

# Is Bigger Always Better?

## A Study of Value Creation in Private Equity<sup>\*</sup>

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Christopher Drewsen<sup>♥</sup>

Gustav Moss<sup>\*</sup>

### Abstract

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This article investigates value creation in leveraged buyouts conducted in Scandinavia during the period between 1997 and 2012, with the emphasis on differences in such value creation dependent on target sizes. This is done by conducting an event study on 199 buyouts using accounting-based performance metrics. The results found indicate excess value creation of private equity portfolio companies in general, evidence prevailing irrespective of target size. More specifically, the authors find improvements in operational efficiency and changes in investment policies to be more prevalent within larger targets, while no such statistical differences can be inferred with respect to differences in growth. Numerous plausible explanations are presented, with the overarching picture indicating larger targets to be more conducive to value creation.

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<sup>♥</sup>21727@student.hhs.se

<sup>\*</sup>21138@student.hhs.se

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Tutor: Assistant Professor Cristina Cella

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Discussants: Mattias Holmberg and Martin Stenlund

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*“People used to think that private equity was basically just a compensation scheme, but it is much more about making companies more efficient”*

David Rubenstein, co-founder The Carlyle Group

## **Section I: Introduction**

**A**s documented and presented by Jensen (1989), the organisational and ownership structures which traditionally have been driving economic growth are being challenged by the emergence of new structures with radically different traits. These new organisational forms are characterised by such attributes as lack of public shareholders, ownership structures dominated and concentrated by institutional investors and highly leveraged capital structures. The drastic increase in leveraged buyouts (henceforth LBOs), interchangeably referred to as Private Equity (henceforth PE) transactions, seen in the United States of America (henceforth USA or interchangeably US) during the 1980s bears testimony to this change within the corporate landscape.

An LBO, in wider terms, refers to a context whereby an investment firm (interchangeably referred to as PE firm) acquires a majority stake in e.g. a private company, a public company (a so-called public-to-private transaction), or a corporate division being spun off, with the main source of capital being debt as opposed to equity (see for example; Jensen, 1989; Kaplan and Strömberg, 2009; Lichtenberg and Siegel, 1990). Beyond the usage of substantial amounts of debt, PE transactions are in general synonymous with incentive alignment with respect to management and the owners, along with improved corporate governance policies (see for example; Jensen, 1989; Kaplan and Strömberg, 2009; Palepu, 1990). Early advocates of PE ownership, such as Jensen (1989), argue that the combination of a lean structure within the investment firms, along with the active governance and ownership applied to the respective portfolio companies, gives rise to an organisational structure, with respect to the buyout targets, far superior to the general public company.

Looking at the PE industry, a wide range of investment firms with various focus areas can be discerned. The traditional buyout funds have been complemented by debt and hybrid funds, as well as by funds targeting niche investment areas such as infrastructure and real estate. Also within the more traditional buyout landscape, increasingly focused and specialised funds have emerged as the industry has matured. In this setting, one can further clearly distinguish between buyout funds focusing on larger companies versus smaller targets. According to the European Private Equity and Venture Capital Association (henceforth EVCA) approximately 55% of the total value of PE

transactions in Europe is attributable to the small and medium market segments (EVCA, 2013)<sup>1</sup>. Hence, even though the PE investments which typically become first page material in the general media and press often are larger investments, one clearly realises the volume and importance of PE investments targeting smaller size segments to be substantial; such smaller segments are thus undoubtedly an important area of study (please note that the smaller targets, as defined in this study, are not to be viewed as e.g. start-ups and their equivalents, but rather as companies of reasonable size in relation to larger targets, yet small enough to be e.g. targeted by a different set of PE funds).

Looking at previous research within the field of organisational theory and management, significant attention has been given towards the issue of agency conflicts, and the construction of corporate governance mechanisms aiming at mitigating such conflicts resulting from the separation of ownership and control (see for example; Fama and Jensen, 1983b). In the seminal work conducted by Berle and Means (1932), the agency problem relating to the modern corporation was initially introduced and academically formalised. The key theme surrounds the separation of control between directors and managers on one hand (agents), and the owners (principals) on the other. Further, studies by e.g. Fama (1980) and Jensen and Meckling (1976) elaborate on this topic and point out the inevitable misalignment resulting from the non-conjoined interests of utility-maximising individuals in modern corporations, individuals once again represented by management and the owners. Related to this topic is the theory of corporate governance, which can be described as a set of mechanisms used by capital providers to ensure an alignment of stakeholder interests, and thereby enhancing the probabilities of receiving an adequate return on their invested capital (see for example; Shleifer and Vishny, 1997).

As pointed out by amongst others Jensen (1989), active investors such as PE firms address these concerns by deploying mechanisms such as highly leveraged capital structures, performance-based compensation schemes, managerial ownership stakes along with additional initiatives resulting from the imposed active ownership model. These mechanisms are in place to mitigate amongst others the principal-agent problem and improve corporate governance. Authors such as Kaplan and Strömberg (2009) expand on this reasoning and divide the set of changes conducted by PE firms to improve their targets into Financial, Governance and Operational engineering. Naturally, not all

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<sup>1</sup>The definition of size segments is debatable, with EVCA defining target firms with an enterprise value below EUR 500mn as small or medium. The approach chosen in this article is based on both secondary and primary sources, and defines Large (Sub-Large) as companies acquired by PE funds (c.f. one PE firm in general consists of several PE funds) with total committed capital in excess of (below) EUR 1bn. Please refer to Section III: Data and Methodology for a detailed review

researchers agree with this somewhat glorified picture of PE ownership; researchers such as e.g. Easterbrook and Fischel (1991) oppose the view of Jensen (1989) that the dominating corporate form in the US, at the time being the public corporation, is inferior to the one offered by an LBO firm.

Much of previous research surrounding the field of PE investigates the performance of PE-backed funds (see for example; Gottschalg and Phalippou, 2009; Kaplan and Schoar, 2005; Ljungqvist and Richardson, 2002), the activities conducted post-acquisition (see for example; Baker and Wruck, 1989; Jensen, 1989; Kaplan and Strömberg, 2009), as well as investigates whether or not PE firms create economic value through their ownership (see for example; Kaplan, 1989; Lichtenberg and Siegel, 1990; Smith, 1990; for a Nordic perspective see for example Bergström et al., 2007). Given the relatively modern type of ownership structure PE entails, it is far from surprising to discern a focus, within the academic discourse, towards contrasting PE to other asset classes and firms rather than distinguishing between PE fund-related and target firm differences, e.g. segmental and geographic focus, target sizes etc.

Given the evolution of the overall PE asset class, however, a tendency in the academic discourse to investigate such specific angles within the PE space is arguably emerging. Authors such as Holthausen and Larcker (1996) investigate the performance of reverse LBOs (henceforth RLBOs), Kaplan (1989) focuses on Management Buyouts (henceforth MBOs), and Lerner et al. (2011) investigate PE in developing markets. One further natural research area, currently to a large extent overlooked, would be to investigate potential differences in the performance of PE investments targeting different-sized firms. The size factor, in general, has been a longstanding research area within, amongst others, the field of asset pricing. For example Fama and French (see for example; Fama and French, 1993; Fama and French, 1996) present in their influential papers the improved explanatory value resulting from the extension of the widespread CAPM model (see for example; Lintner, 1965; Mossin, 1966) to include a size variable. More adjacent studies which do attempt to merge the topics of size and organisational theory, study amongst others board composition (see for example; Bennett and Robson, 2004; Eisenberg et al., 1998) along with the general need for corporate governance in all organisational forms (see for example; Abor and Adjasi, 2007). In the context of alternative asset classes, such authors as Gottschalg and Phalippou (2009) capture the size aspect, to some extent and in a widely different setting given their inherent differences, by distinguishing between Venture Capital (henceforth VC) and PE funds. On a more

concrete note, medium-sized businesses<sup>2</sup> only account for one to two percent of all businesses by number in e.g. Germany and the United Kingdom (henceforth the UK), however they contribute to approximately one third of Gross Domestic Product (EVCA, 2013), but have nonetheless, as discussed above, been given limited attention in the academic discourse. Thus, the theoretical justification for studying this angle is demonstrably rigid, so as the overall market sentiment which portrays an increasing interest for understanding the size factor in a PE context. Beyond previous academic findings, interviews with investment professionals, i.e. investment-focused employees of PE firms (please refer to Section III: Data and Methodology for further details on interviews conducted), have indicated an overall market sentiment moving towards considering targets within an increasingly wider spectrum of size ranges. Such factors as increased competition for the largest of targets (often divested through structured auction processes, with numerous bidders for attractive targets), substantial uninvested committed capital (c.f. dry powder) in the wake of the financial crisis which made debt less accessible and targets more scarce, fundraising restrictions etc., have all altered the market space. On this topic, as pointed out by for example Hart (1995) and Turner (1983), and corroborated by information from interviewed investment professionals, the potentially more favourable structures within smaller targets, which may be more conducive to changes in corporate governance and operational improvements, imply the potential existence of benefits for PE firms to broaden the scope of investments so as to consider smaller size categories; these are factors which lend further credence to the relevance and topicality of the research questions (see formalisation of research questions in Section II).

In order to investigate whether or not value creation is more prevalent, and if different strategies are implemented, depending on target sizes, the authors of this study (henceforth Authors) construct a comprehensive data set of 199 Scandinavian PE-backed transactions during the period between 1997 and 2012. The Authors study the impact of PE ownership on value creation measures including Growth (proxied by changes in Revenues<sup>3</sup>), Operating Performance (proxied by changes in Earnings Before Interest Taxes Depreciation and Amortisation, henceforth EBITDA, margins, Earnings Before Interest and Taxes, henceforth EBIT, margins, and Return on Assets, henceforth ROA), and Capital Spending (proxied by changes in Depreciation and Amortisation, henceforth D&A, charges in relation to Revenues) in order to determine differences in value creation between size categories (see Hypothesis section for details on the operationalisation of the hypotheses). To

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<sup>2</sup> As defined by EVCA

<sup>3</sup> For illustrative purposes, accounting terminology and metrics are denoted with the first letter being capitalised

add further credibility and insights to the study, the Authors have, in addition to the secondary data, conducted interviews with Scandinavian investment professionals active within different size segments.

The study presents evidence of overall buyout superiority, i.e. not distinguishing between target sizes, in terms of Growth and Operating Performance, but finds no proof of an alternation of investment policies (c.f. measured as Capital Spending) as opposed to peers. Looking within the area of main contribution of this study, i.e. distinguishing between different target size segments, a similar picture is portrayed when studying peer-adjusted buyout performance, in terms of Growth and Operating Performance, for the different size categories on a stand-alone basis. In terms of Capital Spending, a peer-adjusted alternation in investment policies can be discerned only for larger buyout targets, where a reduction in relative investments can be identified. On the basis of these inter-group results, further tests are performed in order to determine whether the identified group differences are in fact statistically significant. Such statistically significant differences are observed for the majority of Operating Performance measures along with Capital Spending, indicating larger targets to not only outperform peers, but also smaller targets, in terms of improvements in operational efficiency (c.f. measured as Operating Performance), as well as altering investment policies, i.e. in this case decreasing relative investments, to a larger extent than peers and their smaller counterparts. With respect to growth (c.f. measured as Growth) characteristics, no such differences between target sizes can be discerned.

The disposition of the study is as follows; Section II describes the underlying theories and previous research conducted within the field and its adjacent research areas, and concludes with a statement of, and discussion on, the hypotheses the article aims to test; Section III provides a detailed overview of the collected data set and outlines the methodologies used to test the aforementioned hypotheses; Section IV presents and analyses the results obtained from the conducted tests; and finally Section V provides a discussion of the key findings of the article and presents suggestions for potential further research.

## **Section II: Theories, Previous Research and Hypotheses**

### **Introduction to the Private Equity Industry**

The emergence of the PE industry in the 1980s has reshaped the corporate landscape significantly, and today PE transactions account for a major part of the overall Mergers and Acquisitions (M&A) market. In 2012 alone, the global PE industry raised approximately USD 320bn and conducted transactions with a total deal value of approximately USD 190bn (Bain & Company, 2013). As discussed by Jensen (1989) and Kaplan and Strömberg (2009), PE investments in general refer to control investments financed to a large extent by debt and often entail immediate, and significant, changes to the corporate and governance structures of the targets. The typical PE structure (for an excellent review see for example; Hardyman et al., 2011) from fund creation to realisation is initiated by the raising of external capital from capital providers, denoted Limited Partners (henceforth LPs). The PE firm itself, denoted General Partner (henceforth GP), is usually structured as a partnership and is typically compensated through two components; a management fee and carried interest. Once the GP has raised capital to the investing fund from LPs including institutional investors, the GP initiates the process of identifying investment targets. Note that several provisions govern this investment process in terms of e.g. target sizes and sector focus, and that PE partnerships typically have a pre-determined life of approximately ten years, with the possibility of extension. Of that typical ten-year lifecycle, an initial period of investing, circa five years according to Kaplan and Strömberg (2009), will take place, followed by a period of divesting. The technical lifecycle is to a large extent a result of restrictions on the GP, aiming at e.g. ensuring aligned incentives between the GP and its LPs.

A discussion of valuation techniques is beyond the scope of this study, but worth mentioning is the common usage of intrinsic methodologies, essentially discounting the stream of future cash flows of the business, and market-based methods focusing on relative valuation as compared to peer companies. Irrespective of technique(s) used, such traits as strong growth, high margins and limited/efficient capital usage all benefit valuation. As an example, improved margins and lower capital spending, *ceteris paribus*, increase free cash flows as calculated in intrinsic models, whereas growth and improved margins may justify a premium to the market value of comparable firms.

Once a target has been acquired, a period of transformation, complemented by management incentive mechanisms and improved governance, commences and continues throughout a holding

period of, on average, five years for investments divested in 2012 (Bain & Company, 2013). Typically, the PE partnership will divest an investment through e.g. a trade sale or a public offering.

## **Private Equity Performance**

The previous literature covering the performance of the PE asset class assesses performance using several metrics. One option is to look at the Internal Rate of Return (henceforth IRR) of PE funds (see for example; Ljungqvist and Richardson, 2002), whereas another option is to benchmark the performance of the fund against an index such as the S&P 500 (see for example; Moskowitz and Vissing-Jørgensen, 2002). Yet another option is to use accounting data to determine whether or not there is an impact resulting from the buyout event (see for example; Bergström et al., 2007; Kaplan, 1989). The latter option is the approach taken in this study and will be elaborated upon below. As for the first two options, the literature on the performance of the asset class in terms of fund returns is somewhat limited when compared to e.g. mutual funds, and is also in many cases based on fund valuation from third-party providers of information. Data from these sources suffer from several disadvantages including e.g. aggregate rather than fund-by-fund data, selective data due to voluntary reporting, and the fact that the return data is based on unrealised as well as realised investments. However, e.g. Kaplan and Schoar (2005) perform a comprehensive study of precise fund data and investigate the performance and capital inflows of PE partnerships in the US. They find that on a gross level, i.e. excluding fees, PE funds outperform the S&P 500, whereas returns net of fees are in line with the returns of the said index. Ljungqvist and Richardson (2002) find that PE funds generated substantial excess returns in the 1980s and 1990s based on a data set of PE funds compiled based on fund-by-fund data, as in the case of Kaplan and Schoar (2005). Previous studies with less granular data such as e.g. Moskowitz and Vissing-Jørgensen (2002) find that average PE returns do not outperform publicly traded equities during a sample period between 1952 and 1999, using amongst others data from third-party providers. As indicated in the abovementioned studies, the returns generated by PE funds differ widely depending on measurement method, sample, time period used etc. This mixed picture is exemplified by the different results reported by e.g. Gottschalg and Phalippou (2009), who present a sceptical view on the performance of the asset class, and Harris et al. (2012), who in a more recent study find that the asset class has outperformed equities markets.

## **Scope of Previous Research Within the Asset Class**

In the academic literature, there is a broad range of subjects related to PE, beyond asset class performance, which have been investigated. For example, Fenn et al. (1995) study the structure of



the overall PE landscape, including its historical development, the intermediary role of the GPs, and the development of the composition of LPs. Other studies, such as Leamon et al. (2011), conduct similar analyses of the PE landscape but focus on specific geographic segments outside of the US, such as China and other developing nations. Strömberg (2007) conducts an exhaustive analysis of 21,000 LBO transactions taking place during the 1970s to 2007, focusing on divestment behaviour, holding periods and transaction types, and notes that the geographic and industry scope of LBOs has broadened over time. Furthermore, the study finds that most LBO activity targets private entities, and that holding periods are longer than what has been documented in the previous academic literature. Axelson et al. (2012) analyse an international sample of LBOs for the period between 1980 and 2008 and investigate the determinants of the applied levels of leverage and its pricing. The study finds that, in contrast to what capital structure theory would suggest, the state of the overall credit market is the main determinant of leverage in LBO transactions, and also concludes that increased LBO transaction leverage may translate into increased prices and thus lower returns. Related to the subject of leverage is the study by Hotchkiss et al. (2012), which uses a sample of approximately 2,200 PE-backed firms and investigates their default likelihood and restructuring behaviour. The authors find that buyout targets which experience financial distress typically are able to restructure more quickly than industry peers with no PE backing, and that they are overall neither more nor less likely to experience financial distress than the said peers given similar debt levels. Another research angle is the actual structure of PE firms and its determinants, a subject discussed in e.g. Hardyman et al. (2008) and Hardyman et al. (2011), as well as the compensation and fee structures employed by PE firms, as investigated by e.g. Metrick and Yasuda (2010) and Robinson and Sensoy (2012). As can be seen from the above, the academic field of PE offers a breadth of topics and angles and takes various stakeholder perspectives into account. One area of further interest, and the one of highest relevance for this study, however, is understanding and validating the actions taken by PE firms to improve operations within their portfolio companies.

## **Operational Improvements**

A natural starting point for investigating operational improvements in PE-owned portfolio companies is the influential study conducted by Jensen (1989), which discusses, in addition to the efficiency of the investing entity (c.f. GP), the importance of such traits as performance-based managerial compensation, a debt-based capital structure, active and concentrated ownership and governance processes, in driving value in the buyout target. Kaplan and Strömberg (2009) divide

these measures into Financial, Governance, and Operational engineering. Financial engineering is related to the highly leveraged capital structure often deployed, and the agency benefits resulting from the pressure on management to continuously service debt and maintain debt covenants, which limits the use of excess cash to fund negative Net Present Value (henceforth NPV) projects (see for example; Jensen, 1986, for a review of the agency benefits of debt). From a returns perspective, Financial engineering, and the amortisation of debt conducted during the holding period, is also a key driver of returns. Governance engineering refers to the usage of e.g. management incentive schemes, usually deployed through managerial ownership stakes, as discussed by e.g. Jensen (1989), which aim at mitigating the potential misalignment resulting from the separation of ownership and control in the modern corporation. Also, as analysed by Acharya et al. (2008) and Kaplan and Strömberg (2009), Governance engineering is related to e.g. the typically smaller board composition of PE-backed firms and the fact that they convene more frequently than those of public peers. Finally, Operational engineering refers to the operational improvements of the buyout target in terms of Revenues, operating profitability etc., from which one can infer the actual existence of specific measures deployed by the PE firm. Given the aim of this study, the focus is primarily directed towards the last type of engineering, namely Operational engineering.

Kaplan (1989) reviews, in his pioneering study, changes in operational efficiency and valuation with respect to Management Buyout targets. The study identifies, in the three years post the MBOs, improvements in operating profitability, defined as EBITDA margins, alternation of investment policies, by Kaplan (1989) defined as Capital Expenditure (henceforth CAPEX), and net increases in cash flows, defined as EBITDA less CAPEX. Another study on MBOs conducted by Smith (1990) reports significant increases in operating profitability, measured as Operating Cash Flow before Interest and Tax in relation to the Asset base and the number of employees. From a more regional perspective on MBOs, Desbrieres and Schatt (2002) find, for the period between 1988 and 1994, MBO outperformance as compared to industry peers. Looking outside of MBOs, e.g. Cressey et al. (2007) find, for a sample of 122 UK LBOs, abnormal buyout target profitability. In a Western-European setting, Acharya et al. (2008) find abnormal performance when studying 395 buyouts during the period between 1991 and 2007. In a Scandinavian context, Bergström et al. (2007) confirm this view, and find abnormal improvements in EBITDA margins and Return on Invested Capital (henceforth ROIC). For further examples of studies investigating the Scandinavian buyout landscape, please refer to e.g. Adler and Norberg (2012) and Gulliksen et al. (2008). Holthausen and

Larcker (1996) study a specific case of PE ownership, namely targets conducting an RLBO, i.e. where a PE firm divests an investment through a public offering after having first taken it private. The study finds that at the event of the public offering, on average, targets outperform industry peers in terms of accounting metrics. Worth mentioning is that not all studies focus on the potential existence of performance improvements relating to accounting measures or financial measures in general, but rather focus on real effects in terms of such metrics as e.g. total factor productivity. Examples of these studies are Amess (2003), Harris et al. (2005) and Lichtenberg and Siegel (1990). Complementing these highly data-driven studies, Baker and Wruck (1989) conduct an in-depth case study of the buyout of the O.M. Scott & Sons Company, and find the injection of debt in combination with increased managerial ownership to result in improved efficiency and growth. Clearly, the literature points to PE ownership as having a significant and positive impact on corporate growth and efficiency. The Authors would like to refer to Cumming et al. (2007) for an excellent review of the discourse related to e.g. value creation in buyout targets.

Given the more specific angle of this particular study, light ought to be shed on other related niche research areas. For example, Kaplan (1991), follows 183 LBOs conducted during the period 1979 to 1986, and observes how the ownership structures of the buyout targets evolve over time, and concludes that, in general, LBOs are in the middle between being a permanent and a temporary organisational form. Long and Ravenscraft (1993) and Lerner et al. (2011) examine the effects of PE ownership on innovation by focusing on changes in the level of spending on Research and Development (henceforth R&D) and patenting activity. The former study finds that R&D spending is significantly reduced, whereas the latter finds that innovation, measured by patenting activity, is unchanged. Also, studies such as Adler and Norberg (2012), investigating the importance of vendor identity preceding a buyout, Bogdanov and Teye (2011) and Jääskeläinen (2011), investigating the resilience of PE-backed firms through financial crises, add further colour to the PE research area.

## **Organisational Theory**

As previously mentioned, Jensen (1989) and other authors argue the mitigation of agency problems and implementation of efficient governance practices, associated with the PE ownership model, to be a key differentiating factor for the asset class. With respect to the overall literature on agency problems, the influential study by Berle and Means (1932) originally discusses the problems of separating ownership and control in the modern corporation. They argue that the difference in compensation structure between managers and shareholders, in the typical dichotomous case

prevalent in the US at the time of the study, in that managers receive salaries while shareholders receive compensation in the form of capital gains on invested capital, leads to a misalignment of incentives between the two stakeholders. Further influential papers within the field of agency theory include Jensen and Meckling (1976), in which an overall view of the costs of the principal-agent relationship is provided, and Fama and Jensen (1985), which incorporates a financier's perspective on the issues of agency problems, and e.g. Fama and Jensen (1983a; 1983b) which discuss factors in place to secure the survival of organisations in the presence of these issues. The agency problems of separating ownership and control are linked to the practice of corporate governance, as discussed by e.g. Shleifer and Vishny (1997) who mention two main approaches to implementing corporate governance; legal protection and concentrated ownership. They take the recent development of LBOs in the US, at the time, as an example of a development in the corporate landscape, characterised by measures directly attempting to remedy some of the consequences resulting from sub-par corporate governance practices. As an example, Bhagat et al. (1990) show that many LBOs are accompanied by the divestment of non-core Assets and operations, Assets and operations arguably originally introduced as a result of e.g. empire-building and excess diversification. Therefore, they reason that the agency benefits of leverage and concentrated ownership work to improve governance. This is further evidenced by Thomsen and Pedersen (2000), who find a positive relationship between ownership concentration and shareholder value.

To minimise agency costs and improve corporate governance, PE firms tend to deploy a certain number of initiatives, which are elaborated further on below. As discussed by Miller and Modigliani (1958), in imperfect markets, debt comes with such advantages as interest tax shields which enhance company value, however there are several other, perhaps more important, advantages from increasing the leverage of a firm. Leverage not only signals a commitment from management regarding the availability of future cash flows, but also creates financial boundaries within which management must act, thus minimising the opportunities for management to engage in negative NPV projects. As pointed out by Jensen (1986), the problem of management investing excess cash flows in negative NPV projects is commonly referred to as the Free Cash Flow Problem, which is argued to be reduced by leveraging the company's capital structure. As also pointed out by Kaplan and Strömberg (2009), leverage does not only confer benefits but can also entail significant risks such as increased costs of financial distress if taken to excess, however, third-party lenders such as banks act as a constraint on these activities. With respect to PE firms as owners, Kaplan and

Strömberg (2009) note that the active ownership deployed by PE firms manifests itself in many ways; as mentioned above the boards of PE-backed firms tend to be smaller, and also tend to convene more frequently than comparable firms. This is further evidenced by the study performed by e.g. Cornelli and Karakas (2008), which uses data on public-to-private LBOs in the UK. Further, Acharya et al. (2009) point to six key learnings for the boards of publicly listed firms in the UK, influenced by the practices of e.g. PE-backed boards, which include, amongst others, reducing board sizes, investigating changes to remuneration structures, and educating the boards with respect to their company's underlying business. Moreover, as pointed out by Kaplan and Strömberg (2009), the practice of awarding management the ability, and in many cases requiring them, to co-invest, not only gives them significant upside potential but also introduces significant risks, and thus extends the disciplining effect of equity ownership. Furthermore, given the illiquid nature of the ownership, management is incentivised to foster long-term, rather than short-term, performance, and their incentives are thus aligned with those of the other shareholders. As Kaplan (1989) points out, management ownership stakes increase significantly as a result of public companies being taken private. Keasey et al. (2005) provide another perspective by linking the recent development of corporate governance codes to the convergence of governance across firms, which to some extent is argued to limit the ability of implementing, and reducing the need for, the changes employed by PE firms. Worth noting is the current debate on whether or not the governance benefits of an LBO can be obtained without actually taking the buyout target private (see for example; Jensen et al., 2006).

## **Operational Improvements and Firm Size**

Having looked into the previous research conducted within PE and its performance as an asset class, the general operational improvements typically implemented, as well as the underlying organisational theories suggested by PE proponents such as Jensen (1989), the natural concluding step in the discussion of theories and previous research is to provide an overview of the research distinguishing between buyout target size segments as presented in both academia and the professional field.

As pointed out by e.g. Turner (1983), smaller firms tend to suffer from less organisational inertia and can hence be argued to be more susceptible to organisational change. This picture is somewhat corroborated by interviews with investment professionals, who also highlight such factors as increased bidding competition for larger targets to act in favour of targeting smaller firms. Some investment professionals also indicate smaller firms to be somewhat more mouldable, a trait highly valued by PE firms looking to implement strategic and organisational change. Worth mentioning is

that the grass, per se, may not be greener on the smaller proverbial side of the size fence, as such factors as increased volatility, higher default probabilities and larger idiosyncratic risks make the playing field for smaller firm investments more opaque (see for example; Dichev, 1998; Dietsch and Petey, 2004). The risk-return trade-off is discussed in a market setting by authors such as Freeman (1987), who points out that smaller listed firms often are prone to larger mispricing since the magnitude of abnormal returns is negatively related to company size, and in the study of the cross-section of expected stock returns by Fama and French (1992), a negative relationship between the size of companies and their average returns (companies with smaller market capitalisation levels tend to generate higher average returns) is shown. Related to this literature is the research area concerned with the differences in performance between VC and more traditional PE, or buyout, investments. Despite VC being beyond the scope of this study, the distinction between VC and PE, in the context of investment firms found in the literature, is nonetheless important to investigate since it indirectly, to some extent, incorporates a size perspective. Two studies focusing on the performance of funds investing in, on one hand VC, and on the other hand PE, are Gottschalg and Phalippou (2009) and Kaplan and Schoar (2005), respectively. The former study does not find a significant difference in performance, measured against the S&P 500, between VC and PE funds, whereas the latter finds decreasing returns to scale with respect to fund size. Worth noting is that total fund returns inevitably will capture factors in addition to changes in accounting-based value creation measures, factors such as multiple expansion and recapitalisations etc.; nonetheless, fund returns will depend on company improvements which are arguably captured by changes in various value creation measures. In sum, the evidence is scattered with respect to firm size in a PE context, further justifying the Authors' desire to ascertain the impact of the size factor in a Scandinavian PE setting.

## **Hypotheses**

Before going into further detail on the aforementioned size factor, a prefacing analysis to determine the potential existence of a general outperformance of buyout targets as opposed to peers, irrespective of size, in a Scandinavian setting, is conducted. The related hypotheses will carry the denotation (a). Shifting the focus to include the size factor, the hypotheses surrounding outperformance as opposed to peers for different size categories in isolation are denoted (b), whereas the final hypotheses regarding the potential existence of differences between size segments will carry the denotation (c).

As previously discussed, significant improvements in accounting measures in general, post-buyout, have been documented by a range of scholars. Looking more specifically into present evidence regarding the impact of PE ownership on Growth, Acharya et al. (2008) find buyouts, in general, to be accompanied by abnormal Revenue growth. Further, a more qualitative study conducted by Baker and Wruck (1989) confirms this picture and documents significant Revenue growth in the O.M. Scott & Sons Company following its buyout. Worth mentioning is that Bergström et al. (2007) find no significant impact on Growth, measured as the compounded annual growth (henceforth CAGR) in Revenues, as a result of the buyout event for a sample of Swedish firms. The above discussion, in combination with anecdotal evidence from interviewees regarding the importance of growing operations in order to realise value in the acquired targets, leads the Authors to believe in a positive relationship between PE ownership and abnormal Growth (Growth adjusted for the Growth had the buyout not occurred, i.e. the counterfactual, which in this study is proxied by the Growth of a matched peer group as further elaborated upon below). The hypotheses related to this setting are formalised as follows for the total and the split sample respectively:

***I(a)** Buyout targets will in general exhibit directionally positive abnormal Growth*

***I(b)** Buyout targets will in general, irrespective of size, exhibit directionally positive abnormal Growth*

When it comes to the distinction between degrees of Growth in various size segments, the expected results are less clear. Evidence from market participants such as Silverfleet Capital (2013), and primary data from interviews, often highlight the importance of e.g. buy-and-build and internationalisation strategies for smaller targets. In conjunction, these interpolations make the Authors expect Growth to be inversely related to size due to either a difference in terms of strategies deployed or the feasibility of the implementation thereof, resulting in the following hypothesis:

***I(c)** Smaller buyout targets will in general exhibit directionally positive abnormal Growth in excess of larger buyout targets*

With respect to operational improvements, the literature is widespread and exhaustive. The findings generally point towards both economically and statistically significant improvements in operating metrics. For example, Kaplan (1989) finds significant increases in operational efficiency, measured as EBITDA margins, related to firms undergoing MBOs, and Cressey et al. (2007) find, for UK buyout targets, significant peer-adjusted outperformance of buyout targets when considering for example ROA. In a Swedish setting, Bergström et al. (2007) also find significant peer-adjusted outperformance of buyout targets when considering EBITDA margins and ROIC levels. Also, the

general market sentiment recognises the importance of improving operational efficiency in buyout targets, given the typically short holding period and the direct impact of such improvements on margins, and therefore valuation. The hypotheses related to abnormal Operating Performance (abnormal defined in accordance with the above) are formalised as follows:

***II(a)*** *Buyout targets will in general exhibit directionally positive abnormal Operating Performance*

***II(b)*** *Buyout targets will in general, irrespective of size, exhibit directionally positive abnormal Operating Performance*

On one hand, previously mentioned studies such as e.g. Turner (1983) indicate smaller firms to be more conducive to operational changes given lower degrees of operational inertia. On the other hand, studies by for example Nikoskelainen and Wright (2007) find a positive relationship between PE returns and buyout target size. Given that operational improvements is one of the main drivers of firm valuation, this may indicate an increasing ability to improve margins with size given the increasing cost base. Further, an important dimension is, as discussed above, the potential existence of differences in strategies deployed by PE firms dependent on size focus. In contrast to the buy-and-build strategies discussed for smaller targets, it is not unreasonable to expect a more active focus on margin expansion as opposed to Growth in larger targets. This view is further confirmed by market sentiment. Hence, the Authors are somewhat ambiguous with respect to the direction of the relationship between size and Operating Performance, but expect larger firms to be more conducive to such improvements, rendering the following hypothesis:

***II(c)*** *Larger buyout targets will in general exhibit directionally positive abnormal Operating Performance in excess of smaller buyout targets*

Aside from Growth and Operating Performance, an additional commonly implemented initiative is to reduce, or phrased differently optimise, Capital Spending. Upfront the Authors want to highlight that, as opposed to directionally positive Growth and Operating Performance, directionally negative Capital Spending is not necessarily beneficial. On one hand portfolio company valuation may increase given increased cash flows to capital providers, on the other, future growth and earnings may be jeopardised. As documented by Jensen (1986; 1989) many buyout targets previously exhibited inefficient capital allocation and tended to, in some instances, suffer from the Free Cash Flow Problem. In such cases, firm valuation should benefit from reduced levels of investments. Results by Kaplan (1989) confirm this hypothesis, and indicate reduced levels of CAPEX post-buyout. Contrastingly, authors such as Myers and Majluf (1984) emphasize the



importance of excess free cash flows as mitigants to underinvestment. In conjunction, the academic discourse and primary data lead the Authors to expect more restrictive investment policies resulting from buyouts, i.e. directionally negative abnormal Capital Spending (abnormal defined in accordance with the above). The hypotheses related to this setting are formalised as follows:

***III(a) Buyout targets will in general exhibit directionally negative abnormal Capital Spending***

***III(b) Buyout targets will in general, irrespective of size, exhibit directionally negative abnormal Capital Spending***

Intuitively, one could reason smaller firms, being in an earlier stage in their business lifecycles, to exhibit larger relative levels of CAPEX, but that there is less headroom for improvements for the PE firm given a higher need for such investments. This intuition is confirmed by researchers such as Fazzari et al. (1988), who find that smaller firms have higher investment to capital ratios. The potential differences in feasibility of altering investment policies, along with the potential existence of differences in strategies (c.f. buy-and-build strategies), between size segments, and anecdotal evidence from investment professionals, make the Authors believe in a larger prevalence of directionally negative Capital Spending in larger targets, leading to the following hypothesis:

***III(c) Larger buyout targets will in general exhibit directionally negative abnormal Capital Spending in excess of smaller buyout targets***

+++ Insert Exhibit 1. here +++

As can be seen from the summarisation presented in Exhibit 1., each full-sample hypothesis is followed by a group-level hypothesis where the size groups are tested in isolation, after which a hypothesis on differences between size segments is formalised. The rationale for conducting the full-sample tests, denoted by (a), is two-fold; firstly, the Authors want to confirm the results of previous studies (which typically do not distinguish between size categories) and, to the extent possible, validate the quality of the data, given the additions and amendments conducted; secondly, such tests create a foundation upon which the latter tests will build and be contrasted against. The Authors however want to stress the importance of realising that the first set of tests are not to be seen as the focus of this study. The tests distinguishing between size categories are where the article aims to complement the academic research by bridging the knowledge gap currently existing with respect to corporate governance and the applicability of the PE ownership model dependent on target sizes. Further, the article seeks to connect academic research within the field to the views and experience existing in the market space on this topic.

## **Section III: Data and Methodology**

### **Data**

As presented in Section I and II, the study investigates the impact of PE ownership on target Growth, Operating Performance and Capital Spending. To test the hypotheses a rigid data sample containing such information as transaction years, investing funds and their corresponding committed capital, and accounting data, used as value creation proxies, is compiled. An elaboration of the data sample is presented below.

### **Sample Period**

As a result of the demarcations of this study, the data required to validate the hypotheses must cover a sufficient time period, such that any operational improvements plausibly can be expected to have occurred. This entails examining buyout targets for the year of investment and divestment. Furthermore, given that the study follows an investment during the entire holding period, in order to theoretically capture the full extent of the value creation, which typically lies in the range of three to six years where such factors as overall macroeconomic conditions and firm performance may push the holding period towards the lower or the higher end-points, the sample period must encompass an adequately lengthy period of time. This implies that many targets divested in later years may have been acquired at peak prices prior to the sub-prime mortgage crisis and the ensuing Eurozone crisis, subsequently leading to divestment difficulties as portfolio valuations dropped in the aftermath. Therefore, in order to generate a sample covering a sufficient amount of time, such that a large number of acquired and subsequently divested target firms can be identified, while also including periods of benign as well as difficult macroeconomic conditions, this study focuses on the period between 1997 to 2012, a period considered wide enough to allow for an over-the-cycle view of PE investments. To alleviate any still existing concerns regarding the impact of the said crisis, the Authors perform the tests by excluding the immediate crisis years and subsequent periods of economic turmoil, e.g. excluding the years of 2008 to 2010. The impact of such period alternation is highly limited, rendering the picture of value creation in PE targets unchanged. Further, one can argue that such a long sample period mitigates the impact of funds unwilling to divest underperforming assets and therefore extend the holding period. The consequence of this is hence that the data sample arguably captures this impact and includes data points of underperforming assets. Finally, it is worth mentioning the Authors' dependency on data availability, which to some extent dictates the starting year of the sample period.

## **Data Set**

Two previous Master's theses covering the Scandinavian PE landscape have studied somewhat overlapping time periods for which they have collected accounting and financial information. These are Adler and Norberg (2012) and Gulliksen et al. (2008) (further discussed under Section II), where Gulliksen et al. (2008) use a data set of 349 buyouts conducted between 1994 and 2008. The PE firms used for the study are identified through membership lists with Scandinavian trade associations, and corresponding portfolio companies are identified from fund websites, complemented by third-party sources (c.f. Mergermarket) in order to account for selection bias arising from voluntary reporting. Finally, Gulliksen et al. (2008) collect accounting and financial information for the relevant time period from the Bureau van Dijk Orbis/Amadeus (henceforth BvD) database, as well as local databases such as Affärsdata. The peer group selection is done entirely through BvD, where industry classification and financial constraints are applied to create a peer group for each buyout target. Adler and Norberg (2012) build on this data set by adding buyouts conducted between 2008 and 2010, and amend the original data set where needed. They further exclude potential VC and minority investments along with data points lacking sufficient granularity, such that only control investments with satisfying data are included. They conclude that the data set compiled by Gulliksen et al. (2008) is likely to constitute one of the largest databases available for PE investments in Scandinavia and, given the subsequent amendments and additions, Adler and Norberg (2012) therefore argue their final data set to be a comprehensive list of Scandinavian buyouts well-suited for examining the performance of PE-backed companies; for a review of Adler and Norberg (2012) please refer to Section II.

Having been granted access to the final data set of 218 buyouts in the Adler and Norberg (2012) study, the Authors are able to build on the data set by, firstly, adding buyouts divested during the years 2011 and 2012, and secondly, conducting a thorough review of the entire data set to assure alignment with the needs of the Authors' study. Comparability is ensured by restricting the fund landscape to incorporate the PE firms used in the two aforementioned studies. The relevant deal and accounting information is, once again to ensure comparability, sourced from company websites, BvD and local filings. In addition, each individual transaction in the entire data set is examined and double-checked using e.g. BvD and local filings as well as press releases, to ensure that, to the extent possible, the original financial information is accurate. Collecting information from secondary sources such as BvD is naturally inferior to sourcing data from the actual accounting filings, which is

why the BvD data has been complemented by accounting filings to the extent possible. Additionally, the Authors have conducted a separate review of all investments conducted by the PE firms in question since 1997, and have added transactions previously overlooked, due to for example data constraints and instances where the distinction between the transaction being a control or minority investment has been difficult to make, to the sample. This comprehensive data exercise also includes separating PE firms in so-called club deals, where a consortium of investors acquires a target company. In such instances, the leading PE firm is assigned to the target company based on the PE firm holding the largest post-acquisition equity stake. In cases where investors hold equivalent stakes, the buyout target is assigned to the PE firm which is determined to be the lead investor based on press releases and general media consensus.

Having examined and, where needed, amended, each individual transaction in the original data set, along with added transactions divested in 2011 and 2012, the Authors' final data set comprises 199 PE buyouts, with an addition of 86 and a deduction of 105 transactions. The additions are the result of mainly the extended sample period, while the deductions mainly are the result of the aforementioned exhaustive review of the previous observations. In cases where the previous financial information has not, by the Authors, been at all verifiable through BvD, local filings or any other source, they have been excluded. These exclusions are cases when entries appear to have been made on an unconsolidated basis, when immediately adjacent years do not match press releases, BvD or local filings etc. Moreover, there are certain instances where buyout transactions have been described as majority investments in press releases, but which upon further investigation have been shown to arguably be considered as minority investments. These are excluded, as only control investments are relevant for this study. For non-Swedish investments divested prior to 2002 the original data has been highly valuable due to BvD constraints, and naturally these observations have not been verifiable to the same extent by the Authors. In cases where sufficient data is not available for the relevant years, the adjacent years are used if the total holding period for those observations still exceeds one year; this is done in order to ensure that any operational improvements can reasonably be expected to have occurred. Furthermore, Finnish transactions are excluded due to the non-exhaustive nature of the original data set with regards to Finnish deals, as well as due to the limited access to Finnish financial information on private companies available to the Authors. A somewhat similar exercise to the above has been conducted for the peer group data, in order to further validate the data and ensure comparability. Furthermore, peer group information has

additionally been amended in the original data set for instances where e.g. industry classification is debatable, and internal consistency in terms of classification methodology has been ensured. Note that, for the Authors' study on differences between size segments, firstly, the data set has been amended to, where possible, include the potential existence of bankrupt holdings, where the bankruptcy is seen as equivalent to a divestment of a non-performing asset, and secondly, significant time has been spent identifying instances where underperforming portfolio companies are omitted from PE firm websites. This results in a data set, which, by the Authors, is argued as not only comprehensive but, to the extent possible, relieved of survivorship and selection bias, further elaborated on below (see for example; Brown et al., 1992 for a discussion of such concerns). The Authors want to stress that the data obtained from Adler and Norberg (2012) is rigidly and comprehensively constructed, and that the review, cross-checking and amendments shall be seen as having been conducted by the Authors to suit the needs of this particular study and to further build on the data, and hence the above discussion shall not be seen as any type of critique.

The data on fund sizes needed for the size categorisation, the methodology of which is discussed in the Methodology section, is retrieved almost exclusively from the websites of the included funds. In many cases the exact size of each separate fund, and not only the amount of total capital under management, along with the fund(s) corresponding investments, is presented, making the classification relatively straightforward once the size threshold has been determined, a threshold discussed further in the Methodology section. However, for instances where such detailed information is not presented by the funds themselves nor is available in the press, the Authors have, based on such metrics as total committed capital, investment ranges and previous fund data, been able to categorise each fund, and thereby each transaction, in a reliable and accurate way.

As a result of this exercise, the final data set consists of 199 observations of Scandinavian control investments acquired and realised by PE firms between 1997 and 2012. Exhibit 2. presents high-level descriptives, on the basis of both the total sample as well as the sub-categories, with respect to the accounting metrics used as value creation proxies. The motivation and description of the accounting metrics chosen is presented in forthcoming sections, but the Authors already here want to introduce the data and enable the readers to receive a holistic overview of its traits. The reason for displaying fewer observations than the 199 existing in the raw data is attributable to the data trimming exercise conducted, a process elaborated further upon in the Methodology section. The reason for not portraying the descriptives of the raw data is purely related to consistency.

+ + + Insert Exhibit 2. here + + +

+ + + Insert Exhibit 3. here + + +

As can be seen from Exhibit 3., the PE firms with detailed fund data have been plotted based on the range of committed capital of their corresponding funds associated with the buyout targets included in the data sample. Interestingly, one can note that PE firms with attributable funds denoted as investing in the Sub-Large (the Large and Sub-Large categories are defined in Section III, and are here interchangeably referred to as the larger and smaller size categories for increased reader-friendliness) category only in rare instances have upper end-points in their largest fund size ranges exceeding e.g. EUR 500mn, whereas the PE firms with attributable funds denoted as investing in the Large category exhibit a much wider spread in their largest and smallest fund size ranges, with the upper end-point of their largest funds significantly above the EUR 1bn threshold. Hence, relatively few funds lie close to the EUR 1bn cut-off point, which implies that the categorisation of buyout targets is relatively insensitive to alternations of the fund size threshold. It is also worth noting that for PE firms lacking fund-by-fund data, the same picture holds, since the funds in most cases have not even been close to the EUR 1bn threshold, and the classification has hence been straightforward. Worth noting is the sole inclusion of PE transactions, and that the companies included in the Sub-Large category are not to be seen as e.g. start-ups and the like, but rather as established companies of reasonable size and track record as targeted by the PE funds in question.

### **Selected Summary Statistics**

+ + + Insert Exhibit 4. here + + +

As can be seen from Exhibit 4., investments are made throughout the observation period, with the majority of investments taking place during the period between 1999 and 2006. The average number of yearly investments amount to approximately 14, with the most active year being 2003. Worth noting is that the number of investments in the later years, e.g. 2009 to 2012, inevitably will be smaller in amount than previous years given the inclusion of investments only held from acquisition to divestment and the typical length of the holding period. Obviously, the reverse holds for divestments. One can further note the significant number of divestments taking place in the boom years of 2005 to 2007. Far from surprisingly, the data also indicates low levels of divestments in the years, and the aftermath, of the financial crisis; this is largely expected given the impact of macroeconomic conditions and market sentiment on firm valuation.

+ + + Insert Exhibit 5. here + + +

As previously discussed, average holding periods in the literature have been determined to be approximately five years (see for example; Bain & Company, 2013; Parker, 2013). Looking at this study's data sample, this picture is to a large extent reinforced with the majority of investments being held for two to six years and on average for four years, as illustrated in Exhibit 5.

+ + + Insert Exhibit 6. here + + +

Concluding the summary statistics, one can observe a predominance of buyout targets active within e.g. Manufacturing along with Wholesale and Retail Trade. This is to be expected, given the wide sub-sector inclusion relating to e.g. Manufacturing as determined by the NACE industry classification, as well as the inclination of PE firms to invest in these spaces (EVCA, 2012; 2013).

In order to complement the secondary data, the Authors have conducted interviews with investment professionals active within the industry. In order to obtain perspectives from various funds and across size segments, interviews have been conducted with investment professionals from a heterogeneous range of PE firms, including 3i Group plc, EQT Partners AB, FSN Capital Partners AB, Investor AB, Segulah Advisor AB and Volati AB.

## **Methodology**

In order to test the hypotheses presented under Section II, several methodologies come to mind. One approach would be to investigate the difference in valuation at acquisition versus divestment, and thereby draw conclusions dependent on changes in firm value. Metrics of interest in such cases would either be changes in e.g. Enterprise Value (henceforth EV), in relative market valuation, or IRR. A second approach would be to perform a more qualitative case study of specific buyout targets within various size segments, and based on this qualitative assessment investigate potential differences. A third approach, and the one taken by the Authors, would be to, in line with such studies as Barber and Lyon (1996), Bergström et al. (2007) and Kaplan (1989), study the impact of PE ownership on accounting-based metrics over a period ranging from acquisition to divestment of the portfolio companies, i.e. a data-driven event study of PE ownership. As pointed out by Fried et al. (2003), accounting-based metrics may not necessarily portray the true economic reality of a given firm due to e.g. selective reporting, however accounting acts as a close approximation of this economic reality and can hence be argued to be of highest relevance when determining the impact of PE ownership on firm performance.

The event study, in its original form pioneered by Dolley (1933), has been a longstanding point of reference within the field of finance, but also in other unrelated fields of research. The procedure of an event study (see for example; MacKinlay, 1997, for a detailed review) begins by defining the event of interest and the period over which the event is assumed to impact the studied variables. In this study, in line with e.g. Bergström et al. (2007), the event corresponds to the buyout event and the event window to the holding period. The next step applies selection criteria to the observations in order to determine their potential inclusion. Once having a final data set, in our case 199 transactions, the chosen Abnormal Performance Metrics (henceforth APMs), further elaborated on below, surrounding the event window are examined. In this case, such metrics are measured as abnormal Growth, Operating Performance and Capital Spending proxied by certain accounting metrics as discussed further below. The abnormal changes are defined as the actual changes subtracted by the expected changes if the event had not happened, i.e. the counterfactual (a detailed review of this process follows below). The last step of the event study then becomes specifying the statistical model(s) for studying the impact of the event. Worth mentioning is that one key feature of a correctly conducted event study is the circumvention of the endogeneity problem (interchangeably referred to as the omitted variable bias), giving further credence to the results obtained.

As mentioned above, the event of interest is the buyout conducted by the PE fund. The holding period of the investment is in this case the period of time representing the event window. Several potential methods for defining the start of the event window can be used, with the approach utilised in this study being defining the event window as being initiated when the buyout is announced, for which there are several reasons; firstly, announcement dates are more readily available than closing dates and their usage in the industry is more common; secondly, the time period from announcement to closing is often substantial and therefore limited strategic initiatives can be implemented during the announcement year; thirdly, using the year prior to acquisition as the start of the event window, as suggested by e.g. Bergström et al. (2007), is problematic when acquisitions consider carve-outs or are conducted as add-ons to existing portfolio companies or even as simultaneous roll-ups of several targets (in fact in many cases the transaction will result in major organisational reshuffling, where it may be of significant difficulty to even back-trace the accounting data of the pre-acquisition entity); lastly, given that the accounting values of the Assets of the target will be remeasured at acquisition and that goodwill will be recorded, basing the changes in operating performance on pre-remeasurement Asset values may understate the actual change in accounting



measures which take into account the Asset base of the target, measures such as ROA, D&A as well as EBIT (see further elaboration of accounting measures below). With respect to the year of divestment, i.e. the ending year of the event window, a somewhat reverse line of reasoning must be applied since the Authors want to maintain comparability between the acquisition and divestment years as well as maintain consistency within the data sample. Therefore, the last year of the event window corresponds to the year prior to the announcement year of the divestment, so as to avoid yet another remeasurement of Asset valuations which could potentially lead to distortions in the abovementioned metrics. Further, this approach avoids issues of accounting for the consolidation conducted by the second buyer, i.e. integrating the target into current holdings, altering the operational structure etc. Data availability is also an issue impacting this decision since it, much like the issues relating to defining the first year of the event window, is often complex to track the correct legal entity. The approach can hence be concluded as aiming at isolating the changes conducted under the sole ownership of the PE firm(s) in question.

As for the accounting metrics chosen, changes in which proxy for Growth, Operating Performance and Capital Spending, as first presented in Section I, these are selected based on their proximity to the value creation strategies typically deployed by PE firms. What follows is a detailed review of these metrics, changes in which are denoted Performance Metrics (henceforth PMs). It is already here worth discussing the applicable methodologies of measuring the PMs. One approach would be to measure a yearly average change in the underlying accounting measure, something which can be argued to benefit comparisons between size categories if holding periods differ. However, such a methodology is inherently flawed, for the purpose of this study, for several reasons. Firstly, the value creation instigated by the PE firm need not be performed over a pre-defined period of time, which in turn need not be the same across size segments, but rather to the extent the PE firm, irrespective of size, is comfortable in realising the value created. This implicitly, and reasonably, assumes that the point of divestment, and thereby the end-point of the holding period, is equivalent to the time at which the PE firm finds it economically unjustifiable to continue the value creation efforts after controlling for systematic factors, and thereby chooses to divest operations. Hence, realising adequate value potential may take different time on a case-by-case basis. Even if this potentially were an issue, i.e. observing significant differences in the time required for value creation, it would not have a meaningful impact on this particular study given almost identical average holding periods across size categories. Secondly, given that most previous literature does not

base results on segmental grouping, thereby rendering this discussion moot, using a yearly average change in PMs in this study would create comparability issues. The Authors therefore choose to use changes during the entire holding period in order to investigate differences between groups, with the exception being Growth due e.g. a desire to maintain comparability with previous literature along with the obtaining of more economically meaningful and interpretable results. To alleviate any remaining concerns, the Authors still perform the tests using yearly averages, in order to capture any such, in this case minuscule, holding period aspects, with the overall picture remaining unaltered.

## **Performance Metrics**

### ***Growth***

The accounting metric assigned to proxy for Growth is growth in reported Revenues, i.e. Revenues attributable to the core business of the portfolio company. This metric is used by e.g. Acharya et al. (2008), when studying value creation in PE. The growth in Revenues is calculated as the CAGR during the event window, c.f. Equation 1 for firm  $i$ :

$$\text{Equation 1: PM}_{\text{Revenues}, i} = \frac{\text{Revenues}_i^{\text{Divestment}}}{\text{Revenues}_i^{\text{Acquisition}}} \left( \frac{1}{\text{Year}_i^{\text{Divestment}} - \text{Year}_i^{\text{Acquisition}}} \right) - 1$$

Revenue growth is here determined to be the most appropriate proxy for the measures undertaken by PE firms to grow the business by increasing volumes and/or prices, such that the portfolio company can potentially gain positioning and market share within its industry, which in the long run ought to contribute to a more favourable divestment by the PE fund.

## **Operating Performance**

### ***EBITDA***

The first metric assigned to proxy for Operating Performance is EBITDA margin expansion. The margin is calculated as EBITDA as a percentage of the corresponding year's Revenues. This metric measures the degree to which the buyout target is able to retain the earnings generated by selling goods or services after expensing its operating costs (excluding D&A). Investigating EBITDA margins can arguably be preferable to e.g. EBIT margins, since the former exclude the impact of variations in D&A schedules between firms and industries. Furthermore, EBITDA margins indicate not only how efficient the buyout target's cost structure is, but also, albeit imperfectly due to the exclusion of CAPEX and changes in net working capital, proxy for the firm's ability to generate cash

flows. Therefore, EBITDA is also an indication of the degree to which the company can sustain interest charges, and thus be leveraged. These traits are generally attractive for PE firms and are hence drivers of valuation. Thus, since improved EBITDA margins may be a factor playing into the realised value of investments by PE firms, one would expect measures aimed at improving the EBITDA margins, through improved operational efficiency, of portfolio companies to be implemented by the owners. The EBITDA margin expansion is calculated as per Equation 2:

$$\text{Equation 2: } PM_{\text{EBITDA}, i} = \frac{\text{EBITDA}_i^{\text{Divestment}}}{\text{Revenues}_i^{\text{Divestment}}} - \frac{\text{EBITDA}_i^{\text{Acquisition}}}{\text{Revenues}_i^{\text{Acquisition}}}$$

### ***EBIT***

The second metric used for studying Operating Performance is the change in EBIT margins. The EBIT margin is defined identically to the EBITDA margin barring the exclusion of D&A. As mentioned above, one can argue EBITDA to be superior to EBIT given the exclusion of variations in D&A schedules along with its widespread usage as a proxy for cash generation. However, this argument can be turned on its head, and favour EBIT as the superior metric given the consideration taken to the investments required by the firm. Worth mentioning is that proxying for investment policies with D&A is imperfect unless investment levels are on par with D&A charges, but can nonetheless be argued as preferable to not including it at all. The PM is calculated as per Equation 3:

$$\text{Equation 3: } PM_{\text{EBIT}, i} = \frac{\text{EBIT}_i^{\text{Divestment}}}{\text{Revenues}_i^{\text{Divestment}}} - \frac{\text{EBIT}_i^{\text{Acquisition}}}{\text{Revenues}_i^{\text{Acquisition}}}$$

### ***ROA***

The final metric used to proxy for Operating Performance is the change in ROA. The ROA for a company measures the return the company is able to generate on its Asset base, and hence takes into consideration the capital base required for the said generation. Hence, the measure takes into consideration the efficiency of an organisation in terms of its capital usage. Recognising the availability of several similar metrics, metrics such as ROIC and Return on Capital Employed, the Authors justify the usage of ROA based on its common usage in the academic literature (for an excellent review of measures used in previous academic discourse please refer to; Barber and Lyon, 1996) along with data availability. Further, as pointed out by e.g. Kaplan (1989), comparability is improved by relating an earnings level to an Asset base and/or Revenues since it to some extent controls for differences in M&A strategies between the target firms and their peer groups. As also

pointed out by Barber and Lyon (1996) the ROA measure is robust when compared to using alternative denominators such as e.g. cash-adjusted Total Asset metrics.

ROA is in this study defined as in Equation 4, analogous to a range of previous studies including Kaplan (1989) and Mikkelsen and Partch (1994):

$$\text{Equation 4: } PM_{ROA, i} = \frac{EBIT_i^{\text{Divestment}}}{\text{Total Assets}_i^{\text{Divestment}}} - \frac{EBIT_i^{\text{Acquisition}}}{\text{Total Assets}_i^{\text{Acquisition}}}$$

According to conventional wisdom within the field of accounting, the denominator is in general an average between opening and closing balances or the opening balance for the investigated year. In this study however, the Authors use end of period Assets for two reasons; the first being to use a methodology in line with previous studies (see for example; Kaplan, 1989; Mikkelsen and Partch, 1994) and maintaining data consistency, and the second being data availability mainly for the transactions conducted earlier during the observation period.

## **Capital Spending**

### ***D&A***

The PM chosen as a proxy for Capital Spending is the change in the level of D&A in relation to the value of the buyout target's turnover of goods and services, measured as the D&A divided by Revenues, between the acquisition and divestment year. This metric is related to the hypothesis that PE firms may, depending on the circumstances of the particular investment, wish to increase or decrease the level of investments in the buyout target during the holding period, with the key point being that the efficiency of this expenditure is improved. Increased investments may be needed to increase the turnover of goods and services (e.g. increased spending on new equipment, internationalisation etc.), whereas decreased investments may be needed to increase the level of cash flow generation by the company (increasing overall financial flexibility, maintaining debt covenants, meeting fixed debt charges etc.), i.e. value creation can be obtained by either increasing or decreasing investment levels on a case-by-case basis. The reason for relating D&A to Revenues instead of directly using the actual CAPEX of each firm, c.f. investments in Fixed Assets, is primarily due to data availability issues; however, under current accounting practices (see for example; Fried et al., 2003), CAPEX must typically be capitalised and therefore also depreciated over the useful life of the acquired Assets. Implicitly, profits would therefore be seen as overstated if no allocation of the cost of investments in Fixed Assets is made. Thus, one could reasonably expect increases in CAPEX to

be accompanied by increasing levels of D&A, albeit most likely not in a linear fashion but rather in a lagging fashion. This PM is calculated as per Equation 5:

$$\text{Equation 5: } PM_{D\&A, i} = \frac{D\&A_i^{\text{Divestment}}}{\text{Revenues}_i^{\text{Divestment}}} - \frac{D\&A_i^{\text{Acquisition}}}{\text{Revenues}_i^{\text{Acquisition}}}$$

### **Concluding Remarks**

The Authors argue that the presented proxies for Growth, Operating Performance and Capital Spending are strong representatives of the underlying factors the study aims to investigate. However, it is worth mentioning that no proxy can ever be a perfect representation of the true object which it aims to represent. For example, even though the level of Revenues in general acts as an indication of size, and thereby growth in the said metric approximates true changes in size, distorting effects, from e.g. dispersions in accounting treatments concerning the actual metric used, may impact the accuracy of the proxying variable. For example, the distinction between organic and inorganic Revenue growth, differing Revenue recognition accounting principles and other accounting-related amendments could all, to varying extents, impact the ability of Revenue growth to accurately represent the sought Growth. However, the Authors argue that the Revenue line item is a comprehensive representation of the gross inflow of economic benefits to the company as described by the International Accounting Standards Board, and it may also be argued that inorganic growth (add-on acquisitions) are simply to be seen as a substitute for organic growth, and hence no distinction should be made between the two. As for Operating Performance, similar accounting-related issues create distortions in the accuracy of e.g. EBITDA and EBIT margins as representatives of the sought Operating Performance (i.e. the true change in operational efficiency of an organisation). Furthermore, undoubtedly, there are classification issues related to the inclusion or exclusion of various line items in EBITDA and EBIT, and one could argue that operational efficiency could just as well be represented, accounting-wise, by allocating Revenue to e.g. the number of employees, estimating the change in the size of the workforce etc. Again, however, the chosen profitability metrics are in line with academia and industry standards in estimating operational efficiency, and the fact that margins are a normalised version of profitability enables financial statement users to compare margins across firms. Thus, the Authors believe that EBITDA and EBIT margins serve as the most appropriate representations of Operating Performance for the purposes of this study. With respect to ROA, one can perhaps argue that the Asset base will increase as a result of the transaction and the accompanied revaluation of Assets. This will naturally affect the

ROA metric, however using the revalued Asset base not only represents a more accurate picture of the firm's ability to generate returns on its capital base, but also ensures comparability between not only firms, but also between acquisition and divestment years. Finally, with respect to Capital Spending one needs to realise the importance of differences in accounting policies regarding; (i) the choice of capitalising versus expensing investments; (ii) D&A acting as an allocation of total investments in Fixed Assets, and that a significant increase in the level of investments during a given period will not add to the D&A line item on a one-to-one basis. It can however be argued that given data availability, regulatory requirements which to some extent dictate the choice of capitalising versus expensing, and the prudence of studying D&A changes rather than investments in Fixed Assets (given the lack of a one-to-one relation between the two), justifies the approach taken by the Authors.

### **Abnormal Performance Metrics**

Once having determined which specific PMs that are of interest, the subsequent process becomes creating the APMs which are used to determine excess value creation resulting from the buyout. An APM is defined as the PM for each buyout target subtracted by the expected PM if the event had not occurred, i.e. the counterfactual to the applicable PM. As illustrated and explained in Equation 6, the PM for a buyout target is defined, as presented above, as the static value of the chosen accounting measure (defined as  $x$ ; c.f. EBIT margins, ROA) at divestment in comparison to the same measure at acquisition, and the expected PM, i.e. the counterfactual, is defined similarly but as if the event had not occurred.

$$\text{Equation 6: } APM_{x,i} = PM_{x,i} - E \text{ } PM_{x,i}$$

The counterfactual is, in this study, defined, in line with previous research such as Barber and Lyon (1996), as the corresponding PM for a matched group of peers, and what follows is a detailed overview of the process of creating and assigning these peer groups to each individual buyout target.

### **Peer Group Creation**

The actual buyout performance is, as mentioned above, adjusted for the counterfactual performance by assigning, to each specific buyout target in the sample, a peer group with similar traits and characteristics. More concisely, the peer group adjustment aims at capturing value creation when controlling for, in theory, all possible aspects barring the buyout. Within the academic literature a wide range of methodologies for conducting such adjustments can be discerned. The approach used

in this study is further elaborated upon below, and is similar to the approaches taken by e.g. Barber and Lyon (1996), Bergström et al. (2007) and Kaplan (1989).

When assigning peer groups, this study utilises the European system named Nomenclature Générale des Activités Economiques dans l'Union Européenne (henceforth NACE) in order to enable the selection of peers of similar businesses. The process of using industry classification codes, such as NACE codes, is widely acknowledged and utilised in several previous studies including Amess (2002), Bergström et al. (2007) and Kaplan (1989). As with other industry classification codes, such as Standard Industrial Classification codes, the NACE codes are constructed based on layers of industry granularity, with the first four digits being European-wide. The debate in the literature regarding the level of detail with respect to the number of digits utilised in the selection process naturally comes down to a trade-off between either including more firms, firms which are not as close to the core business of the studied company, or having a smaller peer universe to select from, a universe however more closely reflecting the core business of the studied company. As used by e.g. Bergström et al. (2007), this study applies the first four digits in the NACE code to assign peer groups. This decision is not only anchored in academia, but is also feasible given the size of the peer universe received by using a wider geographic inclusion criteria (more reasoning on geographic inclusion is presented below). In cases where the industry classification of a buyout company is not an accurate description of the core business of the entity, which holds for e.g. NACE code 7415 (c.f. Management activities of holding companies), the industry classification of the firm's major subsidiary/(ies) has been utilised.

Once having determined the NACE codes attributable to each buyout, two additional segmentation filters are applied; geographic region and peer size as defined by Total Assets. When selecting the applicable geographic region one can once again take several different approaches; one option would be to limit the peer group to companies active in a similar region, c.f. Bergström et al. (2007) who limit their universe to mainly the local market (i.e. Sweden), or to broaden the universe as done by e.g. Acharya et al. (2008). The approach taken in this article is the latter, and is mainly a result of the Authors desire to use an approach consistent with Adler and Norberg (2012), along with the fact that most of the companies studied are highly international and compete to a large, if not larger, extent with international competitors, and are in many instances more similar to these. Lastly the Authors argue the trade-off between size of peer universe and similarity of economic climate, in the geographic sense, to be outweighed by the former, even though the Authors realise

that in certain cases too wide a geographic definition could potentially create concerns for instances in which the local market differs significantly from an international context. The European definition of geographic region is however considered to limit this concern to a large extent. Further, in order to take into consideration the aforementioned desire to also assign peers of similar size, as discussed by e.g. Barber and Lyon (1996), the process used by e.g. Kaplan (1989) is utilised. This procedure is crucial for the purposes of this study, since it theoretically shall remove all differences related to target size, differences such as alternative risk profiles, such that the impact of the buyout event dependent on target size can be isolated. The Asset base of the buyout target in the year prior to the event period is used as the foundation upon which the composition of the peer group is determined. On a more practical note, the Asset base at this point in time is used as a segmentation criterion when obtaining peer financials from BvD. Worthwhile mentioning is that even though Barber and Lyon (1996) gives appreciation to this process, they also recognise the fact that sole NACE segmentation could be efficient in some instances, as well as the fact that past-performance-based approaches might be beneficial in other, even though past-performance-based approaches in many cases render similar explanatory power as size-based matching. The methodology used is further well in line with the one applied by Adler and Norberg (2012), and thus the final data set is internally consistent. Once the peer universe attributable to each target has been determined, a peer group consisting of the 20 closest firms in terms of Total Assets is selected and held constant throughout the event window (in line with the methodology used by Barber and Lyon, 1996). To adjust for the potential existence of outliers, the median value within the peer group is used. Finally, the Authors realise the potential for survivorship bias in the performance of peer groups, however argue the process of holding the peer groups constant as well as naturally including the deterioration of non-performing firm/firms in financial distress to alleviate this concern. Instances where peers have gone bankrupt have been scarce, so any remaining survivorship bias ought be minor.

As peer group design is a critical part in generating the results of the study, it is important to mention the potential concerns related to the design of these groups, and the mitigation efforts conducted by the Authors aiming at minimising these concerns. As pointed out by Barber and Lyon (1996), performance-based matching of peers comes with several benefits. However, as argued by the same authors, also solely size-based matching renders well-specified and powerful results in random samples and samples of large firms as determined by the Book Value of Assets. The approach of assigning the 20 closest peers in terms of Asset size as the peer group can also be



debated, and other approaches have been seen in the literature (see for example; Bergström et al., 2007). The Authors however argue that firstly, taking the median value within the group removes the effect of extreme values, and secondly, the usage of peers within a similar size range renders a better benchmark than using for example only the largest firms as conducted by Bergström et al. (2007). As discussed above, firms within different size segments will likely have different traits such as market positioning, scale, maturity etc., and in order to capture potential differences in abnormal returns dependent on size such aspects need to be taken into account. Another methodology is exemplified by Acharya et al. (2008), who limit the peer universe to solely listed companies. The benefit of this is not only increased data availability, enabling users to control for firm-specific effects such as major acquisitions, differences in capitalisation policies etc., but also the fact that listed firms are more heavily scrutinised and have more stringent reporting requirements than their non-listed counterparts. On the other hand, one encounters issues with this approach, issues including the fact that listed firms in general are of larger size than the average firm within the industry, that listing is accompanied by significant direct and indirect costs, that an increase in the number of stakeholders may affect aspects such as strategic direction and capital structure, and that the attractiveness of going public varies between industries, c.f. large utility companies with high capital needs versus personnel-intensive care providers. In sum, these drawbacks most likely render this approach prone to bias in the setting of this study. Finally, as with all studies utilising peer groups as the counterfactual, one can question the arguably strong assumption that the performance of the peer group is equivalent to the performance of the buyout target, were it not to have gone through the event. This likely holds especially in young and growing industries, and in industries within which significant structural changes are seen. Utilising common techniques, such as adjusting for outliers and matching on Asset base, used within the academic discourse, as well as actively assigning peer companies as similar to the target as possible in terms of geographic proximity, industry classification etc., while at the same time maintaining consistency within the data sample, arguably mitigates these concerns. Finally, to further improve the accuracy of the data set, direct anomalies have been manually corrected for to the extent possible, anomalies including the potential inclusion of the target in the peer groups, as well as removing obviously misrepresentative data.

### **Introducing the Size Factor**

The methodology for segmenting the observations into appropriate categories is a key feature of this study. Despite having spent significant efforts examining previous literature within PE, the size angle

remains relatively unexplored and one needs to broaden the view in order to obtain a meaningful and specific segmentation criteria. For this reason, not only secondary research within the broader PE landscape, such as studying industry association and PE firm classifications, but also primary research with investment professionals across size segments has been conducted. A range of alternative classification methods and metrics can be discerned, with for example EVCA (2013) defining the so-called European Large Cap segment as companies with an EV in excess of EUR 500mn. Other approaches, often seen within the industry, define segments based on the size of the investing fund, size as defined by committed capital, or based on company financials such as profitability or Asset base. Despite the potential attractiveness of basing segmentation on EVs, it comes with several drawbacks with the major being the limited availability of transaction data. As for using accounting data, the arbitrary choice of line items and applicable thresholds renders such a methodology inappropriate. Minimising the dependency on crucial assumptions, along with addressing the concern of data availability, lack of academic clarity coupled with a desire by the Authors to incorporate industry-wide practice, results in basing the segmentation on fund sizes and not on target firm valuation nor target financials; the Author's method thus represents an amalgamation of academic and practitioner perspectives. Having conducted interviews with investment professionals across size segments, along with having triangulated such information with secondary research, the industry view with respect to the Scandinavian region is to define the large segment (henceforth Large) as investments made by individual funds with committed capital in excess of EUR 1bn. Implicitly, this entails funds with a commitment of less than EUR 1bn to be classified as investing in targets below Large (henceforth Sub-Large). The arguments justifying this specific threshold put forth by professionals are often technical and include parameters such as the capacity of PE firm employees and therefore GP sizes, fund constraints such as restrictions on the number and size of investments, and potential conflicts of interest if Sub-Large funds approach objects which may also be targeted by Large funds managed by the same GP. In order to make use of this definition each individual transaction is matched to not only a GP, but also to the specific fund through which the investment was made. Potential differences in currency denomination have been corrected for by using average exchange rates during the years of fund establishments.

One issue related to the size factor pertains to the impact of potential differences in risk profiles between the size categories, differences which, if not handled accurately, may distort the conclusions. For one, one can argue smaller firms to be more prone to higher business risk due to

e.g. their earlier stage in the lifecycle and potentially more volatile market share. Hence, a potential discrepancy in value creation between segments may be impacted by such existence, to the detriment of smaller targets. However, this would only be the case if the counterfactual did not exhibit an equivalent business risk, and thereby adjusting for the counterfactual would not render the buyout event as being the sole impacting factor with respect to value creation. However, the Authors' process of assigning counterfactuals based on not only industry classification, but also, and more importantly, on size, specifically takes this issue into account, rendering the impact of a potential existence of differences in business risk between segments moot. Secondly, despite controlling for differences in business risk, differences in financial risk between the size segments, post-buyout, may also impact the results if not taken into consideration. This financial risk arises from the typical implementation of increased debt levels by PE firms (c.f. Financial engineering), i.e. is a result of the buyout event and could thus be argued as omitted by the counterfactual. This however would only be of concern if lenders would have a preference regarding default risk solely attributable to such excess financial gearing, i.e. tolerate higher default risk related to excess buyout-gearing, that is, gearing in excess of what the business risk would dictate, in either of the size categories. That such preferences would exist is highly unlikely since e.g. banks will lend based on cash generation, i.e. as determined by business risk, which implies that any excess gearing should have the same incremental default risk irrespective of target. To further ameliorate any remaining concerns, the Authors want to stress yet another mitigant; the accounting metrics used are all based on capital-structure-natural line items (c.f. EBITDA). To conclude, the Author's methodology to the extent possible isolates the size factor, to which any incremental value creation is thus to be seen as attributable.

### **Data Cleaning**

With the segmentation and APMs defined and in place, the last and final step before specifying the statistical models to be used, is to perform a data cleaning exercise so as to exclude extreme values and outliers. In this study, the data sample is trimmed for potential misrepresentative observations. The approach of trimming, discussed by e.g. Stigler (1973) and Tukey and McLaughlin (1963), sets a higher and lower threshold, beyond which the observations are removed. It is usually argued that a trimmed data sample renders less impacted estimates of the population mean and median, especially in cases with extreme deviations and heavy tails. Further, as argued by Crow and Siddiqui (1967), in samples potentially having misrepresented observations, where the extent of misrepresentation is unknown, a trimmed data set may be more appropriate than e.g. Winsorised data; not being able to

fully rule out such an existence further justifies the usage of trimming. The level of trimming varies within the academic discourse, and ranges from such levels as 0.1% (see for example; Gujarati, 2003) to several percentage points (see for example; Kothari et al., 2005) have been observed. The issues the Authors are confronted with are, on one hand, to remove all potentially misrepresentative observations, while, on the other hand, ensuring that excessive trimming is not performed, which would result in the exclusion of correctly represented observations. In light of this, along with support from e.g. Nieuwenhuis et al. (2013), a one percentage point threshold is selected.

To further validate the results, the Authors expand this reasoning and perform the tests using not only trimmed data, but also Winsorised along with raw data. The approach of Winsorising, discussed by amongst others Dixon (1960), Tukey (1962) and Tukey and McLaughlin (1963), sets a higher and lower threshold, and the observations falling outside of these are set as equal to the closest threshold value. The results of performing the tests using the different data sets are elaborated further upon in the Results section and when discussing robustness.

### **Model Specification**

In order to test the hypotheses regarding whether or not PE-owned firms create abnormal value as defined in Section II, one can think of a wide range of statistical approaches which could be applicable. Examples of methodologies which can be discerned in the adjacent literature include testing hypotheses using a Student's t-test (see for example; Bergström et al., 2007; Dann et al., 1991, who use both parametric and non-parametric tests), non-parametric tests such as the Wilcoxon signed-rank test (see for example; Barber and Lyon, 1996; Kaplan, 1989, where the former contrast parametric and non-parametric tests in an excellent way) or regression analysis (see for example; Holthausen and Larcker, 1996; Lichtenberg and Siegel, 1990).

This study emphasises the first two alternatives, given their widespread usage in the adjacent academic literature, and the significant assumptions required on e.g. variable linearity and sample distribution when using a regression analysis. Further, a Student's t-test requires the fulfilment of a set of assumptions including the data being continuous, following a normal probability distribution, and being used on a sample constituting a randomly picked set of observations from the population. The APM variables used in this study clearly do not fulfil all of these specified criteria; for example, neither APM can be said to follow a normal probability distribution. As an alternative to parametric tests such as the Student's t-test, a non-parametric test such as the Wilcoxon signed-rank test can be

utilised. The Wilcoxon signed-rank test has wider applicability given less stringent assumptions, and does not require assumptions on sample distribution but generates overall somewhat weaker statistics. The more lax requirements regarding assumptions, along with the results presented by Barber and Lyon (1996) regarding the superiority of the Wilcoxon signed-rank test in the presence of extreme values, justifies the use of this method when testing the hypotheses on overall buyout target outperformance with respect to peers. Note however that as part of the robustness checks, parametric tests are run as further elaborated upon in the Results section.

The process of conducting a Wilcoxon signed-rank test is initiated by ranking observations with respect to the absolute value of pair-wise differences in performance, which returns a vector of differences ordered by magnitude. The next step is to sum the ranks corresponding to the positive and negative pair-wise differences respectively, and denote the smallest absolute value of these sums as the Wilcoxon signed-rank test statistic (henceforth  $T$ ). As explained by Carlson et al. (2007), when the number of pairs exceeds 20,  $T$  is approximately normally distributed. Based on this latter step, the decision rule becomes to reject the null hypothesis if:

$$-z_{\text{critical}} > Z > z_{\text{critical}}$$

$$\text{where, } Z = \frac{T - \mu_T}{\sigma_T} \text{ and where, } \mu_T = \frac{N(N+1)}{4} \text{ and, } \sigma_T = \frac{\sqrt{N(N+1)(2N+1)}}{24}$$

and,  $N$  equals the number of non-zero pair-wise differences.

As discussed above, the Wilcoxon signed-rank test is utilised in order to test the hypotheses surrounding the potential existence of abnormal value creation in buyout targets. The next step, and where this study really makes its mark, is in validating the hypotheses surrounding inter-group differences between the performance of Large versus Sub-Large target firms. This is first done by mimicking the usage of the Wilcoxon signed-rank test as per above for both sub-groups, which confirms or rejects the existence of abnormal value creation within the groups as compared to peers. However, in order to investigate whether or not potential differences in abnormal value creation between groups are statistically significant, a new methodology is required. Also here the discussion to a large extent is centred around whether or not a parametric or non-parametric test is preferable. As discussed above, the assumption on e.g. normality of the probability distribution is at least doubtful, which, together with the desire by the Authors to maintain the usage of non-parametric

test methods, renders a traditional Analysis of Variance inapplicable. The natural choice of test model then becomes the Mann-Whitney U test (also known as the Wilcoxon-Mann-Whitney test), which builds on the Wilcoxon signed-rank test but is used to draw conclusions on the difference between two independent populations as opposed to the total sample as a whole, and is beneficially used for samples within which the sub-groups are of different size. Furthermore, as pointed out by Fay and Proschan (2010), there are several instances where the Mann-Whitney U test is more powerful than its parametric counterparts, e.g. when distributions are characterised by heavy tails or skewness. Also, when tranching data with respect to e.g. size categories, non-parametric tests such as the Mann-Whitney U test are once again in many cases seen as preferable. For a detailed review of non-parametric statistical methods and their applicability, please refer to e.g. Gibbons (1976). For larger samples, as in the case of this study, the Mann-Whitney U test is conducted by first arranging all observations into one ranked series including the observations of both samples, i.e. Large and Sub-Large. The ranks are then summed for the two samples, and the U-statistic is calculated as per:

$$U = N_{\min}N_{\max} + \frac{N_{\min}(N_{\min}+1)}{2} - R$$

where, R equals the lowest sum of ranks of the two samples,  $N_{\min}$  the number of pairs in that corresponding sample, and  $N_{\max}$  the number of pairs in the other. The U value is the test statistic which is compared to the critical value as determined by significance tables. However, for large samples, just as for the Wilcoxon signed-rank test, the test statistic is approximately normally distributed, yielding the standardised normal test statistic (to be compared to significance tables) of:

$$Z = \frac{U - \mu_U}{\sigma_U} \text{ where, } \mu_U = \frac{N_{\min}N_{\max}}{2} \text{ and, } \sigma_U = \sqrt{\frac{N_{\min}N_{\max}(N_{\min}+N_{\max}+1)}{12}}$$

### **Robustness Checks**

As always, robustness checks are important for the validity of the results. Apart from the accounting measures used, the model specification and the alternation of sample period, all elaborated upon above, and the design of the peer groups which, as discussed in above, has been triangulated with the discourse, the two main concerns surround data cleaning and the selection of size threshold.

In order to control for the potential existence of values not accurately representing the true PMs, such as the existence of corporate restructurings, changes in accounting standards and other

events which may have led to distorted data, the data has been, as documented above, trimmed. However, naturally one wants to understand the impact on the results of changes to this methodology. Hence, the Authors have altered not only the level of trimming but also conduct the tests on Winsorised and raw data. Already here the Authors want to highlight that the general results presented are heavily robust with respect to these changes. With respect to the size threshold, the assumptions are not only of relevance with respect to understanding market dynamics, but arguably of utmost importance in understanding the generalisability of the results. If additional testing using altered thresholds is ignored, the results would arguably be significantly weaker. In order to address this concern, and validate the proposed generalisability of the results, the Authors spend rigorous time and effort in order to determine the impact of the set threshold level on the results.

The first robustness check with respect to size categorisation is conducted by adjusting the threshold for inflation. The rationale behind this methodology is as follows; given that the EUR 1bn threshold is the one active in the market as per today, one must realise that raising a EUR 1bn fund in 2000 is vastly different from say 2008. As there is no viable way of incorporating differences in fundraising conditions, market sentiment, and other factors affecting fund sizes without making arbitrary assumptions, the Authors, at least partly, control for this effect by considering differences in purchasing power surrounding the observation period. On a more practical note, this is done by adjusting the EUR 1bn threshold for Swedish inflation levels during the observation period as determined by Statistics Sweden, rendering a corresponding inflation-adjusted threshold for each year. The rationale for using the Swedish inflation rate as the adjustment factor is the fact that the observations are disproportionately tilted towards Swedish targets and funds. One can naturally argue that perhaps a value-weighted consumer basket based on the value-weights of the nations of the funds in the sample, their origin and targets, is more appropriate, however the Authors are of the opinion that this would again be highly arbitrary and hence conclude the most appropriate option to be selecting the inflation rate of the nation most prevalent amongst the observations. As elaborated further in the Results section, the results are fully robust when considering the inflation adjustment. The second robustness check with respect to this assumption is done by adjusting the threshold upwards and downwards by one quartile to include or exclude borderline Large or Sub-Large funds. The rationale behind this is to investigate if such a change significantly alters the allocation of observations to each sub-category which may significantly alter the picture. However, as presented in the Results section, and indirectly discussed in the Data section, the tests are robust even here.

## **Section IV: Results and Analysis**

This section will be devoted to the results and analysis of both the full-sample tests as well as the subsequent group-level tests. The section will be divided into two parts corresponding to each of these focus areas, and is structured to first present detailed results of the performed tests followed by a thorough analysis of the findings, findings discussed and contrasted to previous applicable literature. The full-sample tests are to be seen as first and foremost an introduction to the subsequent group-level tests, as well as a complement to the existing research on general value creation in PE. It is in the results relating to the group-level tests that this study aims to shed light on a current knowledge gap within the academic discourse surrounding PE.

### **Full Data Sample**

#### **Results**

This first section aims to present the results from testing hypotheses I(a)-III(a). Here the Authors seek to understand the potential existence of general abnormal value creation in PE portfolio companies.

+ + + Insert Exhibit 7. here + + +

As is evident from Exhibit 7., the results are clear; PE-backed firms tend to outperform peers on all tested metrics related to Growth and Operating Performance, and thereby generate abnormal value creation. For example, looking at such metrics as changes in EBIT margins buyout targets outperform peers by on average approximately three percentage points during the holding period.

On the basis of Growth, one can discern a clear outperformance of the buyout target as opposed to peers. Buyout targets as well as peers exhibit highly statistically significant and positive Growth over the sample period, however the buyout targets exhibit nearly twice the same. Given the magnitude of the outperformance (approximately six percentage points on a yearly basis), as well as the low p-values (less than 0.00), the Authors conclude the outperformance of buyout targets to be both economically and statistically significant. Hence, one can infer Hypothesis I(a) to be supported by the data. Looking at the metrics capturing Operating Performance, the picture showing abnormal outperformance of buyout targets with respect to Growth is repeated, as buyout targets improve margins as well as their return on capital to a larger extent than peers. For example, buyout targets overall improve margins with approximately one to two percentage points depending on metric,



whereas peers, interestingly, even experience a decline in the aforementioned profitability metrics. The same holds true when looking at ROA levels. The positive Operating Performance with respect to buyout targets is not only statistically significant, but also economically powerful across metrics. The same holds for peer groups except for the fact that profitability deteriorates during the same period, albeit to a limited extent. Concluding, buyout target abnormal operational outperformance has economic implications and is statistically significant at all generally accepted significance levels. Hypothesis II(a) is hence also supported by the data, implying that PE-backed firms in general exhibit positive abnormal value creation with respect to these operating metrics. With regards to Capital Spending, the results are less clear-cut; neither buyout target, nor peer group, changes in relative spending are statistically different from zero. Looking at the results for peer-adjusted changes, the same picture holds true and no inference can be made with respect to directionally positive or negative abnormal Capital Spending. Hence, the Authors conclude Hypothesis III(a) not to hold, implying that no relationship can be discerned with respect to PE firms' general tendency either to increase or decrease relative investments.

Having determined the general effects of PE ownership on Growth, Operating Performance and Capital Spending, the Authors conduct a robustness check on the data set by Winsorising, rather than trimming, the observations. Winsorising the observations at one percent (the same thresholds used in the trimming methodology) and performing the tests portrays an unchanged picture across PMs. Additionally, the same procedure is conducted utilising the raw data set, which once again leaves the results unaltered. The unchanged results are reinforced by the picture given when omitting the years of the latest financial crisis. As a final robustness check, the parametric Student's t-tests are performed, also resulting in an overall unchanged picture. Thus, the Authors conclude the results to be not only economically and statistically significant, but also highly robust. Given the full-sample nature of the tests, altering the fund size threshold as a robustness check is inapplicable in this case.

## **Analysis**

The results obtained in this section are very much in line with what the Authors expected, with the main caveat being the non-significant results found in relation to Capital Spending. The fact that PE-backed firms outperform their peers in terms of e.g. Growth is far from surprising given the fact that implementing Growth initiatives often is a key strategy for PE firms, since Growth, through increased market share, economies of scale, bargaining power in the value chain etc., drive the valuation at which the PE firm can divest its investment. The improvements found for the metrics

related to Operating Performance once again confirm the picture that not only is value creation important, but it is also typically realised through remedying operational inefficiency as manifested by improved profitability. The non-existence of statistically significant Capital Spending is somewhat more surprising, and based on the full-sample tests it is unclear whether this is attributable to the nature of the PM not accurately representing underlying investment policies, to a major difference between groups (as analysed further below), or rather is evidence of a general lack of focus on Capital Spending initiatives by PE firms; the latter deemed by the Authors to be less realistic.

Relating the results to previous literature, the full-sample tests largely confirm the overall academic picture. Such studies as Acharya et al. (2008), Bergström et al. (2007), Cressey et al. (2007) and Kaplan (1989) unanimously point towards similar conclusions when looking at a broad range of value creation measures. For example, Acharya et al. (2008) to some extent confirm the findings of positive Growth, while Growth further is part of the PE value creation model continuously emphasized in the market (see for example; EVCA, 2013). In contrast, Bergström et al. (2007) find no statistically significant growth in Revenues on a peer-adjusted basis, even though positive operating performance in general is found. With regards to Operating Performance, Bergström et al. (2007), Cressey et al. (2007) and Kaplan (1989) all find a positive relationship between abnormal improvements in operational efficiency and PE ownership. Worth mentioning is that the Authors recognise that there could be a significant difference between size segments with respect to which value creation initiatives that are implemented, and differences between size segments may in such a case offset each other, reducing the magnitude of changes observed; however, the fact that statistically significant results are obtained for the sample as a whole, in spite of this possibility, further highlights the magnitude of changes likely implemented by PE-backed firms. Looking at Kaplan (1989), one can infer the results found with respect to Capital Spending, where on a peer-adjusted basis, Kaplan finds PE-backed firms to, both economically and statistically, significantly reduce their investments. The reason for a lack of such results in this study is likely attributable to, as discussed above, the possibly imperfect accuracy of D&A as a proxy for actual investment policies, the potential heterogeneity between size categories within the full sample or inherent sample differences such as period and geographies studied. Also, looking at a more local setting, the general results are very much in line with the general findings presented by Adler and Norberg (2012), Gulliksen et al. (2008) and Jääskeläinen (2011), which should arguably have been expected given the proximity of the studies in terms of e.g. observation periods and PE firms covered.

## **Group-Level Samples**

### **Results**

The results presented in this section are to be seen as the main findings of the article, and the main contribution to the academic field. What follows is, firstly, the results from investigating the existence of abnormal value creation in each specific size category, and secondly, the Authors will address the statistical significance of potential inter-group differences in terms of Growth, Operating Performance and Capital Spending. Hence, the section presents the results from validating Hypotheses I(b)-III(c).

+ + + Insert Exhibit 8. here + + +

As can be seen in Exhibit 8., when investigating the existence of abnormal value creation after splitting the sample into the Large and Sub-Large categories, the overall picture from the full sample also holds for group-level tests. This implies statistically and economically significant positive Growth, Operating Performance but somewhat weaker results for Capital Spending. Looking at Growth, the results portray a strong level of abnormal Growth within both size segments, with a higher magnitude of this Growth exhibited for the Sub-Large category. Both levels of Growth are in excess of five percent on a peer-adjusted and annual basis, which can be considered to be substantial abnormal Growth. With respect to Operating Performance, the picture from the full-sample tests is once again repeated, however in this case it is noteworthy that the orders of magnitude are substantially different between size categories (the Authors recognise that further tests need to be done to discuss the validity of such differences between size categories, however this follows further below). The economic significance of abnormal Operating Performance is substantial, ranging from approximately one to five percent over the holding period depending on the metric examined. Interestingly, the peer groups appear to underperform their buyout target counterparts, as they exhibit declining profitability across metrics within Operating Performance, barring EBITDA margins. With regards to Capital Spending, a statistically significant negative alternation of relative investments can be seen for Large buyout targets, whereas no significant results are obtained for the Sub-Large buyout targets. This can be compared to the full-sample results, where no significant abnormal Capital Spending can be observed. Thus, even though the Large category does seem to display some statistically significant negative abnormal Capital Spending, the overall picture for the related PM remains mixed. In sum, this leads Hypotheses I(b)-II(b) to be accepted across all common significance levels, whilst Hypothesis III(b) only to hold to some extent.

The robustness checks conducted in this setting are very much equivalent to the full-sample robustness checks, i.e. altering the data cleaning methodology, omitting the years of the financial crisis and changing towards parametric tests, all of which return generally unchanged results. Additionally, the fund size threshold is altered, rendering results which once again confirm higher degrees of value creation in buyout targets, regardless of size, with respect to peers. The often highly economically and statistically significant results, along with the comfort given from the robustness checks, makes the Authors conclude that both sub-groups in general tend to outperform their industry peers with respect to Growth and Operating Performance, whereas in terms of Capital Spending, only the Large buyout targets appear to alter their investment policies as a result of the buyout event.

Once having concluded the existence of abnormal value creation in buyout targets, as well as ocular differences in magnitude of such abnormal creation between groups, the next analysis aims at investigating the significance of such inter-group differences.

+ + + Insert Exhibit 9. here + + +

As illustrated in Exhibit 9., no statistically significant difference is found with respect to Growth for the two size categories. Hence, despite seeing statistically significant abnormal Growth for the sub-groups in isolation, there is no indication, from a statistical point of view, of a difference in abnormal Growth between the groups.

+ + + Insert Exhibit 10. here + + +

In contrast to Growth, a statistically significant difference can be observed when investigating two of the PMs related to Operating Performance, namely EBIT margins and ROA, whereas the results for EBITDA are not statistically significant, as displayed in Exhibit 10. Furthermore, the inter-group difference in abnormal improvement with respect to EBIT margins is highly statistically significant, with a p-value of 0.03, whereas the changes in ROA display somewhat weaker statistical significance. Looking at the mean ranks for EBIT margins and ROA, along with the significance levels, one can infer that Large buyout targets tend to improve EBIT margins and ROA to a larger extent than their smaller counterparts.

+ + + Insert Exhibit 11. here + + +

As in the case of EBIT and ROA, the PM related to Capital Spending, as seen in Exhibit 11., also returns a statistically significant result for the difference between Large and Sub-Large. It is

evident that not only is negative abnormal Capital Spending for Large buyout targets statistically significant in isolation (i.e. against peers), but the difference between abnormal Capital Spending for Large and Sub-Large buyout targets is statistically significant as well. As shown in Exhibit 8., the direction of this statistically significant difference is such that Large buyout targets appear to reduce relative investments to a larger extent than not only peers, but more importantly, to a larger extent than their Sub-Large counterparts on a peer-adjusted basis. From the test results, the Authors can hence conclude Hypotheses II(c)-III(c) to hold, with results being somewhat weaker for Hypothesis II(c), whereas Hypothesis I(c) is given no support from the data.

Since the findings obtained from conducting these final inter-group tests are also highly relevant in order to be able to draw any conclusions on differences between size groups, thorough robustness checks, as in the case of the group-level tests discussed above, are conducted in order to further validate the results. When performing the inter-group tests using Winsorised and raw data, rather than trimmed, the results remain generally unchanged, which is also the case when altering the fund size threshold barring one single PM, namely ROA, in the specific case of the fund size threshold being adjusted upwards or downwards by one quartile, the statistical significance of which is altered to some extent. The generally unchanged picture is further reinforced when omitting the latest financial crisis and its adjacent years. The alternation of model specification, i.e. turning towards parametric tests, also displays a similar picture for the PMs EBIT margin, ROA and D&A.

## **Analysis**

The results presented in the above section indicate not only statistically and economically significant abnormal value creation of each sub-group as opposed to peers, but also evidence of significant differences between the groups in terms of a selection of PMs. Below follows an analysis of these findings divided into the three defined categories of PMs.

As discussed when analysing the results of the full-sample tests, the literature to a large extent confirms the existence of positive abnormal Growth resulting from PE ownership. Given the findings in the discourse, c.f. Acharya et al. (2008), along with market sentiment, the results are in line with what the Authors might expect. On a more qualitative note, one can arguably claim Sub-Large companies to be in a more favourable position to increase top-line growth than their larger counterparts, given the prevalence of e.g. an expressed focus on buy-and-build and expansion strategies within the segment, along with the likely ease of implementing such strategies. Also, the

major contribution from mid-market deals to overall M&A volume, and the likely importance of such acquisitions as part of the acquirers' future growth trajectory (see for example; Deloitte, 2012), is arguably evidence of growth potential within the mid-market space, traits which could be expected to be manifested in the data. Further as often argued in traditional corporate finance theory, smaller organisations in general grow faster than mature companies given their earlier stage in the typical business lifecycle along with the likely high efficacy of any pursued growth initiative. However, taking such a stance should imply that the counterfactual ought to have similar traits, and hence peer-adjusted growth must not per se be different between segments; such a difference would only occur if Sub-Large PE-backed firms would focus more on, or be more prone to, top-line growth, or if the PE firms with a smaller size focus are in a more beneficial position to extract such growth, as opposed to PE firms with a larger size focus, or simply are more apt at selecting superior Sub-Large companies in terms of growth potential. None of these qualitative theories are however supported by the data. The results in this study rather argues for a somewhat similar importance and existence of peer-adjusted top-line growth within both size segments, however, importantly, not arguing this top-line growth to be achieved through the same methods, c.f. acquisition-based or organic, nor to the same extent even though the magnitude of the discrepancy remains small.

Shifting the focus towards the accounting measures related to Operating Performance once again confirms the existence of size-independent abnormal value creation relating to PE ownership, as previously documented by e.g. Cressey et al. (2007) and Kaplan (1989). When investigating the observed differences in such improvements between size categories, and not solely in relation to industry peers for each category in isolation, the picture is somewhat less compelling, however still clearly pointing towards a more abundant prevalence of such improvements in larger targets. The encouraging economical and statistical significance concerning the difference between the segments in terms of EBIT margins and ROA should be seen in light of the reasoning presented above regarding PE firm capabilities or the conduciveness of targets. The Authors are of the belief that the most likely explanations are attributable to, on one hand, the likely possibilities of PE firms with a larger size focus to be in a position to more accurately select targets given the prevalence of higher quality information (the reverse likely holds for Sub-Large targets, not taking into consideration significantly smaller targets such as e.g. family offices which are beyond the scope of this article and hence not included, given apparent differences in knowledge between the investment professionals and the previous owners), and on the other, the traits of larger companies being more prone to, and

thereby implying a specific such focus on behalf of the owners on, increased operational efficiency given the existence of a larger cost base, Asset base etc. Without making any bold statements regarding which of these plausible reasons that dominate, it is not unreasonable to assume all to be of high importance given the typical inefficiencies seen in larger corporations as documented by Jensen (1989). The larger the target, the more similar the target is to the, by Jensen (1989) described, inefficient public entity where traits such as inefficient corporate governance, lack of monitoring, incentive misalignment, inefficient capital structure, a bloated cost structure etc. may be prevalent. One can hence argue the existence of e.g. the principal-agent problem and incentive misalignments to be of greater concern and easier to identify in large corporations, and thus easier to remedy.

Elaborating further on plausible explanations using the framework as presented by Kaplan and Strömberg (2009), the measures taken to improve organisations are, as discussed in Section II, grouped into Financial, Governance and Operational engineering. The first type of engineering, as mentioned in Section II, mitigates the Free Cash Flow Problem as defined by Jensen (1986), an issue arguably more prevalent in larger corporations with larger streams of overall cash flows. The second aspect resolves some of the inefficiencies discussed above, through measures such as managerial equity stakes, board composition etc., inefficiencies which can also be argued to be more common in larger companies. Finally, the last point refers to the application of expertise and operational knowhow on behalf of investing organisations to improve the target companies' business models, in order to ultimately realise a higher valuation upon sale. Hence, on a more practical note the initiatives taken by buyout funds on such measures as active sourcing of capable management and incentive alignments, along with the knowledge and competence of the investment professionals within such areas as organisational optimisation, cost cutting, financial understanding etc. are likely superior to the capacity existing within the organisations pre-buyout, all of which may have a higher incremental impact on larger targets. Counterarguments, as proposed by e.g. Turner (1983) are related to the fact that the degree of organisational inertia may be lower in small companies, however this argument can be reversed since higher degrees of organisational inertia also implies that PE-related improvement measures may be more efficacious in larger companies given the possibility to differentiate the company to a larger extent given a successful resolution of this concern.

One can perhaps argue the insignificance of a clear difference between size categories with respect to EBITDA margins to be surprising given the above discussion. However one can argue in

favour of the importance of including D&A charges to the return metrics given its inclusion as a proxy for investment levels, which is an important differentiator between the segments. Naturally there will be inherent differences in investment policies within the size segments, where investments likely are, on a relative note, more prevalent within smaller entities being in an earlier stage of their lifecycle, a statement supported by the data, and hence should be included in order to allow for conclusions to be drawn on aggregate operational efficiency initiatives implemented by the PE firms. Further, many of the proposed benefits of PE ownership aim at a more efficient allocation of capital, through e.g. mitigating the Free Cash Flow Problem along with securing the recoupment of earnings targeted through these investments, additionally highlighting the need to actually proxy for these aspects in investigating Operating Performance. In order to shed further light on this topic, the Authors would ideally want to perform a granular, income-statement-based, multivariate regression in order to understand the importance of the various line items building up EBITDA and EBIT in creating the identified significant difference in EBIT margins between groups, items such as Cost of Goods Sold, Selling, General and Administrative Expenses, D&A etc. Given data availability however, such a methodology is not feasible, but the Authors argue, and it is realistic to assume, all line items to be affected by the buyout event, including D&A, the inclusion of which makes the value creation difference statistically significant, which justifies the usage of EBIT rather than EBITDA. Lastly, the more practical limitations of the EBITDA measure not being a Generally Accepted Accounting Principles measure, introduces inconsistencies, which may further distort the picture of this Operating Performance metric.

Looking at the last value creation measure, namely Capital Spending, reveals a picture where not only the Large category reduces relative spending as opposed to peers, but also to a larger extent than Sub-Large targets. The notion that reducing investments increases valuation, *ceteris paribus*, is confirmed by e.g. Lerner and Willinge (2002), and has also been corroborated by other researchers within the academic discourse, as evidenced by e.g. Kaplan (1989) and Smith (1990), and it is in this light that the results of the Authors' study should be seen. Further, as shown by e.g. Baker and Wruck (1989), the level of Capital Spending in a company funded, at least to some extent, by debt, is typically restricted as a result of debt covenant agreements, which forces management to employ more efficient investment policies than what may have been the case pre-buyout, which in combination with the ambiguity regarding the preferred direction of change, lends further credence to the notion that CAPEX may either increase or decrease as a result of a buyout, with the key point



being that the efficiency of this expenditure is improved, such that higher levels of growth and/or earnings are generated for every proverbial dollar spent. The headroom for such efficiency improvements is likely significantly larger for larger targets. Another factor impacting the difference between the size categories is related to the fact that smaller companies often are acquired with the intention of the acquiring PE firm being to grow target operations significantly, something which likely would correspond to higher relative levels of CAPEX during the holding period. This is exemplified by middle-market buyout specialists such as Silverfleet Capital, which in addition to organic growth initiatives drives further growth in portfolio companies by employing a buy-and-build strategy (Silverfleet Capital, 2013), and FSN Capital Partners, which has a defined strategy to invest in Nordic middle-market companies with the potential to be grown into international players (FSN Capital Partners, 2013). The particular importance of increased CAPEX in smaller targets is also discussed in e.g. a study by Deloitte (2012), which finds that middle-market companies are especially active when it comes to conducting add-on acquisitions. Given the non-existence of statistically significant abnormal Capital Spending when comparing Sub-Large buyout targets to peers, this likely indicates the existence of similar activities within the counterfactual. This relative pattern cannot be said to hold for Large buyout targets, as they exhibit significant changes in such relative investment levels. As discussed above, there are likely several plausible explanations for the observed differences between size categories, where it is most reasonable to assume the organisational inefficiencies of large corporations as referred to by e.g. Jensen (1989), and the larger dollar amount of investments conducted within the same, to be the primary drivers of the results found.

To conclude, targets in both size categories see improvements in top-line growth as well as profitability, while reduced relative investments can only be discerned for larger buyout targets, as opposed to peers. Further, one can infer higher abnormal improvements in larger targets with respect to Operating Performance and larger reductions in Capital Spending, whereas a lack of discrepancy with respect to Growth is found. Thus the conclusion the Authors are able to draw, in terms of segmenting PE buyouts, is that, on aggregate, buyout targets outperform peers and that larger targets benefit from the ability to improve operations to a larger extent than their smaller counterparts. With respect to Capital Spending, the key finding is that the investment policies of Large buyout targets appear to be altered not only from peers, but to a larger extent than those of smaller targets on a peer-adjusted basis.

## **Section V: Discussion and Conclusion**

The aim of this study is to not only add further flavour to the understanding of value creation in PE, but more specifically to investigate whether or not any differences in value creation can be discerned between PE firms targeting, say, market leaders versus future prospects. The research area of PE is a comparatively young field within finance, with value creation being one of the more popular topics. As a result, the angle taken in this study is to further bridge the gap between organisational theory and finance, while also considering market perspectives, when incorporating a size perspective. More concisely, the Authors shed light on the impact of the size factor in a PE value creation setting.

The results found indicate not only the value creation of PE to, in general, be superior to peers, but also for sub-groups in isolation. Further, the evidence indicates a difference between these segments in terms of the ability to increase profitability over time, an ability which appears to be more prevalent for larger targets, whereas no such distinction can be made for changes in Revenues. Turning towards investments, the picture is less clear and indicates peer-adjusted reductions in relative investments for larger targets in isolation, as well as when compared to their smaller counterparts. These results are arguably explained by the fact that PE firms with a larger size focus may likely be in a more favourable position with respect to target selection, a result of e.g. information availability, as well as those targets being more prone to the value creation strategies deployed. Overall, these results are in line with the academic discourse, but arguably somewhat contradict the views of market participants concerning inter-group differences, who, besides recognising the continued attractiveness of larger targets, also emphasize the increasing attractiveness of smaller firms. Given the rigid data sample, with observations covering a 15-year period of Scandinavian buyouts, the Authors are of the strong opinion that the results are generalisable across both time periods and geographies, barring structural and/or regulatory changes which may fundamentally alter the conditions for PE investments.

The Authors recognise that, despite the rigorous efforts exerted with respect to ensuring the data to be of highest possible quality, accounting data will by definition always be a proxy for the true Growth, Operating Performance and Capital Spending of a corporation. Moreover, even though the tests are based on an event study, where adjusting the observations for the performance of peers should theoretically eliminate all differences between the buyout targets and their peers apart from the buyout event itself, there is no guarantee that every single impacting factor, barring the buyout, is accounted for through this adjustment. Regarding inter-group differences, it could be

the case that PE funds of different sizes are in fact different in size, so as their targets, because of differences in experience levels and internal resources, i.e. target sizes may not be solely exogenously determined. This could imply that the larger funds may have generated the same value creation in smaller firms, and vice versa, had they shifted size focus. Even if this were the case, it should not detract attention from the results, given that larger targets still would be more attractive, especially from an investor perspective. Further, the Authors believe the impact of such exogenous factors to be limited in this study, since one could, in the example presented above, argue that larger GPs in such a case would have instead raised several smaller funds targeting smaller firms if these targets in fact had more favourable traits relative to larger targets, which gives further credence to the results.

Having identified the impact of size on value creation, future research could expand on this study by e.g. altering the data or deep-diving into the qualitative aspects of the underlying theories, both within organisational theory and PE. With regards to the former, such aspects as altering the data sample, despite the used data already being comprehensive, to include additional transactions, regions, sectors, funds etc., would further improve the understanding and implications of the results. Further, the approach taken in this study with respect to categorising the buyouts can be altered by abandoning the binary threshold and rather increasing the granularity of the size categorisation, along with potentially including significantly smaller companies such as e.g. VC targets in the sample. Lastly, such changes as alternative counterfactual assignments, an increased number of tested PMs, and the use of not only accounting-based, but also e.g. real production, metrics, would enable researchers to obtain a more comprehensive picture of differences across size categories. From a more qualitative perspective, an in-depth study of what the differences in portfolio strategies are for different buyout funds would add to the understanding of differences between investing in different size segments. This would complement the data-driven approach employed in this particular study.

To conclude, given that the aim of PE investors is to realise adequate returns, the results obtained with respect to positive abnormal Operating Performance and negative abnormal Capital Spending, assuming no deterioration resulting from the latter with regards to performance, argue larger buyouts to be preferable. Obviously other firm specifics as well as systematic factors influence company valuation, and thereby returns, to a large, if not larger, extent. However, neither of these implications should detract attention from the clear importance of recognising the apparent benefits of investing in larger targets, placing, on aggregate, the Authors in a strong position to conclude that, yes, bigger is in fact better.

## Section VI: References

Abor, J. and Adjasi, C. (2007), “Corporate Governance and the Small and Medium Scale Enterprise Sector: Theory and Implications”, *Corporate Governance: International Journal of Business in Society*, vol. 7, no. 2, pp. 111-122.

Acharya, V., Gottschalg, O., Hahn, M. and Kehoe, C. (2008), “*Corporate Governance and Value Creation: Evidence from Private Equity*”, Working Paper, Department of Finance, New York University, New York.

Acharya, V., Kehoe, C. and Reyner, M. (2009), “Private Equity vs. PLC Boards in the U.K.: A Comparison of Practices and Effectiveness”, *Journal of Applied Corporate Finance*, vol. 21, no. 1, pp. 45-56.

Adler, V. and Norberg, R. (2012), *Do Parents Matter?*. Master Thesis, Department of Accounting and Department of Finance, Stockholm School of Economics, Stockholm.

Amess, K. (2002), “Management Buyouts and Firm-Level Productivity: Evidence from a Panel of U.K. Manufacturing Firms”, *Scottish Journal of Political Economy*, vol. 49, no. 3, pp. 304-317.

Amess, K. (2003), “The Effects of Management Buyouts on Firm-Level Technical Inefficiency: Evidence From a Panel of U.K. Machinery and Equipment Manufacturers”, *Journal of Industrial Economics*, vol. 51, no. 1, pp. 35-44.

Axelson, U., Jenkinson, T., Strömberg, P. and Weisbach, M. S. (2012), “Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts”, *Journal of Finance*, Forthcoming.

Baker, G. P. and Wruck, K. H. (1989), “Organisational Changes and Value Creation in Leveraged Buyouts: The Case of The O.M. Scott & Sons Company”, *Journal of Financial Economics*, vol. 25, no. 2, pp. 163-190.

Bain & Company (2013), *Global Private Equity Report 2013*. Boston: Bain & Company, Inc.

Barber, B. M. and Lyon, J. D. (1996), “Detecting Abnormal Operating Performance: The Empirical Power and Specification of Test Statistics”, *Journal of Financial Economics*, vol. 41, no. 3, pp. 359-399.

Bennett, R. J. and Robson P. J. A. (2004), “The Role of Boards of Directors in Small and Medium-Sized Firms”, *Journal of Small Business and Enterprise Development*, vol. 11, no. 1, pp. 95-113.

Bergström, C., Grubb, M. and Jonsson, S. (2007), “The Operating Impact of Buyouts in Sweden: A Study of Value Creation”, *The Journal of Private Equity*, vol. 11, no. 1, pp. 22-39.

Berle, A. A. and Means, G. C. (1932), *The Modern Corporation and Private Property*. New York: Macmillan.

Bhagat, S., Shleifer, A. and Vishny, R. (1990), “Hostile Takeovers in the 1980s: The Return to Corporate Specialization”, *Brookings Papers on Economic Activity: Microeconomics 1990*, pp. 1-84.

Drewnsen, C. and Moss, G. (2013), *Is Bigger Always Better? A Study of Value Creation in Private Equity*

Bogdanov, N. (2013), Interviewed by: Christopher Drewnsen 2013-12-02.

Bogdanov, N. and Teye, M. (2011), *The Resilience of Private Equity Owned Portfolio Companies During Crises*. Master Thesis, Department of Finance, Stockholm School of Economics, Stockholm.

Brown, S. J., Goetzmann, W., Ibbotson, R. G. and Ross, S. A. (1992), "Survivorship Bias in Performance Studies", *The Review of Financial Studies*, vol. 5, no. 4, pp. 553-580.

Bruzelius, A. (2013), Interviewed by: Christopher Drewnsen 2013-09-12.

Carlson, W. L., Newbold, P. and Thorne, B. (2007), *Statistics for Business and Economics*. New Jersey: Pearson Education, Inc.

Cornelli, F., and Karakas, O. (2008), "Private Equity and Corporate Governance: Do LBOs Have More Effective Boards?", Working Paper, Department of Finance, London Business School, London.

Cressey, M., Munari, F. and Malipiero, F. (2007), "Playing to Their Strengths? Evidence that Specialization in the Private Equity Industry Confers Competitive Advantage", *Journal of Corporate Finance*, vol. 13, no. 1, pp. 647-669.

Crow, E. L. and Siddiqui M. M. (1967), "Robust Estimation of Location", *Journal of the American Statistical Association*, vol. 62, no. 318, pp. 353-389.

Cumming, D., Siegel, D. S. and Wright, M. (2007), "Private Equity: Leveraged Buyouts and Governance", *Journal of Corporate Finance*, vol. 13, no. 1, pp. 439-460.

Dann, L. Y., Masulis, R. W. and Mayers, D. (1991), "Repurchase Tender Offers and Earnings Information", *Journal of Accounting and Economics*, vol. 14, no. 3, pp. 217-251.

Deloitte (2012), *Middle Market M&A News – 2011: Year in Review*. Chicago: Deloitte Touche Tohmatsu Limited.

Desbrierers, A. and Schatt, P. (2002), "The Impact of LBOs on the Performance of Acquired Firms: The French Case", *Journal of Business, Finance and Accounting*, vol. 29, no. 1, pp. 695-729.

Dettel, J. (2013), Interviewed by: Christopher Drewnsen and Gustav Moss 2013-10-24.

Dichev, I. D. (1998), "Is the Risk of Bankruptcy a Systematic Risk?", *The Journal of Finance*, vol. 53, no. 3, pp. 1131-1147.

Dietsch, M. and Petey, J. (2004), "Should SME Exposures Be Treated as Retail or Corporate Exposures? A Comparative Analysis of Default Probabilities and Asset Correlations in French and German SMEs", *Journal of Banking & Finance*, vol. 28, no. 4, pp. 773-788.

Dixon, W. J. (1960), "Simplified Estimation from Censored Normal Samples", *The Annals of Mathematical Statistics*, vol. 31, no. 2, pp. 385-391.

Dolley, J. C. (1933), “Characteristics and Procedure of Common Stock Split-Ups”, *Harvard Business Review*, vol. 11, no. 3, pp. 316-326.

Easterbrook, F. H. and Fischel, D. R. (1991), *The Economic Structure of Corporate Law*. Cambridge: Harvard University Press.

Eisenberg, T., Sundgren S. and Wells, M. (1998), “Large Board Size and Decreasing Firm Value in Small Firms”, *Journal of Financial Economics*, vol. 48, no. 1, pp. 35-54.

European Private Equity and Venture Capital Association (2012), *2012 Pan-European Private Equity and Venture Capital Activity*. Brussels: European Private Equity and Venture Capital Association.

European Private Equity and Venture Capital Association (2013), *Delivering the Goods*. Brussels: European Private Equity and Venture Capital Association.

Fama, E. F. (1980), “Agency Problems and the Theory of the Firm”, *The Journal of Political Economy*, vol. 88, no. 2, pp. 288-307.

Fama, E. F. and French, K. R. (1992), “The Cross-Section of Expected Stock Returns”, *The Journal of Finance*, vol. 47, no. 2, pp. 427-465.

Fama, E. F. and French, K. R. (1993), “Common Risk Factors in the Returns on Stocks and Bonds”, *Journal of Financial Economics*, vol. 33, no. 1, pp. 3-56.

Fama, E. F. and French, K. R. (1996), “The CAPM is Wanted, Dead or Alive”, *The Journal of Finance*, vol. 51, no. 5, pp. 1947-1958.

Fama, E. F. and Jensen, M. C. (1983a), “Agency Problems and Residual Claims”, *Journal of Law and Economics*, vol. 26, no. 2, pp. 327-349.

Fama, E. F. and Jensen, M. C. (1983b), “Separation of Ownership and Control”, *Journal of Law and Economics*, vol. 26, no. 2, pp. 301-325.

Fama, E. F. and Jensen, M. C. (1985), “Organisational Forms and Investment Decisions”, *Journal of Financial Economics*, vol. 14, no. 21, pp. 101-119.

Fay, M. P. and Proschan, M. A. (2010), “Wilcoxon-Mann-Whitney or T-Test? On Assumptions for Hypothesis Tests and Multiple Interpretations of Decision Rules”, *Statistics Survey*, vol. 4, no. 1, pp. 1-39.

Fazzari, S. M., Hubbard, R. G. and Petersen, B. C. (1988), “Financing Constraints and Corporate Investment”, *Brookings Papers on Economic Activity*, vol. 1, no. 1, pp. 141-195.

Fenn, G. W., Liang, J. N. and Prowse, S. D. (1995), *The Economics of the Private Equity Market*. Washington: Board of Governors of the Federal Reserve System and of the Federal Reserve Banks.

Folkesson, T. (2013), Interviewed by: Christopher Dreusen 2013-12-03.

Freeman, R. (1987), "The Association between Accounting Earnings and Security Returns for Large and Small Firms", *Journal of Accounting and Economics*, vol. 9, no. 2, pp. 195-228.

Fried, D., Sondhi, A. C. and White, G. I. (2003), *The Analysis and Use of Financial Statements*. Charlottesville: John Wiley & Sons, Inc.

FSN Capital Partners (2013), *Concept and Strategy*. Oslo: FSN Capital Partners. Available: [http://www.fsncapital.com/index.php/concept\\_strategy](http://www.fsncapital.com/index.php/concept_strategy) 2013-11-14.

Gibbons, J. D. (1976), *Nonparametric Methods for Quantitative Analysis*. Columbus: American Science Press Inc.

Gottschalg, O. and Phalippou, L. (2009), "The Performance of Private Equity Funds", *Review of Financial Studies*, vol. 22, no. 4, pp. 1747-1776.

Gulliksen, A. V., Falk Hansen, O. and Audestad Wara, K. (2008), *The Operating Performance of Scandinavian Private Equity Companies*. Master Thesis, Department of Finance, Norwegian School of Economics and Business Administration, Bergen.

Hardymon, F., Leamon, A. and Lerner, J. (2008), "A Note on Limited Partner Advisory Boards". Harvard Business School.

Hardymon, F., Leamon, A. and Lerner, J. (2011), "Note on Private Equity Partnership Agreements". Harvard Business School.

Harris, R. S., Jenkinson, T. and Kaplan, S. N. (2012), "*Private Equity Performance: What Do We Know?*", Working Paper, Department of Finance, University of Chicago, Chicago.

Harris, R., Siegel, D. S. and Wright, M. (2005), "Assessing the Impact of Management Buyouts on Economic Efficiency: Plant-Level Evidence From the United Kingdom", *The Review of Economics and Statistics*, vol. 87, no. 1, pp. 148-153.

Hart, O. (1995), "Corporate Governance: Some Theory and Implications", *The Economic Journal*, vol. 105, no. 430, pp. 678-689.

Holthausen, R. W. and Larcker, D. F. (1996), "The Financial Performance of Reverse Leveraged Buyouts", *Journal of Financial Economics*, vol. 42, no. 3, pp. 293-332.

Hotchkiss, E. S., Smith, D. C. and Strömberg, P. (2012), "*Private Equity and the Resolution of Financial Distress*", Working Paper, Department of Finance, Boston College, Boston.

Jensen, M. C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers", *The American Economic Review*, vol. 76, no. 2, pp. 323-329.

Jensen, M. C. (1989), "Eclipse of the Public Corporation", *Harvard Business Review*, vol. 67, no. 5, pp. 61-74.

Jensen, M. C., Kaplan, S. N., Ferenbach, C., Feldberg, M., Moon, J., Hoesterey, B., Davis, C. and Jones, A. (2006), "Morgan Stanley Roundtable on Private Equity and its Impact for Public Companies", *Journal of Applied Corporate Finance*, vol. 18, no. 3, pp. 8-37.

Jensen, M. C. and Meckling, W. H. (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics*, vol. 3, no. 4, pp. 305-360.

Jääskeläinen, J. (2011), *Operational Performance of Nordic Private Equity Backed Buyouts in the Recession of 2007-2009*. Master Thesis, Department of Finance, Aalto University, Espoo.

Kaplan, S. N. (1989), "The Effects of Management Buyouts on Operating Performance and Value", *Journal of Financial Economics*, vol. 24, no. 2, pp. 217-254.

Kaplan, S. N. (1991), "The Staying Power of Leveraged Buyouts", *Journal of Financial Economics*, vol. 29, no. 2, pp. 287-313.

Kaplan, S. N. and Schoar A. (2005), "Private Equity Returns: Persistence and Capital Flows", *Journal of Finance*, vol. 60, no. 4, pp. 1791-1823.

Kaplan, S. N. and Strömberg, P. (2009), "Leveraged Buyouts and Private Equity", *The Journal of Economic Perspectives*, vol. 23, no. 1, pp. 121-146.

Karlberg, M. (2013), Interviewed by: Christopher Drewnsen and Gustav Moss 2013-11-28.

Keasey, K., Thompson, S. and Wright, M. (2005), *Corporate Governance: Accountability, Enterprise and International Comparisons*. West Sussex: Wiley Press.

Leamon, A., Lerner, J. and Vase, A. (2011), "A Note on Private Equity in Developing Countries". Harvard Business School.

Lerner, J., Sørensen, M. and Strömberg, P. (2011), "Private Equity and Long-Run Investment: The Case of Innovation", *Journal of Finance*, vol. 66, no. 2, pp. 445-477.

Lerner, J. and Willinge, J. (2002), "A Note on Valuation in Private Equity Settings". Harvard Business School.

Lichtenberg, F. R. and Siegel, D. (1990), "The Effects of Leveraged Buyouts on Productivity and Related Aspects of Firm Behavior", *Journal of Financial Economics*, vol. 27, no. 1, pp. 165-194.

Lintner, J. (1965), "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets", *The Review of Economics and Statistics*, vol. 47, no. 1, pp. 13-37.

Ljungqvist, A. and Richardson, M. (2002), *The Cash Flow, Return and Risk Characteristics of Private Equity*, Working Paper, Department of Finance and Entrepreneurship, New York University, New York.

Long, W. F. and Ravenscraft, D. J. (1993), "LBOs, Debt and R&D Intensity", *Strategic Management Journal*, vol. 14, no. 1, pp. 119-135.



MacKinlay, C. (1997), “Event Studies in Economics and Finance”, *Journal of Economic Literature*, vol. 35, no. 1, pp. 13-39.

McLaughlin, D. H. and Tukey, J. W. (1963), “Less Vulnerable Confidence and Significance Procedures for Location Based on a Single Sample: Trimming/Winsorization 1”, *Sankhya: The Indian Journal of Statistics, Series A*, vol. 25, no. 3, pp. 331-352.

Metrick, A. and Yasuda, A. (2010), “The Economics of Private Equity Funds”, *The Review of Financial Studies*, vol. 23, no. 6, pp. 2303-2341.

Mikkelson, W. H. and Partch, M. M. (1994), “The Consequences of Unbundling Managers’ Voting Rights and Equity Claims”, *Journal of Corporate Finance*, vol. 1, no. 2, pp. 175-199.

Miller, M. H. and Modigliani, F. (1958), “The Cost of Capital, Corporation Finance and the Theory of Investment”, *The American Economic Review*, vol. 48, no. 3, pp. 261-297.

Moskowitz, T. and Vissing-Jørgensen, A. (2002), “The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle”, *American Economic Review*, vol. 92, no. 4, pp. 745-778.

Mossin, J. (1966), “Equilibrium in a Capital Asset Market”, *The Econometric Society*, vol. 34, no. 4, pp. 768-783.

Myers, S. and Majluf, N. (1984), “Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have”, *Journal of Financial Economics*, vol. 13, no. 2, pp. 187-221.

Nikoskelainen, E. and Wright, M. (2007), “The Impact of Corporate Governance Mechanisms on Value Increase in Leveraged Buyouts”, *Journal of Corporate Finance*, vol. 13, no. 4, pp. 511-537.

Palepu, K. G. (1990), “Consequences of Leveraged Buyouts”, *Journal of Financial Economics*, vol. 27, no. 1, pp. 247-262.

Parker, J. (2013), “Private Equity-Backed Portfolio Company Holding Periods”, *Preqin*, May 2013.

Robinson, D. T. and Sensoy, B. A. (2012), “Do Private Equity Managers Earn Their Fees? Compensation, Ownership, and Cash Flow Performance”, Working Paper, Department of Finance, Duke University, Durham.

Shleifer, A. and Vishny, R. W. (1997), “A Survey of Corporate Governance”, *The Journal of Finance*, vol. 52, no. 2, pp. 737-783.

Silverfleet Capital (2013), *We Buy to Build – Creating Value*. London: Silverfleet Capital. Available: <http://www.silverfleetcapital.com/we-buy-to-build/creating-value/> 2013-11-05.

Skoglund, M. (2013), Interviewed by: Christopher Drewsen and Gustav Moss 2013-11-28.

Smith, A. J. (1990), “Corporate Ownership Structure and Performance: The Case of Management Buyouts”, *Journal of Financial Economics*, vol. 27, no. 1, pp. 143-164.

Stigler, S. M. (1973), “The Asymptotic Distribution of the Trimmed Mean”, *The Annals of Statistics*, vol. 1, no. 3, pp. 472-477.

Strömberg, P. (2007), “The New Demography of Private Equity”, in *Globalization of Alternative Investment Working Papers Volume 1, The Global Economic Impact of Private Equity Report 2008*. Geneva: World Economic Forum.

Svarts, J. (2013), Interviewed by: Christopher Drewnsen and Gustav Moss 2013-11-18.

Thomsen, S. and Pedersen, T. (2000), “Ownership Structure and Economic Performance in the Largest European Companies”, *Strategic Management Journal*, vol. 21, no. 6, pp. 689-705.

Tukey, J. W. (1962), “The Future of Data Analysis”, *The Annals of Mathematical Statistics*, vol. 33, no. 1, pp. 1-67.

Turner, J. A. (1983), “*Organisational Performance, Size, and the Use of Data Processing Resources*”, Working Paper, Center for Research on Information Systems, New York University, New York.

## **Section VII: Appendix**

### **Exhibit 1. Hypotheses Summary**

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#### **Hypothesis I**

- (a) Buyout targets will in general exhibit directionally positive abnormal Growth
  - (b) Buyout targets will in general, irrespective of size, exhibit directionally positive abnormal Growth
  - (c) Smaller buyout targets will in general exhibit directionally positive abnormal Growth in excess of larger buyout targets
- 

#### **Hypothesis II**

- (a) Buyout targets will in general exhibit directionally positive abnormal Operating Performance
  - (b) Buyout targets will in general, irrespective of size, exhibit directionally positive abnormal Operating Performance
  - (c) Larger buyout targets will in general exhibit directionally positive abnormal Operating Performance in excess of smaller buyout targets
- 

#### **Hypothesis III**

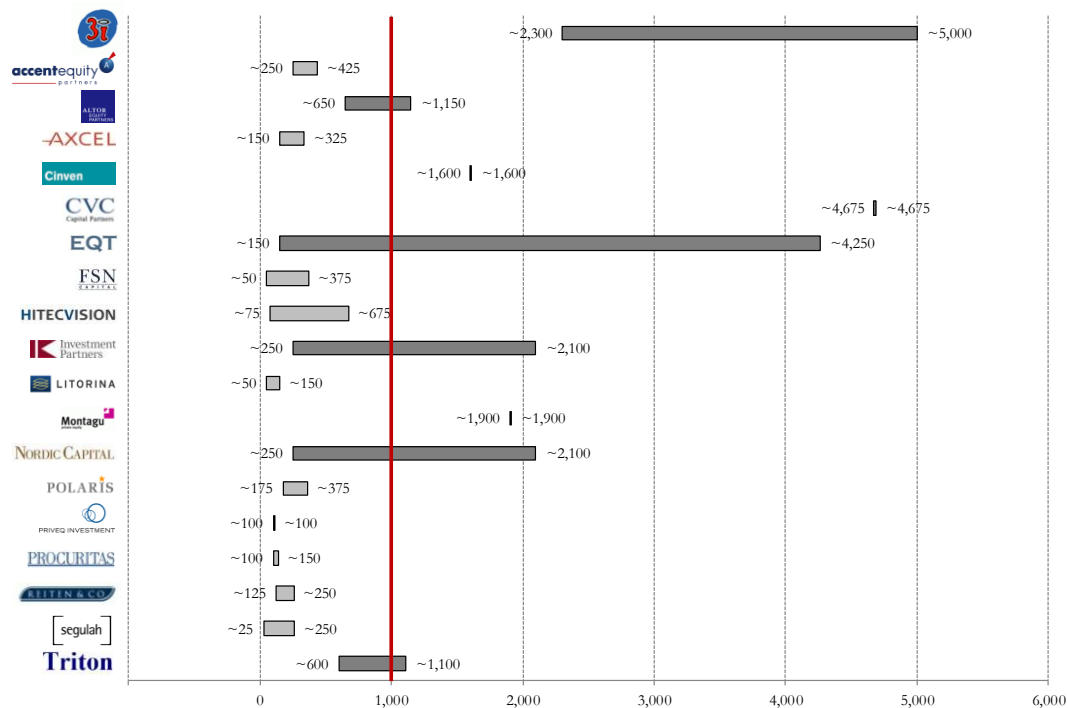
- (a) Buyout targets will in general exhibit directionally negative abnormal Capital Spending
- (b) Buyout targets will in general, irrespective of size, exhibit directionally negative abnormal Capital Spending
- (c) Larger buyout targets will in general exhibit directionally negative abnormal Capital Spending in excess of smaller buyout targets

**Exhibit 2. Descriptive Statistics**

| Performance Metric | No. of<br>Observations | Mean    | Median  | Standard<br>Deviation | 95 Percent<br>Confidence Interval |        |
|--------------------|------------------------|---------|---------|-----------------------|-----------------------------------|--------|
| Revenues           |                        |         |         |                       |                                   |        |
| Full Sample        | 195                    | 12.44%  | 6.27%   | 32.93%                | 7.79%                             | 17.09% |
| Large              | 50                     | 14.34%  | 5.67%   | 34.82%                | 4.45%                             | 24.24% |
| Sub-Large          | 145                    | 11.79%  | 6.27%   | 32.36%                | 6.48%                             | 17.10% |
| EBITDA             |                        |         |         |                       |                                   |        |
| Full Sample        | 195                    | 2.73%   | 1.86%   | 11.06%                | 1.17%                             | 4.29%  |
| Large              | 49                     | 3.72%   | 2.51%   | 13.09%                | (0.04%)                           | 7.48%  |
| Sub-Large          | 146                    | 2.40%   | 1.48%   | 10.32%                | 0.71%                             | 4.09%  |
| EBIT               |                        |         |         |                       |                                   |        |
| Full Sample        | 195                    | 3.06%   | 2.81%   | 11.36%                | 1.46%                             | 4.66%  |
| Large              | 49                     | 5.65%   | 4.28%   | 13.17%                | 1.86%                             | 9.43%  |
| Sub-Large          | 146                    | 2.19%   | 1.59%   | 10.59%                | 0.46%                             | 3.93%  |
| ROA                |                        |         |         |                       |                                   |        |
| Full Sample        | 195                    | 2.80%   | 2.62%   | 14.06%                | 0.82%                             | 4.79%  |
| Large              | 50                     | 6.06%   | 4.85%   | 14.10%                | 2.06%                             | 10.07% |
| Sub-Large          | 145                    | 1.68%   | 2.26%   | 13.92%                | (0.61%)                           | 3.96%  |
| D&A                |                        |         |         |                       |                                   |        |
| Full Sample        | 195                    | (0.29%) | 0.23%   | 5.06%                 | (1.00%)                           | 0.43%  |
| Large              | 47                     | (1.29%) | (1.14%) | 4.54%                 | (2.62%)                           | 0.04%  |
| Sub-Large          | 148                    | 0.03%   | 0.37%   | 5.19%                 | (0.81%)                           | 0.87%  |

**Note:** Descriptives refer to Abnormal (i.e. peer-adjusted) Performance Metrics, trimmed data sample  
Please recognise that EBITDA, EBIT and D&A are all scaled by Revenues as defined in the Methodology section

### Exhibit 3. PE Fund Overview: Fund-Level Committed Capital (EURmn)



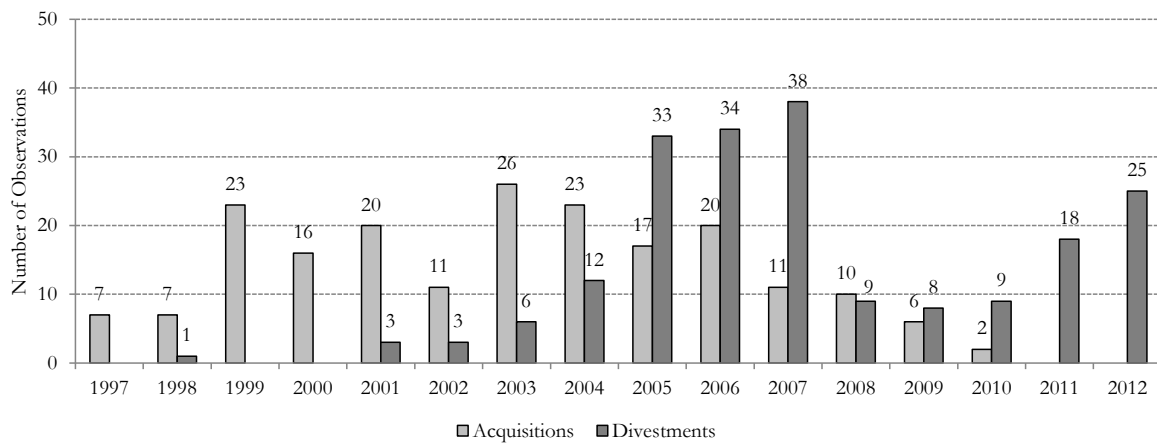
**Note:** The exhibit portrays the ranges of fund sizes, from smallest to largest, for each of the PE firms, those for which such detailed data has been readily available, associated with buyout targets included in the data sample

Fund range for Accent Equity does not include fund(s) pre-2003

AAC Capital Partners, Advent International, Altaria, Amplico Kapital, Apax Partners, Bridgepoint, CapMan, Catella Investments, Eqvitec Partners, Ferd, Gilde Investment Management, Investcorp SA, Norgesinvestor, Norvestor, Ratos, Silverfleet Capital, Traction, Verdane Capital and Vision Capital are not included in the table given lack of detailed fund size data, however sufficient data on fund sizes has been retrieved to be able to classify the corresponding buyout targets in terms of size category

Exchange rates are converted using average rates during the year of fund establishment, sourced from OANDA.com

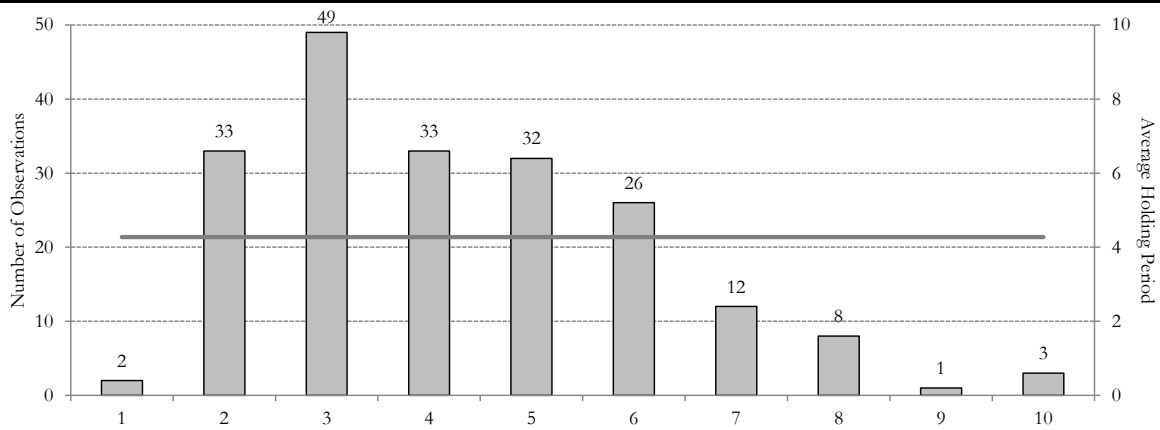
#### Exhibit 4. Sample Distribution: Acquisition and Divestment Years



**Note:** Refers to Raw data sample

Acquisition years as defined in the Data section, Divestment years as defined in the Data section barring the one-year adjustment

### Exhibit 5. Sample Distribution: Holding Periods

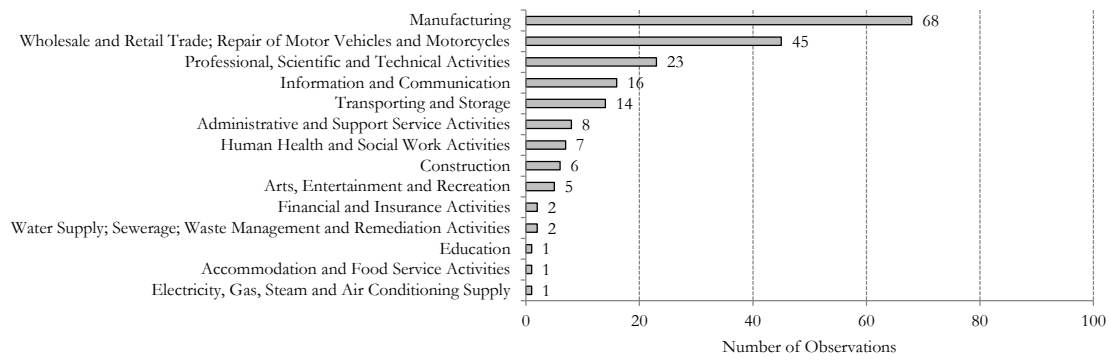


**Note:** Refers to Raw data sample

Acquisition years as defined in the Data section, Divestment years as defined in the Data section barring the one-year adjustment

## Exhibit 6. Sample Distribution: Industry Classification

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**Note:** Refers to Raw data sample



**Exhibit 7. Median Change in Performance Metrics for Buyout Targets, Peer Groups and the Peer-Adjusted Buyout Targets**

| Performance Metric | Number of Observations | Buyout Targets       | Peer Groups          | Peer-Adjusted Buyout Targets <sup>1)</sup> |
|--------------------|------------------------|----------------------|----------------------|--|
| <b>Revenues</b>    | 195                    | 12.34%****<br>[0.00] | 6.37%****<br>[0.00]  | 6.27%****<br>[0.00]                        |
| <b>EBITDA</b>      | 195                    | 1.21%****<br>[0.00]  | (0.34%)**<br>[0.09]  | 1.86%****<br>[0.00]                        |
| <b>EBIT</b>        | 195                    | 1.96%****<br>[0.00]  | (0.39%)***<br>[0.01] | 2.81%****<br>[0.00]                        |
| <b>ROA</b>         | 195                    | 2.93%****<br>[0.00]  | (0.33%)***<br>[0.04] | 2.62%****<br>[0.00]                        |
| <b>D&amp;A</b>     | 195                    | (0.11%)<br>[0.25]    | (0.19%)<br>[0.77]    | 0.23%<br>[0.88]                            |

1) Given the trimming of observations in each individual sample (i.e. 'Buyout Targets', 'Peer Groups', 'Peer-Adjusted Buyout Targets') and the calculating of medians on each individual sample, the differences between the terms 'Buyout Targets' and 'Peer Groups' do not equal the median of the sample denoted 'Peer-Adjusted Buyout Targets'. Please recognise that 'Peer-Adjusted Buyout Targets' refers to the aggregation of each individual matched difference between each buyout target and its corresponding peer group

**Note:** Refers to trimmed data sample

The significance levels refer to two-sided Wilcoxon signed-rank tests of whether the median values are different from zero, where significance levels of 15 percent (\*), ten percent (\*\*), five percent (\*\*\*) and one percent (\*\*\*\*) along with p-values ([ ]) are highlighted

Please recognise that EBITDA, EBIT and D&A are all scaled by Revenues as defined in the Methodology section

**Exhibit 8. Median Change in Performance Metrics for Buyout Targets, Peer Groups and the Peer-Adjusted Buyout Targets Segmented by Size Category**

| Performance Metric | Number of Observations <sup>(1)</sup> | Buyout Targets       | Peer Groups         | Peer-Adjusted Buyout Targets <sup>(2)</sup> |
|--------------------|---------------------------------------|----------------------|---------------------|---|
| <b>Revenues</b>    |                                       |                      |                     |   |
| Large              | 50                                    | 14.83%****<br>[0.00] | 8.16%****<br>[0.00] | 5.67%****<br>[0.01]                         |
| Sub-Large          | 145                                   | 11.35%****<br>[0.00] | 5.99%****<br>[0.00] | 6.27%****<br>[0.00]                         |
| <b>EBITDA</b>      |                                       |                      |                     |   |
| Large              | 49                                    | 1.52%****<br>[0.00]  | 0.17%<br>[0.84]     | 2.51%***<br>[0.02]                          |
| Sub-Large          | 146                                   | 0.71%**<br>[0.06]    | (0.52%)**<br>[0.06] | 1.48%****<br>[0.01]                         |
| <b>EBIT</b>        |                                       |                      |                     |   |
| Large              | 49                                    | 3.74%****<br>[0.00]  | (0.55%)*<br>[0.01]  | 4.28%****<br>[0.00]                         |
| Sub-Large          | 146                                   | 1.61%***<br>[0.03]   | (0.22%)*<br>[0.14]  | 1.59%***<br>[0.02]                          |
| <b>ROA</b>         |                                       |                      |                     |   |
| Large              | 50                                    | 3.64%****<br>[0.00]  | (0.45%)*<br>[0.15]  | 4.85%****<br>[0.00]                         |
| Sub-Large          | 145                                   | 2.35%***<br>[0.02]   | (0.23%)*<br>[0.13]  | 2.26%****<br>[0.01]                         |
| <b>D&amp;A</b>     |                                       |                      |                     |   |
| Large              | 47                                    | (0.45%)*<br>[0.01]   | 0.60%<br>[0.19]     | (1.14%)*<br>[0.06]                          |
| Sub-Large          | 148                                   | (0.04%)<br>[0.83]    | (0.42%)<br>[0.18]   | 0.37%<br>[0.32]                             |

1) Refers to the number of observations in the 'Peer-Adjusted Buyout Targets' sample

2) Given the trimming of observations in each individual sample (i.e. 'Buyout Targets', 'Peer Groups', 'Peer-Adjusted Buyout Targets') and the calculating of medians on each individual sample, the differences between the terms 'Buyout Targets' and 'Peer Groups' do not equal the median of the sample denoted 'Peer-Adjusted Buyout Targets'

Please recognise that 'Peer-Adjusted Buyout Targets' refers to the aggregation of each individual matched difference between each buyout target and its corresponding peer group

**Note:** Refers to trimmed data sample

The significance levels refer to two-sided Wilcoxon signed-rank tests of whether the median values are different from zero, where significance levels of 15 percent (\*), ten percent (\*\*), five percent (\*\*\*) and one percent (\*\*\*\*) along with p-values ([ ]) are highlighted

Please recognise that EBITDA, EBIT and D&A are all scaled by Revenues as defined in the Methodology section

**Exhibit 9. Abnormal Growth: Test of Inter-Group Differences**

| Performance Metric | Number of<br>Observations | Mean Rank | z-Statistic | P( Z  >  z ) |
|--------------------|---------------------------|-----------|-------------|--------------|
| <b>Revenues</b>    |                           |           |             |              |
| Large              | 50                        | 99 [98]   |             |              |
| Sub-Large          | 145                       | 98 [98]   |             |              |
| <b>Total</b>       | <b>195</b>                |           | <b>0.17</b> | <b>0.86</b>  |

**Note:** Refers to trimmed data sample

[ ] Refers to expected rank

The significance levels refer to two-sided Mann-Whitney U tests of whether the two populations are equal, where significance levels of 15 percent (\*), ten percent (\*\*), five percent (\*\*\*) and one percent (\*\*\*\*) are highlighted

**Exhibit 10. Abnormal Operating Performance: Tests of Inter-Group Differences**

| Performance Metric | Number of Observations | Mean Rank | z-Statistic | P( Z  >  z )   |
|--------------------|------------------------|-----------|-------------|----------------|
| <b>EBITDA</b>      |                        |           |             |                |
| Large              | 49                     | 103 [98]  |             |                |
| Sub-Large          | 146                    | 96 [98]   |             |                |
| <b>Total</b>       | <b>195</b>             |           | <b>0.71</b> | <b>0.48</b>    |
| <b>EBIT</b>        |                        |           |             |                |
| Large              | 49                     | 113 [98]  |             |                |
| Sub-Large          | 146                    | 93 [98]   |             |                |
| <b>Total</b>       | <b>195</b>             |           | <b>2.13</b> | <b>0.03***</b> |
| <b>ROA</b>         |                        |           |             |                |
| Large              | 50                     | 109 [98]  |             |                |
| Sub-Large          | 145                    | 94 [98]   |             |                |
| <b>Total</b>       | <b>195</b>             |           | <b>1.56</b> | <b>0.12*</b>   |

**Note:** Refers to trimmed data sample

[ ] Refers to expected rank

The significance levels refer to two-sided Mann-Whitney U tests of whether the two populations are equal, where significance levels of 15 percent (\*), ten percent (\*\*), five percent (\*\*\*) and one percent (\*\*\*\*) are highlighted. Please recognise that EBITDA and EBIT are both scaled by Revenues as defined in the Methodology section.

**Exhibit 11. Abnormal Capital Spending: Test of Inter-Group Differences**

| Performance Metric | Number of<br>Observations | Mean Rank | z-Statistic   | P( Z  >  z )   |
|--------------------|---------------------------|-----------|---------------|----------------|
| <b>D&amp;A</b>     |                           |           |               |                |
| Large              | 47                        | 82 [98]   |               |                |
| Sub-Large          | 148                       | 103 [98]  |               |                |
| <b>Total</b>       | <b>195</b>                |           | <b>(2.24)</b> | <b>0.03***</b> |

**Note:** Refers to trimmed data sample

[ ] Refers to expected rank

The significance levels refer to two-sided Mann-Whitney U tests of whether the two populations are equal, where significance levels of 15 percent (\*), ten percent (\*\*), five percent (\*\*\*) and one percent (\*\*\*\*) are highlighted

Please recognise that D&A is scaled by Revenues as defined in the Methodology section

## Exhibit 12. Sample Observations

| Buyout Firm               | Country | PE Firm                | Size Category |
|---------------------------|---------|------------------------|---------------|
| Acando Consulting         | Sweden  | Accent Equity          | Sub-Large     |
| Actic Sverige             | Sweden  | FSN Capital            | Sub-Large     |
| Adixen Sensor             | Sweden  | Litorina               | Sub-Large     |
| Ahlsell Sverige           | Sweden  | Nordic Capital         | Large         |
| Aleris                    | Sweden  | EQT                    | Large         |
| Alfa Laval                | Sweden  | IK Investment Partners | Large         |
| Alignment Systems         | Sweden  | FSN Capital            | Sub-Large     |
| Alimak Hek                | Sweden  | 3i Group               | Large         |
| Annas Pepparkakor         | Sweden  | Accent Equity          | Sub-Large     |
| Anticimex                 | Sweden  | Nordic Capital         | Sub-Large     |
| Anticimex                 | Sweden  | Ratos                  | Large         |
| AP&T                      | Sweden  | Amplico Kapital        | Sub-Large     |
| APL                       | Norway  | HitecVision            | Sub-Large     |
| Arca Systems              | Sweden  | IK Investment Partners | Large         |
| Ariterm                   | Sweden  | Procuritas Partners    | Sub-Large     |
| Atea Holding              | Sweden  | 3i Group               | Large         |
| Atos Medical              | Sweden  | Nordic Capital         | Large         |
| Attendo                   | Sweden  | Bridgepoint            | Large         |
| Aura Industrier           | Sweden  | Bridgepoint            | Sub-Large     |
| Avitec                    | Sweden  | 3i Group               | Large         |
| Axenti Holding            | Sweden  | Procuritas Partners    | Sub-Large     |
| Ballingslöv International | Sweden  | EQT                    | Sub-Large     |
| Basefarm                  | Norway  | Reiten & Co            | Sub-Large     |
| Bergsala                  | Sweden  | Amplico Kapital        | Sub-Large     |
| Bergteamet                | Sweden  | Accent Equity          | Sub-Large     |
| Bewator                   | Sweden  | EQT                    | Sub-Large     |
| Biovitrum                 | Sweden  | Nordic Capital         | Sub-Large     |
| BlueCom                   | Norway  | Norgesinvestor         | Sub-Large     |
| Bluegarden                | Norway  | Ratos                  | Large         |
| BMH Marine                | Sweden  | Catella Investments    | Sub-Large     |
| Bodilsen                  | Denmark | EQT                    | Sub-Large     |
| Bravida Sverige           | Sweden  | Procuritas Partners    | Sub-Large     |
| C More Group              | Sweden  | Nordic Capital         | Sub-Large     |
| Callenberg Group          | Sweden  | Segulah                | Sub-Large     |
| Carema                    | Sweden  | 3i Group               | Large         |
| Carpark                   | Sweden  | Bridgepoint            | Sub-Large     |
| CC System                 | Sweden  | Priveq Investment      | Sub-Large     |
| Cefar Medical             | Sweden  | Accent Equity          | Sub-Large     |
| Cerbo Group               | Sweden  | Vision Capital         | Sub-Large     |
| Cermaq                    | Norway  | Norgesinvestor         | Sub-Large     |
| Collett Pharma            | Norway  | Ferd                   | Sub-Large     |
| Com Hem                   | Sweden  | EQT                    | Large         |
| Computas                  | Norway  | Eqvitec Partners       | Sub-Large     |
| Contex Holding            | Denmark | Ratos                  | Large         |
| Coor Service Management   | Sweden  | 3i Group               | Large         |
| Coromatic Group           | Sweden  | Litorina               | Sub-Large     |
| Crem International        | Sweden  | Accent Equity          | Sub-Large     |
| CTEK Sweden               | Sweden  | FSN Capital            | Sub-Large     |
| CyberCity                 | Denmark | Advent International   | Large         |
| Dackia Corporation        | Sweden  | Procuritas Partners    | Sub-Large     |
| Dahl International        | Sweden  | EQT                    | Sub-Large     |
| Dako                      | Denmark | EQT                    | Large         |
| Damcos                    | Denmark | 3i Group               | Large         |
| Dansk Droge               | Denmark | Polaris Private Equity | Sub-Large     |
| Dometic International     | Sweden  | EQT                    | Large         |
| DT Group                  | Denmark | CVC Capital Partners   | Large         |
| Dynal Biotech             | Norway  | Ratos                  | Large         |
| Dynapac                   | Sweden  | Altor Equity Partners  | Sub-Large     |
| Dyno Nobel                | Norway  | IK Investment Partners | Large         |
| Eldon                     | Sweden  | EQT                    | Sub-Large     |

**Note:** PE firm refers to lead investor  
Size category refers to EUR 1bn threshold

**Exhibit 12. Sample Observations: Cont'd**

| <b>Firm</b>                 | <b>Country</b> | <b>PE Fund</b>         | <b>Size Category</b> |
|-----------------------------|----------------|------------------------|----------------------|
| Elektrokoppar Svenska       | Sweden         | IK Investment Partners | Sub-Large            |
| ELFA                        | Sweden         | IK Investment Partners | Sub-Large            |
| Elitfönster                 | Sweden         | Triton Partners        | Sub-Large            |
| Ellipse Klinikken           | Norway         | Reiten & Co            | Sub-Large            |
| Eltel Networks              | Sweden         | IK Investment Partners | Large                |
| Emotron                     | Sweden         | Polaris Private Equity | Sub-Large            |
| Envac Centralsug            | Sweden         | Ratos                  | Large                |
| Epax                        | Norway         | Ferd                   | Sub-Large            |
| eTRAVELi                    | Norway         | Norvestor              | Sub-Large            |
| Euroflorist                 | Sweden         | Accent Equity          | Sub-Large            |
| Eurosilt                    | Norway         | Verdane Capital        | Sub-Large            |
| Exotic Snacks               | Sweden         | Segulah                | Sub-Large            |
| Falck                       | Denmark        | Nordic Capital         | Large                |
| Findus                      | Sweden         | EQT                    | Sub-Large            |
| Fiskarhedenvillan           | Sweden         | Polaris Private Equity | Sub-Large            |
| FlexLink                    | Sweden         | AAC Capital Partners   | Sub-Large            |
| Frigoscandia Distribution   | Sweden         | Triton Partners        | Sub-Large            |
| Frösunda                    | Sweden         | Polaris Private Equity | Sub-Large            |
| Gambro                      | Sweden         | EQT                    | Large                |
| Gant                        | Sweden         | 3i Group               | Large                |
| Global Garden Products      | Sweden         | AAC Capital Partners   | Sub-Large            |
| Global Refund               | Sweden         | Apax Partners          | Large                |
| Grycksbo                    | Sweden         | Accent Equity          | Sub-Large            |
| Guide Konsult               | Sweden         | Nordic Capital         | Sub-Large            |
| Haglöfs                     | Sweden         | Ratos                  | Large                |
| Helly Hansen                | Norway         | Altor Equity Partners  | Large                |
| HemoCue                     | Sweden         | EQT                    | Sub-Large            |
| Hemtex                      | Sweden         | Priveq Investment      | Sub-Large            |
| Hilding Anders              | Sweden         | Investcorp SA          | Large                |
| HMS Industrial Networks     | Sweden         | Segulah                | Sub-Large            |
| Häggelunds Drives           | Sweden         | Ratos                  | Large                |
| Ioopal                      | Denmark        | Axcel                  | Sub-Large            |
| Ilva                        | Denmark        | Advent International   | Large                |
| Inflight Service            | Sweden         | CapMan                 | Sub-Large            |
| INR                         | Sweden         | Accent Equity          | Sub-Large            |
| Intrum Justitia             | Sweden         | IK Investment Partners | Sub-Large            |
| Isaberg rapid               | Sweden         | Segulah                | Sub-Large            |
| ISS                         | Denmark        | EQT                    | Large                |
| IVT Industrier              | Sweden         | AAC Capital Partners   | Sub-Large            |
| Jarowskij Enterprises       | Sweden         | Amplico Kapital        | Sub-Large            |
| Jetpak                      | Sweden         | Polaris Private Equity | Sub-Large            |
| JH Tidbeck                  | Sweden         | Procuritas Partners    | Sub-Large            |
| Jotul                       | Norway         | Accent Equity          | Sub-Large            |
| Joy Shop                    | Sweden         | Segulah                | Sub-Large            |
| KappAhl                     | Sweden         | Nordic Capital         | Large                |
| Karlssons Varuhus           | Sweden         | Amplico Kapital        | Sub-Large            |
| Kid interiör                | Norway         | IK Investment Partners | Sub-Large            |
| Kilroy Travel International | Denmark        | Axcel                  | Sub-Large            |
| KMD                         | Denmark        | EQT                    | Large                |
| Kongsberg Automotive        | Norway         | IK Investment Partners | Sub-Large            |
| Kongsberg Automotive        | Norway         | FSN Capital            | Sub-Large            |
| Kosan Crisplant             | Denmark        | Segulah                | Sub-Large            |
| Lekolar                     | Sweden         | Procuritas Partners    | Sub-Large            |
| LensOn                      | Sweden         | Verdane Capital        | Sub-Large            |
| LGT Logistics               | Sweden         | Litorina               | Sub-Large            |
| Lindab                      | Sweden         | Ratos                  | Large                |
| Louis-Poulsen               | Denmark        | Polaris Private Equity | Sub-Large            |
| Lundhags                    | Sweden         | EQT                    | Sub-Large            |
| Macgregor                   | Sweden         | IK Investment Partners | Sub-Large            |
| Modul-System                | Sweden         | Segulah                | Sub-Large            |

**Note:** PE firm refers to lead investor  
Size category refers to EUR 1bn threshold

**Exhibit 12. Sample Observations: Cont'd**

| <b>Firm</b>                             | <b>Country</b> | <b>PE Fund</b>              | <b>Size Category</b> |
|---|----------------|-----------------------------|----------------------|
| Multicom Security                       | Sweden         | IK Investment Partners      | Large                |
| Myresjöhus                              | Sweden         | IK Investment Partners      | Sub-Large            |
| Mölnlycke Health Care                   | Sweden         | Nordic Capital              | Sub-Large            |
| Naxys                                   | Norway         | HitecVision                 | Sub-Large            |
| Nederman                                | Sweden         | EQT                         | Sub-Large            |
| Nexus Marine                            | Sweden         | Amplico Kapital             | Sub-Large            |
| Nicator                                 | Sweden         | AAC Capital Partners        | Sub-Large            |
| Nimbus                                  | Sweden         | Altor Equity Partners       | Sub-Large            |
| Nobia                                   | Sweden         | IK Investment Partners      | Sub-Large            |
| Nopco Paper Technology                  | Norway         | Nordic Capital              | Sub-Large            |
| Norfoods                                | Sweden         | Segulah                     | Sub-Large            |
| Norlandia Care                          | Norway         | FSN Capital                 | Sub-Large            |
| Norse cutting & abandonment             | Norway         | HitecVision                 | Sub-Large            |
| NVS Installation                        | Sweden         | Segulah                     | Sub-Large            |
| NVS Installation                        | Sweden         | Triton Partners             | Large                |
| Nybron Flooring                         | Sweden         | Nordic Capital              | Sub-Large            |
| Närkes Elektriska                       | Sweden         | Segulah                     | Sub-Large            |
| Ordning & Reda Paper & Design           | Sweden         | Segulah                     | Sub-Large            |
| Oriflame                                | Sweden         | IK Investment Partners      | Sub-Large            |
| Orrefors Kosta Boda                     | Sweden         | EQT                         | Sub-Large            |
| Pahlén                                  | Sweden         | Litorina                    | Sub-Large            |
| Phadia                                  | Sweden         | Silverfleet Capital         | Sub-Large            |
| Plantasjen                              | Norway         | EQT                         | Large                |
| Plastal Sweden                          | Sweden         | Gilde Investment Management | Sub-Large            |
| Point International                     | Sweden         | Nordic Capital              | Large                |
| Powel                                   | Norway         | Norvestor                   | Sub-Large            |
| Previa                                  | Sweden         | Segulah                     | Sub-Large            |
| Pysslingen Forskolor och Skolor         | Sweden         | Polaris Private Equity      | Sub-Large            |
| Q-Matic                                 | Sweden         | 3i Group                    | Large                |
| Relacom                                 | Sweden         | Altor Equity Partners       | Sub-Large            |
| RenoNorden                              | Norway         | Norvestor                   | Sub-Large            |
| Reslink                                 | Norway         | Verdane Capital             | Sub-Large            |
| RGS 90                                  | Denmark        | CapMan                      | Sub-Large            |
| S.A.T.S.                                | Sweden         | Nordic Capital              | Sub-Large            |
| Sandå Måleri                            | Sweden         | Procuritas Partners         | Sub-Large            |
| SBL Vaccin                              | Denmark        | 3i Group                    | Large                |
| SCAN Geophysical                        | Norway         | Norvestor                   | Sub-Large            |
| Scandpower Petroleum Technology Holding | Norway         | HitecVision                 | Sub-Large            |
| Scribona                                | Sweden         | Norvestor                   | Sub-Large            |
| Securitas Direct                        | Sweden         | EQT                         | Large                |
| Semantix                                | Sweden         | Accent Equity               | Sub-Large            |
| Semper                                  | Sweden         | Triton Partners             | Sub-Large            |
| Skamol                                  | Denmark        | Polaris Private Equity      | Sub-Large            |
| Skandinavisk Kommunalteknik             | Sweden         | Segulah                     | Sub-Large            |
| Sonans                                  | Norway         | Norvestor                   | Sub-Large            |
| Sonion                                  | Denmark        | Nordic Capital              | Sub-Large            |
| Spring Consulting                       | Norway         | Verdane Capital             | Sub-Large            |
| SPT Group                               | Norway         | Altor Equity Partners       | Large                |
| Stenqvist                               | Sweden         | EQT                         | Sub-Large            |
| Stenqvist                               | Sweden         | Triton Partners             | Sub-Large            |
| Stofa                                   | Denmark        | Ratos                       | Large                |
| Struers                                 | Denmark        | EQT                         | Sub-Large            |
| Swedish Satellite Systems               | Sweden         | Litorina                    | Sub-Large            |
| Swedish Tool                            | Sweden         | Traction                    | Sub-Large            |
| Sven-Axel Svensson Bijouterier          | Sweden         | Accent Equity               | Sub-Large            |
| Svenska Fönster                         | Sweden         | Axcel                       | Sub-Large            |
| Synerco                                 | Sweden         | CapMan                      | Sub-Large            |
| Synnøve Finden                          | Norway         | Norvestor                   | Sub-Large            |
| TA Teleadress Information Holding       | Sweden         | IK Investment Partners      | Large                |
| Tampnet                                 | Norway         | HitecVision                 | Sub-Large            |

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**Exhibit 12. Sample Observations: Cont'd**

| <b>Firm</b>           | <b>Country</b> | <b>PE Fund</b>         | <b>Size Category</b> |
|-----------------------|----------------|------------------------|----------------------|
| TeamTec               | Norway         | Verdane Capital        | Sub-Large            |
| Telelogic             | Sweden         | Ratos                  | Large                |
| Thalamus Networks     | Sweden         | Traction               | Sub-Large            |
| Thule                 | Sweden         | EQT                    | Sub-Large            |
| TusenFryd             | Norway         | Verdane Capital        | Sub-Large            |
| Wedins                | Sweden         | Accent Equity          | Sub-Large            |
| Welltec               | Denmark        | Eqvitec Partners       | Sub-Large            |
| Wermland Paper        | Sweden         | Procuritas Partners    | Sub-Large            |
| Wernersson Ost        | Sweden         | Accent Equity          | Sub-Large            |
| West Fish Aarsæther   | Norway         | Verdane Capital        | Sub-Large            |
| Vest-Wood             | Denmark        | Axcel                  | Sub-Large            |
| Vetxx                 | Denmark        | Montagu Private Equity | Large                |
| Via Travel Group      | Norway         | FSN Capital            | Sub-Large            |
| Via Travel Group      | Norway         | Norgesinvestor         | Sub-Large            |
| Victor Hasselblad     | Sweden         | Cinven                 | Large                |
| Videokonferensbolaget | Sweden         | Norgesinvestor         | Sub-Large            |
| Wonderland            | Norway         | Altaria                | Sub-Large            |
| Voss of Norway        | Norway         | Verdane Capital        | Sub-Large            |
| VSM Group             | Sweden         | IK Investment Partners | Sub-Large            |

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