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Bachelor's Thesis

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Value creation in private equity firms

Is value creation connected to ownership structure?

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Abstract:

In this study we examine value creation in private equity firms through looking at changes in RONA metrics for a group of private equity owned companies during the holding period and then compare the results to an industry group to determine the difference. Furthermore, we adjust for measurement bias to eliminate the effect of earnings management. We use a sample of 42 private equity divestments of Swedish companies in the period 2008-2017, both including divestments in the public and private markets. Our results show that private equity owned companies outperform non-private equity owned companies, both when looking at measures including as well as excluding the effect of earnings management. The result that private equity firms generate a superior performance regarding value creation is consistent with previous research.

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1 Introduction

1.1 Background

In 2016, private equity firms owned more than 800 Swedish companies with a total workforce of around 200,000 people (Swedish Private Equity and Venture Capital Association, 2017). This equals 4.2 per cent of the entire Swedish workforce (Statistics Sweden, 2016) and demonstrates the significant impact that private equity firms have on the Swedish economy.

Considering the large impact private equity firms have on the Swedish economy, studies monitoring and evaluating the performance of private equity firms is of importance for the Swedish society. Studies conducted on both Swedish data (Bergström et al., 2007) and international data (e.g. Achleitner et al., 2010; Desbrieres and Schatt, 2002) have found evidence that private equity ownership enhances value creation. For example, Bergström et al. (2007) found that private equity owned companies outperform non-private equity owned companies regarding value creation, defined by Bergström et al. (2007) as change in return on net operating assets (RONA) and EBITDA margin. However, since the value creation measures in the study are based on accounting numbers, they are subject to the potential existence of earnings management.

Earnings management is a way for insiders to misuse the information asymmetry that exist between insiders and non-insiders. It is defined as when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the economic performance of the company, or to influence contractual outcome that depends on reported accounting numbers (Healy and Wahlen, 1999).

According to a U.S. study published by De-Wai et al. in 2006 there is significant evidence that companies owned by a private equity firm substantially increase their earnings management efforts prior to and shortly after an IPO (Initial Public Offering). Sharon Katz (2009) found similar results, concluding that private equity owned companies conduct more earnings management than the average non-private equity owned company.

Prior research have found that private equity firms enhance value creation in their portfolio companies, but also that there is significant evidence of earnings management that distorts the

accounted results (Healy and Wahlen, 1999) and thereby value creation metrics based on these numbers. Considering these facts, we aim to answer the following research question:

Does private equity owned companies outperform non-private equity owned companies regarding value creation?

To be able to investigate this, we will study value creation both by using measures based on accounting numbers as well as measures eliminating the effect from earnings management. Furthermore, we will analyse whether using the accounting numbers exaggerates the value creation by private equity firms.

1.2   Purpose

The main purpose of this thesis is to study if private equity firms create value in its portfolio companies. This will studied through analysing whether private equity owned companies create more value than non-private equity owned companies, both when eliminating and when not eliminating the effect from earnings management. Additionally, the study will examine if not eliminating the effect from earnings management exaggerates of the value creation generated by private equity firms when measuring value creation using accounting based metrics. This study is inspired by evidence from previous research such as Bergström et al. (2007) and Achleitner et al. (2010) which have found significant evidence that private equity owned firms create more value than its non-private equity owned counterparts. Furthermore, the study is also inspired by research on earnings management in private equity firms such as De-Wai et al. (2006) and Katz (2009), finding that private equity owned firms conduct more earnings management than the average non-private equity owned firm.

As earnings management distorts certain value creations metrics (Healy and Wahlen, 1999), and considering the large impact private equity firms currently have on society, accurate measurement of their value creation is important for society and public policy makers. More research on the area will also be beneficial for other stakeholders such as potential investors in private equity funds and accounting standard setters.

1.3   Contribution

This study will add to the existing research body in three ways. Firstly, the study contributes with an up to date investigation of the private equity ownership effect on value creation by using recent Swedish data when measuring value creation using accounting numbers. This

will give us the opportunity to compare our results with previous studies, both which have been conducted on Swedish data (e.g. Bergström et al., 2007) as well as on data from other countries (e.g. Achleitner et al., 2010; Desbrieres and Schatt, 2002). This will provide evidence if previous findings on value creation by private equity firms still seems to be accurate and if the findings are coherent with results found in other countries.

Secondly, the study will increase the understanding of the effect of private equity ownership on value creation by eliminating the earnings management effect. Since there is a lack of studies measuring value creation by private equity firms when using metrics that eliminate earnings management, this study will add new knowledge to the subject.

Thirdly, the study will provide a comparison of the differences between measuring the performance of private equity owned firms by using a measure that excludes the effect of earnings management compared to using a measure that includes the effect of earnings management. This comparison will yield new knowledge to how earnings management affects the measures of value creation by private equity firms and thereby the validity of earlier studies that doesn't eliminate earnings management.

1.4   Delimitations

The study is limited to only include Swedish listed and unlisted companies since we want to examine the value creation of private equity firms in Swedish companies. Furthermore, we want all companies in the sample to be under the same legislation to enhance comparability within the sample. Additionally, since annual reports for Swedish private companies as well as public companies are public information, the data needed for the study is easily accessible.

The study will only include portfolio companies of a private equity subcategory known as buyout capital. Since buyout capital funds typically own a controlling interest in the companies they invest in, contrary to venture capital firms and angel investors who mainly owns non-controlling interests in the companies they invest in, only buyout funds will be used for the study (Söderblom, 2011). The reason for this is that we want to be able to conclude that the private equity firm has the ultimate control of the value creation in the companies included in our sample. Another reason to limit the scope of the study to only include buyout capital funds is that they predominantly invest in mature companies (Söderblom, 2011). This is desirable for our study since mature companies have more developed accounting processes

and thus also might be the ones that are most inclined to conduct earnings management (Beuselinck and Manigart, 2007).

The third delimitation of the study is to only include private equity divestments from 2008-2017, the main reason for this is that no data exist prior to 2007 in the Retriever Business database and this data is needed to obtain industry averages to conduct the study. As the study measures value creation by looking at changes in metrics, the earliest year a divestment could have been made by a private equity firm is in 2008 as 2007 is the first year that we could obtain financial information for the peers and we need at least one annual change to be able to conduct our study.

Furthermore, we will only study if the value creation in private equity owned firms is higher compared to non-private equity owned firms. We will not study the size of the difference in value creation.

2   Concepts, theories and previous research

This section serves as an introduction for the reader to private equity, value creation, measurement bias and earnings management. Concepts, theories and previous research on the separate fields as well as the intersection of the fields are presented.

2.1   Private equity

The name private equity stems from the fact that equity can be split into two groups; publicly traded equity, traded over an exchange, and private equity that is not traded in the public market (Moon, 2006). Private equity, compared to public equity, is generally traded less frequently and often with large portions in the company being traded (Moon, 2006).

Private equity investors are normally split into three subcategories; angel investors, venture capital and buyout capital (see figure 2.1). The Swedish Private Equity and Venture Capital Association (SVCA) and Invest Europe (formerly the European Private Equity and Venture Capital Association) define buyout capital as investments at late phases in mature companies. Venture capital is defined as investments in less mature companies at an earlier development phase and angel investors are defined as wealthy individuals, commonly previous or active entrepreneurs that invests parts of their fortune in early stage companies.

Figure 2.1
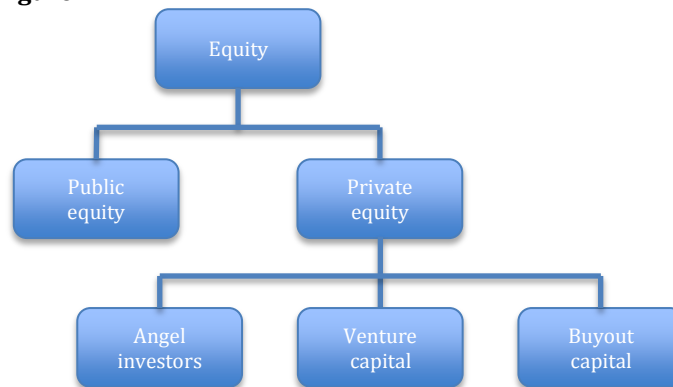
Private equity firms typically raise capital through funds. Investors in these funds commonly include financial institutions, such as pension funds and insurance companies, as well as wealthy individuals (Payne, 2011). According to Payne (2011) the investors in the fund can be divided into two groups; limited partners and general partners. Limited partners typically commits capital to the fund but lacks the authority to decide how the capital in the fund is to be invested. The general partners typically invests a small portion in the fund and decides how to invest the capital in the fund, manages the portfolio companies as well as decides when to divest. (Payne, 2011)

In general, private equity investing is a way to pursue active ownership. A stake in a company is acquired, the company is developed over the holding period and then divested (Klier et al., 2009). The active ownership model is synonymous with private equity and puts emphasis on value creation by the general partners, whom are expected to not only provide capital but to also to create value through their experience, network and legitimacy (Söderblom, 2011).

Buyout capital is a subgroup of private equity that targets mature and established companies. The investment targets are often expected to go through significant changes in operations, strategy and company structure. Buyout firms typically acquire a controlling interest of the portfolio company (Söderblom, 2011). Söderblom (2011) also states that these acquisitions are most commonly financed with a high level of leverage through a combination of debt instruments, collateralised by the target company's assets in the transaction. This type of transaction is called a leveraged buyout (LBO). The buyout firm executes the transaction, manages the portfolio company over the holding period and then carries out a divestment ("exit") of the portfolio company. The buyout process as such compromises the acquisition, the divestment and the holding period in between. (Söderblom, 2011)

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2.2 To measure value creation

Previous studies on the subject have differed in terms of method for measuring value creation since a private equity firm can be measured from different perspectives, for example from the private equity fund investor perspective by evaluating investment returns (Phalippou and Gottschalg, 2009) and from a societal perspective by looking at operating performance (Bergström et al., 2007).

Bergström et al. (2007) looks at value creation from the society's perspective and furthermore defines it as enhancement of the portfolio company's operating performance. The operating performance was studied through RONA and EBITDA margin, where RONA is argued to be the most neutral metric when studying operating performance across industries. Barber and Lyon (1996) argue that it is preferred to use operating income matched with operating assets as an operating performance measure. This is due to RONA not being clouded by either tax, special items or minority interest as well as being unaffected by the company's capital structure.

2.3 Value creation concepts in private equity

Previous research indicates that private equity owned companies outperform non-private equity owned companies regarding value creation (Bergström et al., 2007; Achleitner et al., 2010). Kaplan and Strömberg (2009) argue that this outperformance is stemming from the fact that private equity firms enhance value creation in its portfolio companies through several value creating initiatives categorized into **governance engineering**, **financial engineering** and **operational engineering**.

Governance engineering is achieved in the portfolio companies by trying to optimize the governance of the company and align the management incentive plans with the value creation goals of the private equity firm. This mitigates agency costs and thus increases the value of the portfolio company at exit (Kaplan and Strömberg, 2009).

Private equity firms are trying to improve governance by optimizing the composition and the way of work of the board of directors. Acharya et al. (2013) found that company boards in private equity owned companies are smaller and meet more often compared to non-private equity owned companies. The same study also shows that the board of directors in private equity owned companies seems to be more inclined to replace poorly performing management

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than in non-private equity owned companies. It was found that one-third of the CEOs were fired in the first 100 days after the shift to private equity ownership and that two-thirds are replaced over a four-year period (Acharya et al., 2013).

Apart from tight governance, private equity firms typically employ incentive plans in an attempt to make management of portfolio companies perform better (Kaplan and Strömberg, 2009). These incentive plans usually contain a mix of stocks and options (Ericson, 2004). A study by Kaplan and Strömberg (2009) found that the CEO in average owns 5.4 per cent of the company after a buyout, and that the management group averaged an ownership share of 15 per cent. The same study also found that private equity firms often demand management to do substantial investments in the company it is managing, to not only let managers capture the upside, but also the downside. Furthermore, Kaplan and Strömberg (2009) concluded that since the equity is private, management cannot sell equity or exercise options until an exit transaction has validated the value of the company. This illiquidity reduces the incentive of management to manipulate short-term performance in ways that doesn't maximize the exit value of the company (Bergström et al., 2007).

However, with a too large portion of the management's personal wealth depending on the success of the company they are managing, they might be less inclined to take on riskier projects even though the projects have a positive net present value, effectively due to managers lacking diversification (Holthausen and Larcker, 1996). Since the private equity firm only has a small portion of their total funds invested in a particular company, they are enjoying a higher degree of diversification and would likely benefit from higher risk taking than management might be inclined to take. (Kaplan and Strömberg, 2009).

Operational engineering is referring to when the private equity firm is adding value to a portfolio company by bringing expertise regarding the optimal organizational structure and contributing with knowledge about the industry and the type of business the company is performing. Private equity firms can add value through operational improvements when they have what Sadtler (1993) calls a parenting advantage.

Parenting advantage treats the subject of how a business parent affects value creation in its portfolio companies. A parenting advantage exists when a parent company is a better owner to the subsidiary than other companies would have been. This advantage is created through

understanding what adds value to the company as well as through practical experience. (Sadtler, 1993)

Bergström et al. (2007) argues that the private equity ownership form enhances value creation in its subsidiaries and that there exists a parenting advantage compared to other owners. First of all, the time horizon of private equity firms is argued to be optimal for value creation since it both gives time for implementing restructuring measures but still is short enough for managers to be incentivized and motivated to implement the restructuring. Furthermore, private equity firms typically provide substantial compensation packages and reduction in media exposure which is believed to be beneficial for management performance (Bergström et al., 2007). According to Bergström et al. (2007), private equity firms typically create value and provide a parenting advantage in several ways:

Industry structure. Private equity managers can create a more attractive industry for the portfolio company to compete in, for example through a consolidation process where several smaller companies in the industry are acquired (Bergström et al., 2007).

Expertise. The private equity firms can create value by providing industry and management expertise to the portfolio company. This expertise can for example be transferred through an operating partner model in which the private equity firm assigns industry experts to apply their knowledge to the portfolio company's most important high-level strategic issues (Matthews et al., 2009).

Network. Value creation by offering a contact network that could enhance the decisions made by the company as well as provide business opportunities through new business partners, customers and suppliers (Bergström et al., 2007).

The fact that leading private equity firms have become specialised around specific industries in recent years can be seen as evidence that operational engineering has become a more important source of value creation (Kaplan and Strömberg, 2009). This view is supported by Achleitner et al. (2010), finding that two-thirds of the value creation in private equity owned companies stems from operational improvements.

Financial engineering is a way to add value to the firm by optimizing the financing structure of the company. The present value of debt is the present value of the benefits of debt minus the present value of the cost of debt. The interest tax shield is generally seen as the main benefit of debt (Kraus and Litzenberger, 1973). However, other benefits of debt include less wasteful spending by the management due to interest payments reducing excess cash flow (Jensen, 1986) and through engaging lenders to monitor the firm's spending (Jensen and Meckling, 1976).

2.4 Agency theory

Agency theory is treating the subject of contractual relationship between two cooperating and risk sharing parties with different goals as well as levels of risk aversion (Eisenhardt, 1989). The relationship is found in situations where there is one party that delegates assignments, known as the principal, and another party, known as the agent, which executes the orders of the principal and to some extent has the authority to make decisions regarding the principal's orders (Jensen and Meckling, 1976). In an organizational context, this kind of relationship can for example exist between the shareholders and the CEO of a company (Eisenhardt, 1989).

Problems occur in agency relationships when the agendas of the different parties are not coherent and when it is difficult and costly for the principal to monitor what the agent is doing. In a situation where the agent's actions cannot be completely monitored there is room for the agent to act opportunistically. This problem is called the 'principal-agent problem' and it leads to the principal needing to measure the most optimal balance between extra costs of monitoring and the loss due to the agent's opportunistic behaviour (Eisenhardt, 1989). Another problem arises when different risk preferences make the agent act in a way that the principal does not comply with. The costs for the principal in both these situations are called agency costs.

By aligning the agent's and the principal's interests and through active monitoring, agency costs can be reduced. Jensen and Meckling (1976) found that management equity ownership increases coherence in agendas between the managers and the owners, which decreases agency costs. Furthermore, Jensen (1989) concludes that the alignment of interest between owners and managers is crucial for company performance. A monitoring institution for the owners interests is the company board (Fama and Jensen, 1983) and when the board is more

engaged it is more likely that managers act in the shareholders' interests (Eisenhardt, 1989), leading to decreased agency costs.

In general, private equity ownership creates an organizational structure with advantages in mitigating agency costs (Jensen, 1989). This is both due to the agency benefits of debt and effective monitoring of the managers through an active board of directors (Bergström et al., 2007). The more concentrated ownership in private equity owned companies compared to most public companies gives the private equity owned firms an advantage in monitoring capabilities (Shleifer and Vishny, 1986). The better monitoring capabilities in private equity owned companies increases the potential to spot and take action against opportunistic behaviour by management compared to in non-private equity owned companies. Furthermore, the high degree of equity options for managers in portfolio companies aligns goals with the private equity firm and decreases agency costs (Acharya et al., 2013).

Buyout capital portfolio companies are in general financed with a substantial amount of debt (Söderblom, 2011) and this levered capital structure creates both benefits and costs according to theory. The optimal capital structure is the one that maximize firm value and minimizes agency costs (Jensen, 1986). When deciding capital structure in the light of the agency relationship, following costs and benefits of debt should be taken into account:

Reduction of wasteful investment. For debt funding, managers are contractually obligated to pay debt costs such as interest and principal, or otherwise the lenders have the opportunity to take the firm into bankruptcy. These payments reduce the cash flow available for managers to use in an opportunistic manner (Jensen, 1986). This decreases the agency costs for the firm and overall serves as a motivator for the firm to become more efficient.

Debt overhang. When a company is severely indebted, there can arise situations where managers are not willing to invest in the most positive net present value projects as the upside is captured by debt holders, but instead they want to invest in projects that gives equity holders the benefit even though it is not optimal from a firm perspective (Berk and DeMarzo, 2016).

2.5 Value creation studies in private equity

Numerous studies (see table 2.1 for a few examples), with a wide spectrum of measurement methods used, have been conducted to evaluate the effect of private equity ownership on value creation. Studies by Nikoskelainen and Wright (2007) as well as Phalippou and Gottschalg (2009) have looked at the internal rate of return (IRR) on the investments and hence the value the general partners create for their investors as well as the increase in value of the portfolio companies. Others, such as Bergström et al. (2007) as well as Cressy and Munari (2007) have focused on the value creation in the portfolio companies by studying their operating performance. A summary of previous research conducted on the subject is disclosed in table 2.1.

Bergström et al. (2007) found that the operating performance of Swedish buyout portfolio companies significantly improved over the holding period in terms of RONA and EBITDA margin, which both were defined as measures of value creation. The results were similar for Cressy and Munari (2007) who found that the operating profitability for UK buyout capital portfolio companies was higher than its non-buyout counterpart three years after the buyout. They also found that the profitability in the buyout year was strongly correlated with the superior performance during the post buyout years, suggesting that investment selection skills may play a major role in the results.

A study by Bull (1989) found that financial performance was significantly better two years after an LBO compared to two years before in terms of operating results such as sales and operating income metrics. The increased performance could be explained by a shift in management focus and reduction of agency costs due to higher debt burden. Muscarella and Vetsuypen's (1990) study of 72 firms that were delisted through an LBO and then relisted again, found that the profitability and operating performance of these companies increased significantly compared to peer companies during the holding period.

Table 2.1

Authors	Country	Findings
Achleitner and Engel, 2010	Europe	Sample of 206 buyout transactions 1991-2005. 2/3 of value creation comes from operational improvements.
Cao and Lerner, 2009	US	Sample of 526 private equity IPOs 1981-2003. PE IPOs outperform non-PE IPOs.
Mozes and Fiore, 2012	International	Sample of 2,590 private equity funds. Finds that private equity outperforms public equity.
Phalippou and Gottschalg, 2009	US and Europe	Sample of 852 private equity funds. Private equity funds outperform S&P 500 with 3% gross performance fees.
Bergström et al., 2007	SWE	Sample of 73 buyouts 1998-2006. Significant improvements in operational performance following buyout
Cressy et al., 2007	UK	Sample of 122 buyouts 1995-2002. Operating profitability 4.5% greater that for peers post-buyout
Desbrieres and Schatt, 2002	FRA	Sample of 121 firms. Operating performance exceeding peers both ex ante and ex post buyout
Kaplan, 1989	US	Sample of 48 MBO's 1980-1986. Evidence on post-buyout operating improvements and value increases
Bull, 1989	US	Sample of 25 LBO's 1971-1983.Evidence that private equity firms outperform non-private equity firms.
Lichtenberg and Siegel, 1990	US	Sample of 1,100 plants. Significant improvements in total factor productivity in particular MBO's
Nikoskelainen and Wright, 2007	UK	Sample of 321 LBO's 1995-2004. Manegerial equity holding closely linked to improved operational performance.
Muscarella and Vetsuypens, 1990	US	Sample of 72 PE IPOs 1976-1987. Operating performance outperform peers.
Smith, 1990	US	Sample of MBO's 1977-1986. Significant increase in operating returns and decrease in working capital

2.6 Earnings management

Reliability and relevance are two of the most important characteristics of high quality financial reporting. Unfortunately, a fundamental conflict exists between relevant and reliable financial reporting. The reason for this is that to be able to provide exact information about how a company is performing, complete freedom for managers to decide when to recognise revenues and costs is a prerequisite. The problem with this degree of freedom is that the financial reports wouldn't be very reliable (Healy and Wahlen, 1999), managers would have the possibility to report whatever earnings they would like.

Policymakers facing this conflict have decided to allow companies a certain degree of freedom in how to report their earnings, however, having this freedom also creates a possibility for managers to manipulate earnings. This possibility led Healy and Wahlen to 1999 define earnings management as:

"Earnings management is a way for insiders to misuse the information asymmetry that exist between insiders and prospective and current non-inside owners. It is defined as when

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managers use judgement in financial reporting and in structuring transactions to alter financial report to either mislead some stakeholders about the economic performance of the company or to influence contractual outcome that depend on reported accounting numbers". (Healy and Wahlen, 1999).

Earnings management can be divided into real earnings management and accrual-based earnings management (Xu et al., 2007). Real earnings management is defined as when management departs from normal operating activities with the aim to mislead stakeholders and make them believe that certain financial targets have been achieved during normal business operations (Roychowdhury, 2006). This kind of earnings management has an impact on cash flow and occurs through real business activities such as price discounts, extended credit lines and overproduction. Accrual-based earnings management on the other hand is conducted when company management manipulates earnings through exploiting the discretion in accounting principles (Xu et al., 2007; Lo, 2008).

As real earnings management include alterations of the business operations to manipulate results (Xu et al., 2007), this kind of earnings management is not possible to separate with any accurate method. Therefore, when referring to earnings management in this study, it is referred to accrual-based earnings management.

One of the main goals of a private equity firm is to maximize the divestment price of their holding companies (Mozes and Fiore, 2012) and valuation is often highly biased to be based on accounting numbers, where especially margin- and sales trends have a major impact on the valuation (Cormier and Martinez, 2006). Considering this fact and that earnings management has a positive effect on both earnings growth and margin improvements (Healy and Wahlen, 1999), it can be concluded that incentives for upward earnings management are abundant in a private equity setting (Beuselinck and Manigart, 2007).

Prior studies have been consistent with theory on the subject and have found increased upward earnings management in private equity owned companies prior to an equity divestment (Katz, 2009). However, incentives goes both ways as private equity firms are repeat players in the capital markets and hence in divestments need to be honest with the new investors or future potential buyers may be lost (Cao and Lerner, 2009).

De-Wai et al. (2006) found significant evidence that companies owned by a private equity firm substantially increase their earnings management efforts prior to and shortly after an initial public offering. Katz (2009) found that private equity owned firms conduct more earnings management than companies not going public. Results are consistent and conclude that earnings management increases prior to an IPO.

2.6.1   Measurement bias and earnings management

Measurement bias, denoted as q, is defined as the difference in the book value of an asset and the fair value of the asset (Runsten, 1998). Measurement bias stems from the fact that policymakers have decided to take a prudent approach to accounting, recognizing income late, costs early, valuing assets low and liabilities high. Thus, the more prudent the accounting is, the higher the measurement bias. (Runsten, 1998)

Figure 2.2
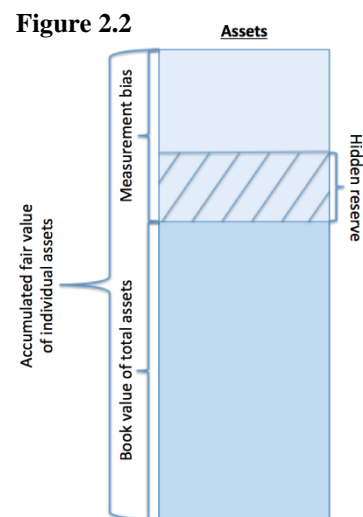
Earnings management is a possibility for management to affect accounted earnings and smooth earnings between years by using different type of accruals to shift future earnings to today or today's earnings to the future by utilizing the balance sheet (Healy and Wahlen, 1999). However, essential for the possibility to conduct earnings management is the existence of a hidden reserve in the balance sheet, stemming from the difference between the most prudent and the most aggressive accounting allowed (see figure 2.2 for an illustration). This difference creates a degree of freedom for management to either report lower or higher earnings than without earnings management. Thus, eliminting this degree of freedom would also eliminate the earnings management. This implies that if all assets and liabilities where to be correctly valued and no measurement bias would exist, there would be no room for earnings management since earnings management needs a degree of freedom, stemming from the hidden reserve in the balance sheet that exists today.

From this it can be concluded that when eliminating the measurement bias, the possibility for earnings management is also eliminated since there will exist no hidden reserve that the management can utilize for earnings management. Thus measuring value creation adjusting for measurement bias also effectively eliminates the effect from earnings management.

3 Method

In this section our scope of the study, the hypotheses and empirical predictions based on theory and previous research will be presented. Furthermore, we will present the model and variables used as well as the statistical method.

3.1 Scope

As investors such as private equity funds can create value in several ways it is necessary to define a measure of value creation. We have decided to define value creation in the same way as Bergström et al. (2007), which is by looking at changes in operating performance as a measure of value creation from a societal perspective. RONA is the operating performance metric that will be used since it both enables comparison with a similar study by Bergström et al. (2007) and since it is a measure of operating performance unaffected by capital structure (Barber and Lyon, 1996). We are furthermore going to adjust RONA for measurement bias and thereby eliminate the effect of earnings management as we then get a more pure measure of value creation (Skogsvik, 1998). However, both these measures and the differences between them will be studied and the change in the RONA metrics will serve as a proxy for value creation from a societal perspective.

The study will be conducted by looking at the change in both RONA unadjusted for measurement bias as well as adjusted for measurement bias between the entry and the divestment year for a group of private equity owned companies. The changes will be compared with the changes in RONA metrics for non-private equity owned peers between the same years.

3.2 Hypotheses

In our first hypothesis we consider the positive impacts related to the reduction of agency costs (Jensen, 1986), the concepts of private equity value creation (Kaplan and Strömberg, 2009) and the potential negative effects of the private equity ownership such as debt overhang (Berk and DeMarzo, 2016). Furthermore, we consider previous research such as Bergström et al. (2007) finding that private equity owned Swedish firms outperform non-private equity owned firms regarding value creation in terms of operating performance. We believe that private equity firms improve the control of the management in their portfolio companies through the board of directors and that the high extent of management incentive plans motivates company executives to deliver results (Sahlman, 1990). We furthermore believe

that the negative effects of the higher debt levels doesn't outweigh the aforementioned positive effects from the private equity ownership. Our formulated first hypothesis is therefore:

H₁: Private equity owned firms will outperform non-private equity owned firms regarding value creation when not adjusting for measurement bias

However, even though the studies and theories mentioned above indicates that private equity firms a have positive impact on operating performance, when adjusting for the measurement bias effect and thereby eliminating earnings management, the outcome can potentially change. The reason for this is that research have found significant evidence that private equity owned companies conduct more earnings management than the average non-private equity owned company (De-Wai et al., 2006).

Even though earnings management seems to be evident in an equity sale setting, indicated by Beuselinck and Manigart (2007) and Katz (2009), we still believe that the operating performance development will be significantly higher for the private equity owned firms. As mentioned in the first hypothesis, we expect the net effect of the private equity ownership to be positive for value creation in the portfolio company. Since numerous previous studies (Bergström, 2007; Cressy and Munari, 2007) have found the value creation to be significantly higher for private equity owned companies, we still believe that this difference is enough to support the same conclusion even when adjusting for measurement bias. Our formulated second hypothesis is therefore:

H₂: Private equity owned firms will, when adjusting for measurement bias, outperform non-private equity owned firms in value creation

Furthermore, we want to provide evidence on the potential difference between the measure of value creation adjusted for measurement bias and the ordinary non-adjusted measure. This could potentially explain if earnings management has affected the results in previous studies that have used profitability metrics as proxy for value creation. If the difference between the measures is large, then conclusions by previous studies potentially can be questioned. With previous studies (Teoh et al., 1998; Katz, 2009) giving significant evidence that earnings management increases in an equity sale setting and since private equity firms have incentives

to conduct earnings management as it can raise equity prices (Cormier and Martinez, 2006), we expect that private equity owned firms will outperform non-private equity owned firms to a greater extent when not adjusting for measurement bias compared to when adjusting. This yields the following hypothesis:

H₃: The difference in value creation between private equity firms and non-private equity owned firms is lower when adjusting for measurement bias compared to when not adjusting for measurement bias

3.3 Model and variables

We will test our first hypothesis by measuring the change in RONA unadjusted for measurement bias, a biased RONA, between the entry and the divestment year for a group of private equity owned companies. The results will then be compared to the change in RONA for non-private equity owned peers between the same years.

To test our second hypothesis we will use a model that estimates a RONA adjusted for measurement bias and thereby not impacted by the effect from earnings management, an unbiased RONA. This model will be used to estimate the unbiased RONA for a group of private equity owned companies during their respective holding periods. The change in unbiased RONA between the entry and the divestment year for the group of private equity owned companies will then be compared to the change in unbiased RONA for non-private equity owned peers between the same years.

The third hypothesis will be tested by measuring if the value creation difference between the private equity owned firms and the industry group is smaller when using an unbiased RONA to measure value creation compared to when using a RONA not adjusted for measurement bias.

3.3.1 Kenth Skogsvik model for measuring unbiased RONA

The model that will be used to estimate the unbiased RONA is based on the relationship between return on equity and unbiased return on equity that has been derived by Kenth Skogsvik (1998). Since research finds RONA to be a more accurate measure of value creation (Bergström, 2007), the model is modified to be based on this metric. What the model

effectively does is to calculate the unbiased RONA by adjusting for the permanent measurement bias and thereby removing the effect of earnings management.

The model for estimating the unbiased RONA is expressed as:

$$RONA_{t+1} = RONA_t^{unbiased} + q * (RONA_t^{unbiased} - g)$$

Which can be rewritten as:

$$RONA_t^{unbiased} = (RONA_{t+1} + g * q)/(1 + q)$$

Definition of variables:

$RONA_{t+1}$: Return on operating net assets in period t+1. Calculated as $\frac{Operating\ income_{t+1}}{ONA_t}$, where $ONA_t = Debt_t + Equity_t - Cash_t$, and debt is defined as total interest bearing liabilities and equity as total shareholders' equity.

$RONA_t^{unbiased}$: Return on operating net asset without any measurement bias in period t. This is a RONA that is not impacted by earnings management.

q: Estimated measurement bias related to operating net assets in period t. Estimated using the q-values per industry derived by Runsten (1998). We believe that these q-values are good estimations for the measurement bias in this study since Runsten believed these values to be stable over time (Runsten, 1998).

g: Growth in operating net assets, adjusted for change in net debt, dividends paid and equity capital raised. Calculated as $g = (ONA_{t+1} - ONA_t - Delta\ Net\ debt - Capital\ issues + Dividends)/ONA_t$.

3.3.2 Measurement bias calculation and adjustments

When operatizing the model, Runsten's (1998) q-values by industry has been used as an estimate for the q-value in the studied companies as well in the industry peer groups. As the q-value in Runstens study is defined as measurement bias scaled by equity, and this study

aims to calculate the unbiased RONA, the q-value need to be adjusted to match the operating net assets of the specific company (see figure 3.1 illustrating the difference between the two measures). Additionally, Runstens q-values are based on a specific equity to asset ratio, which also has been adjusted for to truly reflect the capital structure of the specific company or peer group in the study.

The equity to operating asset adjustment for company/peer group *i* has been executed as follows:

$$q_{ONA} = q_{Equity} * (Equity_t/ONA_t)_i$$

Figure 3.1
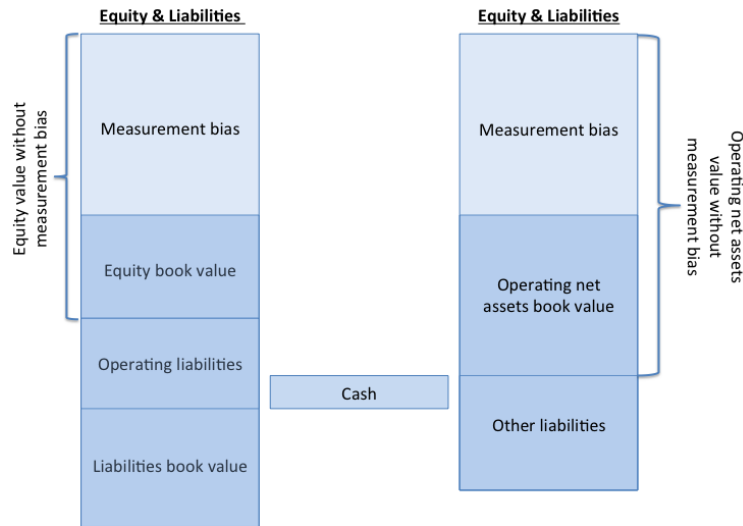
Figure illustrating differences in capital bases and q-values

The capital structure adjustment has been done as following:

$$q_{Adjusted\ for\ capital\ structure} = q_{Runsten} * \frac{Solidity_{Runsten}}{Solidity_{i\,t}}$$

Thus the full adjustment of the q-value for the company/peer group *i* in period *t* is:

$$q_{i\,t} = q_{Runsten} * \frac{Solidity_{Runsten}}{Solidity_{i\,t}} * \frac{Equity_{i\,t}}{ONA_{i\,t}}$$

3.4　Assigning peer groups

All private equity owned companies in the sample were matched with their respective peer group using the SNI industry classification system, which is a Swedish company industry classification system made by Statistics Sweden (SCB). As the sample as well as the peer group includes private Swedish companies, the SNI system was used as it is the only industry classification system covering all private and public Swedish companies (SCB, 2017).

3.5　Statistical method

3.5.1　Test variables

We will test our empirical data regarding value creation during the holding period. For our first and second hypothesis, we calculate the differences in RONA unbiased as well as RONA biased between the entry year and the exit year. This has been done as follows:

$$\Delta RONA^a_{PE,Holding\ Period} = RONA^a_{PE,Exit} - RONA^a_{PE,Entry}$$

Where *a* can either be *biased* or *unbiased*

This measure will then be compared with the change of the peer industry mean for the same metric between the same years, which is calculated as follows:

$$\Delta RONA^a_{industry,Holding\ Period} = RONA^a_{industry,Exit} - RONA^a_{industry,Entry}$$

Where *a* can either be *biased* or *unbiased*

The respective data points are then tested against each other to see the difference in operating performance, this gives our test variable, calculated as:

$$\bar{D}_{Holding\ period} = \frac{\sum_{i=1}^{n}(\Delta RONA^a_{PE,Holding\ period} - \Delta RONA^a_{industry,Holding\ period})}{n-1}$$

Where *a* can either be *biased* or *unbiased.* $\bar{D}$ is the average sample difference for the total change in RONA biased or unbiased between the private equity portfolio companies and the industry group, measured for the whole holding period, allowing for one degree of freedom. *n* is the number of observations included in the sample.

To test our third hypothesis we use the test variable calculated as follows:

$$\bar{C}_{Holding\ period} = \bar{D}^{Biased}_{Holding\ period} - \bar{D}^{Unbiased}_{Holding\ period}$$

Where $\bar{C}$ is the difference between the average sample difference for the total change in RONA biased and the average sample difference for the total change in RONA unbiased between private equity portfolio companies and the industry group.

3.5.2　Z-test

When testing for significance of the test variables, relying on the central limit theorem stating that the mean of any sample is approximately normally distributed if the sample size is larger than 30 (Newbold et al., 2016), we employ a Z-test. The test aims to prove if the difference between the two means of the matched pairs is statistically significant. To test our hypothesis, we apply a one-sided Z-test with the hypothesis for the test variable denoted as $\bar{D}$ (or $\bar{C}$ in case of our third hypothesis):

$H_0: \bar{D} \leq 0$, which will be tested against the alternative

$H_A: \bar{D} > 0$

The decision rule for the test is to reject H_0 if $P(Z > Z_a)$ where $Z = \frac{\bar{D} - \mu_0}{s/\sqrt{n}}$ and

$Z_a = 1.645$ for a 5 per cent significance level.

4　Empirical data

In this section, we will describe our method for obtaining the sample used in the empirical tests. We will furthermore discuss the choice of time period, the data collection process as well as provide descriptive statistics of the data.

4.1　Sample selection

Since we want to look at the difference between the RONA metrics during the initial investment year and the divestment year we first required that all private equity owned companies in the sample to have been divested. Private equity firms have in general two ways of making a divestment, either by selling the company in the public market or through a

divestment in the private market (Kaplan and Strömberg, 2009). Jenkinson and Sousa (2007) conclude that there is an industry and company characteristic bias in terms of divestment method of a private equity portfolio company. To remove this industry and company characteristic bias, the sample has been chosen to include an equal number of previous private equity portfolio companies that have been divested in the private market as well as through a public listing.

4.1.1   Sample selection of public market divestments

We started by selecting a sample of previously owned private equity portfolio companies that had been divested through a public listing. The initial sample was chosen to include all firms that went through an IPO on Nasdaq OMX or Nasdaq First North between 1st January 2008 and 30th March 2017. However, as Nasdaq First North didn't have any listings made by a private equity firm classified as a buyout capital firm during the period, the initial sample was only obtained from NASDAQ OMX and compromised 131 companies.

At first, 18 companies were removed due to not being Swedish group companies. As the study is limited to include Swedish companies since we want to study the value creation of private equity firms in Swedish companies, foreign based group companies were excluded. Then 47 companies were removed due to being subject to list changes and secondary listings. These had to be removed as the companies were not initially offered in the capital markets and hence didn't represent a divestment made by a private equity firm.

44 companies were removed due to the ownership structure before the IPO since these companies weren't majority owned by buyout capital firms. To conclude if the owner can be classified as a buyout capital firm, we used the registers at SVCA and Invest Europe where private equity firm members are classified into the corresponding private equity category. Furthermore, we chose to only include companies in which, prior to the IPO, buyout capital firms had ownership majority since we wanted to be able to conclude that the private equity firm had the ultimate control of the value creation in the companies included in our sample. Furthermore, one company defined as "Financial services" according to SNI code was removed due to the RONA measure not being applicable for this company since interest is its main source of income. RONA as a measure of operating performance becomes irrelevant for this kind of company since it doesn't include interest income.

Table 4.1

Criteria	No. of companies
All initial public offerings during time period	*131*
Adjustments:	
Not a Swedish group company	*18*
List changes and secondary listings	*47*
Not buyout capital owned prior to listing	*44*
Bank and insurance companies	*1*
Sample (n)	***21***

4.1.2 Sample selection of private market divestments

To get an equal number of companies divested in the private market as in the public, we first collected a list of all Swedish companies that had been divested in the private market by a private equity firm defined as a buyout capital firm in the SVCA and Invest Europe registers between January 2008 and March 2017. Through Mergermarket, we got an initial sample of 227 companies. To select 21 companies, we conducted a simple random sampling process without replacement to get an unbiased sample of companies.

Every company was assigned a number between 1 and 227. Through Excel's randomizing function, 21 unique random numbers were generated and the companies with the corresponding numbers were chosen to be included in the sample.

4.2 Data collection and time period

The data for all companies was obtained from Wharton Research Data Services (WRDS) and Retriever Business. Both were used to collect financial information and Retriever Business was also used to obtain ownership information. Retriever Business was furthermore used to collect the financial data for the peer groups.

We collected data for the years 2007 – 2016. 2007 was the earliest year as it is the first year of financial information that can be obtained by using Retriever Business. As 2017 was the latest year in which a company in the sample was divested, financial data for 2016 was the latest fiscal year financial results available for any company in the sample.

Data was collected from companies that were divested by a private equity firm between January 2008 and March 2017. This time period was chosen since 2008 was the earliest year that a company in the sample could have been divested since 2007 was the earliest year that we could obtain data for the industry peers from the Retriever Business database. As the study measures value creation by looking at changes in metrics, the earliest a divestment could have been made by a private equity firm is in 2008 as 2007 is the first year that we could obtain financial information for the peers and we need at least one annual change to be able to include the company in the sample.

The RONA measures were calculated for the years during the holding period as a private equity portfolio company. However, RONA for the initial investment year was in many cases not available since when a private equity firm acquires a company, we discovered it is common that the group structure is remade. This makes it hard to compare the entry year financial information with the prior years; and in many cases the financial information for these years were not available. The closing balance of the net operating assets for the previous year must be available to calculate RONA measures for a specific year and therefore the metrics for the entry year was not available to obtain in several cases. In all cases, the first obtainable RONA measures were used when calculating the value creation during the holding period.

4.3   Peer group selection

The peer group for each of the private equity owned companies in the sample was assigned by taking the SNI-code for the individual company and then use Retriever Business to get al.l companies with the same SNI-code. Depending on the number of companies in the peer group, either the more specified five digit code or the broader two digit code were used. When the five digit code didn't provide data for more than 10 peer companies then the broader two digit code were used. We chose this method since if the peer group would have been very small, which would have been the case for many industry groups if only the five digit code would have been used, then company specific fluctuations likely would have skewed the results.

Then all companies with sales below 10 million Swedish Krona (SEK) where excluded from the peer group. The decision to set the limit as low as 10 million SEK in revenues was made since a large data set of peers was considered to be necessary to not let extreme values have a

too large impact on the yearly average. The other option would have been to expand the industry definition instead of decreasing the sales limitation. We considered this to be an inferior approach as previous research indicates that if having to choose between these two methods, it is preferable to extend the sales range to a certain extent rather than expand the industry classification (Hu et al., 2010).

4.4 Descriptive statistics

There is a total of 42 holding period observations in our sample regarding change in unbiased and biased RONA, these observations are divided over 21 different industries. The industry data is based on a total of 17,914 companies (see table A5 in appendix), with between 71 and 3,367 companies in each of the industries. Looking in table 4.2, it is evident that even though the mean in PE – Peers doesn't deviate extremely between unbiased and biased RONA, the standard deviation is significantly higher for the unbiased RONA.

Table 4.2.

				Descriptive statistics		
Category	*Measure*	*N*	*Min.*	*Max.*	*Mean*	*Std. Dev.*
PE owned	Δ*Biased RONA*	42	-0.18	0.29	0.044	0.1122
	Δ*Unbiased RONA*	42	-0.21	0.49	0.058	0.1270
Peers	Δ*Biased RONA*	42	-0.09	0.13	0.009	0.0411
	Δ*Unbiased RONA*	42	-0.08	0.10	0.004	0.0296
PE - Peers	Δ*Biased RONA*	42	-0.18	0.32	0.035	0.1168
	Δ*Unbiased RONA*	42	-0.22	0.49	0.054	0.1318

Looking at table 4.3 displaying the average annual private equity value creation by holding year, i.e. first year of the holding period, second year of the holding period and so on, we can see that the deviation in returns between holding years is very high and that no clear pattern can be observed.

Table 4.3

Base of measure		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
		Average annual private equity value creation, by holding year							
PE - Peers, biased	*Return*	2.0%	-0.4%	0.2%	3.0%	-0.9%	-0.9%	3.7%	0.2%
	Std. Dev.	9.4%	7.4%	9.1%	9.9%	7.1%	9.7%	4.5%	5.6%
PE - Peers, unbiased	*Return*	0.8%	5.0%	-3.0%	5.2%	1.2%	-2.9%	2.5%	-3.3%
	Std. Dev.	10.4%	21.7%	24.6%	12.0%	8.6%	7.8%	5.2%	2.5%
	Observations	42	36	31	19	14	9	8	2

In table 4.4 we can observe the average annual value creation by the length of the holding period for our sample. For this data it is also tough to observe any clear patterns, however, it seems to be a tendency that the average value creation for the holding period decreases with the length of the holding period. A potential explanation for this tendency could be that in the investments that private equity firms quickly manages to implement the potential improvements they see upon buying the company, a realisation of the full potential will be done quickly. Assuming that the total value creation would be the same, spread over fewer years, the average annual value creation will be higher with a shorter holding period.

Table 4.4

Base of measure		1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years
		Average annual value creation for holding period, by length of holding period							
PE - Peers, biased	*Return*	-1.6%	2.4%	1.5%	0.5%	1.2%	0.4%	-0.7%	-0.4%
	Std. Dev.	8.1%	4.8%	3.4%	2.4%	4.1%	N/A	0.9%	1.0%
PE - Peers, unbiased	*Return*	-0.9%	2.8%	1.4%	-0.4%	3.2%	0.3%	1.7%	-0.8%
	Std. Dev.	10.9%	5.8%	3.2%	1.9%	6.9%	N/A	6.8%	0.2%
	Observations	6	5	12	5	5	1	6	2

5 Results

Here we will present our main results from the study. We will separately disclose the results for each of our hypotheses.

5.1 Test of value creation using biased RONA

In the test of our first hypothesis, we investigate if the biased RONA is higher for private equity owned companies compared to their industry peers. The results from the test of the difference between the RONA for the matched pairs (test variable $\overline{D}$) using a Z-test is disclosed in table 5.1.

Table 5.1

Z-test, test value = 0						
	N	*Std. Dev.*	*Z*	*df*	*Sig. (1-tailed)*	*Mean Difference*
PE - Peers, biased	42	0.11675	1.974	41	0.0275	0.03514

The test resulted in a mean difference of 0.03514 between private equity owned companies and non-private equity owned companies. Furthermore, it resulted in Z-value of 1.974. Thus the p-value for a 1-tailed test is 0.0275 and H_0 can be rejected at a 5 per cent significance level. We can therefore conclude that private equity portfolio firms experience higher increases in biased RONA than its non-private equity owned counterparts and correspondingly we accept the first hypothesis.

5.2 Test of value creation using unbiased RONA

In our second hypothesis, we investigate whether private equity ownership has any positive effect on value creation in their portfolio companies after adjusting for measurement bias. The result from the Z-test is presented in table 5.2.

Table 5.2

Z-test, test value = 0						
	N	*Std. Dev.*	*Z*	*df*	*Sig. (1-tailed)*	*Mean Difference*
PE - Peers, unbiased	42	0.0541	2.694	41	0.005	0.05414

The Z-test for matched pairs resulted in a mean difference of 0.05414 between private equity owned companies and non-private equity owned companies. The Z-score obtained was 2.694

and thus the p-value for a 1-tailed test is 0.005 and H_0 can therefore be rejected at a 5 per cent significance level. From the Z-test we can draw the conclusion that private equity firm ownership has a positive effect on value creation even when adjusting for measurement bias and thereby excluding earnings management. Hence the second hypothesis is accepted.

5.3 Test of difference in RONA measures

In our third hypothesis, we study whether there is a significant difference when evaluating the difference between private equity owned companies and non-private equity owned companies using a RONA adjusted for measurement bias compared to a non-adjusted RONA. The result from the Z-test is presented in table 5.3.

Table 5.3

Z-test, test value = 0						
	N	*Std. Dev.*	*Z*	*df*	*Sig. (1-tailed)*	*Mean Difference*
Unbiased diff - Biased diff	42	0.07731	1.608	41	0.0575	0.01895

The Z-test for matched pairs of the test variable resulted in a Z-value of 1.608 with a corresponding 1-tail p-value of 0.0575. Therefore, we cannot reject H_0 at a 5 per cent significance level and the third hypothesis that there is a lower difference between private equity owned and non-private equity owned companies when measuring value creation using a RONA adjusted for measurement bias compared to an unadjusted RONA is rejected.

6 Analysis and discussion

In this section we will present the analysis as well as discussion of the results and the research method. Furthermore, we will discuss the generalizability of our results and conduct a sensitivity analysis to test the results obtained.

6.1 Evaluation of results

6.1.1 Analysis of value creation using biased RONA

Our first hypothesis tested if value creation measured as change in RONA unadjusted for measurement bias is higher for private equity owned firms than their non-private equity owned counterparts. The test results from the Z-test proved that our hypothesis was correct on

a 5 per cent level of significance. The result is in line with predictions from theory, such as Kaplan and Strömberg (2009), arguing that private equity ownership enhances value creation. These theories are mainly based on a superiority in mitigating agency costs (Jensen, 1989) where private equity firms closer and more actively monitor management (Acharya et al., 2013) and better aligns the incentives of management with the goals of the private equity firm through incentive plans (Kaplan and Strömberg, 2009). The result is aligned with previous studies that have found private equity owned firms to outperform non-private equity owned firms regarding value creation measured as operating performance (Cressy and Munari, 2007; Bergström et al., 2007; Achleitner et al., 2010).

The implied superior value creation stemming from private equity ownership has implications for society. However, previous research conclude that private equity firms conduct significant amounts of earnings management (Beuselinck and Manigart, 2007; Katz, 2009). Considering that earnings management is potentially distorting operating value creation metrics such as RONA, it may not be reliable to make conclusions regarding the value creation without eliminating the effect of earnings management.

6.1.2   Analysis of value creation using unbiased RONA

The second hypothesis tested if value creation measured as change in RONA adjusted for measurement bias is higher for private equity owned firms than non-private equity firms. The test results from the Z-test proved that our hypothesis was correct on a 5 per cent level of significance. This result is in line with aforementioned theories that private equity ownership enhances value creation. However, considering that previous research found that private equity owned firms conduct more earnings management than non-private equity owned firms (Beuselinck and Manigart, 2007; Katz, 2009), it is interesting that private equity owned firms also seems to be superior regarding value creation when adjusting for measurement bias and thereby eliminating earnings management.

6.1.3   Analysis of difference in RONA measures

The third hypothesis tested if the difference in value creation between private equity owned companies and non-private equity owned companies is lower when adjusting for measurement bias compared to not adjusting. The results from the Z-test show no significant evidence that the difference is lower when measuring value creation with RONA unbiased compared to when measuring value creation with RONA biased. Therefore, our hypothesis was not correct.

Considering that previous research found that private equity owned firms conducts significantly more earnings management than companies not looking for an equity exit (Beuselinck and Manigart, 2007; Katz, 2009), the result implying that private equity owned companies conduct less earnings management than non-private equity owned companies is not expected.

One potential explanation of this result is the theory that since private equity firms are repeat players in the IPO as well as private equity sale market, divestments need to be honest with the new investors or future potential buyers may be lost (Cao and Lerner, 2009).

Since adjusting RONA for measurement bias eliminates the effect of earnings management, the implications of the result is that the potential existence of earnings management doesn't lead to an exaggeration of the value creation in private equity owned companies when using a profitability metric impacted by earnings management. This is an interesting finding in regards to the validity of earlier studies with change in profitability metrics as a proxy for value creation. If the difference when using a biased profitability measure would have been significantly higher for private equity owned firms compared to non-private equity owned firms, it would have indicated that previous studies may have overestimated private equity firms' effect on value creation.

6.2   Sensitivity analysis

In the sensitivity analysis we will examine whether any industry or time period seems to have a disproportionate contribution to our results. If that would seem to be the case, we will exclude that industry or time-period and re-run our test and see if it has any effect on the significance of our results.

Looking at the table 6.1 presenting the value creation separated by industry, we can see that the industry *Wholesale – Food* seems to be contributing significantly to the positive private equity ownership effect on value creation. Due to this we will re-run our test excluding the industry *Wholesale – Food* and see if it has any effect on the significance of our results.

Table 6.1

Private equity average holding period value creation, by industry and measure

Industry name	Unbiased RONA	Biased RONA	Obs.
HVAC, installation and wiring	9.85%	2.65%	2
Construction and installation of telecommunication equipment	-0.48%	-6.95%	2
Pipeline distribution of gas	0.78%	-3.93%	1
IT services	-1.97%	0.00%	2
Industrial goods and building materials	13.41%	12.04%	7
Retail	7.25%	6.32%	4
Manufacturing of other parts for automobiles	8.37%	-0.22%	2
Wholesale – Food	32.35%	21.07%	2
Manufacturing of dental and medical instruments and equipment	3.25%	5.22%	2
Manufacturing of other transportation vehicles	0.82%	10.43%	1
Manufacturing of other machines	8.28%	7.84%	1
Manufacturing of metal frames and similar applications	6.61%	3.87%	1
Facility management	16.24%	8.47%	1
Other transportation support services	2.92%	-15.45%	1
Education	-10.10%	-8.09%	2
Healthcare	-1.36%	1.32%	6
Veterinary medicine	-21.47%	-14.16%	1
Hotel and accommodation	0.26%	-4.45%	1
Manufacturing of windows and doors	0.75%	-10.50%	1
Pharmacy	9.73%	5.22%	1
Online retail	-2.60%	6.90%	1

In table 6.2 we can see the result from excluding the industry *Wholesale – Food*, being that the unbiased measure for value creation is still significant at a 5 percentage level. However, the biased measure is now not significant at a 5 percentage level, with a p-value of 0.069. One should bear in mind that this result is based on the assumption that the excluded industry doesn't contribute with any value creation at all, something that might be a too conservative assumption. Considering this, we won't give this small insignificance when completely

excluding the value creation in the industry *Wholesale – Food* any major importance in the interpretation of our main results.

Table 6.2

	N	Std. Dev.	Z	df	Sig. (1-tailed)	Mean Difference
Z-test, test value = 0						
PE - Peers, biased	40	0.112	1.514	39	0.069	0.02658
PE - Peers, unbiased	40	0.114	2.305	39	0.013	0.04103

After investigating the sensitivity in our results from excluding industries with an extreme outperformance, we will now investigate whether the value creation by private equity firms show any significant difference between time periods. If that would be the case we might suspect that to indicate that the value creation in private equity firms is decreasing or increasing over time. That would make our results less stable over time and perhaps even only be applicable for the time period of our study.

Looking at table 6.3 below, we can see that the means in private equity value creation between the period 2007-2012 and 2012-2016 is not deviating substantially for the biased RONA with a mean in the first period of 0.49 per cent and a corresponding mean in the second period of 1.32 per cent. The test for equality in means yields a significance of 53.3 per cent assuming equal variances and 53.2 without that assumption. This implies that we cannot with statistical significance determine whether the means are equal or unequal.

The means for the unbiased private equity value creation is substantially more equal with a mean for the first period of 1.42 per cent and a corresponding mean for the second period of 1.35 per cent. Testing for the equality of the means we get that the means are statistically equal with a 97.8% probability. This suggests that the unbiased value creation is stable between recent time periods and that our result is not sensitive for the choice of time period.

Table 6.3

<div align="center">

Z-test, test value = 0

Test for equality in means between period 2008-2011 and 2012-2016, value creation

</div>

		N	Mean	Std. Dev.	df	Sig. (2-tailed)	Z-value
PE - Peers, biased	2007-2012	85	0.0049	0.09256	-	-	-
	2012-2016	83	0.0132	0.07837	-	-	-
	Equal variances assumed	-	-	-	166	0.533	-0.624
	Equal variances not assumed	-	-	-	163	0.532	-0.626
PE - Peers, unbiased	2007-2012	85	0.0142	0.22029	-	-	-
	2012-2016	83	0.0135	0.08347	-	-	-
	Equal variances assumed	-	-	-	166	0.978	0.028
	Equal variances not assumed	-	-	-	108	0.978	0.028

6.3 Research method discussion

To enhance the validity of our study we have deliberately sought to make decisions in regard to all aspects of delimitations, models, data samples, study design and tests. These choices and weaknesses of our study will be presented in this section. Furthermore we will present the generalizability of our study.

6.3.1 Study design criticism

When conducting the study, we have tried to use the most scientific method to get as valid results as possible. After conducting the study, we however have a few suggestions on how a similar future study could get a more valid result.

Firstly, when estimating the measurement bias, the q-values for individual asset classes and expense items could have been used instead of industry averages. This would provide a more accurate estimate of the measurement bias for the individual firm and thus a more accurate result regarding value creation adjusted for measurement bias.

Secondly, our study has only focused on if private equity owned companies outperform non-private equity owned companies regarding value creation. Thus the difference could potentially not be explained by the fact that private equity ownership is a superior model, but rather by the fact that they buy companies that experience a higher value creation, possibly

explained by factors such as company size and age. A phenomenon similar to the size factor in the 3-factor model by Fama and French (2004).

Thirdly, it is reasonable to assume that both our peer groups and our study group suffer from survivorship bias. In our study group we only include companies that private equity companies actually have sold, and in our peer groups we only include companies that exists in 2016. Thus companies that have gone bankrupt during the period will be excluded in both of the groups, and if bankruptcy risk can be assumed to be the same between the groups it will not affect the validity of our results. However, previous research has found that private equity owned firms experience a higher bankruptcy risk than the average non-private equity owned firm (Sudarsanam et al., 2011). Considering this, it can be assumed that survivorship bias might make us exaggerate the value creation in private equity firms since our study do not capture the differences in bankruptcy risk between private equity owned companies and non-private equity owned companies.

Furthermore, the decision to include companies with sales higher than 10 MSEK in the peer group could potentially not be the most appropriate in terms of comparability as the private equity owned companies in the sample all had above 100 MSEK in sales. This decision was made since a large data set of peers was considered to be necessary to not let extreme values have a too large impact on the yearly average. The other option would have been to expand the industry definition, instead of decrease the sales limitation, this we considered to be an inferior approach since previous research indicates that if you have to choose between these two methods, it is preferable to extend the sales range to a certain extent rather than expand the industry classification (Hu et al., 2010).

Moreover, in a future study the sample size of the study group could be larger and include more companies to get a more valid result. However, with the choice to include an equal number of previous private equity owned companies that have been divested through a public listing and through a private market divestment, the sample could only have been expanded if the time period was extended to include companies divested prior to 2008. We believe this to be an inferior option as we want our sample to be up to date and since it isn't possible to obtain financial information from entire industries using Retriever Business prior to 2007.

6.3.2   Model criticism

How to measure value creation is a debated subject and is defined differently in different studies, e.g. RONA (Bergström et al., 2007) compared to IRR (Phalippou and Gottschalg, 2009). We have decided to use RONA as a proxy based on the fact that it is to be seen as value creation to the society as a whole, compared to IRR that takes an investor approach to the value creation (Bergström et al., 2007). However, we acknowledge the fact that value creation is a complex phenomena and that RONA may not be the most appropriate when measuring operating performance in this setting.

Regarding q as measurement of the measurement bias, there exists some criticism towards its complete validity. As Runsten expresses it:

"... it is obvious that the size of the q may also be a proxy for other aspects" (Runsten, 1998).

Therefore, the q used in the study may not perfectly reflect the measurement bias and as a consequence the adjustments to RONA may not completely remove earnings management and reflect a totally unbiased RONA.

6.3.3   Generalizability

This study's characteristics limit us to draw any general conclusions in several ways. Since we only investigated value creation of private equity owned Swedish group companies, we cannot make any general conclusions for the impact of private equity ownership on value creation worldwide. Furthermore, since we only choose to look at companies owned by private equity sponsors defined as buyout capital, our conclusions are only applicable to the value creation of this kind of private equity category and cannot be generalized to include other private equity actors such as venture capital firms. As the study measures value creation using operating performance metrics, we cannot make any conclusions value creation in general, but only regarding value creation in terms of the studied operating performance metrics. Furthermore, we can only draw conclusions regarding if the value creation is superior to Swedish peers.

7   Suggestion for future research

Our study has examined value creation in private equity owned companies with the result that private equity owned companies outperform non-private equity owned companies. In the process of conducing the study, we have found several interesting complementary subjects related to but outside of the study's scope.

Firstly, it would be interesting to conduct a similar study on data from other countries to see if value creation by private equity firms is similar across countries and how eliminating earnings management would affect these results. This would be interesting to study as differences in financial reporting standards, regulations and culture may affect the willingness of private equity firms to manipulate results.

Furthermore, our study has only investigates whether private equity owned companies outperform non-private equity owned companies regarding value creation. Thus the difference is potentially not explained by the fact that private equity ownership is a superior model, but rather by the fact that private equity firms buy companies that experience a higher value creation, potentially explained by factors such as company size and age. A phenomenon similar to the size factor in the 3-factor model by Fama and French (2004). A model taking this potential effect into account, potentially through a regression model, would provide complementary knowledge to the existing research body regarding the effect of private equity ownership.

Another potential subject for future research is to study the distribution of value creation in private equity companies and see whether it differs between the different stages of the holding period. Theoretically, one could argue that value creation might be biased to the early years of the holding period since the potential changes that the private equity firm could implement arguably has most impact the first years.

Additionally it would be interesting to see if private equity ownership leads to long-term value creation when using the same measures as in this study. As our study only investigate the value creation during the holding period, the private equity firm could potentially take decisions that maximizes certain metrics short term but that in the long term decrease the value of the portfolio company. This study could for an example be conducted by looking at

similar metrics eliminating earnings management but in this case investigating the years after the holding period.

8 Summary and conclusion

This study has examined whether private equity firms create value by looking at development of RONA metrics during the holding period for private equity owned companies and then comparing the results to non-private equity owned firms. The RONA metrics used have both been with and without adjustments for measurement bias and thereby with and without the elimination of the effect of earnings management on the reported results. Furthermore, we have studied if not adjusting for measurement bias and thereby not eliminating the effect of earnings management tends to overestimate the value creation of private equity firms.

This study has found that value creation in private equity owned companies is superior compared to the industry, both when adjusting and not adjusting for earnings management. These results are in line with previous studies not adjusting for earnings management such as (Cressy and Munari, 2007; Bergström et al., 2007; Achleitner et al., 2010), as well as theories that private equity firms enhances value creation by mitigating agency costs (Jensen, 1989) as well as by providing operational and industry expertise (Matthews et al., 2009; Bergström et al., 2007). The implied superior value creation stemming from private equity ownership has implications for society. Policy makers might want to consider this when regulating private equity firms and potentially not try to counteract the existence of private equity firms if the goal is to strengthen the Swedish business landscape and the competitiveness of Swedish companies.

Furthermore, we have found that not adjusting for measurement bias and thereby not eliminating earnings management does not seems to exaggerate the performance of private equity owned firms, indicating that previous studies using unadjusted profitability measures provide valid results regarding value creation.

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10 Appendix
Table A1

Company name	Exit	Industry	RONA biased									
			07	08	09	10	11	12	13	14	15	16
Bravida Holding AB	IPO	HVAC, installation and wiring	-	-	-	-	-	-	10%	11%	13%	-
Eltel AB	IPO	HVAC, installation and wiring	-	2%	-6%	3%	4%	5%	6%	4%	9%	-
Netel Group	M&A	Construction and installation of telecommunication equipment	-	-	-	-	-	-	-	34%	30%	-
Com Hem Holding AB	IPO	Construction and installation of telecommunication equipment	-	-	-	-	-	5%	4%	4%	5%	-
Swedegas	M&A	Pipeline distribution of gas	-	-	-	-	6%	7%	8%	9%	2%	-
Episerver Group	M&A	IT services	-	-	-	-	11%	16%	10%	-	-	-
Coromatic Group	M&A	IT services	-	13%	16%	11%	17%	-	-	-	-	-
Bufab AB (publ)	IPO	Industrial goods and building materials	22%	16%	8%	5%	12%	8%	13%	11%	-	-
Eton Group	M&A	Retail	-	-	-	-	-	0%	3%	18%	24%	-
Thule Group AB	IPO	Manufacturing of other parts for automobiles	-	-	7%	11%	11%	10%	8%	10%	-	-
Granngården	M&A	Retail	-	-	4%	28%	7%	-4%	14%	16%	2%	-
Candyking Holding AB	M&A	Wholesale - Food	0%	0%	-6%	8%	27%	8%	8%	11%	-	-
Autotube	M&A	Manufacturing of other parts for automobiles	-	-	-	-	-	32%	51%	45%	-	-
Bulten AB	IPO	Industrial goods and building materials	-7%	-4%	-9%	4%	21%	-	-	-	-	-
Perten Instruments Group	M&A	Industrial goods and building materials	-	-	-	-	27%	17%	18%	34%	-	-
Atos Medical	M&A	Manufacturing of dental and medical instruments and equipment	-	-	-	-	-	1%	1%	4%	11%	-
Gambro AB	M&A	Manufacturing of dental and medical instruments and equipment	-	2%	-2%	6%	2%	1%	-	-	-	-
Permobil Holding AB	M&A	Manufacturing of other transportation vehicles	5%	11%	18%	9%	8%	10%	-	-	-	-
Alimak Group AB	IPO	Manufacturing of other machines	-	17%	13%	11%	-7%	21%	20%	21%	21%	-
Troax Group AB	IPO	Manufacturing of metal frames and similar applications	-	-	-	-	-	-	-	17%	23%	-
CTEK	M&A	Industrial goods and building materials	-	-	12%	18%	-	-	-	-	-	-
Coor Service Management	IPO	Facility management	0%	-7%	-10%	-11%	3%	5%	-21%	-2%	2%	-
KGH Customs Services	M&A	Other transportation support services	-	30%	26%	36%	26%	12%	-	-	-	-
AcadeMedia AB	IPO	Education	-	-	-	-	28%	11%	10%	12%	10%	12%
Internationella Engelska Skolan	IPO	Education	-	-	-	-	-	0%	0%	0%	24%	26%
Menigo	M&A	Wholesale - Food	-3%	-15%	-12%	1%	6%	2%	9%	17%	22%	-
Akademikliniken	M&A	Healthcare	-	-	-	-	-	-16%	8%	-1%	8%	-
Evidensia	M&A	Veterinary medicine	-	-	-	-	-	-	2%	-7%	-	-
Aleris Holding AB	M&A	Healthcare	5%	6%	2%	-	-	-	-	-	-	-
Capio AB (publ)	IPO	Healthcare	-	-	-	-	0%	3%	6%	4%	6%	-

Table A1, cont'd

Company name	Exit	Industry	RONA biased									
			07	08	09	10	11	12	13	14	15	16
Attendo AB (publ)	IPO	Healthcare	-	-	-	14%	17%	19%	11%	12%	13%	-
Humana AB	IPO	Healthcare	-	-	22%	28%	22%	13%	23%	27%	13%	15%
Solhaga	M&A	Healthcare	-	-	-	-	11%	0%	-1%	-1%	-1%	-
Scandic Hotels Group AB	IPO	Hotel and accommodation	-	10%	5%	3%	5%	4%	3%	3%	7%	-
MQ Holding AB	IPO	Retail	8%	14%	9%	14%	-	-	-	-	-	-
Hööks Group AB	M&A	Retail	-	-	-	-	-	21%	27%	-	-	-
Ahlsell AB (publ)	IPO	Industrial goods and building materials	-	-	-	-	-	-	14%	14%	12%	28%
Dometic Group AB	IPO	Industrial goods and building materials	-	-	-	-	-	7%	8%	8%	9%	-
Inwido AB	IPO	Manufacturing of windows and doors	18%	8%	8%	10%	11%	8%	8%	11%	-	-
Byggmax Group AB	IPO	Industrial goods and building materials	5%	13%	25%	24%	-	-	-	-	-	-
Apoteket Hjärtat	M&A	Pharmacy	-	-	-	-	-2%	1%	15%	14%	-	-
Dustin Group	IPO	Online retail	14%	10%	10%	13%	18%	20%	22%	20%	12%	-

Table A2

Industry description	RONA biased									
	07	08	09	10	11	12	13	14	15	16
HVAC, installation and wiring	16%	17%	11%	14%	17%	13%	14%	15%	18%	24%
Construction and installation of telecommunication equipment	12%	7%	9%	15%	12%	9%	4%	9%	14%	3%
Pipeline distribution of gas	7%	7%	7%	6%	6%	6%	6%	6%	6%	4%
IT services	7%	5%	6%	7%	6%	7%	9%	9%	10%	10%
Industrial goods and building materials	18%	15%	11%	14%	15%	12%	12%	13%	14%	16%
Retail	15%	11%	13%	15%	13%	11%	13%	15%	15%	14%
Manufacturing of other parts for automobiles	19%	11%	1%	12%	13%	10%	11%	14%	11%	13%
Wholesale - Food	13%	13%	13%	15%	13%	12%	12%	13%	14%	12%
Manufacturing of dental and medical instruments and equipment	8%	7%	8%	5%	7%	9%	7%	7%	5%	9%
Manufacturing of other transportation vehicles	14%	11%	10%	11%	13%	9%	8%	10%	12%	10%
Manufacturing of other machines	18%	16%	7%	12%	15%	12%	11%	13%	12%	16%
Manufacturing of metal frames and similar applications	20%	19%	12%	12%	16%	15%	10%	13%	16%	13%
Facility management	12%	10%	11%	13%	12%	11%	11%	11%	11%	11%
Other transportation support services	10%	12%	6%	8%	6%	10%	7%	7%	10%	8%
Education	3%	2%	1%	3%	1%	2%	2%	3%	3%	3%
Healthcare	9%	7%	7%	8%	8%	8%	11%	10%	9%	0%
Veterinary medicine	18%	11%	8%	9%	13%	15%	13%	18%	12%	0%
Hotel and accommodation	8%	7%	5%	6%	8%	7%	7%	7%	9%	12%
Manufacturing of windows and doors	9%	16%	14%	17%	14%	10%	10%	12%	12%	0%
Pharmacy	9%	-2%	5%	2%	8%	15%	21%	20%	14%	12%
Online retail	17%	9%	11%	5%	11%	12%	22%	13%	9%	N/A

Table A3

Industry description	Industry name	Runsten industry		RONA unbiased								
		q-value, raw	Solidity	07	08	09	10	11	12	13	14	15
HVAC, installation and wiring	Building and construction	0.38	19%	5%	4%	5%	5%	6%	6%	6%	7%	3%
Construction and installation of telecommunication equipment	Capital intensive service	0.76	30%	9%	7%	5%	7%	5%	4%	5%	4%	1%
Pipeline distribution of gas	Capital intensive service	0.76	30%	1%	1%	1%	1%	1%	1%	1%	1%	2%
IT services	Consultants & computer	0.38	19%	6%	5%	6%	6%	6%	6%	6%	8%	10%
Industrial goods and building materials	Trading and retail	0.47	19%	6%	5%	5%	6%	6%	5%	6%	6%	2%
Retail	Trading and retail	0.47	38%	6%	5%	6%	6%	5%	6%	7%	7%	8%
Manufacturing of other parts for automobiles	Consumer goods	0.72	34%	7%	2%	3%	6%	5%	4%	4%	3%	3%
Wholesale - Food	Consumer goods	0.72	38%	4%	4%	5%	6%	4%	4%	6%	5%	6%
Manufacturing of dental and medical instruments and equipment	Other production	0.31	35%	4%	4%	4%	5%	4%	3%	3%	3%	5%
Manufacturing of other transportation vehicles	Other production	0.31	35%	5%	4%	4%	4%	3%	5%	4%	4%	7%
Manufacturing of other machines	Other production	0.31	35%	7%	5%	5%	6%	6%	5%	5%	6%	7%
Manufacturing of metal frames and similar applications	Other production	0.31	35%	10%	8%	6%	8%	8%	6%	5%	5%	6%
Facility management	Other service	0.62	23%	4%	7%	8%	8%	7%	7%	6%	7%	6%
Other transportation support services	Other service	0.62	23%	4%	3%	3%	5%	5%	5%	5%	4%	7%
Education	Other service	0.62	23%	1%	1%	2%	1%	2%	2%	2%	2%	1%
Healthcare	Other service	0.62	23%	4%	4%	6%	7%	6%	7%	8%	8%	9%
Veterinary medicine	Other service	0.62	23%	24%	12%	7%	8%	10%	10%	6%	11%	10%
Hotel and accommodation	Other service	0.62	23%	2%	3%	3%	4%	4%	3%	2%	3%	3%
Manufacturing of windows and doors	Trading and retail	0.47	24%	15%	8%	7%	5%	6%	5%	4%	7%	15%
Pharmacy	Trading and retail	0.47	24%	N/A	-7%	-2%	1%	2%	3%	8%	9%	9%
Online retail	Trading and retail	0.47	24%	0%	2%	1%	0%	0%	1%	2%	3%	1%

Table A4

Company name	Exit	Industry	RONA unbiased									
			07	08	09	10	11	12	13	14	15	16
Bravida Holding AB	IPO	HVAC, installation and wiring	-	-	-	-	-	-	9%	11%	13%	-
Eltel AB	IPO	HVAC, installation and wiring	-	-2%	-4%	3%	4%	5%	6%	4%	11%	-
Netel Group	M&A	Construction and installation of telecommunication equipment	-	-	-	-	-	-	-	31%	27%	-
Com Hem Holding AB	IPO	Construction and installation of telecommunication equipment	-	-	-	-	-	6%	2%	2%	3%	-
Swedegas	M&A	Pipeline distribution of gas	-	-	-	-	2%	6%	4%	3%	3%	-
Episerver Group	M&A	IT services	-	-	-	-	1%	2%	-5%	-	-	-
Coromatic Group	M&A	IT services	-	11%	14%	8%	14%	-	-	-	-	-
Bufab AB (publ)	IPO	Industrial goods and building materials	20%	15%	0%	4%	10%	7%	12%	10%	-	-
Eton Group	M&A	Retail	-	-	-	-	-	-	1%	17%	22%	-
Thule Group AB	IPO	Manufacturing of other parts for automobiles	-	-	6%	9%	9%	8%	7%	8%	-	-
Granngården	M&A	Retail	-	-	2%	28%	3%	15%	12%	13%	1%	-
Candyking Holding AB	M&A	Wholesale - Food	-	-	-21%	-6%	48%	3%	4%	27%	-	-
Autotube	M&A	Manufacturing of other parts for automobiles	-	-	-	-	-	30%	48%	43%	-	-
Bulten AB	IPO	Industrial goods and building materials	-6%	-3%	-8%	4%	25%	-	-	-	-	-
Perten Instruments Group	M&A	Industrial goods and building materials	-	-	-	-	27%	17%	17%	31%	-	-
Atos Medical	M&A	Manufacturing of dental and medical instruments and equipment	-	-	-	-	-	1%	0%	2%	9%	-
Gambro AB	M&A	Manufacturing of dental and medical instruments and equipment	-	2%	-3%	5%	5%	0%	-	-	-	-
Permobil Holding AB	M&A	Manufacturing of other transportation vehicles	8%	11%	17%	8%	7%	9%	-	-	-	-
Alimak Group AB	IPO	Manufacturing of other machines	-	15%	11%	8%	-12%	36%	18%	20%	26%	-
Troax Group AB	IPO	Manufacturing of metal frames and similar applications	-	-	-	-	-	-	-	15%	23%	-
CTEK	M&A	Industrial goods and building materials	-	-	12%	17%	-	-	-	-	-	-
Coor Service Management	IPO	Facility management	-	-15%	-31%	-16%	-4%	0%	10%	-3%	1%	-
KGH Customs Services	M&A	Other transportation support services	-	25%	12%	30%	21%	29%	-	-	-	-
AcadeMedia AB	IPO	Education	-	-	-	-	33%	10%	10%	12%	8%	11%
Internationella Engelska Skolan	IPO	Education	-	-	-	-	-	-	-	-	24%	26%
Menigo	M&A	Wholesale - Food	-2%	-13%	-9%	2%	6%	3%	8%	15%	15%	-
Akademikliniken	M&A	Healthcare	-	-	-	-	-	-16%	7%	-5%	5%	-
Evidensia	M&A	Veterinary medicine	-	-	-	-	-	-	1%	-15%	-	-
Aleris Holding AB	M&A	Healthcare	4%	4%	1%	-	-	-	-	-	-	-
Capio AB (publ)	IPO	Healthcare	-	-	-	-	-	4%	5%	4%	5%	-
Attendo AB (publ)	IPO	Healthcare	-	-	-	8%	9%	31%	9%	11%	12%	-
Humana AB	IPO	Healthcare	-	-	13%	21%	131%	12%	23%	25%	11%	14%
Solhaga	M&A	Healthcare	-	-	-	-	10%	-1%	-3%	-11%	-2%	-
Scandic Hotels Group AB	IPO	Hotel and accommodation	-	7%	2%	4%	10%	3%	2%	5%	8%	-
MQ Holding AB	IPO	Retail	7%	13%	8%	15%		-	-	-	-	-
Hööks Group AB	M&A	Retail	-	-	-	-	-	19%	23%	-	-	-
Ahlsell AB (publ)	IPO	Industrial goods and building materials	-	-	-	-	-	-	14%	14%	12%	28%
Dometic Group AB	IPO	Industrial goods and building materials	-	-	-	-	-	6%	8%	7%	9%	-
Inwido AB	IPO	Manufacturing of windows and doors	18%	8%	7%	9%	10%	7%	8%	10%	-	-

Table A4, cont'd

Company name	Exit	Industry	RONA unbiased									
			07	08	09	10	11	12	13	14	15	16
Byggmax Group AB	IPO	Industrial goods and building materials	4%	13%	24%	25%	-	-	-	-	-	-
Apoteket Hjärtat	M&A	Pharmacy	-	-	-	-	-5%	-2%	15%	13%	-	-
Dustin Group	IPO	Online retail	14%	9%	9%	12%	16%	18%	19%	19%	12%	-

Table A5

Industry description	SNI - Code	n	PE companies compared to peer group
HVAC, installation and wiring	43	412	Eltel, Bravida
Construction and installation of telecommunication equipment	42.220	115	NeTel, ComHem
Pipeline distribution of gas	35.220	686	Swedgas
IT services	62	2 243	Coromatic, EPI
Industrial goods and building materials	46 – Industrial goods	3 367	Bufab, Bulten, CTEK, Ahlsell, Dometic, Byggmax
Retail	47	1 725	Eton, Granngården, MQ. Hööks
Manufacturing of other parts for automobiles	29.320	214	Thule, Autotube
Wholesale - Food	46 - Food products	1 353	CandyKing, Menigo
Manufacturing of dental and medical instruments and equipment	32.501	578	Atos Medical, Gambro
Manufacturing of other transportation vehicles	30.920	155	Permobil
Manufacturing of other machines	28	1 151	Alimak
Manufacturing of metal frames and similar applications	25.110	346	Troax
Facility management	81	1 118	Coor
Other transportation support services	52.290	579	KGH custom service
Education	85	1 425	AcadeMedia, Internationella Engelska Skolan
Healthcare	86	825	Aleris, Capio, Attendo, Humana, Solhaga
Veterinary medicine	75	71	Evidensia
Hotel and accommodation	55	954	Scandic
Manufacturing of windows and doors	16.233, 16.232	85	Inwido
Pharmacy	47.730	233	Apoteket
Online retail	47.911, 47.912, 47.913, 47.914, 47.915, 47.916	279	Dustin