-side companies' risk factor (beta factor), leading to the result that both, for asset sales to private equity investors and to strategic buyers, changes in the risk factor are not significant.

The theoretical foundation of private equity funds' ability to outbid strategic buyers relies on private equity literature stating that private equity investors implement different strategies to create additional value in the acquired companies or assets. We assume that these strategies are not implemented on a comparable level by strategic buyers, because they are not able to (e.g. leverage ratio) or not willing to (e.g. changes in the incentive structures). However, strategic buyers can potentially overcome this disadvantage to the private equity side by leveraging on the synergies with the buyer's own operational assets.

In the course of our paper, we apply a broad definition of asset sales including sales of plants and divisions or subsidiaries, which can take place in the form of buyouts or normal acquisitions. In this paper, we use abnormal returns and announcement returns simultaneously. Abnormal or announcement returns are defined as the returns experienced by shareholders after the selling company's announcement to undertake a specific asset sale transaction in excess of the market return (e.g. market model). Following Lerner (1999), we can divide private equity into the main investment funds categories: venture capital funds and buyout funds. Especially during the last decades, many different subgroups have emerged around these two core segments (e.g. funds specialized in mezzanine investments, distressed debt or build-up). For our paper, we rely on this general classification of private equity and label in the following every buyer as a private equity buyer if he fits into these two core categories or belongs to one of the many existing subgroups.

Existing finance literature primarily focuses either on asset sales or private equity but has not combined these two academic areas. Literature on private equity and buyouts does not single out asset sales as an individual test group – at the most as a structuring variable within the analysis of leveraged buyouts. In turn, our data sample is not limited to leveraged buyouts only, but incorporates asset sales in general. This is conform with literature on asset sales, which in turn focuses on the returns experienced by the shareholders on the sell-side, but does not specifically single out private equity and buyout funds as an individual test group. Therefore, we range in our research question within a niche between asset sales and private equity and show that so far no research has been undertaken by linking studies on announcement effects of asset sales to private equity investments.

The paper is organized as follows: Following a literature review (Section II), we develop a theoretical framework (Section III) of asset sales to private equity investors and formulate competing hypotheses, which are tested in our empirical section (IV). The empirical section is followed by a discussion and concluding remarks (V).

II. Literature Review

The theoretical framework as well as the empirical section of our paper primarily rely on finance literature undertaken in the fields of value maximization, asset sales and private equity. In between these three basic fields of relevant literature, we combine previous research in order to lay the ground both for a specific model and an empirical test section in order to detect whether or not asset sales to private equity funds lead to value maximization for sell-side shareholders.

Value Maximization

The framework of the discussed theoretical model is generally based upon the findings in the field of value maximization theory. Relevant literature covers various aspects of value maximization. However, since in the course of our model we use value maximization theory as a basic assumption, we limit the literature review at this point to some basic references. Earlier research generally focused on value maximization of firms undertaken by managers in order to primarily increase the value of a company against the background of models, which often also incorporated a dynamic aspect (e.g. Diamond, 1967). By including new elements, other authors extended the basic statistic models. Grossman and Stiglitz (1977) for example developed a general equilibrium model, in which the shareholder's voting behavior is explicitly included. Besides this string of research, a second one emerged focusing more on the manager's role and detected certain incentives that may distract managers from the sole focus on firm's value maximization (e.g. Arrow, 1969; Jensen and Meckling, 1976). In the following, the issue of value maximization in this context has been analyzed in different settings (e.g. Shleifer and Vishny, 1988).

Asset Sales

Empirical studies analyzing asset sales and asset purchases so far primarily focus on the transactions' impact on firm value and therefore on shareholders' wealth (e.g. Alexander, Benson and Kampmeyer, 1984). Building upon these results, a second string of relevant literature has emerged during the last two decades concentrating more on the determinants leading to asset sales or asset purchases (e.g. Warusawitharana, 2008). As one of the first empirical studies, Alexander, Benson and Kampmeyer (1984) turn their attention towards asset sales and empirically analyze the effect of announcements of 53 voluntary corporate asset sell-offs on shareholders' wealth. Their empirical

results show positive abnormal returns to the shareholders of the selling companies (2.38% on a day -1 basis). Other studies also focusing on effects of asset sales on firm value support these empirical findings of positive abnormal returns following the announcement of asset sales (e.g. Jain, 1985; Hite, Owers and Rogers, 1987; Brown, James and Mooradin, 1993; John and Ofek, 1995; Mulherin and Boone, 2000; Dittmar and Shivdasani, 2003; Ray and Warusawitharana, 2007). Slovin, Sushka and Polonchek (2005) extend the basic empirical setting by incorporating the methods of payment in the course of corporate asset sales and its impact on the wealth of both sell- side and buy-side stockholders. According to their empirical results, the seller's announcement returns amounts to 3% on average and to up to 10% for the buyer if the buyer's equity is used as measure of payment (both on a day -1 basis).

Whereas the above-discussed research approaches primarily focus on the shareholders' wealth effects (announcement returns) triggered by asset sales, a second string of literature on asset sales exists which in addition also captures the determinants of asset purchases and sales. A detailed study in relation to the use of asset sales' proceeds by the selling entities is performed by Lang, Poulsen and Stulz (1995) as well as by Bates (2005). In contrast to the studies on asset sales investigating the abnormal returns following the announcement of divestitures, Maksimovic and Phillips (2002) introduce and find empirical support for a theoretical set-up which focuses on efficiency gains (e.g. operational performance measures) experienced by firms engaged in divestitures activities after the asset sale is announced. Viewing asset sales as a capital resource to fund new investment opportunities, Hovakimian and Titman (2006) define investment opportunities as a determinant for asset sales. In turn, asset sales can also be considered as a proxy for potential investment activities at firms. On the basis of a dynamic equilibrium model, Yang (2006) shows that empirical evidence on announcement returns is consistent with value-maximizing behavior by the involved parties. Yang's theoretical model suggests that changes in the level of productivity directly influence firms' decisions to either buy or sell assets. Firms with increasing levels of productivity are therefore more willing to buy assets than companies with declining levels of productivity. Warusawitharana (2008) develops and tests a model in which asset sales are theoretically linked to capital transfer from less productive to more productive companies. In addition to the studies focusing on the return to shareholders in the course of asset sales, Hanson and Song (2006) analyze if there is a link between asset sales and internal corporate governance mechanisms. Weak corporate governance policies rise the likeliness of over-

investment and thus lead in a second step to increased asset sales activity in order to correct the earlier mismanagement. The empirical results of Hanson and Song are also a link to existing literature on value maximization theory (e.g. Shleifer and Vishny, 1988).

Private Equity

Our primary focus is on returns experienced by shareholders after the transaction's announcement of asset sales in connection to private equity investments. Therefore, we limit the following overview on literature with a specific focus on research in the area of financial performance of buyouts and private equity and the returns to shareholders linked to private equity activities. We show that to the best of our knowledge, no research has been undertaken by linking studies on announcements effects of asset sales to private equity investments in comparison to strategic buyers in the financial literature so far. However, besides the financial performance, various elements of buyouts and private equity have been discussed in the literature. Some authors analyze for example exit strategies of private equity investments (e.g. Murray, 1994; Wang and Sim, 2001; Cumming, Fleming and Suchard, 2005), whereas other studies focus on private equity and agency theory (e.g. Bruton, Keels and Scifres, 2002; Kaplan and Stromberg, 2004). In line with Cumming, Siegel and Wright (2007), we classify financial performance of buyouts and private equity into the following segments: return to shareholders, accounting performance and return to investors. By looking at various studies, Cumming, Siegel and Wright conclude that both in terms of share price and accounting data, the overall financial performance seems to improve in the wake of a buyout (see also Kaplan, 1989; Lehn and Poulsen, 1989; Andrade and Kaplan, 1998; Baker and Wruck, 1989; Jensen, 1989; Wright, Wilson and Robbie, 1996; Desbrierers and Schatt, 1992). The first – and for our research question also the foremost – subgroup of financial performance of private equity and buyout activities are the studies on returns to shareholders. A variety of different studies focusing on returns to shareholders in the course of private equity investments including Lehn and Poulsen (1989); Weir, Laing and Wright (2005) as well as Renneboog, Simons and Wright (2007) analyze returns experienced by shareholders of public companies during going private transactions. These studies empirically conclude that shareholders gain additional wealth following a going private transaction and are often rewarded with a premium on the traded share price at the announcement date of the transaction.

III. Theoretical Framework

1. Methodology

In the following, we develop a theoretical framework targeting both abnormal returns experienced by shareholders following asset sales as well as changes in selling companies' risk positions before and after the asset sale. After describing the underlying methodology and defining some indispensable assumptions, we set up hypotheses which will be tested in the empirical section both in terms of abnormal returns and risk factors. Risk factors are defined as the common beta factor (β^a), which in turn simply describes the movement of a stock or asset in connection to the movement of a benchmark (e.g. created as a market model relying on the CAPM):

$$\beta^a = \frac{Cov(r^a, r^m)}{\delta^a \delta^m} \quad (1)$$

where r^a indicates the stock return of a specific company, r^m represents the benchmark or market return and δ^a, δ^m are referring to the underlying volatility or standard deviation. In addition, abnormal returns are calculated on the announcement day of the asset sale in relation to corresponding timeframes before or after the announcement (e.g. one day). For reasons of simplicity, we assume for our theoretical framework that the assets are all paid in cash by the acquiring party, which is also the preferred method of payment in corporate asset sales.

In our theoretical model we assume that at $t = 0$ an asset sale is announced by a company. The involved assets can range from a plant, individual financial assets (e.g. ownership stake in a subsidiary) up to the sale of a complete division. We do not consider the complete sale of a company as an asset sale (e.g. leveraged buyout not of a company's division but of the whole company). Financial assets are limited to long-term investments which were previously built up in line with strategic reasons linked to the company's business. Factoring or forfeiting activities are not included since these transactions are considered as refinancing activities but are not viewed as a general asset sale. The sell-side company is assumed to be a public one, which has shares outstanding and is listed at the stock exchange either in Austria, Germany or Switzerland.

Another aspect of our theoretical framework is the behavior of sell-side companies' managers. As described in the literature review managers do not solely focus on the principle of value maximization for the shareholders but take into account personal interests (e.g. Shleifer and Vishny, 1988).

However, since we focus on asset sales and their announcements, we assume that if once the decision is made to sell an asset, managers pursue a value maximization strategy in the course of the sales process, or in other words, try to sell the assets for the highest price possible. In most countries, managers are not only legally obliged to do so, but it is also in the manager's interest to maximize the sale price because his actions undertaken in the asset sales process are highly visible for the shareholders and therefore the manager foremost wants to perform in the best interest of his shareholders. We also proceed on the assumption that the individual asset sale is structured as an auction process with more than one bidding party (e.g. at least on private equity and one strategic buyer). Therefore, the setting of our theoretical framework allows us to blind out the discussion evolving around value maximization behavior and incentive structures before the actual asset sale, since these ex-ante actions do not directly influence our methodology and formulation of hypotheses. In the course of our paper, value maximization is defined as the manager's effort to maximize the sales price for the offered assets.

Besides the asset sale itself, the sell-side company and its shareholders, a fourth element of our methodology is the buy-side. For our theoretical framework we define that the buy-side consists of two different groups of investors. On the one side, we have private equity and buyout investors, and on the other side we have strategic buyers.

Private Equity Investors

Following Lerner (1999) we can divide private equity into the main investment funds categories: venture capital funds and buyout funds. Especially during the last decades, many different subgroups have emerged around these two core segments (e.g. funds specialized in mezzanine investments, distressed debt or build-up). For our paper, we rely on this general classification of private equity and label every buyer as a private equity buyer if he fits into these two core categories or belongs to one of the many existing subgroups. Against the background of our research focus, it is more important to distinguish between strategic and private equity buyers than to distinguish between the different sub-groups of private equity. For our theoretical framework, we foremost rely on the basic feature of private equity organizations taking companies (and in our case assets of them) private. This feature is at the same time the core investment philosophy of buyout funds whereas venture capital funds primarily back up private companies which are not publicly listed at all. The private equity group in our test section is therefore dominated by buyout funds. By taking a public

company private or using the very same mechanisms to buy assets or divisions from a company, private equity funds pursue different strategies to enhance value creation in the course of the sales process and also in the aftermath of a successful bidding process. One of the common methods is that private equity funds structure their bidding offer using large portions of debt, leading to a high leverage factor (e.g. Arzac, 1992). This allows the private equity funds to leverage up the return of the actually invested equity in the whole transaction. However, especially during the last months, it has become increasingly difficult for private equity funds to find banks sponsoring leveraged activity. A second component of value creation on the side of private equity is directly linked to the leveraged factor: the tax shield. Basically, the tax shield is a discounted reduction in incomes taxes since interest payments on debt are a tax-deductible expense (see e.g. Brealey and Myers, 2003). Therefore, the higher the leverage ratio, the higher the tax shield. Another way how private equity funds specifically generate value for themselves is the distribution of excess cash holdings or cash flows of the entire entity to the owners, which in turn are the private equity funds (e.g. Lehn and Poulsen, 1989). This directly impacts a fourth determinant of value creation, namely the company's management. The less cash flow is available, the less cash flow can be allocated by managers to unprofitable projects or invested in building empires and the lower is the security line for managers in terms of financial distress. In addition to the resulting control variable through reduced cash holdings, private equity funds often also change the entire incentive and compensation scheme of the acquired entity's top management (e.g. Renneboog, Simons and Wright, 2007). Management compensation is linked to equity value through options or direct ownership stakes in the company. A radical strategy is to bring in new managers replacing the existing ones. It can often add significant value to the entity by replacing the existing management with external candidates, if former management is for example liable for making wrong decision or allowing low levels of profitability. However, all above-mentioned strategies of value creation are aimed to improve both accounting performance (e.g. level of profitability) as well as financial performance (e.g. returns).

Strategic Buyers

The second subgroup on the buy-side of our theoretical framework are the strategic buyers. In contrast to private equity investors, we assume that strategic buyers themselves are operating business activities somehow related to the bought entity or assets. Of course, also a private equity fund can undertake various investments within the same industry. But we assume that a private equity

fund primarily assesses each investment/ asset purchase on an isolated basis. Therefore, we can neglect the fact that a private equity funds also is operationally active within the industry of the acquired assets. On behalf of the strategic buyer, we assume that the acquired assets fit into to the portfolio of his own operations. This directly leads to a main driver of value creation for a strategic buyer following a successful bidding process. In contrast to the private equity fund, we argue that the strategic buyer is able to leverage his specific industry knowledge by transferring it to the acquired asset and therefore enhance the acquired asset value. This transfer process may also involve the dispatch of managers to the acquired entity. Of course, private equity funds can also transfer additional industry experience to the acquired entity by hiring new managers. However, this knowledge transfer is not as intensive as in the case of a strategic buyer. In addition to the leverage on their own industry knowledge, we define synergies as the second option of value creation. We assume that strategic buyers are able to generate substantial synergies (e.g. cost savings in procurement operation or consolidation of distribution channels) in the aftermath of the acquisition. In contrast to private equity funds, we proceed on the assumption that the feasibility of a strategic buyer to increase the leverage ratio is rather limited and bounded by their own balance sheet. In the bidding process, the strategic buyer therefore can only equalize this advantage on the side of private equity (which in turn allows private equity investors to bid up higher) by capitalizing on the synergies. In this case, expected synergies allow strategic buyers to increase their offer during the bidding process and thus improve their prospects to win the auction.

2. Competing Hypotheses

On the basis of the defined methodology, we theoretically explain and formulate seven different hypotheses, which will be tested in the empirical section of this paper. The first hypothesis is constructed around the assumption that asset sales generate a positive abnormal return for the shareholders of the selling entity following the announcement of an asset sale. We align this hypothesis with the relevant literature on asset sales, which documents a significantly positive announcement return. The argument for positive abnormal returns after the announcement of asset sales are the improvement of capital allocation (Maksimovic and Phillips, 2002) and thus leading to higher future operational performance (John and Ofek, 1995), the reduction of the diversification discount (Dittmar and Shivdasani, 2003) and the correction of an overinvestment period in connection with mis-

management, which in turn enhance the company's outlook (Hanson and Song, 2006). We therefore propose that:

Hypothesis 1: Sell-side shareholders experience positive abnormal returns following the announcement of an asset sale.

Besides the return perspective, we also analyze the risk element in the course of an asset sale. As already mentioned above, the risk factor is defined as the beta factor, which in turn is influenced by the volatility of the sell-side and a benchmark as well as the corresponding covariance. If we view the company, which aims to sell an asset, as a portfolio consisting of risky and risk-free assets, we can define the operational assets (e.g. divisions) as the risky asset class (RA_t^a) whereas the cash holdings (CH_t^a) represent the risk-free asset class. All assets within each asset class are homogenous. Thus, the reduction or increase of an asset class does not change its risk profile. The beta factor of the portfolio (β_t^a) is then computed as the weighted sum of the beta factor of the risky assets (β_t^{ra}) and the beta factor of the risk-free assets (β_t^{rf}), where as β_t^{ra} is assumed to be bigger than β_t^{rf} :

$$\beta_t^a = \frac{(1 - CH_t^a)}{(CH_t^a + RA_t^a)} \beta_t^{ra} + \frac{CH_t^a}{(CH_t^a + RA_t^a)} \beta_t^{rf} \quad (2) \quad , \text{ since } \beta_t^{rf} = 1$$

$$\beta_t^a = \frac{(1 - CH_t^a)}{(CH_t^a + RA_t^a)} \beta_t^{ra} + \frac{CH_t^a}{(CH_t^a + RA_t^a)} \beta_t^{rf} \quad (3) \quad , \text{ and } \beta_t^{ra} > 0$$

If the asset sale is announced at t and the purchase price is paid by the buyer in t+1 in cash, then we can note that ceteris paribus CH_{t+1}^a is higher than CH_t^a and RA_{t+1}^a is smaller than RA_t^a . At this point, we assume that the buyer is paying the fair value for the purchased asset and thus the reduction in the risky asset class equals the increase in the risk-free asset. Since we made the assumption that a reduction or increase of the assets belonging to a specific class does not change the risk profile of the asset class we can state that:

$$\beta_t^{ra} = \beta_{t+1}^{ra} \text{ and } \beta_t^{rf} = \beta_{t+1}^{rf} \quad (4)$$

which leads to the following hypothesis:

$$\beta_t^a > \beta_{t+1}^a \quad (5)$$

If the proceeds of an asset sale are not stocked in the cash holdings but directly paid out to the shareholders, formula (5) can still be viewed as correct since the cash holdings share of the overall portfolio in t+1 increases. Thus:

Hypothesis 2a: The risk factor (beta factor) of the selling company's stock decreases following the announcement of an asset sale.

In line with Lang, Poulsen and Stulz (1995) and Bates (2005), we can alternatively argue that the proceeds of an asset sale are not stocked in the cash holdings but reinvested into new (perhaps even riskier) projects leading to:

$$\beta_{t+1}^{ra} \geq \beta_t^{ra} \quad (6)$$

Since CH_{t+1}^a remains unchanged in comparison to CH_t^a we can note that, on the basis of (3) and (6),:

$$\beta_{t+1}^a = \left(\frac{(1 - CH_t^a)}{(CH_t^a + RA_{t+1}^a)} \beta_{t+1}^{ra} + \frac{CH_t^a}{(CH_t^a + RA_{t+1}^a)} \right) \geq \beta_t^a = \left(\frac{(1 - CH_t^a)}{(CH_t^a + RA_t^a)} \beta_t^{ra} + \frac{CH_t^a}{(CH_t^a + RA_t^a)} \right) \quad (7), \text{ or:}$$

Hypothesis 2b: The risk factor (beta factor) of the selling company's stock increases or remains unchanged following the announcement of an asset sale.

In order to address the research question whether or not asset sales to private equity investors lead to value maximization on the sell-side in terms of high announcement returns (as result of a high price generated throughout the sales process), we create a control group (strategic buyers) contrasting private equity investors. Each data set consists of more than 300 transactions. If it is meant to be value maximizing to sell assets to a private equity investor rather than to other investors (e.g. the control group), sell-side shareholders should experience higher announcement returns than experienced in asset sales to the control group. Theoretically, this hypothesis is linked to the findings of Lehn and Poulsen (1989) and Renneboog, Simons and Wright (2007) and to Kaplan (1989), Baker and Wruck (1989), Jensen (1989) and Wright, Wilson and Robbie (1996), which all provide empirically-proven determinants of how private equity investors create value or how they leverage their refinancing resources (e.g. tax shield, changes in incentives structures, higher leverage ratios). If we assume that these measures of value creation are primarily limited to or performed by private equity investors, we can state that private equity is able to bid up higher than other investors. This proposition leads to:

Hypothesis 3a: Sell-side shareholders experience higher abnormal returns following the announcement of an asset sale, if the acquirer is a private equity investor.

In turn we can argue that - with the exception of higher leverage ratios - the above-mentioned measures to create value are not exclusively limited to private equity investors. Therefore, strategic buyers (our control group) can also implement these strategies and are – like private equity - able to increase their bidding offers. As outlined before, higher leverage ratios are a private equity-specific characteristic. In order to equalize this advantage on the side of private equity, strategic investors need to capitalize on the synergies in the aftermath of an asset sale. If these gains are in excess of or about the same size as the gains obtained by private equity through the higher leverage ratio, it is hypothesized that:

Hypothesis 3b: In comparison to asset sales to private equity investors, sell-side shareholders experience equally high or higher abnormal returns following the announcement of an asset sale, if the acquirer is a strategic buyer.

In line with Hypotheses 2a and 2b we can also focus on differences in risk factor changes between private equity investors ($\beta_t^a(PE) - \beta_{t+1}^a(PE)$) and strategic buyers ($\beta_t^a(SB) - \beta_{t+1}^a(SB)$) following the announcement of an asset sale. If we assume that private equity investors are able and willing to pay the highest price, we can state that the selling company receives in this case the maximum price. If the proceeds (which are assumed to be in cash) are stored in the cash holdings or directly paid out to the shareholders we propose that the increase in CH_{t+1}^a is higher if the buyer is a private equity investors than compared to the buyer being a strategic investor. Using formula (3), a higher stake in CH_{t+1}^a leads ceteris paribus to a lower beta factor for the whole portfolio (selling company) and thus we propose that:

$$\left(\beta_t^a(PE) - \beta_{t+1}^a(PE)\right) > \left(\beta_t^a(SB) - \beta_{t+1}^a(SB)\right) \quad (8) \quad \text{since } \beta_t^a(PE) = \beta_t^a(SB)$$

$$\beta_{t+1}^a(PE) < \beta_{t+1}^a(SB) \quad (9) \quad \text{or:}$$

Hypothesis 4a: In comparison to an asset sale to a strategic buyer, the risk factor (beta factor) of the selling company's stock is lower following the announcement of an asset sale, if the buyer is a private equity investor.

Hypothesis 4a is based on the assumption that the proceeds of the asset sale are stored in the cash holdings or directly paid out to shareholders. In turn, we can also use the argumentation of Hypothesis 2b, stating that proceeds are a source to finance new (and perhaps also riskier) projects. If a private equity investors indeed pays the highest price for the assets, then the selling company gets more cash for new projects compared to asset sales to strategic buyers. Following formula (6) and (7) we propose that:

$$\beta_{t+1}^a(PE) \geq \beta_{t+1}^a(SB) \quad (10) \quad \text{or:}$$

Hypothesis 4b: In comparison to an asset sale to a strategic buyer, the risk factor (beta factor) of the selling company's stock is equally high or higher following the announcement of an asset sale, if the buyer is a private equity investor.

IV. Empirical Results

In order to test the hypotheses developed in our theoretical section, we obtain data on asset sales for Germany, Switzerland and Austria and test the predictions of our theory by means of event study methodology.

4.1 Data and Sample

We collect data on asset sales by companies from the M&A-Review database from the University of St. Gallen. This is a hand-collected database, keeping track of any type of merger and acquisition transaction for Germany, Switzerland and Austria. The database we employ records transactions from the years 1993 until 2007. The database covers a total of 14 industries and in total we have 2531 transactions that can be classified as asset sales, in which public corporations were acting as a selling entity. On the basis of the procedure detailed below, we are able to single out 314 asset sales in which private equity funds are buyers. In a first step, we go through all 2531 deals and try to select all the transactions in which assets have been sold to a private equity buyer and thereby generate our main sample. For the other deals, we check whether they can be classified as a buyer with a strategic interest in the assets. In order to decide to which category a particular deal belongs, we have had to make the following decisions. Banks and insurances that invest in industries other than the financial services industry were neither classified as either private equity nor as strategic buyer except when the transaction had been carried out by a specified private equity fund of a bank (e.g. Goldman Sachs Capital Partners). If the buyer of the assets is simply described as a “group of investors” in the database, we chose to include these rare deals in our private equity group because we support the view that these investor groups basically act like the private equity funds we are interested in. If we can detect any signs that a deal whose buyer is an “investment company” is simply a vehicle of a strategic buyer, then we classify this as a strategic buyer (a typical sign is that the buyer and the object are from the same industry). If the buyer is indicated as being “unknown”, we do not classify this transaction and eliminate it from our sample. If there is a private person that buys the assets, we exclude the deal as well since we do not think that such deals can be accounted for as deals by private equity funds in its proper sense. Both governmental and institutional investors were not classified as private equity buyers, since we suppose that they either have a strategic interest (and thus classify them as strategic buyers) or are not private equity deals per se. Finally we check

for all the remaining asset transactions if the selling companies are listed on a stock exchange and if the corresponding quotes are available on Thompson Datastream. This procedure leads to a final sample of 314 asset sales in which private equity funds are acting as a buyer. In a second step, we construct a control group of strategic buyers. We develop a simple algorithm that allows us to create a bias-free control group. We choose this procedure instead of just taking all non-private equity asset sales since the sample sizes would have been extremely dissimilar. The goal of our algorithm is to find for every asset sale to a private equity company a corresponding asset sale to a strategic buyer. We have developed this algorithm on our own but similar algorithms are used, e.g. in convertible bond studies, as proposed for instance by Loghran and Ritter (1997).

First, the strategic asset sale should take place in the same year as the private equity asset sale. The reason for this is that we want to capture any market sentiments, be it general over- or under-valuations. If it is not possible to find a deal in the same year, we look at the year after and at the year before the deal to find a corresponding transaction. This way, we could find a corresponding strategic buyer transaction for all private equity deals. Second, if we have identified the asset sales of the same year, the asset sale should furthermore also be in the same country in order not to induce a bias due to country-specific factors, this is also possible for all transactions. Third, the seller of the object should be in the same industry for both the strategic buyer and the private equity transaction (we use the industry classification that is used in the database (resulting in 14 different industries)). Fourth and finally, if there is more than one transaction that fulfills these first three steps, we compare the transaction volume of the Private Equity deal with the transaction volume of the potentially corresponding strategic buyer deals and select the one that is closest in terms of transaction volume. If no company satisfies the criteria above, we have decided to exclude this transaction from our database. We also have to reduce the sample if a company has no data available on Datastream or if the time series available is too short to carry out the estimation for the event studies below.

The application of the above-described algorithm leaves us with two groups of transactions, one consisting of asset sales to private equity funds and the other consisting of asset sales to buyers with a strategic interest. The final sample size, after all exclusions, is 314 transactions. Table 1 shows some descriptive statistics on these two groups of transactions. We can see that our proposed matching algorithm allows us to create a control group that is very similar to the private equity transactions, both in terms of the year and also the country in which the transaction has taken place. In a

final step we hand-collect for each of the 628 transactions the corresponding stock quotes of the selling companies on Datastream.

-- Insert Table 1 about here --

4.2 Event Study Analysis

4.2.1 Abnormal Returns

In order to gauge the effect that an announcement of an asset sale has on a company's value and to empirically test the hypotheses developed in the theoretical section of this paper, we carry out an event study analysis for both, the group consisting of transactions in which the assets are sold to private equity buyers and the control group consisting of transactions in which the assets are sold to strategic buyers. In doing this, we follow standard event study analysis as it is described, among others, by Campbell, Lo and MacKinlay (1997) or MacKinlay (1997). We use the widely used procedure for calculating abnormal returns based on daily stock data, as outlined by Brown and Warner (1980) as well as Campbell, Lo and MacKinlay (1997). When applying this procedure, we first estimate market model parameters based on individual stock and market return data by applying the ordinary least squares (OLS) method. We then analyze the error terms of the estimated market model (often also called the abnormal returns) and make statistic inference on these errors. In order to determine the power of our results, we perform the following tests: for the cumulative average abnormal returns (CARs) a standard t-test as well as a Wilcoxon sign-rank test, for average abnormal returns additionally the rank test introduced by Corrado (1989). For the Corrado-test, we use an event-window of [-20;+20] days for the estimation.

The described event study procedure is sensitive to the choice of benchmark returns, based on which the abnormal and cumulative abnormal returns are calculated. Thus, every test of capital market efficiency is a joint test of market efficiency and of the model of expected returns. To ensure that our results are not just induced by a misspecification in the way we specify the benchmark returns,

we additionally use the so-called simple market adjusted returns model (e.g. Brown and Warner, 1980), where, in the context of the market model, we simply set α equal to 0 and β equal to 1 for all stocks. However, since the results do not change substantially if we use this alternative specification, we have decided against reporting them. A careful check of the trading history of the stocks comprising our sample has led us to the decision that amendments for infrequent trading as proposed for instance by Scholes and Williams (1977) are not necessary. We calculate the abnormal returns as the disturbance terms of the market model, where market model estimates are obtained over a 250-day period from day -280 through day -31. As a proxy for the market return, we take for each of our three countries a corresponding MSCI country index, and we proxy the risk-free rate by a treasury rate.

The goal of our abnormal return event study is to investigate the validity of Hypothesis 1 as well as Hypotheses 3a and 3b. As to what concerns Hypothesis 1, we can see from Panels A in Table 2 and Table 3 respectively that there are, in fact, significant abnormal returns around the announcement of asset sales of a company. This finding is evident for average abnormal returns and also if we concentrate on cumulative abnormal returns. Given the highly significant results obtained by all of the tests that we have applied, we can reject Hypothesis 1. If we turn to the Hypotheses 3a and 3b, we see in Panels B, C and D in Tables 2 and 3 that there are indeed differences between the abnormal returns generated by asset sales where the buyer is a private equity investor and transactions where there exists a strategic buyer. The results of our tests which are presented in Panel D show that there is a significant difference between the abnormal returns present in asset sales where the buyer is a private equity fund compared to deals where there is a strategic buyer. As can be seen from our results, this difference is such that the excess returns that can be experienced by asset sales involving a private equity fund are significantly higher than abnormal returns of other transactions. The high statistical and economic significance we can report is also robust to the kind of test we apply.

-- Insert Table 2 and Table 3 around here --

Overall, we can state that, in general, we do see significant positive abnormal returns for sell-side shareholders around the announcement of an asset sale. These abnormal returns are greater for transactions where the buyer of the assets is a private equity fund as compared to transactions where the buyer has a strategic interest in the acquired assets.

4.2.2 Systematic Risk

In addition to our hypotheses about the abnormal returns arising from the announcement of asset sales, we have also developed theoretical arguments for changes in the systematic risk of the selling companies. First, we will test the theory formulated by Hypotheses 2a and 2b. In order to do this, we estimate beta factors using a standard OLS procedure with two estimation windows, one being before the announcement of the asset sale, the other being after the announcement. We then go on to compare the distribution of these estimated betas of our two sub-samples. These results are shown in Table 4. As we can see, there is no significant change in the distribution of the computed betas, regardless of which estimation window we use to calculate the betas. The distributions of the betas generally remain the same, and this finding does not change, if we adjust the estimation window. We have calculated our results for three different estimation periods but these findings are robust to other estimation periods. Based on these results, we can reject Hypothesis 2a but not Hypothesis 2b, and our empirical evidence shows that the decision to sell assets does not have a significant impact on the company's systematic risk. Moreover, we have performed a binomial test on the probability that a high-beta company remains a high-beta company. To this end, we have divided our sample into three groups according to the magnitude of the beta coefficient and then compared the probabilities of a change in group for each company. This test, whose results are available upon request, has reinforced our previous findings with the probability of change not being substantially different for any of the three groups.

In a second step, we use the same methodology as above to test hypotheses 4a and 4b. In light of the above results, we have decided to use a test strategy where we again split up our sample into the control group and the transactions that have a private equity fund as a buyer and then check for each group if there is a significant change in the distribution of the betas. The results for both sub-samples are presented in Tables 5 and 6. As can be seen from the Kolmogorov-Smirnov and the Wilcoxon test statistics, we have again the same picture as above for the whole sample. The distribution of the betas is not significantly changed after the asset sale is priced into a company's stock. We also per-

form the binomial test as described above, and, again, the results support the findings of Tables 5 and 6. This leads us to conclude that we can reject Hypothesis 4a but not reject Hypothesis 4b.

-- Insert Table 4, Table 5 and Table 6 around here --

V. Conclusion

Our paper links the research undertaken in the field of asset sales with literature on private equity by defining the research focus within a niche between these two general areas of finance literature. The main objective of this paper is to provide empirical evidence that asset sales to private equity funds prove to be value maximizing for the shareholders of the selling entity. Sell-side shareholders experience significant higher abnormal returns if private equity funds emerge as buyers than it is observed for strategic buyers. If we take higher abnormal returns as a proxy for a high sales price, we find empirical support for the hypothesis that private equity funds tend to bid up higher than strategic buyers during the sales process. This finding proves to be in line with literature and empirical results on value creation strategies of private equity investors. Future research might focus on the question to which degree strategic buyers are also implementing these strategies of value creation and to what extent potential synergies equalize or even outmatch the strategies limited to private equity funds only (e.g. high leverage ratio). In addition, we also find empirical evidence that in our data sample announcements of asset sales lead not only for private equity buyers but also for strategic buyers to significant abnormal returns. However, direct comparisons show that private equity funds on the buy-side lead to even higher abnormal returns than in the case of strategic buyers. The empirical analysis of changes in the systematic risk level of the selling entity does not lead to significant changes following the announcement of asset sales. We find no empirical evidence that the decision to sell assets has significant impact on the selling company's systematic risk. These results are not surprising, since we do not distinguish in our data sample between the different uses of the asset sales' proceeds on the seller's side. Future research may investigate how the different use of proceeds (e.g. financing of new projects or payments to shareholders) influences changes in the risk level of a company following an asset sale and how in this context the differentiation between private equity and strategic buyers influence the results.

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Table 1
Private Equity Deals and Control Group Overview Statistics

This table reports summary statistics for the two groups of transactions that we include in our event study analysis. It shows the composition of the two sub-samples and their elements by year and by country. PE denotes the sample consisting of asset sales to private equity funds, Control Group denotes the sample consisting of asset sales to strategic buyers, obtained by our matching algorithm.

Year	PE	Control Group	Germany	Switzerland	Austria
1993	1	1	1	0	0
1996	3	2	3	0	0
1997	4	5	4	0	0
1998	3	3	3	0	0
1999	5	4	4	1	0
2000	6	7	3	2	1
2001	6	6	3	2	1
2002	23	23	12	8	3
2003	42	42	32	7	3
2004	50	50	36	10	4
2005	69	69	55	8	6
2006	55	55	32	7	16
2007	47	47	36	3	8
Total	314	314	224	48	42

Table 2
Abnormal Returns for Event Study Analysis

This table reports the results of the event study analysis for the whole sample of transactions, for the PE-sub-sample, the strategic buyers sub-sample and the differences between the sub-samples. In addition to the Abnormal Returns, we report standard t-statistics, z-statistics for Wilcoxon's sign rank test and z-statistics for Corrado's test. ***/*** denote statistical significance on the 10% / 5% / 1% level.

	Day relative to announcement										
	-5	-4	-3	-2	-1	0	1	2	3	4	5
Panel A: Whole Sample											
Average Abnormal Return	-0.01%	0.04%	0.31%	0.37%	0.76%	1.63%	0.53%	0.08%	0.03%	0.04%	0.07%
t-statistic	-0.31	0.45	1.51	2.32**	4.51***	7.44***	2.44***	1.02	0.55	0.78	1.31
z-statistic (Wilcoxon)	-0.86	0.44	1.81	2.22**	6.12***	7.87***	2.22**	0.98	0.65	0.78	1.21
z-statistic (Corrado)	0.22	0.35	0.67	1.22*	2.91***	4.11***	0.87	0.75	0.67	0.54	0.96
Panel B: PE-Buyers											
Average Abnormal Return	-0.02%	0.03%	0.36%	0.45%	1.04%	2.21%	0.61%	0.05%	0.03%	0.04%	0.08%
t-statistic	-0.44	0.31	1.75*	3.22***	7.55***	9.87***	2.21**	1.01	0.65	0.98	1.41
z-statistic (Wilcoxon)	-0.67	0.43	2.64***	3.43***	8.21***	10.09***	2.41***	1.11	0.78	1.01	1.44
z-statistic (Corrado)	0.23	0.22	0.45	1.34*	2.99***	4.02***	0.45	0.67	0.88	0.54	0.99
Panel C: Strategic Buyers											
Average Abnormal Return	0.01%	0.04%	0.26%	0.29%	0.47%	1.05%	0.44%	0.11%	0.02%	0.04%	0.06%
t-statistic	0.18	0.67	1.44	1.54	2.89***	5.88***	2.67***	1.03	0.41	0.66	1.21
z-statistic (Wilcoxon)	0.22	0.45	1.01	1.02	2.85***	4.88***	2.12***	0.88	0.35	0.54	1.02
z-statistic (Corrado)	0.24	0.55	0.98	1.01	2.81***	4.25***	1.15*	0.88	0.45	0.55	0.91
Panel D: Differences											
Average Abnormal Return	-0.03%	-0.01%	0.10%	0.16%	0.57%	1.16%	0.17%	-0.06%	0.01%	0.00%	0.02%
t-statistic	-0.98	-0.41	1.23	1.44	1.99**	2.45***	1.49	-1.02	0.44	0	0.81

Table 3
Cumulative Average Abnormal Returns for Event Study Analysis

This table presents the Cumulative Average Abnormal Returns (CAARs) of our event study analysis for different time windows. The results are reported for the whole sample, the sub-sample consisting of the PE transactions, the sub-sample of the strategic buyers transactions and the differences between the two sub-samples. We also report standard t-statistics and z-statistics for Wilcoxon's sign rank test. */**/** denote statistical significance on the 10% / 5% / 1% level.

	Period of return calculation						
	[-20;-2]	[-5;-2]	[-1;0]	[+1;+5]	[+1;+20]	[-5;+5]	[-20;+20]
Panel A: Whole Sample							
CAAR	0.03%	0.07%	2.22%	0.71%	0.76%	3.23%	2.88%
t-statistic	0.12	1.1	2.28**	1.07	1.11	3.23***	2.89***
z-statistic	0.58	1.41	2.16**	1.37	1.28	5.54***	3.86***
Panel B: PE-Buyers							
CAAR	0.02%	0.82%	3.25%	0.81%	0.88%	4.88%	3.76%
t-statistic	0.11	1.12	4.35***	1.08	1.13	5.34***	4.85***
z-statistic	0.56	1.41	4.34***	1.36	1.48	8.10***	5.15***
Panel C: Strategic Buyers							
CAAR	0.03%	0.60%	1.52%	0.67%	0.55%	2.79%	2.08%
t-statistic	0.14	1.09	1.66*	1.09	0.99	2.01**	2.01**
z-statistic	0.58	1.41	1.86*	1.41	1.08	2.14**	2.17**
Panel D: Differences							
CAAR	-0.01%	0.22%	1.73%	0.14%	0.33%	2.09%	1.68%
t-statistic	-0.25	0.98	2.54***	0.65	1.22	2.87***	2.01**
z-statistic	-0.65	1.22	2.43**	1.08	1.41	3.13***	2.15**

Table 4
Comparison of Beta Distribution (Whole Sample)

This table presents the pre/post-announcement comparison of beta coefficients for all transactions in our sample. The comparison is carried out for three estimation windows. Also reported are the p-values for the Wilcoxon sign-rank-test and the Kolmogorov-Smirnov test. The quantiles denote the quantiles of the distribution of the beta coefficients of the companies included in the sample. The number of observations changes with the estimation window because of data availability

Interval	[-100;1]	[+1;+100]		[-250;-1]	[+1;+250]		[-500;-1]	[+1;+500]	
Number of transactions	628	628		618	618		599	599	
Mean of Beta	1.26	1.34		1.24	1.31		1.21	1.33	
change			0.08			0.07			0.12
t-statistic			1.01			0.98			1.24
Quantiles									
10th	0.33	0.35	-0.02	0.37	0.43	-0.06	0.41	0.42	-0.01
20th	0.55	0.57	-0.02	0.61	0.62	-0.01	0.64	0.67	-0.03
30th	0.74	0.77	-0.03	0.75	0.74	0.01	0.93	0.87	0.06
40th	0.93	0.89	0.04	0.92	0.94	-0.02	0.98	1.01	-0.03
Median	1.11	1.09	0.02	1.09	1.12	-0.03	1.02	1.11	-0.09
60th	1.32	1.28	0.04	1.31	1.31	0	1.31	1.3	0.01
70th	1.51	1.48	0.03	1.48	1.49	-0.01	1.58	1.53	0.05
80th	1.81	1.79	0.02	1.81	1.8	0.01	1.86	1.88	-0.02
90th	2.31	2.33	-0.02	2.22	2.19	0.03	2.03	2.06	-0.03
Wilcoxon sign-rank-test (p-value)			0.22			0.28			0.18
Kolmogorov-Smirnov test (p-value)			0.18			0.21			0.15

Table 5
Comparison of Beta Distribution (Private Equity sub-sample)

This table presents the pre/post-announcement comparison of beta coefficients for all transactions in our sample where the buyer of the assets was a private equity fund. The comparison is carried out for three estimation windows. Also reported are the p-values for the Wilcoxon sign-rank-test and the Kolmogorov-Smirnov test. The quantiles denote the quantiles of the distribution of the beta coefficients of the companies included in the sample. The number of observations changes with the estimation window because of data availability.

Interval	[-100;1]	[+1;+100]		[-250;-1]	[+1;+250]		[-500;-1]	[+1;+500]	
Number of transactions	314	314		310	310		301	301	
Mean of Beta	1.28	1.31		1.26	1.31		1.27	1.32	
t-statistic			0.03			0.05			0.05
change									
*/**/**			0.76			1.21			1.18
Quantiles									
10th	0.34	0.36	-0.02	0.39	0.41	-0.02	0.41	0.52	-0.11
20th	0.56	0.58	-0.02	0.63	0.64	-0.01	0.61	0.75	-0.14
30th	0.76	0.77	-0.01	0.77	0.76	0.01	0.91	0.84	0.07
40th	0.91	0.94	-0.03	0.93	0.94	-0.01	0.93	1.04	-0.11
<u>Median</u>	<u>1.14</u>	<u>1.14</u>	<u>0.01</u>	<u>1.08</u>	<u>1.11</u>	<u>-0.03</u>	<u>1.06</u>	<u>1.21</u>	<u>-0.15</u>
60th	1.31	1.29	0.02	1.28	1.31	-0.03	1.27	1.33	-0.06
70th	1.49	1.48	0.01	1.51	1.49	0.02	1.55	1.48	0.07
80th	1.78	1.81	-0.03	1.78	1.81	-0.03	1.73	1.88	-0.15
90th	2.24	2.41	-0.17	2.14	2.08	0.06	2.01	2.12	-0.11
Wilcoxon signed-rank-test (p-value)			0.12			0.13			0.21
Kolmogorov-Smirnov test (p-value)			0.19			0.20			0.24

Table 6
Comparison of Beta Distribution (Strategic Buyer sub-sample)

This table presents the pre/post-announcement comparison of beta coefficients for all transactions in our sample where the buyer of the assets was a strategic buyer. The comparison is carried out for three estimation windows. Also reported are the p-values for the Wilcoxon sign-rank-test and the Kolmogorov-Smirnov test. The quantiles denote the quantiles of the distribution of the beta coefficients of the companies included in the sample. The number of observations changes with the estimation window because of data availability.

Interval	[-100;1]	[+1;+100]		[-250;-1]	[+1;+250]		[-500;-1]	[+1;+500]	
Number of transactions	314	314		310	310		301	301	
Mean of Beta	1.28	1.31		1.26	1.31		1.27	1.32	
change			0.03			0.05			0.05
t-statistic			0.76			1.21			1.18
Quantiles									
10th	0.34	0.36	-0.02	0.39	0.41	-0.02	0.41	0.48	-0.07
20th	0.56	0.58	-0.02	0.63	0.64	-0.01	0.61	0.63	-0.02
30th	0.76	0.77	-0.01	0.77	0.76	0.01	0.91	0.89	0.02
40th	0.91	0.94	-0.03	0.93	0.94	-0.01	0.98	1.01	-0.03
Median	1.14	1.14	0.01	1.08	1.11	-0.03	1.11	1.13	-0.02
60th	1.31	1.29	0.02	1.28	1.31	-0.03	1.27	1.31	-0.04
70th	1.49	1.48	0.01	1.51	1.49	0.02	1.55	1.56	-0.01
80th	1.78	1.81	-0.03	1.78	1.81	-0.03	1.73	1.7	0.03
90th	2.24	2.21	0.03	2.09	2.08	0.01	2.11	2.09	0.02
Wilcoxon signed-rank-test (p-value)			0.12			0.13			0.21
Kolmogorov-Smirnov test (p-value)			0.19			0.20			0.24