The Performance of Reverse Leveraged Buyouts

The real abnormal return of Private Equity

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Word of Gratitude

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Abstract

This research provides insights into the performance of Reverse Leveraged Buyouts (RLBO). A firm, formerly backed by a Private Equity, is offered to the public through an initial public offering (IPO). The research is executed over the time period of 2000-2018 for American and European companies. The research looks at the stock performance with respect to different return measures against geographical peer market indices S&P500 and MSCI Europe. Additionally, accounting performance measures are tested in terms of accounting ratios of the sample and industry-adjusted peer market companies. The accounting performances are measured through operational engineering (efficiency), reinvestments, profitability and financial engineering. RLBOs outperform their geographical market peer indices with a slight outperformance of USA over EU. The short -and long-term performance of the sample shows an outperformance for the long-term RLBOs. Also, the holding period of PE firms to their portfolio companies is tested for short (1-2 years) and long (more than 2 years) holding periods. The longer holding periods outperform the shorter. Lastly, also the different interest rate periods are tested for higher and lower than average periods. The higher interest rate periods outperform the lower-than-average periods over the sample time span. On an accounting performance level, the operational engineering shows outperformance for the sample over industry-adjusted peer market companies. The PE firms do add value in a significant way to their portfolio companies under different economic and investment climate conditions.

Keywords: Leveraged Buyouts, Reversed Leveraged Buyouts, Quick Flips, Duration Private Holding Period, RLBOs and Interest Rates

JEL Classification: G3, G32, G34, G35

Contents

1 Introduction

In this thesis the Initial Public Offerings (IPO) of companies which were previously held by Private Equity (PE) companies is investigated. This is called a Reverse Leveraged Buyout (RLBO). The research provides novelty on an investment, interest rate and holding period level. The previously owned PE companies were at first bought by PE through a leveraged buyout (LBO) transaction, where the majority of the transaction (60-90%) is financed with debt. LBOs increased in popularity since the 1980s foremost in the United States of America (USA). LBOs are performed by PE firms in collaboration with financing partners. The companies acquired through an LBO are then held in a portfolio of companies within the PE firm. PE firms use the free cashflows to write off the debt used for the transaction in order to create extra value (Lowenstein, 1985). PE firms tend to create value for the acquired firm through operating, financial or managerial excellence (Grundfest, 1989). However, this value creation is often criticized. The benefits of acquisitions by PE firms are argued to only benefit the PE and not the long-term value of the acquired firm (Harford and Kolasinski, 2014). Hence, this makes the topic of value creation by PE an interesting research subject. The period after acquisition by PE is private and confidential in terms of information. Therefore, this research primarily focuses on the period after the private holding period. This period is generally initiated through a sale. The sale, or exit, can be executed in different ways, however this research emphasizes the exit through IPO (RLBO). In this exit type, the shares of the PE owned company are offered to the public at a certain price. This public information makes IPOs suitable for research. Prior studies have also investigated RLBOs and their performance. DeGeorge and Zeckhauser (1993) find that LBO companies perform better than their industry peers during the private period, but worse in the year immediately after going public. Holthausen and Larcker (1996) find positive statistically significant outperformance of RLBO companies relative to industry peers in the first four years on the buy-and-hold abnormal return level. Although almost the same sample period is being used as by DeGeorge and Zeckhauser (1993), they use some different return measures and hence get different results. Moreover, they do not find abnormal returns with respect to their benchmark companies. Cao and Lerner (2009) consider all the aforementioned in their research. They extend their research of RLBOs to look into the cross-sectional differences in performance. With an extensive research of 526 RLBOs between 1983 and 2003, they have found that RLBOs perform as well or better than other IPOs. In this longer-range time period, many

large RLBO transactions have been executed. In 2013, Datta et al. researched RLBOs over an even longer time period: 1978-2006. They assessed the restructuring activities executed in the private period and found that these firms are more profitable than their peers. Datta et al. (2015) followed up on the previous literature with an extensive research on the post-IPO stock price performance between RLBOs and IPOs. In addition, the impact of prestigious underwriters has an effect on the stock price performance at the moment of offering, but also over time. The underwriter prestige is not accounted for in this research as this paper focuses on the performance after IPO not the specifics during the IPO itself.

As prior studies provide different results of out -and underperformance for different return measures, but also at different points in time after IPO, RLBOs remain an interesting topic for further research. To emphasize, by adding different aforementioned measures to the sample, the results might deviate from prior research. Therefore, in combination with the aforementioned value creation of PE firms and the performance of RLBO stocks, I have formulated the following research question for this thesis:

RQ: Do PE firms create abnormal returns for Reverse Leveraged Buyout stocks?

To emphasize, the abnormal return is explained as a higher return than the benchmark against which it is compared. In support of this research question, four hypotheses are being tested. These hypotheses provide clarity in the answer to the research question, but also introduce new research topics associated with RLBOs. Important to investigate is if the prior research by DeGeorge and Zeckhauser (1993); Holthausen and Larcker (1996); Cao and Lerner (2009) and Datta et al. (2013) still holds as the time span and hypotheses in this research are different from those papers. Therefore, the long- and short-term performance of the RLBO sample versus their industry-adjusted benchmarks is tested. This will be executed over the new time period from 2000-2018 for the United States of America

This research provides new insights on different levels. The RLBOs are sampled in a unique period from 2000-2018. Also, the study performs a bilateral approach towards the performance of RLBOs and their industry-adjusted peer market index companies. Here not only the stock performances are being measured in a time-series regression, but also the

accounting performances through different value-added PE measures, such as financial engineering and profitability.

First, a new event study measure of interest rates on government and corporate lending is added. Moreover, this measure is added to control for the investment climate. Sharpe and Suarez (2020) focus on the effect of interest rates on investments and state the importance of accounting for this in an investment climate. Yung et al. (2008) study the IPO cycles in the market and account for the state of the market, but do not include RLBOs specifically. These combined prove the importance of the cyclicality and the climate of the performance of stocks.

Second, the holding periods of the sample were gathered to uncover any results between long and short holding periods in the stock performance after IPO. Harford and Kolasinski (2013) highlighted the short-term profits for PE firms, however they did not relate this to the holding period but to the stock performance. Hence, this is a new field of research for RLBOs. The geographical areas USA and Europe (EU) are used to look for differences between the PE and stock climates. In prior research of Brecht (2015) the outperformance of USA over EU was uncovered. Therefore, this will be investigated in this research. Buy-and-hold (BHR), buy-and-hold abnormal (BHAR) -and abnormal returns (AR) and Jensen's Alpha are used and further explained in the methodology section 4.1. Furthermore, the accounting performances of the sample versus the industry-adjusted market peer companies is tested. For these tests four different measures are used: operational engineering, reinvestments, profitability and financial engineering. Moreover, these are further explained in section 4.2.

These findings are relevant as two hypotheses extend on prior research with respect to sample size/time span. From another point of view, investors could have special interest as the performance of RLBO stocks is compared to other stocks and indices accounting for different measures. Also, PE companies can be viewed from a different (positive) stance to add value on the long run not only for themselves, but also for their portfolio companies. Lastly, the investing climate (state of market) with respect to interest rates provides insights to regulators for the effect of increasing or decreasing these rates.

The results show mean stock outperformance of the sample over all periods in time using BHR, BHAR, AR and Jensen's Alpha. These findings show statistical significance at the 10% and 1% levels. This implies that PE firms do show to maintain abnormal returns over geographical

peer market indices over time. The accounting measures show outperformance against industry-adjusted peer market companies for operational engineering. This is later discussed as the operational efficiency that PE firms add to their portfolio companies.

The paper is structured as follows: First, the literature is reviewed. Second, the data used for research is discussed. Third, the methodology for research is explained. Fourth, the results are presented. Finally, a conclusion is offered with an outlook on possible future research topics.

2 Literature Review

2.1 Private Equity and Leveraged Buyouts

A private equity (PE) firm is a firm that collects funds through a structure of different types of investors, mainly institutional investors or wealthy individuals, which are called limited partners (LPs). The PE firm which controls the collected funds acts as the General Partner (GP) (Strömberg & Kaplan, 2009). The fund is invested by the PE firm over a certain holding period between six and ten years. The PE firm invests the collected funds into a diversified company base. Moreover, the diversified way of investing is used to diminish the company or sector specific risks, in order to maintain a predefined return on investments (ROI) or internal rate of return (IRR) (Strömberg & Kaplan, 2009). In addition, the risk-return relationship states that every return equals a certain risk, the higher the risk, the higher the related return and vice versa. The investments in the different companies are entered as private investments, where a majority stake within the company is taken. Furthermore, these investments must be exited before the end of the holding period. The exits on these investments are made at a point in time to create a return at the end of the holding period, which is thereon distributed over the LPs through the fund.

Moreover, a certain threshold return, which is stated at the beginning of the fund, flows to the GP (Strömberg & Kaplan, 2009). Also, the PE firms earn money through the LPs who pay fees (Kaplan & Schoar, 2005). PE firms may execute different buyout transactions to obtain a majority stake in a portfolio company. These companies can be private or public, but are, after the stake of the PE firm, always taken private. Moreover, this is also referred to as the

private holding period. During the private holding period PE firms try to add value on different layers. Three types of 'engineering' are on an operational, financial and governance level (Gompers et al., 2016). This paper will focus on operational and financial engineering, but also on a metric of profitability and reinvestments. Muscarella and Vetsuypens (1990) research the performance of RLBOs and especially look at operational engineering. They state that the efficiency and organization applied by PE firms to their portfolio companies is one of their main wealth gains towards a positive return on their investments. Moreover, the PE firm also applies different cost reduction schemes. The paper states three ways of cost reduction to gain wealth. Firstly, by changing operational organizations and how these are managed. Secondly, general cost reduction programs which are implemented directly after the buyout. Thirdly, by altering the management structure in a less bureaucratic way to reduce corporate overhead costs (Muscarella & Vetsuypens, 1990). However, PE critics state that the cost cutting comes at the expense of personnel (Lerner et al., 2011).

PE public-to-private buyout funds were first established by Kohlberg, Kravis and Roberts & CO. (KKR) in 1978. KKR was founded by three former employees of Bear Stearns, an investment bank at the time. Moreover, Bear Stearns started using leverage in buyout transactions in the mid-1960s. When a funding proposal was turned down by the bank, the three left the company to start KKR private equity company. At the beginning of the 1980s, the buyout transaction type 'Leveraged Buyout' (LBO) emerged at PE firms (Cheffins and Armour, 2008). A leveraged buyout is typically a transaction executed by PE where a majority stake in a company is taken by the PE company financed with debt (Kaplan and Stromberg, 2009) contrary to venture capital investments where only a minority stake in a company is made in a scale-up company (Cumming et al., 2007). In addition, the debt is provided by a third party, a bank, which provides attractive interest yields to execute this transaction. The ratio of debt to equity in an LBO in the first years was often as high as 10% equity to 90% debt (Olsen et al., 2003). The minimum debt criterion to call the transaction an LBO is more than 60% in this research.

During the 90s and 00s, the levels of debt decreased towards 60-70% debt, but still remained the largest part of the capital provided (Schwarzberg & Parker Deo, 2016; MacArthur, 2018). The innovative use of debt increased the buying power of LBOs and hence increased the number of transactions. At the end of the 1980s, the number of public-to-private buyouts reached its peak.

A famous example of such a transaction is the KKR takeover of RJR Nabisco of $25 billion plus $7 billion financing expenses in 1989. This deal, which remained a record high until 2006, set off a merger wave in the 1990s (Cheffins & Armour, 2008). Furthermore, in that period of time, LBOs were arguably performing better than other firms' transactions because these buyouts were better managed by the PE companies (Jensen, 1986). In the 1990s' merger wave, the buyout transaction was typically driven by strategically motivated deals, vertical integration or by advantages of economies of scale. The number of transactions, but also the size of the transactions continued to increase in the 2000s, and LBOs are still the most widely used transaction type by PE (Cheffins & Armour, 2008). In the Global Private Equity Report 2020 published by Bain, the number of transactions was notably high in 2006-2007, right before the financial crisis. As economic prosperity, and the risk appetite shifted after these years, the number of buyout transactions drastically diminished. The number of LBOs decreased in the following years, as debt became costly and returns were insignificant (MacArthur, 2020). Thereafter in 2017, a rise in buyout transactions occurred, as debt again became available at attractive interest rates and the risk-return relationship became more favourable. As aforementioned, the LBO is the most used buyout transaction by PE (MacArthur, 2020). However, LBOs are often considered as a controversial subject by the public with up- and downsides.

2.1.1 (Dis)Advantages of LBOs

First, one of the downsides of LBOs is the high amount of leverage resulting in an increased risk of financial distress. The risk of financial distress is caused by the down payment of the interest and debt within the LBO construction. The LBO acquired company has cashflows from operations and these cashflows are used to service the interest and debt payments. If the cashflows are not sufficient to execute these payments, the risk of financial distress increases. With a higher level of financial distress, the firm can be pushed into bankruptcy (Easterwood, et al., 1989).

Second, high levels of debt in an LBO negatively affect the Research and Development (R&D) in the holding company. In extend, the negative effect was on output, but also investment in R&D. Hall (1999) revised prior research of Long and Ravenscraft (1993), who have found this negative effect of debt on R&D the basis of future returns. Their findings support the evidence that after LBO almost no R&D was executed in the companies. In addition, the R&D investments reduced following the increase in debt. However, the

decrease in R&D does not directly imply a decrease in the performance of the company. These levels can be tested through accounting performances that look for the reinvestment in the sample firms. This will be further explained in section 4.2. Finally, when debt levels are high, the debt can be credited as riskier by credit ratings agencies. This higher credit rating can lead to higher interest rates (Axelson et al., 2013). However, there are also upsides to high levels of debt in an LBO. First, one of the most renowned advantages of debt is tax exposure. The interest payments to be made on debt are tax deductible. The interest payments on debt are deducted from the net income, which decreases initial tax expenses. Within the Modigliani and Miller (1963) model this advantage of interest rates on tax is called the tax shield.

Secondly, literature shows that debt affects management performance. The cashflows on the company are used to pay off interest and debt payments within the LBO structure. As the performance of the company is affected by the down payments, its management is disciplined to work efficiently. The operating and financial performances are directly related to these cashflows, which incentivizes management to firmly keep the predetermined goals (Kaplan & Schoar, 2005). Additionally, where management discipline efficiently aids in the buyout of the firm, it also improves the overall productivity of the company (Lichtenberg & Siegel, 1990). Finally, the literature touches upon theories related to corporate governance and LBOs. One of these theories is the agency theory. The agency theory explains the misalignment of interests between shareholders and managers. Managers are claimed to make decisions in the best interest of their own benefits rather than those of the firm's shareholders (Jensen & Meckling, 1976).

A well-researched topic within this stream of literature is executive compensation, which proves to be a potential solution to the agency problem as the company manager's goals are aligned to these of the shareholders. If the manager succeeds in achieving these goals, the manager could get a bonus in cash or an increase in equity stake of the company (Bebchuk & Fried, 2003). Within the structure of an LBO, the management of the company always has to buy-in a stake in the acquired company (Kaplan & Stromberg, 2009; Acharya et al., 2007). Therefore, the aforementioned alignment will create a favourable position between management and stakeholders and thus diminishes this agency problem (Renneboog & Vansteenkiste, 2017). Following the agency theory, another - bigger - issue is shareholders versus stakeholders. The public mostly scrutinizes PE and LBOs as acquired companies are shrunken and made lean, where the loss of stakeholders, including employees (wages), is not

seen as a problem. Other stakeholders such as clients and society at large are often left outside this equation. Although some research shows evidence of net job losses, others find an increase in gross job creation (Davis et al., 2014). In addition, Weston et al. (1998) found that these 'losses' of employees are not observed in LBOs.

2.1.2 Exits of Private Equity firms

After the private period where a company is owned by the PE, the company will exit through a sale. This sale is executed to earn the projected return on the investment. In the BAIN Global PE Report 2020, the median holding period of PE firms is around 4.7 years. Considering the number of deals and the average value, the BAIN report states around 3000 deals executed with an average value of $551 million in 2020. These exited deals can be done in different ways. There are different types of exits made by PE, assuming the firm to be sold has not gone bankrupt. The three most common exits types are a strategic buyout, sponsor to sponsor and an Initial Public Offering (IPO).

First, a strategic buyout is a sale to a company which is believed to have synergies with the target firm which can be exploited. Meaning, the buyer can make use of economies of scale, value-added services or increments in market share.

Second, sponsor-to-sponsor is the sale to another PE firm, which believes that this firm can create even more value with the assistance of the PE. Finally, the IPO is a share offering to the public. In this process, a certain number of shares is put out in the market and can be bought at a certain price. Important to note, not all of the company's shares (100%) are offered to the market. Private Equity firms will most likely time to exit their investments in windows of opportunity when the capital market is 'hot' (Jenkinson & Souza, 2015). In extend a hot capital market is a market where the spending on stock deemed as popular gets more attention by investors. Therefore, these stocks and/or the capital market itself faces an increase in money circulation and spending hence increasing the value of these former PE investments (Jenkinson & Souza, 2015).

There are (dis)advantages of an IPO as an exit route for PE firms, but also for the firm going public. On the one hand, an IPO has the advantage of a broad reach of different investors enabling a higher valuation due to the competition of investors towards the shares bought. Secondly, from the investor perspective, the PE firm has to retain itself into the target company until certain positive company results, whether accounting, sales or other, are

reached. This has a positive effect on both the share price of the company, but also gives some certainty within the management of the company (La Lande et al., 2011).

On the other hand, a disadvantage of an IPO could be the high transaction costs which come with the public offering. In the process of the IPO, an underwriter (bank) has to lead the process of the sale of shares. For this they ask a transaction fee, which is high. Secondly, the PE firm will face market risk. This market risk is two-sided with on the one hand the risk of the market not fully responding to the initial offering of the shares, and on the other hand the risk that post offering, the share value could decrease, leaving a negative effect on the stake of the PE firm and thus the PE firm itself. As aforementioned, this IPO by a PE firm could be a reversed transaction from the private (LBO) to the public (IPO) market. Therefore, this transaction is called a Reverse Leveraged Buyout (RLBO) and this type of transaction will be the main topic of this research.

2.2 Reverse Leveraged Buyouts

A reverse leveraged buyout is the transition of a previous leveraged buyout company that will be brought back into the equity market through an IPO (DeGeorge & Zeckhauser, 1993). This type of transaction has increased in popularity over the last years, with around 20% of all IPOs in the USA being a RLBO (Datta et al., 2013). In general, the deal size of these IPOs is twice the size of a regular IPO (Cao & Lerner, 2009). As the transition from private to public gives little information on the private period, it is hard to measure exactly which part of the performance increased within the publicly offered firm. This is because PE firms tend to keep this information private, as their competitive advantage towards other PE firms lies in these increased performances. One can only look at the change before the company went private and after the company went public. With regards to the period before the privatization of a company, there are three different RLBOs. First, the public-to-private transactions, which concerns companies that were already traded publicly prior to the LBO. Second, the division-to-private deals which resemble highly levered going private equity carve-outs. Lastly, the private-to-private RLBO where a private company is acquired by a PE firm. This firm thereafter is taken public by means of an IPO (Datta et al., 2013). In this research, all the different RLBOs are discussed.

2.2.1 (Dis)Advantages of RLBOs

An RLBO can be viewed from two perspectives. On the one side, there is the company and the PE owner and on the other side we have the investor who is willing to buy shares that are offered in the IPO. On the other side, in order to highlight both sides, the research should consider the (dis)advantages of RLBOs to investors. The advantage of an RLBO lies in the pure selection where research looks at debt overhang and selection effect (DeGeorge & Zeckhauser, 1993). Debt overhang arises when PE owned firms want to raise equity, but are reluctant to do so when their debt is risky. Through an RLBO equity is brought into the firm, which reduces the risk of the debt. However, as risk is reduced, the price of the bonds rises. Then, the benefit of the equity goes to the debt holders rather than the equity holders. Therefore, this theory would suggest to discourage RLBOs when bonds are riskier. Secondly, this leads to the selection effect where PE owned firms performing strongly are more likely to go public. In extend, strongly performing firms translate into less-risky debt and would therefore make it attractive to go public (DeGeorge and Zeckhauser, 1993).

The disadvantage is information asymmetry, where the seller (PE owned firm) has superior information, towards investors, on the shares prior to an IPO. DeGeorge & Zeckhauser (1993) investigated and found that LBOs wanting to go public (hence RLBOs) have difficulty giving the market credible information about their prospects. The investors or the market can overcome this asymmetry by pricing this into the offered share price. Therefore, they make use of the ‘lemon problem’ of Akerlof (1970) where the probability of disappointing performance of a share is calculated.

2.2.2 Prior RLBO research

In 1993 different researchers executed studies with respect to RLBOs. Mian and Rosenfield (1993) studied the long-run investment performance of stocks following LBOs. After constructing a sample with 85 firms over the period 1983-1988, they found positive statistically significant abnormal returns. DeGeorge and Zeckhauser (1993) found that in the period before going public, RLBOs outperform other firms. They investigate the private period and show that the post RLBO performance (when public) suggests added value coming from the PE firm. However, in the year after going public and onwards, RLBOs perform worse than other IPO firms on average. Holthausen and Larcker (1996) research the

accounting and stock performance of RLBOs vs. others and find that the RLBOs outperform their industry peers in the first four years of the RLBO. They computed this out of a series of 90 different RLBOs. Jain and Kini (1994) studied the post-issue operating performance of previously owned PE firms going public. They have found a post IPO statistically significant positive relation for operating performance on the retention of equity by the original entrepreneurs. Moreover, this states that the original entrepreneurs would have been retained during the PE investments and would yield a positive effect on the firm after IPO. Hogan, Olson and Kish (2001) investigate the factors that explain the returns earned by investors which are involved in RLBO stock trading. A mean excess return of 7.64% is observed in the period of 1987-1998. They have found that this return is significantly lower than the returns earned by investing in IPO stocks. This evidence is therefore contradicting the aforementioned literature, but it discussed a different time period.

Cao and Lerner (2009) introduced the first extensive research with a sample of more than 500 RLBO firms. They find statistically significant outperformance, but this deteriorated over the years. Datta et al. (2013) extends on the research sample of Cao and Lerner (2009) and found RLBO outperformance for the first five years with respect to their industry peers. As aforementioned, prior research could be different for this time period and sample. Moreover, by constructing hypotheses with new and/or different measures other insights to the research question can be provided. Hence, in the next section I will elaborate on the different hypotheses.

2.3 Hypotheses

As stated before, it is hard to gauge the performance development during the private period. However, this is a part which is particularly interesting as we can then observe the added value that PE firms have on companies. We can look at the performance before and after the private period, but we can also observe the pure performance at the moment of IPO and compare these performances with other IPOs, which are not RLBOs.

Firstly, research presents different angles on how to measure the performance of the RLBOs vs. other IPOs. Mian and Rosenfield (1993) show that the investment performance of RLBOs is higher than of IPOs. DeGeorge and Zeckhauser (1993) examine the accounting

performances of RLBO firms versus non-RLBO IPOs. Their research focuses on the information handling towards potential investors with respect to RLBOs. As aforementioned, they find that RLBO firms perform worse than other IPO firms on average after going public.

On the contrary, Cao and Lerner (2009) find that RLBOs outperform other IPOs, and show that size, leverage and reputable underwriters affect these performance differences. In addition, their findings show that over time the outperformance decreases and disappears. In their study, Datta et al. (2013) use a large sample on the period before going private and after going public. They have found that RLBO firms outperform their industry peers for five consecutive years in their sample period from 1978 to 2006. Acharya et al. (2013) stated that on an operating level, PE-owned companies outperform their peer groups. As existing studies show to be inconclusive, with different return on short-space and long-term performances after going public, this problem statement should be investigated in order to answer the research question. Therefore, the following hypothesis is tested in support of answering the RQ:

H1: *RLBO stocks outperform their market indices in the long-term (3-5 years)*

Secondly, the length of the private period can also influence the performance after going public. As earlier mentioned, some PE firms have relatively short private holding periods after LBO which are referred to as "quick flips" (Harford & Kolasinski, 2014). The number of 'quick flips' is presented in table 3A column No Flip. The quick flip is related to the efficiencies and productivity gains during the private period. If these short-term objectives in terms of gains at different company levels are achieved, the company is revalued by the PE firm (Datta et al., 2013). Thereafter, an RLBO is executed when revaluation adds value for the PE firm in terms of buyout prospects. After going public, these quick flips are more focused on short-term profits, rather than sustainable company growth (Harford & Kolasinski, 2014). However, their research has found that PE firms do not tend to transfer their wealth to short-term profits at the expense of long-term company value creation.

Other research has shown that the PE firms seek long-term lasting value for companies. Cumming and MacIntosh (2006) found that PE firms also emphasize strategic support that will help create lasting value. They typically target investors oriented toward long-term growth. Lastly, Cao and Lerner (2009) investigate the median holding period and compare

the above and below median holding period. They have found that the below median holding period (going public in one year after LBO) translates into worse performance than the peer group. In this research, the period of "quick" will be translated to a private period of two years or less. With the comparison of short (less than two years) and long (more than two years) private holding periods, the value added of PE firms on short- and long-term performance is tested. Therefore, the following hypothesis is tested in this research:

H2: *RLBO stocks perform better when the private holding period is longer than two years*

Thirdly, the state of the market at the point of RLBO is important for the performance of the stock. The type of market in which IPOs are executed is researched by Yung et al. (2008). Their research focusses on the cycles in the IPO market. They have developed a time-varying real investment model to look for adverse selection in the market for IPOs. Meaning, they look for different types of markets in which IPOs perform. One of their conclusions suggests that cross-sectional variance in long-run returns is much higher for firms that issue in a hot market, a market where the average underpricing is high (Ritter, 1984; Yung et al., 2008). Therefore, literature suggests that IPOs would better perform when the market is relatively underpriced, the interest rates are higher than average, hence offering more potential to outperform the current market (Acharya et al., 2007).

Additional research has provided insights in the investing climate (state of the market) and the interest rates (Sharpe & Suarez, 2020). In this paper, interest rates are the cost of borrowing. The study attempts to gauge the interest rate sensitivity on the investments. The market interest rate is incorporated in the traditional cost of capital. As the interest rates decrease, investments go up as the cost of borrowing decreases (Sharpe & Suarez, 2020). However, the paper of Graham & Harvey (2001) has provided insights on the Duke University CFO Magazine Global Business Outlook. This research included 800-900 companies each quarter in recent years. They found that most businesses claim that their investment plans are insensitive to decreases in interest rates and only somewhat responsive to increases. Taking the aforementioned into consideration, a new field of research will be executed in comparing the height of interest rates and the performance of RLBO stocks. All in all, literature to date is still contradictive with on the one hand seeing higher returns in 'hot' markets, but on the other hand seeing little effect on investments of a decrease or

increase in interest rates. Although existing literature is contradictive, I expect the following based on Acharya et al. (2007):

H3: *RLBOs perform better when interest rates are lower than average.*

Finally, most literature focuses on the United States of America (USA) when it comes to the research on RLBOs. However, the number of RLBOs and IPOs in Europe (EU) is increasing (MacArthur, 2020). The number of LBO transactions in the USA was slightly higher than in EU for 2019. The transaction multiple (EV/EBITDA) of LBOs in USA and EU was 11.5x and 10.9x respectively. As the EU LBO and RLBO market surges (MacArthur, 2020), the topic becomes a more interesting field of research. Renneboog and Vansteenkiste (2017) investigated the financing of RLBOs in the USA market. They stated that research from USA cannot be extrapolated to EU. Firstly, they found that different environments with respect to the financing of debt affects RLBOs. Secondly, the lenders in the USA prefer the corporate markets, whereas EU is more prone towards bank lending (Brecht, 2015). These papers indicate that favorable corporate capital market and financing opportunities in the USA would results in a higher performance. Therefore, an extension on these findings provides a more complete answer on the research question. Thus, the following hypothesis is tested:

H4: *US RLBO stocks outperform EU RLBO stocks*

The four hypotheses combined should provide a clear sign to answering the research question whether PE firms create abnormal returns in RLBO stocks. In extend, the research suggests added value from private equity. The added value is translated into the abnormal return RLBO stock makes after going public. To conclude, the research question will be tested for long-term performance on different accounting measures, the length of the private holding period, the state of the market with respect to interest rates and the differences between USA and EU RLBO stock performances. The first and fourth hypothesis add to previous research with a new sample period. The second and third hypothesis provide new research insights into the performance of RLBOs towards their industry-adjusted peer market indices.

3 Data

The data used in this research is retrieved from the Eikon (DataStream/ThomsonOne) and Bloomberg databases. From these databases information on accounting performances, stock price performances and the RLBO sample is captured. OECD and ECB databases obtain long-term loan interest rates in both USA and EU. The Eikon database is used to retrieve the RLBO sample, the Eikon/DataStream databases are used for accounting performances and the DataStream database is used for stock price performances. The Capital IQ, Preqin and Bloomberg databases are used to identify PE firms. Cao and Lerner (2009) discussed their time frame (1981-2003) and concluded that the popularity of RLBOs increased at the end of the 1980s. At the end of 1980s, a merger wave occurred which set off a significant rise in the number of RLBOs. As other researchers also provided significant papers on the same timeframe from 1981 to 1989 (DeGeorge & Zeckhauser, 1993; Holthausen & Larcker, 1996), this paper will exclude that period of time. The sample period in this research is set from 2000-2018 for USA and EU. In addition, January 2018 is used as the last month of an RLBO. As the first hypothesis looks for the outperformance in the long-run (3-5) years benchmarked to market indices, some RLBOs that do not comply with the threshold of three years (36 months) are excluded.

First, the Eikon and Bloomberg databases are used to identify the initial set of PE-backed IPOs.

Secondly, excluded from the sample are Real Estate Investment Trusts, Close-end funds, unit offerings and firms with assets under five million (Cao & Lerner, 2009). Additionally, Cao and Lerner (2009) check the dataset for a minimum transaction value. This minimum value is used to avoid the venture capital backed transactions in the sample. They explain, that as PE firms previously also executed venture capital style investments, the minimum transaction value for the sample is set at five million.

The third criterium is that LBO financing of the transaction is undertaken by a PE firm and equals or exceeds a minimum leverage of 60% (Kaplan & Strömberg, 2009). Information on the characteristics of the financing is checked on SEC filings, the IPO prospectus, press releases of PE firms and on the databases Preqin, Bloomberg and Capital IQ. If the IPO satisfies the abovementioned criteria, it is identified as an RLBO. Next, the database from RLBOs on Eikon is then cross-checked with the company stock performances

on DataStream. These results are matched and missing data is eliminated from the sample. Finally, the sample of the RLBO is constructed and contains a total of 490 RLBOs.

Table 1 - Sample Size Reduction

Source	Observations
BloomBerg and Eikon identified PE-backed IPOs 2000-2018	1.210
Excluding Real Estate, Close-end funds, Unit Offerings and min. Value of $5 mln	1.010
Eikon and Preqin LBO identification	739
Manually check Preqin and News Articles RLBO criteria	564
Accounting and Stock data availability Datastream	490

The benchmark data is also retrieved via DataStream. The S&P500 is used to benchmark the USA, and the MSCI Europe Index is used to benchmark the EU. Prior studies have shown that these indices are used for analysis (Jensen, 1968; Barber & Lyon, 1997; Modigliani & Leah, 1997). Cao and Lerner (2009) also used these indices and state these are capitalization-weighted and therefore suitable as a benchmark. The performances of the RLBOs and indices are measured using different timespans. Furthermore, as later explained in section 4.2 accounting performances, the RLBO sample is also controlled for size and industry.

The number of RLBOs between 2000-2018 is shown in table 2A. There were 297 deals in the USA and 193 in EU, a significant higher amount for the USA, which is in line with prior research of Cao and Lerner (2009). The number of RLBOs increased significantly from 2004 to 2007. After 2009, the number of RLBOs started to increase again, with a sample high in 2014 of 55 transactions. The number of transactions after 2009 is higher than before. The table also shows the splits per hypothesis. In between these time frames, the global financial crisis of 2008-2009 occurred. In an event study by Chamberlain and Joncheray (2017) they researched the impact and found that RLBOs in that timeframe had a weaker performance than other years, but still better than their market peers. In extend, the number of RLBOs in the sample used for this research only contain 11 out of the 490 RLBOs. Hence, the effect of the RLBOs during the global financial crisis on the sample as a whole is negligible.

Table 2A - Sample Distribution by Year

The sample consists 490 RLBO companies between 2000-2018. In the table the summary count per year is shown. At every year the number of deals per year, the geographical area of origin, the Flip (short holding period under two years by PE company of a portfolio company), NoFlip (longer than two year holding period by PE company of a portfolio company, the below average interest rate of geographical OECD or ECB lending rate on a long-term loan and the above average of geographical OECD or ECB lending rate on a long-term loan.

	No. deals	US	EU	Flip	NoFlip	Interest Below	Interest Above
2000	16	11	5	6	10	0	16
2001	11	8	3	5	6	0	11
2002	18	11	7	3	15	0	18
2003	10	10	0	5	5	0	10
2004	26	21	5	6	20	0	26
2005	38	27	11	13	25	0	38
2006	45	25	20	23	22	0	45
2007	37	14	23	19	18	0	37
2008	2	2	0	0	2	0	2
2009	9	9	0	1	8	9	0
2010	27	18	9	4	23	27	0
2011	21	11	10	6	15	21	0
2012	23	21	2	5	18	23	0
2013	49	33	16	12	37	49	0
2014	55	30	25	15	40	55	0
2015	34	20	14	7	27	34	0
2016	25	10	15	3	22	25	0
2017	42	15	27	17	25	17	0
2018	2	1	1	0	2	2	0
All	490	297	193	150	340	262	228

In the appendix in table 2B the RLBO sample is divided into the different sectors. Over the time period, the sectors Consumer Goods (94), Consumer Services (86) and Industrials (84) are mostly represented in RLBOs. Interesting to highlight is that in the quick flip split, almost half of the RLBOs in the financial industry actually flipped during a short holding period. There are 150 firms that were flipped and 340 firms that were not. The highest monthly raw return was 221.42% and the lowest monthly return was 93.91%. as stated in table 3A, which shows the stock summary statistics. In figure 1 the distribution of the BHR is presented. The figure shows a non-normal distribution. As table 3A states, the distribution has a positive skewness of 2.73 meaning a fatter tail to the right side.

Table 3A – Stock Summary Statistics

The sample consists of 490 RLBO companies between 2000 and 2018. The return measures raw return, buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the table. The means and medians for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The table provides stock performance descriptives of the sample. The mean, median (p50), standard deviation (SD), minimum monthly return value (Min), maximum monthly return value (Max), skewness (Skew) and kurtosis (Kurt) are presented in the columns of the table.

Variable	Mean	p50	SD	Min	Max	Skew.	Kurt.
Raw Return	0.928	0.575	14.081	-93.919	221.42	1.28	20.53
BHR	54.576	12.252	44.95	-99.807	185.6	2.73	14.64
BHAR	38.224	5.890	47.79	-81.59	130.42	2.81	16.00
AR	-0.000	-0.375	12.319	-91.134	152.57	1.60	24.38
JALPHA	0.622	0.681	1.525	-4.154	4.492	-0.20	3.18

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With a kurtosis of 14.64 the distribution shows a high peak of observations. Due to the extreme values or outliers in the sample, the data set applied winsorization at 90% All the data below the 5th percentile is set to the 5th percentile and all the data above the 95th is set to the 95th percentile (Ghosh & Vogt, 2012).

Table 3B – Accounting Performances

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures EBIT, CAPEX, OCF, FCF, Sales and TA are presented in the rows. The table provides accounting performance over the 12 -, 24 -, 36 -, 48 -and 60 months of the sample. The means and medians (p50) are presented in the columns. All amounts are in US dollars.

t	12 Months		24 Months		36 Months		48 Months		60 Months	
Ratio	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
EBIT	5.528.380	2.684.000	7.429.113	3.745.100	8.309.493	4.467.700	9.769.744	5.650.250	11.850.734	6.683.900
CAP EX	3.165.472	1.251.500	3.437.329	1.341.250	4.400.649	1.677.400	4.685.724	2.137.700	5.425.595	2.560.000
OCF	10.553.354	5.245.000	14.381.899	7.677.600	15.344.281	7.889.100	17.947.476	10.520.900	18.879.686	9.994.500
FCF	6.280.072	2.421.000	7.385.743	3.428.000	8.176.551	3.751.000	9.595.803	4.807.700	11.254.402	5.755.500
Sales	83.328.594	40.924.300	92.595.175	47.039.700	102.369.929	54.298.600	116.353.679	63.797.500	124.499.739	69.718.800
TA	116.556.135	52.399.300	127.912.782	62.169.250	143.022.284	72.709.600	156.837.242	83.824.000	165.185.092	86.388.900

In table 3B, only the performances of companies from 12 to 60 months are included. All the accounting measures are stated in US dollars. The mean EBIT shows an increase of $5 million over time. Interesting to see is that the OCF, which translates to the operating efficiency, shows a steep increase over the period accompanied by an increase in sales. Moreover, this might highlight the contributed value of PE, but this will be tested later in section 5.

In table 3C the summary statistics of the accounting performances are shown. Important to highlight is that the statistics include all observations with respect to the sample for stock and accounting performances. Although winsorization was adapted to the sample, large outliers still remain. As the sample is subject to companies going public, the sample contains differences between smaller and larger companies which reflects the real-time world. However, in section 5.5 robustness check, the size measures are added to control for these differences.

Table 3C – Accounting Summary Statistics

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures EBIT, CAPEX, OCF, FCF, Sales and TA are presented in the rows. The table provides accounting performance descriptives of the sample. The mean, median (p50), standard deviation (SD), minimum monthly return value (Min), maximum monthly return value (Max), skewness (Skew) and kurtosis (Kurt) are presented in the columns of the table.

Variable	Mean	p50	SD	Min	Max	Skew.	Kurt.
EBIT/TA	0.067	0.066	0.235	-5.320	2.725	-4.41	140.87
EBIT/SALES	-0.286	0.077	15.916	-832.333	14.435	-51.52	2.691.39
OCF/TA	0.207	0.117	4.098	-6.626	209.296	50.71	2.588.39
OCF/SALES	1.342	0.143	52.383	-104.737	2.666.667	48.74	2.458.03
CAPEX/TA	0.045	0.026	0.060	-0.007	0.763	3.70	25.07
CAPEX/SALES	0.118	0.029	0.705	-0.004	27.333	27.38	998.40
FCF/TA	0.068	0.061	0.111	-1.291	0.955	-2.29	36.20
FCF/SALES	-0.080	0.075	6.413	-301.333	4.101	-45.18	2.112.13
EBIT	102.907.205	37.503.000	627.632.351	-7.823.000.000	16.529.000.000	16.59	382.44
CAPEX	79.629.247	17.176.000	549.580.832	-8.229.000	1.624.000.000	24.29	654.57
OCF	208.758.038	74.248.000	1.453.789.966	-7.701.600.000	60.116.223.000	29.24	1.096.63
FCF	120.357.187	41.051.500	564.087.659	-3.901.677.000	13.258.000.000	15.95	315.76
Sales	1.229.345.435	511.806.000	2.460.606.730	10.000	33.222.000.000	5.97	51.04
TA	2.270.689.254	664.971.000	12.794.907.221	1.000.000	324.139.000.000	20.10	451.03

In the first hypothesis, the long-term performance (3-5 years) is tested against the benchmark. Also, the short-term (0-2) year performance is explained. In the second hypothesis, the quick-flips performance on the short-term private holding period (0-2 years) is measured against the longer private holding period (longer than 2 years). In the third hypothesis, the performances of the RLBOs in different interest rate periods are measured with above and below average interest rate in the USA and EU. For the interest rates, the ECB and OECD lending rates are used. In the fourth hypothesis, the US versus EU RLBO samples are compared. In all the hypotheses yearly performance measures are used. This leads to the interval years 1 to 5. The yearly intervals are built upon monthly performance, which is constructed out of a daily performance. In addition, the years are translated into months 12, 24, 36, 48 and 60. The average number of days in a month comply with the 22 trading days.

4 Methodology

The methodology in this research is executed on two levels. Firstly, the stock performance data of the sample is compared to its respective geographical benchmarks S&P 500 and MSCI Europe Index. Secondly, the accounting performances of the sample and the benchmarks are also compared to look for the abnormal return created by PE in terms of operating, investment, profitability and financial performance (DeGeorge & Zeckhauser, 1993; Holthausen & Larcker, 1996; Cao & Lerner, 2009; Datta et al., 2013). To highlight, the stock and accounting performances are tested in the first hypothesis. In the second, third and fourth the accounting performances are not tested, but are used to add value to the explanation of the results.

4.1 Stock Performances

For all of the four hypotheses, stock market performance data of the RLBO sample is tested. Throughout the different RLBO stock returns this research looks for the abnormal return that PE companies have, or have not, added during their holding period. For all the stock performances closing prices are used. The hypotheses are discussed from H1 to H4.
In the hypotheses a time series buy-and-hold return (BHR) is used (DeGeorge & Zeckhauser, 1993; Holthausen & Larcker, 1996; Cao & Lerner, 2009; Datta et al., 2013). Through three different steps the BHR is calculated into an abnormal return (positive or negative). The BHR is taken from the RLBO sample at t=0, which is the moment the RLBO stock was offered to the public. Then the return is measured using the first data with the returns on a monthly base. Lyon and Barber (1997) study the long-run abnormal stock returns. They measure in two different ways: The Cumulative Abnormal Return (CAR) and Buy and Hold Abnormal Return (BHAR). The research was based on Ritter (1991) who initially executed a study on the different return measurements. In both papers the CAR had a higher expected value than the BHAR. They explain that the CAR is a biased predictor of the BHAR. The problem is referred to as the measurement bias. In extend, Barber and Lyon (1997) tested this measurement bias and found that this bias was applicable for CAR but not for BHAR.

Biases which are accompanied with BHAR are the new listing bias, the rebalancing bias and skewness bias. In particular the new listing bias is arguable, since the bias states that the index composition changes due to a new listing and the newly listed companies underperform compared to the existing listed companies (Barber & Lyon, 1997). As this bias is applicable to the RLBO (newly listed) sample, it will be tested in section 5.1. The rebalancing bias refers to the uses of an equally-weighted market index. The paper stated that the index is inflated which leads to negatively affecting the long-run BHAR. However, Canina et al. (1996) [1]found that the bias is more pronounced when using daily rather than monthly stock returns. Hence, this research used monthly stock returns. The last bias is the skewness bias. Moreover, this was tested by Barber and Lyon (1997) for the population means stating that rejecting a null-hypothesis that the sample mean is one at a 5% statistically significant level, which favors the alternative hypothesis that the population mean is less than one when a

[1] This paper is referred to by Barber and Lyon (1997) in their paper, but the referenced paper was only published until 1998. Barber and Lyon (1997) used a working paper version of Canina et al. (1996). Hence, in the references, the same article is referred to under a different year.

positive skewness is observed. This will be tested in this research and stated in the conclusion.

To sum, previous literature prefers BHAR over CAR and therefore this research will do so as well (Barber & Lyon, 1997). In extend, with the use of BHAR and a benchmark market index by controlling for size and industry this research shows similar methodology to previous research (Barber & Lyon, 1997; Lyon, Barber & Tsai, 1999; Francoeur, 2006; Levis, 2011) and an additional difference in difference regression goes beyond. The combined methods of those studies will be used in the calculation of the RLBO and benchmark samples. The BHR stock performance is measured from t=0, t=12, t=24, t=36, t=48, t=60. In addition, as not all companies in the sample are listed for the maximum of t=60, table 4A shows the number of RLBO stocks for each period of time. The i is used for the predictor variable (or regression coefficient) for every outcome of the i^{th} term, in the case of this research this are the different companies within the sample and benchmark companies. The BHR is calculated as:

$$R_{BHR\ i,t} = R_{BHR\ i,t} - R_{BHR,i\ 0} \quad (1)$$

Thereafter, Levis (2011) uses the return R, which is now denoted as Π. The raw returns for each RLBO and the selected benchmark at every month t. The next formula explains the calculation of the BHAR:

$$BHAR_{i,t} = \Pi\left(1 + R_{i,t}\right) - \Pi(1 + Benchmark\left(R_{i,t}\right)) \quad (2)$$

The BHAR is calculated by subtracting the benchmark from the RLBO sample for every month t. For example, the monthly returns for a 12 months period are aggregated starting at the end of the month of the RLBO. This process is repeated for the benchmark returns. These are then both calculated and subtracted from each other to find the BHAR. As the formula shows, 12, 24-, 36-, 48- and 60-months BHR returns are compared within their time-series benchmark group (same holding period). As aforementioned, the RLBO sample is benchmarked to the S&P 500 and MSCI Europe Index**.** These benchmarks are used to look for the abnormal return, but also the market risk is taken into consideration towards the conclusion of the first hypothesis (DeGeorge & Zeckhauser, 1993; Holthausen & Larcker, 1996 and Cao & Lerner, 2009).

To incorporate the benchmark, the market model is used. Here, the RLBO return is subtracted from the market return to uncover the abnormal return (Jensen, 1989). This abnormal return is here translated into the α using the market model (Jensen et al. 1972) with an error term $\varepsilon_{i,t}$ and will be denoted as Abnormal Return (AR):

$$\mathrm{R}_{AR} = \alpha + \beta_i R_m + \varepsilon_{i,t} \tag{3}$$

The market model returns and sample estimates of α and β_i are constructed for a predicted return. Then the market model return subtracts the predicted return which results in the AR. Thereafter, the R_{RLBO} at different monthly levels return to the BHR formula. However, now the formula shows the BHAR return. The benchmarks MSCI Europe and S&P 500 account for market adjustments. As aforementioned, the BHAR is the preferred research method from previous literature to overcome measurement bias, especially in longer time-series regressions:

$$\Pi_{BHAR} = \left(1 + R_{RLBO\ i,1}\right) * \left(1 + R_{RLBO\ i,2}\right) * \left(1 + R_{RLBO\ i,t}\right) - 1 \tag{4}$$

After the BHAR is calculated, the outperformance relative to the market of the RLBO sample occurs when the Risk-Free Rate for every period t in time is subtracted from the R_{BHAR} and R_m. The market adjusted return and the RLBO adjusted BHAR return and look for Jensen's Alpha in the CAPM model with an error term $\varepsilon_{i,t}$:

$$\Pi_{BHAR} - Rf_{i,t} = \alpha + \beta_i\left(Rm_{i,t} - Rf_{i,t}\right) + \varepsilon_{i,t} \tag{5}$$

The alpha represents the outperformance of the adjusted RLBO return over the adjusted market return. Through a time-series OLS regression the alpha will be uncovered. The means and medians will be tested for differences in the Wilcoxon Ranked Sign test. Also, the statistical significance is tested through a t-test.

This t-test is constructed by using the average buy-and-hold abnormal return (ABHAR). Moreover, the ABHAR is calculated in the following way:

$$ABHAR = \left(\frac{1}{N}\right) \Pi\, BHAR_{i,t} \quad (6)$$

The $\Pi\, BHAR_i$ is multiplied by $\left(\frac{1}{N}\right)$ to get the ABHAR. For instance, over a 24-months period, the $BHAR_{i,24}$ is used and multiplied by $\left(\frac{1}{24}\right)$ to get the ABHAR. The ABHAR is used for a statistical t-test. Here the significance of the measure is tested to see if the result is statistically different from zero at a 1%, 5% or 10% significance level:

$$t = \frac{ABHAR}{SD(BHAR)/\sqrt{N}} \quad (7)$$

The ABHAR is divided by the standard deviation of the BHAR divided by the square root of the number of months (between brackets in the denominator). From this t-test, the p-values are shown which give a significance level at 1% (***), 5% (**) and 10% (*) or no significance. These are highlighted within the tables.

4.1.1 Long-Run Outperformance

In the first hypothesis, the long-run outperformance of the sample group is tested. The long-run performance (3-5 years) is benchmarked against market index peers. As aforementioned, the new listing bias (Barber & Lyon, 1997) states that newly listed firms underperform compared to their listed peers. Therefore, also within the sample, the long-run performance will be offset against the short-term performance to look for this bias. The hypothesis is set up for 12-24-36-48- and 60-months periods.

The hypothesis tests for BHR, BHAR, excess returns and Jensen's Alpha and for this it uses formulas (1-5). After the construction of the formulas the two samples are specified to the hypothesis where the long versus short term is tested:

$$RLBO_{excess=}\, R_{Long\ i,t} - R_{Short\ i,t} \quad (8)$$

If the $RLBO_{excess}$ has a positive sign, the returns long-term performance of the sample benchmarked to market index peers outperforms the short-run benchmarked return

performance. In addition, the hypothesis is tested on different levels which can give different outputs. Furthermore, a Wilcoxon signed rank test and t-test statistics will be executed.

4.1.2 The Quick Flip

As there is not much information available on the private holding period of PE companies, this research highlights a piece of public information into the second hypothesis. The different holding periods of the RLBO sample were gathered. The holding periods are also measured in months, starting at 12 months. The definition of quick flip is translated into a holding period of 24 months or less before RLBO. The other group in the sample is longer than 24 months for a holding period. These two RLBO groups are compared using their average returns, BHR, BHAR and Jensen's Alpha on 12-, 24-, 36-, 48- and 60-months periods using the formulas (1-5). Thereafter, the two groups are offset against each other to look for an excess return:

$$RLBO_{excess=} R_{noFlip\ i,t} - R_{Flip\ i,t} \quad (9)$$

If the $RLBO_{excess}$ shows a positive sign, the returns of the longer holding period are higher than the returns on the shorter holding period. Therefore, the second hypothesis could be accepted. In addition, the second hypothesis is tested on different levels which can give different outputs. In addition, a Wilcoxon signed rank test and t-test statistics will be executed.

4.1.3 Interest Rates

In the third hypothesis the interest rates on government lending, ECB (EU) and OECD (USA), are used to uncover a different market situation at time t=0 from the RLBO. To investigate the different market circumstances the returns on the RLBO stocks are compared in periods where the interest rate was above or below the average. In addition, the average is used, but also where the median could have been used, both were calculated, giving similar results, not affecting the hypothesis. The periods of higher and lower than average interest rates are low 2009-2018 and high 2000-2008. These two RLBO groups are compared using their average returns, BHR, BHAR and Jensen's Alpha on 12-, 24-, 36-, 48- and 60-months

periods and are constructed out of the formulas (1-5). Thereafter, the two groups are compared for an excess return:

$$RLBO_{excess=} R_{Low\ i,t} - R_{High\ i,t} \quad (10)$$

If the $RLBO_{excess}$ shows a positive sign, the returns for the period where the interest rate was lower than average are higher than the returns for the period where the interest rate was higher than average. In addition, a Wilcoxon signed rank test and t-test statistics will be executed.

4.1.4 USA vs. EU

In the last hypothesis, a similar testing procedure as in H2 and H3 is used. The different RLBOs are all sampled from either USA or EU. These two RLBO groups are compared using their average returns, BHR, BHAR and Jensen's Alpha on 12, 24-, 36-, 48- and 60-months periods. The formulas 1 to 5 are being used for the construction of the abovementioned measures where the hypothesis will look for an excess return between the USA and EU:

$$RLBO_{excess=} R_{USA\ i,t} - R_{EU\ i,t} \quad (11)$$

If the $RLBO_{excess}$ shows a positive sign, the returns of the USA, in different measurements, outperform the returns of the EU. In addition, a Wilcoxon signed rank test and t-test statistics will be executed. In addition, the hypothesis is tested on different levels which can give different outputs.

4.2 Accounting Performances

After investigating the stock performances, the paper also investigates the accounting performances of the RLBO sample and benchmarks these against market index peers. Considering the PE nature of the RLBOs, four different measures are used to look for possible differences between the sample and their respective benchmark companies (Opler, 1992; Datta et al., 2013). Moreover, by using these measures, the change, or no change, over the years can be uncovered and hence specific improvements.

Firstly, the measure of operational engineering which looks for efficiency gains. The use of different ratios (table 4**)** includes operating cashflow (OCF), Total Assets (TA) and Sales. In addition, the OCF comes from Earnings Before Interest Depreciation and Amortization (EBITDA) minus (or plus if negative) the change in Working Capital (Holthausen & Larcker, 1996; Damodoran, 2012).

The ratios are used to see how the sample companies restructured its performance measures in contrast to their industry-adjusted peer market companies (Damodaran, 2012). The measures, if outperforming results are presented, suggest that PE firms possess a specific skillset that implies operational efficiency gains can be added to their portfolio companies.

Secondly, the measure of the firm's reinvestments. As Bratton and McCahery (2015) researched that in the first years after IPO of the PE owned companies' wealth is distributed at the expense of future profits. The measures follow the expenditures of the company towards their own operations or development. Therefore, the measures of Capital Expenditures (CAPEX) on Total Assets and Sales are used to look for the investment intensity of the sample companies in their own firm (Lerner et al., 2011)

Table 4 - Engineering Ratios

Type of Engineering	Measures	Ratios
Operational Engineering	Operating Cash Flow margin	OCF/Sales
	Operating Cash Flow to Total Assets	OCF/TA
Reinvestments	CAPEX to Total Assets	CAPEX/TA
	CAPEX to Sales	CAPEX/Sales
Profitability	Cash to Sales	FCF/Sales
	Return on Total Assets	EBIT/TA
	EBIT margin	EBIT/Sales
Financial Engineering	Cash Management	FCF/TA

The third measure accounts for the profitability of a company (Mian & Rosenfield 1993; Datta et al., 2013). The RLBO group should have higher profitability ratios as the unproductive assets are eliminated (Kovenock & Phillips, 1997; Datta et al., 2013). The ratios used for this measure are the Free Cash Flow (FCF) divided by Sales, Earnings Before Interest (EBIT) divided by Total Assets and Sales. The Free Cash Flow is a profitability measure which emerges from the differences between EBITDA, amortization and

depreciation, change in working capital, CAPEX and interest payments (Jensen, 1989). EBIT excludes tax and interest measurements and is therefore a suitable measure considering RLBOs as they have previously taken advantage of the tax shield. After RLBO the larger debt amount is written off (DeGeorge & Zeckhauser, 1993).

The last measure is financial engineering or financial restructuring (Datta et al., 2013). In this formula the FCF is divided by the total assets. The cash management is stringent throughout the private period, as it will be used to pay off debt. Previous literature has shown that the ratio remains the same after RLBO, however this will be discussed in the results section 5.

An important aspect to highlight regards account performances as these can be subject to differences in the use by companies. Meaning that the use of accounting performances leads to different ways of reporting certain measures in their quarterly or yearly reports. The report is GAAP adjusted, but still can vary from firm to firm. The aforementioned EBIT, EBITDA, CAPEX, FCF and Sales of the RLBO sample are compared to their industry-adjusted peer market index companies in a difference in difference (DiD) analysis. A difference in difference analysis will be used over a matching method as matching underestimates the causal effect of the analysis. The DiD is used to uncover a selection bias by estimating treatments effects within the chosen data set. As a symmetric DiD is tested on the sample, the DiD performs better than matching and hence the selection effect is small (Chabé-Ferret, 2015). This will be discussed in section 5.5 robustness check.

5 Results

In the results section all the hypotheses are summed in the same order as earlier mentioned. At every hypothesis the stock and accounting performances of the sample towards their benchmarks are stated. The benchmark used for the stock performance are the geographical peer market indices. For the accounting performances, industry-adjusted market peer companies are used as benchmark. To highlight, the stock performances findings show means and medians, the accounting performances only present medians. On stock performances a t-test and Wilcoxon sign test is performed and a Wilcoxon sing test is performed on the medians of the accounting performances.

5.1 Long vs. Short-Term Performance

In the first hypothesis, the short (12-24) -and long-term (36-60) performance of the sample is compared. Table 6 shows the event-time stock performances of the sample.

Table 6 - Event-Time Stock Performance

The sample consists of 490 RLBO companies between 2000 and 2018. The return measures buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the table. The means and medians (p50) for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The return measures are benchmarked against respective geographical market peer indices S&P500 and MSCI Europe. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. Statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months		24 Months		36 Months		48 Months		60 Months	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
BHR	12.18***	8.98***	10.66***	0.38	20.55***	2.78	36.80***	7.54	46.26***	12.25***
BHAR	8.04***	4.45*	6.04***	-2.83	11.91***	-0.31	23.66***	4.71	29.98***	5.89
AR	1.43***	1.16***	1.78***	1.40***	1.73***	1.31***	1.36***	1.09***	1.31***	1.09***
JALPHA	0.54***	0.85***	0.23***	0.37***	0.47***	0.60***	0.71***	0.86***	0.62***	0.68***

Firstly, the BHR shows a mean statistical significance of 1% over all periods and outperforms peer geographical market indices. The median also shows statistical in the first period. The performance increases after the 24-months period and at the 60-months period a return of 46.26% is reported. At mean BHR level the long-term outperforms the short term.

Secondly, the BHAR shows statistical significance at a 1% level over all periods and outperforms peer geographical market indices. A decline is shown after the first period, but a steep increase after the third period. The long-term mean performance repeatedly outperforms the short-term. On the one hand, these findings are opposite to the findings of DeGeorge and Zeckhauser (1993) where only short-term outperformance is observed. On the other hand, these findings are in line with prior research of Cao and Lerner (2009) and Datta et al. (2013), but a larger outperformance is shown in this research.

Thirdly, the AR shows statistical significance at a 1% level over all periods and outperforms peer geographical market indices. A fluctuating trend is observed in the mean and median performance with a decreasing positive return between 0.32% and 0.62%. Furthermore, these results are extensive to the research of Holthausen and Larcker (1996), who only found outperformance for the first four years.

Lastly, the results of the sample adjusted CAPM formula with output return Jensen's Alpha. The alpha shows a slight outperformance at all periods in time between 0.23% and 0.71% statistically significant at a 1% level.

The second part of the hypothesis tests the different accounting performances of the sample against industry-adjusted market peers. The account performances are measured in different ratios, which are earlier mentioned in table 4. In appendix C in table 7, the industry-adjusted accounting performances for every 12-months period are presented. At t=0 the performance of the accounting ratios starts and is then measured for every 12, 24, 36, 48 and 60 months. Firstly, operational engineering (OCF/TA, OCF/Sales). Nearly all means and medians show statistical significance at a 1% level over the whole time period of 60 months. OCF/TA shows an average outperformance of their industry peers from the second to the fourth year. With this the operational efficiency that the PE firms add to their companies is uncovered. However, in the first and the last year, the industry peers were not outperformed. The means do not show statistical significance, but the medians do show statistical significance at a 1% level. These medians do not outperform the industry peers and hence the results are mixed. Considering the OCF/Sales, the operating cashflow margin from the sample to the benchmark is tested. An outperformance at every year over the period to their industry peers is shown at a 1% significance level. For instance, at the 12 months period the sample outperforms their industry peers by 4.25%. Moreover, this translates into a 4.25% higher operating cashflow margin than their respective industry peers. With this measure, the added-value of PE companies towards their portfolio companies is shown in terms of operational efficiency. This finding confirms Acharya et al. (2013) who stated outperformance on an operating level, but contradicts the results of DeGeorge and Zeckhauser (1993) that the RLBO firms underperform on operating level after IPO.

Secondly, the reinvestments of the firm measured by CAPEX/TA and CAPEX/Sales show similar performance for means and medians. The results show a slight underperformance by the sample between zero and two percent. The ratios show an increase over time with a slight average outperformance at the 60-months period, however not statistically significant. The results are opposite to the findings of Mian and Rosenfield (1993) who present a higher investment performance with respect to their peers. Until the 48-months period, all means show statistical significance at a 1% level. In extend, the medians show statistical significance at a 1% level.

Thirdly, profitability ratios EBIT/TA, EBIT/Sales and FCF/Sales show underperformance of the benchmark to their industry peers. EBIT/TA which reflects the return on total assets shows an underperformance between two and four percent over the whole period at a 1% significant level. For example, the average 36-months sample performs

1.9% worse than their industry benchmark. The EBIT/Sales ratio, which is the EBIT margin, shows underperformance, but at an increasing level. At the 12-months period the sample underperforms 1.49% at a 1% significant level, but at the 60-months period the underperformance is only 0.82%. The EBIT margin is lower for these companies and hence the new listing bias (Barber & Lyon, 1997) could be confirmed.

However, the latter is not significantly different from zero. Therefore, the profitability on the long-run improves. However, considering the benchmark, no outperformance for profitability ratios is uncovered which is in line with the research of DeGeorge and Zeckhauser (1993) and Cao and Lerner (2009). However, the results contradict Holthausen and Larcker (1996) and Datta et al. (2013) who have found outperformance on a profitability level.

Lastly, financial engineering measured through the FCF/TA which presents the cash management of the sample firms. Over all periods, the means and medians are statistically significant at a 1% level. The free cashflow to total assets rises over the period with 2.58%. The results are in line with the research of Datta et al. (2013). Therefore, the cash position of the company increases, but the sample shows no outperformance to industry-adjusted peers.

Thus, the results present support of the first hypothesis for the stock and accounting performances as the long-term consistently shows an excess return over the short-term for all measures. In extend, the findings show that the RLBOs outperform the peer market indices for stock performances suggesting an added-value of PE companies. Concerning the new listing bias, on a stock performance level, the newly added firms at the 12-months period do not underperform to their geographical index market peers. However, for accounting performances the reinvestments, profitability and financial engineering at the 12-months period do perform worse than industry-adjusted market peer companies. Hence, the bias is rejected on a stock performance level, but finds support on an accounting performance level.

5.2 Flip vs. No Flip

The second hypothesis tests the difference between the short (12-24-months) and long (more than 24 months) holding periods by PE firms. In table 8 the stock performances per holding period are presented.

Table 8 - Event-Time Stock Performance by Flip

The sample consists of 490 RLBO companies between 2000 and 2018. The return measures buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the table. The means and medians (p50) for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The return measures are benchmarked against respective geographical market peer indices S&P500 and MSCI Europe. The sample is divided between Flip and No Flip with the difference between groups stated in panel C. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months		24 Months		36 Months		48 Months		60 Months	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
Panel A:										
Flip										
BHR	7.72***	2.19	3.41	-5.31	10.38	-4.25	14.60*	-15.07	21.78***	-4.22
BHAR	5.73	-0.08	5.06	-12.05	9.71	-7.47	13.15*	-5.82	19.70***	-10.37
AR	-0.09	-0.74	0.40	0.17	0.30	-0.24	0.37	-0.09	-0.12	-1.26
JALPHA	0.39	0.52*	0.27	-0.03	0.66***	0.58***	0.84***	0.99***	0.69***	0.68***
Panel B:										
No Flip										
BHR	14.05***	10.34	13.33***	4.72	23.66***	9.91	44.04***	15.52	55.17***	19.76
BHAR	9.03***	6.07	5.98***	0.44	11.95***	1.69	26.55***	10.21	33.05***	9.94
AR	2.01***	1.54	2.26***	1.76	2.20***	1.59	1.64***	1.17	1.74***	1.30
JALPHA	0.62***	1.01*	0.22*	0.43	0.39***	0.62***	0.65***	0.77***	0.59***	0.72***
Panel C:										
No Flip-Flip										
BHR	6.33	8.14	9.92	10.04	13.28	14.16	29.44***	30.58	33.39***	23.98
BHAR	3.30	6.15	0.92	12.49	2.24	9.16	13.40	16.03	13.35	20.31
AR	2.10***	2.28	1.86***	1.60	1.90***	1.83	1.27	1.26	1.86*	2.56
JALPHA	0.23	0.49	-0.05	0.46	-0.26	0.05	-0.20	-0.22	-0.11	0.05

Firstly, the BHR in panel C shows excess performance to their geographical index peers over the whole period, but only shows median statistical significance from the 48-months period and mean 60-months period. The means of the sample firms which were not flipped outperform the firms with a short holding period between 6.33% and 33.39%. Also, the medians show excess returns over the flipped firms, but no statistical significance.

Secondly, the BHAR in panel C shows excess returns from the longer to the shorter holding period firms at an increasing rate, excluding the 24-months period. The BHAR has no statistical significance for means and medians.

Thirdly, AR in panel C is statistically significant at the 12-, 24- and 36-months period with a mean 2.1%, 1.86% and 1.9% excess return. This shows that also the short-term performance of these flipped companies is no better than that of the non-flipped companies and this confirms the research of Cumming and MacIntosh (2006). In extend, the research of Cao and Lerner (2009) also accounts for these results, but they only used a holding period of

one year until IPO. Therefore, this research cannot fully accept their results, as different holding periods were used. The mean excess returns do not change significantly towards the 60-months period, where at this period a statistically significant outperformance at the 10% level is found of 1.86%.

Lastly, Jensen's Alpha in panel C shows different results. At the 12-months period there is a slight excess return and outperformance to their geographical market indices, but the mean decreases. Therefore, from the 24-months period there is no excess return for the longer holding period, but for the shorter holding period. Although almost all Jensen's Alphas in panel A and B show statistical significance, in panel C the Alphas show no statistical significance at the means and medians.

The accounting performances of this hypothesis are shown in table 9 in appendix C**.** The table is again divided between panel A and B for Flip and No Flip. The different measures of the accounting performances are used to investigate the findings. Firstly, the operational engineering through OCF/TA and OCF/Sales. The operating cashflow to total assets shows an excess performance in medians for the shorter holding period. Moreover, the OCF/TA at every period in time is higher for the shorter holding period than the longer holding period. The operational accounting performances do not outperform industry-adjusted market peers, excluding the 36 -and 48-months period for the Flip. However, these results do not show statistical significance. The OCF/Sales shows outperformance for the shorter holding period at all periods in time with statistical significance up until the 60-months period. The shorter holding period has an excess return over the longer holding period at all points in time. These results on operational engineering state the short-term efficiency gains that PE has added towards these flipped companies. These findings contrast Cumming and MacIntosh (2006). They stated that the short-term holding periods will not create long-term value on an operating level. These findings show short- and long-term operating gains for the shorter holding period. The results are in line with prior research of Datta et al. (2013). They also found short-term operating efficiency for the flipped companies.

Secondly, the reinvestments with respect to CAPEX on total assets and sales. Both ratios do not outperform their industry-adjusted peers, and all show statistical significance of at least the 10% level. The longer holding period companies outperform the shorter period companies for the 12- and 24-months period for sales and total assets. From the 36-months period to the 60-months period the flipped companies show higher accounting ratios than the longer holding period companies towards their industry-adjusted peer market companies.

Moreover, after 36 months the flipped companies invest more in their own firm creating a higher ratio. These results are in line with the earlier mentioned gains in operational engineering at the same period.

Thirdly, the profitability ratios (FCF/Sales, EBIT/TA and EBIT/Sales). The ratios are higher for the flipped firms than for the non-flipped firms over all periods, but do not outperform their industry market peers. In extend, the operating cashflow is statistically significant at a 1% level for all periods excluding the 48 -and 60-months periods for the flipped firms. The operating margin through EBIT/Sales shows a similar trend for the flipped and non-flipped companies. Over the period the margin rises between 0.85% for the non-flipped firms and 1% for the flipped firms. In the paper of Harford and Kolasinski (2014) the flipped firms created short-term profitability, but these findings also suggest long-term profitability.

Lastly, the financial engineering measure of FCF/TA, which is statistically significant at a 1% level over all periods. Again, the flipped companies perform better than the non-flipped companies, whereby both groups show increasing rates. Therefore, the cash management is better at the flipped companies, but both show increasing ratios.

All in all, the findings show support for the second hypothesis on a stock performance level where the flipped firms perform worse on different return levels, except Jensen's Alpha. In extend, for the stock performance of BHR at the 48- and 60-months periods and for the AR measure at the 12-, 24-, 36- and 60-months periods. On the contrary, the accounting measures show outperformance for the flipped over the non-flipped firms at all periods. Therefore, based on the accounting performance, the second hypothesis is rejected.

5.3 Interest Rates

In this section the test results of the tests on the third hypothesis are presented. In table 10 the stock performances by the two groups are presented. The first group (Panel A) shows the four different return measures for the sample where at that period in time the interest rate was lower than sample period average. In the second group (Panel B) the return measures for the sample where at that period of time, the interest rate was above sample period average. Panel C presents the excess returns of panel B minus panel A.

Table 10 - Event-Time Stock Performance by Interest Rate

The sample consists of 490 RLBO companies between 2000 and 2018. The return measures buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the table. The means and medians (p50) for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The return measures are benchmarked against respective geographical market peer indices S&P500 and MSCI Europe. The sample is divided between below average interest rate and above average interest rate with the difference between groups stated in panel C. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months		24 Months		36 Months		48 Months		60 Months	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
Panel A:										
Interest Below										
BHR	11.97***	8.92***	10.50***	2.69	23.59***	12.07	45.44***	21.21***	57.48***	23.55***
BHAR	5.66***	3.31	1.03	-2.81	5.92	-2.62	19.04***	1.49	24.01***	-9.62
AR	1.77***	1.42***	1.93***	1.42***	2.00***	1.47***	1.49***	1.18***	1.71***	1.37***
JALPHA	0.40***	0.75***	-0.01	0.25	0.18*	0.32***	0.34***	0.42***	0.25***	0.31*
Panel B:										
Interest Above										
BHR	12.34***	9.30***	10.08*	-0.34	14.49***	-9.04	23.31***	-5.76***	32.24***	4.13***
BHAR	11.64***	4.96	12.79***	-3.96	18.77***	1.66	26.96***	7.84	34.35***	15.50
AR	0.75	0.33***	1.34*	1.20***	1.17	0.68***	0.99	0.52***	0.64	0.67***
JALPHA	0.78***	0.88***	0.59***	0.77	0.88***	1.02***	1.15***	1.15***	1.00***	1.24*
Panel C:										
Above-Below										
BHR	0.38	0.38	-0.42	-3.03	-9.10	-21.12	-22.13***	-26.97	-25.24*	-19.42
BHAR	5.98	1.65	11.75***	-1.15	12.85*	4.29	7.91	6.35	10.34	25.11
AR	-1.02	-1.09	-0.59	-0.23	-0.83	-0.79	-0.50	-0.67	-1.07	-0.70
JALPHA	0.38	0.13	0.60***	0.52	0.69***	0.69	0.81***	0.73	0.75***	0.93

Firstly, the BHR in panel C shows an excess return for the means in the first period. However, this finding is not statistically significant. The mean excess return flips from the 24-months period and increases towards the 60-months period. The BHR at the 60-months period excess return is 25.24% for the period below average interest rate. Moreover, this finding is statistically significant at a 10% level. These findings are in line with the aforementioned research of Sharpe and Suarez (2020) which states that when interest rates are low investments in general increase and hence the performance goes up.

Secondly, the mean BHAR in panel C for the above interest rate average period exceeds the below average interest rate period for all periods. The mean 24- and 36-months BHAR show statistical significance at 1% and 10% levels. Therefore, the return using the BHAR was significantly higher for these periods when interest rates were higher than average in the sample period.

Thirdly, the AR in panel C shows outperformance of the below interest rate period (Panel A), but no statistical significance.

Lastly, Jensen's Alpha in panel C shows similar results to the BHR and BHAR. The above interest rate period outperforms the below interest rate group for all periods in means and medians. From the 24-months period the mean performances are all statistically significant at a 1% level outperforming their peer group, but also the geographical peer market indices. These findings are in line with Acharya et al. (2007) and Yung et al. (2008), who have shown that during hot markets when interest rates are higher, the outperformance is higher. Moreover, considering Jensen's Alpha where the CAPM is applied in an adapted model to the sample, these prior findings are confirmed.

On an accounting level, the industry-adjusted performances of the sample to their respective benchmark companies are investigated. In table 11 in appendix C**,** these measures are translated into ratios. Panel A shows the interest below period and panel B shows the interest rate above period. Firstly, the operational engineering is tested. The OCF/TA for panel A shows no outperformance over time to their industry-adjusted market peers and is at all periods in time statistically significant at a 1% level. In panel B this ratio does show outperformance to their industry market peers, but only significant at the 36- and 48-months periods at 1% and 10% levels. Therefore, the above interest rate period shows better performance for the sample companies. The operational efficiency increases for both groups until the 48-months period, but decreases at the 60-months period.

Secondly, the reinvestment ratios through CAPEX on total assets and sales. Both ratios show statistical significance at a 1% level over all periods in time, excluding the 60-months CAPEX/Sales of panel B. The measures underperform with respect to the market industry peers at rates between 0.7% and 1.96%. These findings suggest contradictive results to prior research of Graham and Harvey (2001). They have shown in a survey of CFOs that their investments are insensitive to interest rate changes, however both periods show underperformance and changes over time. The qualitative results from their research are contradictive to the results of this research. A possible explanation for this could be that the CFO sample was biased to CFOs of larger companies in terms of size. Hence, this could explain the opposite results.

Thirdly, the profitability of the two groups is tested. For FCF/Sales the 12 -and 24-months period of panel A shows higher profitability ratios with respect to their industry-adjusted peer companies than panel B at a statistically significant 1% level. Moreover, this is not accounted for in the other two profitability ratios (EBIT/TA, EBIT/Sales). This would imply that only the operating margin is higher for these companies during the first two

periods, but the common profitability ratios are not. The increase in profitability ratios is higher for panel B than Panel A with 0.77%, 0.93% and 3.78% against 2.36%, 0.49% and 0.95%.

Lastly, the financial engineering ratio by FCF/TA. All results show statistical significance at a 1% level. The cash management through this ratio is again better for the above interest rate period than the below interest rate period. The increase over time for both groups is also higher for panel B.

To sum, for both the stock and accounting performances the third hypothesis is rejected. The below interest rate period does not show an excess return over the above interest rate period.

5.4 USA vs. EU

In the last hypothesis the difference between USA and EU RLBOs is tested. In table 12 panel A shows the results of EU performance and panel B shows USA performance. In panel C, the results of panel B minus panel A are presented.

Table 12 - Event-Time Stock Performance by USA - EU

The sample consists of 490 RLBO companies between 2000 and 2018. The return measures buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the table. The means and medians (p50) for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The return measures are benchmarked against respective geographical market peer indices S&P500 and MSCI Europe. The sample is divided between sample companies out of USA and Europe with the difference between groups stated in panel C. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months		24 Months		36 Months		48 Months		60 Months	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
Panel A:										
EU										
BHR	6.97***	2.15	6.34	-2.63	12.82***	-1.13	29.52***	8.30	33.65***	5.00
BHAR	6.77***	3.93	10.38***	2.51	16.43***	4.38	29.05***	13.09***	34.89***	15.27
AR	0.70	-0.11	0.96*	0.61*	0.76	0.47	0.06	0.30	-0.03	0.41
JALPHA	0.52***	0.68***	0.30*	0.43***	0.56***	0.60***	0.72***	0.72***	0.63***	0.66***
Panel B:										
USA										
BHR	15.69***	11.37	13.71***	6.90	26.11***	10.44	42.15***	5.39	55.48***	22.42
BHAR	8.89***	4.88	2.97	-7.66	8.66*	-5.69	19.68***	-5.00***	26.39***	-8.04
AR	1.92***	1.60	2.35***	2.29*	2.43***	2.04	2.32***	2.29	2.29***	2.04
JALPHA	0.55***	0.88***	0.19	0.28***	0.41***	0.59***	0.69***	0.91***	0.62***	0.73***
Panel C:										
USA-EU										
BHR	8.73***	9.21	7.37	9.52	13.28*	11.57	12.63	-2.92	21.82	17.42
BHAR	2.12	0.96	-7.41	-10.17	-7.78	-10.07	-9.37	-18.09	-8.50	-23.31
AR	1.22	1.71	1.40*	1.68	1.66***	1.57	2.26***	1.99	2.32***	1.63
JALPHA	0.04	0.20	-0.10	-0.15	-0.15	-0.01	-0.03	0.19	-0.01	0.07

Firstly, in panel C the BHR over all periods shows a mean and median outperformance for USA and both groups outperform their geographical peer market indices. Only at the 48-months period EU outperforms USA. However, looking at the statistical significance of the results, the 12-months and 36-months means are statistically significant at 1% and 10% levels. These findings are in support of the prior research of Brecht (2015) which indicated that the USA capital market provides a favorable climate for companies.

Secondly, the BHAR in panel C shows different results over time. To highlight, EU outperform the USA from the 24-months period to the 60-months period for both the means and medians. Although the results in panel B do show significance for the different groups at an individual level, the BHAR excess results were not significant. There is no statistical support for the alternative fourth hypothesis.

Thirdly, the AR in panel C shows outperformance to the peer market indices and outperformance of USA over EU at mean and median level. In the period from 24 to 60-months the findings are statistically significant from with 10% and 1% levels. Moreover, over time these excess returns increase steadily. Renneboog and Vansteenkiste (2017) found positive results for the USA, but they did not want to extrapolate to EU. These findings suggest an added value to their research.

Lastly, in panel C Jensen's Alpha shows changing results. USA outperforms EU for the 12-months period, but underperforms until the 60-months mean period. The medians of the 48 -and 60-months periods show outperformance for USA. All results are statistically insignificant.

In appendix C, table 13 the industry-adjusted accounting performances of EU (panel A) and USA (panel B) are shown. The different accounting measures which are translated into ratios are discussed. Firstly, the operational engineering through OCF to total assets and sales. The OCF/TA shows no outperformance to their industry-adjusted peer companies. For panel A the ratio increases with 1.49% over time. However, the findings are only statistically significant from the 12 to 36-months period at 10% and 1% levels. For panel B only the 12- and 60-months period show statistical significance at a 1% level. The USA finds excess return up until the 48-months period, then it switches to EU. The OCF/Sales shows excess returns for EU over USA for the 12-, 24- and 36-months periods, but not statistically significant. At the 48-months period, EU outperforms market adjusted industry peers and USA with 0.13% at a 1% statistical significance level.

Secondly, the reinvestments by ratios CAPEX/TA and CAPEX/Sales. The CAPEX to total assets presents statistical significance at a 1% level over all periods for both groups. The groups do not outperform industry-adjusted market peers. Both groups show similar results with a slight outperformance of USA. The CAPEX to sales shows similar results for both groups over time with a 1% statistical significance.

Thirdly, the profitability ratios between the groups shows no outperformance to industry-adjusted peer companies. EBIT/TA highlights European outperformance until the 60-months period with statistical significance of 1%. For the EBIT/Sales ratio EU outperforms USA for the 12- and 48-months periods and are statistically significant at a 1% level. On the other periods the USA outperforms. The FCF/Sales do not outperform industry-adjusted peer companies. Over time, USA shows a larger increase in ratio than EU with 3.49% vs. 1.21%. Only after the first year EU shows excess return with 1.38% and is statistically significant at a 1% level. These results are in line with prior research of MacArthur (2020) which also indicated a slight outperformance for the USA over the EU with respect to profitability ratios. These findings contradict for the 48-months period where EU shows excess return in the sum profitability.

Lastly, the financial engineering measured by cash management. The ratio is statistically significant over all periods at a 1% level. EU shows excess return for the 12-months period. From the 24-months on USA has excess return over EU where the trend increases at a higher rate.

All in all, the findings in general support the fourth hypothesis for the outperformance of USA over EU. With the exception of the operational efficiency and profitability at the 48-months period.

5.5 Robustness Checks

In this section three robustness check are discussed. In the first robustness check, the size factor is added to the regression to account for stock performance differences between RLBOs and their benchmarks (Lu & White, 2014). The sample is checked for size between the sample companies for the 12- and 60-months periods based on total assets and sales. The sample is divided into small cap, mid cap and large cap stocks (companies). The second robustness check is similar to the first, but based on accounting performances. Table 14

presents the event-time stock performance by continuing RLBOs for stock performance size check.

Table 14 - Event-Time Stock Performance by Size

The sample consists of 490 RLBO companies between 2000 and 2018. The return measures buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the columns of the table. The means and medians (p50) for the periods 12 -and 60-months are stated in the rows divided per small -, mid -and large cap stocks for both periods. The return measures are benchmarked against respective geographical market peer indices S&P500 and MSCI Europe. The sample is divided between below average interest rate and above average interest rate with the difference between groups stated in panel C. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	BHR		BHAR		Abnormal Returns		Jensen's Alpha	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50
Panel A:								
12 months								
Small- cap stocks	12.59***	0.86	7.712*	-3.369	0.611	0.873	0.351	0.105
Mid-cap stocks	12.64***	8.60	12.547***	7.897*	0.571	-0.415	0.832***	0.837***
Large-cap stocks	9.52***	6.06***	7.023***	8.136***	2.162***	1.653*	0.657***	1.070***
Panel B:								
60 months								
Small-cap stocks	26.74***	-4.72	22.943*	-13.845	0.060	0.828	0.583***	0.364***
Mid-cap stocks	33.62***	-0.67	25.453***	-3.166	1.417	0.889	0.667***	0.547***
Large-cap stocks	60.73***	43.52***	48.202***	34.938***	0.794	0.870	0.728***	0.985***

In the last robustness check, a difference in difference (DiD) regression is executed to thoroughly research the relation between the accounting performances of the sample on an industry level. In extend, this DiD is added as a regressor (Lu & White, 2014) and uses the different industry types as splits between the accounting performances for the 12- and 60-months periods. In table 14 the event-time stock performance results checked on size are presented. Firstly, the BHR shows statistical significance for both periods at all different groups. Again, the means outperform their geographical peer market indices. At the 12-months period, the small- and medium-cap stocks show similar results as in table 14. The large-cap stocks perform little worse than the sample mean BHR at the 12-months period. At the 60-months period, the small- and medium-cap stocks perform worse, but the large-cap stocks perform better.

Secondly, the mean BHAR shows similar results as the BHR, also in terms of significance with 10% and 1% levels. At the 12-months period the small- and large-cap stocks show similar results as the sample 12-months BHAR performance, but the mid-cap stocks perform better. At the 60-months period, the small- and mid-cap stocks perform worse than sample mean BHAR, however the large-cap stocks perform better.

Thirdly, the AR measure shows mean outperformance to geographical industry market peers at all size levels over the different periods in time. In extend, only the large-cap stocks at the 12-month period shows statistical significance at a 1% level. After checking for size, at the 12-months period the small- and mid-cap stocks perform worse than sample mean

AR. At the 60-months period, the mid-cap stocks show similar results as the sample mean AR.

Lastly, Jensen's Alpha shows mean statistical significance at a 1% level, excluding the 12-month small-cap stocks. All observations outperform their geographical peer market indices. At the 12-months period, the small-cap stocks underperform sample mean alpha, but the mid- and large-cap stocks perform slightly better. In the 60-months period, the same results are shown between groups.

Overall, the large-cap stocks affect the sample average returns. Over different periods in time, the large-cap stocks perform better than the small-cap stocks. This is in line with prior research of Cao and Lerner (2009) who have also accounted on size and found similar results.

In appendix D in table 16 industry-adjusted accounting performances are checked for robustness by size and are checked against table 7 in appendix C. In panel A the 12-months medians are presented for the different account ratios at the different size levels.

First, the operational engineering ratios OCF/TA and OCF/Sales. The operating cashflow to assets shows an outperformance on the small-cap level to their industry-adjusted peer market companies of 0.16%, but not statistically significant. The large-cap stocks show a relatively high underperformance of 4.9% to their industry-adjusted market peers which is statistically significant at a 1% level. The results of the large-cap stocks, which have a relatively higher total assets than the other two groups, would indicate that their capital expenditures are lower than their industry peer companies. The operating cashflow margin in the 12-months period show an outperformance for the small- and large-cap stocks, but also an underperformance on the mid-cap stocks. The medians are all insignificant.

Secondly, the reinvestment measures. The ratio CAPEX to Sales shows the industry-adjusted means, which are all statistically significant at a 10% level for the small-cap stocks and at a 1% level for the mid- and large-cap stocks. Important to highlight is the in-sample difference between small- and mid-cap stocks for the 12-months period. The mid-cap shows a higher underperformance of 2.34% than the small-cap 1.71% to their respective industry market companies.

Thirdly, the profitability ratios EBIT/TA, EBIT/Sales and FCF/Sales, which are all statistically significant at 10% and 1% levels. Moreover, these findings show that the small-cap stocks have the least underperformance to their industry market peers. Statistically insignificant for EBIT/TA, but statistically significant at a 10% level for EBIT/Sales. The

mid- and large-cap stocks underperform relative to their industry peers and show statistical significance at a 1% level. In panel B the 60-months period accounting ratios are shown. Here, the ratio of OCF/TA is outperforming with 0.21%, but again not statistically significant. Whereas the OCF/TA ratio underperforms, the OCF/Sales ratio at the large-cap level exceeds their industry market peers with 2.98%. The result is not statistically significant.

Lastly, the financial engineering ratio. All observations are statistically significant, excluding the small-cap 60-months stocks. The small-cap stocks show the largest increase over time with 4.65%. These companies increasingly learn how to better manage their cash position and as a result show better performance than the two larger groups over time. The findings are in line with previously presented results.

To sum, the small-cap stocks show positive size check results for the CAPEX/Sales, CAPEX/TA and EBIT/Sales at the 12-months period. The operating and financial ratios perform better at the 12-months period. The EBIT/Sales and FCF/Sales perform worse than the results in table 7. The accounting level size check presents positive results for the mid-cap stocks in OCF/TA as operational measures, CAPEX/TA as reinvestment measure, EBIT/Sales and FCF/Sales as profitability measure. The large-cap stocks show a slightly higher performance at the median level, though not statistically significant on all observations. Moreover, CAPEX/TA, EBIT/Sales, EBIT/TA at the 12-months period show similar results for the size check at the 12-month period. At the 60-months period, only the CAPEX/TA remains consistent. However, the results do provide somewhat changing results, although not statistically significantly different from the previous presented results.

The DiD regression is presented in appendix D in table 17. As aforementioned, the regression was performed on accounting performances of the sample against benchmark companies. In panel A the 12-months period versus peer market companies is presented. In panel B 48-months period versus peer market companies is presented. The differences between these two groups are then regressed resulting into panel C.

Firstly, the operational engineering or efficiency. Although panel A and B shows multiple statistically significant observations, panel C shows none for OCF/TA and OCF/Sales. Nevertheless, interpreting the results in different industries show positive excess performance over market peer companies during the sample period. To highlight, the telecommunications industry in the sample outperforms by 4.98% and 3.58% in operating

efficiency. Also, the financial companies in the sample show positive results with 1.9% and 3.8% gains in efficiency over their market peer companies.

Secondly, the reinvestments measure through ratios CAPEX/TA and CAPEX/Sales. CAPEX/TA shows statistically significant results for Basic Materials, Consumer Goods, Consumer services, Financials and Oil and Gas at 10% and 1% levels. Moreover, these observations all show outperformance. For the CAPEX to sales, only the Technology shows statistical significance at a 10% level. This industry outperforms with 2.24% over time.

Thirdly, profitability ratios show no statistical significance. However, some remarkable returns are made by Oil and Gas and Technology. These also outperform market peer companies.

Lastly, the financial engineering measure, which shows statistical significance for three industries. The Consumer Services segment outperforms market peer companies with 2.81% over time with a significance level of 1%. Furthermore, Financials and Oil and Gas outperform as well with respectively 2.09% and 2.98% with statistical significance of 10%. The results are robust in general to size and industry.

6 Conclusion

As aforementioned, this thesis can be supportive for investors, regulators, PE firms and their portfolio companies as macro and micro economic levels are investigated and tested.
This research focused on uncovering the added-value of private equity firms for their portfolio companies measured after going public through an IPO. The added-value is measured through abnormal returns against the geographical peer market indices on a stock performance level and against industry-adjusted market peer companies on an accounting performance level. A sample of 490 RLBOs is used over a time period of 2000-2018. To explore whether PE firms create abnormal returns for RLBO stocks four hypotheses are tested. The research extends the existing literature by the quick flip firms and the interest rate periods to uncover new evidence for the outperformance of RLBOs over geographical peer market indices and industry-adjusted peer market companies.

At the first hypothesis the outperformance of the long (3-5 years) versus short-term (1-2 years) of the sample is tested. On a stock performance level, long-term (3-5 years) outperforms short-term (1-2 years) and thus support is found at all different return measures. In addition, outperformance of all years against respective geographical market indices is also found. On an accounting performance level, the four different measures are tested using the accounting ratios. The operating performance of the sample generally outperforms industry-adjusted market peer companies. Moreover, these results are contradictory to the findings of DeGeorge and Zeckhauser (1993) who found operational underperformance. The reinvestment ratios are higher for the long-term than the short-term but show no outperformance until the 60-months period over industry-adjusted market peer companies. The financial engineering and profitability measures are negative at an increasingly positive rate, but again no industry-adjusted market peer outperformance. Hence, on a stock performance level, the results support the first hypothesis. For the accounting performances, there is support for the first hypothesis, but only outperformance to industry-adjusted market peer companies on an operational level. Private equity firms do add-value for a stock performance level and an operational accounting level.

The second hypothesis is used to test whether RLBO stocks perform better when the private holding period of PE firms is long (more than 2 years) as opposed to short (two years or less) In extend, the hypothesis tests for outperformance of the long versus the short holding

period. On a stock performance level, the return measures show an outperformance for the long holding period compared to the short holding period Also, the results show outperformance of the sample over the geographical peer market indices. Only Jensen's Alpha shows underperformance after the 12-months period. On an accounting performance level, in general, the operational performance measures show positive performance at an increasing rate over time. The reinvestment and financial engineering ratios increase over time but show no industry-adjusted outperformance. The profitability ratio for the short-term period is lower than the long holding period showing outperformance over time. The results of this statistical test are in contrast to the earlier findings of Harford and Kolasinski (2014) who only found short-term profitability for the short holding period firms. A potential explanation for this difference is that this research extends as it also found long-term profitability. Overall, the results are in line with previous research that firms who are held for a shorter period of time by PE companies show worse performance than firms who are held for a longer period. This indicates that the operational efficiency that PE firms complement to their portfolio companies is a specific skillset that can be added either in a longer and shorter period of time.

The third hypothesis tests the performance of RLBO stocks during different periods of lending interest rates. Moreover, the hypothesis states that RLBO stocks perform better when the interest rates are higher than the average for the sample period. Acharya et al. (2007) and Yung et al. (2008) found that there was higher outperformance during the period where the interest rate was higher than average. The stock performance of the sample shows results in line with the prior research with an exception for the return BHR. The BHR shows outperformance during lower-than-average interest rates, which is in support of Sharpe and Suarez (2020). This indicates that the investment increase and this positively affects the stock performances during the period. The accounting performance measures show somewhat similar results. The operational engineering shows outperformance for the above interest rate period over the industry-adjusted peer market companies as the lower interest rate period. Moreover, this suggests that during a period with higher-than-average interest rates, PE firms can add substantial operating value to their portfolio companies where they outperform all others. For the measures reinvestments, profitability and financial engineering, the findings show underperformance at an increasing rate over industry-adjusted peer market companies. As the above interest rate period still outperforms the below interest rate period for the accounting performances, the findings are in support of the third hypothesis.

The fourth hypothesis concerns the American versus the European RLBO stocks. Theory suggests that USA X outperforms EU X and explains that the USA has a preferable investment climate with respect to the capital market (Renneboog & Vansteenkiste, 2017). At the stock performance level, the results show that USA outperform EU on the different return measures. Although EU RLBO stocks also outperform geographical peer market indices, which contradicts the MacArthur (2020) research report, USA RLBO stocks shows superior performance. Hence, the aforementioned preferable market conditions with respect to debt financing and corporate lending still create higher returns for USA RLBOs over EU RLBOs. On an accounting performance level, the operational engineering shows outperformance for the operating margin. Moreover, this is against EU and industry-adjusted market companies. So, this indicates that PE firms can provide operational efficiency for their portfolio companies over the short -and long-term. All the other accounting measures shows negative results over their industry-adjusted peer market companies at a positive increasing rate.

The results of this study are subject to a number of biases. The biases discussed in this research are the selection, new listing, rebalancing, skewness and measurement bias. Firstly, this study accounts for selection bias using a difference-in-difference regression analysis to uncover the selection effects that investors have. These results are in line with the other tested hypotheses after splitting into industries and two different time levels and thus this study does not suffer from a selection bias. Secondly, the new listing bias is rejected on a stock performance level, but confirmed for the accounting performance level. Thirdly, as aforementioned this study deals with the rebalancing bias by using monthly data for market indices over daily data because of the inflation effects on indices. Fourthly, the skewness bias is tested and shows indeed positive skewness for the population mean and thus this study is subject to this bias. Lastly, the measurement bias implies a bias in predicting return measurements. This measurement bias is more prone within the CAR than the BHAR and hence the BHAR is used to overcome this bias.

All in all, the results of this study suggest significant abnormal returns on a stock performance level over all hypotheses against the geographical market indices. Therefore, the stock performance level does suggest an added-value by PE companies for their portfolio companies measured after IPO. On the accounting performance level, only consistent favorable results to the research question are found in general on an operational engineering level. Implying an added-value that these firms have for efficiently restructuring processes

within these firms. For the other measures, no abnormal returns over industry-adjusted peer market companies can be concluded.

7 Limitations and Future Research

In the process of this research limitations presented themselves. However, also these limitations can be seen as future research possibilities. Firstly, the limitations of this research will be mentioned. Secondly, the possible future research recommendations will be highlighted as recommendations to the limitations and beyond. Important to highlight is that some limitations are different types of research and therefore not limit current research as such, but could add different perspectives.

This study has three distinct limitations. Firstly, the methodology has explained the reasons for using the BHR over the CAR. As previous research favors BHR, CAR could also provide some advantages. Barber and Lyon (1997) provide an advantage of the CAR. They state that the CAR can be used in the Fama French 3 Factor model.

Secondly, in the research of Cao and Lerner (2009) the methodology of excess returns (by BHR, BHAR and Jensen's Alpha) on the respective market indices is similar. However, they also add a group of non-RLBOs or other-IPOs. Therefore, the research is limited with respect to the use of benchmarks.

Thirdly, as the PE industry includes a lot of private information, this limits the data leading to a reduction of the sample.

The future research possibilities are also presented in line with the aforementioned limitations. Firstly, regarding the Fama French 3 Factor model, within this model, the sample is also accounted for differences between small, median and large sizes of the sample. Thus, the high and low book-to-market values and small minus big factors could be added. This might give a more accurate representation of the companies within the RLBO sample. However, through the robustness checks that are executed, almost all of the aforementioned has been checked. Nevertheless, a separate formula within the hypotheses can be seen as a possibility for future research.

Secondly, a grouping of other IPOs could have explained more of the performance of the total IPO market and the relative time-series performance. For future research a portfolio

selection of other IPOs could be constructed in order to get a more representative picture of the IPO (RLBO) market as a whole.

Thirdly, the data was thoroughly constructed from a large sample. The RLBO sample is accurate and checked after the criteria mentioned in table 1. Focusing on the stock performance of the sample the RLBOs are listed, but a part is also delisted. The delisting can have several reasons. The company can be merged, taken private again or gone into bankruptcy. The sample has been adapted for the bankrupt companies.

When a listed company is announced in a merger, the target company has positive announcement effects (Goergen & Renneboog, 2004). Therefore, in some of the last trading months of these target companies, large increase in stock performance might positively influence the sample as a whole, creating an announcement bias on some companies within the sample. By excluding the outliers in this sample these announcement effects can be accounted for.

This can be uncovered from the data, but should be carefully checked in order to make a strong statement. Moreover, considering the aforementioned process, when listed companies acquire other targets, which are surely also within the sample, announcement effects have a negative stock price effect on the buyer (Goergen & Renneboog, 2004). Therefore, for future research the highly up- and downward price fluctuations could be checked.

Lastly, a recommendation regarding the study as a whole. As aforementioned, there is little information available on the private holding period of Private Equity firms. An interesting research method could be to combine qualitative and quantitative research. For instance, the Dutch Union of Participation Parties could be contacted, being the broader union of PE firms. By directly contacting the PE firms, information could be gathered on the different performance measures considered to be highly important when reconstructing the company before going public. Therefore, a clearer picture is provided on how PE firms add value to their portfolio companies.

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Appendices

A Data Description

Table 3D – Accounting Summary Descriptives

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures EBIT, CAPEX, OCF, FCF, Sales and TA are presented in the rows. The mean, median (p50), standard deviation (SD), minimum monthly return value (Min), maximum monthly return value (Max), skewness (Skew) and kurtosis (Kurt) are presented in the columns of the table.

Variable	Mean	p50	SD	Min	Max	Skew.	Kurt.
EBIT	102.907.205	37.503.000	627.632.351	-7.823.000.000	16.529.000.000	16.59	382.44
CAPEX	79.629.247	17.176.000	549.580.832	-8.229.000	1.624.000.000	24.29	654.57
OCF	208.758.038	74.248.000	1.453.789.966	-7.701.600.000	60.116.223.000	29.24	1.096.63
FCF	120.357.187	41.051.500	564.087.659	-3.901.677.000	13.258.000.000	15.95	315.76
Sales	1.229.345.435	511.806.000	2.460.606.730	0.000	33.222.000.000	5.97	51.04
TA	2.270.689.254	664.971.000	12.794.907.221	1.000.000	324.139.000.000	20.10	451.03

Figure 1: BHR Distribution

The sample consists of 490 sample companies between 2000 and 2018. The huy-and-hold return (BHR) is calculated over a 60-months period after IPO. The figure shows positive skewness of 2.73 and a high kurtosis of 14.64. The sample is non-normally distributed with a fat right tail.

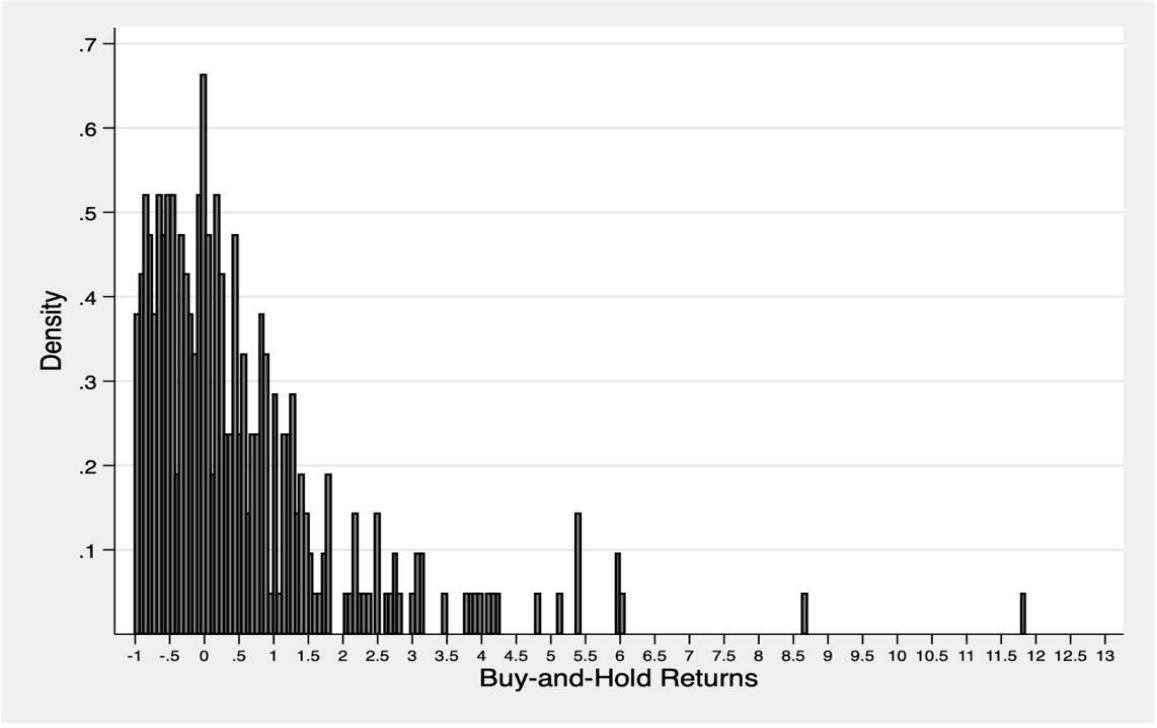

Figure 2: Abnormal Return Distribution

The sample consists of 490 sample companies between 2000 and 2018. The abnormal return (AR) is calculated over a 60-months period after IPO. The figure shows positive skewness of 1.6 and a high kurtosis of 24.34. The sample is non-normally distributed with a slightly fatter right tail.

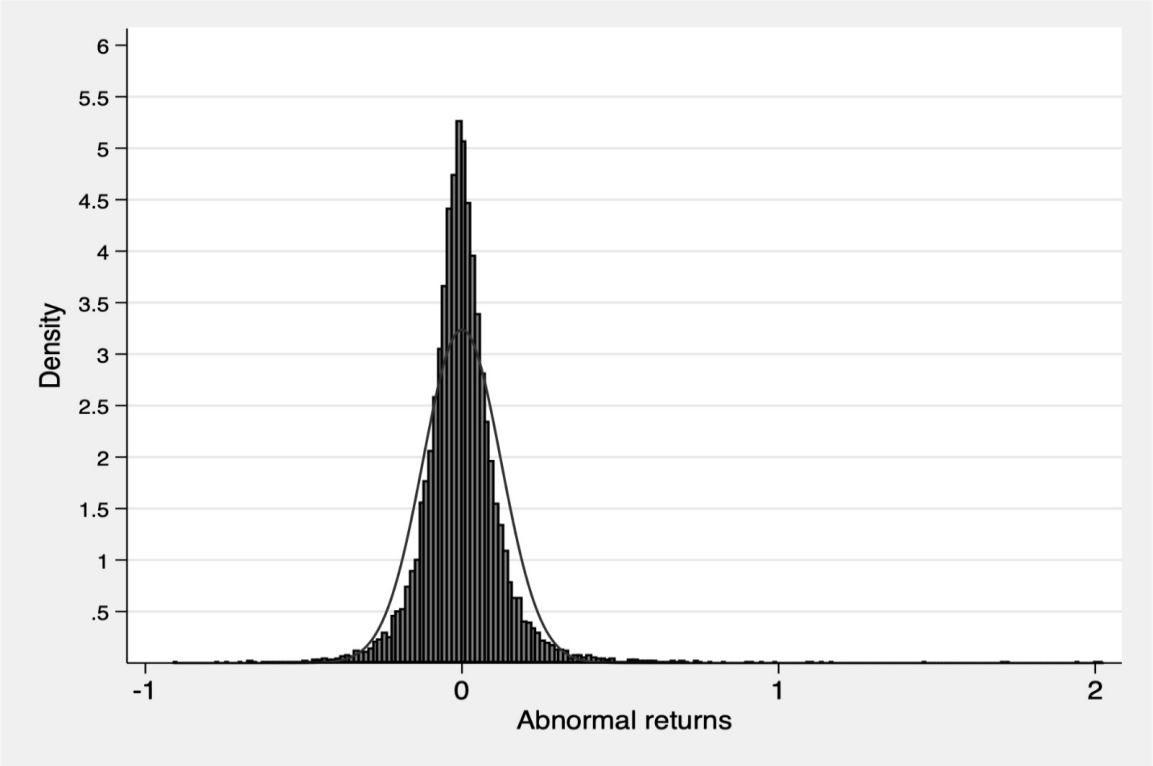

Table 2A - Sample Distribution by Year

The sample consists 490 RLBO companies between 2000-2018. In the table the summary count per year is shown. At every year the number of deals per year, the geographical area of origin, the Flip (short holding period under two years by PE company of a portfolio company), NoFlip (longer than two year holding period by PE company of a portfolio company, the below average interest rate of geographical OECD or ECB lending rate on a long-term loan and the above average of geographical OECD or ECB lending rate on a long-term loan.

	No. deals	US	EU	Flip	NoFlip	Interest Below	Interest Above
2000	16	11	5	6	10	0	16
2001	11	8	3	5	6	0	11
2002	18	11	7	3	15	0	18
2003	10	10	0	5	5	0	10
2004	26	21	5	6	20	0	26
2005	38	27	11	13	25	0	38
2006	45	25	20	23	22	0	45
2007	37	14	23	19	18	0	37
2008	2	2	0	0	2	0	2
2009	9	9	0	1	8	9	0
2010	27	18	9	4	23	27	0
2011	21	11	10	6	15	21	0
2012	23	21	2	5	18	23	0
2013	49	33	16	12	37	49	0
2014	55	30	25	15	40	55	0
2015	34	20	14	7	27	34	0
2016	25	10	15	3	22	25	0
2017	42	15	27	17	25	17	0
2018	2	1	1	0	2	2	0
All	490	297	193	150	340	262	228

Table 2B – Sample Distribution by Industry

The sample consists 490 RLBO companies between 2000-2018. In the table the summary count per industry is shown. The industries are chosen following the GICS classification of industries. At every industry type the number of deals per year, the geographical area of origin, the Flip (short holding period under two years by PE company of a portfolio company), NoFlip (longer than two year holding period by PE company of a portfolio company, the below average interest rate of geographical OECD or ECB lending rate on a long-term loan and the above average of geographical OECD or ECB lending rate on a long-term loan.

	No. deals	US	EU	Flip	No Flip	Interest Below	Interest Above
Basic Materials	18	10	8	7	11	9	9
Consumer Goods	94	56	38	29	65	43	51
Consumer Services	86	57	29	21	65	33	53
Financials	44	28	16	19	25	30	14
Healthcare	43	24	19	13	30	28	15
Industrials	84	43	41	22	62	45	39
Oil and Gas	45	36	9	15	30	30	15
Technology	52	27	25	15	37	30	22
Telecommunications	24	16	8	10	14	14	10
All	490	297	193	150	340	262	228

B Stock Performances

Table 14 - Event-Time Stock Performance by Continuing RLBOs

The sample consists of 354 RLBO companies between 2000 and 2018. The return measures buy-and-hold return (BHR), buy-and-hold abnormal return (BHAR), abnormal return (AR) and Jensen's Alpha (JALPHA) are presented in the columns of the table. The means and medians for the periods 12 -and 60-months are stated in the rows divided per total sample, NoFlip, Flip, Interest Below, Interest Above, USA and EU for both periods. The return measures are benchmarked against respective geographical market peer indices S&P500 and MSCI Europe. The sample is divided between below average interest rate and above average interest rate with the difference between groups stated in panel C. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	BHR		BHAR		Abnormal Returns		Jensen's Alpha	
	Mean	p50	Mean	p50	Mean	p50	Mean	p50
Panel A:								
12 months								
Total Sample	12.18***	8.98***	8.04***	4.45*	1.43***	1.17***	0.54***	0.85***
NoFlip	14.05***	10.34***	9.03***	6.07***	2.01***	1.54***	0.62***	1.01***
Flip	7.72***	2.19	5.73	-0.08	-0.09	-0.74	0.39	0.52*
Interest Below	11.97***	8.92***	5.66***	3.31	1.77***	1.42***	0.40***	0.75***
Interest Above	12.34***	9.30*	11.64***	4.96	0.75	0.33	0.78***	0.88***
USA	15.69***	11.37***	8.89***	4.88	1.92***	1.60***	0.55***	0.88***
EU	6.97***	2.15	6.77***	3.93	0.70	-0.11	0.52***	0.68***
Panel B:								
60 months								
Total Sample	46.26***	12.25***	29.98***	5.89	1.31***	1.09***	0.62***	0.68***
NoFlip	55.17***	19.76***	33.05***	9.94	1.74***	1.30***	0.59***	0.72***
Flip	21.78***	-4.22	19.70***	-10.37	-0.12	-1.26	0.69***	0.68***
Interest Below	57.48***	23.55***	24.01***	-9.62	1.71***	1.37***	0.25***	0.31*
Interest Above	32.24***	4.13	34.35***	15.50	0.64	0.67	1.00***	1.24***
USA	55.48***	22.42***	26.39***	-8.04	2.29***	2.04***	0.62***	0.73***
EU	33.65***	5.00	34.89***	15.27	-0.03	0.41	0.63***	0.66***

C Accounting Performances

Table 5 - Unadjusted Accounting Performances

The sample consists of 490 RLBO companies between 2000 and 2018. The unadjusted accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the table. The means and medians (p50) for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The accounting measures are benchmarked against respective market peer companies from the S&P500 and MSCI Europe. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

t	12 Months		24 Months		36 Months		48 Months		60 Months	
Ratio	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
EBIT/TA	5.68	5.83	7.90	6.32	7.34	6.67	8.39	7.48	7.22	7.82
EBIT/SALES	-5.61	6.86	2.07	7.93	-0.39	7.73	10.68	8.66	9.96	9.10
OCF/TA	11.41	10.23	14.35	11.96	13.92	11.97	14.36	13.30	61.03	13.02
OCF/SALES	6.37	12.88	8.86	15.10	11.46	15.30	21.92	16.17	19.02	15.30
CAPEX/TA	4.39	2.23	4.23	2.43	4.20	2.59	4.45	2.72	4.76	2.91
CAPEX/SALES	15.65	2.73	10.91	2.81	10.61	2.76	8.64	2.95	10.01	3.05
FCF/TA	4.88	5.11	6.71	5.54	6.87	5.95	7.32	6.50	8.08	7.64
FCF/SALES	-4.43	6.51	5.63	7.34	0.61	7.43	9.57	7.86	11.88	8.67

Table 7 - Industry-adjusted Accounting Performances

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the table. The means and medians (p50) for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The accounting measures are benchmarked against respective industry-adjusted market peer companies from the S&P500 and MSCI Europe. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

t	12 Months		24 Months		36 Months		48 Months		60 Months	
Ratio	Mean	p50	Mean	p50	Mean	p50	Mean	p50	Mean	p50
EBIT/TA	-2.77***	-4.24***	-1.64***	-3.17***	-1.90***	-3.23***	-1.44***	-2.24***	-2.33***	-1.89***
EBIT/SALES	-1.49***	-3.55***	-0.17	-2.26***	-0.80*	-3.14***	-0.16	-2.84***	-0.82	-2.45***
OCF/TA	-0.56	-2.98***	2.64***	-1.30***	0.97	-1.78***	1.89***	-0.52	-0.94	-1.78***
OCF/SALES	4.25***	-0.18	8.55***	1.85***	5.08***	1.27	7.08***	2.26***	2.68***	-0.10
CAPEX/TA	-0.96***	-1.79***	-0.72***	-1.34***	-0.38***	-1.14***	-0.24	-1.20***	0.06	-1.02***
CAPEX/SALES	-1.04***	-1.84***	-0.61*	-1.48***	-0.91***	-1.38***	-1.02***	-1.24***	0.21	-0.99***
FCF/TA	-4.64***	-5.15***	-3.62***	-4.62***	-3.12***	-3.91***	-2.68***	-3.25***	-2.06***	-2.23***
FCF/SALES	-3.66***	-4.75***	-2.63***	-3.65***	-2.31***	-3.07***	-2.20***	-2.74***	-1.09***	-2.52***

Table 9 - Industry-adjusted Accounting Performances by Holding Period

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the table. The medians for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The accounting measures are benchmarked against respective industry-adjusted market peer companies from the S&P500 and MSCI Europe. The group is split for Flip and No Flip sample companies. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months Industry-Adjusted Median	24 Months Industry-Adjusted Median	36 Months Industry-Adjusted Median	48 Months Industry-Adjusted Median	60 Months Industry-Adjusted Median
Panel A:					
Flip					
EBIT/TA	-2.66***	-1.50*	-2.51***	-1.67***	-1.28***
EBIT/SALES	-1.94	-2.04***	-2.50***	-1.55	-0.94*
OCF/TA	-2.39***	-0.09	0.95	0.96	-0.45
OCF/SALES	2.29*	3.93***	4.74***	3.93***	1.60
CAPEX/TA	-1.89***	-1.44***	-1.05***	-0.84***	-0.88*
CAPEX/SALES	-1.96***	-1.42***	-1.25***	-1.13***	-0.52*
FCF/TA	-4.71***	-3.88***	-3.14***	-2.53***	-1.49***
FCF/SALES	-4.11***	-2.26***	-2.24***	-2.43	-0.70
Panel B:					
No Flip					
EBIT_TA	-4.42***	-3.69***	-3.38***	-2.70***	-2.08***
EBIT_SALES	-3.89***	-2.43***	-3.51***	-3.42***	-3.01***
OCF_TA	-3.45***	-1.56***	-2.77***	-0.81	-2.14***
OCF_SALES	-1.76	1.16	0.07	1.28*	-0.33
CAPEX_TA	-1.79***	-1.32***	-1.17***	-1.30***	-1.12***
CAPEX_SALES	-1.82***	-1.49***	-1.40***	-1.39***	-1.24***
FCF_TA	-5.47***	-4.74***	-4.12***	-3.44***	-2.57***
FCF_SALES	-5.05***	-3.96***	-3.60***	-2.95***	-3.27***

Table 11 - Industry-adjusted Accounting Performances by Interest

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the table. The medians for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The accounting measures are benchmarked against respective industry-adjusted market peer companies from the S&P500 and MSCI Europe. The group is split for below average interest rate and above average interest rate sample companies. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months Industry-Adjusted Median	24 Months Industry-Adjusted Median	36 Months Industry-Adjusted Median	48 Months Industry-Adjusted Median	60 Months Industry-Adjusted Median
Panel A:					
Interest Below					
EBIT/TA	-5.19***	-4.11***	-3.76***	-3.00***	-2.86***
EBIT/SALES	-4.20***	-3.14***	-4.04***	-3.49***	-3.71***
OCF/TA	-4.71***	-2.87***	-3.53***	-1.72***	-2.85***
OCF/SALES	-1.25	1.90	0.30	2.63***	-0.07
CAPEX/TA	-1.96***	-1.52***	-1.26***	-1.36***	-1.06***
CAPEX/SALES	-1.85***	-1.49***	-1.61***	-1.61***	-1.63***
FCF/TA	-5.23***	-5.02***	-4.21***	-3.99***	-2.56***
FCF/SALES	-4.24***	-3.09***	-3.96***	-3.34***	-3.29***
Panel B:					
Interest Above					
EBIT_TA	-1.46*	-1.15	-1.95***	-0.76*	-0.69
EBIT_SALES	-2.40***	-1.69***	-2.44***	-1.57	-1.47*
OCF_TA	-0.05	1.85	3.61***	2.85*	0.18
OCF_SALES	1.20	1.71***	2.33*	1.80***	-0.21
CAPEX_TA	-1.39***	-1.24***	-0.96***	-0.70***	-0.89***
CAPEX_SALES	-1.79***	-1.46***	-1.20***	-0.91***	-0.37
FCF_TA	-5.01***	-3.20***	-3.19***	-2.21***	-1.33***
FCF_SALES	-5.38***	-3.82***	-2.24***	-2.62***	-1.60*

Table 13 - Industry-adjusted Accounting Performances by US-EU

The sample consists of 490 RLBO companies between 2000 and 2018. The accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the table. The medians for the periods 12 -, 24 -, 36 -, 48 -and 60-months are stated in the columns. The accounting measures are benchmarked against respective industry-adjusted market peer companies from the S&P500 and MSCI Europe. The group is split for Europe (EU) and USA sample companies. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	12 Months Industry-Adjusted Median	24 Months Industry-Adjusted Median	36 Months Industry-Adjusted Median	48 Months Industry-Adjusted Median	60 Months Industry-Adjusted Median
Panel A:					
EU					
EBIT/TA	-4.24***	-2.91***	-3.07***	-1.32***	-2.01***
EBIT/SALES	-3.49***	-2.95***	-3.46***	-2.78***	-3.09***
OCF/TA	-2.99***	-2.65*	-2.37***	-0.33	-1.50
OCF/SALES	-0.03	0.50	0.83	2.39***	0.02
CAPEX/TA	-1.79***	-1.34***	-1.02***	-1.35***	-1.06***
CAPEX/SALES	-1.78***	-1.67***	-1.53***	-1.38***	-1.41***
FCF/TA	-4.24***	-4.17***	-3.62***	-2.81***	-2.07***
FCF/SALES	-4.10***	-3.88***	-4.44***	-3.43***	-2.89***
Panel B:					
USA					
EBIT/TA	-4.17***	-3.60***	-3.29***	-2.78***	-1.66***
EBIT/SALES	-3.59***	-2.01***	-2.75***	-2.85***	-1.71***
OCF/TA	-2.82***	-0.43	-1.67	-0.67	-1.82***
OCF/SALES	-0.51	2.80***	1.72	2.26***	-0.16
CAPEX/TA	-1.80***	-1.33***	-1.23***	-0.99***	-0.92***
CAPEX/SALES	-1.85***	-1.44***	-1.36***	-1.20***	-0.73***
FCF/TA	-5.96***	-4.77***	-3.91***	-3.45***	-2.31***
FCF/SALES	-5.48***	-3.35***	-2.35***	-2.42***	-1.99***

D Robustness Check

Table 16 - Industry-adjusted Accounting Performances by Size

The sample consists of 354 RLBO companies between 2000 and 2018. The accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the table. The medians for the periods 12 -and 60-months are stated in the rows divided per small -, mid -and large cap stocks for both periods. The accounting measures are benchmarked against respective industry-adjusted market peer companies from the S&P500 and MSCI Europe. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	EBIT/TA Industry-Adjusted Median	EBIT/SALES Industry-Adjusted Median	OCF/TA Industry-Adjusted Median	OCF/SALES Industry-Adjusted Median	CAPEX/TA Industry-Adjusted Median	CAPEX/SALES Industry-Adjusted Median	FCF/TA Industry-Adjusted Median	FCF/SALES Industry-Adjusted Median
Panel A:								
12 months								
Small-cap stocks	-0.02	-2.60*	0.16	1.95	-1.39	-1.71*	-5.75***	-6.58***
Mid-cap stocks	-2.61***	-3.55***	-2.15	-1.58	-1.74***	-2.34***	-4.76***	-5.33***
Large-cap stocks	-4.84***	-2.91***	-4.69***	1.78	-1.89***	-1.25***	-4.58***	-2.57***
Panel B:								
60 months								
Small-cap stocks	-0.25	-1.91	0.21	-1.10	-0.19	-0.49	-1.10	-2.49*
Mid-cap stocks	-1.32***	-2.94***	-2.70	-0.96	-1.31***	-1.65***	-2.66***	-3.56***
Large-cap stocks	-3.06***	-1.47	-3.70***	2.98	-1.34***	-0.69***	-3.24***	-1.98*

Table 17 - Accounting Performance Difference-in-Difference (Industry-Time)

The sample consists of 354 RLBO companies between 2000 and 2018. The accounting measures operational engineering (OCF/TA and OCF/Sales), reinvestments (CAPEX/TA and CAPEX/Sales), profitability (EBIT/TA, EBIT/Sales and OCF/Sales) and financial engineering (FCF/TA) are presented in the columns of the table. The medians for the periods 12 -and 60-months are stated in the rows divided per industry. The accounting measures are benchmarked against respective industry-adjusted market peer companies from the S&P500 and MSCI Europe. In panel C the groups differences are presented by the difference-in-difference regression. The results of the t-test are represented by p-values which are shown by the stars next to the numbers in the tables. The Wilcoxon sign test uses the medians of the firms to test for differences between the samples. As aforementioned, these stars represent statistical significance levels of 1% (***), 5% (**) and 10% (*) or no significance.

	EBIT/TA Median	EBIT/SALES Median	OCF/TA Median	OCF/SALES Median	CAPEX/TA Median	CAPEX/SALES Median	FCF/TA Median	FCF/SALES Median
Panel A: 12 Months vs. Market								
Basic Materials	2.93*	1.19	5.00***	4.21*	-1.91***	-4.77***	-0.93	-4.45***
Consumer Goods	-2.06***	-3.49***	1.91	0.57	-1.52***	-2.90***	-2.71***	-3.61***
Consumer Services	-6.64***	-4.63***	-2.88*	-0.05	-0.06	2.38***	-4.62***	-2.79*
Financials	2.94***	-4.77***	2.51	10.31***	-0.01	-2.62***	1.91***	-0.08
Healthcare	-4.89***	-5.51***	0.02	3.28*	-0.50	0.05	-4.28***	-4.17***
Industrials	-1.35*	-5.37***	-0.52	1.95*	-2.54***	-8.37***	-2.25***	-8.46***
Oil and Gas	-2.39	0.94	2.41	10.17***	-1.22	4.14	-3.50***	0.40
Technology	-3.65***	-6.49***	0.66	3.96***	-0.78	-2.54***	-4.95***	-9.16***
Telecommunications	-2.26	-4.79	-1.54	9.22***	-1.11	-0.74	-4.26***	-8.13***
Panel B: 60 Months vs. Market								
Basic Materials	-0.53	-3.98*	5.92***	5.11***	-0.01	-2.60*	-2.25*	-4.87***
Consumer Goods	-1.36*	-3.25***	1.99*	1.28	-0.18	-1.46***	1.31***	-3.60***
Consumer Services	-5.56***	-7.78***	-4.00***	-2.25*	1.20***	1.75***	1.82***	-2.38***
Financials	3.91***	-5.69***	4.40***	14.11***	0.77***	-0.68	3.99***	-3.47*
Healthcare	-3.64***	-8.57***	-0.69	1.49	-0.04	-0.57	2.32***	-7.42***
Industrials	-0.97	-6.92***	0.57	1.84*	-1.74***	-7.51***	1.57***	-9.01***
Oil and Gas	-0.03	4.69*	3.55***	11.85***	0.90	6.57***	-0.52	4.86***
Technology	-1.20	-4.87***	0.73	3.29***	0.07	-0.30	3.15***	-6.51***
Telecommunications	-0.72	-3.44	3.44	12.80***	-1.47*	0.44	2.76***	-6.93***
Panel C: Difference in Difference								
Basic Materials	-3.46	-5.17	0.92	0.90	1.90*	2.17	-1.32	-0.42
Consumer Goods	0.70	0.23	0.08	0.71	1.34***	1.44	1.40	0.02
Consumer Services	1.09	-3.15	-1.12	-2.21	1.26*	-0.63	2.81***	0.41
Financials	0.97	-0.93	1.90	3.80	0.78*	1.94	2.09*	-3.40
Healthcare	1.24	-3.06	-0.72	-1.79	0.47	-0.63	1.95	-3.25
Industrials	0.38	-1.55	1.09	-0.10	0.80	0.86	0.68	-0.55
Oil and Gas	2.36	3.75	1.14	1.67	2.11*	2.43	2.98*	4.46
Technology	2.44	1.61	0.08	-0.66	0.84	2.24*	1.80	2.65
Telecommunications	1.53	1.35	4.98	3.58	-0.36	1.19	1.50	1.19