# ARE PRIVATE EQUITY INVESTORS GOVERNANCE CHAMPIONS OR SIMPLY STOCK PICKING SPECIALISTS?#

**Matthias Kroker[a], Marc Steffen Rapp[b,c], Michael Wolff[d,c]**

[a] Department of Financial Management & Capital Markets, Technische Universität München, Email: matthias.kroker@mytum.de; [b] Center for Entrepreneurial and Financial Studies, Technische Universität München, Email: msr@m-s-rapp.de; [c] Center for Corporate Governance, Leipzig Graduate School of Management (HHL); [d] Department for Corporate Governance, Johannes Gutenberg-Universität Mainz, Email: michael.wolff@uni-mainz.de

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We examine announcement returns of private equity investments in publicly listed firms. Using a novel and hand-collected data set of 377 European transactions between 1997 and 2006 we find substantial announcement returns accumulating to some 10.3%. Target firms are substantially undervalued prior to the transaction. However, we find no evidence that operating performance of target firms increases after the transaction. Our findings are consistent with the view that private equity firms have superior stock picking abilities which allow them to identify and invest in undervalued firms. In contrast, our findings do not support the view that private equity funds are able act as governance champions improving firms' operating performance.

**JEL classification:** *G14 ·G32 ·G34*

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# We are grateful to Ralf Elsas as well as the Economics & Business Data Center (EBDC) at Ludwigs-Maximilian Universität München for providing the time-series of Fama-French factors for European firms. Moreover, thanks to Philipp Schaller, Sebastian Forchhammer, and Wolfgang Köstinger for excellent research assistance. The usual caveat applies.

## 1. Introduction

There is an ongoing debate about the economic effects of private equity investors. Whereas private equity investors often claim that they act as *governance champions* helping firms to align strategic directions and improve firm performance, many commentators are still rather skeptical. As Gorton and Kahl (2002) point out, private equity (PE) fund managers have strong monitoring incentives through their substantial amounts of money at stake. Also, in general equipped with substantial industry and buyout expertise, private equity firms are in the position to enact change among their portfolio companies. Yet, commentators outside the PE industry, e.g. politicians, journalists, managers and employees of target firms, have mixed feelings about the controversial business practices of PE mangers. In line with the raiding hypothesis of Holderness and Sheehan (1985), there is widespread belief among them that the typical PE investor tries to extract corporate resources for the cost of others and that this behavior jeopardizes firm performance.

In this paper we examine the economic effect of private equity investors taking advantage of the recent trend in the PE industry: Within the last years PE investors increasingly invested in listed equity without taking the company private following the investment.[1] Examining the European landscape for the years 1997 to 2006, we identify more than 500 stock purchase transactions by PE investors in publicly listed firms. Examining listed companies comes for two benefits: First, we can easily observe market prices and valuation levels for these firms before the investment takes place. Second, disclosure requirements for listed firms make post-investment operating performance transparent.

In this setting, we conduct a two-step analysis: First, we study the value-creation effect of private equity investors by analyzing the announcement returns of PE investments. Examining 377 of our transactions we find that European target shareholders experience significant positive wealth effects from the announcement of private equity investments of 7.11% around the event window, t=-1 to t=+1. The results are in line with previous studies for Germany (Achleitner, Andres, Betzer and Weir, 2008) and European takeovers (Andres, Bet-

[1] Note that the academic literature generally focuses on pure going private buyouts in the sense that buyouts involve the transfer of 100% of the target's share capital. However, for example, Achleitner, Andres, Betzer and Weir (2008) introduce a minimum stake purchase threshold of 5% for transactions to be included in their sample.

zer and Weir, 2010). Moreover, we find that the returns around the announcement day persist over the entire event window from t=-30 to t=+30 with CARs of 12.02%.

Second, we examine whether we can attribute these returns to pre-transaction valuation levels of firms or post-acquisition performance improvements. While we find that PE investors invest in firms with below average valuation levels, we find no evidence that operating performance of target firms increases after the transaction. Our findings are consistent with the view that private equity firms have superior stock picking abilities which allow them to identify and invest in undervalued firms. In contrast, our findings do not support the view that private equity funds are able act as governance champions improving firms' operating performance.

Our paper contributes to the existing academic literature in several ways. First, we investigate shareholder wealth effects around the announcement of private equity investments in European publicly listed firms. Prior research by Andres, Betzer and Weir (2007) shows that existing target shareholders benefit from such announcements when 100% of the target firm's total share capital is acquired. However, it is questionable whether these results can be sustained when we consider minor stake purchases in our analysis. Moreover, it is of particular interest whether the results for Germany by Achleitner, Andres, Betzer and Weir (2010) can be confirmed with regard to the UK's specific market and governance characteristics.

Second, we provide evidence on the question whether European publicly listed private equity target companies have different pre-announcement valuation levels with respect to comparable public firms. Weir, Laing and Wright (2005) find that public to private target firms in the UK are undervalued compared to similar trading companies. However, their understanding of valuation is not based on widely accepted technical multiples but on recent relative stock performance. Whereas further European research relates the pre-announcement valuation to the magnitude of CARs, we analyze the absolute valuation level of target firms compared to a control sample by means of well-established equity and entity multiples.

Third, we investigate the post-purchase operating performance of target firms. In their role as buyout specialists with active post-acquisition behavior, private equity investors theoretically achieve more efficient monitoring while providing the target with operational and

strategic expertise. It has been shown that, besides operational changes such as plant productivity improvements (for example Harris, Siegel and Wright, 2007)[2], private equity firms increase post-buyout performance among acquired target companies (for example Kaplan, 1989).[3] However, there exists no European cross-country evidence on the post-buyout operating performance of private equity target firms compared to similar exchange-listed firms to date. Therefore, our analysis adds to the growing body of literature and contributes to the public debate on the relevance of private equity firms.

Fourth, we add to the significance of the findings by means of our sample size. The majority of previous studies in this field of research examine only a limited number of deals. For example, the only comprehensive European study by Andres, Betzer and Weir (2007) uses a sample of 115 firms. To the best of our knowledge, our sample is the largest to date with 377 private equity investments in exchange-traded companies covering a ten-year period. Additionally, the study considers 18 different European countries to account for country-specific characteristics regarding shareholder rights, capital market culture and development.

The remainder of the paper is organized as follows. Section 2 discusses possible shareholder wealth effects and develops our key hypotheses. Section 3 describes the data set and presents key descriptive statistics. Section 4 lays out the methodology and presents the results of our event study. Section 5 reports the empirical results of the regression analyses. Finally, section 6 concludes.

## 2. Related literature and key hypotheses

Evidence on positive shareholder wealth effects around the announcement of private equity buyouts has been provided by a number of previous studies. For US transactions, positive average abnormal returns have been reported by, for instance, DeAngelo, DeAngelo and Rice (1984), Lehn and Poulsen (1989), Marais, Schipper and Smith (1989), Travlos and Cornett (1993), van de Gucht and Moore (1998) and Goh, Gombola, Liu and Chou (2002). Yet

[2] See Cumming, Siegel and Wright (2007) for a detailed overview on real buyout effects.
[3] See Gilligan and Wright (2010) for a detailed overview on previous evidence on operating performance changes. Performance improvements have been proved for the US, UK, Netherlands and France.

most of these studies refer to acquisitions during the buyout wave of the 1980s. Second, European evidence is provided by Andres, Betzer and Weir (2007), for the UK by Renneboog, Simons and Wright (2007) and for Germany by Achleitner, Andres, Betzer and Weir (2010).

A straightforward rationale for such an effect is that the market perceives private equity investors to be stock picking specialists as they systematically purchase underpriced securities. This assumption, first mentioned in the paper of Holderness and Sheehan (1985) regarding activist investors acting as "corporate raiders", suggests that stock purchases by a private equity investor lead to positive abnormal returns around the announcement day and that they stem from the elimination of market inefficiencies. Similar to investment funds that operate on long-only equity strategies, private equity firms are looking for underpriced equity in the marketplace. In their role as superior security analysts they generate returns by identifying and purchasing undervalued shares, either based on valuable private information about the target company or better skills in analyzing public information.

First, there is widespread anecdotal and academic evidence that insider information could play a crucial role in the value-capturing of buyouts (e.g. DeAngelo, 1986). For instance, by acting as "hells of devils in the boardroom and executive suite" (Lowenstein, 1985), management may benefit from manipulative actions through an equity participation in leveraged buyouts. Indirect support for this comes from Achleitner, Andres, Betzer and Weir (2010) who argue that management welcomes outside investors if they believe their firm's share to be underpriced. In this case of perceived undervaluation, it might be in management's sense to provide potential investors with private managerial information about the firm's future prospects. Another potential source of non-public information are outsiders to the public firm with insider information. As private equity firms have built up extensive relationship networks in the financial community, they might benefit from their excellent contacts providing them with private information. Since expectations regarding magnitude and volatility of future financial performance are an important valuation driver (Berg and Gottschalg, 2003), buyout specialists such as private equity investors may easily take advantage of private information to determine whether potential acquisition targets are trading at fair value.

Second, the argument that abnormal returns stem from better skills in analyzing public information is based upon the specific expertise of private equity firms. However, superior security analyst skills are being built up systematically in private equity firms. First of all, private equity firms are known for recruiting only top talent among senior investment bankers, lawyers and consultants. Additionally, looking at a large number of potential target

firms and being in regular discussions with top-level executives of various companies allows them to develop unique industry expertise (Anders, 1992). Their superior skills, in turn, enable them to interpret public information in a more sophisticated way and thus to identify undervalued firms in the marketplace.

We argue, that the market acknowledges the greater stock picking capabilities of private equity firms and corrects for the difference between the pre-announcement share price and the company's fair value. Thus, positive share price adjustments subsequent to a stock purchase announcement are due to the elimination of market inefficiencies. This leads us to our hypothesis

**Hypothesis 1:** *Publicly traded private equity target firms are undervalued compared to similar trading companies prior to the announcement.*

Our second hypothesis argues that private equity firms are governance champions and trigger managerial changes in a way that the target firm shows superior relative financial results in the long run. This assumption suggests that existing shareholders experience wealth gains around the announcement day since buyout specialists, leaving no stone unturned, provide a degree of expertise that enables the company to outperform competitors in terms of operating profitability (Wright, Weir and Burrows, 2007) . While this hypothesis is largely dependent on the reputation and capabilities of the actual buyout company, private equity firms are widely acknowledged for value creation through their deep buyout and industry expertise.[4] Additionally, target firms benefit from the mitigation of agency costs through efficient monitoring by the investor, incentive realignment and restrictions regarding the usage of free cash flow.

As emphasized by Jensen (1986), where ownership and control is separated, free cash flow is wasted through non-value maximizing behavior by incumbent management on the cost of shareholders. Hence, low managerial ownership in combination with atomistic shareholder structures lead to incentive misalignment and thus high agency costs. In contrast, academic literature provides evidence that private equity firms initiate various agency cost

[4] For instance, Cressy, Munari and Malipiero (2007) show that industry specialization of private equity firms has a significant positive impact on post-buyout operating profitability.

reduction mechanisms subsequent to leveraged buyouts. First, Cotter and Peck (2001) find that private equity investors engage in active monitoring of target firms through board representation and an ongoing process of control to overcome the free-rider problem as outlined by Grossman and Hart (1980). Second, buyout specialists tend to increase leverage on the cost of management's financial flexibility. Consequently, management is forced to service debt payments to avoid default instead of overfunding inefficient projects (e.g. Jensen and Meckling, 1976) and engaging in empire-building (Murphy, 1985). Finally, investors realize incentive realignment by significantly increasing management's equity stake to reunify ownership and control.[5] It is therefore in management's sense to undertake shareholder value maximizing operational and strategic actions.

Next, in their role as buyout specialists, private equity investors use their profound industry expertise and functional knowledge as well as their relationship network to enforce change among their portfolio companies. Looking at the investor's expertise, the launch of corporate restructuring programs, the adjustment of strategic directions and ongoing operational and strategic advice by the investor support balance sheet re-engineering and efficiency increases. First, capital structure improvements are achieved by, for instance, the sale of underperforming assets and the increase in leverage which, in turn, form a tax shield with a positive impact on cash flows (e.g. Kaplan, 1989). Second, empirical evidence shows that efficiency improvements are mainly driven by overhead reduction through the introduction of smart organizational structures (e.g. Easterwood, Seth and Singer, 1989) and the reduction in production cost accompanied by plant productivity improvements (e.g. Harris, Siegel and Wright, 2003). Moreover, margin improvements are generated through lower cost of capital due to working capital reductions (e.g. Smith, 1990) and tighter cost control with respect to capital expenditures (e.g. Muscarella and Vetsuypens, 1990).

Regarding the investor's relationship networks, target companies might benefit from the investor's portfolio network as supplying other portfolio companies represents an additional sales platform. Next, they might take advantage from greater purchasing power by jointly negotiating delivery contracts for direct and indirect materials. Moreover, in the case of unqualified management teams, investors use their expert network to replace incumbent

[5] For instance, Kaplan (1989) proves a significant increase in equity ownership for the target company's management following a leveraged buyout.

personnel with acknowledged senior executives. Furthermore, buyout targets benefit from the investor's excellent contacts and reputation as a repeat borrower at stake in the financial community in terms of debt financing conditions (Cotter and Peck, 2001).

Accordingly, we argue that private equity investors are governance champions enabling their target firms to realize superior relative financial results and hypothesize

**Hypothesis 2:** *Private equity target firms show superior post-acquisition accounting results compared to similar trading companies.*

It should be noted, that both hypotheses imply positive abnormal returns around the announcement day thus being not mutually inconsistent (Holderness and Sheehan, 1985). With this study, we aim to relate stock price adjustments around the announcement day to either one or both of the argumentations outlined above. Therefore, we construct a control sample of firms that are not involved in any private equity transactions. Our comprehensive data set allows us to examine whether private equity target companies are undervalued prior to the announcement and whether they deliver superior post-acquisition accounting results compared to similar public firms.

## 3. Data and descriptive statistics

This section presents our data set and reports descriptive statistics. Additionally, we define the variables that we use in the empirical analysis.

### *3.1. Data set*

We construct a unique data set of private equity investments in European exchange-listed companies for the analysis. Thereby, we proceed in several steps. First, we screen Thomson SDC Platinum for deals of financial sponsors. Second, we search newswire and newspaper archives for private equity deals. Having identified more than 500 deals, we then select deals that fulfill the following criteria:

(1) The transaction must be announced *and* completed between January 1st, 1997 and December 31st, 2006.

(2) The target company has to be headquartered in one of the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxem-

bourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.[6]

(3) A private equity investor has to be involved in the transaction as opposed to hedge funds or other strategic investors.

(4) The target company has to be publicly listed on a European stock exchange at the announcement date and the ownership structure is free of PE funds prior to the deal.

We find 377 transactions meeting the criteria. Note that unlike previous academic studies, we do not introduce a minimum acquisition stake threshold as not to exclude minority investments. In our final sample there are, however, only 14 transactions where the European stake purchases below a threshold of 5% in the final sample.

The announcement date of these transactions is defined as either the day of the required public disclosure or the release of a price offer to existing shareholders. These dates are not per se available for all transactions. Hence, missing announcement dates were collected manually from newswire and newspaper archives as well as through Internet research. Out of the final sample of 377 companies, 227 remain public in the fiscal year of the initial announcement and 169 in the fiscal year following the initial announcement. All other companies were taken private by the investor.

To control for industry effects, we construct a second data set covering all listed European firms. Therefore, we download data for all publicly listed companies on European stock exchanges from 1996 to 2009 from the Thomson One Banker database. This sample covers 10.547 firms.

----------Table 1 goes about here----------

Table 1, Panel A reports the distribution of private equity investments in publicly listed firms over time. We see a significant increase in private equity acquisitions in the late 1990s followed by reduced activity during the early years of the new millennium. This is consistent with the economic downturn in major European economies and subsequent fund withdraw-

[6] The sample target countries equal the members of the European Union as of 01.01.1997 plus Iceland, Norway and Switzerland.

als. However, private equity activity experienced a comeback and managed to exceed pre-crisis levels by 2006. Panel B shows that the lion's share of transactions originated in the UK (37.7%) underlining the relative importance of the British private equity market, followed by Germany (16.7%) and France (14.3%). The share of UK transactions saw a steady relative decline during the 2000s only followed by revived market activity with a share of 41.7% in 2006. Moreover, Panel B indicates that the sample distribution by country is representative for the stock market size of European countries measured by the number of listed firms. Finally, Panel C gives a detailed overview on the industries covered by private equity firms. The distribution illustrates that investors primarily engage in manufacturing (22.0%), wholesale and retail shops (16.4%) and business equipment industries (14.9%) while underweighting certain industries such as the financial services industry in their portfolios compared to the total number of quoted firms

### *3.2. Variables*

Our regression and event study settings require several financial data and firm characteristics. We describe these variables in detail below. Share price and accounting data used in this study are taken from Datastream and Worldscope, respectively. We use closing prices of the company's main security being in most cases listed on the respective country's main exchange.

**Measures of firm valuation**: In our first two regression settings we examine the valuation of private equity target firms compared to similar trading companies. Therefore, we use two multiples where values are calculated by means of market prices (market multiples), thereof one equity multiple and one entity multiple.[7] To measure a firm's market valuation, we define the market-to-book-value (MTBV) of a company as the market value of its outstanding stock divided by the book value of equity. As an additional measure of firm valuation, we consider enterprise-value-to-sales (EV/SALES) and therefore divide enterprise value by sales. Enterprise value is defined as market capitalization at fiscal year end plus preferred stock, minority interest and total debt minus cash. With a number of firms showing negative

[7] While equity multiples only consider the residual value of equity, entity multiples take the value of the firm's entire capital into account. Alford (1992) and Liu, Nissim and Thomas (2002) find that equity multiples outperform entity multiples in terms of valuation accuracy.

accounting results in the year prior to the announcement we do not use profitability-based multiples, as this would further reduce the sample size due to negative and thus meaningless multiple values.

**Measures of firm performance**: We use performance ratios to examine the post-buyout financial performance of private equity target firms with respect to comparable quoted companies. First, we analyze a firm's efficiency to manage its assets. Therefore, we measure return on assets (ROA) as earnings before interests, taxes, depreciation and amortization (EBITDA) over total assets. Second, we assess a firm's profitability by looking at earnings with regard to revenues. Return on Sales (ROS) is calculated as the percentage of EBITDA divided by sales. We use EBITDA instead of actual earnings (net income) to eliminate country-specific effects through different accounting standards regarding depreciation rules, interest expense conventions and taxation laws.

**Firm characteristics**: In our regression analysis we use several variables to control for firm and governance characteristics. First, we measure firm size by the natural logarithm of sales (SIZE). For instance, Achleitner, Andres, Betzer and Weir (2010) argue that small firms tend to lack financial visibility through either analyst or press coverage and thus suffer from undervaluation. As a simple measure of capital structure, we calculate LEVERAGE as the proportion of total liabilities to total assets. Since the amount of debt has a significant impact on profitability and thus on valuation through the tax shield effect (e.g. Singh, 1990), we exclude possible bias from highly levered companies. Moreover, ownership concentration (OWNC) is measured by the percentage of closely held shares. As emphasized by Shleifer and Vishny (1986) for instance, close monitoring by large blockholding entities reduces the inefficient use of the company's capital and thus has a significant impact on firm performance and valuation. To account for differences regarding the investor's influence on the target firm dependent on the amount of equity ownership, we define STAKE as the post-acquisition percentage of the target's share capital being controlled by the private equity firm.

Additionally, we control for profitability through ROA when we examine the relative pre-announcement valuation of private equity and for MTBV when we analyze post-acquisition accounting performance respectively. Finally, we use country, year and industry dummies in all of our regression specifications. We use the 5 and 10 industry classification scheme of Eugene Fama and Kenneth French (e.g. Fama and French, 1993) to codify firms according to their industry affiliation.

----------Table 2 goes about here----------

Table 2 presents various key statistics on the investigated private equity target firms and the total sample. With respect to median valuation ratios we find that the market values them at 0.8x sales and that they show a market-to-book-ratio of 1.5x in the year prior to the announcement Looking at accounting results of private equity target companies we find that the majority of firms operate profitable with a median return on assets of 12.2% and a median return on sales of 11.9%. The statistics indicate that private equity targets have lower valuation levels but higher profitability ratios in the year prior to the announcement compared to the total sample between 1996 and 2009. The median percentage of closely held shares is 38.2% and the leverage is 58.8% respectively. Although the sample considers minority investments, the median stake purchase by the investor amounts to 91.0%.

## 4. Empirical analysis

This section presents our empirical analysis in three steps. First, we conduct an event study and examine the stock market reaction to announcements of stake purchases by private equity investors. Second, we present our empirical results regarding the pre-announcement relative market valuation and post-investment relative operating profitability of private equity target firms. . Finally, we discuss the robustness of our regression analyses.

### *4.1. Event study*

As outlined in section 2, we expect positive share price reactions and thus positive wealth effects for existing shareholders around the announcement day of private equity investments in publicly listed companies. To evaluate the target firm's average stock price reaction towards the announcement, we perform an event study analysis and therefore adapt the research design of Brown and Warner (1985). We follow the risk-adjusted market model approach (e.g. MacKinlay, 1997) relating the return of a given stock to the return of a market portfolio to estimate expected returns. The abnormal returns for each security ($AR_{it}$) are computed as the difference between the observed return on day *t*, $R_{it}$, and the expected return $R_{it}^{e}$,

$$AR_{it} = R_{it} - R_{it}^{e} = R_{it} - (\alpha_i + \beta_i R_{mt}), \quad (1)$$

where $R_{mt}$ is the period-t return of the market portfolio and $\alpha_i$ and$\beta_i$ are the parameter estimates of the market model. We obtain these parameters from ordinary least squares regressions of the target's daily return on the market return over an estimation period from t=-210 to t=-31 relative to the announcement day. We use the equally weighted S&P Euro index as a proxy for the market portfolio to calculate expected returns as it represents an effective balance between broad market representation and liquidity.[8]

Average daily abnormal returns are then computed over the event window ranging from t=-30 to t=+30 relative to the announcement day over a sample of N firms:[9]

$$AR_t = \frac{1}{N} \cdot \sum_{i=1}^{N} AR_{it} \qquad (2)$$

The estimated cumulative average abnormal returns are calculated by aggregating average abnormal returns between $t_1$ and $t_2$:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t \qquad (3)$$

We test the statistical significance of abnormal returns by means of the simple t-test as a common parametric test.[10]

Table 3 presents the event study results. Column 2 and 5 show the ARs and CARs over the event window [-30;+30], respectively. Column 3 and 6 report the significance test statistics obtained from a t-test.

----------Table 3 goes about here----------

As reported in Table 3, the announcement of a stake purchase by a private equity investor in an exchange-listed company causes significant positive ARs and thus wealth gains for existing shareholders. They earn an average abnormal return of 4.78% on the announcement day (t=0), which is highly significant at the 0.01 level. Moreover, we find highly significant positive abnormal returns of 0.73% (t=-2) and 1.09% (t=-1) even at days preceding the

[8] See www.standardandpoors.com for a detailed description of the S&P Europe 350 index.
[9] According to MacKinlay (1997), the event window and the estimation window generally do not to overlap.
[10] Armitage (1995) provides a comparative overview of parametric and non-parametric tests. See MacKinlay (1997) for a detailed description of the t-test in event study applications.

announcement. These findings might be due to the fact, that in several cases, we do not perfectly know the announcement date, e.g. due to announcement after the trading takes place. In sum, all single day average abnormal returns in the t=-2 to t=+1 period are significant at the 0.01 level. These findings are supported, when we look at the ratio of positive to negative abnormal returns around the announcement day, providing evidence that our abnormal returns are not caused by individual outliers.

----------Table 4 goes about here----------

Table 4 presents cumulative average abnormal returns over various event windows and their respective t-statistics. We find a three-day announcement period return [-1;+1] of 7.11%, with a t-statistic of 26.45. CARs are only slightly higher when we extend the event window period. Over the entire event window from t=-30 to t=+30, they amount to 12.02%, with a t-statistic of 9.91. Thus, we conclude that short-term shareholder wealth gains persist over the entire event window until t=+30 relative to the announcement day.

To ensure robustness of our results, we additionally perform the non-parametric Corrado (1989) rank test. Being based on medians, the rank test does not rely on distributional assumptions in contrast to parametric tests such as the simple t-test (Ahern, 2008). Moreover, Cowen and Sergeant (1996) prove that Corrado's rank test outperforms parametric tests in terms of specification and power if return variance is unlikely to increase. Our findings do not change except for the abnormal return of day t=+1 which, however, stays significant at the 0.05 level.

Additionally, we challenge our results by using models other than the market model to calculate abnormal returns. More specifically, we estimate expected returns by means of the constant mean return model, the capital asset pricing model (CAPM) and the Fama-French (1993) three factor model. As shown in figure 1, these alternative economic methods yield very similar abnormal returns. Moreover, they have comparable t-statistic values.

----------Figure 1 goes about here----------

In conclusion, the event study reveals significant average abnormal returns for existing shareholders around the announcement of a private equity investment in publicly traded equity. The announcement leads to an AR of 4.78% on the announcement day and to CARs

of 7.11% in a 3-day window from t=-1 to t=+1. These findings suggest that private equity investors have a positive impact on shareholder wealth and are consistent with previous academic research. In the next section, we define our empirical strategy and answer the question whether shareholder wealth gains are attributable to both the superior stock picking and governance capabilities of private equity firms.

### *4.2. Empirical analysis*

This section presents our empirical analysis in three steps. First, we present our empirical strategy. Second, we examine whether private equity target firms are undervalued compared to similar trading companies. Finally, we present our findings regarding the relative post-investment operating performance of target firms.

#### *4.2.1. Empirical strategy*

Our paper examines whether the observed private equity target shareholder wealth effects stem from the correction of an inferior pre-announcement market valuation and an expected superior post-acquisition performance. Therefore, we construct control samples of companies without private equity ownership from our total sample of European exchange-listed companies. Due to the high dimensionality of the observable characteristic (private equity ownership), it seems reasonable to use a natural weighting scheme that includes several variables to determine the likelihood of a private equity investment (Dehejia and Wahba, 2002).

To find one respective comparable company for each acquisition target we employ the propensity score matching approach on all European publicly listed companies between 1996 and 2009.[11] Using the nearest neighbor method, we select the comparison firm whose propensity scores are closest to the target firm based on the respective country, the 5 and 10 industry classification schemes of Eugene Fama and Kenneth French (e.g. Fama and French, 1993) and the estimation parameters SIZE, LEVERAGE and ROS of the year prior to the announcement.

Overall, we construct four different comparison samples per industry classification scheme. To be included in the control samples for the first hypothesis, potential comparable

[11] Dehejia and Wahba (2002) provide on overview on propensity score matching methods based on the original idea of Rosenbaum and Rubin (1983).

firms need to be publicly listed and report accounting results in the year prior to the announcement. Being part of either one of the control samples for the second hypothesis requires public listing and reported accounting results for the year prior to the announcement and one, two or three years after the announcement, respectively.

To distinguish between private equity target firms and their similar trading companies, we construct a dummy variable. DUMMY takes the value of 1 if a private equity investor has equity holdings in the firm. We then introduce DUMMY as an exogenous variable in our regression specifications to assess pre- and post-announcement disparities regarding market valuation and operating performance between firms with and without private equity ownership, respectively.

*4.2.2. Target firms and undervaluation*

We investigate the relative market valuation of private equity target firms prior to the announcement day. According to our first hypothesis, what we expect is target firms to be undervalued compared to similar trading companies. This, in turn, should justify the positive significant abnormal returns around the announcement day as market participants acknowledge the stock picking capabilities of private equity firms. To examine our hypothesis we employ two different regression settings.

First, we use industry-adjusted valuation measures to check for undervaluation of target firms. The following empirical regression model is used:

$$IAVM_{pre,i} = \quad c_0 + c_1 DUMMY + e_i, \tag{4}$$

where $IAVM_{pre,i}$ is the industry-adjusted valuation measure for company *i* in the year prior to the stake purchase by the private equity investor. As reported in section 3, *DUMMY* takes the value of 1 for companies with private equity ownership and 0 for comparable trading companies, respectively. $e_i$ is the error term. Industry-adjusted valuation measure is the valuation multiple of target company *i* minus the median of all Fama-French industry-matched firms of the respective country for the same year. Finally, the coefficient $c_1$ captures the difference between firms with and without subsequent private equity investment and is expected to be negative in the sense that private equity firms invest in companies with lower relative market valuation.

As emphasized in section 3, we use MTBV and EV/SALES as valuation measures. To reduce the problem of outliers in the regression analysis, we winsorize these variables with a two-sided threshold of 2.5%, 5% and 10%, respectively. Moreover, we perform the regres-

sions with both, the matched firms based on the Fama-French 5 and 10 industry classification schemes, respectively. Table 5 reports our regression results.

----------Table 5 goes about here----------

Due to missing accounting data for either target firms or comparable companies, the regression is performed on only 327-329 observations for MTBV and 329-330 observations for EV/SALES. Table 5 shows that the coefficient $c_1$ of the variable *DUMMY* representing a subsequent private equity investment is not only negative as hypothesized but significant at the 0.01 level throughout all regressions suggesting that private equity target firms are indeed undervalued compared to similar trading companies. The results support the findings of Andres, Betzer and Weir (2007) and others who find a significant negative relationship between the market valuation of private equity target firms and the magnitude of abnormal returns around the announcement day. Moreover, our findings are consistent with Weir, Laing and Wright (2005) who find that UK private equity target companies show inferior relative stock price performance prior to the announcement. However, this is an important new finding for the academic literature on private equity since this is the first comprehensive European study to examine whether the stocks of private equity target companies are mispriced in absolute terms.

Second, to check for robustness of our results, we examine the relative valuation of target firms through a more sophisticated regression model. Therefore, we include several exogenous control variables to account for possible bias of our results. More specifically, we control for SIZE, LEVERAGE and ROA.[12] Additionally, we include year, country and industry dummy variables. The regression equation is:

$$VM_{pre,i} = c_0 + c_1 DUMMY + c_2 SIZE_{pre,i} + c_3 LEVERAGE_{pre,i} + c_4 ROA_{pre,i} + year\ dummies + country\ dummies + industry\ dummies + e_i, \quad (5)$$

where $VM_{pre,i}$ is the valuation measure for company *i*. Table 6 presents the results for the twelve regressions of this particular setting.

[12]Again, we winsorize the endogenous and exogenous variables with a two-sided threshold of 2.5%, 5% and 10%, respectively.

----------Table 6 goes about here----------

Again, the results confirm our first hypothesis that private equity investors invest in undervalued publicly listed companies. Furthermore, when examining the relative valuation of private equity firms through this empirical specification we find even stronger evidence by looking at the companies' market-to-book-ratio.

*4.2.3. Target firms and operating performance*

Next, we are interested in the issue of superior accounting performance vis-à-vis exchange-traded peers and its explanatory power on the positive abnormal returns around the announcement day. Hence, we examine whether the market perceives private equity investors to be governance champions.

For this, we use two models similar to Model (4) and (5) where we draw on two different profitability measures as dependent variables. More precisely, we use the two accounting ratios return on assets (ROA) and return on sales (ROS). In addition, similar to the regression approach of Healy, Palepu and Ruback (1992) and Croci (2007), respectively, we include the pre-acquisition profitability ratio in the regression equation:

$$IAPM_{post,i} = \quad c_0 + c_1 DUMMY + c_2 IAPM_{pre,i} + e_i, \tag{6}$$

where $IAPM_{post,i}$ is the industry-adjusted accounting profitability measure of company *i* for the respective year following the stake purchase by the private equity investor. $IAPM_{pre,i}$ is the industry-adjusted accounting profitability measure in the year prior to the initial stake purchase for the same company and $e_i$ is the error term. Both measures closely follow the calculation of $IAVM_{pre,i}$ and represent the difference between the performance ratio of company *i* and the median of all Fama-French industry-matched firms of the respective country for the same year. The coefficient $c_1$ measures the impact of private equity ownership on relative post-purchase accounting performance and is expected to be positive, thus implying that private equity investors act as governance champions in the sense that companies with private equity ownership deliver superior accounting results. The slope coefficient $c_2$ captures the correlation in operating performance between the years prior and following to the stake purchase, respectively.

We perform the regressions for the periods of one, two and three years after the initial stake purchase by the investor. Again, performance variables are winsorized with a two-

sided threshold of 5%.[13] Furthermore, we report results for matched firms based on both, the Fama-French 5 and 10 industry classification schemes.

----------Table 7 goes about here----------

Due to frequent delisting in the wake of public to private buyouts and missing accounting data, the regressions were performed for only some one third of the original sample. Table 7 shows that there is no evidence regarding relative superior accounting performance of firms with private equity ownership. The DUMMY coefficient $c_1$ is not significant throughout all regression specifications and even turns out to be negative in some cases. However, there is some weak evidence that relative financial performance improves towards the third year after the initial stock purchase. Additionally, the results for the slope coefficient $c_2$ indicate that pre- and post-investment accounting results are highly positively correlated.

The results support recent findings about post-deal operating performance of leveraged buyout targets during the latest buyout wave. For example, Guo, Hotchkiss and Song (2009) find insignificant profitability changes for US target firms. Also, Weir, Jones and Wright (2009) report poor post-transaction operating profitability for the UK whereas a plethora of previous studies have dwelled on the fact that target companies experienced significant operating performance improvements during the first buyout wave in the 1980's (e.g. Smith, 1990 and Singh, 1990). Our findings support the assumption of Weir, Jones and Wright (2009) who conclude that acquisition targets nowadays do not provide sufficient upside potential in terms of agency cost reductions and improved monitoring as they already have distinct incentive mechanisms and governance structures in place.

Again, we employ a second regression setting to check for robustness of our results. Similar to the above approach, we include a measure of pre-purchase profitability ($PM_{pre,i}$) as control variable. As opposed to model (5), we control for MTBV[14] instead of ROA:

[13] Results for winsorizing levels of 2.5% and 10% are not reported due to limited space. The results remain quantitatively and qualitatively unchanged.

[14] Our results remain qualitatively unchanged when we control for Tobin's Q instead of MTBV as a robustness check.

$$PM_{post,i} = c_0 + c_1 DUMMY + c_2 SIZE_{post,i} + c_3 LEVERAGE_{post,i} + c_4 MTBV_{post,i} + c_5 PM_{pre,i} + year\ dummies + country\ dummies + industry\ dummies + e_i, \quad (7)$$

where $PM_{post,i}$ is the measure of accounting performance for firm *i* in the years following the initial stake purchase.

----------Table 8 goes about here----------

As reported in Table 8, the results of our fourth regression setting are in line with the argumentation above and thus do not confirm our second hypothesis that private equity investors are governance champions. Again, the findings suggest that target firms show superior financial performance in the third year after the initial stock purchase. Yet, the coefficients are insignificant.

Abnormal returns around the announcement day are not attributable to superior post-acquisition profitability but to relative pre-announcement undervaluation of private equity target firms. Hence, we conclude that stock price adjustments stem from the elimination of market inefficiencies as the stock market corrects for the difference between the pre-announcement price and the fair value of a target company's stock. As outlined in chapter 2, stock purchases by a private equity investor result either from valuable private information about the target company or from greater skills in interpreting public information. While stock price adjustments as a result of private information would lead to the conclusion that the market is not strong form efficient in Fama's (1970) sense, abnormal returns as a consequence of the sophisticated analysis of public information would suggest that the market is not even semi-strong form efficient.[15]

### *4.3. Robustness checks*

In the following, we challenge our findings by addressing potential problems of our empirical specifications. First, we discuss some econometric problems of our regression settings.

[15] The strong form of Fama's efficient capital market hypothesis claims that all historical public and private information is reflected in the share price whereas the semi-strong form only postulates the incorporation of public information.

Second, we perform different variations of our empirical analysis in the sense that we use additional independent and dependent variables to ensure robustness of our results.

First, we address two econometric problems. To approach the problem of heteroscedasticity in the standard errors, we use White or Huber/White QML robust t-statistics (White, 1980). Moreover, we account for potential problems of multicollinearity by calculating variance inflation factors for the independent variables throughout all regression settings presented here. We do not find any critical values.

In a second step, we estimate several versions of our regression specifications. For instance, we add OWNC as independent variable in model (4) and (5).[16] As emphasized by Gillan and Starks (1998) for example, individual shareholders have almost no incentive to closely monitor management in corporations with dispersed shareholder structures. In contrast, a high degree of ownership concentration provides for effective management monitoring in the sense that the implementation of control and incentive mechanisms can mitigate the inherent free-rider problem (e.g. Grossmann and Hart, 1980). Next, we use additional profitability measures to determine whether private equity target firms deliver superior relative post-buyout performance results. Hence, we calculate ROA and ROS with EBIT instead of EBITDA. Finally, we replace the binary variable DUMMY by the continuous variable STAKE in the models (6) and (7) to account for differences in the degree of monitoring, control and influence on operational and strategic decisions between minor stake purchases and pure leveraged buyouts. All our results are robust against these variations.

## 5. Conclusion

Private equity investors in general and their governance practices as well as their relevance to the economy in particular have recently been subject to controversial public debates. Despite ever-higher transaction values and an increasing number of acquisitions there has been little empirical evidence on shareholder wealth effects of private equity investments in European exchange-listed firms. With this study, we aim to shed light on abnormal returns around the announcement day of stock purchases by private equity firms and the fundamental reasons that explain the stock market's reaction. Therefore, we examine the relative pre-

[16] OWNC is not initially considered as independent variable in our specifications due to limited data availability.

announcement valuation of target firms and the relative post-acquisition operating profitability.

To gain deeper insight in our research questions, we use a novel hand-collected panel data set covering 377 European private equity investments in publicly listed firms between 1997 and 2006. Thus we are able to investigate the announcement effect on the wealth of existing shareholders and the underlying rationale for abnormal stock price reactions.
In line with previous research by Andres, Betzer and Weir (2007) for instance, we find that European target shareholders earn a risk-adjusted cumulative average abnormal return of 7.11% over the period from t=-1 to t=+1 relative to the announcement day of stock purchases by private equity investors. These short-term gains are not only highly significant but also persist over the entire event window from t=-30 to t=+30 with CARs of 12.02%.

We examine our main hypotheses by means of a regression setting where we use industry-adjusted measures of valuation and firm performance. We confirm our findings in an empirical specification where we control for various firm characteristics. As hypothesized, our results indicate that target companies are undervalued with respect to similar trading companies. More specifically, we find that target firms have lower market-to-book-ratios and enterprise-value-to-sales ratios than comparable firms without private equity ownership. However, when we examine the post-announcement operating performance of target firms up to three years after the initial investment, we find that target firms do not show superior relative accounting results. This is contrary to our assumption that, amongst others, mitigated agency costs and buyout expertise of the private equity firm lead to higher profitability among private equity target firms. Altogether, our empirical findings suggest that positive shareholder wealth effects around the announcement day are attributable to the perception of the stock market that private equity firms act as superior security analysts in the sense that they systematically identify and invest in underpriced securities.

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## Tables

Table 1: Sample description

**Panel A: Stake purchase distribution by year**

| Year | n | % | Year | n | % |
|---|---|---|---|---|---|
| 1997 | 8 | 2.1% | 2002 | 38 | 10.1% |
| 1998 | 22 | 5.8% | 2003 | 49 | 13.0% |
| 1999 | 50 | 13.3% | 2004 | 36 | 9.5% |
| 2000 | 42 | 11.1% | 2005 | 45 | 11.9% |
| 2001 | 27 | 7.2% | 2006 | 60 | 15.9% |

**Panel B: Distribution by country**

| Country | Total Sample | | Deal Sample | | Country | Total Sample | | Deal Sample | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | | n | % | n | % |
| Austria | 160 | 1.5% | 3 | 0.8% | Italy | 454 | 4.3% | 15 | 4.0% |
| Belgium | 238 | 2.3% | 7 | 1.9% | Luxembourg | 50 | 0.5% | 1 | 0.3% |
| Denmark | 293 | 2.8% | 14 | 3.7% | Netherlands | 275 | 2.6% | 14 | 3.7% |
| Finland | 194 | 1.8% | 3 | 0.8% | Norway | 405 | 3.8% | 5 | 1.3% |
| France | 1470 | 13.9% | 54 | 14.3% | Portugal | 133 | 1.3% | 2 | 0.5% |
| Germany | 1426 | 13.5% | 63 | 16.7% | Spain | 256 | 2.4% | 16 | 4.2% |
| Greece | 378 | 3.6% | 5 | 1.3% | Sweden | 646 | 6.1% | 24 | 6.4% |
| Iceland | 19 | 0.2% | 1 | 0.3% | Switzerland | 369 | 3.5% | 2 | 0.5% |
| Ireland | 109 | 1.0% | 6 | 1.6% | UK | 3672 | 34.8% | 142 | 37.7% |

**Panel C: Distribution by industry**

| Industry | Total Sample | | Deal Sample | | Industry | Total Sample | | Deal Sample | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | | n | % | n | % |
| Consumer NonDurables | 821 | 8.0% | 36 | 9.5% | Telecoms | 262 | 2.6% | 14 | 3.7% |
| Consumer Durables | 243 | 2.4% | 19 | 5.0% | Shops | 1137 | 11.1% | 62 | 16.4% |
| Manufacturing | 1377 | 13.5% | 83 | 22.0% | Healthcare | 423 | 4.1% | 11 | 2.9% |
| Energy | 252 | 2.5% | 1 | 0.3% | Utilities | 187 | 1.8% | 4 | 1.1% |
| Hi-Tec Business Equipment | 1496 | 14.7% | 56 | 14.9% | Other | 4006 | 39.3% | 91 | 24.1% |

***Notes:*** *The data describes our deal sample and total sample of European firms. WhilePanel A presents the deal distribution by year, Panel B shows the sample and deal distribution by country. Finally, Panel C focuses on the distribution by industry as of the Fama-French 10 industry classification scheme. Our sample is based on European private equity investments in publicly listed firms covering the period from 1997 to 2006. To be included in the final sample, target companies have to be headquartered in Europe and a private equity investor has to be involved in the transaction. Moreover, the target firm has to be listed on a European stock exchange until the announcement day. This leaves us with a final sample consisting of 377 firms.*

Table 2: Descriptive statistics

| **Panel A: Measures of firm valuation** | | | | |
|---|---|---|---|---|
| Variable | Total Sample [1996-2009] | | Deal Sample [-1] | |
| | Median | Observations | Median | Observations |
| Market-to-book-value (MTBV) | 1.6 | 67,117 | 1.5 | 352 |
| Enterprise-value-to-sales (EV/SALES) | 1.2 | 76,218 | 0.8 | 338 |
| **Panel B: Meaures of firm performance** | | | | |
| Variable | Total Sample [1996-2009] | | Deal Sample [-1] | |
| | Median | Observations | Median | Observations |
| Return on Assets (ROA) | 9.3% | 74,487 | 12.2% | 345 |
| Return on Sales (ROS) | 11.4% | 72,545 | 11.9% | 341 |
| **Panel C: Firm characteristics** | | | | |
| Variable | Total Sample [1996-2009] | | Deal Sample [-1] | |
| | Median | Observations | Median | Observations |
| ln Sales (SIZE) | 11.2 | 76,982 | 12.0 | 354 |
| Total Liabilities / Total Assets (LEVERAGE) | 57.7% | 78,903 | 58.8% | 354 |
| Perc. of closely held shares (OWNC) | 45.7% | 51,917 | 38.2% | 274 |
| Stake purchase by investor (STAKE) | --- | --- | 91.0% | 367 |

***Notes:*** *The table reports descriptive statistics for the sample firms in the year prior to the announcement and for the total sample between 1995 and 2009. Panel A describes median values for the respective measures of firm valuation while Panel B shows the values for firm performance, respectively. Additionally, Panel C reports firm characteristics with respect to firm size and capital structure, ownership structure and the post-acquisition stake of the private equity investor. The number of observations does not correspond to the size of the final sample due to limited data availability.*

Table 3: Daily average abnormal returns and cumulativeaverage abnormal returns

| Event Day | Abnormal Returns | | | Cumulative Abnormal Returns | | | Abnormal Returns | | |
|---|---|---|---|---|---|---|---|---|---|
| | AR in % | t-statistic | Significance | CAR in % | t-statistic | Significance | # >= 0 | # < 0 | Sum |
| -15 | 0.06% | 0.38 | | 0.06% | 0.38 | | 189 | 188 | 377 |
| -14 | -0.12% | -0.79 | | -0.06% | -0.29 | | 179 | 198 | 377 |
| -13 | 0.08% | 0.51 | | 0.02% | 0.06 | | 185 | 192 | 377 |
| -12 | 0.28% | 1.78 | * | 0.29% | 0.94 | | 193 | 184 | 377 |
| -11 | 0.19% | 1.21 | | 0.48% | 1.38 | | 189 | 188 | 377 |
| -10 | 0.26% | 1.66 | * | 0.74% | 1.94 | * | 186 | 191 | 377 |
| -9 | 0.07% | 0.44 | | 0.81% | 1.97 | * | 180 | 197 | 377 |
| -8 | 0.01% | 0.07 | | 0.82% | 1.86 | * | 188 | 189 | 377 |
| -7 | -0.03% | -0.20 | | 0.79% | 1.69 | * | 166 | 211 | 377 |
| -6 | 0.20% | 1.26 | | 0.98% | 2.00 | ** | 182 | 195 | 377 |
| -5 | 0.71% | 4.57 | *** | 1.69% | 3.28 | *** | 201 | 176 | 377 |
| -4 | 0.17% | 1.11 | | 1.86% | 3.46 | *** | 192 | 185 | 377 |
| -3 | 0.17% | 1.11 | | 2.04% | 3.63 | *** | 182 | 195 | 377 |
| -2 | 0.73% | 4.69 | *** | 2.76% | 4.76 | *** | 208 | 169 | 377 |
| -1 | 1.09% | 7.01 | *** | 3.85% | 6.41 | *** | 219 | 158 | 377 |
| 0 | 4.78% | 30.79 | *** | 8.63% | 13.90 | *** | 271 | 106 | 377 |
| 1 | 1.24% | 8.00 | *** | 9.88% | 15.43 | *** | 200 | 177 | 377 |
| 2 | 0.18% | 1.13 | | 10.05% | 15.26 | *** | 187 | 190 | 377 |
| 3 | 0.00% | 0.03 | | 10.06% | 14.86 | *** | 183 | 194 | 377 |
| 4 | -0.01% | -0.08 | | 10.04% | 14.46 | *** | 185 | 192 | 377 |
| 5 | -0.20% | -1.29 | | 9.84% | 13.83 | *** | 185 | 192 | 377 |
| 6 | 0.04% | 0.23 | | 9.88% | 13.56 | *** | 169 | 208 | 377 |
| 7 | -0.04% | -0.25 | | 9.84% | 13.21 | *** | 173 | 204 | 377 |
| 8 | 0.01% | 0.04 | | 9.85% | 12.94 | *** | 173 | 204 | 377 |
| 9 | 0.25% | 1.62 | | 10.10% | 13.01 | *** | 181 | 196 | 377 |
| 10 | 0.18% | 1.17 | | 10.28% | 12.98 | *** | 182 | 195 | 377 |
| 11 | 0.24% | 1.58 | | 10.52% | 13.04 | *** | 181 | 196 | 377 |
| 12 | -0.14% | -0.88 | | 10.39% | 12.64 | *** | 165 | 212 | 377 |
| 13 | -0.02% | -0.14 | | 10.37% | 12.40 | *** | 174 | 203 | 377 |
| 14 | 0.08% | 0.54 | | 10.45% | 12.29 | *** | 192 | 185 | 377 |
| 15 | -0.14% | -0.89 | | 10.31% | 11.93 | *** | 171 | 206 | 377 |

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

***Notes:*** *The table reports daily average abnormal returns, cumulative average abnormal returns and test statistics for the final sample of 377 European private equity investments in publicly listed firms. The calculation of abnormal returns is based on the market model. The simple t-test is used to check the abnormal returns for significance. Column 1 showsthe event day relative to the announcement day (t=0). Column 2 lists the daily average abnormal returns per event day while column 5 reports cumulative average abnormal returns for the period from t=-15 to the event day. Corresponding test statistics of the simple t-test are presented in column 3 and 6, respectively. Column 8 and 9 display the ratio of positive to negative abnormal returns for each event day. These statistics are helpful in determining whether significant abnormal returns are attributable to outliers. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.*

Table 4: Cumulative average abnormal returns and test statistics for various event periods

| Event Window | CAR | t-value | Event Window | CAR | t-value |
|---|---|---|---|---|---|
| [-1;+1] | 7.11% | 26.45*** | [-2;+2] | 8.02% | 23.09*** |
| [-5;0] | 7.65% | 20.11*** | [-5;+5] | 8.86% | 17.21*** |
| [-15;0] | 8.63% | 13.90*** | [-15;+15] | 10.31% | 11.93*** |
| [-30;0] | 10.07% | 11.65*** | [-30;+30] | 12.02% | 9.91*** |

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

***Notes:*** *The table reports cumulative average abnormal returns for various event windows relative to the event day (t=0) with corresponding t-statistics, based on the market model. Test statistics are calculated by means of the simple t-test. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.*

Table 5: Target firms and undervaluation - Industry-adjusted regression results

**Panel A: Fama-French Industry Classification = 5**

| Dependent Variable | Winsorizing Level | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| MTBV | 2.5% | no | - | -0.72030 | -3.30*** | 0.01 | 2 × 329 |
| MTBV | 5.0% | no | - | -0.55915 | -3.16*** | 0.01 | 2 × 329 |
| MTBV | 10.0% | no | - | -0.30201 | -3.05*** | 0.01 | 2 × 329 |
| EV/SALES | 2.5% | no | - | -0.63212 | -3.63*** | 0.02 | 2 × 330 |
| EV/SALES | 5.0% | no | - | -0.48121 | -3.87*** | 0.02 | 2 × 330 |
| EV/SALES | 10.0% | no | - | -0.29182 | -3.73*** | 0.02 | 2 × 330 |

**Panel B: Fama-French Industry Classification = 10**

| Dependent Variable | Winsorizing Level | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| MTBV | 2.5% | no | - | -0.78453 | -3.18*** | 0.01 | 2 × 327 |
| MTBV | 5.0% | no | - | -0.53639 | -3.16*** | 0.01 | 2 × 327 |
| MTBV | 10.0% | no | - | -0.31979 | -3.14*** | 0.01 | 2 × 327 |
| EV/SALES | 2.5% | no | - | -0.50726 | -3.08*** | 0.01 | 2 × 329 |
| EV/SALES | 5.0% | no | - | -0.36857 | -3.29*** | 0.01 | 2 × 329 |
| EV/SALES | 10.0% | no | - | -0.21508 | -3.02*** | 0.01 | 2 × 329 |

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

***Notes:*** *The table reports results of a ordinary least squares regression analysis explaining the difference in pre-acquisition valuation of private equity target firms and comparable public companies that do not experience any investment by a private equity investor. Findings of the analysis based on the Fama-French 5 industry classification are shown in Panel A and based on the Fama-French 10 industry classification in Panel B, respectively. We use industry-adjusted valuation ratios as dependent variables to examine whether private equity firms are undervalued compared to similar public firms in the year prior to the announcement. Industry-adjusted valuation measure is the valuation multiple of a target company minus the median of all Fama-French industry-matched firms of the respective country for the same year. Industry-adjusted valuation measures are winsorized with a two-sided threshold of 2.5%, 5.0% and 10.0%, respectively. The binary variable DUMMY takes the value of 1 if a private equity investor has equity holdings in the company and 0 for similar public companies without private equity ownership. Column 5 reports the results for the coefficient of the variable DUMMY while column 6 shows the corresponding White heteroscedasticity robust t-values. Column 7 lists the adjusted $R^2$ for each regression and column 8 the number of target companies that are included in the regression. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.*

Table 6: Target firms and undervaluation - Industry-unadjusted regression results

**Panel A: Fama-French Industry Classification = 5**

| Dependent Variable | Winsorizing Level | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| MTBV | 2.5% | yes | - | -0.69998 | -3.32*** | 0.18 | 2 × 325 |
| MTBV | 5.0% | yes | - | -0.60872 | -3.67*** | 0.20 | 2 × 325 |
| MTBV | 10.0% | yes | - | -0.39493 | -3.98*** | 0.24 | 2 × 325 |
| EV/SALES | 2.5% | yes | - | -0.50318 | -2.90*** | 0.22 | 2 × 326 |
| EV/SALES | 5.0% | yes | - | -0.41007 | -3.26*** | 0.19 | 2 × 326 |
| EV/SALES | 10.0% | yes | - | -0.25299 | -3.36*** | 0.18 | 2 × 326 |

**Panel B: Fama-French Industry Classification = 10**

| Dependent Variable | Winsorizing Level | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| MTBV | 2.5% | yes | - | -0.76560 | -3.24*** | 0.15 | 2 × 322 |
| MTBV | 5.0% | yes | - | -0.57631 | -3.52*** | 0.19 | 2 × 322 |
| MTBV | 10.0% | yes | - | -0.36467 | -3.54*** | 0.22 | 2 × 322 |
| EV/SALES | 2.5% | yes | - | -0.36137 | -2.26** | 0.24 | 2 × 324 |
| EV/SALES | 5.0% | yes | - | -0.29343 | -2.62*** | 0.22 | 2 × 324 |
| EV/SALES | 10.0% | yes | - | -0.18523 | -2.59*** | 0.23 | 2 × 324 |

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

***Notes:*** *The table reports results of a ordinary least squares regression analysis explaining the difference pre-announcement valuation of private equity target firms and comparable public companies that do not experience any investment by a private equity investor. Findings of the analysis based on the Fama-French 5 industry classification are shown in Panel A and based on the Fama-French 10 industry classification in Panel B, respectively. We use valuation ratios as dependent variables to examine whether private equity firms are undervalued compared to similar public firms in the year prior to the announcement. The binary variable DUMMY takes the value of 1 if a private equity investor has equity holdings in the company and 0 for similar public companies without private equity ownership. Moreover, we control for SIZE, LEVERAGE and ROA. In all regressions, we use country, year and industry dummies based on the Fama-French industry 5 and 10 classification schemes. All exogenous and endogenous variables except for dummy variables are winsorized with a two-sided threshold of 2.5%, 5.0% and 10.0%, respectively. Column 5 reports the results for the coefficient of the variable DUMMY while column 6 shows the corresponding White heteroscedasticity robust t-values. Column 7 lists the adjusted $R^2$ for each regression and column 8 the number of target companies that are included in the regression. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.*

Table 7: Target firms and operating performance - Industry-adjusted regression results

**Panel A: Fama-French Industry Classification = 5**

| Dependent Variable | Period in years rel. to announcement | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| ROA | [-1;1] | no | + | -0.00627 | -0.49 | 0.34 | 2 × 156 |
| ROA | [-1;2] | no | + | -0.01514 | -0.99 | 0.22 | 2 × 141 |
| ROA | [-1;3] | no | + | -0.00918 | -0.45 | 0.06 | 2 × 114 |
| ROS | [-1;1] | no | + | 0.00393 | 0.39 | 0.23 | 2 × 156 |
| ROS | [-1;2] | no | + | -0.00804 | -0.64 | 0.18 | 2 × 141 |
| ROS | [-1;3] | no | + | 0.01791 | 1.32 | 0.08 | 2 × 115 |

**Panel B: Fama-French Industry Classification = 10**

| Dependent Variable | Period in years rel. to announcement | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| ROA | [-1;1] | no | + | -0.00734 | -0.63 | 0.34 | 2 × 156 |
| ROA | [-1;2] | no | + | -0.01565 | -1.22 | 0.26 | 2 × 141 |
| ROA | [-1;3] | no | + | -0.00732 | -0.42 | 0.09 | 2 × 114 |
| ROS | [-1;1] | no | + | 0.00380 | 0.37 | 0.18 | 2 × 156 |
| ROS | [-1;2] | no | + | -0.00677 | -0.60 | 0.16 | 2 × 141 |
| ROS | [-1;3] | no | + | 0.01239 | 0.97 | 0.10 | 2 × 115 |

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

***Notes:*** *The table reports results of a ordinary least squares regression analysis explaining the difference in post-acquisition financial performance of private equity target firms and comparable public companies that do not experience any investment by a private equity investor. Findings of the analysis based on the Fama-French 5 industry classification are shown in Panel A and based on the Fama-French 10 industry classification in Panel B, respectively. We use industry-adjusted accounting performance ratios as dependent variables to examine whether private equity firms show superior accounting results compared to similar public firms in the respective year after the stake purchase. Industry-adjusted accounting performance measure is the valuation multiple of a target company minus the median of all Fama-French industry-matched firms of the respective country for the same year. Industry-adjusted accounting performance measures are winsorized with a two-sided threshold of 5.0%. The binary variable DUMMY takes the value of 1 if a private equity investor has equity holdings in the company and 0 for similar public companies without private equity ownership. Moreover, we control for the pre-announcement accounting performance ratio. Column 5 reports the results for the coefficient of the variable DUMMY while column 6 shows the corresponding White heteroscedasticity robust t-values. Column 7 lists the adjusted $R^2$ for each regression and column 8 the number of target companies that are included in the regression. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.*

Table 8: Target firms and operating performance - Industry-unadjusted regression results

**Panel A: Fama-French Industry Classification = 5**

| Dependent Variable | Period in years rel. to announcement | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| ROA | [-1;1] | yes | + | -0.00458 | -0.36 | 0.46 | 2 × 148 |
| ROA | [-1;2] | yes | + | -0.02090 | -1.54 | 0.40 | 2 × 137 |
| ROA | [-1;3] | yes | + | -0.00290 | -0.15 | 0.26 | 2 × 108 |
| ROS | [-1;1] | yes | + | -0.00076 | -0.07 | 0.32 | 2 × 148 |
| ROS | [-1;2] | yes | + | -0.02096 | -1.87* | 0.40 | 2 × 137 |
| ROS | [-1;3] | yes | + | 0.00996 | 0.88 | 0.39 | 2 × 108 |

**Panel B: Fama-French Industry Classification = 10**

| Dependent Variable | Period in years rel. to announcement | Controls | Expected Sign | DUMMY | t-statistics | Adj. R2 | N |
|---|---|---|---|---|---|---|---|
| ROA | [-1;1] | yes | + | -0.00768 | -0.64 | 0.44 | 2 × 148 |
| ROA | [-1;2] | yes | + | -0.00270 | -0.22 | 0.37 | 2 × 136 |
| ROA | [-1;3] | yes | + | 0.00026 | 0.01 | 0.23 | 2 × 108 |
| ROS | [-1;1] | yes | + | -0.00486 | -0.49 | 0.27 | 2 × 148 |
| ROS | [-1;2] | yes | + | -0.00851 | -0.72 | 0.30 | 2 × 136 |
| ROS | [-1;3] | yes | + | 0.00654 | 0.59 | 0.33 | 2 × 108 |

* Significant at the 0.10 level

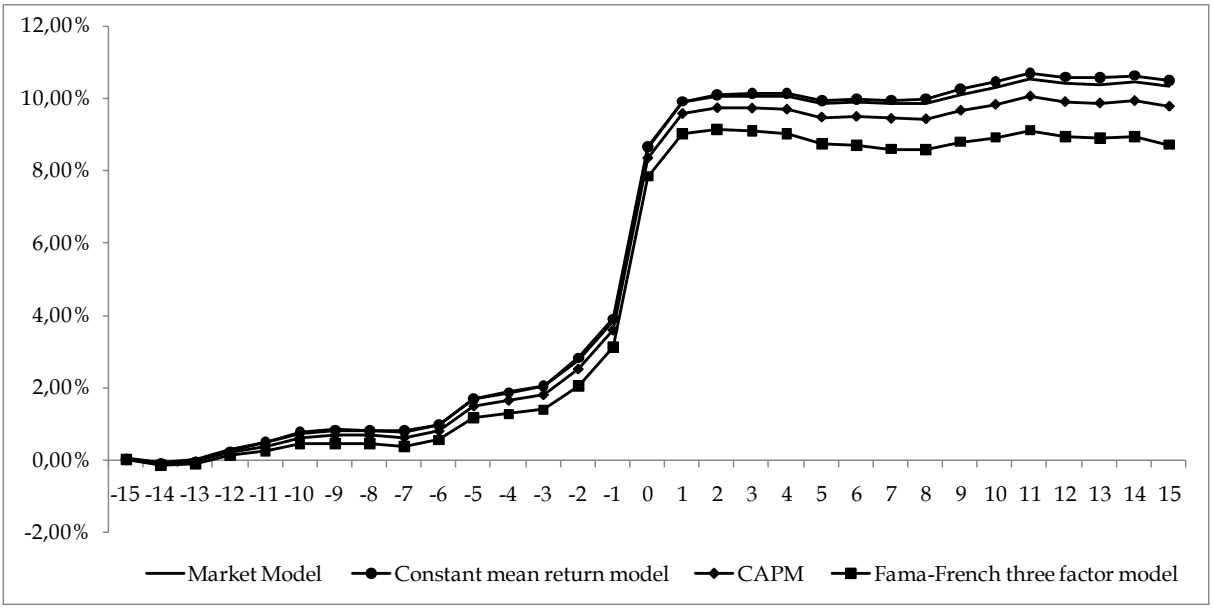
** Significant at the 0.05 level

*** Significant at the 0.01 level

***Notes:*** *The table reports results of a ordinary least squares regression analysis explaining the difference in post-acquisition financial performance of private equity target firms and comparable public companies that do not experience any investment by a private equity investor. Findings of the analysis based on the Fama-French 5 industry classification are shown in Panel A and based on the Fama-French 10 industry classification in Panel B, respectively. We use accounting performance ratios as dependent variables to examine whether private equity firms show superior accounting results compared to similar public firms in the respective year after the stake purchase. The binary variable DUMMY takes the value of 1 if a private equity investor has equity holdings in the company and 0 for similar public companies without private equity ownership. Moreover, we control for the pre-announcement accounting performance ratio as well as for the post-acquisition firm characteristics SIZE, LEVERAGE and MTBV. In all regressions, we use country, year and industry dummies based on the Fama-French industry 5 and 10 classification schemes. All exogenous and endogenous variables except for dummy variables are winsorized with a two-sided threshold of 5.0%. Column 5 reports the results for the coefficient of the variable DUMMY while column 6 shows the corresponding White heteroscedasticity robust t-values. Column 7 lists the adjusted $R^2$ for each regression and column 8 the number of target companies that are included in the regression. Statistical significance at the 1%, 5%, and 10% level is indicated by ***, **, and *, respectively.*

**Figures**

Figure 1: Cumulative average abnormal returns




***Notes:*** *The figure presents cumulative average abnormal returns over the event period[-15;+15] relative to the announcement day based on the market model, the constant mean return model, the capital asset pricing model (CAPM) and the Fama-French three factor model.*