Operational performance of Nordic private equity backed buyouts in the recession of 2007-2009

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PURPOSE OF THE STUDY

While buyouts in the 1980s have been shown to improve operational performance of companies significantly, more recent studies have found little evidence of improved operational performance. However, due to limited scope in previous studies, understanding on how performance varies across transaction types, time periods, and geographies is limited. Moreover, buyout research lacks knowledge on how the companies acquired in the latest buyout boom have weathered the subsequent downturn. This thesis contributes to the existing literature by studying the operational impact of a comprehensive sample of Nordic private equity backed buyouts in the recession of 2007-2009. Unlike previous studies, I provide evidence on both private-to-private and public-to-private transactions.

DATA

I study 144 companies domiciled in Sweden, Finland, Norway, and Denmark acquired by a private equity fund within the time period from 1.1.2005 to 30.6.2007. I combine a hand-collected deal characteristics data from M&A databases and news articles to accounting data to create a novel dataset that allows for comparison of various operational measures in 2007-2009 across deal types and geographies. I benchmark the performance measures against an industry- and size-matched peer group.

RESULTS

My findings support the hypothesis on private equity model's ability to create economic value also in tough economic conditions. Private equity backed companies have outperformed their peers in terms of profitability and working capital efficiency. While employee productivity increases relative to benchmark, I find no significant difference in wage or employment development after the buyout. Decreasing personnel costs in relation to sales and higher leverage are associated with greater abnormal profitability.

Performance varies significantly variation between deal types, suggesting different underlying motivations for alternative types of buyouts. Swedish and Norwegian buyouts have performed clearly better than Finnish and Danish buyouts.

KEYWORDS

Private equity, leveraged buyouts

PÄÄOMASIJOITTAJIEN OMISTAMIEN POHJOISMAISTEN YRITYSTEN OPERATIONAALINEN TEHOKKUUS VUOSIEN 2007-2009 TAANTUMASSA

TUTKIELMAN TAVOITTEET

Aikaisemmat tutkimukset ovat osoittaneet 1980-luvun velkarahoitteisten yritysostojen parantaneen yritysten operationaalista tehokkuutta. Viimeaikaiset tutkimukset eivät kuitenkaan ole löytäneet merkittävää menestyseroa. Ymmärrys tehokkuuseroista transaktiotyyppien, ajanjaksojen ja maantieteellisten alueiden välillä on kuitenkin olematonta aikaisempien tutkimusten kapea-alaisuuden takia. Aikaisempi tutkimus ei myöskään käsittele sitä, miten viimeisimmässä korkeasuhdanteessa tehdyt transaktiot ovat pärjänneet viime vuosien taantumassa. Tämä tutkielma laajentaa aikaisempaa kirjallisuutta tutkimalla miten pääomasijoittajien pohjoismaissa tekemät yritysostot ovat vaikuttaneet operatiiviseen tehokkuuteen vuosien 2007–2009 taantumassa. Aikaisemmista tutkimuksista poiketen, aineistoni käsittää niin julkisten kuin yksityisten yritysten ostot.

LÄHDEAINEISTO

Tutkimusaineisto käsittää 144 Ruotsalaista, Suomalaista, Norjalaista ja Tanskalaista yritystä, jotka pääomasijoittaja on ostanut aikavälillä 1.1.2005–30.6.2007. Aineisto sisältää yrityskauppatietokannoista ja uutisista käsin kootut transaktio-kohtaiset tarkat tiedot, sekä yritysten tilinpäätökset. Lopullinen aineisto mahdollistaa operationaalisen tehokkuuden vertailun transaktiotyyppien ja maiden välillä vuosina 2007–2009. Yrityskohtaisia tehokkuusmittareita vertaillaan toimialan ja koon perusteella koottuihin verrokkiryhmiin.

TULOKSET

Tulokset osoittavat, että pääomasijoittajat ovat pystyneet luomaan arvoa myös matalasuhdanteessa. Pääomasijoittajien omistuksessa olleet yritykset ovat pärjänneet paremmin kannattavuudessa ja käyttöpääoman tehokkuudessa. Työntekijöiden tuottavuus ilman että työntekijöiden palkoissa tai määrissä on tilastollisesti merkittävää laskua suhteessa verrokkeihin. Laskeneilla henkilöstökustannuksilla suhteessa liikevaihtoon ja korkeammalla velkaantuneisuudella on ollut positiivinen yhteys suurempaan kannattavuuseroon verrokkiryhmään verrattuna.

Operationaalinen tehokkuus kuitenkin vaihtelee suuresti transaktiotyyppien välillä, mikä voi tarkoittaa taustalla vaikuttavien päämäärien olevan erilaisia näiden tyyppien välillä. Ruotsalaiset ja norjalaiset yrityskaupat ovat pärjänneet suomalaisia ja tanskalaisia selvästi paremmin.

AVAINSANAT

Pääomasijoittaminen, yritysostot, yrityskauppa

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1   Introduction

Leveraged buyouts first became a major phenomenon during the 1980s, when the soaring stock markets and cheap financing contributed to a series of high-profile buyout transactions. However, many of the transactions made in the late 1980s failed in the subsequent economic downturn, and it took nearly 15 years before the market revived to a new all-time high in the second leveraged buyout wave of the mid-2000s. Record amounts of capital were committed to private equity, and high-profile public-to-private transactions reappeared. Although the subsequent credit crisis froze the market again in 2008, the long-term trend shows that leveraged buyouts and private equity have become major factors in the financial markets.

Many of the studies since 1980s have found support for the ability of leveraged buyouts to enhance the operational performance of the companies and create economic value (Kaplan, 1989; Smith, 1990). Jensen (1989) argued that gains in operating performance are attributable to reduced agency costs through better governance and leverage. However, later studies have shown little (or no) evidence on performance gains (Acharya *et al.*, 2010; Guo *et al.*, 2011), potentially reflecting the adoption of better governance structures and incentive schemes in public corporations.

An open question in the buyout literature is how leveraged buyouts weather the recession. If the firms are able to better adjust in adverse shocks, the underlying operations can be in better shape than their peers. Jensen (1989) argues that high levels of debt forces early and intense response to negative shocks. Thus, high leverage entailed in buyout transactions could push portfolio companies to react more quickly to downturns, leading to better performance in adverse economic conditions than their less-levered peers. Andrade and Kaplan (1998) find that the net effect of LBO and distress after the 1980s wave was on average slightly positive.

Moreover, majority of the studies have been performed in the U.S. and U.K. markets, and are concentrated on public-to-private transactions for which data is more readily available. Thus, existing research lacks understanding of how performance varies across transaction types, time periods, and countries. Existing literature does not provide evidence on the subsequent operational performance of buyouts made in the most recent buyout boom, which is of paramount importance due to the huge number of transactions fuelled by overly optimistic credit markets at the time.

This thesis aims to fill this gap by studying a novel sample of Nordic private equity backed buyouts completed in the latest buyout boom. The aim is to answer whether private equity ownership model has had positive effect on economic value in the acquired companies in the recession of 2007-2009. I assess the magnitude and determinants of abnormal performance of various operating performance measures including profitability, working capital, and personnel ratios, and how they vary across deal types and countries. Further, by shedding light on how private equity backed companies have performed in the financial crisis I provide insights on the returns to private equity as an asset class in the Nordic countries over the next five years. No previous research exists that covers the entire homogenous Nordic buyout market or provides evidence on the differences between transaction types.

The data covers 144 companies domiciled in Sweden, Finland, Norway, and Denmark acquired within the time period from 1.1.2005 to 30.6.2007 with revenue over €15 million at the time of the acquisition. I combine a hand-collected deal characteristics data from various databases and news articles to accounting data to create a novel dataset that allows for comparison of performance in 2007-2009 across deal types and geographies. I find that companies acquired by private equity funds have had significantly better performance in terms of profitability, sales growth, and working capital relative to industry- and size-matched benchmark, although significant variation exists across deal types and countries. Multivariate regressions suggest that leverage and personnel costs in relation to sales may contribute to higher abnormal performance.

There are three important limitations that should be noted. First, the focus of this thesis is not to measure aggregate effect of private equity activity, but rather examine the average effect of private equity ownership in their portfolio companies. Secondly, the data does not cover the whole variety of buyouts, but only those conducted by professional private equity firms. Thirdly, for some of the identified buyout targets accounting data was unavailable for unknown reasons. The data availability and potential biases is further discussed in Chapter 5.

In the next chapter, I define the concepts and provide an introduction to the private equity business model, and relevant descriptive research. In Chapter 3, I present and discuss the theories of value creation and the empirical evidence on the impact of private equity and leveraged buyouts to the acquired companies. Chapter 4 specifies the hypotheses. In Chapter 5, I describe the data gathering process and discuss the methodological choices. Chapter 6 presents the results, and Chapter 7 concludes.

2 Private equity industry

This chapter presents the private equity model, including how a private equity is organized, how a typical transaction is structured, and the different players and their roles in the process, including related concepts and terminology.

2.1 Definitions

In the broadest sense, private equity can be defined as an asset class that consists of medium to long-term investments of equity or equity-related capital in companies that are usually not traded on a public stock exchange. Private equity can be divided into sub-classes based on investment strategies of the private equity firm that relate closely to stage of development of the company that receives the financing.

There are variations in how the terms buyouts, venture capital and growth equity is used. However, venture capital is commonly used in the case of financing of start-ups and other companies with limited revenue and high growth potential. Growth equity balances between buyouts and venture capital, and often involves minority investments in established companies needing additional cash to support high growth. In finance literature, private equity investments are typically divided into venture capital and leveraged buyouts. In this paper, I focus on the latter.

Leveraged buyout (LBO) refers to a transaction in which a company is acquired from its shareholders, typically with a relatively small amount of equity and relatively large amount of debt financing. In a typical LBO transaction, a private equity fund acquires majority ownership of a mature firm with relatively steady cash flows, which is the main distinction to venture capital.

Leveraged buyouts can be further divided to sub-classes based on the characteristics of the driving forces behind the transactions. Some studies make a distinction between insider driven management buyouts (MBOs) and outsider driven management buyins (MBIs). Some studies even separate these management-led buyouts from private equity sponsored institutional buyouts (IBOs). Similarly, deals could be classified as public-to-private transactions, which involve taking private a listed company, private-to-privates and divisional buyouts. Alternatively, some studies divide their sample based on whether a deal involves financial sponsor, i.e. is backed by a private equity fund or not.

However, the term LBO can be generally used to refer to leveraged buyout transactions made by private equity firms (Similar to Kaplan and Strömberg, 2009; Officer *et al.,* 2010). Where possible, I make the distinction between the different subclasses, but generally use the terms LBO and private equity sponsored deal interchangeably, and by private equity firms mean those firms that make leveraged buyouts.

2.2 Private equity model

This section presents the private equity model: how a private equity is organized, how a typical transaction is structured, and the different stakeholders and their roles.

2.2.1 Private equity firms

A private equity firm is an investment management company, usually organized as a partnership or limited liability corporation. Private equity firms establish investment funds that collect capital from investors, make investing decisions, and take active role in the strategic management of investee companies, typically called *portfolio companies.*

2.2.2 Private equity funds

Figure 1 illustrates a typical structure of a private equity fund. Funds are typically structured as limited partnerships in which the private equity firms act as General Partners (GPs) and manage the fund, and investors act as limited partners providing the majority of capital. Limited partners (LPs) typically include institutional investors such as banks, pension funds and insurance companies, funds-of-funds, wealthy individuals and family investment vehicles. (EVCA, 2007)

Figure 1 – A typical private equity fund structure
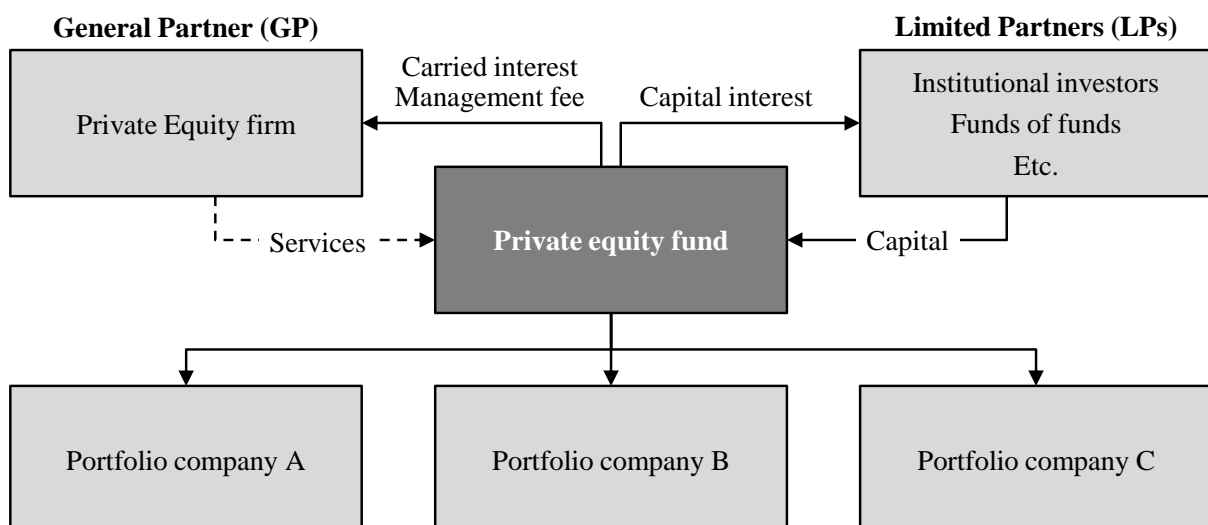
Private equity firms raise equity capital to a private equity fund in a process that usually takes up to one year. Funds are for the most part "closed-end" funds, meaning that after investors commit a certain amount of capital to the fund it cannot leave it before end of its life. Once the capital has been raised, general partners make investment decisions following the investment strategy defined in the covenants in the fund agreement. Typical covenants impose restrictions on how much fund capital can be invested in a single company, the types of securities, and debt at the fund level. (Metrick and Yasuda, 2010a; Strömberg, 2009)

A typical fund has a lifetime of ten years, which can be divided into two parts. First, the general partners have typically five years to invest the committed capital in new portfolio companies. The final five years are reserved for follow-on investments and the exiting of existing portfolio companies. The five-year period meant to return the capital to investors can be extended up to 8 years.

Over the investment period, *drawdowns*, or *capital calls*, are issued to limited partners when the private equity firm has identified an investment opportunity, requiring a portion of the limited partner's committed capital to be paid. The year of the first drawdown of the committed capital is known as the fund's *vintage year*. The cumulative amount of drawn down capital that has actually been invested into the fund's portfolio companies is referred to as *invested capital*.

Axelson *et al.* (2009) classify private equity transactions to three main forms. First, a single private equity firm might find a target and work on an exclusive basis with the potential seller, under an *exclusivity agreement*[1]. These deals are increasingly rare in case of large buyouts, but still exist particularly for small deals. The second, and most prominent type of transaction, involves multiple private equity firms competing for the target in an auction. In some large deals, groups of private equity funds might combine in *"club deals"* to limit exposure to a single company, often stipulated in the fund agreement covenants. The third class of transactions is public-to-private deals, where a fund targets a publicly listed company. These deals are by nature friendly tender offers, as the support of the management is required in order to perform a thorough due diligence on the target.

Figure 2 depicts how a typical private equity transaction is performed. The private equity firm will form a new holding company "NewCo" to bid for a stake in the target company. Private

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[1] In exclusivity agreement vendor may grant management a period of exclusivity during which time the vendor will not market the business to other potential buyers.

equity firms raise capital to this holding company, and invest the debt capital together with their equity to acquire the target company. Subsequently, the holding company is often merged with the target company to form the portfolio company.

Figure 2 – Structure of a typical private equity transaction
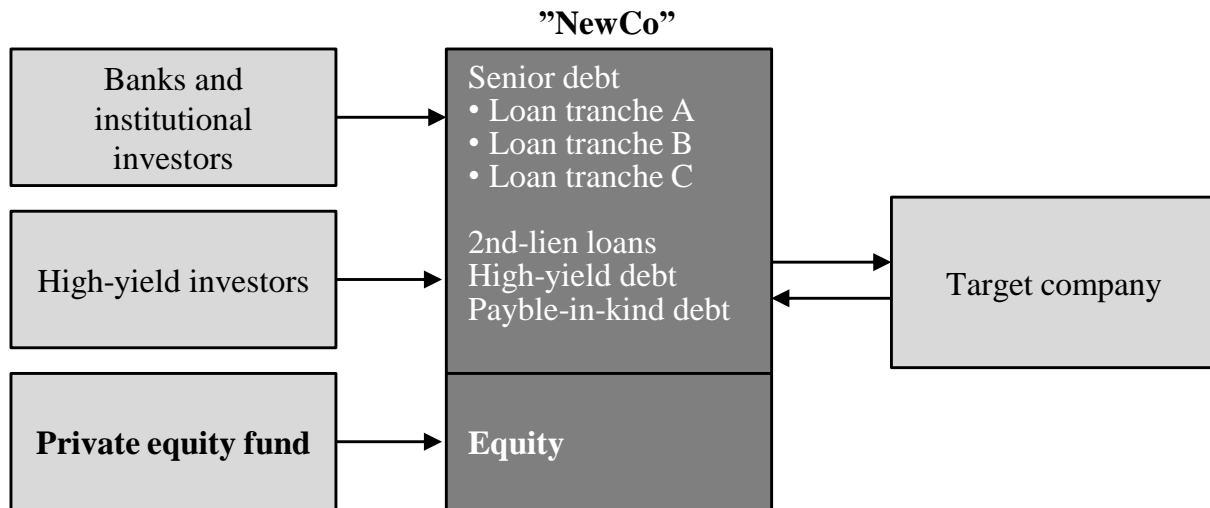
2.2.3 Compensation

Compensation structures of General Partners in a private equity funds can be divided into fixed and variable components, *management fee* being the sole fixed component, and the rest comprising performance based and various other variable fees. Metrick and Yasuda (2010b) provide a comprehensive review of compensation structures of 144 buyout funds raised between 1992 and 2006.

The fixed management fee can be assessed by four alternative methods (Metrick and Yasuda, 2010b). First, the historically most common method was a constant percentage of committed capital, the most common rate being 2%, amounting to a total of 20% of committed capital over the fund lifetime. Second, in more recent years, funds have adopted a decreasing fee structure, with the percentage falling after the initial five year investment period (e.g. 2% for the first five years, then falling 0.25% per year). Third alternative uses a constant rate but changes the basis from committed capital to *net invested capital* after five years. Finally, some funds use a combination of decreasing rate and a change from committed to net invested capital. Metrick and Yasuda (2010b) find that 84% of buyout funds switch to invested capital basis, 45% lower the fee level, and that 39% of buyout funds do both. As a result, they conclude that median present value of lifetime management fees is 10.3% percent of committed capital for buyout funds.

Variable fees can come in three forms: performance based *carried interest*, *transaction fees*, and *monitoring fees*. The first, carried interest, provides majority of expected variable revenue for successful buyout funds. The amount of carried interest a General Partner receives depends on four different concepts, defined in the fund agreement: *carry level, carry basis, carry hurdle,* and *carry timing*. The carry level refers to the percentage of profits (defined by the other three elements) GPs receive. Carry basis refers to the standard by which profits are measured. The carry hurdle refers to a level of returns that GP must exceed in order to gain any carried interest. Finally, carry timing refers to rules that govern the timing of carried interest distributions.

In their sample, Metrick and Yasuda (2010b) find that all 144 buyout funds use 20% carry level, which is almost always the case in the industry. For carry basis, 83% of the buyout funds use committed capital, and the rest investment capital. In the sample, 93% of buyout funds use a hurdle rate, with three quarters having set an 8% hurdle rate. However, the effect of hurdle return is affected by the fact that majority of funds have *catch-up* rate of 100%, meaning that after the hurdle rate has been reached, GPs get 100% of the incremental profits until carry level is reached, after which the profits are split according to the carry level. Thus, in a typical successful fund, GPs receive 20% of all profits despite the hurdle rate. The fourth element, carry timing, can vary significantly. Funds use a variety of rules to allow carried interest upon a profitable exit, thus realizing profits already before the end of fund life-cycle. However, LPs typically have ability to *"clawback"* these distributions if performance in later investments is insufficient.

The final typical variable fee components for buyout funds are *transaction fees* and *monitoring fees*. When a buyout fund buys or sells a company, they charge a transaction fee similar to the M&A advisory fee. However, GPs do not get the full benefit of these fees, as about 80% of fund agreements state that GPs share 50-100% of the fee with LPs. Similar sharing arrangement is typical for monitoring fee. Transaction and monitoring fees depend on company size and performance. Transaction fees for small deals can be as high as 2%, decreasing with deal size. Monitoring fees range between one and five percent of EBITDA each year, smaller companies ending up paying more.

Against the general belief of bulk of the fees coming from performance, the authors find that the median buyout fund earns 19.4% of the committed capital as fees, of which 11.8% are fixed. The median present value of fixed management fee is 10.3%, while the median carried

interest for a buyout fund amounts to only 5.4% of committed capital. Transaction and management fees amount to 3.6%. These significant fees charged by the General Partners have serious implications for private equity investors. Kaplan and Schoar (2005) and Phalippou and Gottschlag (2009) find that the excess returns generated by private equity at the firm level fall in the hands of general partners, resulting average returns below S&P 500 for investors.

Phalippou (2009) argues that selective reporting of returns and opaque fee structures can delude investors to believe that returns are higher than they de facto are. About half of the investments listed in the average fund-raising prospectus are fully realized, which allows for discretionary valuation for half of the investments. In addition, reported internal rates of returns (IRR) can be arbitrarily pooled, resulting in biased averages as investments with higher IRRs tend to be shorter. Moreover, funds tend to choose measures that look best in each case, and report track records selectively.

Phalippou (2009) also raises concerns about agency conflicts between the private equity firm and limited partners. First, general partners have incentive to liquidate good investments quickly while delaying exits from poorly performing investments. Carried interest from successful exits is received immediately, but "clawed back" at exit from poor investment, leaving the time value for GPs. Second, GPs have incentive to exit early due to contracts allowing for reinvestment of short investments, and thus increase of assets under management. Moreover, IRRs is inflated by quick exist due to the reinvestment assumption in IRR calculation. Third, transaction fees based on deal value and company size can distort choices in relation to leverage, size and number of transactions that occur.

2.2.4 Capital structures

Understanding the complex capital structures in leveraged buyouts is of great importance, as it plays an important role in the both in the theory of value creation and economic implications of the private equity industry as a whole. In broadest sense, capital structure can be divided into equity and debt. However, as the private equity industry has developed, capital structures have become highly complicated, and boundaries between the classical division to debt and equity have faded.

Equity investors in a private equity deal typically include private equity fund, which invests by far the largest share of equity. In addition, the management team of the target company typically also buys a small stake in the target company, typically somewhere around 15% of

total equity (Kaplan 1989a; Kaplan and Strömberg 2009; Guo *et al.* 2011; Acharya *et al.* 2010).

The debt is often structured to senior and subordinated tranches. Senior tranches can have portions with unequal maturities, payment schedules and seniority. For example, senior debt portion can be divided into 50 percent amortizing, and 50 percent bullet loan, the former being senior to latter and having longer maturity. The second part, subordinated portion, usually consists of 2nd lien and mezzanine debt. Mezzanine debt often involves, in addition to cash interest, a *payable-in-kind* (PIK) interest. This means that instead of cash interest payments the principal amount of the loan is increased. The rationale behind this arrangement is to ease the problem of constrained cash flow of the target company to pay the relatively high interest payments of mezzanine debt until the senior portion is amortized, or the target company sold to the subsequent acquirer. In addition, the debt structure often involves *contingent* debt, which can mean revolving credit facilities to finance working capital, or relate to some specific capital expenditure or identified acquisition.

Cotter and Peck (2001) argue that a 75% debt-to-equity ratio for buyouts is rather typical, consistent with Axelson *et al.* (2009). However, the amount of equity financing in a deal has varied over time. Kaplan (1989a) finds median leverage of 88% in his sample of 76 public-to-private MBOs in 1980-1986. Axelson *et al.* (2009) report slightly lower leverage in the late 1980s and the first part of 1990s (82% and 74%, respectively). After decreasing in the late 1990s (73%) and early 2000s (72%), in the final sample period of 2003-2006 leverage rises to 78%. Guo *et al.* (2011) report significant variation in their sample of 192 public-to-private buyouts in 1990-2006, with a median debt-to-capital of about 30 percent. Thus, it is somewhat fair to conclude that capital structures have seen a decreasing trend in leverage since the 1980s, with significant cyclicality over the years.

Figure 3 provides an example of a typical capital structure. Axelson *et al.* (2010) find that in their sample of 153 large buyouts from 1985-2006 an average of 81.3% of total non-equity financing is composed of bank debt, and broken down to on average 3.8 tranches. Senior bank debt provides 52.0, junior bank debt 4.7%, and contingent debt 24.6%. In addition to bank debt, 13.6% is financing from bonds.[2]

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[2] Axelson *et al.* (2010) also provide detailed information on interest rates paid on the debt tranches and speed of debt repayment in their sample.

Figure 3 – Typical capital structure in leveraged buyout

This figure describes the capital structure of a secondary buyout of Kwik-Fit in August 2005. Enterprise value totals £774 million, of which £583 million is debt. Corresponding maturities and interest rates for the debt tranches are reported on the right hand side of the figure. PIK is payable-in-kind. Adapted from Axelson *et al.* (2010)
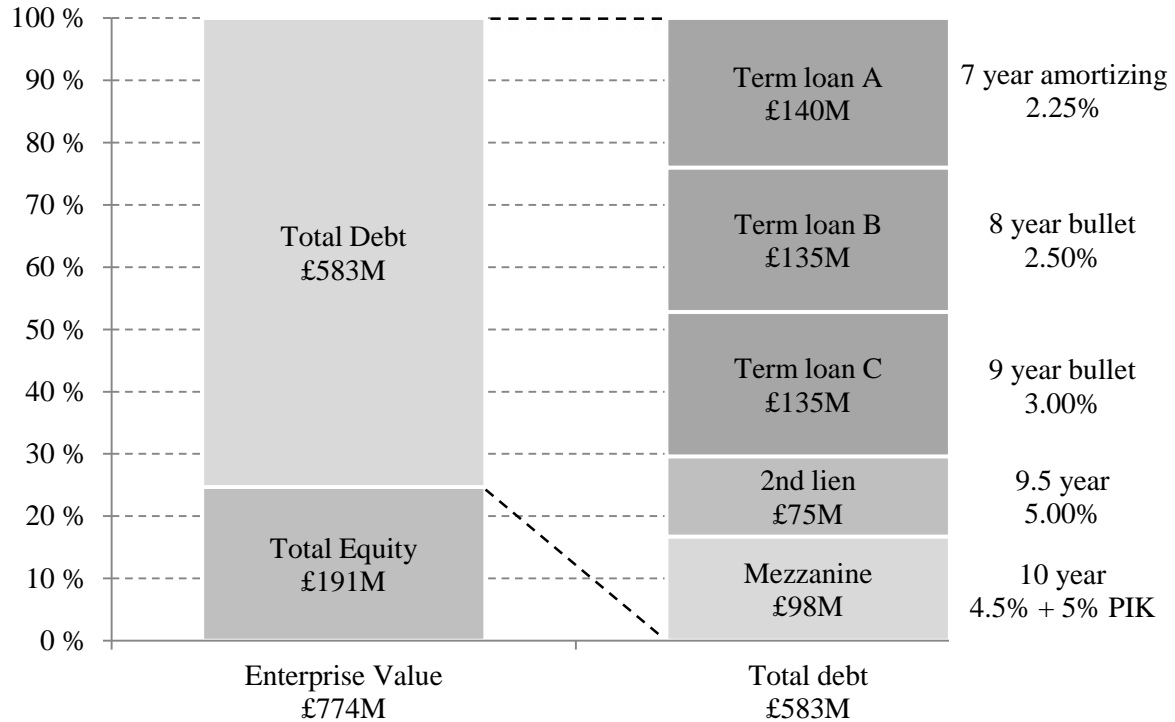
2.2.5 Pricing

Due to the lax disclosure requirements, evidence on pricing of private equity transactions is limited to acquisitions of public companies. However, studies provide evidence on evolution of deal pricing, and investigate the underlying determinants that can drive pricing in leveraged buyouts.

Kaplan and Stein (1993) describe pricing of U.S. public-to-private deals made in the 1980s. They find average EV to EBITDA multiples of 7.8 for the whole period, peaking during the hot LBO market in 1987. Guo *et al.* (2011), who use similar data of U.S. public-to-private deals, find that valuation multiples in the recent boom exceeded those in the 1980s boom. Comparing the results of Kaplan and Stein (1993) and Guo *et al.* (2011), Kaplan and Strömberg (2009) find that valuations of leveraged buyout deals relative to the Standard and Poor's 500 are actually slightly lower in the most recent wave.[3]

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[3] For more complete international comparison of deal pricing, see Renneboog *et al.* (2007)

Strömberg (2008) documents variation in deal pricing in the 1995-2007 period across time, deal type and geography. They find that the mean (median) enterprise value to revenue is 2.4 (0.9) and mean (median) enterprise value to EBITDA is 11.0 (8.0). After decreasing in the early 2000's, pricing multiples were at their historical highs in the 2006 and 2007. Moreover, their findings suggest that LBOs of public companies experience slightly higher EBITDA multiples than LBOs of private companies. However, as data on value and pricing is missing for a large fraction of deals, ability to draw conclusions is limited.

In a typical public-to-private transaction, a private equity acquirer pays a premium of about 30 percent (Bargeron *et al., 2008;* Renneboog *et al.*, 2007*)*. Bargeron *et al.* (2008) provide alternative explanations for pricing differences between private equity firms versus public and private operating companies. Firstly, public and private firms could acquire different types of firms. Secondly, operating companies should be able to pay more as they can expect to have synergy gains that are, at least in theory, shared with the target. Thirdly, the authors provide possible explanations why pricing should depend on organizational form of the bidder. They argue that managers in public firms could be more reluctant to walk away from a deal. Additional explanation is provided by Jensen (1989), who argues that agency conflicts between managers and shareholders can lead to managers making poor acquisitions to gain private benefits.

Bargeron *et al.* (2008) find that target shareholders earn 35% higher premiums if a public firm makes the acquisition rather than a private firm. Target shareholders earn 63% higher premiums with public bidders rather than private equity bidders. The authors find evidence suggesting that private operating companies pay more for acquisitions because they expect benefits from synergies. Moreover, private firms are much less reluctant to walk away from a deal that are public firms, and the difference in abnormal returns is highest between acquisitions made by private equity firms and those by public acquirers with low managerial ownership.

Axelson *et al.* (2010) study the relation between pricing and leverage, as availability of debt financing is often claimed to drive the pricing in buyouts. They find that higher loan rates have a negative impact on both leverage and prices in buyouts, in contrast to limited impact in lending of public firms.

2.2.6   Exit channels

Compensation structure of a private equity fund is highly dependent on carried interest, which in turn is dependent on timing of exit and proceeds. Thus, exiting the investment is crucial aspect in the financial performance of private equity companies.

Strömberg (2008) studies a large international sample of LBOs, and finds that the most common exit route for LBOs with financial sponsor are trade sales to another corporation, accounting for 38% of all exits. The second most common exit route is secondary buyouts (24%), in which portfolio company is sold to another financial buyer. IPOs account for 13% of exits. While the importance of secondary buyouts as an exit route has increased over time, IPOs have decreased from about one-fourth in the late 1980s and early 1990s to approximately 10% in the first half of 2000s.

Due to the high leverage, a potentially high fraction of LBOs end up in bankruptcy or financial distress. Andrade and Kaplan (1998) found that 23% of large public-to-private transactions in the 1980s had defaulted on their debt payments. Moreover, deals made in the hot markets of the late 1980s had even higher default rates (Kaplan and Stein, 1993; Andrade and Kaplan 1998). In Strömberg (2008) for the whole period of 1970-2007, 6% of the recorded deals eventually filed for bankruptcy, went in a financial restructuring, or was reported to have gone out of business. The author notes that although strict conclusions cannot be drawn due to high amount of unknown exits, given the high leverage in these transactions, bankruptcy rates of LBOs seem relatively modest compared to average junk bond issuers.

Strömberg (2008) also documents the timing of exits. The author finds that only 42% of the private equity funds' investments are exited within the target of 5 years of the initial transaction. The median holding period is about 6 years. Accounting for secondary buyouts, the median time a single LBO stays in private equity ownership is around 9 years, which seems to have increased over time.[4] However, it is important to note that due to the recent buyout boom that saw deal volumes increase dramatically, a large share of transactions have not been included in the existing literature.

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[4] Kaplan (1991) found that accounting for SBOs the median LBO target remained in private ownership for 6.8 years

2.3   The Nordic private equity industry

Over the past 25 years, there has been tremendous growth in the private equity industry starting in the U.S. in the early 1980s, and later followed by the U.K. and other European markets. In the Nordics, late 1980s saw the first private equity firms in Sweden, while the other countries followed in the 1990s.

At the height of the market in 2007, Nordic private equity investments accounted for 12% of total private equity investments in Europe, while accounting for only about 8% of GDP. In 2010, Sweden had the highest amount of private equity investments as a % of GDP among 27 European countries (0.78%), with Norway placing third (0.61%), Finland seventh (0.33%), and Denmark 17th (0.17%). Historically the Nordics have outperformed the rest of Europe in returns, which potentially have contributed to the relatively large size of the industry in the Nordics. (EVCA, 2010)

In 2007-2009, nearly €13 billion was raised by Nordic buyout funds. Funds managed by Swedish private equity firms accounted for majority of the amount, 65%, while Norway, Finland and Denmark accounted for 14%, 13% and 8% of the total respectively (EVCA, 2010). However, in the past 10 years many of the larger private equity firms have become multinational Scandinavian funds with wide investment scope. For example, the Swedish fund EQT has over 100 investment professionals in 13 offices around the world, including China and the U.S.

Competition in the Nordic private equity market is intense especially in the small- and mid-cap space due to the high amounts of committed capital and large number of individual private equity firms. Historically, the Nordics have had the high purchase multiples relative to other European markets. (EVCA, 2010)

3   Literature review

In the wake of public takeover wave of the 1980s, Jensen (1989) argued for superiority of private ownership. The author stated that a central source of waste in the public corporation is the conflict between owners and managers over free cash flow, which could be alleviated by "highly leveraged financial structures, pay-for-performance compensation systems, substantial equity ownership by managers and directors, and contracts with owners and creditors that limit both cross-subsidization among business units and the waste of free cash flow".

Majority of the literature on leveraged buyout and private equity have concentrated on their ability to create financial and economic value. This chapter describes recent literature on value creation in the private equity context. First, I present the three levers for value creation. Then, I discuss the alternative explanations for financial value creation. Finally, I discuss cyclicality and financial distress costs in private equity and their implications on value creation.

3.1 Three levers of value creation

Kaplan and Strömberg (2009) divide theories of value creation in the context of leverage buyouts to three parts, which they call these levers of value creation. The following subsections discuss financial, governance, and operational engineering.

3.1.1 Financial engineering

Private equity funds' use of significant financial leverage affects portfolio companies in two ways. The first effect is purely financial. Increasing leverage combined with tax deductibility of interest can potentially raise firm value by lowering weighted average cost of capital. The other effect is that it can reduce agency problems between ownership and shareholders by creating pressure on managers not to waste money.

Firstly, leverage affects the firm value through tax deductibility of interest payments. Modigliani and Miller (1963) argue that the value of a leveraged company is the value of all-equity financed company plus the value of tax shields. However, the value of tax shield to ultimate investors is difficult to calculate because it requires assumptions on shareholder's personal taxes, long-term leverage, and uncertainty of the tax shield realizing in expected time. Modigliani and Miller (1958) argue that optimal allocation between debt and equity is the point where marginal benefits equal marginal costs. If the leverage is too high, expected costs of financial distress can offset the benefits from the tax shield.

The importance of tax shield in value creation is potentially high. Kaplan (1989a) studies the value of the tax shield in sample of 76 MBOs during the period 1980-1986. He found that the reduction in tax due to higher interest payments had a value of between 21% and 142.6% of the premium paid to the former shareholders. Guo *et al.* (2011) find in their sample of 192 public-to-private LBOs in the U.S. that tax benefit can account for 30% to 40% of total returns. However, they note that the magnitude of the impact depends heavily on assumptions on whether leverage will be maintained after the exit. For firms sold in secondary buyouts (for which maintaining leverage is a fair assumption), the increased tax benefits account for 29%

of the return to pre-LBO capital. Acharya, Hahn and Kehoe (2010) study 110 large deals by mature PE houses and find that 56% of average deal IRR comes from financial leverage.

3.1.2 Governance engineering

In addition to value of tax shields, finance literature recognizes two other main mechanism private equity firms use to reduce agency problems between owners and managers though improved corporate governance. First, the need for monitoring can be reduced by paying attention to management incentives. In addition, agency costs can be minimized by reducing monitoring costs through active ownership.

Firstly, Jensen (1986) argues that managers have incentives to invest free cash flow at below the cost of capital or wasting it on organization inefficiencies. Hence, increasing leverage can help to reduce agency cost of free cash flow. Firstly, the necessity to make debt payments (as opposed to pay promised dividend) reduces the cash flow available for spending at the discretion of managers and motivates the organization to become more efficient. Secondly, the high leverage increases monitoring of the company by limited partners who hold large fraction of equity, and creditors who have to be convinced to finance new projects. Numerous studies find support for Jensen's theory.

Cotter and Peck (2001), building on motivational force of high amount of debt, argue that when LBOs are financed with more short-term and senior debt than with long-term and subordinate debt, debt is likely to play a more important role in monitoring and motivating managers in the post-LBO firm. Consistent with this, they find that LBOs where private equity firm controls the majority of are likely to be financed with less short-term and/or senior debt, and less likely to default. In LBOs where private equity firm is not involved, tighter debt terms increase LBO performance.

Axelson *et al.* (2008) propose an explanation for the financial structure of private equity firms based on agency conflicts between the fund managers and investors. They argue that private equity funds are restricted on the amount they can invest in a single deal, requiring the funds to use deal-by-deal debt financing which reduces incentives to make bad investments.

Secondly, private equity model can add value through their concentrated ownership and ensuing control over boards of the portfolio companies, and through active involvement in governance processes. According to literature, private equity portfolio companies have smaller boards than comparable public companies (Cornelli and Karakas, 2011), which can

have a positive impact on company value (Yermack, 1996). In addition, private equity firm have greater board representation on smaller boards, suggesting that they actively monitor managers (Acharya *et al.*, 2010).

Studies have also shown that private equity firms often make changes to management. Acharya *et al.* (2010) find that that 38% of the CEOs of portfolio companies will be replaced within 100 days, 69% at some point of the time. Guo *et al.* (2011) report 37% CEO replacement rate, and show that improvements are greater when the CEO is replaced at the time of the buyout, consistent with Acharya *et al.* (2010).

Finally, private equity firms typically give the management team a large equity upside with stock ownership and options, a practice that was not common in public corporations before the 1990s. However, unlike public companies, private equity firms have traditionally required management to make a substantial investment in the company, generating a significant downside that potentially has higher motivational power than option-based compensation schemes. Moreover, as the management's equity investment in a portfolio company is illiquid and typically has a relatively long investment horizon, it can reduce myopic investment decisions and stock-price manipulation.

High managerial ownership after LBO has been conducted suggests that management incentives might play a significant role in leveraged buyouts. Kaplan (1989a) finds that the equity holdings of the management team increase from a median of 5.9% to 22.6% in a sample of public-to-private MBOs. Leslie and Oyer (2008) report that an average CEO has 68% higher equity stake than a comparable public company manager. Kaplan and Strömberg (2008) find that in their sample of 43 U.S. LBOs during the period 1996-2004 (of which 23 were public-to-private) CEO receives 5.4% of equity upside, while management team as a whole gets 16%. Guo *et al.* (2011) find that in their sample 62% of times management buys some fraction of equity in a public-to-private transaction. In deals where detailed information was available, management team contributes on average 12.8% of the equity. Similarly, Acharya *et al.* (2010) find that on average 14.3% of ordinary equity is being employed for incentive purposes.

While increased managerial incentives is often cited as one of the key drivers of value creation, some recent studies have questioned the view. Leslie and Oyer (2008) argue that public corporations may have adopted some of the practices from private equity firms over the years. Using a sample of 144 *reverse LBOs* from 1996 to 2004, they find no significant

improvement in performance, and show that the compensation and debt differences between PE-owned companies and public companies disappear over a very short after the PE-owned firm goes public. [5]

Acharya *et al.* (2010) find an inverse relation between top abnormal performance deals and the high cash multiples in management compensation. The authors argue that there are two possible interpretations. First, replacement of management in the early phase increases performance, but providing them with strong equity-based incentives and requiring them to co-invest does not; or alternatively, strong incentives are provided because weaker incentives would result in even lower performance. That is, the worst deals are so risky that strong incentive provision required to attract good managers and improve performance fails to improve these deals substantially enough to push their performance above that of other deals.

3.1.3 Operational engineering

Jensen (1989) argued that value in LBOs is created through high leverage and powerful incentives. However, in the past 10 years, focus has shifted from financial and governance engineering to operational improvements. Most top private equity firms are nowadays organized around industries, and use internal expertise groups or consulting firms to identify attractive investment opportunities (Kaplan and Strömberg, 2009). In practice, operational engineering involves large up front investments in due diligence and strategic initiatives. At the time of investment, private equity firms already have developed a plan that considers cost-cutting opportunities, strategic changes and repositioning, and both organic and inorganic growth opportunities. In general, operational engineering is oriented to increasing profitability and cash flows.

Evidence is consistent with top, mature private equity creating financial value through operational improvements (Cumming *et al.* 2007). However, studies on the relationship of human capital and value creation are limited. Acharya *et al.* (2010) tries to fill this gap by studying a sample of 110 LBOs conducted by mature private equity firms. They find that general partners with operational background generate significantly higher outperformance in *organic* deals, while partners with financial background generate higher returns in inorganic

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[5] A reverse leveraged buyout occurs when either a publicly traded firm or a division within one converts to private ownership via a leveraged buyout and subsequently goes public.

deals[6]. Cressy *et al.* (2007b) find that industry specialization of PE firm has positive impact on profitability improvement.

3.2 Other theories

3.2.1 Undervaluation of buyout target

Lowenstein (1985) argues that management of buyout targets has information that is not available to other bidders that they potentially use to gain private benefits. Moreover, managers could use specific accounting techniques to depress the share price. This *undervaluation* or *private information hypothesis* could explain the improvements in operating performance post-buyout especially in management buyouts. On the other hand, also leveraged buyouts by private equity firms could benefit from incumbent management's inside information, if better incentives and monitoring lead to better use of management's knowledge of the firm to deliver better results (Kaplan and Strömberg, 2009).

Some concerns have been expressed about accounting measures around the time of buyouts. Wu (1997) finds evidence of earnings management MBOs in the 1980s. Perry and Williams (1994) find that managers of buyout targets use discretionary accruals to manage earnings downward in the year preceding a management buyout. However, DeAnglo (1986) find no indication that managers systematically understate earnings in period before a MBO. Due to stricter accounting principles and disclosure requirements in the 2000s, it is fair to conclude that earnings management probably plays a minor role in potential undervaluation.

Renneboog *et al.* (2007) find evidence consistent with undervaluation hypothesis. They identify a strong negative relation between pre-transaction price performance and the price premium paid in MBOs and IBOs, which mostly retain part of the incumbent management, whereas the relationship is insignificant for MBIs. Weir *et al.* (2005) find that find that perceived undervaluation can lead to higher occurrence of MBOs, but using a more accurate objective measure leads to insignificant results.

Kaplan (1989a) finds that forecasts of future cash flows at the time of the buyout are actually lower than actual post-buyout realizations, which should be the opposite if private information hypothesis stands. Lee (1992) studies stock price performance of withdrawn MBOs, and finds no evidence in support of MBOs revealing inside information about firm

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[6] The authors define organic deal as a deal where major M&A does not happen, i.e. deals that concentrate more on operational improvements in the target company

value. Ofek (1994) studies both stock price and operational performance and finds no evidence of improvement in firms with unsuccessful MBOs, suggesting that efficiency gains are more likely to come from organizational changes than private information, as in this case the improvements would have occurred regardless of the deal success.

If private information were a prime motivational factor for buyouts, one would expect management turnover to be low, and those deals where incumbent management remains in their seats experience higher returns. However, evidence does not support this. Acharya *et al.* (2010) find that 38% of deals have CEO replaced during the first 100 days, and higher abnormal return for those deals, especially in organic deals. Similarly, Guo *et al.* (2009/2011) find that in 37% of deals CEO was replaced within the first year and that cash flow performance is greater for these deals.

3.2.2 Target selection and market timing

While evidence is inconsistent with operating improvements being the result of information asymmetries between incumbent managers and shareholders, recent studies have found large financial gains combined with modest improvements in operating performance, suggesting that private equity firms are able to buy cheap and sell high. Kaplan and Strömberg (2009) argue that the evidence is potentially consistent with private equity firms' better negotiating skills, leading them to pay lower price than other firms (Bargeron *et al.*, 2008) or private equity investors taking advantage of market timing.

Guo *et al.* (2011) find that significant portion of the positive average returns are likely due to changes in market conditions rather than to firm specific changes while private. They find average increase of 1.08 in EBITDA multiple, and attribute 18% of returns to pre-buyout capital to changes in industry valuation multiples. Similarly, Acharya *et al.* (2010) find average multiple improvement of 1.9.

However, Acharya *et al.* (2009) argue that better matching could explain the puzzle of huge financial performance compared to moderate or no operational outperformance. They find that compared to overall sector benchmarking, peer matching lowers the financial outperformance of PE deals and increases their operational outperformance by roughly one-third.

Expansion of valuation multiples can also be explained by credit market conditions. Demiroglu and James (2010) find that LBOs sponsored by reputable private equity firms are

able to acquire cheaper financing than other LBOs. By taking on large amounts of cheaply priced debt, firms can lower their cost of capital and therefore increase their valuation multiple. The following sub-section discusses market conditions and timing in more detail and its implications to cyclicality in buyout activity.

3.2.3 Cyclicality and impact of downturns

As discussed previously, private equity industry is highly cyclical in terms of deal activity and fundraising. Academic studies suggest that cyclicality is closely linked to availability of debt financing, leading to higher volumes, greater use of leverage, higher valuations, and ultimately higher probability of defaults for deals executed at the top of the cycle.

Kaplan and Strömberg (2009) argue that private equity firms take advantage of the difference between relative cost of debt compared to cost of equity in certain points of time. They find that the difference between the earnings yield in the S&P 500 index and the high-yield rate at the time of the buyout is positively related to fund inflows. Consistent with this, Axelson *et al.* (2010) find significant positive relationship between leverage and the ease of debt market conditions, measured in differences between earnings yield and the high-yield rate at the time of the buyout, and non-price aspects of credit market conditions, such as debt covenants and quantity constraints.

Availability of leverage is also associated with higher valuation levels. Kaplan and Stein (1993) find that favorable market conditions contributed to the buyout wave and increased valuations in the 1980s. Ljungqvist *et al.* (2008) find that established funds accelerate their investment flows when credit market conditions loosen. Kaplan and Strömberg (2009) argue related to the mispricing hypothesis that rate spreads could account as much as 10% of the purchase price, or alternatively, allow private equity firms to pay 10% more for their targets. Thus, relatively more deals will be undertaken when debt markets are unusually favorable, and deals undertaken during favorable conditions could earn higher returns if the competition between buyout funds is not strong enough. Lower premiums paid in club deals support the idea that such market inefficiencies are possible (Officer *et al.* 2010).

Axelson *et al.* (2010) present an agency-based theory for cyclicality. They argue that debt and related monitoring activities work as a tool to reduce negative NPV investments that might otherwise be optimal for the general partners due to the option-like incentive structure that emphasizes upside. When external financers see investment opportunities overly favorable, deal activity increases, and deals underperform those made in strict market conditions. Thus,

in contrast to the mispricing hypothesis, agency theory predicts that increased use of leverage can deteriorate returns of funds.

Kaplan and Strömberg (2009) find strong negative relation between fundraising and aggregate returns over the next 10-12 years. Kaplan and Schoar (2005) find that funds raised in boom times are less likely to raise follow-on funds, suggesting poor subsequent performance. They argue that dilution of aggregate performance is driven by the poor performance of new entrants, as performance of established funds is less affected. Kaplan and Stein (1993) attribute the increased default rates of deals made in the booming LBO market of 1980s to reckless pricing and poorly designed capital and incentive structures.

Bernstein *et al.* (2010) investigate effect of private equity to industries with heavy buyout activity. If firms completing buyouts at market peaks employ leverage excessively, one would expect industries with heavy buyout activity to experience more intense subsequent downturns. However, private equity backed firms may actually outperform in downturns.

First, due to their sponsor's ability to provide equity financing that might be unavailable for other companies during downturns. PE funds have extraordinary liquidity during downturns, due to the commitments raised in the preceding market peak. Thus, PE-backed companies could have financial flexibility that leads to fewer bankruptcies in challenging economic conditions. Second, Jensen (1989) argues that high levels of debt forces early and intense response to negative shocks. Thus, high leverage entailed in buyout transactions could push portfolio companies to react more quickly to downturns, leading to better performance in adverse economic conditions than their less-levered peers. Bernstein *et al.* (2010) find no evidence that economic activity in industries with high PE activity is more exposed to aggregate shocks.

If private equity backed firms are able to better adjust in adverse shocks, the underlying operations can be in better shape than their peers. Thus, even if many end up in financial distress, the outcome can be relatively good due to efficient restructuring. Andrade and Kaplan (1998) find that the net effect of LBO and distress in the 1980s was on average slightly positive. Even distressed buyouts created value. Guo *et al.* (2011) find that large portion of Chapter 11 restructurings in their sample are "pre-packaged" bankruptcies, suggesting that the resolution of distress via Chapter 11 may not be costly for these firms.

3.3 Empirical evidence

This section presents an overview of empirical evidence on real and financial returns of buyouts. The section is divided to four sub-sections based on the type of study. First, I present the evidence on operating performance and productivity gains on a portfolio company level, which largely relies on accounting measures at the portfolio company level. Second, I present the closely related evidence on employment effects of buyouts. The last two sub-sections present empirical evidence financial performance; first recent deal-level studies on financial performance and then, finally, fund-level studies.

To some extent, distinctions between different types of buyouts and transactions can cause a problem. Some studies treat all buyouts as a single group, while some distinguish between LBOs and MBOs, MBIs and IBOs. Moreover, many of the studies are limited to public-to-private transactions. However, many of the drivers of value creation are similar in all types of buyouts, and in many cases results should be directionally consistent, although magnitude can vary.

3.3.1 Operational performance

As summarized by Kaplan and Strömberg (2009) and Cumming *et al.* (2007), there seems to be a general consensus that LBOs enhance performance of companies. However, the more recent public-to-private transactions could be an exception. Guo *et al.* (2011) find that gains in operating performance are not significantly different from those observed for benchmark firms in their sample of 94 U.S. public-to-private transactions completed between 1990 and 2006. For a similar sample, Leslie and Oyer (2008) find generally no evidence for greater profitability or operating efficiency. Consistent with the U.S. evidence, Weir *et al.* (2007) find in their sample of 122 U.K. public-to-private transactions between 1998 and 2004 limited evidence for modest improvements in operating performance. Table 1 presents relevant recent studies on profitability and cash flows.

Table 1 – Previous findings on the impact of buyouts on profitability

Author/year of study	Country/period	Sample	Findings
Kaplan (1989a)	U.S. 1980-1986	76 PTPs	Change in EBIT/sales and EBIT/assets exceed industry median by approximately 20% in first three years after the buyout
Smith (1990)	U.S. 1977-1986	58 MBOs	EBIT/assets increase 3-6 percentage points compared to industry benchmark
Cressy et al. (2007b)	U.K. 1995-2002	122 PE-backed buyouts	Over the first 3 post-buyout years ROA is greater than those of comparable companies by 4.5%
Weir et al. (2008)	U.K. 1998-2004	122 PTPs	Firms do not perform worse than firms that remain public and some evidence that performance improves. PE-backed deals performed better than the industry average and no worse than non-PE deals
Leslie and Oyer (2008)	U.S. 1996-2006	144 Reverse LBOs	No evidence that PE-owned firms are substantially more successful than comparable public firms in operating metrics such as ROA, operating income, or headcount
Acharya et al. (2010)	W. Europe 1995-2005	110 PE-backed buiyouts	EBITDA/sales change on average 2.1 percentage points above sector benchmark
Guo et al. (2011)	U.S. 1990-2006	94 PTPs	Gains in EBITDA/sales and EBITDA/assets either comparable to or slightly exceeded those observed for industry benchmark

Due to limited published research on private-to-private buyouts, no clear picture can be constructed from the whole universe of leveraged buyouts. General problem with the studies is that only public-to-private deals are included, and benchmark group includes only public companies.

3.3.2 Employment effects

Improvements in operating performance are closely related to employment in portfolio companies. Shleifer and Summers (1988) suggest that buyouts and takeovers transfer wealth to investors by laying-off employees or reducing their wages. As cost-cutting is a major potential source for operational efficiency, critics have argued that private equity's impact for the economy as a whole can be less positive if the value is gained at the expense of employees. In addition to the streamlining view, some studies have investigated changes to overall working environment. Table 2 presents recent studies on employment effects of buyouts.

Table 2 – Previous findings on the impact of buyouts on employment

Author/year of study	Country/ period	Findings
Kaplan (1989a)	U.S. 1980-1986	Employment increased post-buyout, but by less than other companies in the industry
Lichtenberg and Siegel (1990)	U.S. 1981-1986	Plants involved in LBOs and MBOs are more productive than comparable plants before the buyout. Employment and wages of white-collar workers at plants (but not blue-collar workers) declines after an LBO or MBO
Bruining *et al.* (2005)	U.K., Holland 1992-1998	MBOs lead to increases in levels of employment and wages
Harris, Siegel, and Wright (2005)	U.K. 1982-1998	Plants involved in MBOs are less productive before the buyout, but substantially increase productivity and reduce employment after a buyout
Amess and Wright (2007)	U.K. 1999-2004	Taken together LBOs have an insignificant effect on employment growth but have significantly lower wage growth than non-LBOs. Employment grows in MBOs but falls in MBIs after buyout
Cressy *et al.* (2007a)	U.K. 1995-2000	PE-backed companies' employment falls relative to controls by 23% over the first 4 post-buyout years. In the fifth year employment increases. Buyouts generating higher operating profits from job cuts are associated with compensating job creation.
Davis et al. (2008)	U.S. 1980-2005	Post-buyout, employment at buyout companies increased at a lower rate than at other companies in the same. However, for new establishments, buyout companies had higher job growth than similar non-buyout companies. The authors were not able to determine the net effect.
Amess, Girma, and Wright (2008)	U.K. 1996-2006	PE-backed leveraged buyouts had no significant impact on either wages or employment. Other LBOs and traditional caused a decline in employment.
Weir, Jones and Wright (2008)	U.K. 1998-2004	PE-backed PTPs incurred job losses each year while non-PE PTPs increased employment after the first year post-deal

For the earlier buyouts, Kaplan (1989b) finds that employment increased after the transaction, but at slower rate than other companies in the industry. Lichtenberg and Siegel (1990) investigate plant-level data and find that employment and compensation of white-collar workers declined following buyouts, but those of blue-collar workers remained unchanged.

Bruining et al. (2005) find that management buyouts result in higher levels of employment, employee empowerment, and wages. These effects were found to be stronger in the U.K. than in Holland. Cressy *et al.* (2007a) find significant decrease in employment after a private equity backed buyout. However, the initial period of rationalization created opportunity for more sustainable job creation.

Davis *et al.* (2008) study employment with a comprehensive sample of U.S. buyouts at the level of firm and establishment (i.e., specific factories, offices, retail outlets and other distinct physical locations where business takes place). They find that employment growth in control group outstripped growth at target establishments after and, interestingly, before the transaction. Although post-buyout job creation is similar to the control group, job destruction is substantially larger. However, greenfield job creation is significantly higher in target firms post-buyout, thus at least partly offsetting the job losses in existing establishments. The authors were unable to determine the net effect of the greenfield job creation and destruction in existing establishments.

Amess *et al.* (2008) conduct an extensive analysis of 1350 U.K. LBOs and find that when LBOs are disaggregated, employment growth is 0.51 of a percentage point higher for insider-driven MBOs after the change in ownership and 0.81 of a percentage point lower for outsider-driven MBIs. This suggests that motivations for outsider-driven LBOs are different, often involving significant restructuring.

Overall, although strict conclusions on effect of leveraged buyouts on employment and wages cannot be drawn, recent literature suggests that in general employment growth in leveraged buyouts lags growth in comparable companies. However, it seems that insider-driven buyouts potentially have positive effect on employment, productivity and work practices; outsider-driven (including private equity backed) LBOs potentially have negative effects on employment in the first years after the buyout.

3.3.3 Firm-level financial performance

Evidence from buyouts in the 1980s suggests that buyouts do have a significant effect on target companies' financial performance, measured in both share price and accounting data. Since then, many of the studies have been made in Europe and especially U.K. due to stricter disclosure requirements for private companies. Table 3 presents recent deal-level studies on financial performance of buyouts.

Table 3 – Previous findings on firm-level financial performance

Author/year of study	Country/period	Sample	Findings
Renneboog *et al.* (2007)	U.K. 1997-2003	177 PTPs	Main sources of the shareholder wealth gains are undervaluation of the pre-transaction target firm, increased interest tax shields and incentive realignment
Nikoskelainen and Wright (2007)	U.K. 1995-2004	321 LBOs	Larger buyouts perform better and provide higher investor returns. Equity returns in PE-backed buyouts are positively impacted by divestments.
Cao and Lerner (2009)	U.S. 1981-2003	526 Reverse LBOs	IPOs of companies that have were previously bought by private equity firms and subsequently brought back to market outperform other IPOs and the whole market
Acharya *et al.* (2010)	W. Europe 1995-2005	110 PE-backed buiyouts	Abnormal performance is significantly positive on average. Higher abnormal performance is related to greater improvement in EBITDA to sales ratio (margin) and greater growth in EBITDA multiple, relative to those of quoted peers. Deals that focus exclusively on organic value creation programs improve margins, while deals with an M&A focus grow EBITDA multiples more substantially. General partners with an operational background generate significantly higher outperformance in organic deals. In contrast, general partners with a background in finance generate higher outperformance in deals with M&A events.
Guo *et al.* (2011)	U.S. 1990-2006	94 PTPs	Median market- and risk-adjusted returns to pre- buyout (post-buyout) capital invested are 72.5% (40.9%). Increases in industry valuation multiples and realized tax benefits from increasing leverage, while private, are each economically as important as operating gains in explaining realized returns.

Nikoskelainen and Wright (2007) present evidence concerning returns from exited buyouts and their determinants. They present two relevant findings. First, larger buyouts perform better and provide higher investor returns. The authors argue that large corporations are less vulnerable to short-term shocks due to diversification effects, and support from the financial sponsor due to the relative importance of larger portfolio companies. For the very same reason, one would expect the sponsor to put more effort on assistance and guidance for these companies. Second, the authors find no evidence that MBI return values would be impacted by acquisitions. Instead, MBI equity returns are positively impacted by divestments. Thus, the results indicate that private equity firms are able to drive their returns through streamlining of target company operations.

Acharya *et al.* (2010) study a sample of 110 medium- and large-size LBOs in U.K. and Western Europe. They separate deals with organic strategies from those deals that involved major M&A events during the private phase. They find that for organic deals, EBITDA

margin improvements explain abnormal performance, but multiple improvements do not. Conversely, for inorganic deals, abnormal performance is explained by multiple improvements but not margin improvements. The authors find that general partners with operational background generate significantly higher outperformance in organic deals, while partners with financial background generate higher returns in inorganic deals. Cressy *et al.* (2007b) find evidence consistent with the view that experience and specialization has an effect on operational performance of the target company.

Guo *et al.* (2011) find industry and stock market adjusted investor returns that are on average large and positive at the portfolio company level. Increases in operating performance and in industry valuation multiples each account for approximately third of returns.

Although there seems to be uniform view that LBOs enhance performance, some concerns have been highlighted in the existing literature. First, some authors have questioned the long-run economic effect of buyouts, as the limited investment horizon and high debt-pressure could create incentives to inflate short-term cash flows on the expense of longer-term value. Moreover, due to the increased equity ownership, managers might have incentives to manipulate earnings downward prior LBO and upward before exit[7]. In contrast to this view, Cao and Lerner (2009) provide evidence that IPOs of companies that have were previously bought by private equity firms and subsequently brought back to market outperform other IPOs and the whole market.

Second, many of the studies are subject to some degree of selection bias. Especially in the U.S., studies have been limited to public companies or companies that hold public debt, as private firms are largely exempt from public disclosure requirements. Many studies have relied on companies that have subsequently experienced an IPO, which happens in only about one-eighth of the cases (Strömberg, 2008). Moreover, another source of selection bias arises from studies looking at only realized investments. The full effect of the latest LBO wave, which accounted for a significant share of all-time LBO volume, is largely unknown.

Many studies may also fail to take in the full effect of defaulted investments. Kaplan and Stein (1993) argue that many of the deals made in the booming LBO market of 1980s were recklessly priced and structured, and lead to high default rates. They find that 22 of 83 of the deals between 1985 had defaulted by August 1991. The authors attribute the increased default

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[7] Wu (1997) shows earnings manipulation in 87 management buyouts during 1980–1987. Chou et al. (2006) find positive and significant discretionary current accruals coincident with offerings of reverse LBOs

rates to poorly designed capital and incentive structures. Jensen (1991) that regulatory shocks and a downturn in the overall economy also played a role. However, Andrade and Kaplan (1998) find that for U.S. buyouts that defaulted, the leveraged buyout companies retained approximately the same value they had obtained before the buyout.

3.3.4 Fund-level financial performance

Although evidence suggests value creation at portfolio company level, returns to investors are deteriorated by price premium paid to target shareholders, and fees paid to private equity firms. Studies have shown that private equity firms pay an average premium of about 30% in public to private transactions (Renneboog *et al.*, 2007; Bargeron *et al.*, 2008). Moreover, a typical private equity fund pays out about one-fifth of the committed capital as fees (Metrick and Yasuda, 2010b).

In addition to the benefit of being net-of-fees, fund-level studies are better than deal-level studies in assessing performance of private-to-private buyouts, thus giving a more complete view of the performance of the whole buyout population. However, aggregation at the fund level and lack of information about the timing of cash flows cause problems in many fund-level studies.

Research of fund-level returns faces two primary challenges. First, cash flow data is confidential, and is not easily accessible. Second, because investments are illiquid and individual deal returns are realized only at the time of the exit, measurement of risk is practically impossible. Thus, calculation of abnormal returns suffers from methodological difficulties. (Metrick and Yasuda, 2010b)

Table 4 – Previous findings on fund-level financial performance

Author/year of study	Period	Fund type	Findings
Ljungqvist and Richardson (2003)	1981-1993	VC and Buyout	Excess returns of about 5-8% per annum relative to S&P 500 depending on assumption
Kaplan and Schoar (2005)	1980-2001	VC and Buyout	Average fund returns overperforming gross-of-fees, returns net of fees are slightly less than S&P 500. Returns persist strongly across subsequent funds of a single private equity firm.
Phalippou and Gottschalg (2009)	1980-2003	VC and Buyout	Average net-of-fees fund performance of 3% per year below that of the S&P 500. Adjusting for risk brings the underperformance to 6% per year.

Kaplan and Schoar (2005) use fund-by-fund VC and LBO data from 169 funds that are either U.S.-based or U.S.-focused to compare the fund performance net of fees to Standard & Poor´s 500 index. Although their data is subject to selection bias as it is collected on voluntary basis, the data allows for cross-sectional comparison between the funds to identify a number of characteristics that affect fund returns. The authors find that average fund returns net of fees are slightly less than S&P 500, although large heterogeneity in performance across funds exists; returns persist strongly across subsequent funds of a single private equity firm, and better performing firms are more likely to raise follow-on funds and larger funds.

Phalippou and Gottschlag (2009) include the same funds as Kaplan and Schoar (2005) and add non-U.S. funds to the final sample of 314 funds. They restrict their investigation to liquidated funds and make adjustments for timing of cash flows, selection bias, and risk. Their results are largely in line with Kaplan and Schoar (2005), with similar return persistence and leveraged buyouts underperforming S&P 500 net-of-fees, and overperforming gross-of-fees. Average investor returns for buyouts vis-à-vis venture capital funds are significantly higher.

Ljungqvist and Richardson (2003) use data obtained from a single private equity investor, and find excess returns of about 5-8% per annum relative to S&P 500 depending on assumption. Phalippou and Gottschlag (2009) argue that the difference could arise from differences in sample. Funds in Ljungqvist and Richardson (2003) sample are larger, more U.S. focused, and more experienced, which are all found to be characteristics that correlate positively with performance (Cumming and Waltz, 2009; Kaplan and Schoar, 2005). Moreover, Lerner, Schoar and Wong (2007) have shown that some investor types have consistently earned higher returns on their private equity investments than other limited partners.

Measurement and reporting of fund returns are potential to numerous biases and shortcomings. Firstly, Cumming and Waltz (2009) show that private equity fund managers may report inflated accounting-based valuation for non-exited investments. Secondly, Groh and Gottschalg (2006) perform a sensitivity analysis that highlights the importance of risk adjustments and assumptions for operating and leverage risk when benchmarking returns to indices. Thirdly, assumptions on timing of cash flows and management fee basis can have a significant impact on net-of-fees returns. Phalippou and Gottschalg (2009) show that in their sample, moving from 2% to 2.5% in management fees translates into 1.3% decrease in alpha. This is explained by management fee being calculated on committed capital instead of invested capital basis.

Overall, evidence from fund-level returns is consistent with firm-level evidence in the sense that private equity on average creates value. However, much of this value seem to fall in the hands of general partners in form of fees (Metrick and Yasuda, 2007; Phalippou and Gottschalg, 2009). Due to issues with data availability and resulting potential biases, the evidence is not conclusive on whether private equity on average creates value for investors. However, there seems to be a general consensus that top private equity funds are able to persistently overperform, which has enabled them subsequently to raise larger funds.

4 Hypotheses

The purpose of this thesis is to examine operational performance of private equity backed companies that were acquired before the financial crisis of 2007-2009. The hypotheses are divided into three sub-groups. First, I study performance of portfolio companies compared to a benchmark group, trying to establish a link between abnormal performance and private equity ownership. Then, a regression analysis is conducted on determinants of abnormal performance to gain knowledge on the factors that potentially affect the results.

4.1 Operating performance

On the basis of the theories and previous empirical findings (see Table 1), I expect buyouts conducted by private equity firms to lead to improved operating performance also in the recession period.

H_1: Profitability of buyouts companies is improved relative to their respective peer group

As discussed in Chapter 3, private equity firms employ a set of changes in the portfolio company which potentially influence the operating performance. Shleifer and Summers (1988) suggest that buyouts may lead to transfer of wealth from employees to investors by laying-off employees or reducing their wages. Moreover, Jensen (1989) argues that high levels of debt forces early and intense response to negative shocks. Thus, I expect to see more intense decrease in wage levels and reduction of the labor force in the buyout companies compared to their peers. Additionally, I expect sales per employee to increase relative to peers if PE-companies are able to streamline their operations faster.

H_2: Personnel costs in relation to sales decrease in buyout companies compared to their respective peer group

H_3: Personnel costs in relation to amount of employees decrease in buyout companies compared to their respective peer group

H_4: Sales per employee increase in buyout companies compared to their respective peer group

Private equity firms commonly initiate restructuring programs to increase capital efficiency in the buyout firms. One of the key items in these programs is reduction of working capital, i.e. lowering inventory levels or accounts receivables, or negotiating better terms with suppliers. In line with Smith (1990), I expect relative increase in working capital turnover in portfolio companies.

H_5: Net working capital/sales decreases in the buyout companies compared to their respective peer group

To understand whether the potential change in working capital is attributable to internal or external factors, I break it down to receivables, payables, and inventory turnover.

$H_{5.1}$: Receivables/sales decreases in the buyout companies compared to their respective peer group

$H_{5.2}$: Payables/sales increases in the buyout companies compared to their respective peer group

$H_{5.3}$: Stock/sales decreases in the buyout companies compared to their respective peer group

4.2   Determinants of abnormal performance

By definition, leveraged buyouts increase leverage in the target companies. According to Jensen (1986), increase in leverage reduces agency cost of free cash flow. Thus, I expect the increase in debt levels to lead to an improved operating performance.

H_6: Higher leverage is associated with higher abnormal operating performance

The effect of secondary buyouts on operating performance has drawn increasing attention in the last years, but limited research on the subject has been published, due to the limitations inherent in buyout studies. According to the theory, private equity firms create value by financial, governance, and operational engineering. Moreover, private equity firms tend to target companies that underperform. If the initial private equity owner has already utilized the

levers, one would expect secondary buyouts to be more focused on financial value creation than operational improvements. Thus, I believe that primary buyouts will show a larger operating improvement than secondary buyouts.

H_7: Primary buyouts show higher abnormal operating performance than secondary buyouts

In addition, I study the employment and working capital hypotheses in relation to the abnormal performance. Decrease in company-level personnel costs and working capital are potentially associated with higher levels of abnormal performance. Especially asset scaled profitability should respond to decrease in net working capital.

H_8: Decrease in Personnel costs/sales leads to higher abnormal operating performance

H_9: Decrease in Net Working Capital/sales leads to higher abnormal operating performance

5 Data and Methodology

This chapter presents the data and discusses the choices on methodology applied. I begin by presenting the general theory of performance measurement and practice in previous studies. Next, I present the methodology applied, including choices on event window, peer group matching technique, and studied variables. Then, I present the statistical methods deployed in the analysis. The final two sections describe the explanatory model applied and accounting variables used in the analysis.

5.1 Sample selection

This section discusses the choices on study period and selection criteria for the sample of buyouts.

5.1.1 Study period

Previous studies on operating performance use various methods to detect abnormal performance for the buyout event. Some studies compare the performance in the first years after the buyout to the pre-buyout performance (e.g. Kaplan, 1989a) while value creation studies often compare pre-buyout levels to the end of the holding period (e.g. Guo *et al.*, 2011).

Definition of the event window is highly dependent on the purpose of the study and data availability. Firstly, if the purpose of the study is to detect the effect of operational engineering and strategic changes, the first year or two after the buyout is the most critical period, and longer event window could only increase variation in the results. When studying value creation at the firm-level, the whole holding period has to be included in the study. Secondly, data availability can differ widely across companies and deal types. In studies of public-to-private transactions, accurate and whole pre-buyout financials are readily available, as opposed to divisional and other private-to-private buyouts, where, if available, financials may not fully reflect the operations and financing of the company as its own separate entity.

Purpose of this thesis is to study the performance of Nordic private equity backed firms in downturn. All sample countries entered the negative growth period in the late 2008. GDP weighed decline in aggregate growth rate started already in 2007, and continued until second quarter of 2009. OECD Composite Leading Indicators signal that the slowdown started already in the second half of 2007. Figure 4 shows the aggregate key economic indicators for the sample countries.

Figure 4 – Real GDP change and OECD Composite Leading Indicators 2005-2010

The figure reports seasonally adjusted growth rate of real gross domestic product compared to the same quarter of previous year, and normalized OECD composite leading indicators in the period 2005-2010. Reported values are GDP weighed averages of the country specific values for Sweden, Norway, Finland and Denmark. Source: OECD
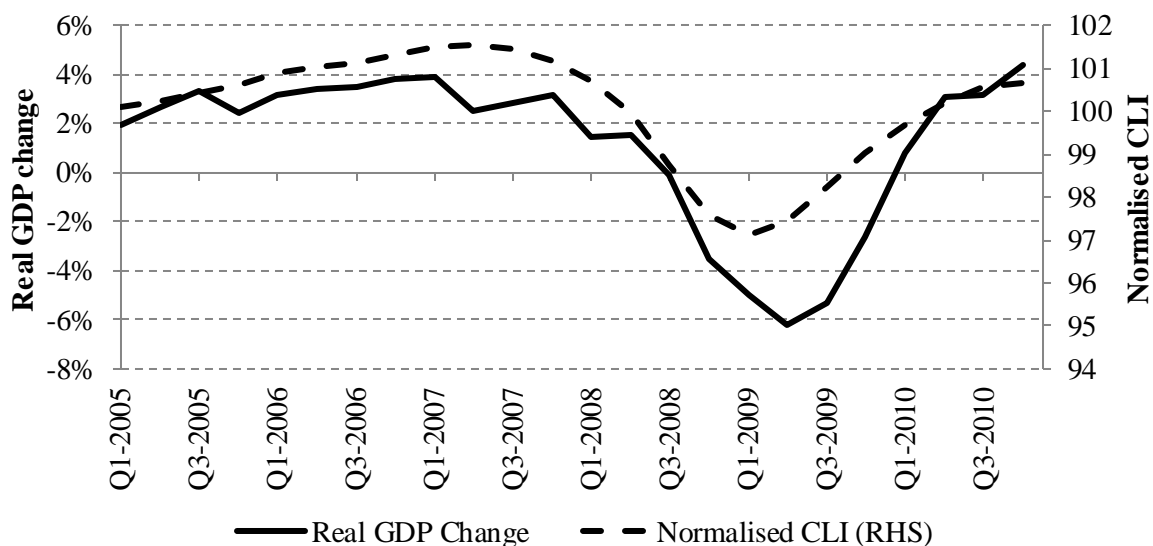
The period 2007-2009 was chosen as the main period under study, as these years cover the whole period of slowing economy. Accordingly, to be included in the sample initial investment in the portfolio company had to be made between 1.1.2005 and 30.6.2007.

While it could be feasible to include companies that were acquired already before 2005, I chose to leave these out for two reasons. First, as argued before, operating impact should be highest for recently acquired companies. Second, recent literature has suggested that many of the buyouts made in the recent buyout boom were motivated by low cost of debt rather than opportunities for creation of economic value in form of operational improvements. However, using recently acquired companies does not allow for isolation of the effect of recession from general improvement in operational performance. Thus, it is hard to say if the increases in operational performance are attributable to superior performance of the PE model in downturn specifically.

5.1.2   Buyout sample and selection criteria

Process of identifying buyouts by private equity firms started with acquiring all deals classified as institutional buyouts[8], where target nation is either Denmark, Sweden, Finland or Norway, and announced or completed date is between 1.1.2005 and 30.6.2007. Combining the deal data and member registries of national venture capital associations, a list of private equity firms was formed for additional searches to identify missing and misclassified deals. Deals backed by financial sponsors that could be classified as family offices, public institutions, and private investment companies were excluded based on information provided by associations and on company web pages. After obtaining the initial deal sample and list of private equity firms, the list of deals was transformed to a list of portfolio companies and complemented with data from web pages of private equity firms.

After obtaining the initial sample of portfolio companies, searches were conducted in Orbis database and national trade registries [9] to match names of the portfolio companies to corresponding financial entities. In most of the cases the operating company is acquired by a holding company, which assumes the acquisition debt. Thus, it is imperative to identify the ultimate parent of each of the operating companies at each year under study were identified to obtain proper balance sheet data for the whole financial entity. All of the post-acquisition entities were identified, while for 10 portfolio companies acquired in divisional buyout pre-acquisition financial entity could not been identified.

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[8] Zephyr defines institution buyout as an acquisition where a Private Equity or Venture Capital firm has taken the majority stake, or is the parent of the bidder company. Most of the deals often denoted MBOs are defined on Zephyr as IBOs due to the fact that the management team does not take a majority stake in the target company

[9] http://www.brreg.no/ for Norway, http://www.cvr.dk/ for Denmark, http://www.bolagsverket.se/ for Sweden, and http://www.prh.fi/ for Finland

Next, the sample of portfolio companies was trimmed by removing companies that had revenue of less than € 15 million in 2007. The reason is two-fold. Firstly, the sample would be nonrepresentative for small companies. Databases generally tend to underreport acquisitions of small companies, or these acquisitions can be misclassified. Further, small companies are exempt from reporting certain key financial items, or from publishing consolidated accounts. Secondly, by excluding small companies I ensure that the sample under study does not contain buyouts that could be classified as earlier stage Venture Capital investments with focus on growth rather than operational improvements.

Finally, deal characteristics and exit date was obtained for each portfolio company using web searches, data on Zephyr deal records, and web pages of private equity firms. Entry type was recorded as divisional buyout, secondary buyout, public-to-private transaction, or other. Divisional buyout was defined as vendor being an industrial operating company. In deals classified as secondary buyouts the vendor was one of the private equity firms defined. Figure 5 describes the final buyout sample by initial investment date, country, and entry type.

Figure 5 – Sample distribution by initial investment date, country, and entry type
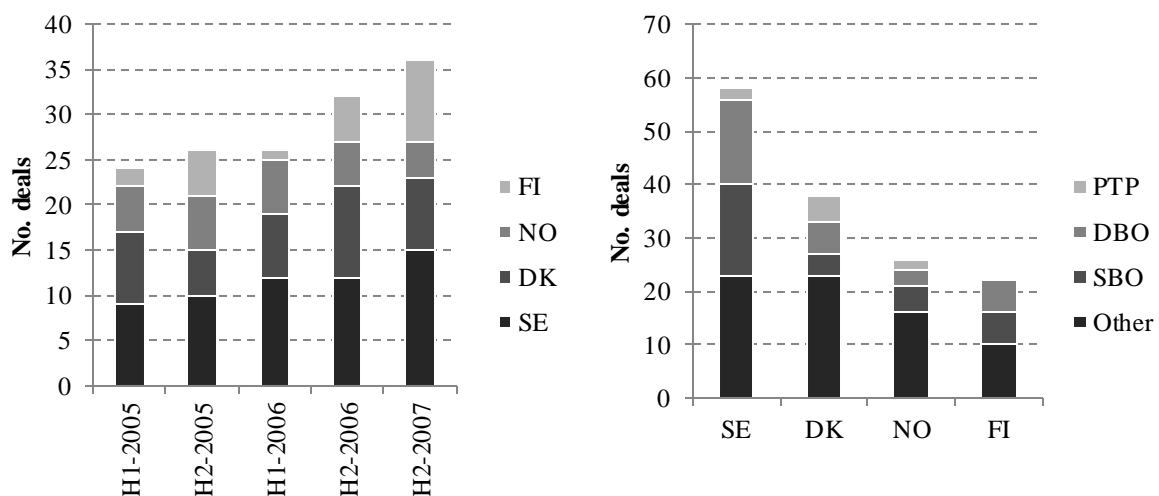
Initial investment dates in the sample is relatively evenly distributed between the half-years, although slight upward trend is visible as expected. As seen in the figure, the amount of secondary buyouts is significantly larger in Sweden compared to the other sample countries, attributable to far more developed private equity industry in Sweden. Otherwise, there are no apparent differences in the division of buyout types between the countries. The proportions of companies in each of the countries are in line with buyout volumes reported by EVCA.

Compared to previous studies, the data set has the benefit of including various types of buyouts and is thus more representative of the whole buyout universe. Most of the published studies on operating performance examine only public-to-private transactions, which is only a small fraction of the entirety of deals. Moreover, many of the studies could suffer from selection bias. In the U.S., academics are forced to study companies that are subsequently listed due to lax disclosure requirements. This could impose a positive bias in the performance measures, as companies that go public tend to have positive track record in the year preceding the listing. Moreover, when measuring operational performance from entry to exit, bankrupt companies are excluded.

However, it is clear that the data has a lot of potential defects. Databases used to identify the deals probably do not cover all of the deals, especially in the smaller end. Moreover, many of the companies had to be excluded as the ultimate parent company could not be identified due to complicated group structures and missing ownership links in the database.

5.2 Detection of abnormal performance

Considerable variation exists in the measures of performance in the existing literature on performance of private equity. Barber and Lyon (1996) discuss performance measurement in event studies. They break the measurement problem down to three choices; selecting measure of operating performance, determining a benchmark, and selecting an appropriate statistical test.

5.2.1 Performance measures

Barber and Lyon (1996) note that performance measure should be carefully selected depending on the research question. For example, IPO firms could overstate their accrual-based measures, and issuers of new securities could initially underperform in terms of capital efficiency, as it takes times to put the capital in use.

All of the recent buyout studies use operating income as the main measure of operating performance. The reason for this is two-fold. First, operating income is a cleaner measure than earnings of the productivity of operating assets, as it excludes special items and taxation. Second, leveraged buyouts almost always result in significant increase in leverage and interest payments. Thus, the main driver of changes in earnings is the amount of debt instead of efficiency of underlying operations.

In order to measure operational efficiency of company's operations, operating income must be scaled. Kaplan (1989) scales operating income with book value of assets, while some more recent studies scale operating income with various other measures that better reflect the capital invested in the company.

Kaplan (1989) and many other studies analyze operating performance by comparing the percentage changes in performance measures. While analyzing changes in performance is generally preferred over absolute levels, it comes with two fundamental problems. First, if the measure under study is negative in either year over which the percentage change is calculated, the result is nonsensical. Thus, researchers are forced to discard firms that experience losses over the sample period, leading to biased results. Second, changes in operating performance are implicitly assumed to be proportional to the level of pre-event return ratios. For example, consider two firms with equal total assets but different operating income levels. An increase of similar absolute size in operating income leads to significantly higher change in return ratio for the company with lower initial return.[10]

In line with Barber and Lyon (1996) and previous empirical studies by Kaplan (1989a) and Guo *et al.* (2011), I measure percentage changes in all variables, and also test the changes in levels for profitability ratios that can have negative values. As the period under study comprises recession years, some of the companies are expected to have negative profitability. As industry medians tend to be less volatile than company values, percentage changes could show a positive bias due to dropping of high number of negative observations in sample firm profitability.

In this thesis, I use EBITDA as the main measure of operating performance, and scale it with total assets of the company. The reason to use EBITDA is two-fold. First, cash flow is the main measure of value and firmly linked to private equity returns, and EBITDA is the closest available proxy of cash flow available in published accounts of the private companies in Nordics. Thus, using it maximizes the amount of observations. Secondly, using EBITDA also allows for comparison between previous studies.

5.2.2 Benchmark group

Purpose of this thesis is to assess whether performance of portfolio companies is unusually good after the leveraged buyout event. Thus, it is crucial to determine an appropriate

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[10] Firm A: TA $100,000 and $1,000 OI vs. Firm B: $100,000 and $10,000. Increase of $5,000 in OI leads to increases in ROA of +500% and 50%.

benchmark to specify expected performance of portfolio companies in absence of the buyout. Previous literature uses a variety of alternative benchmarks. Kaplan (1989) uses industry adjustment based on SIC-codes, excluding companies with limited capital value. Guo *et al.* (2011) use industry, pre-buyout performance level, the change in pre-buyout performance, and the market-to-book assets ratio as the basis for the matching.

Barber and Lyon (1996) compare nine different models of expected operating performance, and come into two important conclusions. First, matching past performance yields test statistics that are generally well specified and powerful. This is potentially attributable to the average tendency for mean reversion of accounting-based performance measures. Secondly, it is important to size-match small firms. The authors also note that researches should hold the benchmark group constant over time.

In this study, I match the peer group by industry, size, and geography. In line with previous studies and guidelines in Barber and Lyon (1996), I have used beginning of the observation period as the matching point, and use a constant peer group throughout the period.

For industry classification, I use NACE classification, as it is the original classification code given to the sample companies. NACE classification is subject of legislation at the European Union level, which imposes the use of the classification uniformly within all member states. As I target holding companies or consolidated parent companies, industry code of the parent entity could not reflect the actual operations of the company. In this case, I use the industry classification of the pre-buyout target company, or largest subsidiary.

Second, I start by considering only companies domiciled in the Nordic countries for each of the peer groups. While many of the companies operate internationally, bulk of the sample companies generate majority of their revenues in their home country or other Nordic countries. On the other hand, restricting peer groups to companies domiciled in the same country would be non-satisfactory because of limited number of satisfactory peer companies operating in the same industry. If limited number of peers is available in the Nordic countries, the search is widened to cover the whole Europe.

Finally, the remaining peer companies with matching industry code and nationality is matched to the buyout company based on asset size as of 2007. This year is used as the reference year, as it best reflects the asset size of the actual portfolio companies, especially in cases where portfolio company is a result of merger of two or more smaller companies. Asset

matching is common in recent literature, and also yields good results according to Barber and Lyon (1996).

Although Barber and Lyon (1996) argue that implementing past-performance matched peer group would yield better results especially for smaller companies and companies that have performed especially well or poorly in the past. I have omitted this, as data availability for the buyout companies would limit the sample size dramatically. Using a similar 90%-110% past performance range would require relaxing of industry or geography restrictions in order to acquire a peer group of decent size.

Peer groups matching was started by first acquiring a list of about 12,000 companies from the Orbis database using broad industry searches. Next, companies in the buyout sample and their subsidiaries were removed from the list by searching for keywords and registry numbers. In addition, companies with limited and/or inconsistent data were removed. Finally, sample companies were matched to their corresponding peer groups in a three step process. Minimum size of peer group was set to five with closest total asset size. Appendix B describes the matching process in detail, and lists the matching criteria for each of the sample companies.

Industry classification was regarded as the most important matching factor, and thus the most accurate 4-digit NACE code was priority in the matching because of the period under study. The case of Nimbus boats highlights the importance of good industry matching: The cyclicality of building pleasure and sporting boats greatly differs from its 2-digit industry group in general, manufacture of other transport equipment, which includes e.g. railway locomotives and aircraft. Moreover, private equity owned companies in general tend to be fairly non-diversified, potentially resulting in higher cyclicality compared to peers matched by wide industry classifications.

The matching process also has some potential problems. First, I accepted both unconsolidated and consolidated accounts of the peer group companies. Thus, some of the peer group companies can be e.g. country organizations of a large international group. However, it is not clear if this creates any bias to the result. If some of the overhead costs are borne by parent companies, the profitability could be upward biased for the subsidiaries. Thus, when measuring percentage changes, the increases and decreases could be deflated.

Secondly, there are two potential sources survivorship bias in the matching process. As in the buyout sample, companies that went bankrupt in the recession are not included in the peer

group. Thus, the measure could be slightly upward biased. In addition, the mean reversion problem of accrual-based accounting measures suggested by Barber and Lyon (1996) could exist. The authors argue that past-performance matching is important especially in case of smaller companies.

5.2.3 Statistical tests

Statistical tests for difference are made for unadjusted firm changes and benchmark-adjusted changes. I use two alternative change measures depending on the performance measure under study. For profitability ratios that can have negative values, percentage point changes are calculated to avoid potential biases from discarding observations with negative values. Unadjusted change is calculated simply by subtracting the performance in reference period:

$$\Delta P_{i,t} = P_{i,t} - P_{i,t-1}$$

where $P_{i,t}$ is the performance measure of firm i in period t. Benchmark-adjusted abnormal performance $AP_{i,t}$ is defined as realized performance less expected performance $E(P_{i,t})$:

$$AP_{i,t} = P_{i,t} - E(P_{i,t}) = P_{i,t} - (P_{i,t-1} + (PG_{i,t} - PG_{i,t-1})) = \Delta P_{i,t} - \Delta PG_{i,t}$$

where expected performance is based on the change in median of the peer group PG_i. When testing changes for level measures and scaled measures that do not have negative values (e.g. sales, sales/employee), logarithmic growth is tested:

$$\ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$$

For adjusted change, the difference in logarithmic growth rate is calculated and tested for difference from zero:

$$\ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) - \ln\left(\frac{PG_{i,t}}{PG_{i,t-1}}\right)$$

To test the hypotheses, I use Wilcoxon signed-rank test[11]. Barber and Lyon (1996) find that nonparametric test statistics are uniformly more powerful than parametric t-statistics when measuring changes in operating measures. The result is attributable to the existence of extreme observations in the distribution of the operating performance measure, an issue

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[11] Also used by e.g. Kaplan (1989a), Cao and Lerner (2009), and Guo *et al.* (2011)

inherent in buyouts, especially those that could be classified as recapitalizations or turnarounds. To test the null hypothesis in which median abnormal performance is equal to zero, I employ the nonparametric Wilcoxon T-statistic. The behavior of T can be predicted under the null hypothesis assuming that the original values are coming from the same continuous population symmetric about a common median.

5.3 Explanatory model for operating performance

In order to test the hypotheses on determinants of abnormal performance, I estimate a regression model to test the hypotheses on wealth transfer from employees to owners, effect of leverage, and secondary buyouts.

$$AP =$$
$$\alpha + \beta_1 Initial\ performance + \beta_2 \Delta Personnel\ costs +$$
$$\beta_3 \Delta Net\ working\ capital + \beta_4 Leverage + \beta_5 SBO + e \ ,$$

Where AP is benchmark-adjusted change in operating performance measured in EBITDA/sales or EBITDA/total assets in the period 2007-2009, $Initial\ performance$ is EBITDA/sales or EBITDA/total assets in year 2007 depending on the dependent variable, $\Delta Personnel\ costs$ and $\Delta Net\ working\ capital$ are percentage point changes in personnel costs and net working capital, both proportional to sales. $Leverage$ is the 2007 Net debt/EBITDA of the buyout firm. SBO is a dummy variable for acquisition from other private equity firm.

To avoid potential problems from extreme values, all continuous variables are Winsorized at 1% and 99% levels. All regressions are Ordinary Least Squares (OLS) regressions with heteroskedasticity-consistent Huber-White standard errors.

5.4 Accounting data

As discussed above, the primary source of accounting data has been Bureau van Dijk's Orbis database. In some cases data provided by the private equity firm or the company's annual report have been used. Although incomplete, data for majority of the companies was available from these sources. Ideally, the accounting data could have been more complete if complemented with data from the national registries.

All data is based on Orbis' Global standard format, which is a standardized template used to increase comparability between alternative accounting principles. All fiscal years that diverge

from the ordinary 12 months ending in December are annualized and/or transformed. Asset scaled measures are calculated using average assets during the fiscal year when data is available.

6   Results and analysis

This chapter presents the results for the operating performance changes. I begin by presenting the summary statistics and results for full sample. Next, I divide the sample first to subsamples based on country of domicile and type of the initial buyout. Finally, I present the results for the regression model.

6.1   Summary statistics

Table 5 describes the sample of portfolio companies. In total, the sample contains 144 companies for which financial data was available. 40% are companies domiciled in Sweden. Buyouts classified as other (a company that was not public, in private equity ownership, or owned by an industrial group at the time of the buyout) account for 50 % of the full sample. Amount of secondary buyouts in Sweden is notable, and potentially attributable to the developed private equity industry.

Table 5 – Distribution of sample by buyout type and geography

The table presents number of sample companies (number as a percentage of full sample) by country of domicile and initial buyout type.

	Sweden	Norway	Denmark	Finland	Total
Other buyouts	23 (16%)	23 (16%)	16 (11%)	10 (7%)	**72 (50%)**
Secondary buyout	17 (12%)	4 (3%)	5 (3%)	6 (4%)	**32 (22%)**
Divisional buyout	16 (11%)	6 (4%)	3 (2%)	6 (4%)	**31 (22%)**
Public-to-private	2 (1%)	5 (3%)	2 (1%)	0 (0%)	**9 (6%)**
Total	**58 (40%)**	**38 (26%)**	**26 (18%)**	**22 (15%)**	**144 (100%)**

Table 6 presents sample companies by industries. Largest industry section in the sample is by far manufacturing, which accounts for 48 % of the sample companies. Wholesale and retail trade accounts for 24 % of the sample, with the rest of the industries splitting the remaining 28 %.

Table 6 – Distribution of sample by industry

The table presents sample companies grouped by NACE Rev. 2 main industry sections. Industries with zero companies are not shown.

NACE Section	# of obs.	% of total
Manufacturing	69	48 %
Wholesale and retail trade	35	24 %
Transportation and storage	7	5 %
Administrative and support service activities	7	5 %
Construction	6	4 %
Information and communication	6	4 %
Professional, scientific, and technical activities	4	3 %
Human health and social work activities	4	3 %
Arts, enterntainment and recreation	3	2 %
Accomodation and food service activities	2	1 %
Other service activities	1	1 %

Table 7 presents the summary statistics for characteristics of the sample companies. Majority of the companies have sales between about €20 million and €1 billion, with a typical sample company with sales of about €100 million. Median EBITDA-margin of 10.16 is similar to previous studies by Kaplan (1989) and Guo *et al.* (2011). Leverage measured as Net Debt/EBITDA shows a median value of 5.20x, which is slightly lower to values reported by Guo *et al.* (2011) for years 2005-2006.

Table 7 – Summary statistics for mean and median firm characteristics (full sample)

The table reports sample characteristics as of 2007. Sales, total assets, sales/employee, and average cost of employee are reported in thousand Euros, profitability ratios in percentage points, and Net Debt/EBITDA as a multiple of EBITDA.

	# of obs.	5 %	95 %	Median	Mean
Sales (EUR th)	135	21,603	1,165,228	108,578	343,578
Total assets (EUR th)	133	14,637	1,567,495	125,367	421,443
Net Debt/EBITDA	124	-0.37x	32.11x	5.20x	18.82x
Book equity/total assets	133	-2 %	48 %	16 %	18 %
EBITDA/sales	133	0.12	24.86	10.16	10.89
EBITDA/total assets	132	0.10	21.13	9.02	9.16
Net working capital/sales	129	1.41	41.10	16.93	19.00
Stocks/sales	116	0.57	31.61	11.31	12.18
Receivables/sales	128	1.17	29.68	14.10	14.87
Payables/sales	129	1.43	20.41	7.68	8.65
Sales/employee (EUR th)	110	93	1,088	306	473
Personnel costs/sales	111	6.48	58.97	22.55	26.24
Average cost of employee (EUR th)	87	34.18	103.06	66.93	66.15

6.2   Changes in operating performance

Large positive gains in return to invested capital reported in previous studies (See e.g. Guo *et al.,* 2011) suggest that one of the main drivers of value creation is true economic value creation at the operational level. In order to analyze the impact of private equity ownership on operating performance, changes in the period 2007-2009 for various performance measures were calculated. In addition, all companies under study are benchmarked against their respective peer groups matched on industry and size. The methodology applied allows comparison to Kaplan (1989) and Guo *et al.* (2011), although differences in matching methodology and sample characteristics exist. I begin by analyzing the full sample, and then divide the sample to sub-samples based on country and type of buyout. Then, I relate the observed abnormal operating performance gains to variables that could explain the increased performance.

Table 8 reports unadjusted changes in operating performance variables. The first column reports changes from 2007 to 2008, second column from 2008 to 2009, and the last column change for the whole period from 2007 to 2009.

Table 8 – Unadjusted changes in operating performance 2007-2009 (full sample)

The table reports changes in unadjusted operating performance. Changes in EBITDA/sales and EBITDA/total assets are reported in percentage points; all other changes are percentage changes. NWC denotes net working capital. Values in parentheses show number of observations and positive observations. Significance levels are based on two-tailed Wilcoxon signed-rank test. *, **, and *** denote levels that are significantly different from zero at 10%, 5%, and 1% levels, respectively.

	2007-2008	2008-2009	2007-2009
A. Growth			
Sales growth	**0.89 % (132;70)***	-1.34 % (130;63)	**2.25 % (127;70)***
B. Profitability			
EBITDA/sales	-0.120 (130;63)	-0.464 (127;60)	-0.435 (126;54)
EBITDA/total assets	1.315 (129;78)	-0.291 (125;56)	0.719 (123;69)
D. Employment			
Sales/employee	**-10.86 % (106;30)*****	**3.10 % (105;63)***	-2.85 % (102;45)
Personnel costs/sales	**1.75 % (107;71)*****	**2.73 % (105;70)*****	**6.02 % (102;73)*****
Avg cost of employee	-4.81 % (82;32)	**6.41 % (79;60)*****	**1.71 % (78;42)****
E. Working capital			
NWC*/sales	**-8.58 % (118;46)*****	**-3.54 % (123;52)***	**-12.01 % (114;34)*****
Stocks/sales	**-4.58 % (112;48)****	**-4.93 % (113;42)****	**-9.92 % (108;33)*****
Receivables/sales	**-8.58 % (124;42)*****	-2.50 % (123;54)	**-11.70 % (118;40)*****
Payables/sales	**-4.85 % (126;53)***	-7.15 % (125;52)	**-10.90 % (121;45)*****

*Net working capital

Unadjusted operating performance measures reported above show insignificant statistical difference from zero for sales growth and EBITDA/sales and EBITDA/total assets. Median sales growth is 2.25%, and median EBITDA-margin decreases by about 0.4 percentage points. EBITDA in relation to total assets shows an increase, which can be explained by increased capital efficiency in the sample firms.

Employment measures show insignificant decrease in Sales/employee for the whole period 2007-2009. Average cost of employee has increased significantly, as has personnel costs/ sales. Working capital measures decrease across the board, as expected in downturn. Median net working capital in relation to sales decreases about 12%, which partially could affect positive development in EBITDA/total assets.

However, as the economic downturn in the study period affects growth in profitability, sales and working capital, it is particularly important to compare the changes in sample firms to their matched peer group in order to identify abnormal performance.

Table 9 adjusts performance gains in sample firms by subtracting the median of peer group matched on industry and size. Compared to their respective peer groups, private equity backed firms seem to have significant performance gains. Sales growth is significantly higher in both years and the full period, and also the economic size of the growth difference is significant 15.05% for full period, and 3.5% to 4.6% in 2007-2009 and 2008-2009, respectively. However, it is important to remember that as the data has not been adjusted for acquisitions, the sales figures can reflect inorganic growth in private equity owned firms.

Table 9 – Adjusted changes in operating performance (full sample)

The table reports changes in adjusted operating performance. EBITDA/sales and EBITDA/total assets is reported in percentage points and subtracts median of peer group; all other measures are sample firm percentage changes subtracted by peer group change in median. Values in parentheses show number of observations and positive observations. Significance levels are based on two-tailed Wilcoxon signed-rank test. *, **, and *** denote levels that are significantly different from zero at 10%, 5%, and 1% levels, respectively.

	2007-2008	2008-2009	2007-2009
A. Growth			
Sales growth	**4.57 % (132;72)***	**3.45 % (130;75)**	**15.05 % (127;86)***
B. Profitability			
EBITDA/sales	**0.968 (130;80)***	0.400 (127;68)	**1.640 (126;75)***
EBITDA/total assets	**2.322 (129;82)***	1.079 (125;73)	**2.260 (123;78)***
D. Employment			
Sales/employee	-3.09 % (106;47)	**7.26 % (105;69)***	**4.94 % (102;63)***
Personnel costs/sales	1.19 % (106;57)	-1.85 % (104;44)	0.70 % (101;51)
Avg cost of employee	-4.38 % (81;34)	**3.73 % (78;49)***	1.01 % (77;39)
E. Working capital			
NWC*/sales	**-10.56 % (116;46)**	1.44 % (122;64)	**-13.10 % (112;46)**
Stocks/sales	**-6.91 % (112;47)**	-0.61 % (113;54)	**-7.05 % (108;43)**
Receivables/sales	-4.50 % (124;55)	-5.66 % (123;50)	**-8.60 % (118;54)***
Payables/sales	1.88 % (126;65)	0.93 % (125;64)	-3.38 % (121;58)

*Net working capital

EBITDA/sales and EBITDA/total assets show significant increases, which is mainly attributable to performance gains in 2007-2008. This is in line with the theories of private equity backed firms reacting swiftly to changes in economic conditions. Moreover, the magnitude of the change is significant comparing to the initial median values of about 10% for EBITDA/sales and 9% for EBITDA/total assets (see Table 7), equaling about 20% increase.

Thirdly, employment measures show significant increase in employee productivity measured in sales/employee, which can be explained by better sales development of private equity backed firms in relation to their peer groups. Other changes in employment measures relative to peers are insignificant and small. Thus, the data does not support the notion that wages have decreased or personnel have been cut any more than in benchmark group.

Finally, working capitals measures provide evidence that private equity backed firms were able to better manage their working capital during the period under study. Net working capital shows significant decrease of 13% in 2007-2009 in relation to the benchmark. The change is mostly attributable to decrease in stocks and receivables, which both show significant decrease. The result is in line with Smith (1990), who found similar change in net working capital also attributable to changes in inventories and receivables.

To sum up, the sample firms show, as expected, significant improvements in operating performance measures compared to the benchmark. However, unadjusted changes show little or no improvement in performance measures. This can potentially lead to many unsuccessful buyout deals and firms in the coming years, if the prices paid in the boom years reflected significant expected increases in cash flows. Moreover, many highly levered firms have been forced to bankruptcy or renegotiate their loans (almost always entailing additional equity investment) due to their inability to pay the high interest payments. Thus, the average returns of the private equity asset class are expected to be lower in the years to come, as historically have been after a buyout boom (Kaplan and Schoar, 2005).

6.2.1 Variation in operating performance across countries

One of the most important questions in the limited buyout research is how performance varies across transaction types, and countries. The purpose of the analysis on the country and buyout type sub-samples is to gain knowledge of the potential differences between the operating performance gains and characteristics of private equity backed firms in the Nordic countries, although the scope of this study does not cover investigation of the underlying determinants. In this sub-section, I divided the sample into subsamples based on the country of domicile. The next sub-section analyzes the differences between buyout types.

Table 10 reports country-specific characteristics of the sample firms. Median size in terms of operating revenue and assets is in Denmark, while Sweden and Finland have relatively the highest amount of smaller deals. Differences in profitability and return to assets are relatively small.

Table 10 – Summary statistics for mean and median firm characteristics (grouped by country)

The table presents median sample characteristics by country of domicile as of 2007. Sales, Total Assets, Sales/Employee, and Average cost per employee are reported in thousand Euros, all other ratios in percentage points.

Variable	Sweden	Denmark	Norway	Finland
Average Sales (EUR th)	85,878	142,519	105,359	85,232
Average Total assets (EUR th)	94,131	148,228	126,410	96,564
Median EBITDA/sales	9.72	11.02	10.42	9.83
Median EBITDA/total assets	8.47	10.03	8.37	9.58
Net working capital/sales	15.65	17.13	21.49	17.36
Stocks/sales	11.40	9.47	12.45	15.34
Receivables/sales	14.94	14.08	13.78	13.11
Payables/sales	7.90	8.66	7.08	6.76
Sales/employee (EUR th)	315	295	291	276
Personnel costs/sales	21.84	21.13	24.03	24.09
Average cost of employee (EUR th)	71.13	67.18	81.88	51.37

Table 11 reports the industry distribution in country sub-samples. The relative amount of manufacturing companies is clearly highest in the Finnish sub-sample, while other sub-samples have relatively higher amount of companies operating in the wholesale and retail trade industries.

Table 11 – Distribution of country sub-samples by industry

This table presents the number of sample companies grouped by NACE Rev. 2 main industry sections and country of domicile. Values in parenthesis show the number of observations in relation to total sub-sample companies. Industries with zero companies are left out from the table.

NACE Section	Sweden	Denmark	Norway	Finland
Manufacturing	28 (48%)	20 (53%)	7 (27%)	14 (64%)
Wholesale and retail trade	14 (24%)	10 (26%)	9 (35%)	2 (9%)
Transportation and storage	3 (5%)	2 (5%)	1 (4%)	1 (5%)
Administrative and support service activities	1 (2%)	2 (5%)	1 (4%)	3 (14%)
Construction	3 (5%)	1 (3%)	2 (8%)	0 (0%)
Information and communication	2 (3%)	2 (5%)	2 (8%)	0 (0%)
Professional, scientific, and technical activities	1 (2%)	0 (0%)	1 (4%)	2 (9%)
Human health and social work activities	4 (7%)	0 (0%)	0 (0%)	0 (0%)
Arts, enterntainment and recreation	0 (0%)	1 (3%)	2 (8%)	0 (0%)
Accomodation and food service activities	2 (3%)	0 (0%)	0 (0%)	0 (0%)
Other service activities	0 (0%)	0 (0%)	1 (4%)	0 (0%)
Total	**58 (100%)**	**38 (100%)**	**26 (100%)**	**22 (100%)**

Table 12 reports benchmark-adjusted changes in operating performance for the country sub-samples. Significant differences between countries exist, although low number of observations limits ability to draw strict conclusions. Especially data on number of employees limits observations on employment figures in Norwegian sub-sample, where average cost of employee could not been calculated for any of companies.

Table 12 – Adjusted changes in operating performance (grouped by country)

The table reports absolute changes in adjusted operating performance. EBITDA/sales and EBITDA/total assets is reported in percentage points and subtracts median of peer group; all other measures are percentage changes subtracted by peer group change in median. Values in parentheses show number of observations and positive observations. Significance levels are based on two-tailed Wilcoxon signed-rank test. *, **, and *** denote levels that are significantly different from zero at 10%, 5%, and 1% levels, respectively.

	Sweden	Denmark	Norway	Finland
A. Growth				
Sales growth	17.66 % (51;36)***	11.37 % (34;22)***	18.66 % (24;17)***	8.65 % (18;11)
B. Profitability				
EBITDA/sales	2.240 (52;33)**	-0.380 (34;15)	2.758 (24;19)*	0.115 (16;8)
EBITDA/total assets	2.499 (50;34)***	-0.193 (35;16)	3.089 (23;18)*	0.605 (15;10)
D. Employment				
Sales/employee	5.23 % (48;31)**	3.46 % (32;18)	16.82 % (4;3)	9.83 % (18;11)*
Personnel costs/sales	3.47 % (32;18)	0.35 % (34;17)	-1.52 % (20;9)	0.00 % (15;7)
Avg cost of employee	2.18 % (29;16)	1.01 % (33;17)	*n.a. (0;0)*	-1.95 % (15;6)
E. Working capital				
NWC*/sales	-17.26 % (44;15)**	-3.74 % (31;13)	-0.47 % (19;9)	-2.94 % (18;9)
Stocks/sales	-16.65 % (43;15)***	-1.81 % (32;15)	-5.69 % (19;6)	5.34 % (14;7)
Receivables/sales	-3.81 % (48;23)	-20.28 % (32;12)**	9.87 % (21;12)	-16.68 % (17;7)
Payables/sales	-7.48 % (49;23)	-6.54 % (34;14)	11.11 % (21;12)	4.20 % (17;9)

*Net working capital

Sales growth compared to the benchmark group is large and significant for Sweden, Denmark, and Norway. In Finnish sub-sample, the increase in sales is slightly smaller and insignificant. It seems that the buyout companies grew more than their benchmark groups in all of the countries, which potentially reflects the general tendency of buyout firms to make more acquisitions compared to other companies.

Interestingly, clear differences emerge in profitability ratios. Swedish and Norwegian companies have increased both sales and asset scaled EBITDA far more than their Danish and Finnish counterparties; a result which exists both in unadjusted and adjusted values[12]. In employment measures, some differences emerge in employee productivity. It appears that employee productivity in Finnish buyouts tend to increase more than in Danish and Swedish companies. However, due to limited data, no clear conclusions of country differences can be made.

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[12] See Table 18 in Appendix C for unadjusted changes.

In terms of working capital changes, Swedish companies have performed well compared to the other countries. The increased working capital efficiency appears to be attributable to deceases in inventories. Denmark shows significant decrease in receivables; however, the overall change in net working capital remains low and insignificant.

To conclude, the results suggest that Swedish and Norwegian buyouts have performed far better than their Danish and Finnish counterparts, both in terms of sales growth and profitability measures. However, the underlying reasons for the varying performance remain unclear. Descriptive statistics and examination of the distributions of the initial differences do not provide clear conclusions. Potentially, the differences could be explained by obvious differences in the characteristics of acquired companies (e.g. industry, company size), or regional differences in the expertise of the buyout firms, which has been shown to have significant impact on overall performance of buyouts.

6.2.2 Variation in operating performance across type of buyout

Another important open question that Strömberg (2008) points out is the need to understand how performance varies across transaction types. Previous research has mainly focused on large public-to-private transactions, which potentially have highly divergent characteristics and motivation from the other sub-types of buyouts. In order to make any conclusions on the economic impact of leveraged buyouts and private equity, it is important to assess the full variety of buyout types and how vary in their ability to create economic value.

Table 13 presents summary characteristics grouped by type of buyout. Public-to-private transactions target larger companies than other types of buyouts. Similarly, secondary buyouts are larger than primary buyouts in private-to-private transactions, which is expected if companies tend to grow under private equity ownership. In terms of initial profitability, public-to-private transactions outperform other transactions, but due to small number of observations generalization is difficult.

Table 13 – Summary statistics for mean and median firm characteristics (grouped by type of buyout)

The table presents median sample characteristics by country as of 2007. Sales, Total Assets, Sales/Employee, and Average cost of employee are reported in thousand Euros, all other ratios in percentage points.

	Public-to-private	Divisional buyouts	Secondary buyouts	Other
Sales (EUR th)	411,172	84,293	168,803	88,339
Total assets (EUR th)	1,495,829	96,564	283,441	81,500
EBITDA/Sales	16.08	13.06	8.87	9.61
EBITDA/Total assets	11.65	8.03	9.65	9.17
Net working capital/Sales	13.98	16.20	19.69	17.11
Stocks/Sales	4.63	11.94	11.68	11.11
Receivables/Sales	15.91	14.08	14.97	13.49
Payables/Sales	8.90	8.01	8.15	7.22
Sales/Employee (EUR th)	260	273	276	328
Personnel costs/Sales	26.61	26.38	25.92	21.13
Average cost of employee (EUR th)	67.29	72.11	59.77	67.18

Table 14 presents the distribution of different types of buyouts across industries. Divisional buyouts and secondary buyouts seem to target more manufacturing companies, while buyouts classified as Other have relatively higher fraction of companies in wholesale and retail trade industries.

Table 14 – Distribution of buyout type sub-sample by industry

This table presents the number of sample companies grouped by NACE Rev. 2 main industry sections and type of initial buyout. Values in parenthesis show the number of observations in relation to total sub-sample companies. Industries with zero companies are left out from the table.

NACE Section	Public-to-privates	Divisional buyouts	Secondary buyouts	Other
Manufacturing	4 (44%)	19 (61%)	16 (50%)	30 (42%)
Wholesale and retail trade	1 (11%)	2 (6%)	4 (13%)	28 (39%)
Transportation and storage	0 (0%)	2 (6%)	1 (3%)	4 (6%)
Administrative and support service activities	2 (22%)	3 (10%)	1 (3%)	1 (1%)
Construction	0 (0%)	0 (0%)	2 (6%)	4 (6%)
Information and communication	1 (11%)	1 (3%)	3 (9%)	1 (1%)
Professional, scientific, and technical activities	0 (0%)	2 (6%)	2 (6%)	0 (0%)
Human health and social work activities	1 (11%)	0 (0%)	2 (6%)	1 (1%)
Arts, enterntainment and recreation	0 (0%)	1 (3%)	0 (0%)	2 (3%)
Accomodation and food service activities	0 (0%)	1 (3%)	0 (0%)	1 (1%)
Other service activities	0 (0%)	0 (0%)	1 (3%)	0 (0%)
Total	**9 (100%)**	**31 (100%)**	**32 (100%)**	**72 (100%)**

Table 16 reports adjusted changes in operating performance, grouped by type of the buyout. As majority of deals are classified as Other, number of observations in other types are limited. However, some significant differences emerge, and variation across buyout types is large.

Sales growth is large and statistically significant in Secondary buyouts and buyouts classified as Other. This could mean that value creation in these buyout classes in more focused on consolidation and restructuring of industries. This makes sense, if in SBO cases improvements conducted by the previous private equity owner limit the ability to create value through operational engineering. Moreover, previous owners of companies that are classified as Other consist of family offices and financial owners, whose potentially limited financial resources could attract private equity firms to invest in particularly good growth prospects.

EBITDA/sales and EBITDA/total assets show positive values for all other buyout types except public-to-privates. Divisional buyouts have by far highest gains, while secondary buyouts and other show significant gains for only asset scaled measure. The exceptional performance of divisional buyouts is interesting. One interpretation of the result is that the potential for operating gains is the highest for companies that were previously considered

non-core divisions by their parent groups. Unadjusted results confirm the outperformance of divisional buyouts.[13]

Table 15 –Adjusted changes in operating performance 2007-2009 (grouped by type of buyout)

The table reports unadjusted and adjusted changes in operating performance grouped by buyout type. EBITDA/sales and EBITDA/total assets is reported in percentage points and subtracts median of peer group; all other measures are percentage changes subtracted by peer group change in median. Values in parentheses show number of observations and positive observations. Significance levels are based on two-tailed Wilcoxon signed-rank test. *, **, and *** denote levels that are significantly different from zero at 10%, 5%, and 1% levels, respectively.

	Public-to-privates		Divisional buyouts		Secondary buyouts		Other	
A. Growth								
Sales growth	5.70 %	(8;4)	7.73 %	(27;16)	**18.60 %**	**(26;18)***	**16.55 %**	**(66;48)***
B. Profitability								
EBITDA/sales	-1.69	(8;3)	**6.15**	**(27;19)**	1.39	(26;16)	1.43	(65;37)
EBITDA/total assets	-0.92	(8;3)	**3.33**	**(26;17)***	**1.74**	**(23;15)**	**2.83**	**(66;43)***
D. Employment								
Sales/employee	2.88 %	(7;5)	7.46 %	(24;14)	**4.80 %**	**(23;14)***	**4.91 %**	**(48;30)**
Personnel costs/sales	1.74 %	(6;3)	-2.81 %	(19;7)	2.32 %	(16;9)	1.44 %	(60;32)
Avg cost of employee	-1.53 %	(5;2)	0.43 %	(16;8)	-7.21 %	(13;6)	1.98 %	(43;23)
E. Working capital								
NWC*/sales	-16.82 %	(5;2)	0.80 %	(22;11)	-15.02 %	(24;10)	**-18.82 %**	**(61;23)**
Stocks/sales	-5.64 %	(6;3)	0.23 %	(21;11)	-8.20 %	(23;10)	**-11.68 %**	**(58;19)**
Receivables/sales	-3.30 %	(7;3)	**-16.68 %**	**(25;10)***	-2.71 %	(24;12)	-7.13 %	(62;29)
Payables/sales	17.53 %	(7;5)	-18.01 %	(25;8)	-6.03 %	(25;10)	4.41 %	(64;35)

*Net working capital

Adjusted Sales per employee is significant and above zero for secondary buyouts and Other. Adjusted Personnel costs/sales is negative in Divisional buyouts. Net working capital measures show large decreases for all types except divisional buyouts, although only difference for Other is significant.

Although analysis on transaction types shows significant differences between buyout groups, it is important to note that country differences could affect the results. As seen in Table 5, majority of sample companies that are classified to DBO and SBO categories are Swedish companies. Thus, the type-specific results could partially reflect country differences, if they

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[13] See Table 19 in Appendix C for unadjusted changes.

exist. Examination of the isolated country and type differences is practically impossible due to limitations in the sample size.

6.3 Determinants of operating performance

Although median changes in operating performance are small on average, the variation in performance measures is relatively large. To examine the determinants of operating performance I employ multivariate regressions to test the hypotheses 6-8.

Table 16 – Regressions for operating performance

Table 9 reports the multivariate regression results for change in operating performance measures 2007-2009. In models (1) and (2) dependent variable is unadjusted percentage point change in operating measure; in (3) and (4) adjusted measure is examined. Initial adjusted operating measure is EBITDA/Sales for models (1) and (2) and EBITDA/Total assets for models (3) and (4). Independent variables for operating measures are unadjusted. *P*-values in parentheses. All regressions are OLS with heteroskedasticity-robust standard errors. All continuous variables are winsorized at 2% and 98% levels. ***, **, and * indicate significante at the 1%, 5%, and 10% level, respectively.

	(1) Change in unadjusted EBITDA/sales	(2) Change in unadjusted EBITDA/assets	(3) Change in adjusted EBITDA/sales	(4) Change in adjusted EBITDA/assets
Initial EBITDA/Sales or EBITDA/total assets	0.073	-0.132	-0.016	**-0.339****
	(0.296)	*(0.229)*	*(0.851)*	*(0.021)*
Change in Personnel cost/sales	**-0.808*****	**-0.832*****	**-0.415****	-0.259
	(0.000)	*(0.000)*	*(0.023)*	*(0.233)*
Change in net working capital/sales	0.073	-0.132	-0.016	-0.339
	(0.755)	*(0.355)*	*(0.201)*	*(0.884)*
Net Debt/EBITDA	**0.196****	**0.254****	**0.179****	0.126
	(0.022)	*(0.013)*	*(0.043)*	*(0.274)*
SBO dummy	1.286	**2.615***	0.237	-0.224
	(0.280)	*(0.061)*	*(0.873)*	*(0.894)*
Constant	**-1.851****	**-2.623****	0.623	0.795
	(0.041)	*(0.023)*	*(0.546)*	*(0.539)*
Number of obs.	94	94	94	94
R^2	0.269	0.294	0.135	0.142

Results of the cross-sectional regressions are reported in Table 16. Columns (1) and (2) report models with unadjusted changes, and columns (3) and (4) are models with benchmark-adjusted EBITDA/sales and EBITDA/total assets changes as dependent variables. All regressions control for initial *adjusted* value of dependent variable, as the ability to improve operating performance may be greatest for firms who underperform their peers in the

beginning of the period. Thus, initial value controls for target selection that is not directly related to private equity firms' ability to create economic value. Other independent variables include Change in Personnel costs/sales, Change in Net Working Capital/sales, Net Debt/EBITDA as of 2007. SBO is a dummy variable indicating that the transaction was a secondary buyout.

The regressions show that companies with higher decrease in personnel costs per sales perform better, although the coefficient for adjusted EBITDA/total assets is insignificant. For unadjusted changes, the significance is obvious, as the size of the coefficient. For change in adjusted EBITDA/sales, one percentage point decrease in personnel cost/sales attributes to 0.42 percentage point increase in abnormal margin improvement. The interpretation could be either that private equity firms are able to increase productivity in their portfolio companies or decrease wages. Additional regressions with Personnel cost breakdown to productivity (sales/employee) and wages (average cost of employee) do not provide significant results due to limited number of observations on the amount of employees in the sample. Thus, I cannot conclude if abnormal performance is explained by improved productivity or decrease in wages.

In addition, firms with higher leverage seem to perform better, consistent with the free cash flow hypothesis. SBO shows positive and significant value for change in uadjusted EBITDA/total assets. For adjusted change, SBO dummy does not show any significance. Therefore, the regressions leave open the question on whether secondary buyouts have any impact on the abnormal operating performance.

7   Conclusion

In this thesis, I have analyzed how operational performance of Nordic private equity backed companies acquired in the latest buyout boom has developed in the subsequent economic downturn of 2007-2009. I use a novel dataset combining deal characteristics and accounting data of 144 companies with revenues over € 15 million domiciled in Sweden, Finland, Norway and Denmark. While existing literature is largely focused on public-to-private deals in U.S. markets, I provide evidence I contribute by providing insights on the future development of the Nordic private equity industry by shedding light on the operational success of the companies acquired in the buyout boom. Additionally, I add to the knowledge on variation of performance changes across geographies and deal types.

Table 17 – Summary of hypotheses

Hypothesis	Support
H_1: Profitability of buyouts companies is improved relative to their respective peer group	**Yes**
H_2: Personnel costs in relation to sales decrease in buyout companies compared to their respective peer group	**No**
H_3: Personnel cost per employee decrease in buyout companies compared to their respective peer group	**No**
H_4: Sales per employee increase in buyout companies compared to their respective peer group	**Yes**
H_5: Net working capital/sales decreases in the buyout companies compared to their respective peer group	**Yes**
H_6: Higher leverage are associated with higher abnormal operating performance	**Yes**
H_7: Primary buyouts show higher abnormal operating performance than secondary buyouts	**No**
H_8: Decrease in Personnel costs/sales leads to higher abnormal operating performance	**Yes**
H_9: Decrease in Net Working Capital/sales leads to higher abnormal operating performance	**No**

See Table 20 in Appendix C for Summary of adjusted 2007-2009 changes in key operating measures

In line with previous studies, I found that private equity ownership in the full sample is associated with significant positive abnormal performance on company's EBITDA-margin (+1.64 ppt.) and EBITDA/total assets (+2.26 ppt.) compared to an industry- and size-matched benchmark. Recent studies on public-to-private buyouts have found little or no improvement in these measures (Guo *et al.*, 2011).

Employment-related measures show no significant difference in personnel costs/sales and average cost of employee, thus contradicting the hypothesis that private equity buyouts have negative impact on wages and employment. However, productivity as measured in sales per employee shows significant increase of about 5% compared to the benchmark group. However, the ability to make strict conclusions is limited due to the extraordinary period under study. The better sales growth of PE-backed companies and inflexible labour market in the Nordics may have contributed to the results.

Working capital measures also show significant improvement. In line with previous study by Smith (1990), benchmark-adjusted net working capital decreases 13%, attributable to decreases in inventories and receivables rather than payables.

Taken together, data supports the notion that private equity model is able to create economic value also in downturn. There is evidence on increased profitability without data supporting

the hypothesis on wealth transfers from employees to owners. Moreover, the decrease in working capital is not attributable to delaying payments to suppliers. However, unadjusted changes in profitability, growth, and return to assets show non-significant differences from zero. This potentially suggests poor returns for private equity if the high prices paid in the latest buyout boom reflected high growth expectations and margin improvements, and not only cheap financing.

Examination of operating performance in various sub-samples shows a large variation between countries and deal types. The positive abnormal performance in the full sample is attributable to good performance of Swedish and Norwegian buyouts. Moreover, significant variation exists between transaction type sub-samples, which show that divisional buyouts have performed clearly better than other buyout types relative to peers and on a stand-alone basis.

Regression analyses on determinants of abnormal performance support the hypothesis on positive effect of leverage on operating performance, in line with Guo *et al.* (2011). Moreover, I find some support for the hypothesis on wealth transfer from employees to owners (Shleifer and Summers, 1988), as decrease in personnel costs relative to sales has significant positive impact on abnormal EBITDA margin change. I did not find support for the hypothesis that secondary buyouts do not generate operational improvements.

The variation in performance change across deal-types potentially suggests that motivation for different types of buyouts can vary. Divisional buyouts can potentially have the best potential for pure operational engineering, while other buyouts squeeze value through other levers of value creation. This is an uncharted territory in the current buyout literature, and a potential avenue for future research as it has helps policy makers to understand the relative economic importance of different types of buyout investors.

The variation in performance across countries is also notable, but strict conclusions cannot be made due to small sample sizes. Underlying differences in market conditions and development stage likely play a role, as differences in characteristics of deals and companies. Future research has first to gather knowledge on the variation by deal characteristics before meaningful research on country level differences can be done. However, the results imply that Swedish and Norwegian buyouts will have better returns in the future, which may imply better fund-raising prospects for private equity in these markets.

Although private equity ownership has had positive impact on many measures of operating performance in the Nordics, the insignificant unadjusted change found in this thesis casts doubt on ability of the investments to achieve the high required returns. Combined with the tough market conditions, going forward, private equity industry in the Nordics will have trouble exiting their investments at high returns, potentially affecting the fund-raising and growth of the industry in the next five years.

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Appendix A – Sample firms

Sample firm	PE firm	Country	Entry	Exit	Entry type	Exit type
Aalborg Industries	Altor Equity Partners	DK	09/2005		SBO	
Addpro	Polaris	SE	05/2005		Other	
Ahlsell	Goldman Sachs Capital Partners, Cinven	SE	01/2006		SBO	
A-Katsastus	Bridgepoint Capital	FI	11/2005		SBO	
Aleris	EQT	SE	02/2005	07/2010	Other	SBO
Alignment Systems	FSN Capital	SE	03/2006		SBO	
Alimak Hek	Triton	SE	01/2007		SBO	
Ambea	3i Group	SE	12/2005	03/2010	SBO	SBO
Annas Pepparkakor	Accent Equity Partners	SE	08/2005	11/2008	DBO	STR*
Anticimex	Ratos	SE	12/2005		SBO	
Arcus-Gruppen	Ratos	NO	07/2005		Other	
Arovit Petfood	Gilde Buyout	DK	09/2006	01/2009	Other	Bank-ruptcy
Asiakastieto	GMT Communication Partners	FI	07/2006	05/2008	DBO	SBO
Atelje Margaretha	Litorina	SE	02/2005		Other	
Atos Medical	Nordic Capital	SE	04/2005		DBO	
Attendo	Industri Kapital	SE	01/2007		SBO	
Aura Light	FSN Capital	SE	04/2006		SBO	
Ball Group	Axcel	DK	12/2006		Other	
Bang & Olufsen Medicom	LD Invest Equity	DK	03/2007		DBO	
Barona Group	Sponsor Capital	FI	05/2007		Other	
BecoTek Metal Group	Norvestor	SE	11/2006		Other	
Beerenberg Corp	Herkules Capital	NO	05/2006		Other	
BIVA Møbler	Dania Capital	DK	06/2006	12/2008	Other	SBO
Blueway AS	Reiten & Co	NO	11/2006		Other	
Bodilsen	EQT	DK	11/2006	06/2009	Other	Bank-ruptcy
Bravida	Triton	NO	11/2006		SBO	
BTX Group	EQT	DK	06/2005		Other	
Byggmax	Altor Equity Partners	SE	12/2005	06/2010	Other	IPO
Capio	Apax Partners, Nordic Capital	SE	11/2006		Other	
Cardinal foods	Capman	NO	03/2005		Other	
Chr. Hansen	PAI Partners	DK	07/2005		Other	
Cimbria	EQT	DK	05/2007		Other	
Color Print	Polaris	DK	09/2006		Other	
Com Hem	Carlyle Group	SE	04/2006		SBO	
Contex Group	Ratos	SE	06/2007		SBO	
Dako	EQT	DK	05/2007		DBO	
DISA Holding	Procuritas	DK	05/2005	09/2008	DBO	SBO
EET Nordic	Capidea	DK	04/2007	12/2010	Other	FIN**
EFG European Furniture Group	Herkules Capital	SE	05/2007		Other	
Elematic	Sentica Partners	FI	08/2006	10/2007	Other	SBO
Elixia	Norvestor	NO	08/2006		DBO	
Erätukku	Sponsor Capital	FI	09/2005		Other	
EskoArtwork	Axcel	DK	10/2005	01/2011	Other	STR*
Espresso House Holding	Palamon capital Partners	SE	04/2006		Other	
Euro Cater	Altor Equity Partners	DK	12/2006		Other	
EuroMaint	Ratos	SE	06/2007		DBO	
European House of Beds	Herkules Capital	NO	02/2006		Other	
Falck	Nordic Capital	DK	02/2005		DBO	
Fameco Group	Credelity Capital	SE	10/2005		DBO	
Ferrosan	Altor Equity Partners	DK	02/2005		Other	
Fiskarhedenvillan	Polaris	SE	03/2007		Other	
Flexlink	AAC Capital Partners	SE	04/2005		SBO	
Forchem Oy	MB Rahastot	FI	01/2007		Other	
Gambro	EQT	SE	07/2006		Other	
Get	Candover	NO	01/2006	01/2007	DBO	SBO
Glud & Marstrand	AAC Capital Partners	DK	03/2005		SBO	
Grycksbo	Accent Equity Partners	SE	03/2006	03/2010	DBO	STR*
Haanpaa Group	Pamplona	FI	07/2005		SBO	

Sample firm	PE firm	Country	Entry	Exit	Entry type	Exit type
Haarslev	Odin Equity Partners	DK	04/2006		Other	
Hamlet Protein	Polaris	DK	06/2007		Other	
Handicare	Herkules Capital	NO	06/2005	11/2010	SBO	SBO
Hatteland Display	Herkules Capital	NO	03/2007		Other	
Helly Hansen	Altor Equity Partners	NO	11/2006		SBO	
Helo	AAC Capital Partners	FI	11/2006		SBO	
HusCompagniet	Axcel	DK	10/2006	04/2011	Other	SBO
Inflight Service	Capman	SE	09/2005	12/2009	Other	SBO
Infocare	Capman	NO	07/2005		SBO	
Inspecta	3i Group	FI	06/2007		SBO	
Interbuild	LD Invest Equity	DK	01/2007		Other	
Isabergs Rapid	Segulah	SE	12/2006	03/2010	Other	STR*
ISS	EQT, Goldman Sachs Capital Partners	DK	06/2005		Other	
Jetpak	Polaris	SE	12/2005		DBO	
Kemetyl Group	Segulah	SE	01/2007		DBO	
KGH Custom Services	Procuritas	SE	06/2007		Other	
Kid Interiør	Industri Kapital	NO	06/2005	08/2009	Other	Bank-ruptcy
Komas	Capman	FI	01/2007		Other	
Kompan	Nordic Capital	DK	05/2005		Other	
Kwintet	Industri Kapital	DK	11/2005		SBO	
Lekolar	3i Group	SE	03/2007		SBO	
LGT Logistics	Litorina	SE	10/2005	04/2009	DBO	SBO
Life Europe	Norvestor	NO	12/2005		Other	
Logstor	Montagu	DK	05/2006		SBO	
Lujapalvelut	Sponsor Capital	FI	12/2006		DBO	
Lundhags	EQT	SE	12/2006		DBO	
Luvata	Nordic Capital	FI	06/2005		DBO	
Maintpartner	Capman	SE	10/2006		DBO	
Malthus	Reiten & Co	NO	11/2006		Other	
Medisize	Ratos	FI	11/2006		DBO	
Micro Matic Norge	Herkules Capital	NO	01/2007		Other	
Mobile Climate Control	Ratos	SE	04/2007		Other	
Moventas	Industri Kapital	FI	01/2007		SBO	
MQ Retail	Capman	SE	05/2006		Other	
Multicom Security	GMT Communication Partners	SE	03/2005		SBO	
Munksjö	EQT	SE	03/2005		DBO	
Navico	Altor Equity Partners	NO	09/2005		DBO	
NEA Group	Segulah	SE	11/2006	07/2010	Other	STR*
Netcompany	Axcel	DK	08/2006		Other	
Nille	Herkules Capital	NO	06/2006	05/2011	Other	SBO
Nimbus boats	Altor Equity Partners	SE	02/2006		Other	
Noa Noa	Axcel	DK	12/2006		Other	
Noratel	Herkules Capital	NO	01/2005		Other	
Norpe Oy	MB Rahastot	FI	09/2005		Other	
North Trade	Procuritas	SE	07/2006		Other	
Notabene	Reiten & Co	NO	04/2006		Other	
Novenco	Dania Capital	DK	03/2006		DBO	
NVS Installation	Triton	SE	06/2006	11/2008	SBO	STR*
Palodex Group	Altor Equity Partners	FI	09/2005	11/2009	DBO	STR*
Panorama Gruppen	Norvestor	NO	05/2005		Other	
Pelly	Litorina	SE	12/2006		Other	
Permobil	Nordic Capital	SE	01/2006		Other	
Perstorp	PAI Partners	SE	12/2005		SBO	
Phadia	Cinven	SE	01/2007		SBO	
PIAB	Altor Equity Partners	SE	07/2006		Other	
Plastal	Nordic Capital	SE	02/2005	11/2009	SBO	Bank-ruptcy
PMC Group	Segulah	SE	07/2005		DBO	
Pouttu	Sponsor Capital	FI	01/2007		Other	
Q-Matic	Altor Equity Partners	SE	06/2007		SBO	
R82	LD Invest Equity	DK	12/2005		Other	
S:t Eriks	Segulah	SE	06/2005		DBO	
Saddler Scandinavia	Credelity Capital	SE	12/2006		Other	

Sample firm	PE firm	Country	Entry	Exit	Entry type	Exit type
SafeRoad Group	Reiten & Co	NO	07/2005	09/2008	Other	SBO
Sanitec	EQT	FI	04/2005		SBO	
SB Seating	Ratos	NO	05/2007		Other	
Scan Global Logistics	Odin Equity Partners	DK	12/2006		Other	
Scandbook	Accent Equity Partners	SE	10/2006	03/2010	DBO	IPO
Scandic Hotels	EQT	SE	05/2007		DBO	
Semantix	Accent Equity Partners	SE	02/2006	12/2009	DBO	SBO
SFK Systems	LD Invest Equity	DK	01/2006		DBO	
Smoke Free Systems	Credelity Capital	SE	01/2007		Other	
SPT Group	Altor Equity Partners	NO	06/2006		SBO	
Suomen Lähikauppa	Industri Kapital	FI	04/2007		Other	
Sydtotal	Priveq Partners	SE	06/2007		Other	
Tammermatic Group	Sentica Partners	FI	01/2007		Other	
TCM Group	Axcel	DK	09/2006		Other	
TDC	Apax Partners	DK	02/2006		Other	
Tesab	Accent Equity Partners	SE	01/2006		Other	
Tilbords	Herkules Capital	NO	04/2007		Other	
Unifeeder	Montagu	DK	06/2007		Other	
Ursviken Group	Sentica Partners	FI	01/2006		Other	
Walki Wisa	Capman	FI	06/2007		DBO	
Welltec	Riverside	DK	05/2005	07/2007	Other	SBO
Vernal	LD Invest Equity	DK	06/2006		Other	
VIA Travel Group	FSN Capital	NO	09/2005		Other	
Visma	HgCapital	NO	06/2006	09/2010	PTP	SBO
Wrist Group	Altor Equity Partners	DK	05/2007		Other	

*Strategic buyer; **Financial buyer

Appendix B – Peer groups

Sample firm	NACE	Industry description	Geography	Asset range	Size
Aalborg Industries	2530	Manufacture of steam generators, except central heating hot water boilers	Europe	1.8	5
Addpro	4651	Wholesale of computers, computer peripheral equipment and software	Nordic	0.2	12
Ahlsell	4674	Wholesale of hardware, plumbing and heating equipment and supplies	Europe	1.1	6
A-Katsastus	7120	Technical testing and analysis	Nordic	1.1	5
Aleris	8730	Residential care activities for the elderly and disabled	Europe	0.6	5
Alignment Systems	2651	Manufacture of instruments and appliances for measuring, testing and navigation	Nordic	0.2	7
Alimak Hek	2822	Manufacture of lifting and handling equipment	Nordic	1	6
Ambea	8810	Social work activities without accommodation for the elderly and disabled	Europe	1	5
Annas Pepparkakor	1072	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	Nordic	1.7	5
Anticimex	8129	Other cleaning activities	Europe	0.5	5
Arcus-Gruppen	1101	Distilling, rectifying and blending of spirits	Nordic	2	5
Arovit Petfood	1092	Manufacture of prepared pet foods	Europe	0.6	5
Asiakastieto	8291	Activities of collection agencies and credit bureaus	Nordic	1.1	7
Atelje Margaretha	4791	Retail sale via mail order houses or via Internet	Nordic	0.2	10
Atos Medical	3250	Manufacture of medical and dental instruments and supplies	Nordic	0.4	5
Attendo	8730	Residential care activities for the elderly and disabled	Europe	1.3	6
Aura Light	2740	Manufacture of electric lighting equipment	Nordic	1	6
Ball Group	4642	Wholesale of clothing and footwear	Nordic	0.3	5
Bang & Olufsen Medicom	3250	Manufacture of medical and dental instruments and supplies	Nordic	0.3	5
Barona Group	7820	Temporary employment agency activities	Nordic	0.4	5
BecoTek Metal Group	2453	Casting of light metals	Nordic	2.2	5
Beerenberg Corp	0910	Support activities for petroleum and natural gas extraction	Nordic	0.5	8
BIVA Møbler	4759	Retail sale of furniture, lighting equipment and other household articles in specialised stores	Nordic	0.2	7
Blueway AS	5110	Passenger air transport	Europe	0.2	8
Bodilsen	3109	Manufacture of other furniture	Nordic	0.4	5
Bravida	4322	Plumbing, heat and air-conditioning installation	Europe	1.2	8
BTX Group	4642	Wholesale of clothing and footwear	Nordic	0.9	5
Byggmax	4752	Retail sale of hardware, paints and glass in specialised stores	Nordic	0.4	5
Capio	8610	Hospital activities	Europe	1.1	5
Cardinal foods	1012	Processing and preserving of poultry meat	Nordic	1.5	5
Chr. Hansen	2110	Manufacture of basic pharmaceutical products	Europe	0.4	5
Cimbria	2822	Manufacture of lifting and handling equipment	Nordic	0.4	5
Color Print	1812	Other printing	Nordic	0.7	5
Com Hem	6110	Wired telecommunications activities	Nordic	0.7	5
Contex Group	2620	Manufacture of computers and peripheral equipment	Europe	0.4	8
Dako	2059	Manufacture of other chemical products nec	Europe	0.3	10
DISA Holding	2892	Manufacture of machinery for mining, quarrying and construction	Nordic	1.7	7
EET Nordic	4651	Wholesale of computers, computer peripheral equipment and software	Nordic	0.2	9
EFG European Furniture Group	3101	Manufacture of office and shop furniture	Europe	0.6	6
Elematic	2892	Manufacture of machinery for mining, quarrying and construction	Nordic	1.7	7
Elixia	9313	Fitness facilities	Europe	2	12
Erätukku	4690	Non-specialised wholesale trade	Nordic	0.5	5
EskoArtwork	2620	Manufacture of computers and peripheral equipment	Europe	0.2	5
Espresso House Holding	5610	Restaurants and mobile food service activities	Nordic	0.3	5
Euro Cater	4639	Non-specialised wholesale of food, beverages and tobacco	Nordic	0.7	7
EuroMaint	3317	Repair and maintenance of other transport equipment	Europe	1.6	5
European House of Beds	3103	Manufacture of mattresses	Nordic	1	6
Falck	8020	Security systems service activities	Europe	2.4	5
Fameco Group	4674	Wholesale of hardware, plumbing and heating equipment and supplies	Nordic	0.2	13
Ferrosan	1089	Manufacture of other food products nec	Nordic	0.7	5
Fiskarhedenvillan	4673	Wholesale of wood, construction materials and sanitary equipment	Nordic	0.2	22
Flexlink	2822	Manufacture of lifting and handling equipment	Nordic	0.5	5
Forchem Oy	2014	Manufacture of other organic basic chemicals	Nordic	0.6	5
Gambro	4646	Wholesale of pharmaceutical goods	Europe	1.2	6
Get	6110	Wired telecommunications activities	Nordic	0.4	7
Glud & Marstrand	2592	Manufacture of light metal packaging	Europe	0.2	9
Grycksbo	1712	Manufacture of paper and paperboard	Nordic	0.3	5
Haanpaa Group	4941	Freight transport by road	Nordic	0.9	5
Haarslev	2899	Manufacture of other special-purpose machinery nec	Nordic	0.6	5
Hamlet Protein	1091	Manufacture of prepared feeds for farm animals	Nordic	0.7	5
Handicare	4646	Wholesale of pharmaceutical goods	Nordic	0.3	5
Hatteland Display	4669	Wholesale of other machinery and equipment	Nordic	0.2	8
Helly Hansen	1419	Manufacture of other wearing apparel and accessories	Europe	0.5	6

Sample firm	NACE	Industry description	Geography	Asset range	Size
Helo	2751	Manufacture of electric domestic appliances	Nordic	0.9	5
HusCompagniet	4120	Construction of residential and non-residential buildings	Nordic	0.2	6
Inflight Service	4799	Other retail sale not in stores, stalls or markets	Nordic	2.5	6
Infocare	9511	Repair of computers and peripheral equipment	Europe	0.9	5
Inspecta	7120	Technical testing and analysis	Nordic	0.6	6
Interbuild	1623	Manufacture of other builders' carpentry and joinery	Nordic	0.4	5
Isabergs Rapid	2573	Manufacture of tools	Nordic	1.8	5
ISS	8110	Combined facilities support activities	Europe	2.5	2
Jetpak	5229	Other transportation support activities	Nordic	0.2	10
Kemetyl Group	2041	Manufacture of soap and detergents, cleaning and polishing preparations	Nordic	1.8	5
KGH Custom Services	5229	Other transportation support activities	Nordic	0.2	18
Kid Interiør	4751	Retail sale of textiles in specialised stores	Nordic	2.5	5
Komas	2562	Machining	Nordic	0.9	5
Kompan	3230	Manufacture of sports goods	Europe	0.8	5
Kwintet	4642	Wholesale of clothing and footwear	Nordic	2.2	5
Lekolar	4647	Wholesale of furniture, carpets and lighting equipment	Nordic	1.7	5
LGT Logistics	5229	Other transportation support activities	Nordic	0.2	18
Life Europe	4729	Other retail sale of food in specialised stores	Europe	0.4	5
Logstor	2420	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	Europe	0.3	5
Lujapalvelut	8110	Combined facilities support activities	Nordic	1	5
Lundhags	4642	Wholesale of clothing and footwear	Nordic	0.2	8
Luvata	2444	Copper production	Europe	2.2	7
Maintpartner	3312	Repair of machinery	Nordic	0.3	5
Malthus	4120	Construction of residential and non-residential buildings	Nordic	0.2	9
Medisize	2229	Manufacture of other plastic products	Nordic	0.5	5
Micro Matic Norge	4669	Wholesale of other machinery and equipment	Nordic	0.2	19
Mobile Climate Control	2825	Manufacture of non-domestic cooling and ventilation equipment	Nordic	0.5	5
Moventas	2599	Manufacture of other fabricated metal products nec	Europe	0.3	7
MQ Retail	4771	Retail sale of clothing in specialised stores	Nordic	1.2	6
Multicom Security	6110	Wired telecommunications activities	Nordic	0.2	6
Munksjö	1712	Manufacture of paper and paperboard	Europe	0.2	7
Navico	7112	Engineering activities and related technical consultancy	Nordic	0.4	7
NEA Group	4321	Electrical installation	Europe	0.2	15
Netcompany	6202	Computer consultancy activities	Nordic	0.2	15
Nille	4719	Other retail sale in non-specialised stores	Nordic	0.2	6
Nimbus boats	3012	Building of pleasure and sporting boats	Nordic	2	6
Noa Noa	4771	Retail sale of clothing in specialised stores	Nordic	1.1	5
Noratel	2711	Manufacture of electric motors, generators and transformers	Nordic	0.5	5
Norpe Oy	2825	Manufacture of non-domestic cooling and ventilation equipment	Nordic	0.3	8
North Trade	4711	Retail sale in non-specialised stores with food, beverages or tobacco predominating	Nordic	0.2	12
Notabene	4761	Retail sale of books in specialised stores	Nordic	1.2	5
Novenco	2825	Manufacture of non-domestic cooling and ventilation equipment	Nordic	0.4	6
NVS Installation	4322	Plumbing, heat and air-conditioning installation	Nordic	1.9	6
Palodex Group	2660	Manufacture of irradiation, electromedical and electrotherapeutic equipment	Nordic	1.5	5
Panorama Gruppen	4648	Wholesale of watches and jewellery	Europe	0.3	5
Pelly	2599	Manufacture of other fabricated metal products nec	Nordic	0.2	7
Permobil	3092	Manufacture of bicycles and invalid carriages	Europe	0.9	6
Perstorp	2013	Manufacture of other inorganic basic chemicals	Europe	0.8	6
Phadia	2059	Manufacture of other chemical products nec	Europe	0.6	10
PIAB	2813	Manufacture of other pumps and compressors	Nordic	0.5	6
Plastal	2932	Manufacture of other parts and accessories for motor vehicles	Europe	0.2	7
PMC Group	2822	Manufacture of lifting and handling equipment	Nordic	0.6	5
Pouttu	1013	Production of meat and poultry meat products	Nordic	0.2	5
Q-Matic	2790	Manufacture of other electrical equipment	Nordic	2.2	6
R82	3092	Manufacture of bicycles and invalid carriages	Nordic	0.8	6
S:t Eriks	2361	Manufacture of concrete products for construction purposes	Nordic	0.2	5
Saddler Scandinavia	4649	Wholesale of other household goods	Nordic	0.2	31
SafeRoad Group	2511	Manufacture of metal structures and parts of structures	Nordic	1.7	9
Sanitec	2342	Manufacture of ceramic sanitary fixtures	Europe	2.5	6
SB Seating	3101	Manufacture of office and shop furniture	Europe	0.6	5
Scan Global Logistics	5229	Other transportation support activities	Nordic	0.3	8
Scandbook	1812	Other printing	Nordic	0.2	7
Scandic Hotels	5510	Hotels and similar accommodation	Europe	0.2	7
Semantix*	7430	Translation and interpretation activities	Europe	2.5	3
SFK Systems	2893	Manufacture of machinery for food, beverage and tobacco processing	Nordic	1.3	6
Smoke Free Systems	4673	Wholesale of wood, construction materials and sanitary equipment	Nordic	0.2	11
SPT Group	6201	Computer programming activities	Nordic	0.4	6
Suomen Lähikauppa	4690	Non-specialised wholesale trade	Nordic	1.1	5

Sample firm	NACE	Industry description	Geography	Asset range	Size
Sydtotal	4322	Plumbing, heat and air-conditioning installation	Nordic	0.5	5
Tammermatic Group	2899	Manufacture of other special-purpose machinery nec	Nordic	0.2	6
TCM Group	4778	Other retail sale of new goods in specialised stores	Nordic	1.2	5
TDC	6110	Wired telecommunications activities	Europe	0.6	6
Tesab	2892	Manufacture of machinery for mining, quarrying and construction	Nordic	0.5	6
Tilbords	4644	Wholesale of china and glassware and cleaning materials	Nordic	0.4	5
Unifeeder	5020	Sea and coastal freight water transport	Nordic	0.2	8
Ursviken Group	2841	Manufacture of metal forming machinery	Nordic	0.8	5
Walki Wisa	1712	Manufacture of paper and paperboard	Nordic	0.2	5
Welltec	0910	Support activities for petroleum and natural gas extraction	Nordic	0.4	7
Vernal	4646	Wholesale of pharmaceutical goods	Nordic	0.2	7
VIA Travel Group	7911	Travel agency activities	Nordic	0.7	5
Vísma	6201	Computer programming activities	Nordic	0.2	6
Wrist Group	4671	Wholesale of solid, liquid and gaseous fuels and related products	Nordic	0.5	5

Appendix C – Supplementary tables

Table 18 – Unadjusted changes in operating performance 2007-2009 (grouped by country)

The table reports unadjusted changes in operating performance grouped by country. EBITDA/sales and EBITDA/total assets is reported in percentage points and subtracts median of peer group; all other measures are percentage changes subtracted by peer group change in median. Values in parentheses show number of observations and positive observations. Significance levels are based on two-tailed Wilcoxon signed-rank test. *, **, and *** denote levels that are significantly different from zero at 10%, 5%, and 1% levels, respectively.

	Sweden		Denmark		Norway		Finland	
A. Growth								
Sales growth	2.25 %	(51;27)	0.41 %	(34;18)	**11.88 %**	**(24;16)***	0.39 %	(18;9)
B. Profitability								
EBITDA/sales	-0.100	(52;23)	-1.620	(34;13)	0.015	(24;12)	-0.973	(16;6)
C. Return to assets								
EBITDA/total assets	1.456	(50;32)	-1.218	(35;16)	0.766	(23;14)	-2.207	(15;7)
D. Employment								
Sales/employee	-2.88 %	(48;21)	-3.60 %	(32;14)	3.14 %	(4;2)	-5.99 %	(18;8)
Personnel costs/sales	**7.22 %**	**(33;26)***	**4.50 %**	**(34;25)***	**7.32 %**	**(20;13)**	5.69 %	(15;9)
Avg cost of employee	-0.05 %	(30;15)	6.47 %	(33;19)**	*n.a.*	(0;0)	1.60 %	(15;8)
E. Working capital								
NWC/sales	**-9.72 %**	**(44;15)**	**-17.68 %**	**(31;5)***	-10.49 %	(21;7)	-3.49 %	(18;7)
Stocks/sales	**-12.19 %**	**(43;11)***	**-8.51 %**	**(32;10)**	-15.21 %	(19;7)	-9.83 %	(14;5)
Receivables/sales	**-9.78 %**	**(48;15)**	**-21.41 %**	**(32;8)***	4.86 %	(21;11)	**-13.85 %**	**(17;6)***
Payables/sales	**-12.66 %**	**(49;14)***	-12.50 %	(34;15)	-2.12 %	(21;8)	-0.11 %	(17;8)

Table 19 – Unadjusted changes in operating performance 2007-2009 (grouped by buyout type)

The table reports unadjusted changes in operating performance grouped by buyout type. EBITDA/sales and EBITDA/total assets is reported in percentage points and subtracts median of peer group; all other measures are percentage changes subtracted by peer group change in median. Values in parentheses show number of observations and positive observations. Significance levels are based on two-tailed Wilcoxon signed-rank test. *, **, and *** denote levels that are significantly different from zero at 10%, 5%, and 1% levels, respectively.

	Public-to-private		Secondary buyouts		Divisional buyouts		Other	
A. Growth								
Sales growth	-5.33 %	(8;3)	**8.98 %**	**(26;19)****	11.13 %	(27;15)	-0.13 %	(66;33)
B. Profitability								
EBITDA/sales	-2.10	(8;2)	-0.16	(26;10)	2.32	(27;15)	-0.47	(65;27)
C. Return to assets								
EBITDA/total assets	-2.58	(8;1)	1.05	(23;15)	1.83	(26;16)	0.76	(66;37)
D. Employment								
Sales/employee	-4.73 %	(7;3)	-3.22 %	(23;10)	-4.53 %	(24;11)	-1.47 %	(48;21)
Personnel costs/sales	1.47 %	(6;4)	**9.43 %**	**(16;12)*****	6.47 %	(20;13)	**6.02 %**	**(60;44)*****
Avg cost of employee	2.43 %	(5;3)	-0.65 %	(13;5)	3.33 %	(17;10)	**1.82 %**	**(43;24)***
E. Working capital								
NWC/sales	**-33.62 %**	**(5;0)*****	**-11.51 %**	**(24;7)***	-3.10 %	(23;10)	**-13.81 %**	**(62;17)*****
Stocks/sales	-7.38 %	(6;1)	**-9.16 %**	**(23;7)****	**-10.68 %**	**(21;6)***	**-12.27 %**	**(58;19)****
Receivables/sales	-18.93 %	(7;2)	**-11.68 %**	**(24;4)*****	**-12.04 %**	**(25;9)****	**-9.15 %**	**(62;25)****
Payables/sales	0.40 %	(7;4)	-12.66 %	(25;8)	**-32.14 %**	**(25;8)****	-6.99 %	(64;25)

Table 20 – Summary of adjusted 2007-2009 changes in key operating measures

The table presents 2007-2009 adjusted changes of key operating measures. EBITDA/sales and EBITDA/total assets is reported in percentage points; all other measures in percentage changes. Significance levels are based on two-tailed Wilcoxon signed-rank test (median) and t-test (mean). ***, **, and * denote significant difference from zero at 1%, 5%, and 10% levels, respectively.

	N	5 %	95 %	Median	Mean	St.dev
EBITDA/sales	126	-9.76	16.05	1.64***	1.96**	8.83
EBITDA/total assets	123	-12.64	20.57	2.26***	2.91**	12.34
Sales growth	127	-36.2 %	89.7 %	15.1 %***	20.2 %***	40.7 %
Sales/employee	102	-30.4 %	76.2 %	4.9 %***	12.8 %***	36.0 %
Personnel costs/sales	101	-35.4 %	27.8 %	0.7 %	-1.0 %	20.9 %
Average cost of employee	77	-23.7 %	73.4 %	1.0 %	9.6 %**	34.8 %
Net working capital/sales	112	-156.2 %	89.7 %	-13.1 %**	-15.6 %**	70.7 %
Stocks/sales	108	-116.1 %	73.1 %	-7.1 %**	-17.5 %**	77.3 %
Receivables/sales	118	-108.5 %	73.0 %	-8.6 %*	-7.6 %	69.3 %
Payables/sales	121	-83.8 %	92.5 %	-3.4 %	2.0 %	86.0 %