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# Performance Dependency of Secondary Buyouts on Primary Buyouts

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## Abstract

Secondary buyouts (SBOs) represent more than 50 percent of the total private equity (PE) buyout activities. However, in academia and practise, a potential underperformance of SBOs compared to primary buyouts (PBOs) is discussed. Therefore, it is all the more important to further understand how the value in SBOs is driven and what makes a potential SBO attractive to look at in a due diligence process. This paper describes the dependency of SBOs on the preceding PBOs based on a dataset of 295 PBOs with their consecutive SBOs. It analyses the impact of the performance of a portfolio company during a PBO on the performance of the following SBO and derives value drivers and their influence on the SBO. Based on the performance of the value drivers during the PBO five criteria are identified for a pre-selection of SBOs. There is not a single perfect strategy for all SBOs, but the value drivers during the SBO differ strongly depending on the identified selection criteria. Generally, general partners (GPs) do not only use complimentary skillsets, i.e. they do something completely different across buyout rounds. Additionally, they work on similar value drivers but with a different focus than the previous investor, i.e. they work differently on similar areas of improvement.

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# 1 Introduction

After the downturn of the private equity (PE) market during the global financial crisis PE is growing significantly ever since. PE funds are getting bigger and large amounts of committed money is available. This success however, puts general partners (GPs) in a conflict. On the one hand, GPs are facing a shortage of attractive investment targets. On the other hand, GPs are forced to exit their portfolio companies within the lifespan of the tendered fund. Due to this market design, secondary buyouts (SBOs) seem to represent a solution to the scarcity of investment opportunities as their share of total buyouts is steadily growing. SBOs are leveraged buyouts (LBOs) in which one PE investor sells his portfolio company to another PE investor. As shown in Figure 1, the share of the SBO transaction volume on the total PE transaction volume grew since 2010 and reaches 52 percent in 2018, both in the EU and the US market.

During an LBO the PE investor creates value by using financial and operational engineering. After the closing the deal, the agenda of GPs is to optimise the portfolio company with respect to short-term and mid-term time horizons. Thus at first glance, a second investor should not be able to achieve abnormal investment returns as the value creation potential is already captured by the first PE investor (e.g. [Jenkinson & Sousa \(2015\)](#), [Wang \(2012\)](#), [Bonini \(2015\)](#)). However, PE investors may decide to acquire companies directly from other financial investors. There are several attempts on explaining the investment rational of SBOs. For example [Jenkinson & Sousa \(2015\)](#) mention complimentary skill sets of the GPs, time pressure to sell the portfolio company early, marketing the successful sale of portfolio companies for future fund raising and usage of favourable debt market conditions as possible explanations. Another used argument is that both the primary buyout (PBO) and the SBO are successful as the organisational structure of PE is superior to non-PE organisational structures ([Jensen \(1989\)](#)) and, thus, SBOs may still provide sufficient returns to investors. Nevertheless, the dependency between the two buyout rounds may further prove the advantages of SBOs. These analyses may provide criteria on how to achieve successful SBOs.

Following these findings, we provide empirical guidance for investing into successful SBO investments. First, we analyse the value drivers in PBOs and SBOs to understand how the total value creation is composed and whether value is driven differently amongst the individual buyout rounds. Second, after the identification of value drivers, we are able to study dependencies of value drivers across the buyout rounds. Do any value drivers during the PBO have an impact on the value creation during the SBO? Answering this question leads to certain characteristics that are favourable for the engagement in an SBO, thus identifying selection criteria for potentially successful SBOs. Third, once selection criteria are identified, a GP needs to understand what to focus on during the SBO based on the development during the PBO. Thus, we analyse the value drivers dependent on the identified selection criteria.

We find that the value drivers differ among buyout rounds. PBO investors primarily focus on company growth, profitability improvement, and boosting innovation to create value. In contrast, SBO investor focus more on increasing profitability and efficiency gains. We are able to identify five selection criteria for target selection that drive value creation during the SBO.

Companies with a lower value creation during the PBO compared to its close peers are generally preferred for SBOs. On the one hand, portfolio companies with a great company growth and profitability development, in terms of EBITDA margin, are favoured. On the other hand, good SBO targets demonstrate weak efficiency during the PBO and, consequently, also an inferior development of return on assets compared to its close peers. The value drivers dependent on these selection criteria differ quite substantially. We confirm the findings of [Jenkinson & Sousa \(2015\)](#) that complimentary skill sets exist, i.e. that GPs focus on something completely different across buyout rounds. Exemplary, the SBO investor improves profitability after the PBO investor has focussed on company growth. However, we also find that this is not the only way to create value in SBOs. SBO investors also do something similar as the previous PBO investor but with a different approach than the PBO investor. For example, the PBO investor works on profitability by improving the EBITDA margin, whereas the SBO investors also focusses on profitability but rather works on the improvement of return on assets. However, an SBO investor does not simply apply the same mechanics as was done during the PBO.

This paper contributes to the literature in the following ways. Most studies about PE performance and SBO performance consider PBO and SBO autonomously (e.g. [Achleitner & Figge \(2014\)](#), [Degeorge et al. \(2016\)](#)). In our opinion, for a rigorous analysis it is crucial to consider two consecutive deals rather than any two independent deals because the dependencies are measured between two back-to-back buyouts rather than individual, independent buyouts. Otherwise the underlying data may suffer from a random selection of individual PBOs and SBOs. To our knowledge, only [Bonini \(2015\)](#) analyses the operating performance of two sequential deals and aims to find reasons for investing into consecutive private equity transactions. This paper does not suffer as much from selection bias as others. By using both public data providers and private data from a large fund of fund manager, we make sure that unsuccessful PE deals are also included. Furthermore, the full length of the holding period of back-to-back buyouts is considered. Most importantly, based on fundamental data it is the first paper that identifies selection criteria and company profiles that are suitable for successful SBOs. We are able to give advice on what to do during SBOs dependent on the individual selection criteria to make the buyout successful.

This paper is structured as follows. The following chapter describes the dataset and its preparation in detail. Chapter three presents the summary statistics of the dataset. The following three chapters explain the hypotheses of the three consecutive research questions, the underlying methodology for the analyses, and present the empirical findings of this study. Finally, the conclusion can be found in the last chapter.

## 2 Data Sample

### 2.1 Explanation of the Data Sample, the Peer Group and the Underlying Variables

Many studies about PE, and especially about SBOs, face tremendous problems gathering sufficient observations for reasonable analyses. Firstly, compared to other transactions, PE deals cover relatively fewer deals. Secondly, many PE transactions are taken privately, which does not require the financial investor to disclose financial information in many countries. Thirdly, due to the construction of PE and the underlying holding periods of portfolio companies, many transactions during the last few years cannot be considered as the financial investor has not yet exited the investment. This is especially critical for our study as we use two consecutive PE deals and thus we can only consider PBOs with an early exit. Lastly, data providers are strongly dependent on financial investors publishing the news of acquiring and exiting their investment, which is also not always the case.

Our original dataset consists of PE portfolio companies, which are located in the United Kingdom (UK). The UK is a very active PE market and, therefore, provides a significant amount of observations. In contrast to the USA, most of the companies in the UK need to publish their full financial accounts, which enables operative analyses on a more detailed level.

We used several data providers to retrieve an initial list of all buyouts that are labelled as “secondary buyout” and “financial buyout”. These data were collected from Capital IQ, Thomson Reuters Eikon, Prequin, Mergermarket and private information from a large fund of fund manager. The list of SBOs includes the names of the portfolio companies that the PE companies invested in and the date of the investment entry and most of the time the investment exit. We eliminated all buyouts that are in fact tertiary buyouts or any other financial buyouts that occurred after the SBO. Most data providers start the portfolio company search in 1996 and companies need at least one year to publish their financial accounts in a timely manner. Therefore, the portfolio companies had their PBO no earlier than 1996 and their SBO exit no later than 2017. We chose those dates as the time horizon needs to be as large as possible to guarantee a sufficient number of observations. Per definition of the consecutive deal analysis, the PBO investment exit date is equal to the SBO investment entry date. After matching for company keys and company name, only few companies had the full date information for the first transaction date (at PBO entry), for the second transaction date (at PBO exit/at SBO entry), and for the third transaction date (at SBO exit). However, for most companies at least one out of the three dates was still missing. Thus, we hand-collected the missing dates, if available, from the financial investor’s websites or other official transaction publications.

We then retrieved accounting information for the underlying portfolio companies for the fiscal years which are the closest to the first, second, and third transaction date, respectively. On the one hand, collecting data only for the fiscal year before the entry date and for the fiscal year after the exit date covers the full time span of the deal but if the entry date and the respective fiscal year are too far apart major early improvements of the GP may not be

recognized in the analysis. On the other hand, collecting data for the fiscal year after the entry date and for the fiscal year before the exit date may not cover the full value creation of the specific buyout. We assume that using the closest fiscal year to the transaction date provides the lowest bias possible. For most private companies in the UK, only the balance sheet and the P&L are published and for some rarer cases the cash flow statement is also published. The reason to track both of those financial statement's items is to combine the static view of the balance sheet with operative, dynamic measures of the P&L statement. Furthermore, we retrieved the number of fulltime employees if available. Table 1 provides an overview of all the retrieved financial information. Ideally 23 variables and ratios have been retrieved, however, that strongly depends on the availability and depth of the financial information. Even if not the full information were available the observation was kept in the sample. Multicollinearity for the observed variables should not be a problem as can be inferred from the low correlations in Table 2.

- Table 1 about here -

The final sample consists of 295 companies. We were able to collect accounting data at the three transaction dates within the setting of consecutive PE deals. This means that we collected information about 590 investments, thus having access to a maximum of 885 transactions per variable. Obviously due to the depth of the available information the number of observations for individual variables may differ significantly.

- Table 2 about here -

As explained in the following section a peer group is needed for both calculating the relevant performance measures and the valuation of our sample companies. The peer group consists of public companies from the UK and the USA. Obviously for our UK sample it is reasonable to use a UK peer group. Due to the fact that we apply an accurate matching procedure over a large time horizon, our potential peer group needs to be very large. The peer group's quality can be improved by enlarging the dataset with other countries that share similar investment characteristics. Especially for bigger companies, such as buyout companies, other countries that share a similar investment market should suffice for an improved comparison (Schreiner (2009)). The American market should therefore serve well as an enlargement of the UK peer group as the PE markets are quite similar. We used Compustat database to retrieve data for all companies that were listed from 1996 to 2017 on the UK and US equity markets. Additionally, we were able to retrieve the same accounting information as for the sample firms.

## 2.2 Preparation of the Dataset

### 2.2.1 Valuation of Sample Companies

The analysis aims to identify the value drivers of the intrinsic value creation. Thus, the equity valuation needs to be considered. For several reasons, we chose to value the equity of our sample companies ourselves by using multiple valuation techniques. For most PE transactions the deal

values are not published or at least the value at either entry or exit is missing. Only using those deals, for which deal values are available, would decrease the total number of observations drastically. From our point of view the pricing of transaction values is determined by many factors that do not directly inherit the private equity core activity. Such factors include price influencers, e.g. negotiation skills of the PE firms ([Achleitner et al. \(2011\)](#)) or random shifts in the demand and supply of potential target companies. In fact, we have been trying to isolate the operational value creation and thus created a fair market value of the sample's companies using public market data. We assumed that the success of a buyout is a combination of several drivers and thus analysed the combined effect of those drivers, expressed as multiple valuations on certain key accounting information. The multiple valuation has the advantage that the observed companies' valuation seems to be more homogenous throughout time, which enables good comparability as small unobservable, firm specific drivers may be included over the time period of the two consecutive deals. Lastly, multiple valuation shares the same fundament as comprehensive valuations and thus provide a good groundwork for deal values ([Liu et al. \(2002\)](#)). Although these market values may differ slightly from actual deal values, they serve well as tendencies of the actual price and are assumed to be quite accurate.

Accordingly, we used trading multiples rather than transaction multiples for the valuation of our sample companies. Most importantly, using transaction multiples would again provide us with price distortion, e.g. in form of transaction fees, possible synergy effects between the target and the acquiring firm and liquidity premia. Thus, for determining purely the operational success, transaction multiples do not seem to provide a reasonable valuation basis. Choosing transaction multiples, we would need to use PE transaction to truly capture all the PE mechanics. A lack of suitable observations may be a problem in that case, too. We, therefore, favoured trading multiples in our study. Within the category of trading multiples several studies analyse the differences between forecasting multiples, trailing multiples and the combination of both of them. Forecasting multiples are those multiples that are based on forecasted accounting information, such as the consensus of broker reports' forecasts. Those forecasting multiples lead to the lowest valuation error ([Liu et al. \(2002\)](#)). Unfortunately, broker reports are not available in the necessary quantity for private companies. We decided to not forecast the financial information ourselves, as we feel that such a forecast would lead to a too subjective outcome. As a result, trailing multiples seem to be the right choice for valuing the sample's companies. Trailing multiples are those multiples that are based on past fundamental data. Several studies aim to identify both the stand-alone accuracy of the multiple valuations and of the combination of several multiple valuations. Amongst others sales, EBITDA, earnings and equity book value multiples perform the best. [Liu et al. \(2002\)](#) find that those multiples perform very well and are not much weaker than forecasting multiples. They analyse the effects of cash flow multiples and find that they perform significantly worse than the above mentioned multiples. For some observations it may be reasonable to implement industry-specific multiples. However, due to the various and detailed industry specifications of our sample, it would not be feasible as most companies do not publish the necessary information. Therefore, sales, EBITDA, earnings and

book equity multiples seemed to be the best choice for a sufficient multiple valuation.

The identification of the best possible peer group is a crucial process for optimising the valuation accuracy. Therefore, our identification process and the underlying matching process underwent a complex and detailed structure. The matching procedure followed the LBO matching procedures of [Guo et al. \(2011\)](#) to apply a pre-performance matching, i.e. finding suitable matches before the activity of the PE investor begins. Generally, we matched our sample portfolio companies with the listed companies from the peer group. The pre-performance matching was done twice, before the PBO as well as before the SBO. With this process we reset the benchmark of the underlying observations. Many other studies apply an industry-size-year matching as this process is supposed to identify the most similar companies available ([Barber & Lyon \(1996\)](#)). However, we assumed that sometimes matching for industry, size, and year as proposed is not enough. *Ceteris paribus*, a company that is very profitable should perform differently compared to a company that is specified as a loss company, and thus develop differently. Therefore, we followed the idea of [Bhojraj & Lee \(2002\)](#) and included a measure of profitability, namely the EBITDA margin, in our matching process. For every sample company, the matching process results in the five closest peer companies. First of all, the sample company's year of transaction has to be exactly the same as the trading year of the peer company in order to eliminate time effects. Secondly, as we track the development of both the sample and peer group companies, the peer firm still needed to be listed at the end of the PE firm's buyout. Thirdly, the companies needed to have a similar size at the beginning of the buyout as a proxy for a similar development within the business lifecycle ([Alford \(1992\)](#)). Thus, a peer group company may not deviate more than 50 percent in total assets from the sample firm. Fourthly, the companies should have a similar profitability. The peers do not deviate more than 25 percentage points in EBITDA margin and should have the same sign of the EBITDA margin. Both of these cut-off points were chosen by us to represent a reasonable comparison. The profitability interval is slightly lower compared to the size interval because the margin is usually centered around an industry average anyways, whilst the size is not necessarily bound to an industry benchmark. Lastly, the companies needed to be in the same industry for all the other premises to be comparable. Out of the standard industry classification codes, GICS codes perform the best for a reasonable valuation ([Bhojraj et al. \(2003\)](#)). We followed [Alford \(1992\)](#) as we matched by the most detailed industry code at the beginning. If there are less than five matches per sample firm, we reduced the depth of the industry codes until every PE portfolio company has at least five matches. If there were more than five matches per portfolio company, the five peers which had the most similar size were selected. A good peer group should have enough observations to smoothen the results, but too many observations may distort the results. [Pereiro \(2002\)](#) and [Schreiner \(2009\)](#) show that a peer group should consist of 2 to 10 peers. We followed [Bhojraj & Lee \(2002\)](#) and find the five most similar peers, as this is in accordance with the leading literature. Due to the nature of the dataset and the corresponding possible peer group, the geographic matching occurred between the UK and the US. A single country-matching would be superior but usually the number of similar compa-

nies in each year and industry is very limited, thus there is no harm to increase the potential comparable companies by comparing to similar economies as well (Schreiner (2009)).

After the identification of the correct peers for each sample company, the peer group multiples needed to be estimated. First of all, we extracted the accounting data of the peer group which are matched with the three transaction dates of the sample companies. The accounting data for the peer group have the same fiscal year as in the sample data collection, i.e. the closest fiscal year to the transaction date. For every match we calculated the multiples of sales, EBITDA, earnings, and equity book value based on the market capitalisation of the respective companies. After the calculation of the individual value for all peer group companies, these values needed to be aggregated. Herrmann & Richter (2003) find that using the arithmetic mean would lead to an overestimation of the valuation and thus distort the valuation. They as well as Baker & Ruback (1999) instead propose that the median is a very good way to aggregate these valuations. Thus, we chose to use the median values. Ultimately, we got the median values for sales, EBITDA, earnings and book equity multiples of the portfolio companies that we wanted to value.

The actual valuation was simply done by multiplying the peer group's multiple values with the sample company's respective accounting data. This process provided four company values as each multiple valuation was done independently of each other. As the companies are quite similar by the nature of the matching process, we applied an arithmetic mean to find the average company equity value among all the multiple valuations.

After the valuation of our sample companies' equity we retrieved as many actual deal values as possible for those sample companies in order to validate these valuation. We were able to retrieve 136 actual transaction values of our given sample. A mean test between the actual observation and the valuations was performed. Both our initial sample and the actual deal values were not significantly different from each other, already indicating that the valuation was not too far off. Further, we regress the value of the self-valued companies on the actual transaction prices in order to see whether our estimates performed well at predicting the actual transaction price. With a coefficient of 0.9333 and a R-squared of 0.85 the company valuations seem to be a very good fit and thus may be used for further analysis.

### 2.2.2 Variable Calculation

Our study focusses on the development of both the overall company growth, but also the growth of all the observed financial information. Generally, when calculating growth two categories of measurements arise. Those variables that always stay positive can be calculated with the compound annual growth rate (CAGR),

$$CAGR_{i,t}(X) = \left(\frac{x_{i,t}}{x_{i,t-k}}\right)^{1/k} - 1 \quad (1)$$

with  $x_{i,t}$  being the variable of interest at time  $t$  of company  $i$ , and  $k$  being the holding period of the investment.



As the nominator and denominator will always be positive, it is possible to distinguish a positive growth from a negative growth. In the underlying analysis the growth of the company value, total assets, equity, number of full-time employees and sales are calculated with the CAGR.

Other variables may become negative over the investment period. For these values the CAGR is mathematically not feasible. For that reason we chose to calculate the yearly growth ratios by dividing the total change in the underlying ratio by the length of the holding period in years.

$$Growth_{i,t}(X) = \left( \frac{x_{i,t} - x_{i,t-k}}{t - k} \right) \quad (2)$$

with  $x_{i,t}$  being the variable of interest at time  $t$  of company  $i$ , and  $k$  being the holding period of the investment.

Winsorising is a commonly used method in the related literature to adjust the underlying data for thorough and generally applicable studies. All the relevant fundamental data were winsorised at the 1 percent and 99 percent level as only a few observations strongly distorted the results. This approach is in accordance with other studies in the research field of PE (e.g. [Achleitner & Figge \(2014\)](#)).

We further chose to use the absolute excess development rather than simply analysing the companies' performance isolated. Especially, for investment purposes it is more important how a company performs in comparison to its peers and the industry it operates in. Although a certain performance indicator may be high in absolute terms it does not mean that the company is well managed as it may underperform its close peer group. Therefore, similar to [Bonini \(2015\)](#), we calculated the difference between all variables of the underlying portfolio company and the corresponding variables of its peer group as follows.

$$d_{i,p} = (x_i - m_p) \quad (3)$$

where  $x_i$  is the performance indicator  $x$  for company  $i$ , and  $m$  being the median of the performance indicator of peer group  $p$ .

## 2.3 Variable Selection

This chapter presents the variables that were used in this paper. In the following, the measurement of growth, profitability, financial engineering, liquidity, efficiency, and innovation are explained.

The growth of a portfolio company is measured in two ways, namely total sales and equity growth. The analysis of total sales growth is necessary for two reasons. Increasing sales either represents a sufficient market share on the total market or it may indicate a growing industry.

Further, the growth of equity is analysed as it is a balance sheet position and thus provides a more stable view on the development throughout the holding period than a profit and loss account position.

The profitability is measured with four variables, namely the EBITDA margin, profit margin, return on equity, and return on assets. The first two variables measure the operating earnings in comparison to the total sales. The EBITDA margin clearly identifies the operating earnings without considering any financing and accounting effects. Complimentary to this measure, we use the profit margin because it also inherits the interest payments and taxes. Usually, GPs are not able to strongly reduce the tax liabilities of the portfolio company, but due to high leverage, interest payments may be very high. The other two profitability variables rather measure the earnings in contrast to the input of capital. They are also crucial to analyse because they are more stable compared to pure profit and loss profitability measures. Within this category of variables, we need to measure both asset and equity returns because the amount of total assets and equity usually differ strongly in buyouts due to the financial leverage.

The capital structure and financial engineering is measured with the development of the financial leverage. The financial leverage is measured as the ratio of liabilities to equity. It serves both well as explanatory variable and control variable of the capital structure.

Liquidity is measured with two variables, namely the cash ratio and the current ratio. The cash ratio is measured as cash and cash equivalents over current liabilities. Especially for high risk investments, such as buyouts, the availability of cash to pay off current liabilities directly, seems to be a valid proxy for liquidity. The current ratio is defined as the current receivables over current liabilities. This ratio measures a similar degree of liquidity but also considers other assets, which shows how solvent a company is in the short-term.

This paper uses two proxies as part of the portfolio company's efficiency. The inventory sales ratio, which is defined as sales over inventory, measures the efficiency on how the inventory is used to achieve certain sales. Generally, companies may aim to reduce the necessary inventory whilst always having just enough inventory to keep the business running smoothly. The receivables turnover ratio represents the efficiency of a company to convert receivables into actual sales. It is defined as sales over receivables outstanding.

Innovation and asset structure are measured with the intangible asset ratio, which is the proportion to intangible assets on total assets. It shows the degree of innovation and brand value, as mostly patents and goodwill are incorporated in intangible assets. Also, it can serve well as a control variable for asset structure, which may be important especially when considering the recent development of digitalisation.

The control variables are manifold. First, we use credit spreads, the employment rate, inflation rate, and GDP index as macroeconomic control variables. Second, as we consider the growth of variables, we need to control for the length of the holding period to differentiate between short-term and long-term value drivers. Third, total assets are used to control for the size of the company. Fourth, we control for the risk of financial distress of the portfolio

company. As portfolio companies are not listed, a market price and its underlying volatility cannot be observed. For that purpose, we choose to measure the risk of a company by analysing its fundamental data as well. The Altman Z-score is a well-established measure to predict financial distress and thus serves well as control variable of risk for private companies ([Altman \(1968\)](#)). Lastly, we apply time and industry dummies.

### 3 Summary Statistics

Table 3 displays the summary statistics for the final dataset of 590 investments. For informational purposes all the statistics are split into three categories: the total sample, primary buyouts and secondary buyouts. Mean T-tests and nonparametric equality-of-medians tests are performed to recognise the differences in characteristics between PBOs and SBOs. The statistics are divided into two panels: the company information at entry and the company information developments. The observations are relatively well balanced, i.e. for most information the full number of potential observations are available so that only few observations go missing in further analysis.

- Table 3 about here -

The first panel covers the valuation, some fundamental data, and selected ratios to display the operative and financial characteristics of the portfolio companies at the beginning of the investment. Figure 2 provides an overview on the investment entry year. The valuation at entry for the total sample has a mean of 60.8 million GBP. This is slightly lower than the deal values in other studies. The size difference may arise from the specific country focus. Large deals are also less likely to be bought twice by financial investors as those deals are quite rare anyway. Thus, in this setting it is less likely to include those large companies twice. The valuation at entry of PBOs is significantly greater in its mean with a weak significance compared to entry valuation of SBOs, indicating that value is created throughout the primary buyout. The medians of the two buyout types are significantly different from each other which clearly shows that value is created in PBOs. As shown by the valuation CAGR all PE-backed companies develop positively over time, again by construction, the fundamental data should be higher at the entry of the SBO. However, the mean differences of the three ratios at entry of PBOs and SBOs, namely return on equity, return on assets and the leverage, are not significantly different from each other. Both return measures are very similar both in mean and median. Both first round investors and second round investors start with a similar return on the invested equity and assets. Although the operative earnings increase, the equity and assets invested to achieve this return grow proportionally the same. Surprisingly, the mean leverage ratios at entry are not significantly different from each other. The standard deviations of both means are extremely high which clearly indicates that there are different approaches on how to use leverage as a tool for value creation. The median tests show roughly the same results and thus do not require further interpretation.

The second panel shows the development of the valuation, the aforementioned fundamental data, and their ratios. Most variables' means are not significantly different from another. This suggests that neither investment type generally performs better or worse than the other. This brings up the question which deal, PBO or SBO, outperforms in the respective fields. The valuation CAGR is positive for both buyout types indicating that both buyouts create excess value compared to its peer group. However, neither the mean nor the median are different from another, showing that in this sample PBOs do not necessarily perform better than SBOs. The mean growth of total assets and equity are significantly different from another which shows that PE firms may bloat the balance sheet more during the PBO. Interestingly, the medians of developments of sales, the EBITDA margin, the EBIT margin, the profit margin and total assets are significantly different from each other and higher in PBOs, showing that for many deals the development of the selected performance indicators are better during the first investment round. The holding period for the total sample on average is 4.1 years. The mean holding periods are not significantly different from another which might indicate that SBOs on average do not follow the idea of having buying and selling pressure more than PBOs. Figure 3 further represents the deviation of holding periods according to PBOs and SBOs.

## 4 Differing Value Drivers Across Buyout Rounds

Throughout the history of PE, portfolio companies generally faced two phases of buyout activity. The first phase focussed on value creation through financial engineering. The second phase made use of operational engineering. Nowadays, both financial and operational engineering are applied to maximise the value creation within a buyout.

Jensen (1989) states that a buyout structure with high leverage allows the PE investors to align management incentives and to create efficient and lean organisational structures. Other studies further show that a high leverage reduces agency costs due to a high powered incentive system (e.g. Jensen & Meckling (1976), Jensen (1986)). Korteweg (2010) finds that during the early investment stages, PE investors often prefer high leverage as their optimal capital structure. The evidence about leverage as value driver in SBOs is rather mixed. Achleitner & Figge (2014) propose that all GPs may use similar skill sets for operational improvements and therefore the only way to create additional return is by increasing the leverage. On the other hand, Wang (2012) states that a successful PBO usually relies on an almost optimal capital structure and therefore the second PE buyer should not change the leverage. For these partially mixed reasons, we expect leverage to have at least a small positive effect on value creation in both buyout rounds of our sample.

After a downturn in debt markets, financial investors had to reinvent their business model and focused on operational performance enhancement rather than simply implementing financial engineering (Matthews et al. (2009)). GPs are more focussed on strategic and operative decision-making and thus trying to improve the efficiency and profitability of the underlying investment companies (De Fontenay (2014)). Operational engineering may come in form of im-

improvements in production, cost structures, marketing, human resource management, inorganic growth, repositioning in the market, or restructuring (Acharya et al. (2012), Lee et al. (2001), Wright et al. (2001)). According to Perembetov et al. (2014), operational engineering and its underlying improvements comprise about 51 percent of the total value creation in PE, whereas financial engineering and multiple effects explain 31 percent and 18 percent, respectively. Generally, SBOs inherit some theoretical problems with respect to operational engineering. The idea of PE is that either GPs are good at identifying and selecting strong performing companies or they are able to optimise portfolio companies throughout the investment period. After the completion of the holding period there should not be any or only little value creation potential left. Thus, after the PBO, the SBO should not be able to achieve a significantly more additional value compared to the first buyout round. Achleitner & Figge (2014), however, find that financial buyouts still offer potential for operational performance, such as sales growth and margin expansion, which have not developed during the PBOs. Therefore, SBOs do not develop differently compared to PBOs.

Growth and expansion as value drivers should be relevant in buyout rounds, but probably more during the PBO because during a PBO a lot of capital is invested into the portfolio company to gain high market shares and expand quickly. Although SBO investors may also try to grow the portfolio company, further and quick market growth may be more difficult to achieve as marginal costs to achieve the growth are higher, resulting in a lower expected effect of growth on value creation.

GPs do not only make use of expansive growth but also ultimately turn the previous growth into profitable cashflows. Thus, we expect that an improvement in profitability has a positive influence on value creation during both buyout rounds. However, this effect could be more relevant during the SBO because the portfolio company is older and thus potentially further developed in the business life cycle. After the growth period during the PBO, the SBO may aim on streamlining the business as a following step.

PE investments belong to the illiquid investment class and, therefore, do not suffer from any short-term goals from shareholders. The portfolio companies do not need to provide a huge degree of liquidity, just enough to run the business smoothly. Shortages in liquidity may also be covered by further capital injections by the financial sponsor. Thus, we expect that financial sponsors focus less on the portfolio companies' liquidity and, therefore, that there is a negative effect of liquidity on value creation during the buyout rounds.

The growth and expansion of companies during buyout rounds leads to inflated balance sheet positions (e.g. assets and equity). Consequently, efficiency ratios suffer as the input variables may increase more than the output variables. The portfolio company is possibly streamlined with respect to those measures during the SBO as part of the "fine-tuning" after the implementation of main value drivers during the PBO. We, therefore, expect a positive correlation with value growth during the SBO but an insignificant effect during the PBO.

During a PBO the PE firm may aim to invest heavily to foster growth, which may also come in form of growth in intangible assets, representing mainly innovation (e.g. patents) and

brand value. The SBO investor can either make use of the increased level of innovation or even further invest in research and development. Due to superior negotiation skills of PE firms and the accompanying high exit price of the portfolio company (Achleitner et al. (2011)), it is reasonable to assume an above average goodwill development for PBOs. Assuming similar negotiation skills between PBO and SBO investors, the amount of goodwill should not change a lot during the SBO. Thus, we expect a stronger increase of innovation and brand value during the PBO and thus a greater effect on value creation.

## 4.1 Methodology

We analyse which determinants are related to value growth of the portfolio companies. As our SBOs directly follow the PBOs, we are able to construct a determinant analysis in form of a panel analysis. The model is defined as:

$$y_{it} = \alpha + \beta * X_{it} + \gamma * Y_t + \epsilon \quad (4)$$

where  $X$  describes the firm-specific variables and  $Y$  describes the macroeconomic variables for firm  $i$  at transaction date  $t$ .

The potential main value drivers are commonly used by other papers and serve well as a start of a determinant analysis. For that purpose, we include growth, profitability, leverage, liquidity, efficiency, and innovation in this model (e.g. Achleitner & Figge (2014), Bonini (2015), Achleitner et al. (2011)). However, as we were able to retrieve the whole profit and loss account and balance sheet we improve the analysis by including more detailed performance measures. We analyse the excess growth of the individual characteristics compared to its predefined peer group of public companies. We use a random-effects model, as the Hausmann-test estimates between random and fixed effects are not significantly different from another (Hausman (1978)). We assume that we control for most of the relevant characteristics and the unobservable effects are rather small. Therefore, a random-effect model is also sensible from an economic point of view.

Afterwards, we apply an OLS regression for both PBOs and SBO separately. This helps to identify if value drivers are different in both buyout rounds. The variables and specification are the same as in the panel regression.

## 4.2 Results

The determinant analyses consist each of three specifications which are displayed in Tables 4-6. The base case specifications only consider the four multiples that were used to perform the valuation of the observed company. Afterwards, in the second specifications, we further include controls for the size, the holding period, the macroeconomic environment, the time, and the main industry the company operates in. In the third specifications, we complete the regressions by adding more detailed firm characteristics that should serve as value drivers.

The determinant analysis for all buyouts is a combination of the following two determinant analyses about PBOs and SBOs. Table 4 shows the results of all buyouts for comparison. The results are not further discussed as we rank the importance of the value drivers in PBO and SBO separately higher than for all buyouts in general. We can confirm that the results for all buyouts align with the PE literature.

- Table 4 about here -

Table 5 displays the determinant analysis of PBOs. The growth of a portfolio company is a significant value driver for primary buyouts as both sales CAGR and equity growth have positive and significant coefficients. Companies that expand their total sales and improve the operative earnings margin are likely to increase their operative cash flows and thus create higher value. Higher equity is equal to a greater intrinsic book value of the company. Further, those companies that are able to increase their equity over time indicate a positive past performance and higher stability, thus increasing the company value.

- Table 5 about here -

Profitability seems to play various roles for value drivers in PBOs. The EBITDA margin is significant for all specifications and the profit margin for the last, most relevant, specifications as well. The coefficient of the EBITDA margin is in line with the previous finding that ultimately, and in combination with sales increase, operative earnings and operative cash flows may be increased. Interestingly, the profit margin coefficient is not significant for the first two specifications but becomes weakly significant and negatively correlated to the company's valuation for the third specification. This observation indicates that portfolio companies that aim to have a great profit margin, without considering the other value drivers, may have a bad overall value development. Portfolio companies that aim to increase their profit margin seem to perform worse at other value drivers, e.g. sacrificing the growth in sales for a higher profitability margin. Furthermore, due to a strong leverage, portfolio companies tend to pay high interest and thus portfolio companies may have negative net earnings. The return on assets and equity are not significant, indicating that the necessary capital may work against the increase in earnings.

In this sample, financial engineering does not seem to be relevant as the coefficient is not statistically significant. However, this development of the financial leverage may be explained because GPs aim to reduce the leverage towards the end of the holding period as can be inferred as well from the summary statistics. Therefore, this explanation may be a reason why there is not an effect on the value creation of a PBO portfolio company.

As expected, the developments of liquidity and efficiency do not influence the value creation during the PBO. These findings however, need to be treated with caution because due to the construction of this dataset, SBOs are the follow-up investors. Assuming that PE investors care less about the underlying liquidity of companies compared to strategic buyers, PBO investors do not focus as much on this measure because SBO investors simply may not regard these developments as valid selection criteria.

PBOs seem to benefit from early innovation and improvement of goodwill. Companies that increase the share of intangible assets in total assets have a stronger value growth. This might be explained by the fact that those younger companies tend to focus more on intellectual property generation or goodwill growth than companies with older and traditional thinking. This finding needs to be treated with caution as well because the result can be heavily driven by the increase from goodwill after the exit of the PBO when comparably there was less or no goodwill incorporated before the PBO.

The results of the SBO value driver analysis are presented in Table 6. Growth seems to be less important in SBOs than in PBOs. The sales CAGR is only significant for the first specifications with a positive coefficient. The coefficient is slightly higher than in specifications of the PBO, which may indicate that during the PBO the expansion of the business probably comes at a lower cost as low hanging fruits can easily be collected.

- Table 6 about here -

The focus of profitability changes during SBOs compared to PBOs. The EBITDA margin development is weakly significant and positive for the first and the third specification with a slightly lower coefficient than in the PBO analysis. This finding is also as expected, as companies with a positive development of a profitability experience superior operative earnings, thus increasing the company value. However, the weaker effect of the EBITDA margin development on value creation for SBOs compared to PBOs, indicates that the improvement comes along with higher opportunity costs during the SBO than during the PBO. The return on assets is positively correlated and significant with a very high coefficient, showing that the return on assets is extremely important in SBOs. It seems that portfolio companies may become cost efficient, in terms of EBITDA margin, during the PBO but lack the asset efficiency in order to achieve that certain profitability. As shown in the t-test, total assets increase strongly during the PBO. This increase seems to be too high in comparison to achieving certain earnings. During an SBO the GP increases total assets significantly less than during a PBO, indicating that total assets are not build up unnecessarily during an SBO and thus creating a better return on assets metric.

Similar to the finding for PBOs, financial engineering does not have a statistically significant effect on value creation during the SBO. This absence of significance is probably driven for the same reason as for PBOs that the leverage is reduced towards the end of the holding period anyways and thus the full effect cannot be observed.

In contrast to PBOs, in SBOs it is rather important to focus more on liquidity. One of the two possible measures for liquidity, namely the current ratio, is significant with a positive coefficient. This result indicates that financial sponsors should hold sufficient current assets to cover all outstanding short-term payables. This is increasingly important when the SBO exits via a strategic sale or through an IPO as liquidity is reasonably more important to non-PE buyers. This reason also explains the difference between PBOs and SBOs for liquidity as value driver during the holding period.



Efficiency gains throughout the SBO holding period also become increasingly important. The inventory sales ratio is highly significant and negatively correlated, as expected. GPs pursue inventory management and thus indicate that they can sell off their inventory quickly or find ways of using the inventory more efficiently. This measure is also amplified through the former analysis of the return on assets metric, as good inventory management reduces the amount of necessary current assets to achieve a certain level of sales and ultimately operative earnings.

The development of innovation is not significant for value creation during SBOs. As expected, innovation does not play a role in value creation for SBOs. As the overall valuation creation is not superior for SBOs compared to PBOs, as can be inferred from the summary statistics, an above-average development of goodwill will not be achieved at time of the exit. Further, total assets increase significantly less during the SBO compared to the PBO, also indicating that probably less growth in intangible assets can be recognized.

## 5 Selection Criteria for SBOs

The previous analysis shows that the value drivers differ across buyout rounds, but still do have some similarities. The differences may be explained by two factors. First, the typical GP of an SBO may prefer to implement other measures than the GP of a PBO. Second, and more importantly, different action needs to be taken considering the state of the company at time of the investment entry. Whereas PBOs stem from a less specialised and less streamlined field of business, i.e. the non-PE backed background, SBO investors acquire companies that have been in the hand of a GP before. Having the same PE driven mindset can serve beneficial for SBOs because the business structures are very similar and many of the favourable traits (such as governance engineering) are already implemented in the business. On the contrary, the potential for value creation might be closed and only little or no potential to create value exists.

[Achleitner & Figge \(2014\)](#) argue that SBOs are able to exploit gaps of value creation if the optimisation process during the PBO could not be completed. The remaining potential for SBOs may occur for several reasons. For example, there may not be enough time in the lifespan of the funds and the portfolio company must be sold early before the GP could cover the whole value creation potential ([Jenkinson & Sousa \(2011\)](#)). For marketing purposes during the fund raising, some investments will be exited early to illustrate good performance to potential investors ([Wang \(2012\)](#) [Jenkinson & Sousa \(2011\)](#)).

As this paper aims to truly identify the dependency of value creation, we take a closer look at the value chain. As a first step, a good potential target needs to be identified. Identifying good investment targets based on past performance indicators is also done in non-PE areas of corporate finance (e.g. [Capron & Shen \(2007\)](#)). The selection of targets should not differ between PE and non-PE in the way how the analysis is conducted. Therefore, we analyse the effect of the portfolio company's development during the PBO on the value creation during the

SBO. This approach helps to identify individual good traits of an SBO. The academic findings on target selection from a PE perspective are unusually silent. Whereas [Jenkinson & Sousa \(2015\)](#) describe in which situations SBOs are the best choice of exit, there is only little evidence on the characteristics of the process from a buying perspective. [Wang \(2012\)](#) aims to answer the question why to engage in an SBO rather than which company to select.

Growth during the PBO may be a very important selection criteria. Usually during the PBO, GPs aim to scale the portfolio company. The odds to sufficiently expand the company during the SBO are reasonably low if the PBO investor was not able to do so, assuming a similar ability to implement growth strategies. Thus, it might be worth looking at strongly growing companies which represent a good acceptance of the market and an increasing market share. Therefore, we expect that the portfolio company's expansion during the PBO has a positive effect on the value creation during the SBO.

Consistent with the argument that targets of SBOs are further progressed in the business life cycle, improving the portfolio company's profitability during the SBO might be the correct step forward. As seen in the previous analyses, the EBITDA development is positively and the development of the profit negatively correlated to the value creation within the buyout. Thus, it may also be that the portfolio company is already quite profitable and further improvement of the profitability is rather difficult. Due to the mixed explanations, on average we do not expect that the profitability development during the PBO has a significant effect on the value creation during the SBO.

The probability that the portfolio company is exited via SBO is higher when the underlying company has a great debt bearing capacity ([Achleitner et al. \(2014\)](#)), indicating that leverage seems to be important to potential financial acquirers. Although leverage is not a significant value driver in our sample, it may be possible that the optimal capital structure has already been found during the PBO. When the leverage is relatively low after the PBO or the portfolio company is able to absorb additional debt, leverage may very well be a value driver for SBOs. Therefore, we expect leverage development during the PBO to have a negative effect on value creation during the SBO.

Liquidity does not seem to be important to GPs, as they can cover shortages in liquidity by providing more capital to the portfolio company. On the other hand, GPs do not intend to inject unnecessary capital into the company and, thus, an very low level of liquidity is not desired. Therefore, on average, whether the investment becomes more liquid during the PBO should not matter for the decision of investing in an SBO as long as the liquidity is acceptable from a buyer's point of view.

As can be inferred from the previous analysis, efficiency gains are made in SBOs to create value. SBO investors may focus on this area in a second step because in-detail efficiency gains may not belong to the category of low-hanging fruits. The less efficient companies become during the PBO in contrast to their peers, the more attractive they become as potential targets for SBOs because there is simply more space for improvement. Thus, we expect that the efficiency improvement during the PBO is negatively correlated to the value creation during

the SBO.

Innovation during the PBO may indicate strongly growing companies and thus align with the growth hypothesis. At the same time, SBO investors may wish to invest in companies that are not as innovative yet because already little investments may foster the value growth. Due to these mixed explanations, we do not expect a significant effect of the degree of innovation during the PBO on the development of the company value during the SBO.

## 5.1 Methodology

After understanding which value drivers are relevant in a general environment, we analyse if and how the success in the second investment round is dependent on the development of the performance drivers during the PBO. We calculate the possibility of an SBO being successful depending on the success of the PBO. A deal is defined as successful when it produces a superior company value development compared to its predefined peer group. Those companies that have an above average development are assigned a "1" in a binary variable setting. Due to the assignment in the binary variable setting, we are able to calculate probabilities whether an investment is going to be successful conditional on the outcome of the prior investment. This overview provides a first idea whether there might be dependencies between the two buyout stages. The conditional probabilities for each case are calculated as follows:

$$P(SBO|PBO) = \frac{P(SBO \cap PBO)}{SBO} \quad (5)$$

In addition, we use an OLS regression to determine whether the development during the PBO has any influence on the value creation during the SBO. This analysis determines which companies are suitable for an SBO. We regress the valuation development during the secondary buyout conditional on the developments of the value drivers during the PBO. We use the value drivers from the determinant analysis and use the following model specification:

$$y_{it}(SBO) = \alpha + \beta * X_{it}(PBO) + \gamma * Y_t + \epsilon \quad (6)$$

where  $y$  describes the company value growth of company  $i$  at time  $t$  during the SBO,  $X$  describes development of the firm-specific variables during the PBO and  $Y$  describes the economic variables.

## 5.2 Results

The probability tree in Figure 4 shows the success probabilities for all buyout rounds and the conditional probabilities for all four cases after the SBO. In our sample there are more deals that outperformed their peer group than deals that underperformed compared to their peer group.

The conditional probabilities of the SBO being successful are similar with 64.9 percent and 67.3 percent for a successful and unsuccessful PBOs, respectively. Thus, it seems that PE investors themselves may perform superior compared to other shareholders and thus on average foster the companies' growth more than their peer group. However, after any development of the PBO there are evidentially some differences between outperforming the market and underperforming the market. The conditional probabilities show that there are slight differences for the success of the SBO conditional on how the PBO performed. However, the differences are not very large and thus we may need a more detailed analysis on how to engage in a successful SBO. Therefore, in the following we analyse which companies are especially suitable for good SBOs.

Table 7 summarises the results of the OLS regression. The evidence about dependency of growth and expansion during the PBO is rather mixed. In all specifications the value growth during the PBO has a negative influence on the value growth during the SBO with a high significance. Those companies, which develop a higher company value during the PBO than their competitors, perform worse during the SBO. This result follows the idea that most of value creation potential is already used up during the PBO. This result corroborates the finding from the conditional probabilities, but its extent is weaker as the conditional probabilities for success are only in a binary variable setting and thus inherit less variation. This theory aligns with the partially significant and negative coefficients in equity development during the PBO as a measure of intrinsic value growth. The sales CAGR is at least for the last specification weakly significant with a positive coefficient. Companies that grow rapidly represent products and services that are promising or generally well-developing brands and thus indicate potential further growth in the future. These results indicate that it is beneficial when the intrinsic value of the company developed rather weakly during the PBO, whilst the market participation, measured in sales, grows.

- Table 7 about here -

The results for SBO value creation based on the profitability development during the PBO is also mixed. The EBITDA margin development during the PBO is statistically significant and positively correlated to the value growth during the SBO. PE firms should invest into companies having a good operative margin. Companies that could not be improved into more efficient companies during the PBO may not improve the EBITDA margin during the SBO either as some businesses are not possible to streamline further. In contrast to the EBITDA-margin, the return on assets ratio is negatively and significantly correlated. We observe that it is important to find companies that use their assets badly to reach a certain operating profit. This finding aligns with the previous regression that return on assets is a very strong value driver for SBOs. Therefore, it seems that portfolio companies should have great operating earnings but require further fine-tuning according to asset usage. This finding is further backed by the inventory sales ratio. According to this variable, PE firms should acquire companies that are bad at selling off and managing their inventory, i.e. using parts of their assets inefficiently. Potentially, during an SBO the GP can sell off the excessive inventory, thereby reducing its working capital and

thus improving its profitability with respect to the invested assets.

The coefficient of the financial leverage is not significant as expected. Leverage does not seem to be a value driver neither the PBO nor the SBO in this sample. Thus, it would be highly irritating if the development of the leverage during the PBO had an impact on value creation during the SBO. Interestingly, the current ratio is not significant in this regression, following the significance as SBO value driver. This can be due to the fact that this metric works a little different compared to other measures. It is assumed that low-hanging fruits can be collected for measures such as the EBITDA margin, i.e. with increasing marginal costs to improve. The liquidity measure may have a more linear function of marginal improvement and thus does not need a bad development during the PBO anyway.

Interestingly, the intangible asset's coefficient is statistically not significant. As the overall value creation during the PBO is negatively correlated, we would have expected a similar result, solely from the perspective of a goodwill creation. It seems that SBO investors do not seek companies that develop the degree of innovation during the holding period of the PBO. Thus, the growth in sales does not necessarily need to be triggered by innovative products and services.

## 6 SBO Value Drivers are Conditional on PBO Development

Knowing the fundamental selection criteria for superior SBO value creation, raises the questions what to do with the SBO, once the acquired portfolio company fulfils these criteria. Considering the previous development of the portfolio company, the value drivers should differ slightly from the first analyses in which the average effect of value drivers in SBOs is measured. Certain developments during the PBO may force the GP of the SBO to act in a way that the GP would not do otherwise. Generally, there should be three potential ways on how to generate further value. First, the second GP takes the exact same action as the first GP because there is still value creation potential left. Second, the SBO investor works on a similar measure but is better performing or takes a different approach. Third, the GP takes different actions and works on nother areas of interest, i.e. complementary skill sets ([Degeorge et al. \(2016\)](#)). This study argues from another perspective than we do. They try to categorize the GPs considering their skillset and analyse the effect on value creation during the SBO. This paper claims that skillset of GPs belongs either to the category pf expansion or to the category of a margin grower, thus, possibly oversimplifying the skillsets of GPs. In our view, it is very likely that the GPs have multiple skillsets to act accordingly to very different companies. Thus, we do not categorize the GPs but rather observe what has been done during both buyout rounds. Observing the development in value drivers clearly show what the certain GP is capable of doing. Authors like [Achleitner & Figge \(2014\)](#) also argue that the main value drivers have already been implemented during the investment period of the PBO and thus the potential remaining value gap supposedly is relatively small. This explanation indicates that new measures need to be taken to exploit other gaps of value creation. Possibly, a mixture of all three aforementioned explanation might

work in SBOs. Therefore, we expect differing value drivers depending on the various selection criteria.

## 6.1 Methodology

Lastly, after identifying the characteristics for suitable targets it is crucial to know what to do with the investment once it is acquired. During the analysis of the target selection we identified five company specific characteristics that make the acquisition of the portfolio company reasonable. These characteristics are lower company growth, strong sales growth, superior EBITDA margin development, weaker development in return on assets, and improved inventory sales ratio. We perform subsampling for all identified value drivers during the regressions for target selection, e.g. if we identified a negative value driver in the previous question, we construct a subsample consisting of all observations that underperform in that specific value driver compared to its peer group. This way, we are able to analyse what to do with a portfolio company if one of the previous selection criteria has occurred. We may be able to recognise similarities in the required actions of the different subsamples to finally identify which performance drivers to favour and therefore to increase the portfolio companies' valuation as much as possible. In this analysis, we look at those individual selection criteria separately. Thus, we apply an OLS regression for all SBOs with different subsamples:

$$y_{it}(SBO) = \alpha + \beta * X_{it}(SBO) + \gamma * Y_t + \epsilon \quad (7)$$

where  $y$  describes the company value growth of company  $i$  at time  $t$  during the SBO,  $X$  describes the firm-specific variables development during the SBO and  $Y$  describes the economic variables.

## 6.2 Results

The results are summarised in Table 8. The five specifications represent the subsamples according to the significant variables from the previous question, namely valuation growth, sales growth, EBITDA margin development, return on asset development and inventory sales ratio development.

- Table 8 about here -

The first specification considers the subsample of all companies that underperformed in terms of valuation growth during the PBO. It is hard to tell how this subsample of 106 companies are characterised, as there are several value drivers during the PBO. The coefficient of the EBITDA margin is significant but economically rather small compared to the profitability coefficients from the previous analyses. The other specifications provide a better insight how the acquired companies are characterised and are therefore more interesting to this study.

The second specification analyses the subsample for those companies that had a superior sales development compared to its peers. Interestingly, the coefficient for sales is not signifi-

cant although we found some significance in the SBO determinant analysis. This observation may indicate that GPs neglect the further excessive expansion of sales when a company grew strongly. On the other hand, the equity growth has a positive and significant coefficient, indicating that successful SBOs are able to channel their earnings into equity. The return on assets is both significant and also highly positive, indicating that it is highly important to improve the effective usage of the portfolio company's assets in order to realise strong value growth. Thus, GPs should focus to redirect the strong sales growth into a profitable operation in relation to its invested assets. The leverage ratio development is significant with a negative coefficient indicating that the proportion of liabilities to equity should decrease. It shows that financial engineering is less relevant when the underlying company has strongly expanded before and probably does not need further capital to generate additional value. Furthermore, it has the effect to reduce the amount of total assets which aligns well with the reasoning about the improvement in return on assets.

The third specification focuses on those companies whose excess EBITDA margin development was positive, i.e. the company developed its operative earnings margin better than its peer group during the PBO. The coefficient for sales growth is significant and positive, meaning that PE firms should rather concentrate on expanding the portfolio company's sales when the operating structures already became leaner. The portfolio companies may benefit strongly as for every additional unit in sales the operative earnings are relatively high. Again, the company should aim to improve the effective utilisation of assets as the significant coefficient for return on assets is very high positive. The size of the company at entry of the SBO, measured in total assets, is significantly and positively correlated to value growth, but the coefficient is too small to be economically relevant. Furthermore, the cash ratio is highly significant and positive, showing that the PE firm needs to use their profitable situation to build up cash, which may be used either to repay the high amount of debt or to invest.

The fourth specification includes those companies whose return on assets has not developed as well as in other companies. These companies need to consider the growth of the company and turn the company into a more profitable organisation to increase operating cash flows. It seems that the inferior return on assets is driven by lower operative earnings. Interestingly, the intangible asset ratio is significant and negatively correlated to value creation. It seems that counteracting the inferior return on assets is achieved by the reduction of intangible assets as they seem to be less effective in generating earnings, at least in the short-run and therefore SBO investors reduce the level of intangible assets on total assets.

The last specification concerns those companies that developed the inventory sales ratio stronger than their close competitors during the PBO, i.e. being worse at inventory management than the peer group. In this specification, only the sales growth coefficient is significant and positive. This indicates that rather than reducing the inventory for a certain level of sales, higher sales should be targeted.

Very interestingly, companies are not only successful when they have additional skillsets as previously assumed. First, they do apply additional skillsets, e.g. improving return on assets

during the SBO after sales growth during the PBO, and thereby do something different to create further value in a consecutive buyout. Second, SBO investors work on a similar area of value drivers, e.g. increasing profitability by improving return on assets, although profitability was already focussed on during the PBO as the EBITDA margin has been improved strongly. However, it seems that SBO investors do not simply continue the previous strategy by doing the same over again in the second buyout round.

Generally, there are different types of characteristics that make PBO portfolio companies interesting for an SBO. Our analysis shows that there is not just a single value driver for SBOs but rather a combination of reactions to the operational development during the PBO. Often the reasons for acquiring a company in an SBO are manifold and thus do not depend on one single indicator. However, the different indicators give a good first insight on how to handle companies in different economic and operational situations. The investors may decide to which category the investment belongs, test whether the significant value drivers can be implemented, and then decide accordingly.

## 7 Conclusion

With a dataset of 295 companies undergoing consecutive PBOs and SBOs this paper answers three research questions. First, we analyse whether PBOs and SBOs have differing value drivers. Second, we answer the question how a company should have developed during the PBO to be suitable for an SBO. Third, we investigate the separate value drivers dependent on the previous development of the portfolio company. Our paper contributes to the existing literature in many ways. The dataset is different from most papers, as it considers consecutive deals rather than PBO and SBO separately. Up to our knowledge this dataset is the largest and most detailed one with this specific construction of back-to-back buyouts. The dataset thus enables a more sensible way to analyse different sets of value drivers. Furthermore, as we hand-collect many data items, we are able to analyse other characteristics, for example risk, that have not been properly examined yet. It is also the first paper which does not only investigate the differences between the two buyouts but rather looks at the dependency between the two buyout rounds based on a fundamental analysis.

The descriptive summary indicates different value creation profiles of PBO and SBO. Like many other studies, we see that the portfolio companies develop well operationally compared to its non PE-backed peers. Interestingly, the mean differences between PBO and SBO are not significant for most of the applied measures. However, the median differences of the same measures are often significantly different from another, mostly with better medians for the PBO. The mean for the valuation CAGR is greater for SBOs than for PBOs, whilst the median value is greater in PBOs than in SBOs. This is the first indication that it is possible to create more value during an SBO than during PBOs but there is simply much more volatility in the operational success of an SBO. Thus, we look closer into the value creation of buyouts and especially of SBOs. The dependency analyses help to identify mechanisms that promote



successful SBOs.

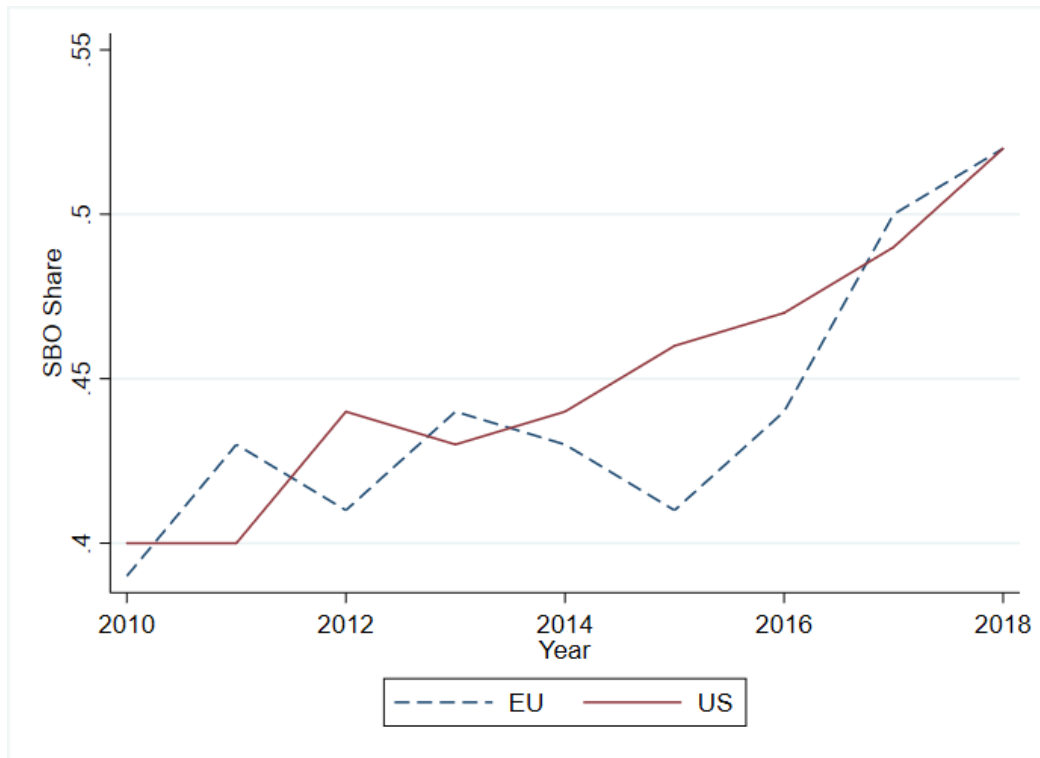
We find that dependencies between the operational performance of PBOs and the operational performance of SBOs exist. We identify five developments during the PBO that influence the value creation during the SBO and thus serve well as selection criteria. The more value was created during the PBO, the less attractive it becomes as potential target for an SBO. However, SBO investors should seek to invest into strongly expanding companies as these companies represent promising markets and, by this, stronger pertinence. When a portfolio company's profitability developed well during the PBO it becomes favourable for SBO acquisitions, an inferior return on assets on the other hand is favourable as it allows further fine-tuning during the SBO. Lastly, the less a portfolio companies improves its efficiency during the PBO, the higher the value creation during the SBO.

The required action taken by the SBO investors differs among the identified selection criteria. Generally, two types of value drivers exist which are conditional on certain selection criteria. First, we find supporting evidence that complimentary skillsets exist, e.g. when sales is developed strongly during the PBO, SBO investors tend to improve the profitability of the portfolio companies. Second, the SBO investors also work on similar measures as the PBO investors but do it differently, e.g. although profitability is focussed on PBO, in terms of EBITDA margin, the SBO investor still aims to work on the profitability, but rather focuses on the improvement of the return on assets. SBO investors either need to set different objectives for their performance management compared to PBO investors or they concentrate on the same objectives with a different approach. However, a simple continuation of the PBO strategy does not create value during the SBO.

Future research may expand this study by further analysing the combination of these effects. Whilst our study provides an initial overview on which companies to acquire and what to do once they are acquired, these findings solely focus on individual effects. Usually, companies are acquired for several reasons rather than just one. This directly effects the combination of what to do with the portfolio company and may differ from what we found. Further, up to this point, it is not clear which of the proposed dependencies provides the greatest success.

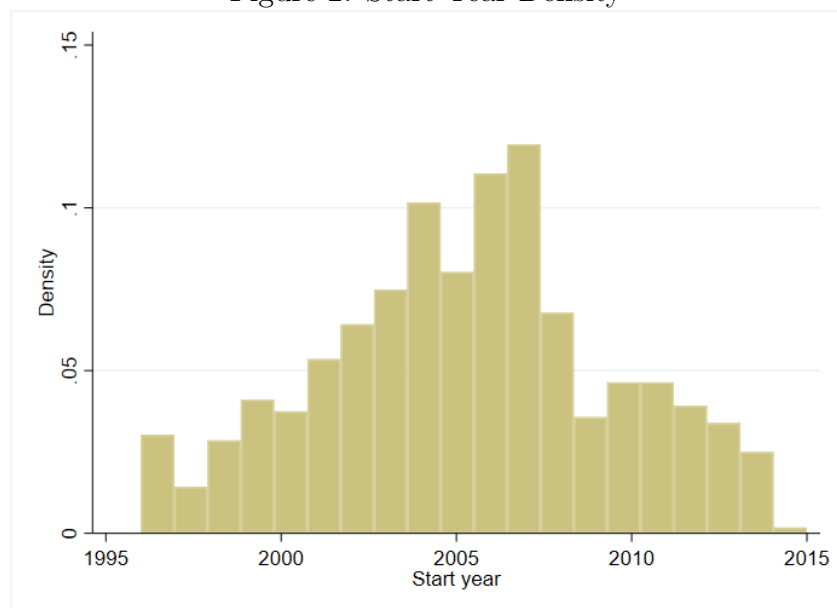
## 8 Appendix

Figure 1: Buyout Exits



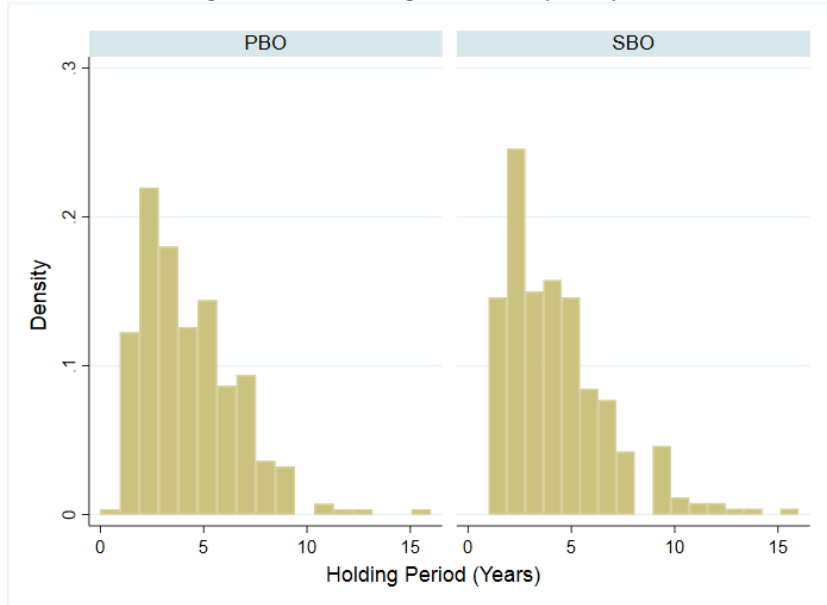
Source: Based on [PitchBook \(2018a\)](#) and [PitchBook \(2018b\)](#).

Figure 2: Start Year Density



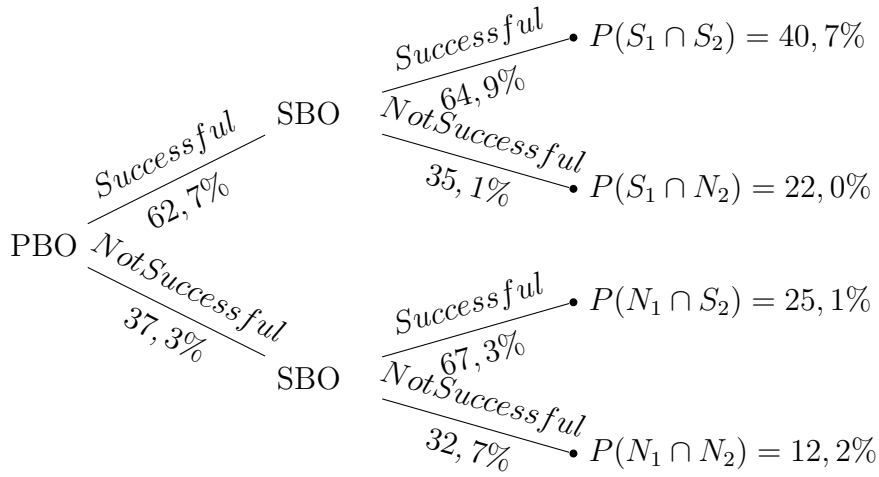
Note: This figure shows the density of the sample's investment entry year.

Figure 3: Holding Period by Buyout



Note: This figure shows the density of the holding periods in years during the PBO and SBO, respectively.

Figure 4: Conditional Probability



Note: This figure shows the (conditional) success probabilities during the PBO and SBO.

Table 1: Variable Overview

Name	Description
<i>Company Specific</i>	
Valuation Growth	The portfolio company's compund annual growth rate in valuation. This variables is winsorised at 1% and 99%.
<i>Growth</i>	
Sales Growth	The portfolio company's compund annual growth rate in sales. This variables is winsorised at 1% and 99%.
Equity Growth	The portfolio company's valuation compund annual growth rate. This variables is winsorised at 1% and 99%.
<i>Profitability</i>	
EBITDA Margin Growth	The development of the EBITDA margin between the investment exit and investment entry divided by the years of the holding period. This variables is winsorised at 1% and 99%.
Profit Margin Growth	The development of the profit margin between the investment exit and investment entry divided by the years of the holding period. This variable is winsorised at 1% and 99%.
Return on Equity Growth	The development of the return on equity between the investment exit and investment entry divided by the years of the holding period. Return on equity is defined as profit over equity. This variable is winsorised at 1% and 99%.
Return on Assets Growth	The development of the return on assets between the investment exit and investment entry divided by the years of the holding period. Return on assets is defined as EBITDA over total assets. This variable is winsorised at 1% and 99%.
Leverage Ratio Growth	The development of the leverage ratio between the investment exit and investment entry divided by the years of the holding period. The leverage ratio is defined as liabilities over equity. This variable is winsorised at 1% and 99%.
<i>Liquidity</i>	
Cash Ratio Growth	The development of the cash ratio between the investment exit and investment entry divided by the years of the holding period. The cash ratio is defined as cash over current liabilities. This variable is winsorised at 1% and 99%.
Current Ratio Growth	The development of the current ratio between the investment exit and investment entry divided by the years of the holding period. The current ratio is defined as receivables over current liabilities. This variable is winsorised at 1% and 99%.

Table 1 Variable Overview – continued from previous page

Name	Description
<i>Efficiency</i>	
Inventory-Sales Ratio Growth	The development of the inventory sales ratio between the investment exit and investment entry divided by the years of the holding period. This variable is defined as stocks over sales. This variable is winsorised at 1% and 99%.
Receivables-Turnover Ratio Growth	The development of the receivables turnover ratio between the investment exit and investment entry divided by the years of the holding period. The receivables turnover ratio is defined as sales over debtors. This variable is winsorised at 1% and 99%.
Intangible Asset Growth	The development of the intangible asset ratio between the investment exit and investment entry divided by the years of the holding period. The intangible asset ratio is defined as the proportion of intangible assets of total assets. This variable is winsorised at 1% and 99%.
Altman Z-Score Development	The development of the Altman Z-score between the investment exit and investment entry divided by the years of the holding period.
<i>Control Variables</i>	
SBO Dummy	Dummy variable that indicates whether the deal is a secondary buyout. Variable is equal to one when the underlying deal is a secondary buyout.
Total Assets	The portfolio company's total assets including all fixed assets and current assets at the time of the respective transaction. This variables is winsorised at 1% and 99%.
Start Year Dummy	Dummy variables that indicate the entry year of the underlying deal.
Holding Period	The time (in years) the investors holds the portfolio company during the first and second buyout, i.e. the time difference between the first and second transaction date and the time difference between the second and third transaction date.
GICS Dummy	Dummy variables that indicates the industry classification of the portfolio company. The classification is based on the 8-digit sub-industry GICS code.
<i>Market-Based</i>	
Inflation Rate	The annual inflation rate at time of entry and exit of the underlying deal.
Credit spreads	Difference between Moody's BAA bond index (corporate bond index) and the risk-free UK government bond (risk-free rate)
Employment Rate	The yearly employment rate in the UK; Employed Working People/Working People
GDP Index	GDP Index Development with 1996=100

Note: The table above presents all variables and ratios that are used in the analysis of this paper. All development measures are calculated for both the PBO and the SBO. When applicable, the absolute excess development compared to the close peer group is considered (see section 3.2.2.). The table includes company specific information, deal-specific, and economic data.

Table 2: Cross-correlation table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Valuation	1.000																	
Sales	0.422	1.000																
EBITDA	0.421	0.466	1.000															
Profit	0.223	0.229	0.588	1.000														
Equity	0.086	-0.221	0.041	0.059	1.000													
Total Assets	-0.088	-0.217	-0.113	-0.049	0.102	1.000												
Holding Period	-0.194	-0.214	-0.022	0.036	0.076	-0.049	1.000											
Intangible Asset	0.105	0.131	0.099	0.029	-0.221	-0.130	-0.018	1.000										
Leverage Ratio	-0.047	0.009	0.049	0.028	-0.003	0.100	-0.064	-0.033	1.000									
Current Cash	0.027	-0.057	0.015	0.043	0.012	-0.005	0.087	-0.025	-0.002	1.000								
Return on Equity	0.071	-0.012	0.010	0.150	-0.005	-0.055	0.000	0.006	0.045	0.015	1.000							
Return on Assets	0.238	0.127	0.327	0.412	0.023	-0.073	0.067	0.001	0.021	0.078	0.279	1.000						
Receivables Sales	0.040	0.185	0.224	0.338	0.000	-0.053	-0.028	-0.011	-0.032	-0.040	0.240	0.196	1.000					
Inventory Sales	-0.280	-0.201	-0.193	-0.295	-0.003	-0.030	0.029	0.001	-0.001	-0.046	0.047	-0.044	-0.044	1.000				
Credit Spreads	0.078	0.008	0.005	-0.006	0.033	0.049	-0.190	0.016	0.003	-0.025	0.002	-0.074	0.008	-0.004	1.000			
Employment Rate	-0.069	-0.025	-0.041	-0.041	-0.042	-0.029	0.023	0.008	-0.001	0.018	0.022	-0.002	0.014	0.067	-0.353	1.000		
Inflation Rate	-0.006	-0.043	-0.003	-0.028	0.034	0.047	-0.018	0.023	0.040	0.026	-0.038	-0.042	-0.078	0.004	0.286	-0.528	1.000	
GDP Index	0.059	-0.053	0.049	0.023	0.015	0.048	-0.179	0.063	0.000	-0.034	0.014	-0.046	0.056	0.001	0.170	0.164	0.460	1.000

Note: The table above shows the correlation matrix of the variable developments used in this paper. The highest positive correlation is 0.588 between EBITDA development and profit development. On the opposite the highest negative correlation is -0.528 between inflation rate and employment rate. None of these variables should cause concern about multicollinearity.

Table 3: Summary

	Panel A: Company Information at Entry											
	Total				PBO				SBO			
	Mean	SD	Median	Obs	Mean	SD	Median	Obs	Mean	SD	Median	Obs
Valuation at Entry	60,801	98,030	26,432	590	52,784	98,481	19,979	295	68,818*	97,083	36,143***	295
Sales at Entry	58,253	87,979	27,684	590	47,813	83,215	19,800	295	68,693**	91,452	36,056***	295
EBITDA at Entry	7,926	16,954	3,412	590	6,588	17,988	2,288	295	9,263	15,771	4,958***	295
Profit at Entry	3,079	7,922	1,492	590	1,740	7,082	745	295	4,418***	8,483	2,423***	295
RoA at Entry	0.156	0.198	0.139	590	0.153	0.226	0.138	295	0.16	0.166	0.141	295
Total Assets at Entry	82,872	176,586	26,966	590	65,562	145,864	19,987	295	100,182***	201,478	36,442***	295
Equity at Entry	2,4116	61,813	5,442	590	19,029	54,307	3,491	295	29,204*	68,217	9,271***	295
Leverage at Entry	2.35	52.3	1.601	587	1.441	58.6	1.816	293	3.36	45.3	1.389	294
	Panel B: Company Information Development											
	Total				PBO				SBO			
	Mean	SD	Median	Obs	Mean	SD	Median	Obs	Mean	SD	Median	Obs
Valuation CAGR	1.320	0.917	1.161	589	1.293	0.769	1.170	294	1.346	1.045	1.148	295
Sales CAGR	1.245	0.617	1.112	589	1.289	0.613	1.162	294	1.2	0.62	1.088***	295
EBITDA-Margin Dev	0.111	0.556	0.018	588	0.125	0.507	0.031	294	0.098	0.601	0.008***	294
Profit-Margin Dev	0.086	0.412	0.014	589	0.09	0.387	0.022	294	0.082	0.436	0.005***	295
RoA Dev	-0.005	0.115	-0.001	587	-0.002	0.117	0.001	294	-0.009	0.113	-0.003	293
Total Assets CAGR	1.202	0.388	1.133	588	1.268	0.455	1.179	294	1.136***	0.0291	1.094***	294
Equity Dev	0.125	0.29	0.06	589	0.152	0.323	0.074	294	0.099*	0.251	0.055	295
Leverage Dev	2.766	32.41	-0.055	585	3.734	37.166	-0.06	292	1.801	26.877	-0.047	293
Holding Period	4.102	2.550	4	590	4.054	2.445	4	295	4.149	2.654	4	295

Note: The table above presents the dataset of 295 companies from the UK that have been tracked throughout the two consecutive buyouts, i.e. the PBO and the SBO. For most of those companies we were able to collect the balance sheet and P&L fundamental data at time of the transactions, speaking before the PBO, after the PBO, and after the SBO. The variables used in this study are defined in table 2. Absolute data are presented in thousands. Panel A displays the valuation and the operative and financial characteristics of the buyouts at time of the investment entry. These fundamental data and ratios represent the basic data of the underlying portfolio company. Panel B illustrates the development of the valuation and the key characteristics throughout the holding period. The calculation of the respective development is also presented in table 1. The significance levels for the mean difference and median difference test between PBO and SBO are \*\*\*0.1%, \*\*1% and \*5%.

Table 4: Determinant Analysis: Total Buyouts

	(1)	(2)	(3)
<i>Growth</i>			
Sales <sub>G</sub>	0.885*** (0.00)	0.881*** (0.00)	0.786*** (0.00)
Equity <sub>G</sub>	0.018*** (0.00)	0.022*** (0.00)	0.023*** (0.00)
<i>Profitability</i>			
EBITDA margin <sub>G</sub>	0.788*** (0.00)	0.744*** (0.00)	0.754*** (0.00)
Profit margin <sub>G</sub>	-0.040 (0.61)	0.008 (0.93)	-0.192* (0.04)
Return on equity <sub>G</sub>			0.058 (0.08)
Return on assets <sub>G</sub>			2.007*** (0.00)
Leverage ratio <sub>G</sub>			-0.002 (0.06)
<i>Liquidity</i>			
Cash ratio <sub>G</sub>			-0.056 (0.59)
Current ratio <sub>G</sub>			0.044 (0.29)
<i>Efficiency</i>			
Receivables Turnover Ratio <sub>G</sub>			-0.002 (0.27)
Inventory Sales Ratio <sub>G</sub>			-0.195*** (0.00)
Altman z-score <sub>G</sub>			0.008 (0.57)
Intangible asset ratio <sub>G</sub>			0.403* (0.02)
log (total assets)		0.006 (0.80)	0.016 (0.54)
log (holding period)		-0.120 (0.06)	-0.147* (0.02)
Macro controls	NO	YES	YES
Time Dummy	NO	YES	YES
Industry Dummy	NO	YES	YES
Constant	0.095** (0.01)	708.192 (0.14)	979.980* (0.04)
Overall R2	0.264	0.396	0.467
Number of Observations	588	588	572

Note: The table above shows the estimates of the panel OLS regression. For all three specifications, the dependent variable is the excess company value growth. The first specification represents the base case which includes the variables used in the valuation of the company. The second specification adds time controls, industry controls and selected macroeconomic variables. The third specification adds more company-specific variables that influence the company value. The t-statistics are reported in parenthesis below the respective coefficients. The significance levels for all specifications are \*\*\*0.1%, \*\*1% and \*5%. The lower case G indicates whether the variable is a measure of excess growth.



Table 5: Determinant Analysis: Primary Buyouts

	(1)	(2)	(3)
<i>Growth</i>			
Sales <sub>G</sub>	0.877*** (0.00)	0.800** (0.00)	0.730* (0.02)
Equity <sub>G</sub>	0.019*** (0.00)	0.018*** (0.00)	0.021*** (0.00)
<i>Profitability</i>			
EBITDA margin <sub>G</sub>	0.851** (0.01)	0.982** (0.01)	0.922* (0.01)
Profit margin <sub>G</sub>	-0.185 (0.15)	-0.288 (0.09)	-0.325* (0.04)
Return on equity <sub>G</sub>			0.072 (0.25)
Return on assets <sub>G</sub>			0.543 (0.60)
Leverage ratio <sub>G</sub>			-0.001 (0.58)
<i>Liquidity</i>			
Cash ratio <sub>G</sub>			-0.036 (0.73)
Current ratio <sub>G</sub>			0.029 (0.55)
<i>Efficiency</i>			
Receivables turnover ratio <sub>G</sub>			-0.003 (0.05)
Inventory sales ratio <sub>G</sub>			-0.035 (0.41)
Alman z-score			0.116 (0.32)
Intangible asset ratio <sub>G</sub>			0.511* (0.02)
log (total assets)		0.039 (0.27)	0.037 (0.31)
log (holding period)		-0.002 (0.99)	-0.017 (0.89)
Macro controls	NO	YES	YES
Time Dummy	NO	YES	YES
Industry Dummy	NO	YES	YES
Constant	0.005 (0.90)	83.267 (0.05)	80.230 (0.06)
Adjusted R-Squared	0.361	0.356	0.380
Number of observations	294	294	290

Note: The table above shows the estimates of the OLS regression for all PBOs. For all three specifications, the dependent variable is the excess company value growth. The first specification represents the base case which includes the variables used in the valuation of the company. The second specification adds time controls, industry controls and selected macroeconomic variables. The third specification adds more company-specific variables that influence the company value. The t-statistics are reported in parenthesis below the respective coefficients. The significance levels for all specifications are \*\*\*0.1%, \*\*1% and \*5%. The lower case G indicates whether the variable is a measure of excess growth.

Table 6: Determinant Analysis: Secondary Buyouts

	(1)	(2)	(3)
<i>Growth</i>			
Sales <sub>G</sub>	0.932** (0.00)	0.786 (0.10)	0.636 (0.22)
Equity <sub>G</sub>	-0.002 (0.82)	-0.007 (0.64)	-0.000 (1.00)
<i>Profitability</i>			
EBITDA margin <sub>G</sub>	0.788* (0.03)	0.733 (0.06)	0.863* (0.03)
Profit margin <sub>G</sub>	0.069 (0.75)	0.155 (0.53)	-0.126 (0.28)
Return on equity <sub>G</sub>			0.085 (0.41)
Return on assets <sub>G</sub>			3.829** (0.01)
Leverage ratio <sub>G</sub>			-0.003 (0.29)
<i>Liquidity</i>			
Cash ratio <sub>G</sub>			-0.051 (0.82)
Current ratio <sub>G</sub>			0.138* (0.03)
<i>Efficiency</i>			
Receivables turnover ratio <sub>G</sub>			0.026 (0.11)
Inventory Sales Ratio <sub>G</sub>			-0.265*** (0.00)
Altman z-score			-0.208 (0.09)
Intangible asset ratio <sub>G</sub>			-0.307 (0.67)
log (total assets)		-0.035 (0.43)	-0.044 (0.32)
log (holding period)		-0.202 (0.10)	-0.267* (0.05)
Macro controls	NO	YES	YES
Time Dummy	NO	YES	YES
Industry Dummy	NO	YES	YES
Constant	0.186*** (0.00)	1251.213 (0.37)	1917.697 (0.14)
Adjusted R-Squared	0.216	0.183	0.287
Number of observations	294	294	282

Note: The table above shows the estimates of the OLS regression for all PBOs. For all three specifications, the dependent variable is the excess company value growth. The first specification represents the base case which includes the variables used in the valuation of the company. The second specification adds time controls, industry controls and selected macroeconomic variables. The third specification adds more company-specific variables that influence the company value. The t-statistics are reported in parenthesis below the respective coefficients. The significance levels for all specifications are \*\*\*0.1%, \*\*1% and \*5%. The lower case G indicates whether the variable is a measure of excess growth.

Table 7: Target Selection

	(1)	(2)	(3)
<i>Growth</i>			
Valuation <sub>PBO,G</sub>	-0.345*** (0.00)	-0.354*** (0.00)	-0.318*** (0.00)
Sales <sub>PBO,G</sub>	0.222 (0.06)	0.276 (0.14)	0.394* (0.04)
Equity <sub>PBO,G</sub>	-0.474* (0.03)	-0.422* (0.03)	-0.330 (0.09)
<i>Profitability</i>			
EBITDA margin <sub>PBO,G</sub>	0.164* (0.03)	0.145* (0.01)	0.189* (0.04)
Profit margin <sub>PBO,G</sub>	-0.088 (0.35)	-0.025 (0.68)	-0.052 (0.60)
Return on assets <sub>PBO,G</sub>			-0.295*** (0.00)
Return on equity <sub>PBO,G</sub>			-0.001 (0.85)
Leverage ratio <sub>PBO,G</sub>			-0.000 (0.51)
<i>Liquidity</i>			
Cash ratio <sub>PBO,G</sub>			0.069 (0.09)
Current ratio <sub>PBO,G</sub>			-0.041 (0.07)
<i>Efficiency</i>			
Receivables turnover ratio <sub>PBO,G</sub>			0.001 (0.60)
Inventory Sales Ratio <sub>PBO,G</sub>			0.543*** (0.00)
Altman z-score <sub>PBO,G</sub>			0.010 (0.73)
Intangible asset ratio <sub>PBO,G</sub>			-0.062 (0.66)
log (holding period) <sub>PBO</sub>		-0.132 (0.07)	-0.123 (0.12)
log (total assets) <sub>SBO</sub>		-0.020 (0.46)	-0.040 (0.10)
Macro controls	NO	YES	YES
Time Dummy	NO	YES	YES
Industry Dummy	NO	YES	YES
Constant	0.266*** (0.00)	2.773 (0.59)	4.570 (0.37)
Adjusted R-Squared	0.062	0.136	0.292
Number of observations	295	294	290

The table above shows the estimates of the OLS model regressing the excess valuation growth during the SBO on the excess variable developments during the PBO. The first specification represents the base case which includes the variables used in the valuation of the company. The second specification adds time controls, industry controls and selected macroeconomic variables. The third specification adds more company-specific variables that influence the company value. The t-statistics are reported in parenthesis below the respective coefficients. The significance levels for all specifications are \*\*\*0.1%, \*\*1% and \*5%. The lower case G indicates whether the variable is a measure of excess growth.

Table 8: SBO Value Drivers

	(1)	(2)	(3)	(4)	(5)
	Valuation	Sales	EBITDA	RoA	Inventory
<i>Growth</i>					
Sales <sub>SBO,G</sub>	0.004 (0.99)	0.413 (0.10)	0.980*** (0.00)	0.481** (0.00)	0.531*** (0.00)
Equity <sub>SBO,G</sub>	0.780 (0.10)	0.474* (0.02)	0.335 (0.30)	0.362 (0.05)	0.170 (0.61)
<i>Profitability</i>					
EBITDA margins <sub>SBO,G</sub>	0.047 (0.84)	0.075 (0.81)	-0.128 (0.26)	0.564** (0.01)	0.208 (0.18)
Profit margins <sub>SBO,G</sub>	0.202** (0.01)	0.496 (0.19)	0.251 (0.42)	0.020 (0.48)	0.024 (0.49)
Return on assets <sub>SBO,G</sub>	-0.713 (0.70)	1.918* (0.02)	2.243** (0.01)	0.057 (0.96)	0.005 (1.00)
Return on equity <sub>SBO,G</sub>	-0.010 (0.66)	0.026 (0.25)	0.003 (0.79)	0.023 (0.25)	0.011 (0.50)
Leverage ratios <sub>SBO,G</sub>	0.001 (0.84)	-0.004* (0.03)	-0.003 (0.18)	0.000 (0.91)	-0.001 (0.62)
<i>Liquidity</i>					
Cash ratios <sub>SBO,G</sub>	0.028 (0.06)	0.085 (0.32)	0.034*** (0.00)	-0.042 (0.64)	0.188 (0.34)
Current ratios <sub>SBO,G</sub>	-0.001 (0.66)	-0.013 (0.52)	0.000 (0.86)	-0.029 (0.47)	-0.038 (0.41)
<i>Efficiency</i>					
Inventory sales ratios <sub>SBO,G</sub>	-1.621 (0.55)	-0.211 (0.74)	-0.118 (0.83)	-2.886 (0.07)	-3.147 (0.06)
Receivables turnover ratios <sub>SBO,G</sub>	0.010 (0.30)	-0.058 (0.06)	-0.055 (0.09)	0.011 (0.22)	-0.039 (0.07)
Altman z-score	0.088 (0.23)	-0.054 (0.60)	0.118 (0.06)	0.099 (0.14)	-0.281 (0.08)
Intangible asset ratios <sub>SBO,G</sub>	-0.083 (0.54)	0.084 (0.31)	0.002 (0.99)	-0.769** (0.00)	-0.124 (0.63)
log (holding period) <sub>SBO,G</sub>	-0.296 (0.11)	-0.071 (0.28)	-0.025 (0.72)	-0.084 (0.31)	-0.051 (0.58)
log (total assets) <sub>SBO</sub>	-0.000 (0.94)	-0.000 (0.56)	0.000* (0.02)	0.000 (0.56)	-0.000 (0.49)
Macro Controls	YES	YES	YES	YES	YES
Time Dummy	YES	YES	YES	YES	YES
Industry Dummy	YES	YES	YES	YES	YES
Constant	-0.581 (0.95)	7.520 (0.11)	3.729 (0.50)	2.002 (0.80)	-5.672 (0.30)
Adjusted R-Squared	0.358	0.405	0.456	0.490	0.503
Number of observations	106	205	171	135	141

Note: The table above shows the estimates of the OLS model regressing the excess valuation growth during the SBO on the excess variable developments during the SBO. All specifications include the base variables, time controls, industry controls, macroeconomic variables and additional company-specific variables. The specifications are subsamples that represent the target selection criteria identified in the second research question. The t-statistics are reported in parenthesis below the respective coefficients. The significance levels for all specifications are \*\*\*0.1%, \*\*1% and \*5%. The lower case G indicates whether the variable is a measure of excess growth.

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