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**Working Paper**

## Insight private equity

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Andrej Gill - Nikolai Visnjic

# Insight Private Equity

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## Non-Technical Summary

Economic literature distinguishes between active and passive investors. In contrast to passive investors, who hold a fraction of a company's equity without getting involved in the business or strategy of the portfolio company, active investors participate in managing their investment. This participation may include actions like monitoring management, sitting on the board of directors, dismissing management and usually influencing corporate strategy.

Following regulation of financial institutions in the U.S. in the first half of the 20th century, a new group of financial institutions evolved. As a special form of active investors, the group of private equity investors, took over the previous role of banks in monitoring and actively managing their portfolio companies. With this approach they aim to increase the value of their investment which eventually has to go hand in hand with an improvement in operational performance of the underlying companies. As of now only one part of the obvious research question whether and through which mechanisms this modified organizational structure creates value has been addressed. Empirical papers which focus on the question whether these investors create value by actively managing their investments and thereby increasing operating performance mainly find outperformance of private equity portfolio companies during their private time.

However, what still has to be analyzed is the origin of the value creation. If private equity investors are not just investing in the right company at the right point in time there may exist systematic value drivers which might be eventually observable. Consequently, there has to be some forces which distinguish the top performing companies from the least performing ones. Problematic in analyzing this issue is the fact that these investors refuse to disclose information regarding financial and operational performance as well as restructuring activities undertaken. Though with our data collection approach we have identified a way to obtain comprehensive information on both operational performance data and restructuring actions for the private time of the portfolio companies. Our main research question therefore focuses on which of the common tools<sup>1</sup> private equity investors use to restructure their portfolio companies are responsible for the aforementioned outperformance and performance variation. In this manner we try to shed light into the black box of organizational and operational restructuring activities and their impact on operating efficiency.

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<sup>1</sup> Although in general the tools PE investors commonly use for their active investing approach are well known there has been hardly any systematic research regarding their particular influence on operational performance.

The particular approach private equity investors employ to generate value is to take on a majority position in the equity of the company<sup>2</sup> and at the same time get a sizeable interest on the board of directors. Hence, they are able to exert control over management, thereby influence decision making and at the end corporate strategy. Superior organizational structure and the high equity stake as well as a large pay for performance sensitivity lead to clear cut incentives for the private equity investor to maximize shareholder value. Effort to increase equity value does often include restructuring of the company, which can mean both, organizational and operational restructuring activities. In our analysis we took advantage of the fact that buyout transactions that are eventually taken public after the restructuring period have to disclose information for public investors. As operational performance has to be stated at least 3 years back we were able to track performance during the private period. We then screened the corresponding IPO prospectuses for information about previous changes in the governance structure or operational strategy that took place during the period the companies belonged to a private equity investor's portfolio.

We find large increases in operational performance of our private equity portfolio companies but at the same time huge variance among growth rates. We are able to identify a set of actions influencing operational performance during the restructuring period: Steep incentives, frequent asset restructuring, tight monitoring and experienced investors are all characteristics that lead to superior growth rates in operating efficiency. In addition US companies have significantly higher financial leverage ratios than European portfolio companies and they outperform their European counterparts while being private.

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<sup>2</sup> Using both equity and debt to finance their equity stake thus increasing financial leverage of the portfolio company.

# Insight Private Equity\*

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## Abstract

We are able to shed light on the black box of restructuring tools private equity investors use to improve the operational performance of their portfolio companies. By building on previous work considering performance evaluation of PE backed companies, we analyze whether private equity improves operating efficiency and which of the typical restructuring tools are the main performance drivers. Using a set of over 300 international leveraged buyout transactions of the last thirty years, we find that while there is vast improvement in operational efficiency, these gains vary considerably. Our top performing transactions are subject to strong equity incentives, frequent asset restructuring and tight control by the investor. Furthermore, investors' experience has a positive influence while financial leverage has no influence on operational performance.

*Keywords:* private equity, leveraged buyouts, active shareholders, corporate restructuring, operational performance

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*JEL classification:* G23, G24, G32, G34

# 1 Introduction

Economic literature distinguishes between active and passive investors. In contrast to passive investors, who hold a fraction of a company's equity without getting involved in the business or strategy of the portfolio company, active investors participate in managing their investment. According to Jensen (1989a) this participation can include actions like monitoring management, sitting on the board of directors, dismissing management and usually influencing corporate strategy.

Following regulation of financial institutions in the US in the first half of the 20th century, a new group of financial institutions evolved. As a special form of active investors, the group of private equity investors took over the previous role of banks in monitoring and actively managing their portfolio companies. With this approach they aimed to increase the value of their investment which eventually has to go hand in hand with an improvement in operational performance of the underlying company. So far, only one part of the research question, whether and through what mechanisms this modified organizational structure creates value, has been addressed. Empirical papers with a focus on whether PE investors create value by actively managing their investments and thereby increasing operating performance, mainly find outperformance of portfolio companies during the private period.<sup>1</sup>

However, determinants of value creation still have to be analyzed. If private equity investors are not simply investing in the right company at the right point in time, systematic value drivers should exist. As a matter of fact while Guo *et al.* (2011) find only small operating performance gains, they also document substantial performance variation within their sample. Consequently, there have to be some characteristics which distinguish the top performing companies from the poorest performing ones. What is problematic in analyzing this issue is the fact that PE investors generally refuse to disclose information regarding financial and operational performance as well as strategy and restructuring activities during the private period. However, with our data collection approach we have identified a way of obtaining comprehensive information on both operational performance and restructuring activities for the private time of the portfolio companies. Our main research question therefore considers, which of the common tools that private equity investors use to restructure their portfolio companies are responsible for performance variation among a sample of PE backed companies. We decipher the black box of organizational and operational restructuring activities and figure out impacts on operating efficiency. Although PE investors' restructuring tools are well known, there has hardly been any systematic research regarding their particular influence on operational performance.

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<sup>1</sup>Kaplan (1989), Muscarella and Vetsuypens (1990) and Gill and Visnjic (2010) in general find positive effects on operational performance after buyouts.

PE investors typically hold majority stakes in their portfolio companies<sup>2</sup> and are usually well represented on the board of directors. As a consequence, they are able to exert control over management and influence decision-making and finally corporate strategy. High equity stakes and large pay for performance sensitivities lead to clear-cut incentives for the PE investor to maximize shareholder value. Efforts to increase equity value often includes restructuring of the company, which can mean both organizational and operational restructuring activities. We took advantage of the fact that buyout backed companies which are eventually taken public after the restructuring period have to disclose information for future public investors. As financials have to be stated for at least the previous three years, we were able to track performance during the private period. Subsequently we screened the corresponding IPO prospectus for information about previous changes in the governance structure or operational strategy.

After evaluating the data we categorize our variables into six groups with a potential impact on operational performance: financial leverage; operating restructuring activities; ownership and control characteristics; management and investor ability and experience; managerial replacement; incentives structure. On the back of theoretically motivated hypotheses we analyze the influence of the variables on operational performance. We start with a single explanatory variable per regression. Afterwards we test the results for each hypothesis by adding all the explanatory variables into one regression. Finally, we check for robustness by running regressions for all variables which show significance.

We find on average an increasing operational performance with large a variance within our sample companies. The following set of activities significantly drive operational performance during the restructuring period: Steep incentives, frequent asset restructuring, tight monitoring and investors experience. These variables have a positive effect on operating efficiency. Furthermore, US companies have significantly higher financial leverage ratios than European portfolio companies and they outperform their European counterparts during the private period.

The paper is organized as follows: In section 2 we describe our sample selection as well as data collection process followed by summary statistics on sample distribution and portfolio company characteristics. Section 3 outlines our theoretically backed hypothesis. Hypothesis tests and robustness checks are shown in section 4 and 5. Finally section 6 concludes.

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<sup>2</sup>Using debt to finance their equity stake thus increasing financial leverage at portfolio company level.



## **2 Sample Selection, Data Description and Summary Statistics**

In order to analyze what determines performance variation among private equity portfolio companies, at the same time we require data on operational performance and transaction and restructuring characteristics. To match our data requirements, we checked a population of roughly 900 LBO transactions between 1980 and 2006 in the Thomson One "Venture Economics" database.

### **2.1 Selection Criteria**

For better information availability we make sure that the companies are public at the time of data collection in order to be included in our sample. This criterion brings down the number of companies from 900 to 303. This step is crucial for our purposes as our analysis depends on good data availability for both transaction and company characteristics. Furthermore we double-checked every transaction in Lexis Nexis for transaction details such as the seller's and the buyer's identity. Wherever possible we include deal metrics such as company valuation and financial structure of the deal. Concerning the buyout transaction type (i.e., the organizational form of the company at the time of the buyout) we find that of our 303 companies 64 meet the criteria of a divisional spin-off. 54 observations are public stand-alone companies at the time of the data collection as well as before their LBO, which is the definition of a reverse leveraged buyout transaction. These two groups differ strongly with respect to their organizational form. As a consequence, they also differ in terms of the underlying corporate governance structure at the time of the LBO. As this disparity could influence operational performance within our sample, we decided to divide the sample into subgroups. Basically there are three types of transactions, which differ with respect to their organization at the time of the LBO: divisional spin-offs (spin-offs), public stand-alone companies (RLBO) and the remaining are private stand-alone companies. We present summary statistics for all three groups and create dummy variables for the regressions.

### **2.2 Descriptive Data**

The companies in our sample are mainly incorporated in the United States (214). The remainder are from Western Europe (85), Australia (3) and New Zealand (1). As a matter of fact, we only include companies in our sample where an English copy of the IPO prospectus is available. This obviously has a strong influence on the origin of our companies. However, as it is in particular unclear whether US evidence on sources of wealth gains does hold for UK and continental European transactions, a distinc-

tion between US and Western European transactions is important. As a consequence, we distinguished between US and non US companies to figure out operational dissimilarities in the summary statistics section and included a US control dummy in the regressions.

Regarding industries, we have Standard Industrial Classification (SIC) codes available for all companies. The distribution is as follows: 134 companies operate in the manufacturing business, 55 in services, 34 in retail trade, 28 in transportation and communication, 25 in finance and insurance, 13 in wholesale trade, 9 in mining, 3 in construction and 1 each in agriculture and public administration.

	Total		US		Spinoff		RLBO	
	obs.	%	obs.	%	obs.	%	obs.	%
1981	1	0.3	1	0.5	0	0.0	0	0.0
1982	0	0.0	0	0.0	0	0.0	0	0.0
1983	1	0.3	1	0.5	0	0.0	1	1.9
1984	3	1.0	3	1.4	0	0.0	2	3.7
1985	4	1.3	4	1.9	0	0.0	2	3.7
1986	5	1.7	5	2.4	1	1.6	1	1.9
1987	8	2.6	8	3.8	1	1.6	5	9.3
1988	10	3.3	10	4.8	2	3.1	5	9.3
1989	12	4.0	12	5.7	2	3.1	4	7.4
1990	5	1.7	5	2.4	2	3.1	0	0.0
1991	2	0.7	1	0.5	1	1.6	0	0.0
1992	6	2.0	5	2.4	1	1.6	0	0.0
1993	4	1.3	2	1.0	0	0.0	0	0.0
1994	5	1.7	3	1.4	1	1.6	0	0.0
1995	2	0.7	1	0.5	1	1.6	0	0.0
1996	13	4.3	9	4.3	2	3.1	2	3.7
1997	19	6.3	15	7.2	2	3.1	3	5.6
1998	21	6.9	15	7.2	4	6.3	5	9.3
1999	38	12.5	19	9.1	12	18.8	4	7.4
2000	19	6.3	12	5.7	4	6.3	4	7.4
2001	17	5.6	8	3.8	3	4.7	2	3.7
2002	28	9.2	16	7.7	10	15.6	4	7.4
2003	29	9.6	21	10.0	5	7.8	6	11.1
2004	27	8.9	14	6.7	7	10.9	2	3.7
2005	19	6.3	15	7.2	2	3.1	2	3.7
2006	5	1.7	4	1.9	1	1.6	0	0.0
2007	0	0.0	0	0.0	0	0.0	0	0.0
2008	0	0.0	0	0.0	0	0.0	0	0.0
<b>Total</b>	<b>303</b>	<b>100.0</b>	<b>209</b>	<b>100.0</b>	<b>64</b>	<b>100.0</b>	<b>55</b>	<b>100.0</b>

Table 1: Sample overview on LBO calendar year distribution for all firms that were public at the time of data collection (All), are located in the US (US), are subject to a Spin-Off from a parent company (Spinoff) and have undergone a reverse LBO transaction (RLBO).

Table 1 gives an overview on distribution of LBO transactions in our sample. There are clearly two waves of buyouts identified for the total sample. The first buyout wave starts in the late '80s and has its peak in 1989 where 4% of our sample companies had their buyout. The second and by far larger buyout wave takes place during the late '90s and early 2000s. The peak of this wave occurs in 1999, where over 12% of our sample companies have their buyout.

	Total		US		Spinoff		RLBO	
	obs.	%	obs.	%	obs.	%	obs.	%
1981	0	0.0	0	0.0	0	0.0	0	0.0
1982	0	0.0	0	0.0	0	0.0	0	0.0
1983	0	0.0	0	0.0	0	0.0	0	0.0
1984	0	0.0	0	0.0	0	0.0	0	0.0
1985	0	0.0	0	0.0	0	0.0	0	0.0
1986	1	0.3	1	0.5	0	0.0	1	1.8
1987	3	1.0	3	1.4	0	0.0	1	1.8
1988	0	0.0	0	0.0	0	0.0	0	0.0
1989	2	0.7	2	1.0	0	0.0	0	0.0
1990	3	1.0	3	1.4	0	0.0	2	3.6
1991	13	4.3	13	6.2	2	3.1	7	12.7
1992	11	3.6	8	3.8	1	1.6	3	5.5
1993	8	2.6	7	3.3	2	3.1	3	5.5
1994	4	1.3	4	1.9	0	0.0	3	5.5
1995	4	1.3	2	1.0	3	4.7	0	0.0
1996	6	2.0	4	1.9	1	1.6	0	0.0
1997	9	3.0	5	2.4	2	3.1	0	0.0
1998	3	1.0	1	0.5	1	1.6	0	0.0
1999	12	4.0	9	4.3	3	4.7	1	1.8
2000	12	4.0	9	4.3	5	7.8	0	0.0
2001	14	4.6	9	4.3	2	3.1	3	5.5
2002	13	4.3	8	3.8	2	3.1	3	5.5
2003	10	3.3	9	4.3	1	1.6	3	5.5
2004	49	16.2	33	15.8	11	17.2	10	18.2
2005	40	13.2	27	12.9	9	14.1	4	7.3
2006	56	18.5	36	17.2	12	18.8	8	14.5
2007	28	9.2	14	6.7	6	9.4	3	5.5
2008	2	0.7	2	1.0	1	1.6	0	0.0
<b>Total</b>	<b>303</b>	<b>100.0</b>	<b>209</b>	<b>100.0</b>	<b>64</b>	<b>100.0</b>	<b>55</b>	<b>100.0</b>

Table 2: Sample overview on IPO calendar year distribution for all firms that were public at the time of data collection (All), are located in the US (US), are subject to a Spin-Off from a parent company (Spinoff) and have undergone a reverse LBO transaction (RLBO).

IPOs also appear in two waves, as shown in table 2. The first wave starts in the early '90s, four years after the first buyout wave started. The second wave starts three years after the second buyout wave. There seems to be better data availability in the Thomson One database for transactions beginning in the '90s. This could be a source for a possible sample selection bias. However, these effects should be rather low as our sample matches the pattern of buyout waves other studies on leveraged buyouts transactions found (see for example Renneboog and Simons (2005)).

The average duration of the private period for the full sample is 3.7 years with a standard deviation of 2.2 and a range from 1 to 11 years. This figure is in line with the typical three to five years private equity investors keep their portfolio companies private before they begin the exit process (using an IPO in our case). Even if US companies and RLBO transactions have a slightly higher average investment duration and spinoff transactions a slightly lower, none of these differences are significant.

## 2.3 Performance Data and Restructuring Characteristics

With respect to company specific information, we collected financial and operational data like income statement, balance sheet and cash flow figures. This serves as input for our operating efficiency ratios, which represent the dependent variables in our

regressions.

Variable	Description	Source
Gross Profit	Gross Profit divided by total sales	Income Statement
EBITDA	EBITDA divided by total sales	Income Statement
Net Income	Net Income divided by total sales	Income Statement
CFOA	Cash flow from operating activities divided by total sales	Income & Cash Flow Statement

Table 3: Description and sources for all dependent variables. Source for data is Compustat with amendments from Bloomberg and the IPO Prospectuses.

By using four different profitability ratios we make sure that we cover all possible sources of efficiency changes. Increases in efficiency can be achieved either by top line growth (i.e., revenue growth) and at the same time stable costs or by cutting costs while keeping sales constant. As shown by the details on the response variables in table 3, all profitability, respectively cash flow figures are divided by sales. Thereby we make sure to account for top line growth. Our three efficiency ratio inputs, which come from the income statement, differ in the degree of costs that are included. Gross profit, which is the broadest profit figure, is derived by subtracting direct production costs from sales. EBITDA is derived by subtracting direct production and administrative costs from sales. Net income, which stands at the bottom of the income statement, is derived by subtracting direct production costs, administrative costs, financial costs and tax from sales. We add cash flow from operating activity over sales as our fourth response variable. Cash flow figures are generally harder to manipulate. We use all four efficiency ratios in analyzing the impact of restructuring activities on operational performance.

Information on the corporate governance characteristics of the companies, like information on management, ownership data, compensation and incentive structure, as well as data on operational strategy changes, like acquisitions and divestitures serve as our set of explanatory variables. The resulting 13 explanatory variables are either proxies for typical private equity restructuring activities or represent investor and executive management characteristics, like type and experience. For a detailed variable descriptions including sources see table 4.

Variable	Hypothesis	Description	Source
Leverage	1: Financial leverage	Book value of short and long term debt over book value of total assets after the LBO transaction	Bloomberg, Compustat, IPO Prospectus
Acquisitions	2: Asset restructuring	Number of acquisitions executed during restructuring period	IPO prospectus
Divestitures	2: Asset restructuring	Number of divestitures executed during restructuring period	IPO prospectus
Director Ratio	3: Monitoring / control	Share of directors belonging to the private equity investor	IPO prospectus
PE Chairman	3: Monitoring / control	Dummy variable with value 1 if the Chairman belongs to the PE investor, 0 otherwise	IPO prospectus
PE Stake	3: Monitoring / control	Fraction of the company's outstanding equity the investor holds at the time of the LBO	IPO prospectus
Independent PE	4: Management / investor ability	Dummy variable indication whether the PE investor belongs to a Bank or other institution (=0) or is independent (=1)	Thomson One
PE Age at LBO	4: Management / investor ability	Number of years the PE investor is in business	PE Homepage
Amount Invested	4: Management / investor ability	Aggregated amount the PE investor invested	Thomson One
Management Change	5: Managerial replacement	Dummy variable showing equal to 1 if a member of the executive management team is replaced during the restructuring period	IPO prospectus
Bonus to Base	6: Incentives	Ratio of value of cash bonus payments to value of cash base compensation	IPO prospectus
Equity Incentives	6: Incentives	Share of outstanding equity that is used for incentive compensation structures of key employees	IPO prospectus
Management Stake	6: Incentives	Fraction of the company's outstanding equity the management holds at the time of the LBO	IPO prospectus

Table 4: Description and sources for all explanatory variables. The corresponding hypothesis is indicated in the second column.

Using this data collection approach, we make sure that we include all available public data for figuring out operational performance determinants of PE portfolio companies. At this point in time we neglect potential cross synergies with other companies belonging to the same PE portfolio, however this could be an interesting topic for future research.

## 2.4 Operational Summary Statistics

In order to determine the influence of PE investors' active investing approach on operational performance of the portfolio companies, we calculate mean values as well as standard deviation for several basic income statement and balance sheet figures. We do so for the time of the initiation of the investment (buyout) and subsequent floating of the company on a stock exchange (IPO, which is the starting point of the exit process). Heterogeneity among industry, size, stage of the company and particular investment duration in our sample leads to sizeable variations in operational data and growth rates. For interpretation purposes we add median levels in the summary statistics section.

A couple of common operational and financial ratios provide an overview on gen-

eral changes in operating efficiency and capital structure. Observations range from 128 to 218, primarily due to constraints in data availability at the time of the buyout. In particular, figures using the size of the workforce as an input have a much lower number of observations.<sup>3</sup>

		Buyout			IPO			Growth		
	obs.	mean	median	stdv.	mean	median	stdv.	mean	median	stdv.
Sales	218	829.65	262.86	2034.14	1194.80	461.71	2251.46	118%	61%	174%
COGS	188	591.92	170.35	1507.88	846.61	279.91	1673.67	120%	53%	193%
SGA	182	167.45	51.78	416.67	235.75	77.85	442.88	139%	55%	290%
EBITDA	146	124.36	48.71	282.72	200.36	100.43	363.01	154%	83%	262%
EBIT	209	49.10	20.62	127.83	104.27	51.05	162.58	271%	103%	1017%
Interest Expense	192	42.88	11.03	167.35	57.39	21.38	162.15	239%	37%	757%
Tax	190	11.46	3.02	32.46	19.30	10.17	31.82	435%	130%	1548%
Net Income	214	-3.13	1.60	93.21	32.95	16.86	87.41	302%	135%	1737%
Cash	163	56.52	12.76	146.52	66.26	28.37	123.11	271%	102%	503%
Current Assets	131	302.62	110.19	590.62	387.73	160.27	697.90	98%	47%	159%
Total Assets	207	1145.49	330.92	3189.90	1393.45	517.18	3082.92	118%	35%	209%
Current Liab.	132	243.95	70.85	512.43	308.85	116.28	553.25	79%	40%	130%
Total Liab.	197	1011.81	283.18	2676.45	1081.24	370.02	2451.53	65%	5%	185%
Shrd. Equity	205	168.48	37.63	762.97	351.72	143.81	819.55	562%	182%	1066%
Working Capital	145	64.87	30.78	170.79	93.62	54.45	253.58	243%	74%	535%
# Employees	77	7.22	1.89	21.22	7.02	1.87	15.59	40%	12%	97%
Liquidity Ratio	128	1.53	1.36	0.85	1.85	1.57	1.94	35%	5%	118%
Leverage	180	0.58	0.56	0.34	0.37	0.36	0.26	-13%	-30%	119%
Sales/Employees	77	0.26	0.20	0.22	0.54	0.23	1.85	66%	25%	166%
EBIT/Employees	77	0.03	0.01	0.07	0.13	0.03	0.71	113%	40%	252%
ROA	205	-0.04	0.01	0.44	0.05	0.04	0.07	132%	98%	420%
Asset Turnover	207	1.18	0.88	0.97	1.20	0.98	0.92	30%	13%	126%
ROE	153	0.10	0.05	1.40	0.12	0.11	0.37	72%	47%	252%
Gross Margin	187	0.36	0.31	0.22	0.38	0.34	0.21	16%	5%	57%
Operating Margin	209	0.05	0.09	0.37	0.11	0.11	0.18	74%	22%	275%
Profit Margin	214	-0.04	0.01	0.38	0.03	0.05	0.14	89%	68%	765%

Table 5: Summary on operational data for our full sample both at the time the buyout transaction took place (Buyout) and at the time of the public offering (IPO) with the corresponding number of observations as well as average growth rates between the two dates. Data includes figures from the income statement and the balance sheet as well as common profitability / efficiency ratios (for a detailed description see appendix). All figures are in million USD except number of employees (in thousands) and ratios.

Table 5 shows vast improvements in operational performance of PE backed companies. However, all figures and growth rates are absolute values. At this point in time no conclusion can be drawn concerning whether restructuring leads to operational outperformance relative to comparable companies. Even more interesting in the wake of our research focus is the fact that there are huge variations among growth rates.<sup>4</sup> This suggests heterogeneity among restructuring impacts on operational performance, which is part of our primary motivation.

The first block in table 5 contains figures from top to the bottom line of the income statement. On the top line we see that median sales growth is 61% during the private

<sup>3</sup>To derive reliable growth rates we had to limit statistics to firms for which we have data ranging from LBO to IPO.

<sup>4</sup>This becomes obvious by comparing mean and median figures or by looking at the standard deviation.

period. Direct production costs and selling, general and administrative costs increase to a lesser extent. As a consequence, EBITDA, EBIT and net income increase disproportionate to sales from LBO to IPO. The steepest increase comes at the bottom line with the median net income level growing over 130%. Common balance sheet figures in the second block reveal that assets grow to a lesser extent than sales, indicating an increase in asset efficiency. It is interesting that while the median level of total assets on average increases 35%, workforce hardly grows more than 10% which suggests workforce efficiency gains. Shareholders equity is rising due to decreasing debt levels and a consequential lower increase in total liabilities compared to total assets. Regarding capital structure, financial leverage decreases strongly during the course of the private time.

Looking at profitability, respectively the efficiency ratios, while gross margins stay roughly flat, we find a steep increase in operating and profit margins. This suggests enhanced organizational structure leading to lower administrative costs. Furthermore, we find strong growth rates for sales per employee and EBIT per employee ranging between 25 and 40%.

## 2.5 Regional Differences

In order to account for diverse organizational structures and regional differences, summary statistics give an overview on the three sub samples: companies which are located in the United States (US), companies which emerge from a division of a parent company (Spinoff) and companies which are public at the time of the buyout (RLBO). For figuring out differences in operational characteristics at the time of the buyout and at the time of the IPO, we give a statistical overview on mean values and provide t-statistics for comparing two means.

Activity and size of the LBO market varies considerably in the relevant regions of our sample. The US buyout market took the leading role, with the UK and Continental Europe following suit. The first buyout wave, which obviously had its starting point in the early 80's in the US, eventually made it to Europe a few years later. The second wave in the late 90's took place simultaneously. However, in terms of size Kaplan and Strömberg (2009) report that the North American LBO market accounted for roughly 90% in the late '80s with the UK and Continental Europe following with 7 and respectively 3%. The heavy weight of the US transactions decreased to less than 50% share of the global market for the period 2000 to 2007. The UK's and continental Europe's share did rise to 15 respectively 30% in this time frame. Obviously the Asia/Pacific region and the rest of the world only play a minor role in the period we analyze. We will therefore focus on the US and Western Europe.

Renneboog and Simons (2005) find several possible explanations for the huge difference in size between the US, the UK and continental European buyout markets, es-

pecially when looking at the first buyout wave. These include differences in the financial infrastructure, entrepreneurial culture, exit options and legal and fiscal regulation. In terms of factors that could be responsible for systematic performance variation between Europe and the US, Toms and Wright (2005) argue that different sources for debt financing and higher debt levels in the US could play a role. Furthermore, Renneboog *et al.* (2007) name different tax treatments and a different buyout focus as sources that could impact private equity backed companies. Buyout investors in the UK focus primarily on companies in their growth phase rather than on mature and high cash flow generating companies PE investors focus on in the US. Even if a couple of these factors have seen some kind of convergence in recent years, we still expect them to influence the operational performance of our sample firms.

	Buyout					IPO				
	US		non US		t-value	US		non US		t-value
	mean	stdv.	mean	stdv.		mean	stdv.	mean	stdv.	
Sales	836.42	2197.65	756.97	1251.15	0.24	1087.21	2081.08	1054.81	2118.49	0.12
COGS	573.45	1553.85	657.04	1139.67	-0.28	689.01	1319.73	907.65	1938.81	-1.03
SGA	133.89	414.21	278.15	391.31	-1.99	203.05	705.47	340.35	554.43	-1.63
EBITDA	122.11	295.53	122.88	212.93	-0.01	155.89	324.94	146.16	252.63	0.25
EBIT	44.22	130.08	66.83	116.50	-1.06	102.28	167.88	95.51	165.85	0.32
Interest Expense	43.71	177.94	24.44	43.52	0.71	51.05	157.83	37.12	90.35	0.77
Tax	9.34	32.35	13.72	25.05	-0.83	19.73	34.65	17.33	29.11	0.58
Net Income	-9.83	92.92	21.52	86.28	-2.09	29.41	76.41	42.82	87.32	-1.35
Cash	53.25	151.07	56.13	102.91	-0.11	54.85	112.31	52.35	87.28	0.19
Current Assets	266.63	536.58	383.54	700.88	-1.03	315.86	684.78	392.21	785.95	-0.83
Total Assets	1168.22	3450.43	1018.36	1897.98	0.28	1230.45	2954.91	1124.49	2231.99	0.31
Current Liab.	211.88	503.38	319.15	522.42	-1.09	229.41	646.68	311.68	557.56	-1.04
Total Liab.	1062.96	2926.96	785.88	1349.67	0.60	937.03	2347.54	775.12	1515.27	0.61
Shrd. Equity	137.98	747.78	255.05	761.30	-0.92	286.64	715.25	355.33	783.38	-0.75
Working Capital	54.21	153.94	112.21	216.91	-1.67	88.07	138.85	81.54	321.42	0.24
# Employees	8.80	25.63	3.91	6.13	0.99	5.33	11.03	4.16	6.79	0.92
Liquidity Ratio	1.59	0.88	1.34	0.73	1.56	2.16	1.77	1.63	1.54	2.49
Leverage	0.61	0.34	0.40	0.30	2.84	0.36	0.29	0.31	0.21	1.58
Sales/Employees	0.25	0.21	0.26	0.25	-0.22	0.43	1.01	0.52	1.74	-0.54
EBIT/Employees	0.02	0.04	0.04	0.10	-0.99	0.08	0.41	0.10	0.65	-0.40
ROA	-0.21	2.15	0.01	0.22	-0.51	0.06	0.11	0.07	0.10	-0.44
Asset Turnover	2.41	7.99	1.90	1.24	0.32	1.49	1.04	1.48	1.15	0.05
ROE	0.00	4.62	0.05	0.62	-0.06	-0.29	10.98	0.34	1.21	-0.55
Gross Margin	0.34	0.23	0.41	0.24	-1.60	0.37	0.20	0.38	0.23	-0.33
Operating Margin	0.04	0.41	0.09	0.11	-0.76	0.12	0.17	0.11	0.15	0.72
Profit Margin	-0.07	0.42	0.04	0.14	-1.76	0.04	0.14	0.06	0.15	-1.24

Table 6: Summary of operational data reporting mean and standard deviation values for US based against non US companies. The first major column represents figures at the time of the buyout; the second at the time of the IPO. Statistical significance at both points in time is evaluated by t-values. Data includes figures from the income statement and the balance sheet as well as common profitability / efficiency ratios (for a corresponding description see appendix). All figures are in million USD except number of employees (in thousands) and ratios.

Comparing US buyouts with their non US counterparts in table 6, we find a statistically significant difference in the leverage level. US companies have a substantially higher debt to assets ratio at the time of the buyout. This causes lower net income levels as interest payments are deducted to calculate net income. Obviously this leads



to lower profit margins at the time of the LBO. As mentioned above, differences in transaction and company characteristics are an indication that the US LBO market is structurally different compared to the European market. Whether a transaction is a real leveraged buyout, containing substantial amounts of debt after the buyout, may have a direct impact on operational performance in the private period.

In terms of size, which is measured by sales and total assets, US companies are on average only slightly larger at the LBO. At the IPO, US companies are comparable to their non US counterparts in size and profitability ratios. Although leverage for US firms declines, it is still at a higher level at the IPO even if it is no longer significant. Differences in net income and profit margin are also no longer significant.

## **2.6 Organizational Differences**

### Spinoffs

In contrast to mergers, a spinoff is a type of corporate restructuring transaction for which the optimal size of the firm is expected to be smaller than present. As a consequence, one of the driving forces to divest a division is certainly the conglomerate discount. This is due to the fact that investors generally value a diversified firm below the sum of the parts value (see for instance Burch and Nanda (2003) or Berger and Ofek (1995)). Economic literature provides various theories and arguments for splitting up large corporations. Diseconomies of decision-making could be a reason to separate two business units due to too many assets or unequal assets under a single management, or diseconomies of decision control by shareholders due to high costs of evaluating and rewarding managerial performance (Schipper and Smith (1983)). Gertner *et al.* (2002) also mention possible agency problems between top management and divisional management of a company as one motivation to separate a division from its parent. According to Lichtenberg and Siegel (1990) post buyout firms that emerge from a division rather than from an entire firm are often less hierarchical and more focused than the companies from which they emerge.

	Buyout					IPO				
	Spinoff		Non-Spinoff		t-value	Spinoff		Non-Spinoff		t-value
	mean	stdv.	mean	stdv.		mean	stdv.	mean	stdv.	
Sales	1273.01	2250.70	704.37	1951.07	1.67	1505.22	2591.42	962.88	1923.93	1.84
COGS	946.92	1836.71	497.07	1388.78	1.67	1071.58	2043.69	654.87	1301.38	1.87
SGA	247.68	357.92	143.83	424.43	1.40	319.05	498.14	229.29	700.17	0.94
EBITDA	284.65	555.72	86.35	147.79	3.46	242.06	495.32	128.80	222.90	2.61
EBIT	103.44	186.76	34.86	102.34	3.25	147.51	225.68	87.66	145.82	2.54
Interest Expense	50.67	101.18	37.24	171.35	0.48	65.70	135.34	42.01	141.88	1.15
Tax	19.78	36.05	7.99	29.12	2.21	29.26	36.93	16.52	31.52	2.51
Net Income	12.95	97.14	-6.87	90.81	1.25	36.44	85.57	32.94	78.76	0.31
Cash	125.46	225.57	36.12	106.07	3.39	80.41	140.06	46.98	92.14	2.25
Current Assets	607.38	963.41	216.58	402.38	3.24	544.62	944.65	285.20	635.28	2.50
Total Assets	1804.91	3454.32	966.55	3089.75	1.53	1784.12	3202.01	1040.41	2594.77	1.92
Current Liab.	505.41	849.18	171.39	343.42	3.19	414.88	732.39	213.18	578.48	2.25
Total Liab.	1592.38	3103.36	853.52	2530.59	1.57	1342.79	2596.79	765.94	1965.40	1.91
Shrd. Equity	269.35	508.17	136.50	798.34	1.01	431.97	799.78	275.28	717.14	1.50
Working Capital	132.05	259.43	49.41	135.15	2.40	131.92	368.45	73.06	144.18	1.90
# Employees	11.17	15.95	5.94	22.12	0.91	6.15	10.44	4.64	9.76	1.05
Liquidity Ratio	1.56	0.85	1.51	0.85	0.23	2.09	1.88	1.96	1.67	0.53
Leverage	0.52	0.34	0.57	0.34	-0.62	0.32	0.26	0.35	0.27	-0.88
Sales/Employees	0.24	0.15	0.26	0.24	-0.32	0.35	0.30	0.48	1.43	-0.73
EBIT/Employees	0.03	0.03	0.03	0.07	0.18	0.05	0.07	0.10	0.56	-0.71
ROA	0.00	0.13	-0.21	2.18	0.52	0.06	0.11	0.07	0.11	-0.59
Asset Turnover	1.34	0.88	2.55	8.08	-0.79	1.32	0.91	1.53	1.11	-1.37
ROE	0.16	1.06	-0.03	4.64	0.21	-2.03	17.43	0.44	4.77	-1.92
Gross Margin	0.38	0.20	0.34	0.24	0.83	0.40	0.20	0.37	0.21	0.87
Operating Margin	0.09	0.10	0.04	0.41	0.81	0.12	0.10	0.12	0.18	0.11
Profit Margin	0.01	0.10	-0.05	0.42	0.98	0.04	0.09	0.05	0.16	-0.44

Table 7: Summary of operational data reporting mean and standard deviation values for spinoff versus non-spinoff transactions. The first major column represents figures at the time of the buyout; the second at the time of the IPO. Statistical significance at both points in time is evaluated by t-values. Data includes figures from the income statement and the balance sheet as well as common profitability / efficiency ratios (for a corresponding description see appendix). All figures are in million USD except number of employees (in thousands) and ratios.

Table 7 shows that at the time of the buyout spinoffs are significantly larger than pre buyout stand alone companies measured by sales. EBITDA and EBIT levels are also significantly higher which can at least in part be attributed to the size difference. Profitability ratios, which control for size, are higher but not statistically significant. In the year of the IPO, the spinoff subgroup is still significantly larger measured by sales and total assets. However, efficiency ratios lose their advance while profit margins even turn into laggards.

### RLBOs

Reverse leveraged buyouts differ from the remaining buyouts in our sample in such that companies are publicly listed at the time of the buyout. This fact severely impacts the governance structure of the companies (ownership and control) and may therefore lead to performance differences during the private period. Cumming *et al.* (2007) consider the pre-buyout agency cost problems in private firms. Benefits of private firms, which usually have a small and concentrated shareholder group, are weighted against possible agency problems connected with this ownership structure. According to the

authors differences between public to private and private to private transactions could impact post buyout productivity.

	Buyout					IPO				
	RLBO		non RLBO		t-value	RLBO		non RLBO		t-value
	mean	stdv.	mean	stdv.		mean	stdv.	mean	stdv.	
Sales	1557.02	3628.91	632.97	1302.68	2.75	1943.22	3382.71	890.54	1638.25	3.39
COGS	1022.62	2528.42	474.68	1066.93	2.06	1096.95	1940.92	658.42	1358.48	1.90
SGA	288.67	810.18	140.08	262.95	1.87	464.15	1378.95	206.95	378.76	2.41
EBITDA	116.68	175.99	123.94	303.74	-0.13	250.03	365.78	131.45	285.47	2.57
EBIT	58.16	147.49	47.03	122.40	0.50	176.29	245.11	83.69	139.9	3.74
Interest Expense	95.52	332.53	25.48	56.72	2.60	112.35	280.52	32.09	74.75	3.85
Tax	21.10	49.75	7.68	23.74	2.50	33.77	49.83	15.91	27.31	3.59
Net Income	-8.81	109.67	-1.36	87.52	-0.48	59.37	119.47	28.13	67.81	2.60
Cash	79.09	198.56	47.68	124.23	1.16	95.61	157.64	45.45	88.22	3.13
Current Assets	407.15	684.26	270.45	557.88	1.09	613.31	1199.90	278.64	538.74	3.07
Total Assets	2142.06	5702.44	873.68	2017.28	2.36	2363.86	4958.89	945.76	1894.03	3.47
Current Liab.	341.27	599.43	215.17	481.87	1.17	487.58	1108.09	203.67	423.15	3.03
Total Liab.	1838.45	4632.91	777.73	1761.86	2.32	1845.36	3767.02	678.05	1482.97	3.71
Shrd. Equity	334.26	1256.81	117.83	541.41	1.69	514.22	1318.08	263.87	529.33	2.26
Working Capital	77.68	221.70	62.10	151.43	0.47	127.53	222.45	76.11	212.28	1.57
# Employees	16.73	42.43	4.61	9.34	2.11	10.23	18.07	3.83	6.55	4.27
Liquidity Ratio	1.54	0.80	1.52	0.87	0.16	1.60	0.74	2.08	1.85	-1.82
Leverage	0.63	0.33	0.54	0.34	1.25	0.46	0.26	0.32	0.27	3.44
Sales/Employees	0.21	0.20	0.27	0.23	-0.87	0.22	0.20	0.51	1.40	-1.46
EBIT/Employees	0.03	0.03	0.03	0.07	-0.04	0.04	0.10	0.10	0.55	-0.66
ROA	-0.01	0.08	-0.23	2.28	0.61	0.06	0.08	0.07	0.12	-0.23
Asset Turnover	1.41	0.86	2.64	8.45	-0.90	1.35	0.84	1.52	1.11	-1.04
ROE	0.43	2.72	-0.15	4.64	0.73	0.14	1.23	-0.14	10.00	0.19
Gross Margin	0.33	0.20	0.36	0.24	-0.50	0.37	0.22	0.38	0.21	-0.12
Operating Margin	0.09	0.10	0.04	0.40	0.84	0.15	0.12	0.11	0.17	1.30
Profit Margin	-0.01	0.08	-0.05	0.43	0.70	0.06	0.15	0.04	0.14	0.94

Table 8: Summary of operational data reporting mean and standard deviation values for RLBO vs. non RLBO transactions. The first major column represents figures at the time of the buyout; the second at the time of the IPO. Statistical significance at both points in time is evaluated by t-values. Data includes figures from the income statement and the balance sheet as well as common profitability / efficiency ratios (for a corresponding description see appendix). All figures are in million USD except number of employees (in thousands) and ratios.

Figures in table 8 show that RLBOs are on average largest among the three subgroups, measured either by sales or total assets at the buyout and the IPO. These findings are statistically significant at the 1% level. EBITDA, EBIT and net income numbers suggest that RLBO outperform their non RLBO counterparts, showing no significance at the LBO but significance at the 1% level at the IPO. Furthermore, we can see a slightly higher leverage ratio at the LBO and a much slower decline in leverage during the private time. This leads to a significantly higher leverage ratio for RLBOs at the IPO.

### Basis Regression

In our baseline regression all control variables are included without any explanatory variables. Control variables include a dummy for each of our three subgroups (US, spinoff and RLBO), the portfolio company's age in years, the size measured by assets, and the investment duration measured in years between entry and exit. We control for industry and calendar years effects using dummy variables. Note that coefficients and

standard errors for industry and calendar year dummies are not explicitly reported in the regression tables.

	Gross Profit	EBITDA	Net Income	CFOA
RLBO	-0.022 (0.126)	0.200 (0.188)	-0.063 (0.592)	0.380 (0.552)
Spinoff	0.063 (0.146)	0.086 (0.248)	-0.979 (0.680)	-0.347 (0.716)
US	0.148 (0.147)	0.116 (0.189)	1.149* (0.590)	1.210** (0.510)
Company Age	-0.001 (0.002)	-0.001 (0.002)	0.009 (0.007)	-0.003 (0.007)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	0.031 (0.037)	-0.017 (0.054)	0.197 (0.167)	0.329* (0.167)
Obs.	188	145	206	146

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 9: Regression results for all base control variables including regional (US) and organizational dummies (RLBO / Spinoff). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

Table 9 shows that US based companies have superior growth rates in net income margin and cash flow efficiency. In addition, longer investments tend to generate higher growth in cash flow efficiency. Age of the portfolio company, size measured by total assets and the type of transaction (i.e., RLBO and spinoff) do not have a statistically significant influence on any of our efficiency growth rates.

### 3 Predictions and hypotheses

We derive hypotheses that match the most common private equity investors restructuring activities. This set is comprehensive as it covers all critical arguments that determine the strategy and future development of a company: corporate strategy, corporate governance, corporate finance, incentive structure and managerial ability. We back the hypotheses with theoretic arguments. By testing the hypotheses we figure out which activities systematically impact the operational performance of PE portfolio companies in our sample.

Without taxes, bankruptcy and agency costs, and asymmetric information, Modigliani and Miller (1958) show that a change in capital structure should have no impact on firm value or performance. However, with the separation of ownership and control agency costs arise and capital structure matters. Various models find that by choosing a certain debt level and thereby a corresponding free cash flow level, the agency problem between the manager and the owner of a firm can at least be mitigated. Studies considering this research area are Grossman and Hart (1982), Jensen (1986), Jensen (1989b),

and Harris and Raviv (1990). Debt, which decreases free cash flow because of interest payments, can act as a disciplining device to the manager. In order to avoid default, management refrains from wasting financial resources and ceteris paribus operational performance and shareholder value increase. Opler and Titman (1993) support this hypothesis and conclude in their empirical analysis of buyout transactions, that debt financing is an important factor for realizing gains in going private transactions. However, Cotter and Peck (2001) suggest that given their empirical findings active monitoring by buyout specialists is a substitute for a tighter debt structure.

**Hypothesis 1. *Debt / Free Cash Flow:*** *A higher debt and respectively lower free cash flow level prevents the management from wasting resources and leads to an increase in performance*

Mulherin and Boone (2000) classify theoretical literature on corporate restructuring using acquisitions and divestitures into two categories: on the one hand there is the non-synergistic theory based on managerial entrenchment, empire building and managerial hubris, claiming that acquisitions should lead to lower performance because of less corporate focus. Divestitures in contrast can increase specialization and lower agency costs and therefore lead to superior performance (For example see Jensen (1986), Roll (1986) or Shleifer and Vishny (1989)). On the other hand, synergistic models based on Coase (1937) predict that both types of transactions should create value. Changes in economic conditions like technology, transaction costs or input prices can lead to a change in the optimal possessor of an asset. Early models on this topic include Klein *et al.* (1978), Bradley *et al.* (1988) and Jensen (1993).

**Hypothesis 2. *Operational Restructuring:*** *More frequent asset restructuring activity systematically impacts operational performance*

Jensen and Meckling (1976) were among the first to introduce agency costs for a ownership structure where management does not own all outstanding equity. Ang *et al.* (2000) empirically confirm the prediction by Jensen and Meckling that agency costs increase with a decrease of the management's stake in the firm. If the management is not able to increase its stake, another possibility to reduce or minimize agency costs is that shareholders and directors monitor management. Because active monitoring comes with a cost to the shareholders, it is only implemented if there is ownership concentration. Consequentially, shareholders can only extract benefits out of monitoring activities if their stake in the firm is large enough. Although ownership concentration reduces liquidity, a vast amount of literature predicts that it causes benefits due to more efficient management control (Maug (1998), Bolton *et al.* (1998) or Pagano and Röell (1998)). In the context of monitoring by the board of directors, literature starting with Baysinger and Butler (1985) analyzes whether and how the composition of the board of directors influences monitoring and hence operational performance.

They find a slight outperformance of companies with independent boards. However, empirical examinations by Rosenstein and Wyatt (1990) and Hermalin and Weisbach (1991) come to the conclusion that board composition does not matter.

**Hypothesis 3. *Ownership, Monitoring and Control:*** *Higher ownership concentration leads to more monitoring effort and tighter control which increases operating performance*

Managerial ability may influence corporate performance. Especially in the private equity industry, which is a specialized working environment, managerial experience can be crucial. Govindarajan (1989) shows that functional experience in R&D is positively related to the successful implementation of differentiation strategies, whereas functional experience in manufacturing is positively associated with the successful implementation of low-cost strategies. McGee *et al.* (1995) find that cooperative arrangements and thereby greater success of the company are most beneficial to ventures where the management team has a high level of experience.

**Hypothesis 4. *Managerial (Investor) Experience:*** *A higher level of managerial experience leads to superior operating performance*

A goal PE investors usually bear in mind is to increase managerial performance. This can be either done by higher effort in monitoring the management (see hypothesis 1 and 3) or simply by replacing the incumbent management team with a superior successor. Several authors approached this issue. Huson *et al.* (2004) analyze whether CEO turnover affects financial performance. They find that accounting performance measures deteriorate relative to other firms prior to CEO turnover and improve thereafter. Ertugrul and Krishnan (2011) find significant variation in the ex-ante stock return of firms that dismissed their CEOs between 1996 and 2008. Similar to Huson *et al.*, they document a decrease in operational performance before and an increase after CEO dismissals.

**Hypothesis 5. *Managerial Replacement:*** *Managerial replacement should lead to an increase in operational performance*

Economic literature generally agrees on the fact that the way management is compensated influences the performance of the underlying company. Yermack (1997) finds that stock prices increase after (non-publicly announced) grants of executive stock options. In addition Abowd (1990) offers evidence that granting stock-based incentives to management improves subsequent stock price performance. In a random sample of US manufacturing firms Mehran (1995) detects positive abnormal operational performance for firms with stronger equity based management compensation and larger management equity stakes. Overall, this evidence is consistent with the hypothesis

that stock-based incentives are important drivers of managerial actions and operational performance.<sup>5</sup>

**Hypothesis 6. *Incentives:*** *A higher level of equity based compensation should lead to better operational performance*

## 4 Results

We analyze which of the characteristics presented in section 2.3 drive performance variation in our sample and estimate the growth determinants of our efficiency ratios. The period of interest is the one from entry of the PE investor (LBO) to the beginning of the exit (IPO). Our basis variables are included in every regression. Explanatory variables belonging to the particular hypothesis are reported separately at the bottom of the table.

	Gross Profit	EBITDA	Net Income	CFOA
RLBO	0.110 (0.107)	0.123 (0.209)	0.401 (0.684)	-0.115 (0.608)
Spinoff	-0.078 (0.123)	0.113 (0.279)	-1.353* (0.794)	-0.090 (0.794)
US	-0.023 (0.126)	0.225 (0.205)	1.596** (0.660)	1.168** (0.555)
Company Age	-0.001 (0.001)	-0.001 (0.003)	0.015* (0.008)	-0.001 (0.007)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	-0.017 (0.031)	-0.014 (0.063)	0.057 (0.205)	0.316 (0.203)
Leverage	-0.470*** (0.131)	-0.396 (0.251)	1.109 (0.845)	1.294* (0.741)
OBS.	143	128	158	127

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 10: Regression results for all four efficiency ratios with leverage being the explanatory variable (Hypothesis 1). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

Considering the prediction that a higher debt to assets ratio should act as a disciplining device to the manager and therefore to outperformance, we estimate the impact of financial leverage on all four efficiency ratios. Results can be found in table 10: Higher leverage levels cause significantly higher cash flow efficiency growth. We check whether this effect disappears if we include our monitoring set of variables in the regression as supposed by Cotter and Peck (2001). As a matter of fact the effect from leverage even intensifies if we control for monitoring. However, at the same

<sup>5</sup>For a summary of theoretical and empirical findings regarding executive compensation see Ashenfelter and Card (1999)

time we document significantly lower growth in the level of gross profit margin for higher leverage ratios. Again, this result does not change if we include our monitoring variables in the regression. As a consequence we can so far give no clear cut answer to Hypothesis 1, as we find conflicting arguments in terms of leverage and efficiency changes.

	Gross Profit		EBITDA		Net Income		CFOA	
RBLO	-0.022 (0.127)	-0.039 (0.129)	0.205 (0.188)	0.136 (0.197)	-0.042 (0.596)	-0.457 (0.582)	0.517 (0.539)	0.147 (0.575)
Spinoff	0.062 (0.147)	0.083 (0.149)	0.078 (0.248)	0.168 (0.260)	-0.996 (0.683)	-0.591 (0.666)	-0.387 (0.697)	-0.033 (0.748)
US	0.148 (0.148)	0.148 (0.147)	0.111 (0.189)	0.121 (0.189)	1.144* (0.592)	1.181** (0.570)	1.178** (0.496)	1.282** (0.510)
Company Age	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.009 (0.007)	0.009 (0.006)	-0.001 (0.006)	-0.002 (0.007)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	0.031 (0.037)	0.030 (0.037)	-0.024 (0.054)	-0.019 (0.054)	0.189 (0.169)	0.173 (0.162)	0.267 (0.164)	0.347** (0.167)
Acquisitions	0.003 (0.056)		0.088 (0.099)		0.113 (0.259)		0.746*** (0.273)	
Divestitures		0.125 (0.191)		0.281 (0.266)		3.128*** (0.866)		1.503 (1.083)
Obs.	188	188	145	145	206	206	146	146

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 11: Regression results for all four efficiency ratios with the number of acquisitions respectively divestitures as explanatory variables (Hypothesis 2). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

Looking at Hypothesis 2, we find that asset restructuring (i.e., acquisitions and divestitures) does have an effect on operating efficiency. First, companies that make acquisitions during the time they stay in the portfolio of the PE investor are able to significantly outperform with respect to cash flow efficiency. Second, companies that pursue divestitures subsequent to the LBO on average see higher net income margin growth rates. Both results are significant at the 1% level. In the context of PE restructuring, we can confirm results of Mulherin and Boone (2000) analyzing acquisitions and divestitures during the 90s. We find evidence that supports the synergistic models of asset restructuring. Regression results for Hypothesis 2 can be found in table 11. To further strengthen our results, we run regressions for all four efficiency ratios with both acquisitions and divestitures as explanatory variables. Although both asset restructuring types are significantly correlated we can reinforce our findings from above. Detailed regression results for both explanatory variables case can be found in the appendix in table 17.



	Gross Profit			EBITDA			Net Income			CFOA		
RLBO	0.009 (0.133)	-0.015 (0.127)	0.012 (0.134)	0.221 (0.205)	0.200 (0.189)	0.191 (0.207)	-0.469 (0.685)	-0.056 (0.595)	-0.118 (0.624)	0.330 (0.705)	0.404 (0.545)	0.294 (0.585)
Spinoff	0.012 (0.156)	0.044 (0.147)	-0.047 (0.155)	0.415 (0.291)	0.084 (0.252)	0.173 (0.283)	-0.766 (0.802)	-0.996 (0.689)	-1.059 (0.720)	0.563 (1.014)	-0.242 (0.708)	-0.608 (0.800)
US	0.344 (0.263)	0.179 (0.151)	0.229 (0.174)	0.504 (0.397)	0.119 (0.196)	0.156 (0.245)	2.569* (1.219)	1.175* (0.609)	1.190 (0.735)	2.312* (1.217)	0.882* (0.528)	0.516 (0.694)
Company Age	-0.001 (0.002)	-0.001 (0.002)	0.000 (0.002)	-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.003)	0.019* (0.009)	0.009 (0.007)	0.011 (0.007)	-0.006 (0.010)	-0.002 (0.007)	-0.004 (0.007)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	0.001 (0.041)	0.035 (0.037)	0.016 (0.041)	-0.037 (0.066)	-0.017 (0.054)	-0.008 (0.067)	0.028 (0.211)	0.199 (0.168)	0.097 (0.194)	0.455* (0.240)	0.295* (0.166)	0.416** (0.196)
Director Ratio	-0.561** (0.261)			-0.902** (0.417)			0.259 (0.261)			-1.156 (1.449)		
PE Chairman	-0.108 (0.124)			-0.012 (0.186)			-0.109 (0.611)			1.146** (0.553)		
PE Stake	-0.333 (0.310)			-0.188 (0.534)			0.689 (1.441)			3.239** (1.529)		
Obs.	160	188	175	114	145	131	161	206	189	108	146	134

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 12: Regression results for all four efficiency ratios with the share of PE backed board representatives, the PE investors' stake and a PE backed chairman dummy as explanatory variables (Hypothesis 3). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

Hypothesis 3 covers ownership concentration, board composition and corresponding monitoring levels of the portfolio company. Table 12 shows that a higher ownership stake of the investor and monitoring through a PE connected chairman leads to higher cash flow efficiency growth rates. In contrast, a higher representation by the PE among the board of directors leads to lower growth rates in both gross profit and EBITDA margins. The reason could be that PE board representatives cannot be counted as fully independent members. This result may therefore be evidence for the conclusion by Baysinger and Butler (1985) that independent boards are superior. Regressions considering all explanatory variables of hypothesis 3 do not alter these results dramatically. While a higher director ratio still coincides with lower EBITDA and gross margins, significance levels drop to the 10% level. This could be due to relatively high correlation with the other two explanatory variables of hypothesis 3. Impact of a PE connected chairman is no longer significant. Positive correlation between PE stake and PE chairman variables could be responsible for the change in significance. Detailed results are shown in table 18 (appendix).

	Gross Profit			EBITDA			Net Income			CFOA		
RLBO	-0.015 (0.127)	0.014 (0.147)	-0.047 (0.147)	0.199 (0.189)	0.110 (0.213)	0.105 (0.213)	-0.102 (0.597)	-0.585 (0.672)	-0.583 (0.688)	0.452 (0.557)	0.889 (0.708)	0.851 (0.717)
Spinoff	0.057 (0.146)	0.000 (0.182)	0.040 (0.180)	0.087 (0.250)	0.410 (0.293)	0.411 (0.292)	-0.925 (0.687)	-0.325 (0.807)	-0.211 (0.817)	-0.430 (0.721)	0.42 (1.027)	0.416 (1.050)
US	0.114 (0.150)	0.389* (0.198)	0.402** (0.196)	0.118 (0.196)	0.349 (0.264)	0.375 (0.268)	1.246** (0.612)	2.551*** (0.836)	2.458*** (0.858)	1.097** (0.542)	2.199** (0.853)	2.350*** (0.873)
Company Age	0.001 (0.002)	0.000 (0.002)	0.000 (0.002)	-0.001 (0.002)	-0.001 (0.003)	-0.001 (0.003)	0.009 (0.007)	0.014* (0.008)	0.016** (0.008)	-0.003 (0.007)	-0.004 (0.009)	-0.006 (0.009)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	0.037 (0.037)	0.012 (0.048)	0.029 (0.047)	-0.017 (0.054)	-0.045 (0.070)	-0.042 (0.068)	0.186 (0.186)	-0.090 (0.217)	-0.008 (0.217)	0.337** (0.168)	0.639** (0.250)	0.591** (0.252)
Independent PE	0.115 (0.102)			-0.006 (0.153)			-0.296 (0.168)			0.453 (0.455)		
PE Age at LBO		0.007** (0.003)			0.001 (0.005)			0.029* (0.015)			-0.028 (0.019)	
Amount Invested			0.000** (0.000)			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)
Obs.	188	146	146	145	109	109	206	151	151	146	107	107

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 13: Regression results for all four efficiency ratios with the age of the PE investor, the PE investors' experience (measured by total investment) and a dummy whether the PE is a standalone firm as explanatory variables (Hypothesis 4). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

We check whether PE investor characteristics and experience drive performance variation in Hypothesis 4. Investors experience measured by age of the PE firm and aggregated amount the firm invested significantly drives gross profit margin growth. Furthermore, the older the PE investor, the higher the net income margin growth. The PE investors' approach is to influence managerial decision-making and to interfere in strategic management of the company, tasks usually covered by incumbent management. Results therefore provide evidence for our hypothesis that increased managerial, i.e. investors' experience, has a positive impact on operational performance. Independence of the investor from banks or other corporations plays no role. Stand-alone, independent PE investors are on average not significantly driving performance in the single explanatory variable regression. See table 13 for detailed results. However, if all three investor characteristics are put into a single regression, we find significantly higher net income growth for independent PE investors. Furthermore we can confirm the positive impact of experience on gross profit and net income margins growth. For details see table 19 in the appendix.

	Gross Profit	EBITDA	Net Income	CFOA
RLBO	-0.013 (0.128)	0.150 (0.190)	-0.132 (0.599)	0.480 (0.562)
Spinoff	0.054 (0.147)	0.122 (0.247)	-0.924 (0.684)	-0.422 (0.721)
US	0.134 (0.148)	0.162 (0.190)	1.257** (0.606)	1.152** (0.514)
Company Age	-0.001 (0.002)	-0.001 (0.002)	0.009 (0.007)	-0.003 (0.007)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	0.024 (0.039)	0.017 (0.058)	0.241 (0.176)	0.264 (0.181)
Management Change	0.060 (0.107)	-0.245 (0.158)	-0.406 (0.499)	0.441 (0.456)
Obs.	188	145	206	146

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 14: Regression results for all for efficiency growth ratios with a dummy for the case of managerial replacement after the buyout as the sole explanatory variable (Hypothesis 5). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

The prediction of hypothesis 5, that management replacement after the investor takes over control of the company leads to superior performance, has to be rejected. Our dummy variable for the dismissal of the incumbent management has no significant influence on any of the four efficiency ratios we analyze. Results are shown in table 14.

	Gross Profit			EBITDA		Net Income				CFOA		
RLBO	-0.014 (0.154)	0.093 (0.123)	0.021 (0.136)	0.276 (0.190)	0.377* (0.209)	0.203 (0.208)	0.020 (0.613)	-0.160 (0.693)	0.028 (0.641)	0.794 (0.713)	1.164** (0.562)	0.538 (0.620)
Spinoff	0.082 (0.174)	0.145 (0.142)	-0.025 (0.156)	0.279 (0.275)	0.237 (0.303)	0.234 (0.289)	-1.322* (0.709)	-0.701 (0.842)	-1.093 (0.732)	-0.360 (0.991)	-0.644 (0.790)	-0.540 (0.850)
US	0.336 (0.282)	0.468* (0.269)	0.106 (0.175)	0.307 (0.394)	-0.122 (0.481)	0.091 (0.242)	-1.792* (1.074)	-1.777 (1.634)	1.220* (0.687)	1.108 (1.189)	0.442 (1.092)	1.113* (0.637)
Company Age	-0.001 (0.002)	-0.002 (0.002)	-0.001 (0.002)	0.000 (0.003)	0.000 (0.003)	-0.001 (0.003)	0.014 (0.009)	0.006 (0.009)	0.011 (0.007)	-0.017 (0.010)	-0.012 (0.009)	-0.004 (0.008)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	0.044 (0.044)	0.028 (0.036)	0.029 (0.041)	0.004 (0.060)	-0.011 (0.069)	0.012 (0.067)	0.136 (0.182)	0.041 (0.215)	0.110 (0.196)	0.420* (0.221)	0.285 (0.171)	0.417** (0.210)
Bonus to Base Ratio	0.096 (0.076)			-0.008 (0.108)			0.050 (0.305)			-0.133 (0.380)		
Equity Incentives		0.226 (0.357)			2.325*** (0.666)			1.640 (2.069)			-0.420 (1.953)	
Management Stake			0.696 (0.509)			1.480 (0.914)			1.761 (2.273)			0.877 (2.682)
Obs.	139	140	171	103	100	127	138	140	185	103	97	130

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 15: Regression results for all efficiency growth ratios with the ratio of bonus to base payment, incentives gives via equity compensation and the management's equity stake as explanatory variables (Hypothesis 6). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

Hypothesis 6 covers the issue of whether incentive compensation of management (cash bonuses and equity components) or the management's equity stake is responsible for performance variation. We find that the ratio of bonus to base cash compensation has no significant influence on efficiency changes after the buyout.<sup>6</sup> In the single explanatory variable regression the same holds for the management's equity stake. Considering equity incentives given to upper level employees, we find strong statistical arguments that the higher the share of the company's equity dedicated to incentive schemes, the higher the growth in EBITDA margins. Table 15 shows the corresponding numbers. Robustness checks including all three explanatory variables further strengthen the result of the equity incentives. Furthermore, by controlling for compensation, we find that a higher management stake is significantly driving net income margins. Detailed figures for the multiple explanatory variable regressions considering hypothesis 6 can be found in table 20 (appendix).

Concerning our basis control variables in the individual regressions, we find only a few significant results for organizational differences: slight outperformance of RLBO transactions and underperformance of spinoffs, depending on the particular explanatory variables. However, considering regional impacts we find significant positive efficiency growth for US transactions in multiple regressions for cash flow, net income and gross profit ratios. This could be due to the fact that US investors prefer companies in a more mature stage as reported by Renneboog *et al.* (2007). It may also be the case, that US based transactions have superior incentive structures. We find lower significance or even negative influence of the US regional dummy if we control for incentives and PE type in the regressions considering net income margin and cash flow efficiency growth as dependent variables. The age of the company only plays a minor role and the size measured by total assets does not play a role at all. Finally, investment duration does have a positive impact on cash flow efficiency gains in a number of cases.

## 5 Robustness Check

To further strengthen our results, we run the regressions for all efficiency ratios with all variables that have shown statistical significance in the single explanatory variable regressions. Results are shown in table 16.

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<sup>6</sup>The bonus is almost always tied to EBITDA.

	Gross Profit	EBITDA	Net Income	CFOA
RLBO	0.104 (0.130)	0.399* (0.222)	-0.739 (0.669)	-0.046 (0.622)
Spinoff	-0.118 (0.149)	0.269 (0.323)	-0.136 (0.804)	-0.156 (0.833)
US	0.208 (0.228)	0.388 (0.821)	2.455*** (0.829)	0.448 (0.725)
Company Age	-0.001 (0.002)	-0.001 (0.003)	0.013* (0.008)	0.000 (0.007)
Total Assets	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Inv. Duration	-0.029 (0.045)	-0.015 (0.072)	-0.053 (0.216)	0.342 (0.222)
Leverage	-0.492*** (0.180)			1.221 (0.794)
Director Ratio	-0.258 (0.269)	-0.284 (0.450)		
PE Age	-0.005 (0.004)		0.030* (0.015)	
Amount Invested	0.000*** (0.000)			
Relative Incentives		2.454*** (0.742)		
Divestitures			2.312* (1.230)	
Acquisitions				0.664* (0.336)
PE Chairman				1.009* (0.601)
PE Stake				2.156 (1.695)
Obs.	103	97	151	117

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 16: Regression results for all response variables putting in all explanatory variables that show significance in the preceding section at one time. Controlled for industry and calendar year. Standard errors are depicted in parentheses.

The positive effect of leverage on cash flow efficiency is no longer significant. The negative effect on the level of gross profit margin is still significant at the 1% level, indicating a negative effect of leverage on operating efficiency. We therefore reject hypothesis 1, that a higher leverage ratio leads to positive operational performance. This result stands in contrast to arguments mentioned in the theoretical motivation of this hypothesis as well as to the results from the empirical analysis by Guo *et al.* (2011). However, Guo *et al.* consider the change in leverage from pre buyout levels and not the absolute level as this study does. Hypothesis 2, which tests whether asset restructuring has a positive effect on operating efficiency, is confirmed. We can show that more acquisitions significantly increase the cash flow efficiency growth rate, whereas more divestitures lead to a higher level in net income profit margins. In terms of ownership concentration and monitoring, we find that the positive effect on cash flow efficiency of the PE chairman variable is still present. PE investor representation and the size of the PE investor's equity stake are no longer significant. This could be due to the sub-

stitutability between the disciplining effect of leverage and monitoring. Nevertheless, these results provide evidence that a high level of monitoring is positively correlated to operational performance (hypothesis 3). PE investor experience is still showing a significant influence on performance variation as predicted by hypothesis 4. A higher aggregated amount invested leads to a steeper increase in gross profit margins. Furthermore, the number of years the PE firm is in business has a significant positive effect on the increase in net income margins. Managerial replacement is not driving operational performance and hypothesis 5 has to be rejected. Finally, regarding top level employees and executive management incentive scheme, stronger equity based compensation leads to superior EBITDA margin growth - as predicted in hypothesis 6.

Considering our basis control variables, we can confirm outperformance of RLBO transactions measured by EBITDA efficiency growth as well as a strong influence of US based transactions on net income margin growth. Furthermore, the age of the portfolio company still slightly impacts net income margin growth.

## 6 Conclusion

We document broad based growth in absolute operational performance during the private period subsequent to leveraged buyouts. While there is both bottom and top line growth, outperformance of the bottom line suggests efficiency gains originate from enhanced organizational structure, respectively lower administrative costs. Furthermore, while the absolute workforce stays roughly flat, workforce efficiency increases considerably.

Comparing US with European transactions, we find that financial leverage is significantly higher for US portfolio companies. This leads to lower profit margins at the time of the buyout. After the restructuring period, US and non US companies are comparable in size and profitability. Financial leverage is still higher while no longer significant. After all, US portfolio companies have significantly higher net income cash flow margin growth rates compared to European companies. Regarding organizational differences, spinoff and RLBO transactions are significantly larger than the remaining transactions measured by sales and total assets. However, transaction types do not seem to have a major impact on operational performance.

Investigating how private equity investors increase operating efficiency, we find several common activities showing an impact: First, more frequent acquisitions and divestitures lead to significant outperformance. This result supports synergistic models of assets restructuring. Second, stronger monitoring due to larger investor equity stakes and a PE-connected chairman show significantly higher cash flow efficiency growth rates. However, higher investor representation among the board of the portfo-

lio company has a negative impact on performance. Third, more experienced investors measured by age and total amount invested, causes significantly higher gross profit margin growth. Finally, our fourth finding reveals that strong equity incentives given to management and top level employees leads to superior growth in EBITDA margins. Robustness checks by putting all explanatory variables showing significance in one regression do basically confirm our results. Only the negative impact of investor representation on the board of directors disappears.

Our results suggest that there is a set of activities that PE investors commonly employ to restructure their portfolio companies, which systematically drives operational performance. These activities separate the top performing from the least performing companies in our sample. While steep incentives, frequent asset restructuring, tight monitoring and experienced investors lead to outperformance, higher levels of financial leverage and managerial replacement do not.

However, a caveat of our approach to examine operational performance determinants of private equity portfolio companies is that all sample companies were sold back to the public in an IPO. Due to poor data availability for private companies, we have to limit our sample to LBOs which are eventually listed on a stock exchange. As a consequence we do not have a perfect random sample of private equity owned corporations and so sample selection is an obvious problem. General conclusions about performance determinants in LBO transactions must therefore be drawn with caution.

Future research on operating performance determinants among LBO transactions should try to incorporate performance evaluation on a relative basis by matching to comparable companies. Although this approach has been considered before, to our knowledge there are currently no studies considering determinants of relative performance. Furthermore, tracking the performance of several portfolio companies belonging to the same PE investor rather than individual companies could be interesting in order to account for possible synergies or cross company effects. This can be particularly insightful if investors pursue a buy and build strategy to leverage operational performance. Finally, avoiding the limited focus on companies with a subsequent IPO could allow a more general conclusion on PE portfolio company performance drivers as only half of all LBOs begin their exit process with an IPO.

# Appendix

	Gross Profit	EBITDA	Net Income	CFOA
RLBO	-0,041 (0,131)	0,152 (0,200)	-0,485* (0,588)	0,438 (0,577)
Spinoff	0,085 (0,152)	0,147 (0,263)	-0,567 (0,670)	-0,289 (0,741)
US	0,149 (0,148)	0,117 (0,190)	1,187** (0,572)	1,199** (0,501)
Company Age	-0,001 (0,002)	-0,001 (0,002)	0,009 (0,006)	-0,001 (0,006)
Total Assets	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)
Inv. Duration	0,030 (0,037)	-0,024 (0,054)	0,179 (0,163)	0,276 (0,167)
Acquisitions	-0,006 (0,058)	0,061 (0,104)	-0,096 (0,256)	0,701** (0,297)
Divestitures	0,130 (0,197)	0,230 (0,281)	3,204*** (0,892)	0,455 (1,151)
Obs.	188	145	206	146

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 17: Regression results with all existing explanatory variables for Hypothesis 2. Controlled for industry and calendar year. Standard errors are depicted in parentheses.

	Gross Profit	EBITDA	Net Income	CFOA
RLBO	0,048 (0,140)	0,211 (0,216)	-0,523 (0,702)	0,274 (0,688)
Spinoff	-0,039 (0,162)	0,451 (0,312)	-0,637 (0,834)	0,355 (1,007)
US	0,418 (0,237)	0,504 (0,416)	2,344* (1,257)	1,171 (1,233)
Company Age	-0,001 (0,002)	-0,001 (0,003)	0,020** (0,009)	-0,008 (0,009)
Total Assets	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)
Inv. Duration	0,001 (0,042)	-0,043 (0,069)	0,053 (0,215)	0,398* (0,233)
Director Ratio	-0,522* (0,274)	-0,879* (0,444)	-0,039 (1,415)	-2,412 (1,463)
PE Chairman	-0,068 (0,128)	0,063 (0,198)	0,009 (0,644)	1,088 (0,660)
PE Stake	-0,296 (0,351)	-0,187 (0,602)	1,771 (1,764)	4,929** (2,120)
Obs.	158	113	160	107

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 18: Regression results with all existing explanatory variables for Hypothesis 3. Controlled for industry and calendar year. Standard errors are depicted in parentheses.



	Gross Profit	EBITDA	Net Income	CFOA
RLBO	-0,003 (0,145)	0,110 (0,216)	-0,546 (0,688)	1,013 (0,716)
Spinoff	-0,015 (0,178)	0,404 (0,296)	-0,238 (0,819)	0,186 (1,046)
US	0,405** (0,193)	0,376 (0,271)	2,450*** (0,848)	2,291*** (0,864)
Company Age	0,000 (0,002)	-0,001 (0,003)	0,014* (0,008)	-0,003 (0,009)
Total Assets	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)
Inv. Duration	0,021 (0,047)	-0,042 (0,071)	-0,103 (0,219)	0,643** (0,250)
Independent PE	0,266** (0,130)	0,079 (0,191)	-0,382 (0,618)	0,807 (0,659)
PE Age at LBO	0,006* (0,003)	0,001 (0,005)	0,032** (0,016)	-0,028 (0,020)
Amount Invested	0,000* (0,000)	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)
Obs.	146	109	151	107

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 19: Regression results with all existing explanatory variables for Hypothesis 4. Controlled for industry and calendar year. Standard errors are depicted in parentheses.

	Gross profit	EBITDA	Net Income	CFOA
RLBO	0,094 (0,123)	0,271 (0,235)	-0,476 (0,698)	1,260* (0,657)
Spinoff	-0,001 (0,146)	0,265 (0,355)	-1,690* (0,865)	-0,865 (0,994)
US	0,331 (0,288)	-0,496 (0,679)	-1,757 (1,783)	0,821 (1,541)
Company Age	0,000 (0,002)	0,000 (0,004)	0,013 (0,010)	-0,013 (0,011)
Total Assets	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)
Inv. Duration	-0,015 (0,036)	-0,048 (0,075)	-0,023 (0,221)	0,253 (0,219)
Bonus to Base Ratio	0,002 (0,059)	0,009 (0,126)	-0,111 (0,349)	-0,071 (0,349)
Equity Incentives	0,656* (0,381)	1,567* (0,887)	4,493* (2,324)	-1,086 (2,272)
Management Stake	0,062 (0,565)	-0,800 (1,280)	7,607** (3,386)	-2,062 (3,615)
Obs.	114	87	112	84

Significance levels : \* : 10% \*\* : 5% \*\*\* : 1%

Table 20: Regression results with all existing explanatory variables for Hypothesis 6. Controlled for industry and calendar year. Standard errors are depicted in parentheses.

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