

Value Generation in Leveraged Buyouts 1989 - 2005

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Abstract

This master's thesis analyses the value generation in LBOs performed by four of the leading private equity firms active in the Swedish market. The thesis, which is based on a highly unique data sample of 72 LBOs taking place between 1989 and 2005, decomposes the value generation into value creation, value capturing and leverage. The mean money multiple in the sample is 4.9 and the average gross IRR is 65 percent. All of the chosen factors of value generation have a significant positive contribution to the value generation, and out of these factors, value capturing has the least impact. The statistical analysis could not support the hypothesis of value creation being the single most important contributor to value generation over the entire sample period. However, we argue that this to some extent is caused by errors in our measure which lead us to underestimate the importance of value creation. Finally, we found that the total value generation and value capturing have decreased over time and that value creation has increased in importance over time.

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1. Introduction

During the past years the leveraged buyout (LBO) market has experienced a huge boom in terms of number of deals and in aggregated value of the transactions. Only in Sweden, companies with an aggregated enterprise value of SEK 35 billion were acquired by buyout funds in 2005 (SVCA, 2006). Fueled by the presumed very good returns in the past, more capital is allocated into the hands of private equity professionals, which in turn has resulted in more transactions. The deals have not only become more numerous, the private equity (PE) firms are no longer restricted to small cap targets but have the financial muscles to successfully compete for larger companies. The recent acquisition of TDC by a consortium of PE firms valued the Danish telecom giant at SEK 125 billion and is the second largest leveraged buyout ever (Jonsson, 2005). The fact that the TDC deal is only overshadowed by the USD 31 billion acquisition of RJR Nabisco in 1989, further indicates that the current LBO activity can only be matched by that of the late eighties (Burrough & Helyar, 1990). In addition, the increased LBO activity has turned the private equity professionals into authorities of the business society.¹

On the other hand, the TDC deal and other high profile deals have got people questioning the phenomenon of leveraged buyouts. Some critics argue that the recent boom of leveraged buyouts is unsound and is nothing but a bubble that is about to burst. They claim that higher and higher valuation by PE firms and an increasing number of so-called secondary buyouts (i.e. private equity firms buying from other private equity firms) are symptoms of a malfunctioning market. Furthermore, “industrialists” say that the returns earned by the PE firms are simply the result of low interest rates and the ability to achieve high debt multiples, without adding any “real” value. As a result, they claim, the market will burst when the supply of debt falls.²

The question of whether the past boom in LBO activity is unsound and if the market will burst leads back to other questions: what factors drive the return and how well do private

¹ Further reading: Froste (2006)

² Further reading: von Platen (2005), Amcoff (2005), Bergin (2006) and Adler (2005)

equity firms perform? Do they just buy companies cheaply and sit back and wait for the value to increase? If the returns from the buyouts are merely the result of bargains and high leverage, one might expect the returns to plummet when the debt supply falls or burst with a stock market crash. This does not seem to be a sustainable strategy and would no doubt prove the critics right.

2. Structure

In order to examine the value generation in buyouts made by PE firms active on the Swedish market, the following structure will be used: We will start by discussing the theory of value generation in leveraged buyouts in section 3. This section is divided into three parts; value creation, value capturing and leverage, each dealing with a different aspect of the value generation process. Having presented our measures of value generation we move on to section 4 where we will present our hypothesis. In section 5 we discuss our methodology and how we have chosen to quantify the subcomponents of value generation. Using the information provided primarily in section 3, 4 and 5 we then present our empirical results and our analysis in section 6. This is followed by our conclusions in section 7.

2.1 Definitions

A leveraged buyout can be defined as a transaction in which a group of investors, typically including the management of the target, purchase a controlling equity stake in a company using debt financing to a large extent. Leveraged buyouts are part of the private equity investment asset class. Venture capital is the second main asset class of private equity and typically refers to investment in new and rapidly growing companies (EVCA, 2006, Strömberg, 2004). We will in this thesis use the terms leveraged buyout, LBO or buyout synonymously. The acquirer will be referred to as the private equity or PE firm. Value generation in this thesis refers to the total amount of equity generated in the buyout.

2.2 Purpose and Contribution

The aim of this master's thesis is to give academics and practitioners in the private equity industry as well as others interested a better understanding of the value generation process in leveraged buyout transactions. We will in this thesis look at the size of the absolute returns and how each factor contributes to the return. We also aim to show how the returns have evolved and how the value generation factors have changed in importance since the 1980s to this day. The focus will therefore be on the total equity generated rather than the risk adjusted return generated to private equity funds' investors.

By examining the actual returns, we hope to uncover some of the uncertainty regarding leveraged buyouts and provide more substance to the debate.

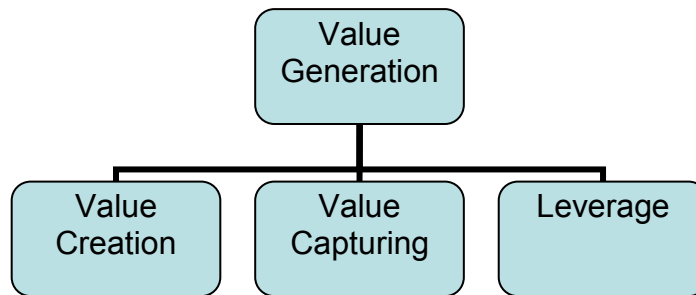
This thesis, which is the first of its kind covering PE firms active in the Swedish market, is also unique in an international context. It will hopefully give a more comprehensive picture of the value generation by private equity firms. Prior studies in the field of value generation in leveraged buyouts often suffer from a lack of access to the highly confidential buyout and deal performance data. As a consequence, articles describing the returns are sometimes based on skilled guesswork of the true numbers or on a very small sample of deals. Prior studies in value generation have almost exclusively focused on the private equity funds and their setup.³ Hence, our study is motivated as it is based on the actual prices paid in these buyout transactions, focuses on the return components in the individual buyouts and uses a large enough sample to allow statistical analysis.

³ For further reading see Kaplan & Schoar (2005)

3. Theory of Value Generation

Previous research has demonstrated that there are a number of mechanisms through which buyouts increase or decrease in value. In this thesis, we will use the term value generation as the broadest definition of increases in equity value. In order to identify the more specific sources of total value generation, we will to some extent use the framework developed by Berg & Gottschalg (2004). We divide the value generation into three dimensions: value creation, value capturing and leverage. Our three dimensions of value generation can be seen in the figure below:

Figure 1. Chart of Value Generation



Value generation occurs throughout the entire buyout process but the different factors' importance varies, depending on the characteristics of the different phases of the investment process. The investment period can be divided into three phases, where the first is the acquisition phase. This usually starts with a process of planning, negotiation and a valuation of the target company. Naturally, this phase has a large influence on the performance of the buyout as it sets a breakeven point for the investment. In this phase the value capturing factor is very much in focus. During the subsequent holding period, the PE firm carries through changes such as the organizational, strategic and operational changes. The final phase of the value generation process is the divestment, or exit phase. The exit can be made in the form of a trade sale, a secondary buyout or an initial public offering. This phase determines the divestment valuation and thereby the total value generation of the investment.

3.1 Value Creation

Value creation is the result of improvements in factors connected to fundamental changes in the portfolio company. Some changes that can lead to value creation are revenue growth and improved margins. Other such factors are reductions in assets, better financing terms and an optimization of capital structure. According to Kaplan & Norton (1989), improved asset utilization can be a source of value creation if the management following the buyout better manages the firm's working capital or dispose of unsound investment plans or underutilized assets. These operational improvements in a buyout process are instigated or enhanced by a number of drivers. The most important drivers will be outlined below.

Expertise

The interaction between management of the target company and the PE firm can lead to effects that influence the value creation. Some argue that the investment managers in PE firms stay closer to the day-to-day work in the target company than a regular board of directors would (Anders, 1992). Also, PE firms usually maintain a large network of industry specialists that can be called upon through the different phases of the buyout (Olson, 2006 and Lindroth, 2006). The PE firms' proximity can also help them detect possible problems relatively early, which enables them to react in an appropriate manner. One example of the benefit of expertise is in the process of financial engineering, where PE firms could provide a better knowledge of the financial solutions available or a better relation with lending institutions (Frankfurter & Gunay, 1992).

Asymmetric Information

Information asymmetry occurs when one party in a transaction has more or better information than the other party. Having different information than the counterparty can lead to a more favorable position for the better informed. Agency theory is a theory concerning asymmetrical information between a principal and an agent of the principal. This asymmetry between agents and the principal is the reality in many business settings, but possibly most severe in high cash flow generating business, i.e. in potential buyout targets (Jensen, 1986). The theory argues that in presence of asymmetrical information, the principal cannot make sure whether the agent really makes the choices that are in the

best interest of the principal or if the agent has put forth maximal effort (Easterwood, 1989).

This implies that fixed wage contracts are not always the best way of organizing the relationship between a principal and the agents (Jensen & Meckling, 1976). Such contracts might create an incentive for the agent not to do his best since his compensation will be the same regardless of the quality of his work or his effort level. When agents do not have an incentive to do their best, it can be more efficient to replace fixed wages with compensation based on the profits of the firm or similar. Such extensions of ownership rights reduce the problems associated with asymmetrical information since they make the agents' compensation dependent on their own performance (Jensen & Ruback, 1983). It can also be seen as a way of changing the point of view of the target company's management from that of a bureaucrat to that of an active businessman or entrepreneur. These incentive structures, which are thought to reduce agency costs, have been referred to as a carrot and a stick by Cotter & Peck (2001).

In combination with changes in the compensation arrangements, an improved corporate governance structure is usually implemented after a buyout. As active investors, PE firms take several actions in order to improve corporate governance in the target companies. Jensen, (1989a) describes the active investor as investors who “actually monitors management, sits on boards, is sometimes involved in dismissing management, is often intimately involved in the strategic direction of the company, and on occasion even manages”. The increased involvement of the PE firm is thought to lead to a better corporate governance structure which should further reduce any agency problems (Jensen, 1989b).

In LBOs, changes in the governance, ownership and compensation structure of the target company are all commonly implemented. These methods of mitigating problems associated with asymmetrical information available to PE firms are not all available to regular firms. This should make them into valuable drivers of value creation in the buyout process.

3.2 Value Capturing

The second cornerstone in our three factor value generation model is value capturing. This is the value generated from changes in the valuation of a company between the time of acquisition and exit, independent of changes in the underlying performance of the business. Hence, it is often called multiple arbitrage among practitioners. Value capturing is, simply put, a buy low and sell high approach and a strategy where each dollar earned by the target company is valued differently at acquisition and divestment. This change is often expressed as a change in the enterprise value over EBITA multiple. There are at least five fundamental reasons for value capturing in a leveraged buyout: changes in market valuation, private information about the target, superior market valuation, superior deal making capabilities and optimization of the corporate scope (Berg & Gottschalg, 2004).

Changes in Market Valuation

Changes in the valuation multiple for the target over the holding period might be the result of an overall change in the market's valuation of the sector in question. This means that a shift in valuation of the target company's peer group also affects the value of the target. The strategy, often called multiple riding by practitioners, is in some cases the result of private equity professionals taking advantage of the fact that companies with the same characteristics are from time to time valued differently in the public market compared to the private market, or there exists a gap in the valuations between two geographic markets (Olson, 2006).⁴

Private Information

Earning multiple arbitrage due to the acquirer taking advantage of private information has been frequently discussed in the academic literature.⁵ This source of value capturing might be especially important in management buyouts, as the management group of a company often possesses information about the company's prospects superior to that of its owners. In extreme cases, the management could deliberately manipulate earning forecasts in order to suppress the enterprise value of the target (DeAngelo, 1986). Even

⁴ An example of the latter is the fact that for quite some time, biotechnology firms were consequently higher valued in the USA compared to Europe.

⁵ For example see De Angelo (1986) and Lowenstein (1985)

though private information continues to be a source of value capturing, the importance of the factor is said to have declined. As leveraged buyouts have become more common, the professionalism of the vendor has steadily increased and today the vendor party not only frequently use external advisors to value the company but also, open auctions have become a standard selling procedure.⁶ The auction process, as well as stricter regulatory disclosure requirements, has come to limit the scope of value generation through private information (Wright et al., 2001).

Superior Market Information

Value capturing may not only be the result of superior information due to private information but simply due to unique expertise in assessing the value of a business based on market intelligence. The PE firms attain the market information via their widespread network of experts and managers in the industry in question, but also through careful due diligence (Berg & Gottschalg, 2004).

Superior Deal Making Capabilities

Deal making includes the ability to identify suitable targets, limit the competition from other potential buyers and manage the negotiation in an acquisition or divestment. One of the most crucial parts in doing a good deal is to limit the competition from other potential buyers. In an exclusive negotiation the buyer and seller agree on a price somewhere in the range of the two parties' valuation. On the other hand, in an auction the price should, according to standard economic theory, lead to bids around the valuation of the second highest bidder, thus reducing the value capturing gains (Barney, 1988). Furthermore, deal making capability also includes knowing when to exit and finding the right buyer.

Another explanation of superior deal making capabilities could be that financial buyers have a bigger purchasing power as they screen dozens of deals for every one they execute. Moreover, they are, in contrast to strategic buyers, not restricted to any specific industry. The deal making process is very important for the PE firms and often something the PE

⁶ This has been mentioned in all of our interviews. For example Olson (2006), Kari (2006) and Jansson (2006)

professionals are being trained in (Butler, 2001). In addition they benefit from a larger deal making experience compared to most trade buyers (Anders, 1992).

Optimization of Corporate Scope

By identifying and exploiting so called conglomerate discount effects or visualizing hidden values, PE firms can gain a good return on their investments. Through the sale of peripheral undervalued businesses, the PE firm can remove the conglomerate discount and benefit from the appreciation in the total price of the portfolio company. This strategy, more known as asset stripping, has been widely used in Sweden during the early 1990s. Buyout firms can also optimize the corporate structure by doing add-on acquisitions to the original investment. By taking advantage of its strong financial muscles the multiple of the portfolio company can increase after the add-on acquisition. This could be the result of taking advantage of economies of scale and achieving stronger monopoly or monopsony power.

3.3 Leverage

The term “leveraged buyout” implies that debt is a very important factor in a LBO transaction. The debt is important in many ways. Firstly, debt is the main financing form and usually constitutes between 60 to 80 percent of total capital (Bain & Co, 2005). In an LBO, some portion of the debt incurred is secured by the assets of the acquired business. The cash flows generated by the target company are then used to service the debt. As there are several types of financing available, under different conditions for different firms, a PE firm can sometimes assist in constructing a new financial structure at better terms. The main debt components in a LBO are usually senior debt, mezzanine, high yield and pay in kind (Forsberg & Karam, 1999).

In order to understand the fundamental value of debt in an LBO transaction we start off with Modigliani-Miller’s basic theorem. It states that in an efficient market with no transaction costs and in the absence of taxes, bankruptcy costs, and asymmetric information, the value of a firm is independent of its financing. Or put differently, if the capital structure has no impact on the cash flow generated by the firm, the decision will have no effect on the total value of the company. Hence, it does not matter if the firm's

capital is raised by issuing stock or selling debt. In this world the effect of debt will only be as a lever of the return (Grinblatt & Titman, 1998). To see this look at the following well known formula:

$$R_e = ROA + (ROA - R_D) * D/E$$

Where,

R_e = *Return on Equity*

ROA = *Return on Assets*

R_D = *Return on Debt*

D = *Debt*

E = *Equity*

However, Modigliani-Miller's basic theorem is based on a number of unrealistic assumptions. The most obvious unrealistic assumption is perhaps that of no taxes. The presence of taxes strongly influences the cash flows of the firm and thereby the value of debt and equity. Modigliani-Miller's theorem from 1963 takes into account the effect of taxes (Grinblatt & Titman, 1998). Their first proposition states the following:

$$V_L = V_U + T_C * D$$

Where,

V_L = *Value of a levered firm*

V_U = *Value of an unlevered firm*

T_C = *Corporate tax rate*

D = *Value of debt*

Since corporations can deduct interest payments, increased debt financing lowers tax payments and thereby increases the value of the firm. Hence, the value increase of the levered firm, compared to an all equity financed firm, is equal to the value of the tax shield of the debt. Furthermore, debt still acts as a lever on the return. However, the formula is somewhat adjusted in order to take into account the effect of taxes:

$$R_e = (ROA + (ROA - R_D) * D/E) * (1 - T_C)$$

This implies that the primary positive effects from leverage are associated with the gains as a lever of the return and from the tax shield. However, the effects from leverage in the real world are not as straightforward as one might think after glancing at the above formulas. If you further relax Modigliani-Millers underlying assumptions (of no transaction or bankruptcy costs and no asymmetric information), the gain from debt financing will decrease, or in certain situations even erase the gain from the tax shield (Butler, 2001).

Apart from positive effects such as the tax shield, leverage can also be used to reduce the problems associated with asymmetrical information. A high level of debt may force the management of a target company to constantly generate enough free cash flow to service the debt payments. This increased “discipline” required to service large amounts of debt can be yet another way of dealing with possible agency problems. In this sense, increased leverage can be seen as a very important contributor to value generation (Jensen, 1986, 1989a, 1989b).

4. Hypotheses

Our hypotheses cover three broad questions: (1) How large is the value generation? (2) How is the value generated? (3) How has the value generation changed over time? Our first hypothesis is attached to the first question, while hypotheses two to seven cover how the value is generated. Finally, hypotheses eight to eleven cover the third of our broad questions, namely how the value generation has changed over time.

1) The Value Generation is positive

The increased involvement of the PE firm is thought to lead to a better corporate governance structure which should further reduce any agency problems and thereby lead to larger value generation (Jensen, 1989b). Further more, this hypothesis is in line with empirical studies on the amount of equity generated in the Swedish private equity market (EVCA, 2006).

2) Value Creation has a positive impact on total Value Generation

This would be a consequence of the reduced agency costs when the company receives one single active owner. Value creation is also positively linked to the increased discipline of the managers due to better corporate governance and increased incentives for the management. We therefore expect a strong contribution from value creation.

3) Value Capturing has a positive impact on total Value Generation

Value Capturing is according to Berg & Gottschalg (2004) an important lever of value generation in LBOs. The gain from value capturing is among other the result of taking advantage of private information about the target and benefit from a large deal experience and thereby performing a thorough valuation (DeAngelo, 1986 and Anders, 1992).

4) Leverage has a positive impact on total Value Generation

This hypothesis is in line with Modigliani-Miller's theorem with taxes from 1963. According to the first proposition, the value of the firm increases proportionally with the net debt to equity ratio and several studies have emphasized the importance of leverage in

LBOs (Frankfurter & Gunay, 1992 and Jensen, 1986). Furthermore, the leverage would contribute to the value generation as a lever of the returns.

5) Value Creation is the most important factor in total Value Generation

Many empirical studies highlight the gains of value creation as a result of the active ownership characterized by the LBO setting.⁷ In addition, the importance of value creation is frequently emphasized by private equity professionals (Olson, 2006 and Jansson, 2006).

6) Value Capturing is the least important factor in total Value Generation

We find no theories supporting a strong gain from value capturing and previous studies indicate that the gain from value capturing has been reduced by the stricter regulatory rules regarding insider information and that the open bidding process has been more widely used (Wright & Robbie, 1996).

7) Margin Enhancement is the most important factor in total Value Creation

Research suggests that most of the value creation comes from margin enhancement rather than revenue growth. Numerous studies have shown that the operating margins for the company increase after the buyout (Loos, 2005 and Opler, 1992). However, research regarding the revenue growth has shown mixed results (NUTEK, 2005 and Loos, 2005).

8) Total Value Generation has decreased over time

This hypothesis is in line with studies performed by EVCA (2006) and SVCA (2006). Furthermore, this trend is in line with fundamental economic theory which states that the excess return achieved in an industry is bound to decline as the competition increase.

⁷ For a review of studies see Jensen, (1989b)

9) Value Capturing has decreased in importance over time

Previous studies indicate that the gain from value capturing has been reduced by the stricter regulatory rules regarding insider information and that the open bidding process has been more widely used (Wright & Robbie, 1996). As the competition in the Swedish private equity market has increased and the open bidding process currently is a standard procedure, it is natural that the probability of striking a bargain has declined.

10) Value Creation has increased in importance over time

As the gain from value capturing has decreased we expect the gain from value creation, at least in relative terms, to have increased. Furthermore, representatives from the PE industry state that they today focus more systematically on operational improvements in the target (Engzell-Larsson, 2005).

11) Leverage has not changed in importance over time

We expect the gain from leverage to be unchanged over time. This is due to some contradicting trends. On the one hand, leverage multiples in buyouts seem to have declined throughout the 1990s, at least internationally. On the other hand, the high yield market has experienced a boom for the past couple of years and as a consequence, the debt multiples have increased again. Hence we do not expect a clear trend in the importance of leverage.

5. Methodology

The chosen methodology is partly based on previous research,⁸ but it is also influenced by the practitioners' point of view as a result of formal and informal meetings with private equity professionals during the course of this thesis. We will start by explaining how we collected the required data and thereafter present the methodology for our three broad questions.

5.1 Data Collection

Evaluating the hypotheses presented in section five requires data that is not publicly available. Private equity firms usually consider the acquisition price, sell price and their return to be very sensitive data and they are in general very reluctant to hand it out. In order to get this information we had to approach the firms directly and ask for their cooperation. Initially, we approached five of the leading PE firms active on the Swedish market, and asked to see all of their realized investments. Cooperating with these firms would enable us to fulfill several important criteria. The following are the main reasons why we chose these particular firms:

1. The chosen PE firms offer a wide range of target companies in terms of size and industry. This is important as we would like our sample to be a good proxy for all LBOs performed in Sweden.
2. The chosen PE firms all have a long history of activity in Sweden. They therefore offer transactions that span a relatively long time period. This is fundamental to us, as we also want to examine variation over time.
3. The chosen firms provide us with quite a large sample of transactions. This is important, not only in order to achieve a large sample per se, but also since it is very time consuming to gather the information from each PE firm.

⁸ Compare Loos (2005) and Berg & Gottschalg (2004)

Of the five PE firms we approached, four chose to participate and finally received data for 74 transactions. Consequently, nine were excluded by the PE firms for different reasons. According to the PE firms, this was due to the structure of the transactions, i.e. the buyouts not being fully realized yet or not traditional buyouts, but rather private placements. Hence, we have no reason to believe that these transactions were excluded due to underperformance. We therefore assume no positive bias in our sample.

Out of these 74 deals, we excluded two since one transaction was not fully realized and the other was not a traditional buyout, which made the analysis meaningless in this context. The final sample includes 72 transactions in a wide range of industries and covers the period from 1989 to 2005. The target companies have a mean enterprise value at entry of SEK 650 million and median of SEK 149 million. The majority of the sample consists of Swedish targets, and of the foreign target companies, the bulk are from other Nordic countries. We choose to incorporate all of the buyouts in our sample as they have all been carried out by PE firms with a focus on the Swedish market. The data we requested was in most cases the following; the enterprise value, acquisition price, revenue, EBITA and equity figures for both the entry and exit years as well as the date of the entry and exit.

One complexity in analyzing the data arises from the PE firms' penchant for using different measurements and key ratios, such as EBITA versus EBITDA. As we only use these measures to produce multiples comparing the entry and exit years for the companies individually, we argue that these differences are eliminated. Due to the restricted information available to us, it has not always been possible to properly account for recapitalizations, add-on acquisitions, dividends and other events that influence the value or structure of the target companies. In order to minimize this problem, the total value generated and the money multiples will be at the center of attention in our analysis rather than the commonly used, but more ambiguous internal rate of return (IRR) measure. We call the IRR ambiguous in this case because of the large impact of events such as dividends and recapitalizations and the importance of their point in time for the size of the IRR.

In those cases where some relevant data was not available, we had to work out a way to get around that problem. When we had a reliable figure for the EV/EBITA multiple and the enterprise value, we used that information to calculate the EBITA.⁹ The EBITA and revenues are mostly LTM adjusted figures. These are calculated using a weighted average from the twelve months prior to entry and exit dates. Where this was not possible, we used the revenue figures for the previous fiscal year. If the IRR was not available from the PE firm, we calculate it based on the assumption that the full amount of equity was invested at the time of acquisition and that no multiple exits were made.

As the data needed for this thesis is highly confidential and has been provided for us by the PE firms themselves, certain difficulties arise. Firstly, we will not be able to verify all the data nor will we be able to present them in absolute numbers to the reader for verification. Instead, we will present the empirical results in percentage and multiple formats without mentioning the names of the individual targets or giving any reference to the corresponding PE firms. This is the downside of being able to carry through this analysis. It may also be in the interest of an information provider to present only successful cases or adjusting the numbers in the direction favorable for them. This problem has been mitigated to some extent by crosschecking the data for some of the investments with publicly known figures. However, some of the problems of verifiability remain.

5.2 How large is the Value Generation?

We will in this section describe our method of quantifying the total value generation. As mentioned earlier, we define value generation as an increase in equity. This measure of return is not adjusted for the different levels of risk in the investments, i.e. debt level, industry characteristics and firm specific risk. Hence, in our model, debt working as a leverage of the return will have a value attributing characteristic.¹⁰

⁹ EBITA is sensitive to LTM (last twelve months) adjustments.

¹⁰ According to basic finance theory, the leverage effect of debt will not increase the value of the company, since the higher debt to equity ratio will raise the risk of the investment and consequently the required rate of return. Hence, the increased risk will work as a counterweight of the increased equity generation in absolute numbers. Since, we are interested in non risk adjusted return, this does not influence our analysis.

We have chosen to calculate the return both in terms of gross IRR and money multiple format. The IRR is calculated in the following way:

$$IRR = \left[\frac{Equity_{exit}}{Equity_{entry}} \right]^{(1/Holding\ period)} - 1$$

As can be seen in the formula, the advantage of using the IRR measure is that it takes into account the length of the investment.¹¹ Furthermore, it is by far the most widely used return measure in the LBO industry (Loos, 2005). All PE firms in our sample use it in their communication with investors and it is often the answer to the question: “What is your return?”. The net IRR is calculated after deducting the fund’s management fee as well as carried interest. The latter part represents the PE firm’s share of the profit and is often set at 20 percent. The net IRR would be appropriate if one would evaluate private equity as an investment asset class, but since the objective of this thesis is the value generation in the individual target companies, gross IRR is a more correct measure.

Nevertheless, the IRR measure can be seriously flawed if one does not account for all intermediate cash flows during the holding period. This is to a large extent the case for LBOs, where there usually exist a number of intermediate cash flows. Firstly, many PE firms use a buy-and-build strategy with several add-on acquisitions. Secondly, in most of the transactions the PE firm realizes the equity generated at several points in time. One common way to realize part of the return during the holding period is to do a recapitalization of the target. In the recapitalization the PE firm usually lever up the target to the original net debt/equity ratio and use the proceeds to pay out dividends. Moreover, many LBOs are exited in an IPO process where the PE firm’s equity stake is gradually decreasing over a long period. Since we have not had access to detailed information of all these different cash flows for the transactions in our sample, we cannot in all cases calculate the exact gross IRR. Thus, the IRRs will for some investments deviate from the ones calculated by the PE firms.¹²

¹¹The time value aspect of the IRR measure is, however, not very important in this thesis as we are primarily interested in breaking up the equity generation into different components.

¹²The mentioned problems have been present in earlier studies of value generation as well and have caused the calculated IRRs to deviate from the ones calculated by the PE firms (Loos, 2005).

As a consequence of these caveats, the IRR measure will not be the main focus in this thesis. Instead, the primary measure of value generation will be the money multiple format. Money multiple is simply the equity generated of the investment divided by the invested capital:

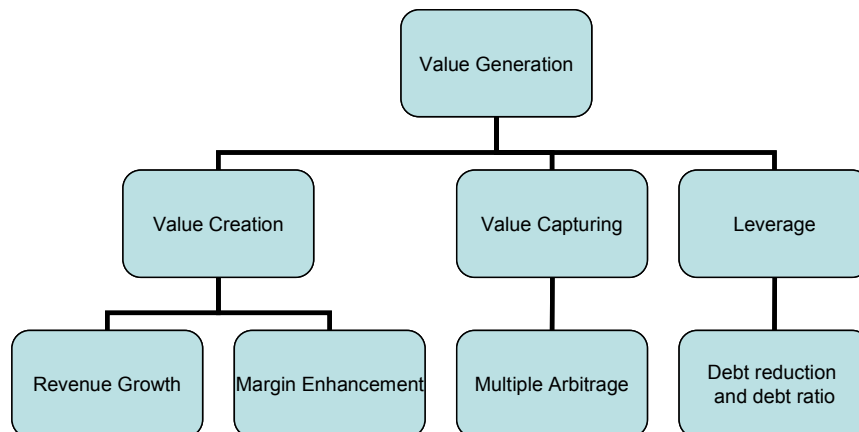
$$\text{Money Multiple} = \left[\text{Equity}_{\text{exit}} / \text{Equity}_{\text{entry}} \right]$$

The advantage of the money multiple format is that it is robust to intermediate cash flows and at the same time presents the return in relation to the invested capital. As is the IRR, this format is widely used in the private equity industry. In the next section, we will describe our fundamental value-driving subcomponents and the logic underlying them.

5.3 How is the Value Generated?

In this section, we will describe how we quantify the theoretical drivers of value generation. According to the theoretical framework, value generation is the result of value capturing, value creation and leverage. In order to evaluate the different factors' effect on total value generation, we break them up into measurable parameters. Revenue growth and margin enhancement are our measures of value creation while multiple arbitrage is chosen as a proxy for value capturing. Leverage will be measured through a combination of net debt reduction and the initial net debt ratio of the target company. These different factors and their subcomponents can be seen in the following figure.

Figure 2. Chart of Value Generation and its Main Factors



The revenue growth parameter in figure two is simply the change in revenue of the target over the holding period. Margin enhancement is measured as the change in operating margins.¹³ Increased revenue or operating margins will, ceteris paribus, increase the equity value of the company. The joint effect of these two measures constitutes what we call value creation. The impact of value creation can be presented as:

$$Value\ Creation = \left[Revenue_{exit} / Revenue_{entry} \right] * \left[(EBITA_{exit} / Revenue_{exit}) / (EBITA_{entry} / Revenue_{entry}) \right]$$

This measure of value creation is a simplification, as the effect of an increase in earnings due to revenues or margins, is shown only at the end of the investment. In reality, the equity holders benefit immediately from the increase in cash flow due to increased earnings. Hence, the measure will on average understate the importance of value creation. Further more, the measure of value creation does not only include organic value creation, but also revenue gains and margin enhancement through add on acquisitions.

The multiple arbitrage factor is measured as the change in enterprise value multiples. The multiples are based on either EBITDA or EBITA, depending on the available data. We express value capturing as:

$$Value\ Capturing = \left[Enterprise\ Value_{exit} / EBITDA_{exit} \right] / \left[Enterprise\ Value_{entry} / EBITDA_{entry} \right]$$

The residual value generation, which has not yet been accounted for in our model, is what we have chosen as our measure of leverage:

$$Leverage = \left[Equity_{exit} / Equity_{entry} \right] / \left[Enterprise\ Value_{exit} / Enterprise\ Value_{entry} \right]$$

This measure takes into account the amount of gearing in the transaction and the level of net debt amortization. According to the formula, the leverage effect will increase with the

¹³The operating margin is in most cases measured as the change in EBITA margin over the holding period, but depending on the data available, it is sometimes measured as the change in EBITDA.

initial net debt to equity ratio. To see this, consider an increase in the total enterprise value and a net debt to equity ratio larger than one. As long as the net debt remains constant, an increase in the total enterprise value will result in an even larger relative increase of the equity stake. Hence, the leverage effect will contribute positively to the total money multiple.

However, our measure of leverage has some inherent weaknesses. One is that it becomes larger the more debt is being amortized. This net debt amortization is not primarily an effect of leverage, but rather strong cash flow generation from the operations. This is most obvious when the equity of the target remains constant between entry and exit. The leverage measure will then only measure the relative change in net debt and can be seen purely as measure of increased cash flows. Also, the measure does not explicitly capture the effect of the tax shield. Hence, our measure of leverage incorporates effects that are not entirely coherent with our theoretical framework (see section 3.3). These difficulties have been present in other studies and we argue that it is a result of lack of more detailed data (Heel & Kehoe, 2005). Combining the formulas above gives us our measure of total value generation:

$$\underbrace{\text{Money Multiple}}_{\text{Value Generation}} = \left[\underbrace{\left(\frac{\text{Revenue}_{\text{exit}}}{\text{Revenue}_{\text{entry}}} \right)}_{\text{Revenue Growth}} * \underbrace{\left(\frac{\text{EBITA}_{\text{exit}} / \text{Revenue}_{\text{exit}}}{\text{EBITA}_{\text{entry}} / \text{Revenue}_{\text{entry}}} \right)}_{\text{Margin Enhancement}} \right]_{\text{Value Creation}}$$

$$* \left[\underbrace{\left(\frac{\text{EV}_{\text{exit}} / \text{EBITA}_{\text{exit}}}{\text{EV}_{\text{entry}} / \text{EBITA}_{\text{entry}}} \right)}_{\text{Value Capturing}} * \underbrace{\left(\frac{\text{Equity}_{\text{exit}} / \text{Equity}_{\text{entry}}}{\text{EV}_{\text{exit}} / \text{EV}_{\text{entry}}} \right)}_{\text{Leverage}} \right]$$

To see the different factors relative importance, we want to transform the multiples into percentages of the total value generated. This is done by taking the natural logarithm of the factors and dividing them by the natural logarithm of the total money multiple:

$$\begin{aligned}
 \text{Money Multiple} = & \left[\ln(\text{Revenue}_{\text{exit}} / \text{Revenue}_{\text{entry}}) / \ln(\text{Equity}_{\text{Exit}} / \text{Equity}_{\text{Entry}}) \right] \\
 + & \left[\ln \left[(\text{EBITA}_{\text{exit}} / \text{Revenue}_{\text{exit}}) / (\text{EBITA}_{\text{entry}} / \text{Revenue}_{\text{entry}}) \right] / \ln(\text{Equity}_{\text{Exit}} / \text{Equity}_{\text{Entry}}) \right] \\
 + & \left[\ln \left[(\text{EV}_{\text{exit}} / \text{EBITA}_{\text{exit}}) / (\text{EV}_{\text{entry}} / \text{EBITA}_{\text{entry}}) \right] / \ln(\text{Equity}_{\text{Exit}} / \text{Equity}_{\text{Entry}}) \right] \\
 + & \left[\ln \left[(\text{Equity}_{\text{exit}} / \text{Equity}_{\text{entry}}) / (\text{EV}_{\text{exit}} / \text{EV}_{\text{entry}}) \right] / \ln(\text{Equity}_{\text{Exit}} / \text{Equity}_{\text{Entry}}) \right]
 \end{aligned}$$

Given that changes in the individual factors' are only measured at the time of entry and exit, their relative importance in total value generation does not depend on which measure one uses, i.e. money multiple or IRR.

5.4 How has the Value Generation changed over time?

In order to measure how the different subcomponents of value generation have changed over time, we split the sample period in half. The first group consists of all transactions entered between 1989 and 1996. This period of eight years includes 39 LBOs. The second group includes 33 LBOs, taking place between 1997 and 2005. Our hypotheses will be tested by performing unpaired t-tests where we test if the factors are significantly different in the two groups.

5.5 Case Study: Value Generation in M&M

In order to illustrate how we will calculate the different subcomponents and how they contribute to the total value generation, we have chosen to present a short example of value generation in the fictional company M&M.¹⁴ M&M was subject to a buyout in January of 2004. At the time of acquisition, the company was valued to 1000 MSEK, of which 400 was net debt and the remainder was equity. In this case, the holding period

¹⁴ The reason for choosing a imaginary company is that the confidentiality agreements with the participating private equity firms restricts us from presenting all the data needed to describe how the equity was generated in a real transaction.

was two years and at exit the enterprise value was 1700, of which 200 was net debt and 1500 was equity. In addition, we need the EBITA of 100 and 200 at the entry and exit respectively, as well the revenue, which amounted to 900 for the entry and 1400 for the exit year. All values are expressed in MSEK.

Figure 3. Value Generation in M&M

| Value Generation Analysis: | | | M&M | | | | |
|--|--------------------------------|------------------------------|-------------------------|---------------------------|-----------------------|--|--|
| (M SEK) | | | | | | | |
| <u>Time of Acquisition</u> | <u>EV</u> | <u>Debt</u> | <u>Equity</u> | <u>EBITA</u> | <u>EBITA Multiple</u> | | |
| 2004-01-01 | 1 000.00 | 400.00 | 600.00 | 100.00 | 10.00x | | |
| <u>Revenue</u> | <u>EBITA Margin</u> | | | | | | |
| 900.00 | 11% | | | | | | |
| <u>Time of Exit</u> | <u>EV</u> | <u>Debt</u> | <u>Equity</u> | <u>EBITA</u> | <u>EBITA Multiple</u> | | |
| 2006-01-01 | 1 700.00 | 200.00 | 1 500.00 | 200.00 | 8.50x | | |
| <u>Revenue</u> | <u>EBITA Margin</u> | | | | | | |
| 1 400.00 | 14% | | | | | | |
| <u>Holding Period (in months)</u> | <u>Change in EV</u> | <u>Change in Debt</u> | <u>Change in Equity</u> | <u>Change in Multiple</u> | | | |
| 24 | 700.00 | -200.00 | 900.00 | -1.50x | | | |
| <u>Change in Revenue</u> | <u>Change in Profitability</u> | | | | | | |
| 56% | 3 perc. units | | | | | | |
| <u>EBITA change(revenue)</u> | <u>EBITA change(margin)</u> | <u>Total change in EBITA</u> | | | | | |
| 55.56 | 44.44 | 100.00 | | | | | |
| Value generated in money multiple format | | | | | | | |
| <u>Revenue Impact</u> | <u>Profitability Impact</u> | | | | | | |
| 1.56 | 1.29 | | | | | | |
| 48% | 27% | | | | | | |
| <u>Total Earnings Impact</u> | <u>Multiple Arbitrage</u> | | <u>Leverage</u> | <u>Money Multiple</u> | <u>IRR</u> | | |
| 2.00 | 0.85 | | 1.47 | 2.50 | 58% | | |
| 76% | -18% | | 42% | 100% | | | |

Using the base data provided and the formulas presented in the previous sections, we start by producing EBITA margins and EV/EBITA multiples for the entry and exit years. Calculating EBITA through revenue for the entry and exit years gives us a margin that increases from 11 to 14 percent. Next, we divide the enterprise value for each year with the corresponding EBITA to produce the EV/EBITA multiples, that can be found to the far right in the table. As can be seen, this multiple decreases from 10 to 8.5 times EBITA between the entry and exit years. Just by looking at the numbers we can also see that the net debt has been reduced by 200 and equity has increased by 900. This tells us that, assuming no recapitalizations or dividends, the target company has produced enough free cash flow to generate 900 in equity at the same time as 200 in net debt was repaid. Dividing the exit year equity value of 1500 with the 600 of the entry year gives us a money multiple of 2.50. The annualized value of this multiple is 1.58 which implies an IRR of 58 percent.

The money multiple of 2.50 can be decomposed into what we have identified as the main subcomponents. These multiples represent different aspects of value generation in buyouts. We do this by calculating the components of total earnings impact, namely revenue impact and margin impact:

$$\text{Revenue impact} = (1400/900) = 1.56 \quad \text{Profitability impact} = (14/11) = 1.29$$

The total earnings impact of 2.00 is simply the revenue and margin factors multiplied. The multiple arbitrage factor is calculated by dividing the EV/EBITA multiple at exit with the corresponding figure at entry. This gives us:

$$\text{Multiple Arbitrage} = (8.5/10.0) = 0.85$$

The impact of leverage is calculated by taking the change in equity over the change in Enterprise Value. Hence, the leverage calculation in the M&M case is the following:

$$\text{Leverage} = (1500/600) / (1700/1000) = 1.47$$

These factors can be seen in the lower section of table one and it is our central and most straightforward method of decomposing and quantifying the value generation in buyouts. As can be seen, all factors except the multiple arbitrage of 0.85, are larger than one and therefore have a positive impact on the total value generation. Multiplying these factors gives us the total money multiple of 2.50. To see the relative importance of each factor we transform them into percentages by taking the natural logarithm of the factors. Hence, the factors presented as percent of total value generated are:

| | | |
|---|--|---|
| $\underbrace{\ln(1.56) / \ln(2.5) = 48\%}_{\text{Revenue in \% of Total Value Generation}}$ | $\underbrace{\ln(1.29) / \ln(2.5) = 27\%}_{\text{Margin in \% of Total Value Generation}}$ | $\underbrace{\ln(2.0) / \ln(2.5) = 76\%}_{\text{Earnings in \% of Total Value Generation}}$ |
| $\underbrace{\ln(0.85) / \ln(2.5) = -18\%}_{\text{Multiple Arbitrage in \% of Total Value Generation}}$ | $\underbrace{\ln(1.47) / \ln(2.5) = 42\%}_{\text{Leverage in \% of Total Value Generation}}$ | |

These percentage values are the ones found in the lowest field in table one. They are useful as they help us decompose the money multiple and quantify our variables of value generation. The interpretation of these numbers is that revenue, margin enhancement and

leverage all have a positive impact on the money multiple in this particular transaction. On the other hand, the decreased EV/EBITA multiple has a negative impact of 18 percent on the total money multiple. The leverage impact of 42 percent is an interesting measure because it incorporates the gearing used in the transaction as well as the amount of net debt that has been amortized. Adding the revenue impact to the margin enhancement then gives us what we call total earnings impact, in this case 76 percent. This tells us that value creation is the most important factor in total value generation in this transaction.

6. Results and Analysis

In this section, we will comment on our results and give a brief overview of other research performed in this area. It is our intention to find and highlight any differences or similarities with our results. Unfortunately, there is relatively little research available regarding the factors that drive the return in LBOs. One reason is that this type of research requires access to confidential data. Previous research has to a large extent evaluated the risk and returns on LBO funds from an investor perspective only, and is therefore not relevant for this study. We have chosen to divide our analysis broadly along our three questions from the methodology section.

6.1 How large is the Value Generation?

Firstly, we want to establish whether the value generation is positive in our sample of buyouts. We will do this by calculating the mean of our proxy for value generation, the money multiple, and performing a t-test.¹⁵ The null hypothesis in this test is that the mean of the money multiple is equal to one, i.e. no additional value is generated. According to our hypothesis, we should be able to reject the null hypothesis in favour of a mean larger than one. The result is as follows:

Table 1. Mean Money Multiple and gross IRR

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|-----------------|--------|---------------|-----------|--------------------------|--------------------|
| Money Multiple | 69 | 4.947976 | 3.622094 | 4.077854 | 5.818098 |
| IRR | 70 | 64.72276 | 56.94786 | 51.14402 | 78.30149 |
| Ho: mean MM = 1 | | | | | |
| Ha: diff < 1 | | Ha: diff != 1 | | Ha: diff > 1 | |
| Pr(T < t) = | 1.0000 | Pr(T > t) | = | 0.0000 | Pr(T > t) = 0.0000 |

As can be seen in table one, the mean money multiple is significantly larger than one at the five percent significance level. This supports our first hypothesis. A mean money multiple of 4.95 indicates that each SEK initially injected, on average, amounted to 4.95 SEK in equity value at the exit. Also included in table is our mean gross IRR of approximately 65 percent. As our sample includes a mixture of Swedish and other European targets, one could expect a return in-between the Swedish and European

¹⁵ All mean values in the analysis are adjusted for outliers.

average returns. However, according to the EVCA (2006), the pooled net IRR for European buyout funds since inception is 12.3 and the corresponding figures for Swedish and US buyout funds are 24.4 and 13.7 percent, respectively (SVCA, 2006). This indicates that our sample outperforms its Swedish and European counterparts.

However, the comparison of returns is subject to a couple of caveats. Firstly, this type of research is mostly based on private data that has been disclosed by the PE firms themselves. Hence, there is some uncertainty regarding the objectivity and comprehensiveness of the data. Secondly, when considering the fact that our mean IRR is considerably higher, one has to bear in mind that we use the gross IRR of each individual buyout and not the fund returns net of fees. Furthermore, as the returns are not industry adjusted, the different returns could simply be due to differences between the industries in which the buyouts have taken place, rather than differences in the regional PE market or PE firms.

On the other hand, it is difficult to explain the discrepancy in returns entirely through these caveats. Firstly, the shortcoming regarding subjectivity is not only present in our study, but in all studies of LBO performance. Hence, it is hard to see that the subjectivity and bias should be larger in our sample and explain the higher returns. Secondly, it is not likely that an adjustment of the PE firm's fees would mitigate the differences in returns. Thirdly, as the transactions cover a wide range of industries and over a long period of time, it seems unlikely that the composition of the industries in the analyzed transactions can explain the higher returns in the sample.

This out-performance could to some extent be explained by PE firms taking advantage of the smaller and less liquid Swedish financial market, which could increase the possibility for professional PE firms to generate value. The four PE firms in our sample are among the first active in the Swedish market and consequently they should benefit from a large industrial network and lots of deal experience. This should be a big advantage through the different phases of the buyout process. Our view is supported by Kaplan & Schoar (2005), who find that older PE firms consistently outperform their younger counterparts. Loos

(2005) argues that PE firms with the best track record are the ones that more easily can attract capital and therefore continue to outperform their peers. As the PE firms in our sample are among the oldest and largest active in the Swedish market, it should not come as a surprise if they outperform the Swedish PE market as a whole. The substantial value generation can also be the result of the PE firms' active ownership. This is in line with the theory of Jensen (1989b), who claims that the corporate governance in buyouts is superior to that of public corporations. In our meetings, the representatives of several PE firms have emphasized the importance of improved corporate governance and being an active investor. It is therefore reasonable to believe that this, to a large extent, is the reason for the large amount of value generated.

6.2 How is the Value Generated?

After concluding that the value generation is not only positive, but quite substantial, we ask ourselves; how is this value generated? We will in this section decompose the value generated into value creation, value capturing and leverage.

Value Creation

We expect that value creation should have a positive impact on total value generation. If this hypothesis is true, the mean of our proxy for value creation, the total earnings impact (i.e. the combined effect of revenue growth and margin enhancement), should be significantly larger than one in the t-test. Again, a rejection of the null hypothesis, in favour of mean larger than one, supports our hypothesis.

Table 2. T-test of the impact of Total Earnings

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|-----------------------|--------|---------------|-----------|--------------------------|--------------------|
| Total Earnings | 66 | 2.018114 | 1.189447 | 1.725712 | 2.310517 |
| Ho: mean = 1 | | | | | |
| Ha: mean < 1 | | Ha: mean != 1 | | Ha: mean > 1 | |
| Pr(T < t) = | 1.0000 | Pr(T > t) | = | 0.0000 | Pr(T > t) = 0.0000 |

As can be seen in table two, our hypothesis of a mean larger than one for the total earnings impact is significant at the five percent level, i.e. value creation has a positive impact. Our mean total earnings multiple tells us that if multiple arbitrage and leverage did not have any impact (i.e. multiples equal to one), the injected equity would, on average, double its value until the exit.

Judging by the statistical analysis, there seems to be no doubt about value creation having a strong positive impact on the total value generation. The question then becomes; what drives this value creation: revenue growth or margin enhancement? As we outlined in section five, we expect margin enhancement to be the most important factor. In order to test this hypothesis, we test our two components against each other using an unpaired t-test. If our hypothesis holds, the mean of the margin enhancement multiple should be significantly larger than the mean revenue growth multiple.

Table 3. Comparison of Revenue Growth and Margin Enhancement

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | |
|-------------|--------|-----------|-----------------|--------------------------|-------------|--------|
| Revenue | 53 | 1.412713 | .6044605 | 1.246103 | 1.579323 | |
| Margin | 50 | 1.76289 | 1.229003 | 1.413611 | 2.112169 | |
| Combined | 103 | 1.582702 | .970982 | | | |
| Difference | | -.3501775 | | | | |
| Ho: diff = | 0 | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 |
| Pr(T < t) = | 0.0336 | | Pr(T > t) = | 0.0671 | Pr(T > t) = | 0.9664 |

As can be seen above, the null hypothesis of no difference is rejected in favour of a negative difference, supporting our hypothesis of margin enhancement having the largest impact on value creation. The results are in line with previous research, which indicate that the impact of revenue growth on operational improvement is often much less pronounced than margin enhancement. In his study of 1000 buyouts in the US between 1980 and 1986, Liebeskind (1995) found that the revenue growth in the buyouts was significantly lower than that of its peer group of public companies. A Swedish study of 113 Swedish and foreign buyouts found that the group of buyouts on average underperformed the peer group in terms of revenue growth (NUTEK 2005). Loos (2005), on the other hand, finds both higher margins and revenue growth in buyouts compared to average industry growth. He argues that it can be a sign of PE firms putting considerable emphasis on achieving revenue growth in buyouts, either organically or through buy-and-build strategies.

There could be several reasons for the strong impact of margin enhancement in our sample. Firstly, it could be the result of effective cost cutting due to increased incentives for the management. Secondly, it could be the result of the divestment of unprofitable non-core businesses. Also, PE firms might choose target companies where the potential

for increased margins is larger. Hence, they might focus less on revenue growth; organic or through buy-and-build strategies.

Value Capturing

As we outlined in section four, we expect value capturing to have a positive impact on total value generation. If this hypothesis holds true, the mean of our proxy for value capturing, multiple arbitrage, should be significantly larger than one.

Table 4. T-test of the impact of Multiple Arbitrage

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|--------------------|--------|---------------|-----------|--------------------------|--------------------|
| Multiple Arbitrage | 65 | 1.138144 | .6003344 | .9893884 | 1.2869 |
| Ho: mean = 1 | | | | | |
| Ha: mean < 1 | | Ha: mean != 1 | | Ha: mean > 1 | |
| Pr(T < t) = | 0.9659 | Pr(T > t) | = | 0.0682 | Pr(T > t) = 0.0341 |

As can be seen in table four, we reject the null hypothesis in favour of a positive contribution for multiple arbitrage at the five percent significance level. Hence, the statistical analysis supports our hypothesis that value capturing has a positive contribution to total value generation. If all other drivers of value generation remained constant, the results suggest that the PE firm would on average earn 14 percent on invested capital only due to changes in the valuation of the company. This result is compatible with previous studies (Loos, 2005, Anslinger & Copeland, 1996) and could be explained by the PE firms' valuation and market timing skills. Apart from general market appreciations, value capturing could also be due to add-on acquisitions made with the intention of increasing the target company's market share. This larger market share could in turn lead to higher exit valuation of the company as it becomes more attractive also for international buyers.

Leverage

In this section, we will examine the importance of leverage in total value generation. Firstly, we will test whether the mean leverage multiple is significantly larger than one in the t-test.

Table 5. T-test of the impact of Leverage

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|--------------|--------|---------------|-----------|--------------------------|--------------------|
| Leverage | 68 | 2.094391 | .8072181 | 1.899003 | 2.28978 |
| Ho: mean = 1 | | | | | |
| Ha: mean < 1 | | Ha: mean != 1 | | Ha: mean > 1 | |
| Pr(T < t) = | 1.0000 | Pr(T > t) | = | 0.0000 | Pr(T > t) = 0.0000 |

As can be seen in table five, a mean larger than one for leverage is significant at the five percent level. This supports our hypothesis of a positive contribution for leverage. The analysis suggests that our measure of leverage would, on average, double the value of the injected equity until the exit.

The empirical research covering the role of leverage in value creation in a leveraged buyout has so far been limited. Heel and Kehoe (2005) found that financial leverage and sector improvement was the main value generator in approximately one third of the studied transactions. However, since they in their study merged the effect of leverage and sector performance, it is difficult to tell exactly how big the impact of leverage is in the total value generation.

The same limitation applies to our study, since we cannot with our measure of leverage totally isolate all the effects of leverage. Instead, it is a mixture of net debt reduction due to increased operating cash flow, tax shields and the initial gearing. Even though our measure is flawed, we still believe that leverage has a large importance on total value generation. Firstly, the leverage works as a lever of the returns. Secondly, debt is a disciplinary device, and as such positively influences the cash flows required for net debt amortization.

Comparisons between the key variables

After concluding that all of our chosen variables of value generation contributed to the total value generation, we move on to determine how important each factor is. This is done by comparing the absolute multiples as well as their relative importance as percentages of total value generation. Firstly, we test hypothesis five; “Value Creation is the most important factor in total Value Generation”. If this hypothesis is true, the mean of the total earnings multiple should be significantly larger than both the multiple arbitrage and the leverage multiple in the t-tests.

Table 6. Comparison of Total Earnings and Multiple Arbitrage

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|---------------------------|--------|----------|-----------------|--------------------------|--------------------|
| Total Earnings | 66 | 2.018114 | 1.189447 | 1.725712 | 2.310517 |
| Multiple Arbitrage | 65 | 1.138144 | .6003344 | .9893884 | 1.2869 |
| Combined | 131 | 1.581488 | 1.039175 | | |
| Difference | | .8799701 | | | |
| Ho: diff = | 0 | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > 0 |
| Pr(T < t) = | 1.0000 | | Pr(T > t) = | 0.0000 | Pr(T > t) = 0.0000 |

The table verifies that the mean total earnings multiple is significantly larger than the mean of multiple arbitrage at the five percent level. Next, we will compare the total earnings factor to the leverage factor.

Table 7. Comparison of Total Earnings and Leverage

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|-----------------------|--------|----------|-----------------|--------------------------|--------------------|
| Total Earnings | 66 | 2.018114 | 1.189447 | 1.725712 | 2.310517 |
| Leverage | 68 | 2.094391 | .8072181 | 1.899003 | 2.28978 |
| Combined | 134 | 2.056822 | 1.01052 | | |
| Difference | | -.076277 | | | |
| Ho: diff = | 0 | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > 0 |
| Pr(T < t) = | 0.3320 | | Pr(T > t) = | 0.6639 | Pr(T > t) = 0.6680 |

As can be seen above, the mean earnings multiple is lower than the mean leverage multiple. This does not support our hypothesis of value creation being the single most important factor in total value generation. Instead, the analysis suggests that leverage and value creation contribute are equally important.

Apart from comparing the change in absolute multiples over time, it is important to compare the relative importance of each factor. This is done by comparing the different factors percentage value of total value generation. When comparing the different factors relative importance, we found that value creation on average amounts to 41 percent of total value generation. The equivalent figures for value capturing and leverage are 4.8 and 55 percent, respectively (see table 18 and 19 in the appendix). Hence, the mean of total earnings impact, in both multiple format, and as a percentage of total money multiple, is lower than the mean of the leverage impact. This does not support our hypothesis of total earnings impact being the most important factor in total value generation. Instead, we find indicative evidence of leverage being the most important factor. In any case, value

creation constitutes, on average, 41 percent of the total value generation and is clearly an important factor.

Several previous studies claim that value creation is the most important factor in total value generation in buyouts. In their study of over 800 transactions, Heel & Kehoe (2005) found that outperformance (the equivalent of value creation in our thesis) in the target companies was the main source of value generation in 63 percent of the analyzed transactions. These results are further supported by the work of Anslinger & Copeland (1996) and Butler (2001). However, a study performed by Bain & Co (2005) claims that the value creation factor accounts for only 20 percent of the return generated in the past five years.

There could be a number of reasons to why we cannot confirm our hypothesis of value creation being the most important factor in value generation. One possibility could be that leverage is more important, as was the conclusion in the study performed by Bain & Co (2005). Still, we believe that this result is mainly due the shortcomings associated with how we measure leverage. Our measure of leverage is in many ways a residual and incorporates value creation characteristics such as lowered net debt due to increased cash flows. As a consequence, our measure of value creation consistently underestimates the true value from operating improvements.

We now move on to hypothesis number six. We want to test whether our proxy for value capturing, multiple arbitrage, has got the least impact on total value generation. The null hypothesis in this test is that value creation and leverage are equally important.

Table 8. Comparison of Leverage and Multiple Arbitrage

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | | |
|--------------------|--------|----------|---------------|--------------------------|------------|-------------|--------|
| Leverage | 68 | 2.094391 | .8072181 | 1.899003 | 2.28978 | | |
| Multiple Arbitrage | 65 | 1.138144 | .6003344 | .9893884 | 1.2869 | | |
| Combined | 133 | 1.627052 | .8577259 | | | | |
| Difference | | .9562471 | | | | | |
| Ho: diff = | 0 | | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 | |
| Pr(T < t) = | 1.0000 | | Pr(T > t) | = | 0.0000 | Pr(T > t) = | 0.0000 |

Here, the null hypothesis of no difference between the means is rejected in favour of a positive difference at the five percent level. As we have already tested the multiple arbitrage factor against the total earnings impact in table six, we can conclude that multiple arbitrage has got a significantly lower impact than both of the other two factors. This supports our hypothesis and is also in line with previous research. In his article “The Alchemy of LBOs”, Butler (2001) studied chemical companies and showed that the LBO funds consistently paid less than industrial buyer for chemical companies during the 1990s. However, he concluded that this gain accounted for just one third of the total value generated. Heel and Kehoe (2005) found that financial arbitrage earned by the buyout funds were the main driver of out-performance in only five percent of the transactions. This standpoint is supported by Anslinger & Copland (1996). They conclude that financial arbitrage was not the main source of value generation in their sample of over 800 transactions. In the study performed by Bain & Co (2005), multiple arbitrage accounted for slightly less than 40 percent of the return earned. The reason for their deviant result is the overall higher valuations (i.e. stock market appreciation), which offset the conflicting effect of more frequent use of auctions. However, it is still not their single most important driver of value generation. Consequently, there is much support for our hypothesis of value capturing having the least impact on total value generation. It seems unlikely that PE firms should be able to consistently achieve high gains from value capturing in a fairly efficient market over such a long period in time.

6.3 How has the Value Generation changed over time?

In this final segment of our analysis, we want to study changes over time in our data. In order to evaluate our eight hypothesis; “The Value Generation has decreased over time”, we have divided the buyouts into two samples, one for buyouts with an entry date prior to 1997 and one for more recent buyouts. We start off by examining the basic statistics of the two samples.

Table 9. Changes in the Money Multiple over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | |
|-------------|--------|----------|-----------------|--------------------------|-------------|--------|
| MM1 | 37 | 6.148374 | 3.951293 | 4.830948 | 7.465801 | |
| MM2 | 32 | 3.560015 | 2.634213 | 2.61028 | 4.50975 | |
| Combined | 69 | 4.947976 | 3.622094 | | | |
| Difference | | 2.588359 | | | | |
| Ho: diff = | 0 | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 |
| Pr(T < t) = | 0.9988 | | Pr(T > t) = | 0.0025 | Pr(T > t) = | 0.0012 |

As can be seen above, the mean money multiple is considerably higher for buyouts with an entry date prior to 1997, giving evidence of a decrease in value generation over time. According to the table, we must reject the null hypothesis of the two time periods’ mean money multiples being equal. Investments entered prior to 1997 earned, on average, 6.1 times the initial investment, compared to 3.6 for the latter period. These results are confirmed by the difference in gross IRR between the two periods (see table 20 in the appendix). The mean gross IRR for deals entered prior to 1997 was 84 percent, compared to 43 percent for the second period. This is quite a dramatic decline in returns.

These results are in line with previous studies and research. Net pooled IRR has declined for funds formed between 1990 and 2004 (EVCA, 2006). Looking at returns based on the actual cash flows gives a similar picture; the returns have decreased from the late 1980s to the late 1990s (Kaplan & Schoar, 2005). This observation is also shared by PE professionals (Olson, 2006). Apart from increased competition, the decreased returns could also be caused by unfavourable timing of the business cycles, which would influence value capturing and value creation. This will be evaluated in the following sections.

Value Creation has increased in importance over time

In order to test this hypothesis we will study the total earnings both in multiple format and as a percentage of the total money multiple over time. By looking at the means and testing if they are significantly different between the two time periods, changes will be detected.

Table 10. Changes in Total Earnings over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|--------------|--------|-----------|-----------------|--------------------------|--------------------|
| TE1 | 35 | 1.991246 | 1.165137 | 1.591007 | 2.391484 |
| TE2 | 31 | 2.04845 | 1.234918 | 1.595478 | 2.501421 |
| Combined | 66 | 2.018114 | 1.189447 | | |
| Difference | | -.0572039 | | | |
| Ho: diff = 0 | | | | | |
| Ha: diff < 0 | | | Ha: diff != 0 | | Ha: diff > 0 |
| Pr(T < t) = | 0.4236 | | Pr(T > t) = | 0.8471 | Pr(T > t) = 0.5764 |

As can be seen above, we observe higher means for the second period, giving indicative evidence of an increase in value creation's importance over time. Because this difference is so small in multiple format, we cannot confirm the difference at the five percent significance level. However, as overall value generation has decreased over time, it might be more reasonable to look at changes in value creation's relative importance.

Table 11. Changes in the relative importance of Total Earnings over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|--------------|--------|-----------|-----------------|--------------------------|--------------------|
| TE1 | 36 | 26.6936 | 63.62104 | 5.167334 | 48.21986 |
| TE2 | 32 | 57.46556 | 71.23645 | 31.78208 | 83.14904 |
| Combined | 68 | 41.17452 | 68.5699 | | |
| Difference | | -30.77196 | | | |
| Ho: diff = 0 | | | | | |
| Ha: diff < 0 | | | Ha: diff != 0 | | Ha: diff > 0 |
| Pr(T < t) = | 0.0321 | | Pr(T > t) = | 0.0643 | Pr(T > t) = 0.9679 |

In table 11 we can confirm that total earnings impact, as a percentage of the total money multiple, has experienced a substantial increase, from 27 to 57 percent. This increase is significant at the five percent level. This supports our theory that the value creation factor has increased in importance over time. Furthermore, in the last time period, value creation is the most important factor, both in multiple format, and as a percentage of the total value generation (57.5 percent compared to 56.5 percent for leverage). This result, which is in line with our hypothesis, is also a common view among practitioners.

We believe that this trend is a natural consequence of a more competitive LBO market where the PE firms need to add more than capital to a buyout transaction. Nowadays, it is even more important for the PE firm to have a clear picture of what to do with the target already in the acquisition phase and many PE firms do not compete for companies where they do not have a clear competitive advantage, i.e. a strong network or previous experience from the industry (Urwitz, 2005).

Value Capturing has decreased in importance over time

With decreasing total value generation and an increased importance of value creation, some other underlying factor must have decreased in importance. We will therefore continue to examine the other factors. We will start off with our proxy for value capturing, multiple arbitrage. Again, we will display it in both multiple format and as a percentage of the total money multiple over time.

Table 12. Changes in Multiple Arbitrage over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|---------------|--------|----------|-----------------|--------------------------|--------------------|
| MA1 | 34 | 1.262858 | .5905474 | 1.056806 | 1.468909 |
| MA2 | 31 | 1.001361 | .5901482 | .7848931 | 1.217829 |
| Combined | 65 | 1.138144 | .6003344 | | |
| Difference | | .2614964 | | | |
| Ho: diff = 0 | | | | | |
| Ha: diff < 0 | | | | | |
| Ha: diff != 0 | | | | | |
| Ha: diff > 0 | | | | | |
| Pr(T < t) = | 0.9604 | | Pr(T > t) = | 0.0793 | Pr(T > t) = 0.0396 |

As can be seen in table 12, the mean multiple arbitrage multiple has decreased from 1.26 to 1.00. This indicates that multiple arbitrage has changed from having a positive to a neutral impact on total value generation. This result is significant at the five percent level. Next, we will examine the relative importance of value capturing.

Table 13. Changes in the relative importance of Multiple Arbitrage over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|---------------|--------|-----------|-----------------|--------------------------|--------------------|
| MA1 | 35 | 12.3169 | 27.59479 | 2.837752 | 21.79604 |
| MA2 | 31 | -3.635732 | 52.7347 | -22.97898 | 15.70751 |
| Combined | 66 | 4.823994 | 41.7874 | | |
| Difference | | 15.95263 | | | |
| Ho: diff = 0 | | | | | |
| Ha: diff < 0 | | | | | |
| Ha: diff != 0 | | | | | |
| Ha: diff > 0 | | | | | |
| Pr(T < t) = | 0.9387 | | Pr(T > t) = | 0.1225 | Pr(T > t) = 0.0613 |

In table 13, we can see that multiple arbitrage's percentage importance has decreased as well, this time from weakly positive to negative. This result is only valid at the ten percent significance level. However, it still gives indicative evidence of a decrease in importance for multiple arbitrage over time. In conclusion, the two tests support our theory of the multiple arbitrage factor having decreased in importance over time.

As we have mentioned above, the value generation has decreased over time in our sample. One explanation to the lower returns could be that the deals made during the early 1990s took place in a time of relatively low market valuations and benefited from the surge in market valuations during the late 1990s. This theory is in line with the multiple arbitrage factor having decreased in importance over time. In addition, the mean multiple arbitrage factor also contributes least to the total money multiple. Apart from less favourable market timing of the stock market, we believe the decrease is a natural consequence of a more mature buyout market and trends where auctions have become a common selling procedure. Also, an increased professionalism among the vendors and an increased number of buyout firms has eroded the possibility to strike bargains. Furthermore, the decrease in value capturing might be due to the less gain from optimization of the corporate scope. A large part of the deals during the first half of the 1990s were bought from conglomerates such as KF, and one might guess that the ability to use either asset stripping or a buy and build strategy were larger. There has, as far as we know, been no previous empiric research regarding how the value capturing has changed over time. However, a study performed by Bain & Co. (2005) suggests that the EV/EBITDA multiples have increased for the past four years. This indicates that the value capturing effect might be larger for buyouts completed during this period. Another possible explanation for the increased multiples is the past couple of years' very strong debt market with high debt multiples.

Ambiguous effect of Leverage over time

In section five, our prediction was an unchanged importance of leverage over time. In order to test this hypothesis, we will examine changes in the mean leverage multiple over time.

Table 14. Changes in Leverage over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|--------------|------|----------|-----------------|--------------------------|----------|
| Leverage1 | 35 | 2.316822 | .8106493 | 2.038354 | 2.59529 |
| Leverage2 | 33 | 1.85848 | .7446866 | 1.594425 | 2.122534 |
| Combined | 68 | 2.094391 | .8072181 | | |
| Difference | | .4583422 | | | |
| Ho: diff = 0 | | | | | |
| Ha: diff < | | 0 | Ha: diff != | | 0 |
| Pr(T < t) = | | 0.9909 | Pr(T > t) = | | 0.0181 |
| | | | Pr(T > t) = | | 0.0091 |

The result of this test is that we reject the null hypothesis of an unchanged mean leverage multiple. Instead, we find that a lower multiple for the second time period is significant at the five percent level. However, as we verified earlier, the total money multiple has decreased over time. We will therefore also consider the relative importance of leverage.

Table 15. Changes in the relative importance of Leverage over time

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | |
|--------------|------|-----------|-----------------|--------------------------|----------|
| Leverage1 | 37 | 53.56823 | 31.01712 | 43.22661 | 63.90985 |
| Leverage2 | 32 | 56.45877 | 38.1928 | 42.6888 | 70.22874 |
| Combined | 69 | 54.90877 | 34.29907 | | |
| Difference | | -2.890542 | | | |
| Ho: diff = 0 | | | | | |
| Ha: diff < | | 0 | Ha: diff != | | 0 |
| Pr(T < t) = | | 0.3649 | Pr(T > t) = | | 0.7298 |
| | | | Pr(T > t) = | | 0.6351 |

In table 15 we see that the mean percentage importance is actually a little bit higher for the second period. However, this small change does not allow us to reject the null hypothesis of no difference between the two periods at the five percent level. This supports our hypothesis insofar as leverage having an unchanged relative importance over time. Critics of the LBO phenomenon would no doubt say that an increased importance of leverage gives evidence of a market that is highly dependent of the high yield market and the high returns is merely the result of the debt to equity ratios of the investments. However, our result gives a slightly more give a balanced picture. That is, even though leverage is one of the most important factors contributing to the return, it is not the only one. Our study suggests that the leverage and value creation factors are more or less equally important over the whole period.

7. Conclusions

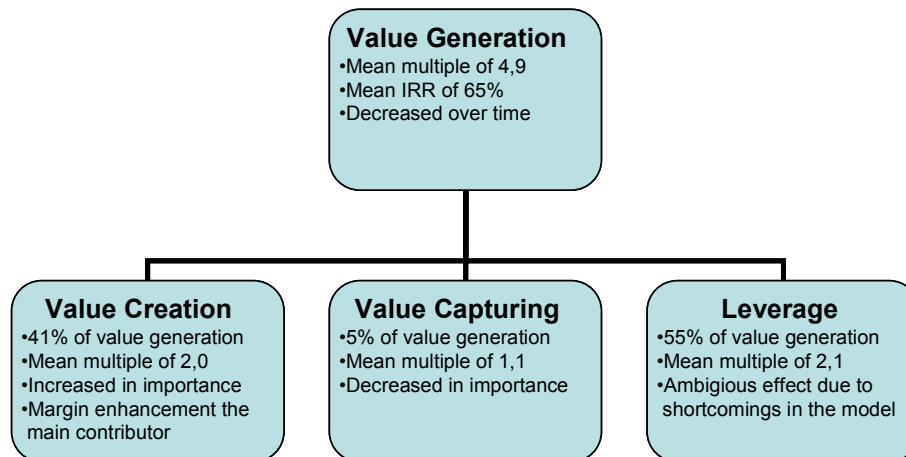
We have conducted a study on value generation in LBOs performed by four of the leading PE firms active in the Swedish market. The study, which is based on 72 LBO transactions, covers the period 1989 to 2005. We decompose the total value generated into value creation, value capturing and leverage in order to answer the following questions (1) How large is the value generation? (2) How is the value generated? (3) How has the value generation changed over time? In answer to the first question we found that the mean money multiple was 4.95 and that the average gross IRR was 65 percent.

We found that all of our chosen factors of value generation have a significant contribution to the value generation at the five percent significance level. Out of these factors we found that value capturing has the least impact. The statistical analysis could not support our hypothesis that value creation was the single most important contributor to value generation. Instead, it indicates that our measure of leverage is the most important. However, as the measure is constructed, it incorporates cash flows that are arguably attributable to operational improvements. Hence, a possible extension of our study would be to further refine the leverage measure. We believe that this would result in a greater importance of value creation. We also found that most of the value creation in our sample comes from margin enhancement.

In answer to our third question, we found that the total value generation has decreased over time. This was in line with our hypothesis and previous research. Our findings also support the hypothesis that value creation has become more important and that value capturing has decreased over time. We draw the conclusion that this is a consequence of a more competitive LBO market where the possibility of striking a bargain has decreased. Consequently, the PE firms need to add more than just capital in order to generate value. While value capturing has decreased and value creation has increased in importance over time, the effect of leverage is more ambiguous. We find that the relative importance of leverage has increased, but this is not significant at the five percent level. Instead, we argue that value creation currently is the most important factor. In response to the current

debate, we believe our results have shown that PE firms' active ownership and corporate governance do create value in the target companies. Furthermore, we believe the consistency of the high returns gives no evidence of a bubble in the PE market that suddenly could burst. Our main findings regarding value generation can be summarized in the following chart.

Figure 4. Key findings



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9. Appendix

Table 16. Summary of the transactions

| Transaction No. | IRR | Revenue Impact | Margin Enhancement | Total Earnings Impact | Multiple Arbitrage | Leverage | Money Multiple |
|-----------------|-------|----------------|--------------------|-----------------------|--------------------|----------|----------------|
| 1 | 2% | NA | NA | 0,32 | 3,27 | 1,11 | 1,15 |
| 2 | 82% | 1,16 | 0,29 | 0,33 | 1,98 | 3,54 | 2,33 |
| 3 | 94% | 1,16 | 0,29 | 0,33 | 0,95 | 10,53 | 3,36 |
| 4 | 21% | NA | NA | 0,45 | 6,71 | 1,69 | 5,13 |
| 5 | 1% | 1,07 | 0,66 | 0,71 | 1,03 | 1,54 | 1,13 |
| 6 | 21% | 0,83 | 1,11 | 0,92 | 1,09 | 2,63 | 2,63 |
| 7 | -100% | 0,79 | 1,18 | 0,93 | 0,00 | 1,00 | 0,00 |
| 8 | 14% | 1,75 | 0,57 | 1,00 | 1,26 | 2,31 | 2,91 |
| 9 | 142% | NA | NA | 1,02 | 1,78 | 1,78 | 3,24 |
| 10 | 80% | 1,01 | 1,03 | 1,04 | 1,02 | 2,28 | 2,42 |
| 11 | 44% | 0,56 | 1,88 | 1,06 | 1,04 | 5,86 | 6,48 |
| 12 | 37% | NA | NA | 1,10 | 1,29 | 1,63 | 2,32 |
| 13 | 19% | 0,88 | 1,33 | 1,16 | 1,16 | 1,71 | 2,29 |
| 14 | 72% | NA | NA | 1,18 | 1,34 | 1,25 | 1,97 |
| 15 | 156% | NA | NA | 1,22 | 2,88 | 1,08 | 3,79 |
| 16 | 13% | 1,82 | 0,69 | 1,25 | 1,64 | 1,28 | 2,62 |
| 17 | 111% | 1,09 | 1,19 | 1,30 | 1,19 | 2,25 | 3,47 |
| 18 | 67% | NA | NA | 1,30 | 5,13 | 4,19 | 27,90 |
| 19 | 48% | 0,94 | 1,47 | 1,38 | 1,32 | 2,24 | 4,08 |
| 20 | 8% | 1,10 | 1,27 | 1,39 | 0,69 | 1,47 | 1,41 |
| 21 | 165% | NA | NA | 1,39 | 3,18 | 2,02 | 8,99 |
| 22 | 31% | 1,10 | 1,36 | 1,49 | 0,89 | 1,37 | 1,82 |
| 23 | 78% | NA | NA | 1,51 | 1,17 | 3,19 | 5,64 |
| 24 | 158% | 1,16 | 1,31 | 1,52 | 1,38 | 2,13 | 4,48 |
| 25 | 10% | 0,08 | 19,22 | 1,53 | 0,73 | 1,77 | 1,98 |
| 26 | 91% | NA | NA | 1,54 | 0,91 | 3,44 | 4,79 |
| 27 | 84% | NA | NA | 1,55 | 1,37 | 1,77 | 3,76 |
| 28 | 20% | 0,78 | 2,06 | 1,60 | 0,37 | 3,52 | 2,08 |
| 29 | 26% | 1,73 | 0,93 | 1,61 | 1,04 | 1,35 | 2,26 |
| 30 | 73% | 1,09 | 1,51 | 1,64 | 0,97 | 1,97 | 3,13 |
| 31 | 85% | 1,01 | 1,67 | 1,69 | 0,94 | 2,65 | 4,20 |
| 32 | 81% | NA | NA | 1,75 | 0,97 | 2,49 | 4,22 |
| 33 | 43% | 1,51 | 1,17 | 1,76 | 0,84 | 1,88 | 2,77 |
| 34 | 15% | 0,97 | 1,87 | 1,81 | 0,64 | 1,62 | 1,89 |
| 35 | 95% | 3,51 | 0,55 | 1,92 | 2,49 | 1,11 | 5,33 |
| 36 | 227% | NA | NA | 1,92 | 1,22 | 1,75 | 4,12 |

| Transaction No. | IRR | Revenue Impact | Margin Enhancement | Total Earnings Impact | Multiple Arbitrage | Leverage | Money Multiple |
|-----------------|-------|----------------|--------------------|-----------------------|--------------------|----------|----------------|
| 37 | 113% | 1,35 | 1,44 | 1,95 | 1,18 | 3,30 | 7,57 |
| 38 | 24% | 0,91 | 2,18 | 1,99 | 0,83 | 1,35 | 2,24 |
| 39 | 82% | 1,39 | 1,44 | 2,00 | 2,19 | 0,99 | 4,33 |
| 40 | 82% | 1,52 | 1,32 | 2,00 | 1,15 | 3,72 | 8,55 |
| 41 | 42% | 1,51 | 1,33 | 2,01 | 0,92 | 2,68 | 4,95 |
| 42 | 166% | 1,18 | 1,71 | 2,02 | 1,43 | 2,90 | 8,36 |
| 43 | 12% | 1,00 | 2,05 | 2,05 | 0,51 | 1,97 | 2,06 |
| 44 | 90% | NA | NA | 2,06 | 1,22 | 1,68 | 4,22 |
| 45 | 226% | 1,85 | 1,12 | 2,06 | 3,74 | 1,49 | 11,47 |
| 46 | 35% | 1,28 | 1,61 | 2,07 | 0,79 | 1,70 | 2,78 |
| 47 | 24% | 0,81 | 2,71 | 2,19 | 0,98 | 1,58 | 3,39 |
| 48 | 117% | 1,17 | 1,97 | 2,30 | 1,02 | 1,88 | 4,40 |
| 49 | 89% | 1,59 | 1,54 | 2,45 | 1,07 | 2,46 | 6,41 |
| 50 | 27% | NA | NA | 2,45 | 0,80 | 1,47 | 2,90 |
| 51 | 18% | 1,30 | 1,92 | 2,49 | 0,68 | 1,77 | 2,97 |
| 52 | 64% | 1,72 | 1,45 | 2,50 | 0,95 | 2,02 | 4,80 |
| 53 | 31% | 2,51 | 1,00 | 2,51 | 0,72 | 2,54 | 4,60 |
| 54 | 70% | 1,27 | 2,19 | 2,78 | 1,76 | 1,90 | 9,25 |
| 55 | 113% | 2,39 | 1,23 | 2,95 | 1,21 | 3,92 | 14,00 |
| 56 | 21% | 2,37 | 1,30 | 3,08 | 0,78 | 1,76 | 4,20 |
| 57 | 815% | 1,12 | 2,76 | 3,08 | 1,39 | 2,81 | 12,00 |
| 58 | 6% | 1,22 | 2,62 | 3,21 | 0,34 | 1,26 | 1,38 |
| 59 | 30% | 1,92 | 1,69 | 3,25 | 0,76 | 1,63 | 4,05 |
| 60 | 54% | NA | NA | 3,35 | 0,78 | 2,23 | 5,86 |
| 61 | 109% | 1,48 | 2,29 | 3,40 | 0,97 | 2,77 | 9,09 |
| 62 | 8639% | 1,47 | 2,58 | 3,80 | 0,77 | 5,18 | 15,20 |
| 63 | 48% | 2,10 | 1,96 | 4,12 | 0,77 | 3,14 | 9,98 |
| 64 | 45% | 1,33 | 3,18 | 4,23 | 0,72 | 1,71 | 5,20 |
| 65 | 150% | 2,22 | 2,52 | 5,61 | 0,82 | 3,93 | 18,11 |
| 66 | 62% | NA | NA | 7,31 | 1,04 | 2,41 | 18,35 |
| 67 | 38% | NA | NA | 9,60 | 0,48 | 2,36 | 10,83 |
| 68 | 80% | 1,74 | 7,19 | 12,50 | NM | NM | 9,29 |
| 69 | 63% | 2,70 | 6,47 | 17,50 | 0,93 | 2,26 | 36,77 |
| 70 | 17% | 0,95 | NM | NM | NM | 1,05 | 2,00 |
| 71 | -11% | 2,38 | NM | NM | NM | 0,47 | 0,89 |
| 72 | 180% | NA | NA | NM | NM | 2,29 | 9,31 |

Note: The transactions are sorted by total earnings impact. The calculated gross IRR and multiples may in some of the investments deviate from the ones calculated by the PE firms.

Table 17. Revenue and Margin Enhancement as percentages of total Value Creation

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | |
|-------------|--------|-----------|-----------------|--------------------------|-------------|--------|
| Revenue | 49 | 33.10474 | 117.7193 | -.70818 | 66.91766 | |
| Margin | 49 | 66.90883 | 117.7058 | 33.09977 | 100.7179 | |
| Combined | 98 | 50.00679 | 118.3301 | | | |
| Difference | | -33.80409 | | | | |
| Ho: diff = | 0 | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 |
| Pr(T < t) = | 0.0792 | | Pr(T > t) = | 0.1584 | Pr(T > t) = | 0.9208 |

Table 18. Total Earnings and Multiple Arbitrage as percentages of total Value Generation

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | |
|--------------------|--------|----------|-----------------|--------------------------|-------------|--------|
| Total Earnings | 68 | 41.17452 | 68.5699 | 24.57707 | 57.77197 | |
| Multiple Arbitrage | 66 | 4.823994 | 41.7874 | -5.44863 | 15.09662 | |
| Combined | 134 | 23.27053 | 59.62165 | | | |
| Difference | | 36.35053 | | | | |
| Ho: diff = | 0 | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 |
| Pr(T < t) = | 0.9998 | | Pr(T > t) = | 0.0003 | Pr(T > t) = | 0.0002 |

Table 19. Total Earnings and Leverage as percentages of total Value Generation

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | |
|----------------|--------|-----------|-----------------|--------------------------|-------------|--------|
| Total Earnings | 68 | 41.17452 | 68.5699 | 24.57707 | 57.77197 | |
| Leverage | 69 | 54.90877 | 34.29907 | 46.66923 | 63.14831 | |
| Combined | 137 | 48.09177 | 54.33285 | | | |
| Difference | | -13.73425 | | | | |
| Ho: diff = | 0 | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 |
| Pr(T < t) = | 0.0698 | | Pr(T > t) = | 0.1396 | Pr(T > t) = | 0.9302 |

Table 20. Gross IRR for period one and two

| Variable | Obs. | Mean | Std. Dev. | 95 % Confidence Interval | | |
|-------------|--------|----------|-----------------|--------------------------|-------------|--------|
| IRR1 | 37 | 83.87155 | 54.00693 | 65.86475 | 101.8784 | |
| IRR2 | 33 | 43.25289 | 53.02993 | 24.44929 | 62.05649 | |
| Combined | 70 | 64.72276 | 56.94786 | | | |
| Difference | | 40.61866 | | | | |
| Ho: diff = | 0 | | | | | |
| Ha: diff < | 0 | | Ha: diff != | 0 | Ha: diff > | 0 |
| Pr(T < t) = | 0.9989 | | Pr(T > t) = | 0.0023 | Pr(T > t) = | 0.0011 |