

Insight Private Equity

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Abstract

We build on previous work on operational performance evaluation of private equity portfolio companies as we are able to at least partially decrypt the black box consisting of restructuring tools these investors use and the corresponding impact on their portfolio companies. Beyond answering whether private equity improves operating efficiency we figure out which of the typical restructuring tools drive operating efficiency. Using a set of over 300 international leveraged buyout transactions in 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 and financial leverage a negative influence on operational performance.

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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 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.¹

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. As a matter of fact while Guo, Hotchkiss, and Song (2011) find only small operating performance gains they do also document substantial performance variation within their sample. 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

¹Studies that do in general find a positive effect on operational performance subsequent to private equity buyouts include Lehn and Poulsen (1989), Kaplan (1989), Smith (1990), Muscarella and Vetsuypens (1990), Degeorge and Zeckhauser (1993) Cotter and Peck (2001) and Gill and Visnjic (????).

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 tools² 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.

The particular approach private equity investors employ to generate value is to take on a majority position in the equity of the company³ 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.

After evaluating the data we were able to categorize our variables into six groups who might be influencing operational performance: financial leverage; operating restructuring activities; ownership and control characteristics; management and investor ability and experience; managerial replacement; incentives given to management and employees. Using

²Although 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.

³Using both equity and debt to finance their equity stake thus increasing financial leverage of the portfolio company.

theoretically motivated hypotheses for the 6 groups we evaluated the variables influence on operational performance with a single explanatory variable per regression. In addition we test the results by adding all explanatory variables into one regression for every hypothesis. Finally, as a last step we check for robustness of these results by running regressions for all variables which show significance.

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.

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

2 Sample Selection, Data Description and Summary Statistics

In order to be able to answer the question what determines performance variation among private equity portfolio companies we had to select companies for which we were able to evaluate operational performance and at the same time have transaction and restructuring characteristics available. We checked a population of roughly 900 LBO transactions between 1980 and 2006 in the Thomson One private equity and venture capital database "Venture Economics" to match our data requirements.

2.1 Selection Criteria

Our main sample consists of 303 companies that have been private equity portfolio companies before going public. In addition to allow for broad data and general information availability we made sure that the companies were public at the time of data collection in order to be included in our sample.⁴ Furthermore we double-checked every single transaction in Lexis Nexis for transaction details such as the sellers and the buyers identity, wherever possible included deal metrics like company valuation and financial structure of the deal. As far as the buyout transaction type is concerned (i.e., the organizational form of the company at the time of the buyout) we found that of our 303 companies 64 met the criteria of a divisional spin-off and 54 were a public stand alone company 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 and therefore also in terms of underlying corporate governance structure at the time of the LBO. As this discrepancy could be responsible for operational performance variation in comparison to the remaining 185 companies, which were private stand-alone companies at the time of the buyout we decided to divide the sample into subgroups for the summary statistics section and to control for them in our regressions using dummy variables.

2.2 Descriptive Data

The companies in our sample are mainly incorporated in North America (214). The remainder are from Western Europe (85), Australia (3) and New Zealand (1). As a matter of fact, we only included those companies in our sample for which an English copy of the IPO prospectus was available, which 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 do hold for UK and continental Europe transactions a distinction between North American and Western European transactions in the analysis could be

⁴This criterium brings down the number of companies from 900 to roughly 300. However, this is crucial for our analysis as we are dependent on good data availability on transaction and company characteristics.

insightful. As a consequence we distinguished between US and non US companies to figure out operational dissimilarities in the summary statistics section and controlled for a US and a non US origin in our regressions.

With regards to the different industries, we have SIC codes available for all companies where 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.

	All		US		Spinoff		RLBO	
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%
total	303	100.00%	209	100.00%	64	100.00%	54	100.00%

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 of the time structure of our sample. Looking at the distribution we can clearly see two waves of buyouts and IPOs for the entire sample. The first buyout wave started in the late 80's and had its peak in 1989 where four percent of our sample companies had their buyout. The second and by far larger buyout wave took place during the late 90's and early 2000's. The peak of this wave occurred in 1999 with over 12 percent of our sample companies experiencing their buyout during that year.

	All		US		Spinoff		RLBO	
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%
total	303	100.00%	209	100.00%	64	100.00%	55	100.00%

Table 2: Sample overview on IPO calender 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).

The private equity backed initial public offerings of our sample companies also appear in two waves as shown in table 2. The first IPO wave started in the early 90's, four years after the first buyout wave started, and the second IPO wave started three years after the second buyout wave. Although our sample could be subject to a selection bias (especially because there seems to be better data availability in the Thomson database for transactions beginning with the 90's) it still matches the pattern of buyout waves other studies on leveraged buyouts transactions found⁵.

In terms of the duration of the private time the average across all sample companies is 3.72 years with a standard deviation of 2.21 and a range between 1 to 11 years. This figure is also in line with the typical 3 to 5 years private equity investors keep their companies in their portfolio before they begin the exit process (using an IPO in our case). Even if US companies and RLBO transaction have slightly higher and spinoff transactions a slightly lower average investment duration, non of the differences are significant.

⁵See for example Renneboog and Simons (2005)

2.3 Response variables and explanatory variables

On the company side we collected financial and operational data like income statement, balance sheet and cash flow figures. Input for calculating our operating efficiency ratios of the portfolio companies which serve as response variables in the regressions comes from these sources.

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

Table 3: Description and source for all response variables. Origin of the input data is mainly Compustat with amendments from Bloomberg and the IPO Prospectuses.

By using 4 different profitability ratios we make sure that we cover all possible sources of efficiency gains⁶. As shown by the details on the response variables in table 3, all profitability respectively cash flow figures are divided by revenues. Thereby we make sure to account for top line growth. Our three efficiency ratio inputs coming from the income statement differ in extent of costs that are included. Gross profit which is the broadest profit figure is derived by subtracting direct production costs from revenues. EBITDA is derived by subtracting direct production and administrative costs from revenues. Net income which is at the bottom of the income statement is derived by subtracting direct production costs, administrative costs, financial costs and tax from revenues. As cash flow figures are harder to manipulate by management we add cash flow from operating activity over revenues as our fourth response variable. We use all 4 efficiency ratios in our analysis to conclude in which direction the restructuring activities affect the portfolio companies and how they influence operational performance.

Information on the corporate governance of the companies (i.e., 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

⁶Increases 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 revenues constant.

variables. The resulting thirteen explanatory variables are either proxies for typical private equity restructuring actions or variables used as proxies representing investor and executive management characteristics like type and experience. For details regarding variable descriptions and 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 source for all explanatory variables. The corresponding hypothesis is indicated in the second column.

With this data collection approach we make sure that we have all publicly available data to figure out performance determinants of private equity portfolio companies at the company level. At this point in time was not our intention to cover potential synergies with other companies belonging to the same private equities portfolio.⁷

2.4 Operational Summary Statistics

In order to see what influence the private equity investors active investing approach has on operational performance of the portfolio companies in general, we calculate mean values as well as standard deviation for several basic income statement and balance sheet

⁷Nevertheless this would be an interesting topic to analyze in future research on the topic.

figures 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. As a consequence we add median levels for interpretation purposes of the summary statistics section.

In addition we calculate a couple of common operational and financial ratios to track the dynamics of changes in operating efficiency and capital structure. Observations range from 128 to 218 depending primarily on data availability at the time of the buyout. Due to data constraints figures using the size of the workforce as an input have a lower number of observations.⁸

		Buyout			IPO			Growth		
	obs.	mean	median	stdv	mean	median	stdv	mean	median	stdv
revenues	218	829,6	262,8	2034,1	1194,8	461,7	2251,4	118%	61%	174%
COGS	188	591,9	170,3	1507,8	846,6	279,9	1673,6	120%	53%	193%
SGA	182	167,4	51,7	416,6	235,7	77,8	442,8	139%	55%	290%
EBITDA	146	124,3	48,7	282,7	200,3	100,4	363,0	154%	83%	262%
EBIT	209	49,1	20,6	127,8	104,2	51,0	162,5	271%	103%	1017%
interest expense	192	42,8	11,0	167,3	57,3	21,3	162,1	239%	37%	757%
tax	190	11,4	3,0	32,4	19,3	10,1	31,8	435%	130%	1548%
net income	214	-3,1	1,6	93,2	32,9	16,8	87,4	302%	135%	1737%
cash	163	56,5	12,7	146,5	66,2	28,37	123,1	271%	102%	503%
current assets	131	302,6	110,1	590,6	387,7	160,2	697,9	98%	47%	159%
total assets	207	1145,4	330,9	3189,9	1393,4	517,1	3082,9	118%	35%	209%
current liabilities	132	243,9	70,8	512,4	308,8	116,2	553,2	79%	40%	130%
total liabilities	197	1011,8	283,1	2676,4	1081,2	370,0	2451,5	65%	5%	185%
shareholders equity	205	168,4	37,6	762,9	351,7	143,8	819,5	562%	182%	1066%
working capital	145	64,8	30,7	170,7	93,6	54,45	253,5	243%	74%	535%
number of employees	77	7215	1890	21218	7023	1865	15589	40%	12%	97%
liquidity ratio	128	1,526	1,356	0,851	1,845	1,572	1,936	35%	5%	118%
leverage	180	0,581	0,560	0,339	0,373	0,362	0,261	-13%	-30%	119%
revenues / employees	77	0,255	0,195	0,222	0,547	0,230	1,852	66%	25%	166%
EBIT / employees	77	0,027	0,014	0,066	0,126	0,025	0,710	113%	40%	252%
ROA	205	-0,043	0,008	0,442	0,045	0,037	0,074	132%	98%	420%
asset turnover	207	1,181	0,886	0,969	1,201	0,984	0,915	30%	13%	126%
ROE	153	0,102	0,054	1,400	0,115	0,106	0,369	72%	47%	252%
gross margin	187	0,356	0,309	0,216	0,376	0,339	0,209	16%	5%	57%
operating margin	209	0,051	0,085	0,370	0,113	0,108	0,181	74%	22%	275%
profit margin	214	-0,041	0,009	0,384	0,029	0,046	0,141	89%	68%	765%

Table 5: Summary on operational data for our full sample at the time the buyout transaction took place (Buyout) and at the time of the public offering (IPO), 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 corresponding description see appendix). All figures except ratios and number of employees are in million USD.

Table 5 clearly shows that we have vast improvement in operational data for private

⁸To derive reliable growth rates we had to limit the company summary statistics to firms for which we have data ranging from LBO to IPO.

equity managed companies. What is even more interesting in our case is the fact that at the same time we find huge variations with respect to growth rates by comparing mean and median figures as well as by looking at the standard deviation of the data. This again points to heterogeneity among restructuring impact on operational performance of the companies in our sample and is part of our motivation to figure out what is driving these variations in performance. However, one has to bear in mind that all figures and growth rates are absolute values and that therefore at this point no conclusion can be drawn whether restructuring leads to operational outperformance relative to comparable companies.

When looking in more detail, 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 revenues growth is 61 percent during the private period. Direct production costs and selling, general and administrative costs increase to a lesser extent and as a consequence EBITDA, EBIT and net income increase strongly from LBO to IPO. The steepest increase comes at the bottom line with median net income levels growing over 130 percent which can be attributed to lower interest and tax payments. A look at common balance sheet figures in the second block reveals that assets seem to grow to a lesser extent than sales pointing towards an increase in asset efficiency. Interesting is also that while the median level of total assets on average increases 35 percent, workforce hardly grows more than 10 percent which suggests workforce efficiency gains. Shareholders equity is rising because of lower debt 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.

Moreover looking at profitability, i.e., efficiency ratios, we find that while gross margins stay roughly flat, we find a steep increase in operating and profit margins which points to an enhanced organizational structure possibly leading to lower administrative costs. Furthermore, growth rates for revenues and EBIT per employee between 25 and 40 percent could be a hint that a change in employee incentive structure led to a productivity increase of the workforce.

2.5 Regional Differences

In order to account for different organizational structures (with respect to corporate governance) and regional differences it is important to have a look at our three sub samples: companies which are located in the United States (US), companies that emerge from a division of a parent company (Spinoff) and companies that were public at the time of the buyout (RLBO). For the purpose of figuring out differences in average operational and financial company characteristics at the time of the buyout and at the time of the IPO, we give a statistical overview on the above mentioned sub samples as well as t-statistics between them.

Activity and size of the LBO market varies considerably in the most 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 percent in the late 80's with UK and Continental Europe following with 7 and respectively 3 percent. The heavy weight of the North American transactions decreased to less than 50 percent share of the global market for the period 2000 - 2007 with the UK's and Continental Europe's share rising to 15 and 30 percent. As can be seen the Asia/Pacific regions and the rest of the world did only play a minor role in the period we analyzed and can therefore be neglected.

Renneboog and Simons (2005) find several possible explanations for the huge difference in size between the US, the UK and Continental European buyout markets, especially 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, Simons, and Wright (2007) name different tax treatment and a buyout focus on companies in their

growth phase for the UK in contrast to a focus on mature and high cash flow generating companies in the US as sources that could have an impact on private equity backed companies. Even if a couple of these factors have seen some kind of convergence in recent years we expect them to influence the performance of our sample firms and therefore control for regional differences.

	Buyout					IPO				
	US		non US		t-value	US		non US		t-value
	mean	stdv	mean	stdv		mean	stdv	mean	stdv	
revenues	836,4	2197,6	756,9	1251,1	0,24	1087,2	2081,0	1054,8	2118,4	0,12
COGS	573,4	1553,8	657,0	1139,6	-0,28	689,0	1319,7	907,6	1938,8	-1,03
SGA	133,8	414,2	278,1	391,3	-1,99	203,0	705,4	340,3	554,4	-1,63
EBITDA	122,1	295,5	122,8	212,9	-0,01	155,8	324,9	146,1	252,6	0,25
EBIT	44,2	130,0	66,8	116,5	-1,06	102,2	167,8	95,5	165,8	0,32
interest expense	43,7	177,9	24,4	43,5	0,71	51,0	157,8	37,1	90,3	0,77
tax	9,3	32,3	13,7	25,0	-0,83	19,7	34,6	17,3	29,1	0,58
net income	-9,8	92,9	21,5	86,2	-2,09	29,4	76,4	42,8	87,3	-1,35
cash	53,2	151,0	56,1	102,9	-0,11	54,8	112,3	52,3	87,2	0,19
current assets	266,6	536,5	383,5	700,8	-1,03	315,8	684,7	392,2	785,9	-0,83
total assets	1168,2	3450,4	1018,3	1897,9	0,28	1230,4	2954,9	1124,4	2231,9	0,31
current liabilities	211,8	503,3	319,1	522,4	-1,09	229,4	646,6	311,6	557,5	-1,04
total liabilities	1062,9	2926,9	785,8	1349,6	0,60	937,0	2347,5	775,1	1515,2	0,61
shareholders equity	137,9	747,7	255,0	761,3	-0,92	286,6	715,2	355,3	783,3	-0,75
working capital	54,2	153,9	112,2	216,9	-1,67	88,0	138,8	81,5	321,4	0,24
number of employees	8801	25627	3907	6134	0,99	5328	11033	4159	6788	0,92
liquidity ratio	1,594	0,884	1,336	0,730	1,56	2,164	1,773	1,625	1,536	2,49
leverage	0,607	0,337	0,401	0,301	2,84	0,361	0,289	0,307	0,213	1,58
revenues / employees	0,250	0,206	0,261	0,250	-0,22	0,426	1,010	0,515	1,735	-0,54
EBIT / employees	0,021	0,039	0,036	0,095	-0,99	0,078	0,411	0,104	0,652	-0,40
ROA	-0,213	2,151	0,009	0,215	-0,51	0,062	0,114	0,068	0,103	-0,44
asset turnover	2,410	7,993	1,898	1,238	0,32	1,489	1,042	1,483	1,145	0,05
ROE	-0,003	4,621	0,054	0,618	-0,06	-0,287	10,980	0,343	1,213	-0,55
gross margin	0,339	0,232	0,413	0,236	-1,60	0,371	0,202	0,381	0,233	-0,33
operating margin	0,039	0,409	0,086	0,111	-0,76	0,124	0,173	0,110	0,146	0,72
profit margin	-0,066	0,423	0,043	0,143	-1,76	0,036	0,140	0,058	0,150	-1,24

Table 6: Summary on 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 except ratios and number of employees are in million USD.

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 which in turn leads to lower net income levels.⁹ Of course this fact also leads to lower profit margins at the time of the LBO. As mentioned above these transactions and company differences are an indication that the LBO market in the US is structurally different when compared to the European counterpart. The fact whether a transaction constitutes a real leveraged buyout, i.e. containing substantial

⁹Interest payments are deducted to calculate net income.

amounts of debt after the buyout, may have a direct impact on operational development of the portfolio companies afterwards.

In terms of company size which we measure by revenues and total assets US companies are on average only slightly bigger. After the restructuring period, at the time of the IPO, US companies are comparable to their non US counterparts in size and profitability ratios. Although leverage for the US firms declines, it is still at a higher level (no longer significant). As a consequence, differences in net income and profit margin are also no longer significant.

2.6 Organizational Differences

In contrast to mergers, a spinoff is a type of corporate restructuring transaction where the optimal size of the firm is expected to be smaller than present. As a consequence, for the top management 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 value¹⁰. Economic literature has various theories and arguments for splitting up large corporations. Diseconomies of decision making due to too many or too unequal assets under one management and diseconomies of decision control by shareholders due to high costs of evaluating and rewarding managerial performance could be reasons to separate two business units (Schipper and Smith (1983)). Gertner, Powers, and Scharfstein (2002) also mention possible agency problems between top management and divisional management of a company as one motivation so 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.

¹⁰For evidence of diversification effects on firm value see for instance Burch and Nanda (2003) or Berger and Ofek (1995)

	Buyout					IPO				
	Spinoff		non Spinoff		t-value	Spinoff		non Spinoff		t-value
	mean	stdv	mean	stdv		mean	stdv	mean	stdv	
revenues	1273,0	2250,7	704,3	1951,0	1,67	1505,2	2591,4	962,8	1923,9	1,84
COGS	946,9	1836,7	497,0	1388,7	1,67	1071,5	2043,6	654,8	1301,3	1,87
SGA	247,6	357,9	143,8	424,4	1,40	319,0	498,1	229,2	700,1	0,94
EBITDA	284,6	555,7	86,3	147,7	3,46	242,0	495,3	128,8	222,9	2,61
EBIT	103,4	186,7	34,8	102,3	3,25	147,5	225,6	87,6	145,8	2,54
interest expense	50,6	101,1	37,2	171,3	0,48	65,7	135,3	42,0	141,8	1,15
tax	19,7	36,0	7,9	29,1	2,21	29,2	36,9	16,5	31,5	2,51
net income	12,9	97,1	-6,8	90,8	1,25	36,4	85,5	32,9	78,7	0,31
cash	125,4	225,5	36,1	106,0	3,39	80,4	140,0	46,9	92,1	2,25
current assets	607,3	963,4	216,5	402,3	3,24	544,6	944,6	285,2	635,2	2,50
total assets	1804,9	3454,3	966,5	3089,7	1,53	1784,1	3202,0	1040,4	2594,7	1,92
current liabilities	505,4	849,1	171,3	343,4	3,19	414,8	732,3	213,1	578,4	2,25
total liabilities	1592,3	3103,3	853,5	2530,5	1,57	1342,7	2596,7	765,9	1965,4	1,91
shareholders equity	269,3	508,1	136,5	798,3	1,01	431,9	799,7	275,2	717,1	1,50
working capital	132,0	259,4	49,4	135,1	2,40	131,9	368,4	73,0	144,1	1,90
number of employees	11167	15947	5942	22122	0,91	6151	10441	4642	9759	1,05
liquidity ratio	1,555	0,845	1,513	0,854	0,23	2,089	1,878	1,958	1,670	0,53
leverage	0,524	0,337	0,573	0,341	-0,62	0,318	0,257	0,352	0,272	-0,88
revenues / employees	0,238	0,146	0,258	0,239	-0,32	0,347	0,303	0,483	1,432	-0,73
EBIT / employees	0,029	0,032	0,025	0,072	0,18	0,046	0,072	0,097	0,560	-0,71
ROA	0,000	0,125	-0,216	2,178	0,52	0,057	0,107	0,066	0,111	-0,59
asset turnover	1,340	0,880	2,546	8,082	-0,79	1,323	0,914	1,532	1,110	-1,37
ROE	0,164	1,061	-0,028	4,640	0,21	-2,029	17,431	0,439	4,769	-1,92
gross margin	0,379	0,200	0,344	0,241	0,83	0,395	0,198	0,368	0,213	0,87
operating margin	0,089	0,095	0,039	0,408	0,81	0,122	0,098	0,119	0,179	0,11
profit margin	0,009	0,096	-0,054	0,422	0,98	0,036	0,090	0,045	0,155	-0,44

Table 7: Summary on operational data reporting mean and standard deviation values for Spinoff vs. 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 except ratios and number of employees are in million USD.

Table 7 shows that at the time the buyout takes place spinoffs are significantly larger than pre buyout stand alone companies measured by revenues. 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 our spinoff subgroup is still significantly larger measured by revenues and total assets. However, efficiency ratios loose their advance while profitability margin even turns into a laggard.

Reverse leveraged buyouts differ most notably in one feature from the remaining buyouts in our sample, namely that the companies which are subject to the buyout are publicly listed at the time of the buyout. This fact has a severe influence on the whole governance structure of the companies (i.e., ownership and control) and may therefore also lead to performance differences during the holding period in the portfolio of the private equity investors. For instance, Cumming, Siegel, and Wright (2007) are considering the

debate about pre-buyout agency cost problems in private firms. Benefits of private firms, usually having a small and concentrated shareholder group, are weighted against possible agency problems connected with this kind of ownership. According to the authors these differences between public to private and private to private transactions could have an influence on post buyout productivity changes.

	Buyout					IPO				
	RLBO		non RLBO		t-value	RLBO		non RLBO		t-value
	mean	stdv	mean	stdv		mean	stdv	mean	stdv	
revenues	1557,0	3628,9	632,9	1302,6	2,75	1943,2	3382,7	890,5	1638,2	3,39
COGS	1022,6	2528,4	474,6	1066,9	2,06	1096,9	1940,9	658,4	1358,4	1,90
SGA	288,6	810,1	140,0	262,9	1,87	464,1	1378,9	206,9	378,7	2,41
EBITDA	116,6	175,9	123,9	303,7	-0,13	250,0	365,7	131,4	285,4	2,57
EBIT	58,1	147,4	47,0	122,4	0,50	176,2	245,1	83,6	139,9	3,74
interest expense	95,5	332,5	25,4	56,7	2,60	112,3	280,5	32,0	74,7	3,85
tax	21,1	49,7	7,6	23,7	2,50	33,7	49,8	15,9	27,3	3,59
net income	-8,8	109,6	-1,3	87,5	-0,48	59,3	119,4	28,1	67,8	2,60
cash	79,0	198,5	47,6	124,2	1,16	95,6	157,6	45,4	88,2	3,13
current assets	407,1	684,2	270,4	557,8	1,09	613,3	1199,9	278,6	538,7	3,07
total assets	2142,0	5702,4	873,6	2017,2	2,36	2363,8	4958,8	945,7	1894,0	3,47
current liabilities	341,2	599,4	215,1	481,8	1,17	487,5	1108,0	203,6	423,1	3,03
total liabilities	1838,4	4632,9	777,7	1761,8	2,32	1845,3	3767,0	678,0	1482,9	3,71
shareholders equity	334,2	1256,8	117,8	541,4	1,69	514,2	1318,0	263,8	529,3	2,26
working capital	77,6	221,7	62,1	151,4	0,47	127,5	222,4	76,1	212,2	1,57
number of employees	16727	42432	4613	9338	2,11	10231	18072	3828	6545	4,27
liquidity ratio	1,544	0,802	1,516	0,865	0,16	1,597	0,743	2,075	1,857	-1,82
leverage	0,632	0,329	0,544	0,342	1,25	0,460	0,258	0,320	0,265	3,44
revenues / employees	0,211	0,198	0,265	0,227	-0,87	0,215	0,201	0,505	1,402	-1,46
EBIT / employees	0,025	0,033	0,026	0,071	-0,04	0,044	0,099	0,095	0,547	-0,66
ROA	-0,010	0,076	-0,233	2,281	0,61	0,061	0,080	0,065	0,116	-0,23
asset turnover	1,412	0,858	2,637	8,454	-0,90	1,345	0,843	1,517	1,114	-1,04
ROE	0,433	2,727	-0,145	4,637	0,73	0,137	1,227	-0,135	10,003	0,19
gross margin	0,334	0,204	0,355	0,241	-0,50	0,371	0,219	0,375	0,208	-0,12
operating margin	0,093	0,101	0,039	0,403	0,84	0,146	0,115	0,114	0,174	1,30
profit margin	-0,005	0,082	-0,051	0,425	0,70	0,060	0,151	0,039	0,142	0,94

Table 8: Summary on 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 except ratios and number of employees are in million USD.

Figures in table 8 show that our RLBO subgroup is by far the largest measured by both revenues and total assets at both points in time. These findings are statistically significant even at the 1 percent 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 percent level at the IPO. Other than that we can see a slightly higher leverage ratio at the LBO and a much slower decline in leverage during the private time leading to a significantly higher leverage ratio for the RLBO subgroup at the IPO.

We start with our baseline regression where we put in all the control variables without

any explanatory variables from the hypotheses.

	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)
Investment Duration	0,031 (0,037)	-0,017 (0,054)	0,197 (0,167)	0,329* (0,167)
N	188	145	206	146
R ²	0,135	0,156	0,308	0,257

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 seem to experience superior growth rates in net income margins and cash flow efficiency. In addition, longer investments tend to generate higher gains 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

Following the data we extracted out of the IPO prospectuses we derive a set of hypotheses that match the most common actions out of the private equity investors restructuring black box with respect to their individual portfolio company. From our point of view this set is comprehensive in that it covers all critical arguments that determine the strategy and therefore success of a company: corporate strategy change, corporate governance and corporate finance changes, incentive structure and managerial ability and change. Subsequently we back these hypotheses by mostly theoretically motivated arguments. In testing the hypotheses we aim to figure out whether we can identify actions that have a systematic impact on operational performance of our sample companies.

Without taxes, bankruptcy costs, agency costs and asymmetric information, Modigliani

and Miller (1958) show that a change in capital structure should have no influence on firm value or performance. However, with the separation of ownership and control agency costs arise and capital structure matters. Various models that by choosing a certain debt level (and corresponding free cash flow level) the agency problem between the manager and the owner of a firm can at least be mitigated¹¹. Debt which decreases free cash flow because of interest payments can act as a disciplining device to the manager. In order to avoid default the manager refrains from wasting financial resources and as a result ceteris paribus operational performance and shareholder value increases. Supporting this hypothesis, Opler and Titman (1993) in their empirical analysis of buyout transactions come to the conclusion that debt financing is an important factor for realizing gains in going private transaction. However, Cotter and Peck (2001) suggest that given their empirical findings active monitoring by buyout specialists is a substitute to tighter debt structures.

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 theoretic literature on corporate restructuring using acquisitions and divestitures into two categories: on the one hand is the nonsynergistic theory based on management entrenchment, empire building and managerial hubris arguing 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 higher performance¹². On the other hand synergistic models based on Coase (1937) predict that both types of transactions should create value. Changes in economics conditions like technology, transaction costs or input prices can lead to a change in the optimal possessor of an asset¹³.

Hypothesis 2. *Operational Restructuring:* *More frequent asset restructuring activity*

¹¹Prominent articles on this research area are Grossman and Hart (1982), Jensen (1986), Jensen (1989b), and Harris and Raviv (1990)

¹²For example see Jensen (1986), Roll (1986) or Shleifer and Vishny (1989)

¹³Early models on this topic include Klein, Crawford, and Alchian (1978), Bradley, Desai, and Kim (1988), Jensen (1993)

influences operational performance systemically

Jensen and Meckling (1976) were among the first introducing agency costs for a type of ownership structure where the management does not own all the outstanding equity¹⁴. In order to reduce or minimize these agency costs shareholders and directors can monitor the management. Because active monitoring of the management comes with a cost to the shareholders, monitoring by the shareholders is only implemented if there is ownership concentration. A single large shareholder can only extract benefits out of monitoring activities if his stake in the firm is large enough. Although ownership concentration reduces liquidity a vast amount of literature comes predicts that it creates benefits from more efficient management control¹⁵. In the context of monitoring by the board of directors, literature starting with Baysinger and Butler (1985) analyzed whether and how board composition influences monitoring and as a consequence operational performance. They find a mild outperformance of companies with independent boards. However, newer 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, experience of the management team 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, Dowling, and Megginson (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.

¹⁴Ang, Cole, and Lin (2000) empirically confirm the prediction by Jensen and Meckling that agency costs increase with a decrease of the managements stake in the firm

¹⁵E.g. Maug (1998), Bolton, Thadden, et al. (1998), Pagano and Röell (1998)

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

One goal private equity 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, Malatesta, and Parrino (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, Malesta and Parrino 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 upon the fact that the way the management is compensated influences the performance of the particular company it serves. 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 those firms with stronger equity based management compensation and higher equity percentage holdings of the management. Overall, this evidence is consistent with the hypothesis that stock-based incentives are important drivers of managerial actions and operational performance¹⁶.

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

¹⁶For a summary on theoretical and empirical findings regarding executive compensation see Ashenfelter and Card (1999)

4 Results

In the following we analyze which of the characteristics we present in section 2.3 are responsible for performance variation in our sample. In our regressions we aim to explain the growth rate of a particular efficiency ratio from entry to the beginning of the exit of the PE investor. A base of explanatory variables includes a dummy for each of our three subgroups (US, spinoff and RLBO), the portfolio company's age in years and size measured by assets, as well the the investment duration measured by years between entry and exit. In addition we control for industry and years using dummy variables¹⁷.

	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)
Investment 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)
N	143	128	158	127
R ²	0.385	0.157	0.386	0.267

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 our first prediction that a higher debt to assets ratio should act as a disciplining device to the manager and therefore to outperformance within our sample we test our leverage variable on all 4 efficiency ratios. Results can be found in table 10: For higher leverage levels we find 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 this effect even intensifies if we control for monitoring. However, at the same time we document significantly lower growth in the level of gross profit margin for higher leverage ratios. Again, this result does

¹⁷Note that coefficients and standard errors for these dummy variables are not explicitly reported in the regression tables

not change if we include our monitoring variables in the regression. As a consequence we can 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)
Investment 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)
N	188	188	145	145	206	206	146	146
R ²	0.135	0.137	0.162	0.164	0.309	0.359	0.304	0.27

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 in the form of 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 those that do not with respect to growth in cash flow efficiency. Second, companies that pursue divestitures subsequent to the LBO experience on average higher growth rates for net income margins. Both results are significant at the 1 percent level. We can therefore in the context of private equity restructuring effort confirm the results of Mulherin and Boone (2000) based on their empirical analysis of acquisition and divestiture activity during the 90s as 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 for the asset restructuring hypothesis we also run regressions for all four efficiency ratios with both acquisitions and divestitures as explanatory variables. Although both types of asset restructuring are significantly correlated we can reinforce our findings from above. Complete regression figures for the multiple explanatory variable

case can be found in the Appendix in table 17.

Hypothesis 3 covers aspects of ownership concentration, board composition and corresponding monitoring level of the portfolio company. Table 12 shows evidence that a high ownership stake of the PE investor is responsible for higher growth rates in cash flow efficiency. Monitoring effort through a chairman belonging to the PE investor is also leading to a significantly higher growth rate of cash flow efficiency. In contrast a higher share in board representation by the PE investor leads to lower growth rates in both gross profit and EBITDA margins. This could be due to the fact that investors as board representatives can not be counted towards fully independent members and may therefore be evidence that supports the view by Baysinger and Butler (1985) that independent boards are superior. Regressions considering all explanatory variables from hypothesis 3 do not alter these results seriously: while a higher director ratio still coincides with lower EBITDA and gross margins significance levels drop to the ten percent level. This could be due to relatively high correlation with the other two explanatory variables hypothesis 3 contains. The fact whether the chairman belongs to the investor is no longer significantly driving cash flow efficiency gains. Positive correlation between the stake of the PE investor and the chairman dummy variable and the fact that both explanatory variables drive cash flow efficiency in the same direction could be responsible for the change. Results are shown in table 18 (Appendix).

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 is significantly driving growth in gross profit margins. In addition, the older the PE investor the higher the growth in net income margins. As the PE investor's approach is to influence managerial decision making and to interfere in strategic management of the company (tasks usually covered by incumbent management) these results provide evidence for our hypothesis that increased managerial, i.e. active investor's experience has a positive influence on operational performance. The investor's independence from banks or other corporations plays no role as stand alone, independent PE investors are on average no significant performance drivers in our single explanatory variable regression. See table 13 for detailed results. However, if we put all three in-

	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)
Investment 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)						0.689 (1.441)			3.239** (1.529)
N	160	188	175	114	145	131	161	206	189	108	146	134
R ²	0.202	0.139	0.169	0.275	0.156	0.167	0.362	0.308	0.338	0.27	0.285	0.286

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.

	Gross Profit			EBITDA			Net Income			CFOA		
RLBO	-0.015 (0.127)	0.014 (0.147)	-0.047 (0.189)	0.199 (0.213)	0.110 (0.127)	0.105 (0.110)	-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)
Investment 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 Inv.			0.000** (0.000)			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)
N	188	146	146	145	109	109	206	151	151	146	107	107
R ²	0.142	0.205	0.219	0.156	0.257	0.259	0.310	0.378	0.360	0.264	0.338	0.319

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 stand alone firm as explanatory variables (Hypothesis 4). Controlled for industry and calendar year. Standard errors are depicted in parentheses.

investor characteristics explanatory variables into one regression and thereby control for experience we find significantly higher net income growth if the investor is independent. Furthermore we can confirm the positive influence of the investors experience on growth in gross profit and net income margins. 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)
Investment 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)
N	188	145	206	146
R ²	0.136	0.174	0.311	0.264

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.

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

Our final hypothesis 6 covers the issue whether incentive compensation of management and upper level employees (via cash bonuses and equity components) or the management's equity stake is responsible for performance variation among private equity portfolio companies included in our sample. We find that the ratio of bonus to base cash compensation for executive management (with the bonus being almost always tied to EBITDA figures) has no significant influence on efficiency changes after the buyout. The same is true for the management's equity stake in our single explanatory variable regressions. Looking at incentives given to employees via equity components in the compensation package we find strong statistical arguments that the higher the share of the companies equity dedicated

	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)	0.794 (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)	-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)	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)	-0.012 (0.010)	-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)	
Investment 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)	
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)	
N	139	140	171	103	100	127	138	140	185	103	97	
R ²	0.196	0.297	0.183	0.264	0.361	0.200	0.429	0.375	0.342	0.323	0.386	

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.

to incentive schemes the higher the increase in EBITDA margins throughout the time the company is held by the PE investors. Table 15 shows the corresponding numbers. Robustness checks by putting all three explanatory variables considered under the hypotheses in our regressions further strengthen the result of the equity incentives. Additionally they reveal that if we control for compensation we find that a higher management stake is driving net income margins. This result is significant at the 5 percent level. All figures for the multiple explanatory variable regressions considering hypothesis 6 can be found in table 20 (Appendix).

Concerning our standard control variables displayed in the individual regressions we find only few significant results for organizational differences. We see a slight outperformance of RLBO transactions and underperformance of spinoffs depending on the particular explanatory variables put into the regression. However, looking at the impact of the region where the transaction takes place we document significant positive efficiency growth for US based transactions in the majority of our regressions for cash flow, net income and gross profit ratios. This result could be attributed to the fact that US investors in contrast to their Continental European counterparts prefer companies in a more mature stage as reported by Renneboog, Simons, and Wright (2007). As we controlled for leverage this source can not be made accountable for the differences in efficiency growth rates between the two regions. Another explanation may be that US based PE investors investing locally employ superior incentive structures to their portfolio companies¹⁸. Age of the company only plays a minor role, leading to slightly higher growth rates in net income margins in two regressions. The size of the company measured by total assets does not play a role. Finally the time between buyout and IPO in years does have a positive impact on cash flow efficiency gains in a number of cases.

¹⁸We find lower significance or even negative influence of the US regional dummy if we control for incentives and PE type in the regressions with net income margin and cash flow efficiency growth as response variables

5 Robustness Check

For robustness reasons we decided to rerun the regressions on every efficiency ratio we analyze with all variables that have shown statistical significance in the single explanatory variable regressions. Results are shown in table 16.

	<u>Gross Profit</u>	<u>EBITDA</u>	<u>Net Income</u>	<u>CFOA</u>
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)
Investment 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)
N	103	97	151	117
R ²	0.518	0.372	0.397	0.358

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.

If we revisit hypothesis 1 the positive effect of the leverage level on cash flow efficiency is no longer significant. In contrast the negative effect on the level of gross profit margin is still significant at the 1 percent level, indicating a negative effect of leverage on operating efficiency. We must therefore reject our hypothesis 1 that a higher leverage ratio implies 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, Hotchkiss, and Song (2011). However, they consider the change in leverage from pre buyout levels and not the absolute level as we do. Hypothesis 2 which tests whether asset restructuring via acquisitions and divestitures has a positive effect on operating efficiency can be confirmed. We can show that more acquisitions significantly increase the growth rate of cash flow efficiency whereas more divestitures lead to a higher level in net income profit margins. In terms of the level of ownership concentration and proxies for monitoring intensity we find that the positive effect on cash flow efficiency due to the PE investor related chairman is still present. The share of PE investor representatives on the board of directors and the size of the PE investor's equity stake are no longer significant which could be due to the substitutability between the disciplining effect of leverage on management and high effort level in monitoring the management. Nevertheless this results provides evidence that increased monitoring effort is positively correlated to operational performance (hypothesis 3). Managerial experience of the PE investor is still showing a significant influence on performance variation in our sample as predicted by hypothesis 4. A higher overall amount the PE investor has invested leads to a steeper increase in gross profit margins. This result shows high statistical significance at the 1 percent level. In Addition the number of years the PE firm is in business has a significant positive effect on the increase in net income margins. Managerial replacement does play no role in the performance variation of PE backed companies. As a consequence hypothesis 5 has to be rejected. Finally, our measure how steep the incentive scheme is that is provided to top level employees and executive management shows that the higher the share of equity that can be used to compensate employees and management the higher the increase in profitability measured by EBITDA margins - as predicted in hypothesis 6.

Considering our standard control variables results as part of the robustness regressions we can confirm outperformance of RLBO transactions measured by EBITDA efficiency growth. In additions we can also confirm a strong influence of US based transactions on the growth of net income margins. As reported before, the age of the portfolio company does have a mild impact on growth of net income margins.

6 Conclusion

We document broad based growth in absolute operational performance during the private period among companies that are subject to a leveraged buyout. While there is both bottom and top line growth, outperformance in bottom line growth suggests that the largest efficiency gains come from enhanced organizational structure which leads to lower administrative costs. Interesting is also that while absolute workforce stays roughly flat workforce efficiency measured by revenues respectively EBIT over number of employees increases considerably.

Comparing transactions taking place in the US with Europeans transactions we find that financial leverage is significantly higher among US companies which leads to lower levels of profit margins at the time of the buyout. After the restructuring period US companies are comparable to their non US counterparts in size and profitability. Financial leverage is still higher while no longer significant. After all, US portfolio companies experience significantly higher growth rates in net income and cash flow margins then corresponding European companies.

Spinoff and RLBO transactions are significantly larger than the rest of the transactions in our sample measured by revenues and total assets. However, both transaction types do not seem to have a major impact in operational performance.

In evaluating the issue whether and how private investors increase operating efficiency we find several action these investors commonly apply to their portfolio companies having an impact: First, operational restructuring in the form of more frequent acquisitions and divestitures of assets leads to significant outperformance which is consistent with synergistic models of assets restructuring. Second, a higher monitoring level employed by larger equity stakes by the private equity investor and the chairman belonging to the investor shows significantly higher growth rates in cash flow efficiency. However, a larger investor representation on the board of the portfolio company has a negativ impact on performance. Third, more experienced investors measured by age of the private equity and the total amount invested cause significantly higher growth in gross profit margins. Finally our fourth finding is that strong incentives given to management and top level

employees via equity linked compensation lead to superior growth in EBITDA margins. As a consequence Hypothesis 2, 3, 4 and 6 can be confirmed while hypothesis 1 (leverage acts as a disciplining device to management therefore generating gains in efficiency) and hypothesis 5 (managerial replacement leads to superior management and therefore higher growth rates) have to be rejected.

Robustness checks via putting all explanatory variables that have shown significance before in one regression do mainly confirm our results from above. Solely the negative impact of a higher investor representation on the board of directors is no longer present.

Our results indicate that there seems to be a set of actions private equity investors commonly use during the restructuring period that systematically drive operational performance in the underlying portfolio companies. These actions 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 study operational performance of private equity portfolio companies and especially performance determinants is the fact that all the companies in our sample are sold back to the public by the private equity investor via an IPO. Because of lack of data availability for private companies we have to limit our sample to this type of transactions. As a consequence we do not have a perfect random sample of private equity owned corporations. General conclusions about performance drivers in LBO transactions must therefore be drawn with caution.

Future research on operating performance changes among private equity portfolio companies should include performance evaluation on a relative basis by matching portfolio companies to comparable companies.¹⁹ Besides focusing on individual holdings of a particular investor, tracking other holdings that are at the same time in the portfolio of the same private equity company could be useful to assess whether they do influence operational performance by pursuing a buy and build strategy to leverage operational performance. Finally, a sample that is not restricted to transactions that have an IPO after

¹⁹Although this step has been done before in this context, to our knowledge there are currently no studies considering relative performance and performance drivers.

the restructuring period could reveal more general results on private equity performance drivers as only a part of the buyouts have a IPO attached to their exit process.

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)
Investment 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)
N	188	145	206	146
R ²	0,137	0,167	0,359	0,305

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)
Investment 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)
N	158	113	160	107
R ²	0,212	0,267	0,367	0,356

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)
Investment 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 Inv.	0,000* (0,000)	0,000 (0,000)	0,000 (0,000)	0,000 (0,000)
N	146	109	151	107
R ²	0,264	0,262	0,385	0,354

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)
Investment 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)
N	114	87	112	84
R ²	0,429	0,319	0,505	0,398

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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