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The long-run performance of new listings on the Nordic stock markets:
IPOs, Spin-offs and Carve-outs

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ABSTRACT

This paper studies the long-run performance of new listings on the Nordic stock markets from January 1996 to April 2014 by analyzing a sample of 203 non-sponsored IPOs, 100 private equity-backed IPOs, 60 spin-offs and 30 carve-outs. First, we investigate the median buy-and-hold abnormal returns associated with the different listing groups. Second, we evaluate whether there are any systematic differences in the long-run performance between the groups. In line with prior research, we find that new Nordic listings on an aggregated level underperform applicable country indices and similarly sized firms, from the closing price on the first day of trading to three years after the listing date. However, while non-sponsored and private equity-backed IPOs experience significantly negative abnormal returns, the spin-offs and carve-outs show signs of outperformance. The difference in performance is significant for spin-offs, but the evidence is mixed for carve-outs. As spin-offs are more commonly acquired than other listings in our sample, we investigate whether the spin-off outperformance is simply a consequence of takeover premiums, but find no such evidence. In particular, we find that a group of focus-increasing spin-offs and carve-outs performs significantly better than non-focus-increasing spin-offs and carve-outs and all other benchmarks used. We control for the IPO activity at the time of the listing, firm size, industry and initial book-to-market ratio, but these variables do not explain our results.

Keywords: Nordic IPOs, spin-offs, carve-outs, long-run abnormal returns
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1. INTRODUCTION

The European initial public offering (IPO) markets have shown remarkable activity growth during the last few years, with 2014 being the most successful year since the pre-crisis record levels of 2007 (PwC report, 2015). The Nordic IPO markets have also experienced a strong recovery, seeing high-profile IPOs such as that of ISS (Denmark), Com Hem and Thule (Sweden) in 2014. The IPO markets have benefited from favorable stock market conditions and valuation levels, fuelled by the continuously low interest rate environment, increasing investors' appetite for new investment opportunities. Financial investor backed IPOs, as a large subgroup of IPOs, have also seen vast growth in recent years, in both absolute numbers but also as a share of all IPOs (Baker & McKenzie report, 2015). The Nordic private equity (PE) market remains one of the most significant in Europe, having the third highest concentration of assets under management in relation to other European economic regions (Mueller, 2014). Sweden in particular has the largest PE market in the region, also being the second most active one in Europe, only behind the UK in relative terms (EVCA report, 2015). Close to 50% of all Swedish IPOs in the last fifteen years have been PE-backed (SVCA report, 2015).

However, traditional IPOs do not represent the only route for new listings to come to the stock exchanges. Despite the fact that traditional IPOs represent a vast majority of the new listings on the Nordic stock markets and elsewhere, and receive considerably more attention from both the investor community and media, it is also important to incorporate the smaller groups of new listings when analyzing newly listed firms. Such groups include new listings stemming from corporate restructuring activities in the form of demergers, such as spin-offs and carve-outs. Although having differences in the underlying motives for the listings and in the general listing processes, spin-offs and carve-outs also represent new potential investment opportunities for the investor community. This makes it relevant to analyze them on a standalone basis, and compared to traditional IPOs (Cusatis et al., 1993). Moreover, such listings have become increasingly popular during the last two decades, further increasing the need incorporate them into academic research (Jannarone, 2014; Veld and Veld-Merloukova, 2009). As an interesting example, the Guggenheim Spin-off ETF product (introduced in 2006), which invests into recently spun-off (up to 30 months) US firms (both spin-offs and carve-outs), has outperformed the S&P 500 index by 19% over the last three years and by some 30% since its inception (Guggenheim Investments, 2015). The long-run performance for different groups of new listings is a relevant research area for the whole Nordic investor community, including private investors, institutional investors, asset managers and other market participants, as they have significant wealth effects for the investors.

The seminal research on general IPO long-run performance constitute studies such as Ritter (1991) and Loughran and Ritter (1995), who document the IPO long-run underperformance phenomenon over a three and five year horizon, finding abnormal returns of -27.4% and -50.7% respectively. Studies on PE-backed IPO long-run performance document similar trends, but also find that PE-backed IPOs show superior aftermarket returns compared to non-sponsored IPOs (Brav and Gompers, 1997; Schöber, 2008). Explanations for the differences in returns include a variety of value drivers of the PE business model, which lead to a superior organizational structure and value maximization (Kaplan, 1989). In contrast to IPOs, spin-offs have shown positive long-run abnormal returns compared to applicable market indices (Cusatis et al., 1993; Desai and Jain, 1999). Carve-outs have also shown not to experience underperformance relative to applicable market benchmarks, again indicating a contrast to traditional IPOs (Vijh, 1998).

Previous academic research on new listings in the Nordic region has been relatively scarce. For IPOs, the only comprehensive study covering all Nordic markets (Westerhom, 2006) shows results in line with the commonly acknowledged trends. Nordic PE-backed IPOs have not been analyzed in separate academic studies[1], despite the great role of PE players in the IPO market and high importance of PE investors as capital providers in the region (Spliid, 2013). To the best of our knowledge, no previous studies in well-known academic journals analyze the performance of spin-offs and carve-outs in the Nordic region. Furthermore, despite numerous academic papers covering the different types of new listings in separate studies and providing motivation to compare them (e.g. Cusatis et al., 1993; Vijh, 1999), there is to our knowledge still no studies analyzing them together and in relation to each other[2].

Our paper integrates the research on traditional IPOs (non-sponsored and PE-backed IPOs) with research that studies spin-off or carve-out performance separately. We study a dataset of 393 new listings on the main lists of the Nordic stock markets from the years January 1996 to April 2014. The new listings are divided into four groups based on the pre-listing ownership structure of the newly listed firm and the listing process specifics. The sample includes: (1) 203 non-sponsored IPOs, (2) 100 PE-backed IPOs, (3) 60 spin-offs and (4) 30 carve-outs. Our paper aims to fill the gap in academic literature by studying the long-run performance of different types of new listings on the Nordic

[1] We are aware of a couple of Master theses (such as Danielsson and Gustavsson (2014) and Mathisen and Ornelas (2012)) analyzing Nordic PE-backed IPOs, whereas no such studies have been published in distinguished academic journals to the best of our knowledge.

[2] Schuster (2003) includes spin-offs and carve-outs is his research sample together with IPOs, but does not analyze or compare their performance on a standalone basis.

markets. By analyzing aftermarket performance through buy-and-hold abnormal returns up to 36 months after the listing, we provide a comprehensive overview of the long-run performance of all the new listings on the Nordic stock markets, as a whole and on a subgroup level. We analyze each of the groups not only on a standalone basis, but also in comparison with the other groups and to the rest of the stock market.

In line with previous research, we find that all new listings as a group underperform applicable country indices and similarly sized matching firms, and the corresponding buy-and-hold abnormal returns are -22.2% and -15.0% respectively. We find that this underperformance is driven by non-sponsored and PE-backed IPOs, which have significantly underperformed Nordic equity indices and similarly sized firms. While we find no statistically significant abnormal returns for carve-outs, spin-offs have positive abnormal returns of 17.5% against both benchmarks. The difference in three-year abnormal returns between spin-offs and other IPOs (excluding carve-outs) is statistically significant, and so is the difference between the abnormal returns of carve-outs and non-sponsored and PE-backed IPOs for the same holding period, at least when using similarly sized matching firms as benchmarks. In contrast to Cusatis et al. (1993), but in line with Desai and Jain (1999), we also find that the significant outperformance is unaffected when excluding takeover premiums. Classifying the spin-offs and carve-outs into focus-increasing and non-focus-increasing, we find that the spin-off outperformance is rather an effect of an increase in corporate focus. A group of all focus-increasing demergers (including both spin-offs and carve-outs) outperform all applicable benchmarks, while non-focus-increasing demergers have insignificant abnormal returns. We regress the abnormal returns on IPO market activity, firm size, industry performance (high versus low), and initial book-to-market ratio but find that our results cannot be explained by these variables.

Our findings suggest that a trading strategy of investing in spin-off shares, and in particular focus-increasing demergers, on the closing price of the first day of trading and holding them for three years may yield significant positive abnormal returns, in sharp contrast to investing in traditional new listings such as IPOs.

In the following section, we describe the specific characteristics of each of the mentioned groups, providing a theoretical framework to analyze and understand the performance differences. In Section 3 and Section 4, we discuss the data and methodology for our study. Section 5 reports our results, compares them to other academic research and discusses potential explanations for our findings. Finally, Section 6 outlines the main conclusions of the study, discusses some limitations to it, and suggests further studies on the topic.

2. LITERATURE REVIEW AND HYPOTHESES

2.1 Long-run performance of IPOs in general

The long-run aftermarket performance of IPOs has been a widely researched topic, with numerous studies on the US, European and Asian stock markets. A common theme in the IPO literature is the IPO long-run underperformance phenomenon, referring to IPOs underperforming applicable benchmarks over the long-run, usually over a period of three-to-five years after the IPO. There is however no clear consensus about the existence of such a phenomenon, as many academics argue that the long-run performance analysis and results are highly dependent on the econometric measurement methodology (Ritter and Welch, 2002; Brav and Gompers, 1997). Ritter and Welch (2002) add that IPO long-run performance can also vary dependent on the choice of sample period.

In two seminal studies, Ritter (1991) and Loughran and Ritter (1995) find that IPOs in the US stock market experience significant underperformance over a three year and five year period respectively, using a set of comparable firms matched by size and industry. Brav and Gompers (1997) find that underperformance is mainly driven by relatively small (market capitalization under $50 million) non-venture-backed IPOs, however also arguing that underperformance is not exclusively an IPO effect, as it is found to be a characteristic of small, low book-to-market firms in general. The IPO underperformance phenomenon has also been documented outside the US stock market. Loughran et al. (1994) give an overview of various international studies, describing that IPO long-run underperformance has been documented in Brazil, Germany, Singapore and UK, whereas Japanese and South-Korean IPOs have been shown to outperform the benchmark. Schuster (2003) studies a large sample of European IPOs from 1988 to 1998 (973 IPOs) and finds no proof of the long-run underperformance phenomenon, although noting the skewness of the return distribution, with only 28% of IPOs showing positive returns and demonstrating that the median IPO would experience long-run underperformance (Schuster, 2003). In a recent study, Boissin and Sentis (2012) find that French IPOs significantly underperform the benchmark portfolios over a two to five year horizon.

Research regarding the Nordic IPO markets has been relatively scarce to our knowledge, with only a few studies having analyzed either one of the Nordic markets separately or as part of larger international comparisons. The evidence from those studies is mixed, similarly to the US or other international stock markets. Both Keloharju (1993) and Hahl et al. (2014) state that IPOs in Finland substantially underperform the market index during a three year period. In contrast, Loughran et al. (1994) demonstrated that IPOs in Sweden between 1980 and 1990 (sample of 162 IPOs) outperform

the benchmark index. To the best of our knowledge, Westerholm (2006) carries out the first more comprehensive study of the Nordic IPO markets, analyzing the period of 1991-2002 and showing that on average the Nordic IPOs experience significant long-run underperformance over a five year period.

2.1.1 Explanations for IPO underperformance

Academic literature proposes several explanations of the IPO long-run underperformance. Miller (1977) develops a behavioral view for explaining the phenomenon, arguing that investors have a high level of divergence in opinions regarding the valuation of the IPO firm, with only the most optimistic investors investing into the IPO. Over time, as more information about the firm and its earnings quality becomes evident, the divergence in opinion is reduced. This in turn causes the marginal investor's (investors investing in the IPO) valuation to move towards the mean market valuation, causing the share price to fall. Ritter (1991) and Loughran and Ritter (1995) support this theory, both indicating that investors may systematically be too optimistic about the future prospects of firms which are issuing equity for the first time. Ritter and Welch (2002) add that Miller's (1977) theory is also consistent with the drop in share price at the end of the lockup period (documented by Field and Hanka, 2001), as trading the IPO firm's stock with lockup agreements differs from trading the shares after the lockups expire, because only a fraction of shares can trade before the lockup expiration and therefore the intentions and insider information held by pre-IPO shareholders are not fully revealed.

A second common explanation for IPO long-run underperformance is based on a theory by Schultz (2003). The author argues that firms engage in "pseudo market timing", as managers try to time the market ex-ante (taking advantage of the "windows of opportunity") and therefore more firms go public when they can receive a higher price for their shares, ex-post resulting in more IPOs at peak valuations than at lower valuations, despite that the managers did not know whether the prices were at the peak at the time when the IPO was conducted. The study implies that a large number of IPOs follow a lower number successful IPOs, whereas the former group of IPOs would underperform. As they represent a relatively larger part of the sample, their underperformance will also result in underperformance for the sample as a whole on average. (Schultz, 2003)

Jain and Kini (1994) find that firms experience a significant decline in operating performance during a five year period after the IPO event, helping to explain the scope of the IPO long-run underperformance. The study shows that the potential explanations for such a decline include the increased agency costs related to the transition from private to public ownership, pre-IPO window dressing of accounting numbers and the resulting overstating of the pre-IPO performance by

investors. The study also argues that despite the IPO long-run underperformance phenomenon, investors do not anticipate the decline in operating performance and are constantly surprised by the poor post-IPO performance. (Jain and Kini, 1994)

Loughran and Ritter (1995) also use operating performance measures to explain long-run underperformance, stating that issuing firms have typically had recent improvements in their operating performance before the IPO and that the market appears to overweight such improvements, whereas underweighting the long-run mean-reverting tendencies in operating performance measures. This results in long-run underperformance when the transitory nature of the operational performance becomes apparent following the IPO. The study adds that IPO long-run underperformance can be partly explained by the book-to-market effect. IPO firms generally have relatively low book-to-market ratios (compared to non-issuers), which are generally common to growth firms and also tend to be accompanied by low returns (Loughran and Ritter, 1995).

2.2 Long-run performance of private equity-backed IPOs

Various studies have separately analyzed the long-run performance of IPOs which have been backed by financial sponsors (PE-funds), such as venture capital (VC) or buy-out funds. Interestingly, studies indicate significant differences in the long-run performance between PE-backed IPOs and non-sponsored IPOs. Brav and Gompers (1997) compare the long-run performance of VC-backed and non-VC-backed IPOs using a dataset of 934 VC-backed IPOs and 3,407 non-VC-backed IPOs from the US stock market in the years 1972-1992. The study finds that VC-backed outperform non-VC-backed IPOs over a five year period, and that the whole sample experiences underperformance relative to comparable benchmarks (Brav and Gompers, 1997). In a later study, Schöber (2008) uses a dataset of 921 IPOs in the US between 1973 and 2007 and indicates that PE-backed IPOs have a positive abnormal return of around 10-12% on the first year of trading, however experiencing a performance deterioration in 8 to 32 months after the IPO. Schöber (2008) indicates that the price deterioration could potentially be due to the substantial divestments of PE funds over that time period.

Academic studies have also found similar trends in the largest European stock markets. Bergström et al. (2006) analyze the long-run performance of PE-backed IPOs (focusing on the buy-out segment) in UK and France, using a dataset of 152 PE-backed IPOs and 1,370 non-sponsored IPOs between the years 1994-2004. The study concludes that PE-backed IPOs outperform non-sponsored IPOs over time periods of six months, three years and five years. Bergström et al. (2006) also finds that PE-backed IPOs generate positive and significant abnormal returns in the early post-

IPO period, however experiencing a decline around six months after the IPO and underperforming the benchmark market index over time periods of three years and five years. (Bergström et al., 2006)

Levis (2011) compares the aftermarket performance of PE-backed (buy-out segment) IPOs to VC-backed and non-sponsored IPOs on the London stock exchange in the years 1992-2005, documenting significant performance differences between the three classes. PE-backed IPOs show significant positive abnormal returns through a 36-month period, outperforming non-sponsored and VC-backed IPOs. Levis (2011) also indicates a positive relation between the positive abnormal aftermarket performance of PE-backed IPOs and their leverage ratios and the proportion of PE sponsors' shareholding immediately after the flotation. (Levis, 2011)

2.2.1 Theories explaining long-run performance of private equity-backed IPOs

Levis (2011) argues that there is lack of comparative evidence and underlying reasoning for the differences in performance of PE-backed IPOs and non-sponsored IPOs. However, we are able to analyze the most commonly mentioned arguments from academic articles, providing at least some explanation for the superior performance of PE-backed IPOs relative to non-sponsored IPOs.

Studies explaining the performance of PE-backed IPOs mainly focus on the operational and managerial aspects, which the PE business model utilizes as its key value drivers. Jensen (1986, 1989) argues that the key value drivers of the PE model are to do with managerial stock-based incentive structures, concentrated equity ownership, closer monitoring practices from the financial sponsors and higher levels of leverage. The studies argue that those factors create an organizational form whose incentive structure leads to value maximization (Jensen 1986, 1989). The research of Kaplan (1989) and Kaplan and Strömberg (2009) support these views, finding that companies which have gone through a buy-out experience increases in operating income and net cash flow, also stating that the positive changes are due to improved incentive and governance structures and better access to capital.

Brav and Gompers (1997) report similar factors for VC-backed firms, stating that VC investors give their portfolio companies better access to capital, provide valuable advice and connections through staying on the company boards and help to put in place best performing management structures. The study also explains that better performance by venture capitalists is also influenced by their reputational concerns. Venture capitalists repeatedly take firms to public and therefore do not want to become associated with failures in the public market, which could hurt their reputation and ability to bring new firms public in the future. The reputational concern affects both the initial investment decisions and the later pricing processes. (Brav and Gompers, 1997)

Despite the increased organizational and managerial efficiency and value maximizing incentive structures put in place by PE investors, one could expect that such positive benefits will seize at the time of the IPO, which is a common way to exit its investment for a PE investor. Levis (2011) however reports that the involvement of PE sponsors is not completely terminated at the time of the IPO, as factors such as lock-up agreements, performance incentives and liquidity considerations tend to result in significant retention (although reduced) of PE sponsor holdings for a considerable time after the flotation. Levis (2011) further argues that it is also reasonable to expect that the PE model value drivers will be maintained for at least some time after the PE firms exit. In contrast to the other IPO performance related studies which report operating performance deterioration for firms after the IPO (such as Jain and Kini, 1994), Levis (2011) shows that PE-backed IPOs are more profitable compared to other IPOs during a time period of three years after the flotation, serving a positive surprise for the investors (Levis, 2011). Katz (2009) adds that PE-backed IPO firms have higher quality, engage less in earnings management and have more conservative reporting both prior to and after the IPO.

Bergström et al. (2006) state that PE-backed IPOs are commonly associated with large allocations of shares to institutional investors, who are also motivated to be allocated shares in subsequent PE-backed IPOs, in turn providing price support for a longer period than for non PE-backed IPOs. The study also mentions that the IPO underwriters may support the share price during the lock-up periods in order to ensure future business with the PE firms. The authors also analyze the before-mentioned overoptimism phenomenon as an explanation for IPO underperformance (Ritter, 1991; Loughran and Ritter, 1995), explaining that overoptimism is primarily related to smaller IPOs, as they appear more risky and are harder to value due to less public information. However, the investors buying into PE-backed IPOs (mostly institutional investors) tend to be less sensitive to investor sentiment and more rational and professional in their investment decision, also generally avoiding investing into smaller IPOs. (Bergström et al., 2006)

2.3 Spin-offs

2.3.1 Definition and features

A spin-off is defined as a pro-rata distribution of the shares of the wholly owned subsidiary to the parent's shareholders, therefore creating a new business entity which trades independently from its former parent (Cusatis et al., 1993). After the spin-off, the shareholders of the parent company hold shares in both the parent company and the subsidiary. A distinct feature of a spin-off from other asset sale or divestiture methods is that it does not involve exchange of any cash and is therefore not

motivated by a company's capital needs (Desai and Jain, 1999). A primary effect of a spin-off is that the subsidiary becomes a separate decision-making firm, resulting in a separation of control from the parent firm's management (Johnson et al., 1996). Under the US IRS code, spin-offs represent a non-taxable method for a share distribution in the form of dividends. (Cusatis et al., 1993)

2.3.2 Motives for spin-offs and value creation sources for shareholders

Mukherjee et al. (2004) conducted a questionnaire study among corporate CFOs in US regarding the largest corporate divestitures (including spin-offs) undertaken during the years 1990-2001. The study finds that the most common motives for divestitures were increasing corporate focus (36%) and divesting a low-performing division (36%), followed by increases in managerial efficiency (10%), achieving a specific organizational form (e.g. a clear divisional structure) (7%) and a variety of other less common reasons (11%). (Mukherjee et al., 2004)

Veld and Veld-Merloukova (2009) give an overview of spin-off related research papers from the US and European stock markets, concluding that there is broad consensus in academic (and also popular) studies that spin-offs create value for shareholders by means of positive abnormal stock returns. Positive abnormal returns are associated with both the spun-off company and its parent company, and such wealth effects have been documented in both the short-run (announcement period effect) and in the long-run. (Veld and Veld-Merloukova, 2009)

In line with the results of Mukherjee et al. (2004), the most commonly researched wealth gains from spin-offs are associated with an increase in corporate focus. Daley et al. (1997) and Desai and Jain (1999) find that the spin-offs' (and their parent firms') excess returns are significantly positively related to both the increase in focus and the change in operating performance. The increase in focus is measured using indicators such as industry codes of the spin-off and the parent company, and the number of segments reported by the parent firm before and after the spin-off event (Desai and Jain, 1999). A model by Berger and Ofek (1995) further explains the wealth gains from an increase in focus through the existence of a diversification discount (about 15% of firm value), which firms can avoid by spinning off unrelated subsidiaries and concentrating on their core business. (Desai and Jain, 1999)

The decrease of information asymmetry is another common source of wealth gains from spin-offs. Krishnaswami and Subramaniam (1999) argue that spin-offs reduce information asymmetry between the firm's managers and the capital markets about cash flows and operating efficiency of the individual divisions of the firm. Divesting a division through a spin-off decreases the information asymmetry and improves the market valuation of both the parent firm and the spun-off company

(Krishnaswami and Subramaniam, 1999). Other, less common sources of wealth gains related to spin-offs include increases in geographical focus and wealth transfers from bondholders to shareholders in the process of a spin-off, as shown by Maxwell and Rao (2003). (Veld and Veld-Merloukova, 2003)

2.3.3 Announcement effect and long-run performance of spin-offs

As mentioned previously, spin-offs have shown positive abnormal stock returns in both the short-run and long-run. A vast majority of related studies focus on the short-run wealth effects associated with spin-offs, analyzing the spin-off announcement period (usually an event window of three days) returns. The results of 26 research papers from European, US and Asian stock markets indicate an average abnormal and statistically significant positive announcement period return of 1.32% to 5.56%. (Veld and Veld-Merloukova, 2009)

The long-run performance of spin-offs has been a relatively less researched topic. Cusatis et al. (1993) argue that event studies which measure the abnormal returns near the spin-off announcement date do not accurately estimate the total value which spin-offs create. Cusatis et al. (1993) studied the long-run stock returns for periods up to three years following the distribution of shares on a sample of 231 spin-offs and their parents on the US stock market in years 1965-1988. The study finds significantly positive abnormal long-run returns for spin-offs and their parent firms, stating that spin-offs provide statistically significant excess returns of 12.6%, 24.2% and 17.4%, respectively within intervals of one, two and three years after the spin-off. This indicates that the initial announcement effects underestimate the total value created through spinoffs. (Cusatis et al., 1993)

The article also states that both spin-offs and their parent firms experience a high incidence of takeovers in a relatively short period after the spin-off event and that the excess returns are limited to only the firms involved in takeover (or merger) activity. One third of the spin-offs used in the study sample were involved in takeover activity within three years of the spin-off event, indicating that investors have not fully anticipated the increased takeover activity and have therefore underestimated the value created by spin-offs. The article concludes that by dividing a company into separate businesses (effectively creating pure plays), spin-offs provide a low-cost method of transferring control of corporate assets to acquiring firms and that the excess returns of spin-offs are primarily associated with the takeover premiums. (Cusatis et al., 1993)

Desai and Jain (1999) focus on the widely documented focus-increasing aspects of spin-offs and analyze whether the increase in focus is related to the announcement period and long-run abnormal returns, arguing that the full impact of the spin-off decision is likely to be captured only through a

long-run study. The study uses a sample of 155 spin-offs in the US stock market between the years 1975 and 1991, analyzing the difference between the long-run stock market performance of focus-increasing and non-focus-increasing spin-offs. The authors find statistically significant positive abnormal returns of 11.12%, 20.77% and 33.36% over respective holding periods of one, two and three years following the spin-off event for the focus-increasing spin-offs. In contrast to Cusatis et al. (1993), the study find that the abnormal returns are not limited to firms which were involved in takeover activity. However, non-focus-increasing firms experience statistically insignificant negative abnormal returns. Desai and Jain (1999) add that non-focus-increasing spinoffs are undertaken by firms which are spinning off poorly performing subsidiaries. (Desai and Jain, 1999)

McConnel et al. (2001) conduct another study on the US market, however finding no robust evidence for statistically significant positive abnormal long-run performance of spin-offs, in contrast to the earlier studies. Although the study finds statistically significant abnormal long-run returns in comparison with portfolios of stocks matched on size and book-to-market equity ratios, the returns using the Fama and French three-factor model are statistically insignificant.

Veld and Veld-Merkoulova (2004) conducted a research about European spin-offs, using a sample of 156 spin-offs from 15 European countries in the years 1987 to 2000. In line with the US-focused studies, they find a cumulative average abnormal three day announcement period return (2.62%) for the European spin-offs. However, the study does not find statistically significant long-run excess returns for European spin-offs, and is therefore not able to confirm the results of the before-mentioned US market focused studies by Cusatis et al. (1993) and Desai and Jain (1999), referring to that the announcement period returns efficiently evaluate the future wealth gains associated with spin-offs. Veld and Veld-Merkoulova (2004) also propose a hypothesis that differences in corporate governance systems could be a reason for the differing excess long-run returns (within the European countries and comparing to the US), but do not find statistically significant results to conclude that.

2.4 Equity carve-outs

2.4.1 Definition and features

An equity carve-out (carve-out) is a partial divestiture of a wholly-owned subsidiary by the parent firm through an IPO (Vijh, 1999). The unique feature of a carve-out is that the parent firm generally retains a controlling ownership stake in the subsidiary after the subsidiary IPO (Ghosh et al., 2012). As such, carve-outs are a method of corporate restructuring for parent firms and serve a number of efficiency increasing purposes for firms. Schipper and Smith (1986) showed that the most common motives for

conducting carve-outs include enabling the subsidiary to obtain external financing for its anticipated growth, improving investor understanding of the subsidiary, designing more efficient compensations structures for managers and increasing corporate focus. Klein et al. (1991) add that a carve-out can in many cases be the first stage of longer asset restructuring process, resulting in a full divestiture of the remaining interests in the subsidiary or a re-acquisition of the publicly traded shares by the parent firm. Anslinger et al. (1997) emphasizes that a carve-out gives the subsidiary firm independence from the parent firm, which has proven to foster innovation and growth within the subsidiary. At the same time the subsidiary still has access to resources from the corporate center, continuously enabling both the parent firm and the subsidiary to profit from various operational synergies. (Anslinger et al., 1997)

2.4.2 Carve-out short and long-run performance

In a seminal study, Vijh (1999) argues that carve-outs combine different features of both equity offerings and divestitures, in turn meaning that carve-outs combine events which are linked to both negative (IPOs - equity offerings) and positive (spin-offs - divestitures) excess long-run returns in academic studies. In addition to that, Vijh (1999) interestingly states that carve-outs are in a way similar to VC-backed IPOs, as venture capitalists also continue to hold significant equity stakes in the firm after the IPO and take part in the firm's decision making processes through board representation.

Similar to spin-offs, carve-outs are associated with shareholder value creation in academic literature. Schipper and Smith (1986) and Vijh (2002) show that carve-out parent firms experience positive abnormal announcement period returns, ranging from 1.8% to 4.8%, reflecting the short-run wealth gains from carve-outs.

Vijh (1999) analyzes the long-run performance of carve-outs on the US stock market (years 1981-1995), comparing it to results from studies on IPO long-run performance. The study finds that carve-outs (subsidiary firms) do not underperform different benchmark indices over a three year period, showing excess returns insignificantly different from zero, therefore indicating a sharp contrast with the IPO long-run underperformance phenomenon. Vijh (1999) argues that such results can on one hand be interpreted as the announcement effects already efficiently capturing the likely future performance of all carve-outs. Despite that, the study also considers such results surprising due to the great similarities of carve-outs and IPOs, therefore also making it relevant to analyze the underlying reasons for the long-run performance differences (Vijh, 1999). In another study, Prezas et al. (2000) however argues that regular IPOs show better long-run performance compared to carve-out IPOs

over a three year period on the US stock market (years 1986-1995), whereas the returns do not significantly differ over a six month and one year period.

The carve-out positive announcement period return and superior long-run performance relative to IPOs are explained using a number of factors similar to the ones used to explain spin-off and VC-backed IPO performance. Vijh (1999) states that similarly to spin-offs, carve-outs help to increase corporate focus for both the subsidiary and the parent firm, which is in turn associated with positive long-run excess return (as shown by Desai and Jain, 1999). Other factors contributing to shareholder value gains, again similar to spin-offs, result from investors' preference for pure-play firms and the accompanying increase in takeover activity (Schipper and Smith, 1986; Cusatis et al., 1993), decreasing the diversification discount (Berger and Oflek, 1995) and a decrease of information asymmetry regarding a subsidiary firm value (Krishnaswami and Subramaniam, 1999). Similarly to VC investor owners, Vijh (1999) argues that the superior long-run performance relative to IPOs is also partly achieved due to the parent firms' continuous monitoring and signaling role for outside investors.

Ghosh et al. (2012) add to these factors, describing that there is less uncertainty and information asymmetry about carve-outs compared to regular IPOs, as their publicly traded parent firms' financial statement contain indicative information about their value already before the carve-out event. Furthermore, as the parent company continues to hold a significant equity stake in the listed subsidiary after the carve-outs, their own stock price and information about the subsidiary value in their financial statements will continuously provide additional information for investors about the subsidiary over the long run. (Ghosh et al., 2012)

2.5 Summary and research hypotheses

2.5.1 Non-sponsored and PE-backed IPOs

IPOs have by far found the most coverage in academic research, when compared to the other types of new listings analyzed in our paper. The widely documented IPO long-run underperformance phenomenon finds support using examples from the US (Ritter, 1991; Loughran and Ritter, 1995), European (incl. Nordic) and Asian stock markets (Loughran et al., 1994; Westerholm, 2006). Underperformance is in large explained by the pre-IPO investor opinion divergence, pseudo market timing, pre-IPO window dressing and the general overoptimistic investor sentiment towards IPOs. PE-backed IPOs also experience long-run underperformance in most cases, but show superior long-run performance compared to the non-sponsored IPOs (Schöber, 2008; Brav and Gompers, 1997). Critics however argue that results are highly dependent on used econometric methodology (Brav and

Gompers, 1997) and the choice of the sample period (Ritter and Welch, 2002). Despite the criticism, we propose research hypotheses in line with the results of the majority of prior research papers.

H1: All new listings as a group experience negative long-run abnormal performance
H2: Non-sponsored IPOs and PE-backed IPOs experience negative long-run abnormal performance
H3: PE-backed IPOs experience less underperformance than non-sponsored IPOs

2.5.2 Spin-offs and carve-outs

Prior research on spin-offs provide evidence of significant positive abnormal long-run performance over a three year period (Cusatis et al., 1993; Desai and Jain, 1999). The studies show that the positive abnormal returns are achieved due to the positive impacts of increases in corporate focus after spinning off from the parent company (Desai and Jain, 1999) and due to the high likelihood of takeover activity of spun-off firms, which results in considerable acquisition premium for the shareholders, but is underestimated by the market initially (Cusatis et al., 1993). Prior research provides reason to believe that spin-offs show superior long-run performance in comparison to the other new listings, and we formulate our hypotheses accordingly.

H4: Spin-offs experience positive long-run abnormal performance
H5: Spin-offs experience superior long-run performance in comparison to all the other subgroups of new listings

Prior research about carve-outs indicates that carve-outs do not experience abnormal performance in the long-run (Vijh, 1999). Carve-out long-run returns are affected by a combination of wealth effects, stemming from both positive long-run effects common to divestitures (such as an increase in corporate focus, similarly to spin-offs) and continuous parent firm ownership effects (similarly to PE-backed IPOs), but also by negative effects common to equity offerings (similarly to IPOs) (Vijh, 1999). We base our hypothesis in line with the prior research.

H6: Carve-outs do not experience long-run abnormal performance
H7: Carve-outs experience superior long-run performance in comparison to non-sponsored and PE-backed IPOs, but underperform relative to spin-offs

3. RESEARCH DATA

3.1 Data collection process

Our sample consists of 393 public listings executed in the Nordic stock markets from January 1996 to April 2014. As Westerholm (2006) argues, it is plausible to analyze these countries together, as three of them (Sweden, Denmark and Finland) are under the same OMX umbrella and all of them are part of the NOREX alliance, which harmonizes systems and regulations between the stock exchanges. We also followed the author and chose to exclude Iceland's stock market, as it is an outlier in terms of liquidity and its all-share index contains only 15 listings in the Thomson Reuters Datastream database (Datastream).

The listings were classified into the following four groups based on their pre-listing ownership structure: non-sponsored IPOs, PE-backed IPOs, spin-offs and carve-outs. Time series of share price development were collected for a period of three years after the listing (or until the date of delisting) for all of our sample firms, as well as for their benchmarks.

3.2 Initial sample generation

We collected a gross list of public listings made from January 1996 to April 2014 from the financial databases Zephyr and SDC Platinum. As Zephyr only provides a list of new listings from 1997 and onwards, we used SDC Platinum to gather the rest of the sample from 1996. We obtained a gross sample of 911 listings made on the Nordic stock markets during the sample period from the databases. Listings that stem from the following were subsequently excluded:

i. Secondary listings, unless the listings were made concurrently
ii. Listings on lists other than the main market lists, i.e. other than Oslo Børs, Nasdaq Copenhagen, Nasdaq Helsinki, Nasdaq Stockholm and their predecessors
iii. List transfers into main lists, e.g. from Oslo Axess to Oslo Børs
iv. Listings of closed-end funds and real estate investment trusts (REITs)
v. Listings of Norwegian savings banks that issued equity certificates (instead of common equity)

Exclusions on criteria i. and iii. were made since the shares of these listed companies were already priced on the market beforehand, which would distort comparisons to initial listings. Exclusions on criteria ii. were performed to get a sample with as coherent profitability, size, and accounting requirements as possible prior to the listing. We have included stocks listed on the former Oslo SMB list, as these shares were transferred to Oslo Børs when the Norwegian stock exchanges

were restructured in 2007, and when Oslo Axess was established for shares that did not meet the listing requirements of Oslo Børs. Furthermore, shares listed on the former I and NM lists in Finland were also included, as they became part of the OMX Nordic list together with shares from other Nordic main lists, when the OMX Nordic Exchange opened a common presentation of Swedish, Danish and Finnish listed companies. Excluding closed-end funds and REITs (criteria iv.) is a common practice (Ritter, 1991; Loughran and Ritter, 1995). We excluded Norwegian savings banks that issued equity certificates (criteria v.), as those differ from common shares, for example in terms of ownership rights on the company's assets.

The resulting sample was divided into four groups dependent on pre-listing ownership. Information on the pre-listing ownership structure was primarily obtained from the listing prospectuses retrieved from either the company websites, Bloomberg, Morningstar or the financial supervisory authorities of the respective country. In case we could not retrieve the listing prospectus, we used demerger documents, annual reports, the ORBIS database, corporate press releases and publications in the financial press to cross-check the pre-listing ownership. In some cases, we could only obtain annual reports released for the year of the listing (i.e., with ownership info after the listing), in which case we made a sound judgment about the pre-listing ownership, trying to again cross-check with contemporary articles in the financial press and the ORBIS ownership database. In other instances, we have excluded these listings from our sample, as we could not determine the necessary pre-listing conditions due to lack of data.

3.3 Classification of new listings

For our research purpose, non-sponsored IPOs comprise all offerings that are not sponsored by a financial investor such as a private equity firm, nor are the result of a demerger of a publicly traded company. These include, but are not limited to, privatizations (e.g. Telia in 2000), listings from non-private equity investment companies (e.g. Norgani Hotels in 2005, backed by Canica Invest) and entrepreneur-led listings (e.g. Recipharm in 2014).

In order to classify firms as PE-backed, we followed Schöber (2008), and require that the pre-IPO combined ownership by private equity players be at least 10%. However, we do not distinguish between buy-out backed IPOs and venture capital backed IPOs, following the broad definition of private equity by the European Private Equity and Venture Capital Association (EVCA) (EVCA Handbook, 2014). As Levis (2011) acknowledges, identifying various kinds of PE-backed offerings (i.e., VC-backed and buy-out-backed) can be a dubious procedure due to the similarities in the

different sponsors' investment activities. Cao and Lerner (2009) further emphasize the increasingly blurred boundaries between VC and buy-out investments. The authors argue that there are PE firms which are currently active in the buy-out segment but have also made venture capital investments in the past, making it difficult to distinguish between the two segments. Also, as we are focusing our study on the main lists, the stricter requirements associated with listings on those lists (e.g. requirements regarding the use of IFRS, sufficient operating history, and documented profitability or financial resources) are expected to mitigate the relevance of these differences. Furthermore, we aim to study whether there are any differences in the long-run performance between non-sponsored IPOs, PE-backed IPOs, spin-offs and carve-outs. We do not aim to study whether there are any significant differences within the private equity universe. Similar grouping of PE-backed listings is also performed in other papers, such as Ferretti and Meles (2011). For determining whether the listing is PE-backed, we checked our pre-listing ownership data with membership lists of the Swedish (SVCA), Norwegian (NVCA), Danish (DVCA) and Finnish (FVCA) Venture Capital & Private Equity Associations and classified each observation manually. However, the venture capital associations do not provide historical membership lists, whereas our study ranges back to 1996. For some earlier cases, we have determined that an owner is a private equity fund based on highly indicative company names (e.g. Four Seasons Private Equity, that was part of the Odim ASA listing in 2005) or company descriptions (e.g. Apax and Index Ventures, that backed Genmab A/S in 2001), even though the company is not listed as a current member of any of the Nordic Venture Capital Associations, or has changed its name.

Our last two groups were listings stemming from public demergers. These groups comprise spin-offs and carve-outs. We classified a listing as a spin-off if the listing stemmed from a pro-rata distribution of the shares of the wholly owned subsidiary to the parent's shareholders, including both complete and partial spin-offs. In line with Benveniste et al. (2008), we classified a listing as a carve-out if the company was wholly owned by a publicly traded parent prior to the listing, and the parent continued to hold a significant stake in the subsidiary after the listing. Consequently, carve-outs from private companies are not included in this group, but among non-sponsored listings. This information was either retrieved from the prospectuses, the Swedish tax authority (in case of Swedish carve-outs), demerger documents or subsequent annual reports, which described the transaction. In some dubious cases, e.g. when a firm was both spun-off and new shares were offered to the public, we have relied on classifications made by SDC Platinum, from which we obtained a list of both spin-offs and carve-outs from 1996 to 2014.

3.4 Data for measurement of long-run performance

We collected time series for the share price development of each of the listed companies in our sample, as well as their market capitalization immediately after the listing from Datastream. This data were also collected for the matching firms. The matching firms' market values were used to match them to our sample firms based on their inflation-adjusted market values (detailed benchmarking discussion in Section 4.1.3). We also collected the time series of Nordic stock indices for complementary benchmarking. In case we could not find share price time series for the listings on Datastream after controlling for name changes, we excluded them from our sample. Inflation data were obtained through the consumer price indices of the respective country, also retrieved from Datastream. The share prices were collected on a total return basis, i.e. adjusted for stock splits and with reinvested dividends, according to common practice (e.g. Loughran and Ritter (1995), Levis (2011)). In order to make an accurate comparison, we use the MSCI total return indices for each of the Nordic countries. Furthermore, all market values are obtained in Euro to facilitate value-weighting and matching.

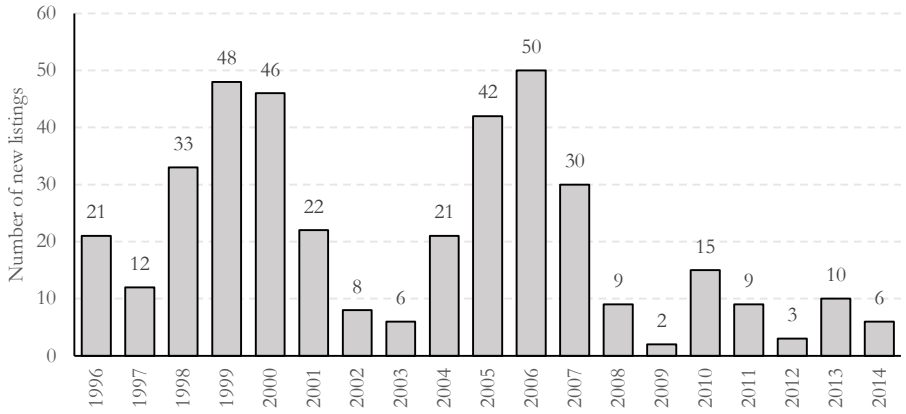

Figure 1. Distribution of new listings on the Nordic stock markets from January 1996 to April 2014

After excluding firms based on criteria i-v. listed above and due to lack of data (regarding both information to determine pre-listing ownership and time series in Datastream), our final sample constitutes 393 listings with the following distribution: 203 non-sponsored IPOs, 100 PE-backed IPOs, 60 spin-offs and 30 carve-outs. As observed in Figure 1., the listings saw peaks during the midst of the technology bubble in 1998-2000 and during 2005-2007. Particularly few listings were introduced in the years following the technology bubble and during the financial crisis in the late 2000s.

Table 1

Distribution of listings based on pre-listing ownership, country and market value

The table reports the distribution of the listings by pre-listing ownership, country and market value. The pre-listing ownership is divided into non-sponsored IPOs (NS), PE-backed IPOs (PE), spin-offs (SO) and carve-outs (CO). The countries are Sweden (SW), Norway (NO), Denmark (DK) and Finland (FN). The market values are obtained from Datastream, expressed in millions of Euro, defined as the share price multiplied by the number of ordinary shares in issue immediately after the listing, and are unadjusted for changes in price level.

	Total listings					Average market values at listing (EUR mn)				
	SW	NO	DK	FN	All	SW	NO	DK	FN	All
NS	55	72	44	32	203	777	621	221	594	573
PE	39	39	12	10	100	329	383	1014	306	430
SO	31	12	2	15	60	358	301	1009	624	435
CO	4	21	0	5	30	665	380	n.a.	577	451
Total	**129**	**144**	**58**	**62**	**393**	**537**	**495**	**412**	**554**	**506**

Table 1 presents the different groups by the number of listings and average initial market value per country. Among the different countries, listings from Finland had the highest average initial market value, driven by listings such as Sonera (1998), Fortum (1998) and Neste Oil (2005). The largest listing of the whole sample was that of Telia in June 2000, which constituted almost a third of the inflation-adjusted market value of all the non-sponsored IPOs. In Norway, the listings of Statoil (2001) and Telenor (2000) drove up the average listing market value, while other listings tended to be much smaller. Denmark had the smallest listings on average; however recent listings such as Pandora (2010) and ISS (2014) made the PE-backed group of Danish IPOs have the highest initial market value of the all PE-backed groups in the Nordic countries.

3.5 Data source discussion

The vast majority of the listings data are collected from Zephyr. However, when we compare against the lists obtained from SDC Platinum, we discover that there are missing listings in Zephyr that are reported in SDC Platinum. Those listings are added, yet this indicates that our collection of new listings may lack some listings made on the Nordic stock exchanges during our sample period. However, we believe this affects our results and conclusions only marginally, as cross-checking two databases yields robustness.

Another challenge was to retrieve the all the necessary documents for the classification procedure. We did not obtain a complete set of prospectuses or other documents that clearly show the pre-listing ownership structure. In most cases, we exclude these firms, since we cannot reliably classify the listing. However, as discussed above, there are some earlier cases, in which we have made

a judgment solely based on annual reports filed for the year of the listing or the year before the listing. However, this potential data uncertainty primarily relates to the classification of non-sponsored and PE-backed companies, as we were able to use SDC Platinum's spin-off and carve-outs lists to double check those classifications.

It should also be noted that the results and analysis in Section 5 are highly dependent on the accuracy of the data generated from Datastream, as Datastream provides us with all the share price time series, market values, industry codes, book-to-market ratios and most of the other variables used in the analysis.

4. METHODOLOGY

4.1 Long-run performance methodology considerations

Prior research does not provide a best practice method for a complete analysis of long-run performance for newly listed companies, as described in Sections 4.1.1-4.1.4. In the following sections, we discuss the several choices made regarding the methods employed in our study. First, we describe the time regime and measurement period used to measure long-run performance. Second, we discuss the metric representing the abnormal returns for our different groups. Third, we discuss appropriate benchmarks in order to establish which returns could be considered abnormal. Finally, we discuss the statistical tests used in the main study.

4.1.1 Time-period

Two choices concerning the time period had to be made. First, regarding the time regime and second regarding the measurement period. The choice of time regime constitutes either conducting the study in event time or calendar time (Schöber, 2008). In the event time approach, an event window is specified for each observation and the returns are calculated with respect to the start of this event window. The event time approach has been the most commonly used time regime in previous research. Yet, the calendar time approach is also widely used and is for example suggested by Fama (1998) for the measurement of long-run returns. The author argues that existing methods do not fully correct for the correlation of returns stemming from events not captured by common benchmarking methods, such as that of using a broad equity index to calculate abnormal returns. The author further argues that a calendar time approach fully solves this issue. In contrast to the event time approach, it manages to capture these cross-sectional correlations, as it averages abnormal returns across stocks, or groups of stocks, for each calendar period (e.g. each month). However, given the prevalence of the event time approach in prior research, and the fact that the calendar time approach does not accurately capture an investor's ultimate return (Krigman et al., 1999), we choose to perform the study according to the event time approach.

The common time-span for the measurement of long-run performance is usually between one and five years (Certo et al., 2009; Schöber, 2008). We have limited our study to a measurement period of three years to make it comparable to seminal studies such as Ritter (1991), Cusatis et al. (1993), Desai and Jain (1999), Vijh (1999) and Levis (2011). Long-run performance is also examined for time periods (event windows) of twelve, twenty-four and thirty-six months, but with particular focus on

the latter. The measurement period starts from the closing price after the first day of trading, in line with common practice (e.g Ritter, 1991; Michaely and Shaw, 1995). One important reason for this is the difficulty for an investor to be able to consistently buy the shares at the offer price, due to the allocation procedure in the book building process, while buying at the market price allows for an implementable portfolio strategy (Loughran and Ritter, 1995). As there has been a limited amount of spin-offs and carve-outs over the sample period, the relevance of our study is diminishing with event time, as spin-offs and carve-outs could be acquired or for other reasons delisted, providing another reason to limit our study to a maximum of three year measurement period.

4.1.2 Metric of abnormal returns

Previous research employs various abnormal return metrics, of which the most commonly used are buy-and-hold abnormal returns (BHARs) and cumulative monthly abnormal returns (CARs). The former compounds single-period abnormal returns, while the latter sums up single-period abnormal returns. Both metrics have their advantages and disadvantages from an economical and statistical point of view. While the BHARs precisely represent what an investor gets from an investment in the sample firm at the beginning until the end of the event window (again, we looked at the total return, assuming that intermediate dividends were reinvested into the sample firm), the compounding effect makes the metric more likely to produce extreme observations than CARs are. The extreme observations commonly result in fat right-hand tails and right-skewness, which make them less compatible with traditional statistical tests, such as the t-test. In contrast, as there is no compounding effect when utilizing CARs, there are usually less extreme results, which make the metric more suitable for standard tests. On the downside, CARs do not represent true investor returns. In addition, CARs combined with fixed weights, such as equal-weights, lead to an unrealistic trading strategy with high implied trading costs due to the required monthly rebalancing of the portfolio, argues Schöber (2008). We choose to follow Loughran and Ritter (1995), Barber and Lyon (1997) and Zheng (2007) among others, and use BHAR on conceptual grounds. We primarily test our data against non-parametric tests (described in Section 4.1.4), instead of e.g. the t-test, in order to mitigate the statistical inference issue. Formally, we calculate the BHARs for firm *i* in event month *t* as follows:

$$BHAR_{0,T}^{i} = \prod_{t=1}^{T}(1 + R_t^i) - \prod_{t=1}^{T}(1 + R_t^{Benchmark})$$

If a firm is delisted during the event window, we follow standard practice, such as Ritter (1991) and Loughran and Ritter (1995), and truncate its BHAR from its delisting date or the last day of trading. For the 18 stocks (or 5% of the sample) with insufficient trading history (i.e., listed between April 2012 and April 2014) we let the returns as of April 8, 2015 represent long-run performance, following the approach in Westerholm (2006). When computing average returns across the groups, we weight the companies within a group both on an equal-weighted basis and a value-weighted basis, where the value-weight is the inflation-adjusted market value immediately after the listing (using 1996 as base year), divided by the aggregated inflation-adjusted market value for the group. To calculate inflation-adjusted market values, we divide the market value after the listing by one plus the growth in CPI from January 1996 to the month of the listing date for the respective country. We adjust the market value by inflation, as the listings within a group occur at different points in time. These weighing methods have strong academic basis (Schöber, 2008), although we will only use these weightings for descriptive purposes, as our statistical tests are mainly focused on sample medians rather than means, as described in Section 4.1.4.

4.1.3 Benchmark

There are in particular two types of benchmarks applied in previous research: broad equity indices and matching firms or portfolios of matching firms (Schöber, 2008). For example, US-based studies commonly use the CRSP value-weighted NASDAQ index or AMEX-NYSE index. We benchmark our sample firms against the MSCI Sweden, MSCI Norway, MSCI Denmark or MSCI Finland indices. If the sample firm is listed on the Swedish stock exchange, we benchmark to MSCI Sweden, and so on. However, even though easily implemented and compared across studies, broad indices may fail to incorporate unique characteristics of the listed firms (Schöber, 2008). Hence, it is common to complement the study with a matching firm benchmark or portfolios of matching firms. In line with the notion that average stock returns are related to firm size and book-to-market ratios, the benchmark firm is usually of similar size to the sample firm (e.g. Loughran and Ritter, 1995; Eckbo and Norli, 2005), has a similar book-to-market ratio (e.g. Gompers and Lerner, 2003; Zheng, 2007), and/or sector code (e.g. Ritter, 1991) or a combination of these characteristics. As Loughran and Ritter (1995) argue, matching by industry may have limited relevance, as there are often only a few publicly traded firms with a size comparable to those of the new listings in an industry, resulting in the same matching firm for several newly listed companies. We therefore shy away from matching by industry, but regress the abnormal returns on industry among other control variables, as the industry effect has explained large

parts of abnormal returns in other long-run performance studies. For example, even though they do not utilize sector based matching, Loughran and Ritter (1995) acknowledge that prior studies suggest that industry effects explain as much as one-third of the underperformance of seasoned equity offerings (SEOs). Furthermore, given the small sample sizes of spin-offs and carve-outs from the Nordic countries, and the limited access to book-to-market ratios on Datastream (which would push for additional exclusions of firms), we chose to follow e.g. Loughran and Ritter (1995) and match our sample firms to matching firms based on size.

We collect a sample of all currently listed stocks on the Nordic exchanges (excluding Iceland). In addition, all delisted Nordic stocks available in Datastream ('dead' stocks) are collected in order to avoid survivorship bias. From this sample we exclude firms which were delisted before 1996 or for which Datastream lacks the delisting date or last trading day info. This leaves us with 1,997 potential matching firms, out of which 688 were listed at the time of the sample collection from Datastream. For all the firms which were listed past 1995, we collect the market values on the dates December 31 of 1995 to 2013, calculate their corresponding inflation-adjusted market values for each year, and sort the firms based on the inflation-adjusted market value at the end of each year. A given sample firm's inflation-adjusted market value immediately after the listing is matched to the closest to but higher inflation-adjusted market value of the matching firms on the year prior to the listing. For example, new listings in 1996 are matched against the matching firm sample of December 31, 1995, etc. However, a firm cannot be a matching firm unless it has been listed for at least five years prior to the date when the matching group is drawn, which ensures that we do not compare new listings against each other. For that matter, we also collect the matching group on the dates December 31 of 1990 to 1994. If a firm was not listed in the 1990 sample, it cannot be a matching firm for firms matched with the December 31, 1995 matching group. Even if it had been listed at December 31, 1995, it must have been listed between December 31, 1990 and December 31, 1995, i.e. less than five years ago. Similarly, if a firm was not listed on December 31, 1991, it cannot be a matching firm for listings which are matched against a firm from the dates December 31 of 1995 or 1996, and so on. If a matching firm gets delisted before the earlier of a sample firm's three-year anniversary date or delisting date, we draw a second matching firm with the inflation-adjusted market value immediately higher than the first matching firm's, from which we calculate returns after the first matching firm's delisting date according to standard practice (e.g., Loughran and Ritter, 1995). If needed, we subsequently draw a third matching firm, and so on.

4.1.4 Statistical tests for hypotheses testing

Our study seeks to answer whether there are any abnormal returns related to the long-run performance of non-sponsored IPOs, PE-backed IPOs, spin-offs and carve-outs, and whether there are any differences in the long-run performance between these groups. As the BHARs are not normally distributed (see Appendix 1), we test our hypotheses using non-parametric tests, which do not assume normal distribution, rather than using other commonly used tests, e.g. traditional t-test.

To test whether there are any abnormal returns related to the long-run performance of our different groups of new listings, we have used the Wilcoxon signed-rank tests, under which the null hypothesis is that the median difference (i.e., median BHAR) between pairs (i.e., between the sample firms and the indices, and the sample firms and their matching firms) is zero. To test whether our different groups differ in performance, we have used the Wilcoxon-Mann-Whitney test. The Wilcoxon-Mann-Whitney test compares the medians of two populations, and can answer the question whether any of the two medians is significantly higher than the other. The test ranks each observation, assigning rank 1 to the lowest value of the observations, rank 2 to the second lowest value of the observations and so on, until it assigns the highest rank to the highest value of the observations. The probability of significant differences in medians between two groups increases as the difference of the mean ranks of the two groups increases. In Section 5, we report mean ranks along with p-values when we utilize the Wilcoxon-Mann-Whitney test. These tests have also been used to test abnormal returns in prior research (e.g. Veld and Veld-Merkoulova, 2004; Schöber, 2008).

5. RESULTS AND ANALYSIS

5.1 Buy-and-hold abnormal returns (BHARs)

Table 2 reports median buy-and-hold abnormal returns (BHARs) with 12, 24 and 36 months holding periods for all new listings between January 1996 and April 2014, as well as for our focus groups, i.e. new listings that were either non-sponsored IPOs, PE-backed IPOs, spin-offs or carve-outs. Using the Wilcoxon signed-rank test, we document statistically significant long-run underperformance at the 5% level for all new listings combined for a 36 months holding period. However, benchmarking against similarly sized firms yields no statistically significant long-run underperformance at shorter holding periods.

Table 2

Median Buy-and-Hold Abnormal Returns (%)

The table reports buy-and-hold abnormal returns (BHARs) for 12, 24, and 36 month holding periods for a total of 393 new listings between January 1996 and April 2014, of which 203 are non-sponsored IPOs (NS), 100 are PE-backed IPOs (PE), 60 are spin-offs (SO) and 30 are carve-outs (CO). We use Datastream for the daily share prices, obtaining total return indices. The returns are measured from the closing price after the first day of trading. If a firm is delisted within 36 months of its listing, we truncate its performance as of the delisting date. For the 18 stocks (or 5% of the sample) with insufficient trading history (i.e., listed between April 2012 and April 2014) we let the returns as of April 8, 2015 represent long-run performance. The returns are reported for two different benchmarks, the MSCI country index for either Sweden, Norway, Denmark or Finland depending on which stock exchange the listing was made, as well as a matching firm, which is a firm traded on any of the Nordic stock exchanges at the time of the listing, with the market value closest to but higher than that of the sample firm immediately after the listing. The p-values are from the Wilcoxon signed-rank test.

	Index					**Matching firm**				
Months	All	NS	PE	SO	CO	All	NS	PE	SO	CO
12	-6.3	-13.1	-10.6	13.2	7.2	-0.6	-0.7	-11.4	14.3	8.4
p-value	0.086	0.046	0.019	0.015	0.910	0.888	0.860	0.177	0.104	0.254
24	-17.5	-24.2	-24.7	15.3	4.0	-9.2	-18.7	-9.1	26.0	14.1
p-value	0.000	0.000	0.000	0.035	0.813	0.188	0.011	0.110	0.039	0.098
36	-22.2	-28.6	-25.9	17.5	-2.6	-15.0	-26.3	-13.6	17.5	18.6
p-value	0.000	0.000	0.000	0.013	0.734	0.023	0.002	0.025	0.102	0.141

The overall underperformance of newly listed companies follows a wide range of prior research, such as Ritter (1991), Loughran and Ritter (1995) and Levis (2011). Loughran and Ritter (1995), who also compared the performance against matching firms based on size, found average BHARs of -26.9% in their sample of IPOs going public between 1970 and 1990 in the US. Our corresponding size-matched three-year median BHAR is -15.0%. We find that all new listings as a group underperform applicable MSCI country indices by 22.2%. This can be compared to for example 13.4% underperformance against the Financial Times All-Share Index in Levis (2011). Even though Schuster

(2003) finds no proof of underperformance on the largest European stock markets during 1988-1998 using equal-weighted buy-and-hold returns, he acknowledges that the median firm experienced underperformance. In the Nordic market specifically, our finding that new Nordic listings experience underperformance is in line with that of Westerholm (2006), although the author uses a five-year event window. Our results support Hypothesis 1, that all new listings experience underperformance.

When looking at the group level, however, the picture differs dramatically. The severe underperformance shown for the sample is primarily driven by non-sponsored and PE-backed issues, both of which underperformed during all holding periods. Non-sponsored IPOs underperformed significantly (5% level) for all holding periods with both benchmarks, except for the 12 month holding period against the matching firms benchmark. The BHARs benchmarked against MSCI country indices and matching firms are -28.6% and -26.3% respectively. In Levis (2011), the corresponding BHARs, measured through equal weighted averages, were -20.2% and 14.2% respectively.

PE-backed IPOs also experience statistically significant long-run underperformance, for all holding periods against the Nordic MSCI country indices, although only for the 36 months holding period when benchmarking against similarly sized firms. The corresponding BHARs of -25.9% and -26.3% are in sharp contrast to Levis (2011), who find that PE-backed IPOs outperform similar benchmarks by 13.8% and 22.5% respectively. This discrepancy might be explained by the sample selection; Levis (2011) only includes buy-out-backed IPOs among his PE-backed IPO group, while we include both VC-backed and buy-out-backed IPOs. However, our results are in line with Schöber (2008) who found median BHARs of -26.5% for a three-year holding period, benchmarking against the S&P 500 index. As Hypothesis 2 states that non-sponsored and PE-backed IPOs experience underperformance in the long-run (which in our case is three years, or 36 months), we find that our results are in line with that hypothesis. The long-run underperformance of PE-backed IPOs is in line with the studies of Brav and Gompers (1997), Schöber (2008) and Bergström et al. (2006) among others. For both non-sponsored and PE-backed IPOs, the negative abnormal returns are getting more severe as the holding period increases, likely due to compounding effects. An illustration of the development of the median BHARs for all listings as well as for our different groups is shown in Figure 2.

In contrast to non-sponsored and PE-backed IPOs, spin-offs experience significant positive abnormal returns for all holding periods against the index benchmark. However, the abnormal returns for the 12 and 36 months holding periods are not significant at any of the traditional levels when matching against similarly sized companies, albeit being very close (10.2% significance level). The 36 month median abnormal return against the index and matching firms benchmarks is 17.5%. These results confirm the findings of Cusatis et al. (1993) and Desai and Jain (1999), who also studied abnormal returns for spin-offs over 12, 24 and 36 months after the listing. The former obtained three-year matched-firm adjusted returns of 33.6% and the latter 19.8%, both based on BHARs. The results are also in line with McConnel et al.'s (2001) findings, in cases where they measured performance against matching firms based on size and book-to-market ratios. However, the support for Hypothesis 4 is inconclusive, as we can only find statistically significant support benchmarking against country indices.

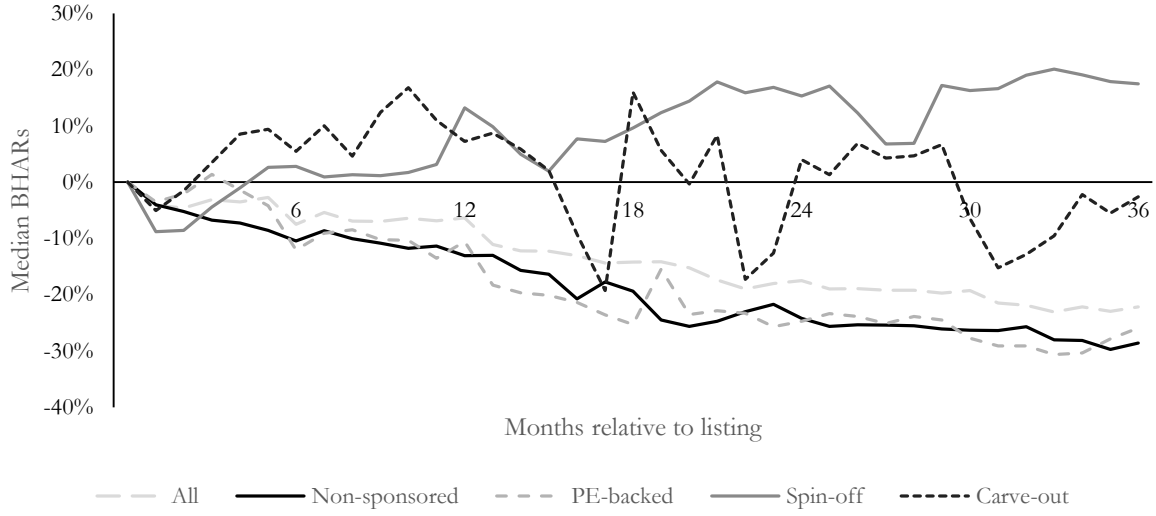

Figure 2 Median BHAR development for a sample of 203 non-sponsored IPOs, 100 PE-backed IPOs, 60 spin-offs and 30 carve-outs, listed from January 1996 to April 2014 and benchmarked against MSCI country indices

Carve-outs outperform the MSCI country indices over the 12 and 24 months holding periods, but underperform the benchmark during a 36 month holding period. The BHARs using matching firms are all positive, but only significant for the 24 month period return (at the 10% level). None of the other abnormal returns for equity carve-outs are however statistically significant, which is in line with the results of Vijh (1999). Our three-year median BHAR against the MSCI country indices, -2.6%, is very similar to the three-year mean BHAR of Vijh (1999), -2.9%, when the author benchmarks against a market index. Similar to Vijh (1999), we find that carve-outs outperform matching firms.

Vijh (1999) matches against firms based on size and book-to-market ratio and finds a three-year mean BHAR of 8.0%, while we find three-year median BHAR of 18.6%. The results give overall support for Hypothesis 6; however, the small sample size (30 carve-outs) is likely a contributing factor to the insignificance of our results. From Figure 2 we can observe that the median BHAR development of carve-outs is much more volatile than those of the other groups, probably because individual listings have relatively stronger effects on the overall carve-out performance.

Table 3
Mean Buy-and-Hold Returns (%)

Buy-and-hold abnormal returns for 12, 24, and 36 months holding periods for a total of 393 firms listed during January 1996 to April 2014, from the closing price after the first day of trading to the earlier of its three-year anniversary date or delisting date. We use Datastream as the source for the daily share prices, obtaining total return indices. The returns are reported on the basis of pre-listing ownership and type of benchmark.

Panel A. Equal-weighted

	Index					**Matching firm**				
Months	All	NS	PE	SO	CO	All	NS	PE	SO	CO
12	11.3	9.4	9.4	24.0	5.1	20.1	22.8	14.1	21.0	20.6
24	-0.8	-8.8	-5.4	32.4	2.6	6.6	-2.9	4.0	32.3	27.7
36	-7.6	-11.4	-25.0	28.7	4.0	-4.2	-9.0	-18.7	19.0	31.1

Panel B. Value-weighted

	Index					**Matching firm**				
Months	All	NS	PE	SO	CO	All	NS	PE	SO	CO
12	-0.3	-1.4	-10.0	15.1	9.5	14.4	24.1	-16.3	10.2	28.8
24	-10.7	-14.3	-18.4	6.8	12.5	18.9	29.7	-13.0	9.3	38.8
36	-2.1	-0.5	-23.9	15.6	16.0	18.3	31.9	-24.4	15.2	32.2

In Table 3, mean BHARs are reported on an equal-weighted and value-weighted basis. Comparing to Table 2, we can see signs of the BHAR skewness. Observing the equal-weighted means, the non-sponsored IPOs show signs of long-run underperformance, although not to the same extent as the medians would indicate. The equal-weighted average of the non-sponsored IPOs even shows positive abnormal returns during the first year, and the same stands for the PE-backed IPOs. In particular, the PE-backed listings show diminishing BHARs over time, in line with Schöber (2008), who also documented one-year positive abnormal returns but negative three-year abnormal returns. The author suggests that one possible explanation for the sharp deterioration of abnormal returns is the PE-funds' divestments following the lock-up periods. The average spin-off shows signs of an even higher outperformance than the median spin-off, while carve-outs outperform both benchmarks. The

magnitudes of the outperformance differ dramatically between the benchmarks, as eight of the carve-outs outperform their matching firm by over 100% over a three-year holding period.

The value-weighted results give a completely different picture compared to the equal-weighted results. Although the average PE-backed IPO, spin-off and carve-out perform in line with the median firm of the respective groups, the non-sponsored IPO performs notably better, particularly against matching firms. This is driven by the three largest listings among the non-sponsored IPOs: Telia outperforms its matching firm Ericsson by some 20-30% during all holding periods, Statoil outperforms Skandia Försäkring by 63%-115%, and Telenor outperforms Svenska Handelsbanken over a three-year period by 14%. These three firms account for over 50% of the value-weighted average for non-sponsored IPOs. Arguably, the value-weighted results should be taken cautiously by an investor consistently investing in new issues.

5.2 Performance differences

Table 4 reports the results of the Wilcoxon-Mann-Whitney tests for differences in abnormal returns among our different groups, using a holding period of three years after the listing date. In contrast to other studies finding that non-sponsored and PE-backed IPOs significantly differ in long-run performance, such as Brav and Gompers (1997), Bergström et al. (2006) and Levis (2011), we find no evidence of this phenomena on the Nordic stock markets during our sample period, hence finding no evidence for Hypothesis 3. Observing the median performance in Table 2, we see that the returns for the two groups have been very similar using the index benchmark. Despite that the group's abnormal returns differ by more than 10 percentage points benchmarking towards matching firms, we do not find evidence that this difference is systematic. However, non-sponsored IPOs do significantly underperform both spin-offs (benchmarking against both indices and matching firms) and carve-outs (benchmarking against matching firms).

Our findings suggest that Nordic spin-offs have significantly different long-run abnormal returns than non-sponsored IPOs, at least between January 1996 and April 2014. The significant difference between spin-offs and non-sponsored IPOs is not surprising given the vast difference in median BHARs and the results of prior research on IPO and spin-off long-run performance. However, as far as we know these groups have not been directly compared against each other in prior studies. Spin-offs have rather been grouped together with other listings (e.g Schuster, 2003) or studied in spin-off specific studies (e.g. Cusatis et al., 1993; Desai and Jain, 1999; McConnell et al., 2001; Veld and Veld-Merkoulova 2004). The results of the latter group's studies are often contrasted against the

results of more general long-run performance studies of newly listed companies such as Ritter (1991), in most cases solely studying IPOs. The seminal carve-out studies, such as Vijh (1999), have also focused on carve-outs separately, although Prezas et al. (2000) use other IPOs as matching firms. However, our results differ from those of Prezas et al. (2000), as we find that carve-outs significantly outperform other IPOs, not the other way around (at least when using similarly sized matching firms). As spin-offs do not show significantly higher abnormal returns than carve-outs, and carve-outs do not show significantly higher abnormal returns than non-sponsored and PE-backed IPOs for both benchmarks, we have mixed support for Hypothesis 5 and 7.

Cusatis et al. (1993) found that the abnormal performance of their spin-off sample was limited to firms which were taken over or merged during the event window, i.e. a sample of spin-offs, excluding firms that were acquired, did not show any significant positive abnormal performance. On the other hand, Desai and Jain's (1999) spin-off sample showed positive abnormal performance even after excluding acquired firms. In our sample of 60 spin-offs, 14 firms (or almost 25%) were acquired within 36 months of listing, which is comparable to the one-third in Cusatis et al. (1993). Among the other listing groups, 4 equity carve-outs (13%), 16 PE-backed IPOs (16%), and 21 non-sponsored IPOs (10%) were acquired during the first three years of listing. This indicates that firms that have been spun-off seem to be likely acquisition targets, potentially due to the creation of "pure play" firms, as suggested in Cusatis et al. (1993). Intuitively, size could be another reason why spin-offs are acquired relatively often. However, even though spin-offs in our sample are smaller on average than non-sponsored IPOs, as seen in Table 1, the median spin-off size (€220mn) is much larger than the median non-sponsored firm (€89mn). The divergence between the average and median market values is driven by outliers in the latter group such as Telia (initial market value of €31,994mn).

We check whether the long-run outperformance associated with spin-offs is simply an effect of takeover premiums by excluding all the firms which were acquired within three years of the listing, running the tests after that again. Overall, the results stay the same and we get further indications that spin-offs outperform MSCI country indices over a three-year period after the listing. However, the three-year positive abnormal returns using matching firms are still significant only at the 15% level. Hence, excluding takeover premiums does not change our initial findings. Through comparing the groups' three-year BHARs (excluding takeover premiums) against each other with the Wilcoxon-Mann-Whitney test, we get further confirmation of our prior results, as spin-offs still do significantly better than both non-sponsored and PE-backed IPOs.

Table 4

Wilcoxon-Mann-Whitney test of differences of three-year BHARs between listing groups

The table shows the results of the Wilcoxon-Mann-Whitney test for differences in median BHARs performed for all pair combinations of non-sponsored IPOs (NS), PE-backed IPOs (PE), spin-offs (SO) and carve-outs (CO). The BHARs are calculated for a 36 months holding period with two different benchmarks: the MSCI index for the country of the listing and a matching firm which is the firm with the inflation-adjusted market value closest to but higher than that of the sample firm immediately after the listing. The table reports the mean ranks, and the p-values result from the Wilcoxon-Mann-Whitney test.

	NS	PE	NS	SO	NS	CO	PE	SO	PE	CO	SO	CO
Number of listings	203	100	203	60	203	30	100	60	100	30	60	30
MSCI Nordic Index												
Mean rank	151.9	152.3	120.4	171.3	114.3	135.0	67.8	101.6	62.8	74.5	47.3	41.9
p-value	0.968		0.000		0.116		0.000		0.134		0.351	
Matching firm												
Mean rank	152.3	151.3	124.7	156.7	112.5	147.3	73.1	92.9	60.9	80.8	45.2	46.2
p-value	0.924		0.004		0.008		0.009		0.011		0.864	

When looking at the carve-out performance, we can note that the group still outperforms non-sponsored and PE-backed IPOs when benchmarking against similarly sized companies, suggesting that listings that stem from public demergers do better than other listings, regardless if it is partly done by raising capital for the parent (carve-out) or as a cash-free dividend distribution (spin-off). As with the results from the sample including takeovers, we find no evidence of significant differences of abnormal returns between non-sponsored and PE-backed IPOs. For full reporting of results excluding takeovers, see Appendix 2 and Appendix 3.

5.3 Focus-increasing versus non-focus-increasing public demergers

As noted in Section 2, Desai and Jain (1999) find that focus-increasing spin-offs perform significantly better than non-focus-increasing spin-offs in the long-run. Veld and Veld-Merkoulova (2004) also observed almost three percentage points higher abnormal returns related to the announcement of a spin-off for focus-increasing spin-offs, than for announcements of non-focus increasing spin-offs. In line with these findings, we first check whether an increase in corporate focus explains differences in abnormal returns in our spin-off sample. We also check whether the grouping of all focus-increasing listings stemming from public demergers (i.e., grouping focus-increasing spin-offs and carve-outs) result in any differences in the abnormal returns. We do not separately test carve-outs due to the very limited sample size.

We analyze whether there is any significant difference between focus-increasing and non-focus increasing spin-offs by obtaining the two-digit Industry Classification Benchmark (ICB) industry codes from Datastream for both the parents and the spun-off companies. In cases we cannot obtain the two-digit ICB code, we obtain the two-digit SIC code and convert it manually. In the one case we neither obtain ICB codes nor SIC codes, we obtain the first-digit ICB code and read the company description in order to assign it a two-digit industry code. The same procedure is used for carve-outs. If the two-digit industry codes differ between a parent and a demerged subsidiary, we classify a spin-off (or a carve-out) as a focus-increasing spin-off (carve-out). Among the spin-offs, 25 (42%) are focus-increasing and 35 (58%) are non-focus-increasing. Among carve-outs, 14 (47%) are focus-increasing and 16 (53%) are non-focus-increasing. The distribution between focus-increasing and non-focus-increasing divestitures differs compared to Desai and Jain's (1999), who find that 111 out of 155 spin-offs (72%) are focus-increasing. This discrepancy is likely an effect of the use of ICB codes rather than SIC codes, which were used in Desai and Jain (1999), and other country-specific circumstances.

Table 5 reports the median three-year BHARs for spin-offs, carve-outs and all public demergers combined, separating focus-increasing and non-focus-increasing listings. The focus-increasing listings experience overall higher median BHARs, and the difference is statistically significant using the size benchmark for spin-offs. Using matching based on size and industry, Desai and Jain (1999) report that the difference in the mean three-year abnormal returns between focus-increasing spin-offs and non-focus-increasing spin-offs was 76% in their sample. Our size-matched firms show a difference of 55% in median three-year abnormal returns. Carve-outs show dramatic differences, with the difference in median three-year BHARs (using index benchmarks) being over 80%. However, the limited sample sizes of focus-increasing and non-focus-increasing carve-outs make us cautious in providing any further interpretation of these differences.

Table 5
Focus-increasing and non-focus-increasing demergers (BHARs)

The table reports the three-year median BHARs for a sample of focus-increasing and non-focus-increasing spin-offs, carve-outs and all public demergers combined in our sample. The focus-increasing listings comprise those demerged companies that have an Industry Classification Benchmark (ICB) two-digit code different from that of their parent, whereas the code is the same in case of a non-focus-increasing listing. The p-values are from 1) the Wilcoxon-signed rank test for the significance of abnormal returns and 2) the Wilcoxon-Mann-Whitney test for significance of differences in BHARs between focus-increasing and non-focus-increasing listings.

		Index			**Matching firms**		
	No.	BHAR %	p-value[1)]	p-value[2)]	BHAR %	p-value[1)]	p-value[2)]
Panel A: Spin-offs							
Focus-increasing	25	33.3	0.030	0.264	58.2	0.023	0.015
Non-focus-increasing	35	9.8	0.116		3.7	0.922	
Panel B: Carve-outs							
Focus-increasing	14	51.6	n.a.	n.a.	25.0	n.a.	n.a.
Non-focus-increasing	16	-32.5	n.a.		-1.3	n.a.	
Panel C: All public demergers							
Focus-increasing	39	43.0	0.010	0.041	56.5	0.003	0.007
Non-focus-increasing	51	1.0	0.660		-1.3	0.851	

As seen from Table 5, the focus-increasing public demergers in our sample perform better overall, compared to the non-focus-increasing demergers. The focus-increasing public demergers show 42 percentage points higher abnormal returns than non-focus-increasing public demergers using index benchmarks, and 58 percentage points higher abnormal return using our matching firms. The difference is significant using both benchmarks. In Section 5.5 we provide further discussion about these results.

5.4 OLS regressions for robustness checking

In Sections 5.1 to 5.3, we find that spin-offs, and in particular listings from focus-increasing public demergers (focus-increasing spin-offs and carve-outs as a group), outperform the index and matching firms' benchmarks, and have performed better than both non-sponsored IPOs and PE-backed IPOs over our sample period. However, even though we have obtained our abnormal returns in line with commonly used methods (benchmarking towards both country indices and similarly sized matching firms), other factors have also been found to have a relation with the returns of newly listed companies, as well as with cross-sectional stock returns in general. For example, Ritter (1991) finds that IPOs in periods of high IPO activity are related to lower long-run raw returns. This is confirmed by Bergström et al. (2006), who also find that large (by market capitalization) IPOs perform relatively better than small IPOs. Referring to the discussion in Section 4.1.3, industry and the book-to-market ratio are also commonly used to explain long-run returns (e.g. Loughran and Ritter, 1995; Fama, 1998).

Table 6
Three-year equal-weighted BHARs (%) by industry

The number of listings in our sample grouped by industry and the industry groups' corresponding BHARs. The industry classification is based on the Industry Classification Benchmark (ICB) one-digit industry codes, retrieved from Datastream.

		Benchmark		
Industry	No.	Index	Matching firm	Average
Basic Materials	12	30.5	17.9	24.2
Consumer Goods	37	-20.7	3.7	-8.5
Consumer Services	40	-10.4	-32.4	-21.4
Financials	60	-5.5	1.9	-1.8
Health Care	38	-5.0	-0.7	-2.8
Industrials	74	9.6	20.1	14.9
Oil and Gas	34	8.5	21.8	15.2
Technology	84	-27.9	-33.6	-30.7
Telecommunications	12	-7.8	-9.0	-8.4
Utilities	2	-105.2	-39.6	-72.4
Total / Average	393	-7.6	-4.2	-5.9

In order to control for these factors, we perform OLS regressions. As a dependent variable, we use the three-year BHARs, using both benchmarks. First, the BHARs are regressed to a dummy variable (Spin-off), taking the value 1 if the observation is a spin-off and 0 otherwise. We create additional control variables to control for listings made in periods of high IPO activity, the size of the listed company, industry and initial book-to-market ratio. However, as we could only obtain the initial

book-to-market ratio for 354 of our 393 observations from Datastream[6], we perform the regression both including and excluding the book-to-market ratio variable. To control for high IPO activity, we divide the number of listings in each year by 100 (IPO Volume), following the approach of Ritter (1991). As we only obtain listings from the first quarter of 2014, we divide the 2014 listings by 25 respectively. The size of the listings is controlled for by taking the natural logarithm of the market value of equity (Market Value) immediately after the listing.

As we can observe in Table 6, basic materials, oil and gas and industrial companies have performed especially well during our observation period, while utilities and technology companies have performed particularly badly. Given only a few listings in our sample from the basic materials industry and the prevalence of spin-offs among industrial companies (additional industry distribution in Appendix 4), we choose to include a dummy variable taking the value 1 if the observation is an industrial company (Ind). We also choose to control for technology sector listings, even though utilities perform worse on average. We believe it is redundant to control for an industry that only affects two firms, especially since the average is heavily driven by Fortum, listed in late 1998 on the Official List of the Helsinki Exchange. Fortum was severely outperformed by the MSCI Finland index, which saw a boom from the mid-1990s up until the beginning of the 2000s. We hence include another dummy variable for technology listings (Tech), taking the value 1 if the observation is a technology company. This approach also follows Ritter (1991), who controlled for the best and worst performing industries in his sample. We measure industry-performance through the equal weighted BHARs, as the performed OLS regressions weigh each observation equally. However, as shown in the Appendix 5, the median industry BHARs confirm our choices of industries to control for. Secondly, we perform the same regressions, exchanging the spin-off dummy to a dummy taking the value 1 if the observation is a focus-increasing demerger (Focus) and 0 otherwise.

The results documented in Table 7 show that the high abnormal returns from spin-off listings against index benchmarks cannot be explained by listing activity, size and industry performance (high versus low). The spin-off dummy variable is positive and significant at the 5% level, both when including and excluding book-to-market ratios, meaning that spin-off listings are associated with higher abnormal returns.

[6] This includes 182 non-sponsored IPOs, 93 PE-backed IPOs, 52 spin-offs and 27 carve-outs. Datastream provides market-to-book ratios, which we invert.

Table 7

OLS regression with the three-year BHAR as the dependent variable

The table reports the output from a regression of BHARs on up to six explanatory variables. Spin-off is a dummy variable, taking the value 1 if the observation is a spin-off, and 0 otherwise. IPO volume is the number of listings in the year of the listing, divided by 100. For listings in the first quarter of 2014, we use 25 respectively. Log(Market value) is the natural logarithm of the market value immediately after the listings. Ind and Tech are dummy variables taking the value 1 if the observation is an industrial or technology company, respectively, and 0 otherwise. The industry classification is based on the Industry Classification Benchmark (ICB) one-digit industry codes, retrieved from Datastream. BM is the book-to-market ratio for an observation after the first day of trading. The variable Focus in Panel B is a dummy taking the value 1 if the observation is a focus-increasing demerger, and 0 otherwise. The p-values, in parantheses, are based on bootstrapping by resampling 10,000 times with replacement.

Panel A.	**Index**		**Matching firms**	
Spin-off dummy	(1)	(2)	(3)	(4)
Spin-off	0.126	0.110	0.049	0.030
	(0.005)	(0.024)	(0.290)	(0.538)
IPO volume	0.083	0.070	-0.075	-0.071
	(0.085)	(0.153)	(0.101)	(0.151)
Log(Market value)	0.025	0.034	0.053	0.083
	(0.557)	(0.488)	(0.204)	(0.080)
Ind	0.050	0.076	0.052	0.062
	(0.522)	(0.365)	(0.453)	(0.408)
Tech	-0.073	-0.061	-0.073	-0.038
	(0.063)	(0.212)	(0.103)	(0.463)
BM		0.069		0.106
		(0.271)		(0.040)
R^2 adjusted	0.020	0.024	0.016	0.027
No. of observations	393	354	393	354

Panel B.	**Index**		**Matching firms**	
Focus-increasing dummy	(5)	(6)	(7)	(8)
Focus	0.146	0.189	0.121	0.113
	(0.027)	(0.003)	(0.013)	(0.020)
IPO volume	0.082	0.072	-0.071	-0.068
	(0.071)	(0.132)	(0.122)	(0.152)
Log(Market value)	0.015	0.021	0.042	0.072
	(0.741)	(0.655)	(0.325)	(0.128)
Ind	0.049	0.072	0.046	0.056
	(0.539)	(0.379)	(0.506)	(0.447)
Tech	-0.069	-0.056	-0.065	-0.035
	(0.085)	(0.245)	(0.149)	(0.491)
BM		0.056		0.089
		(0.341)		(0.068)
R^2 adjusted	0.025	0.047	0.028	0.038
No. of observations	393	354	393	354

The spin-off dummy variable is not significant in the regression using three-year matching firm BHARs, which is rather unsurprising given that we only find evidence of long-run outperformance at the 15% significance level (see Table 2).

The results for the IPO volume variable are inconclusive, as it has opposite signs depending on the benchmark. It is marginally significant (10% significance level) against the three-year index BHARs, excluding the book-to-market ratios. Yet, including book-to-market ratios make the IPO volume variable insignificant. One interpretation is that firms with high book-to-market ratios have outperformed applicable indices, even when listed during periods of high IPO activity. The variable is negatively associated with matching firm BHARs, although insignificantly. The initial market value has a positive but insignificant relation to abnormal returns, except for in regression (4), in which it is significant at the 10% level. This result is not only in line with Bergström et al. (2006) and Brav and Gompers (1997), but also with the seemingly strong value-weighted BHARs against matching firms. From the industry variables, only technology firms show a significant effect on long-run abnormal returns, and only with the index benchmark. Including book-to-market ratios, however, reduce the importance of technology firm observations, potentially due to the inflated market values associated with technology listings during the technology bubble in the early 2000s. In our sample, technology firms had the lowest book-to-market ratios.

The results are similar when changing the spin-off dummy to the focus-increasing dummy. Yet, the dummy itself yields positive and significant results for every regression. We hence get further indications that the positive abnormal returns associated with spin-offs are not purely a spin-off effect but rather a focus-increasing effect. In Appendix 6, we include OLS regressions with two country dummies for Sweden and Norway respectively in order to disentangle potential country effects not captured by our matching firms. Including these dummies does not change our conclusions.

As the dependent variable is skewed and the residuals are not normally distributed, we report bootstrapped p-values, resampling 10,000 times with replacement, although they are similar to those returned by the OLS regression. Furthermore, the explanatory powers of all eight regressions are very low. Yet, even though these results should be interpreted with caution, they do indicate some robustness with regards to the results obtained from our Wilcoxon signed-rank tests and Wilcoxon-Mann-Whitney tests.

5.5 Discussion

The severe long-run underperformance of IPOs documented in the Nordic stock markets could potentially be explained by investor overoptimism towards IPOs (Loughran and Ritter, 1995). As the IPOs often experience a significant decrease in operating performance after the IPO (Jain and Kini, 1994), the overoptimism characterizing some IPO investors may decrease, while the valuation divergence in the investor community may also be reduced subsequently. As the valuation move towards the mean market valuation, the share price falls. Furthermore, the 'pseudo market timing' theory (Schultz, 2003) states that the IPO firms generally try to time the market and achieve the highest valuation possible for their firm, however leading to a long-run underperformance of IPOs in general.

The same set of possible factors apply for the PE-backed IPOs. Academic research argues that PE funds help the firm to create a value-maximizing operational and managerial set up (Jensen 1986, 1989), leading to for example improvements in operating income and net cash flows (Kaplan, 1989; Kaplan and Strömberg, 2012). The governance and performance improvements prior to the IPO may however imply less room for operational improvement after the IPO for the PE-backed IPOs. As the market tends to overweight recent operational improvements (Loughran and Ritter, 1995), the difficulty to maintain the strong performance may cause the firms to fail to meet the high expectations from the investor community. Additionally, as PE funds commonly seek to exit their investment at the IPO or after the lock-up period, the efficient monitoring associated with PE ownership (Jensen, 1986, 1989) may at least partly disappear.

The circumstances may differ for spun-off or carved-out companies. Timing high valuation levels (pseudo market timing) is not a commonly mentioned reason to demerge a public company (Mukherjee et al., 2004). As there is no exchange of cash involved in spin-offs, the incentive to window dress or undertake earnings management is also potentially lower. The strong operational improvements associated with PE ownership before the IPO and the difficulty to improve already efficient operations might not be as prevalent among spun-off subsidiaries.

We find indications that focus-increasing spin-offs and carve-outs perform particularly well over our observation period. While neither spin-offs nor carve-outs experience significant abnormal returns against both of the benchmarks as separate groups, a combined group of focus-increasing spin-offs and carve-outs does. As we find indications that non-focus-increasing spin-offs perform significantly worse than focus-increasing spin-offs, and yield insignificant abnormal returns against both benchmarks, we find support for Desai and Jain's (1999) claim that non-focus-increasing spin-offs are

commonly underperforming prior to the spin-off, which serves as a reason to spin it off. The reason for spinning off a subsidiary with operations relatively unrelated to that of its parent may on the other hand be to enhance corporate focus, in line with the findings of Mukherjee et al. (2004). Even if the focus-increasing demerger is relatively poorly performing, the low performance may imply substantial room for operational improvement, in contrast to the case for the median PE-backed IPO. We would also expect less investor overoptimism in such a spin-off. In addition, we would expect that the long-run performance of a spin-off is less affected by the investor community's focus on recent operational improvements. For the focus-increasing demerger, not only would there be potential to gain benefits of direct access to capital markets and more independent decision making, but also for increased managerial and operational focus. The potential for an increase in managerial and operational focus would not be equally prevalent in a non-focus-increasing demerger, potentially explaining why these listings do worse. Desai and Jain (1999) also find that focus-increasing spin-offs experience an improvement in operating performance after the completion date, but cannot find any evidence of improved operating performance for non-focus-increasing spin-offs. The improved operating performance is in sharp contrast with the findings of general post-IPO operating performance studies, such as Jain and Kini (1994).

It should nevertheless be noted that the focus-increasing effect could well be prevalent among certain non-sponsored IPOs as well. However, as this group comprises a wide range of pre-listing ownership conditions, such as the firms that were governmentally owned or controlled by the original founders, our study is not able to disentangle this potential effect.

6. CONCLUSIONS

In line with a wide range of prior research on the US and European stock markets, our paper indicates that new Nordic listings on an aggregated level experience long-run underperformance, underperforming the Nordic MSCI country indices by 22.2% and similarly sized companies by 15.0% over a three-year horizon. However, by grouping new Nordic listings based on their pre-listing ownership, we find indications of systematic differences among groups. While the median non-sponsored and PE-backed IPO experience long-run underperformance, the median spin-off and carve-out do not. We also find that spin-offs perform significantly better than non-sponsored and PE-backed IPOs during our sample period. Even though spin-offs are more commonly acquired after the listing compared to other listing groups in our research sample, we find that our results cannot be explained by simply removing takeover premiums. We also test the difference in abnormal returns between carve-outs and non-sponsored and PE-backed IPOs, but the results are inconclusive. Carve-outs have performed significantly better against matching firms, but the differences when benchmarking against the country indices are insignificant.

In particular, we find that focus-increasing spin-offs and carve-outs outperform applicable benchmarks over a three-year period in our sample. After performing OLS regressions, we cannot find evidence that IPO activity, the size of the listing, industry or the initial book-to-market ratios fully explain the higher abnormal returns associated with focus-increasing demergers.

Yet, the methodologies used in long-run performance studies remain controversial. In this study, we have focused our analysis around median abnormal returns, employing non-parametric tests to determine the statistical significance of our findings. This ultimately provides some limitations in terms of comparability with studies focusing on average abnormal returns and employing t-tests.

Our study does not investigate operating performance prior to or after the listing. Hence, it remains to be studied whether improvements in operational performance after the listing differ between the different kinds of listings. A better understanding of post-listing operating performance could potentially explain the positive abnormal long-run returns of demerger-related listings on the Nordic stock markets.

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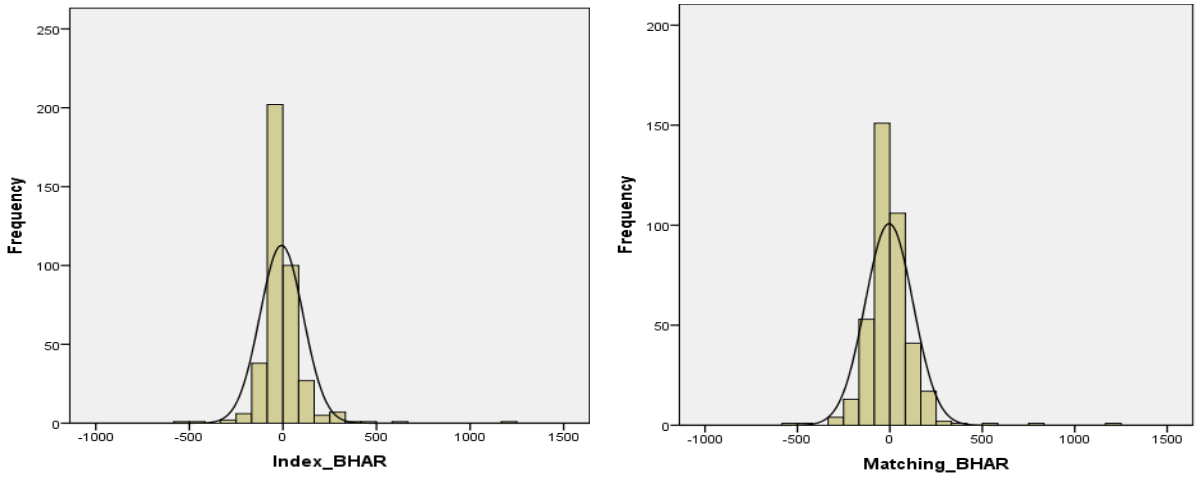
7. APPENDICES

Appendix 1
Frequency tables of three-year BHARs



Appendix 2

Median Buy-and-Hold Return (%) excluding takeovers

The table reports buy-and-hold abnormal returns (BHARs) for 12, 24, and 36 month holding periods for a total of 338 new listings between January 1996 and April 2014, of which 182 are non-sponsored IPOs (NS), 84 are PE-backed IPOs (PE), 46 are spin-offs (SO) and 26 are carve-outs (CO). We use Datastream for the daily share prices, obtaining total return indices. The returns are measured from the closing price after the first day of trading. If a firm is delisted within 36 months of its listing, we truncate its performance as of the delisting date. For the 18 stocks (or 5% of the sample) with insufficient trading history (i.e., listed between April 2012 and April 2014) we let the returns as of April 8, 2015 represent long-run performance. The returns are reported for two different benchmarks, the MSCI country index for either Sweden, Norway, Denmark or Finland depending on which stock exchange the listing was made, as well as a matching firm, which is a firm traded on any of the Nordic stock exchanges at the time of the listing, with the market value closest to but higher than that of the sample firm immediately after the listing. The p-values are from the Wilcoxon signed-rank test.

Months	**Index**					**Matching firm**				
	All	NS	PE	SO	CO	All	NS	PE	SO	CO
12	-4.8	-13.8	-5.6	16.1	9.6	-1.4	-3.6	-9.6	13.5	0.2
p-value	0.146	0.022	0.130	0.014	0.568	0.960	0.628	0.365	0.145	0.341
24	-21.0	-26.8	-23.9	19.2	-3.2	-12.2	-21.0	-11.5	32.9	14.1
p-value	0.000	0.000	0.000	0.019	0.751	0.076	0.004	0.057	0.028	0.191
36	-24.9	-33.7	-27.0	25.6	-21.1	-20.0	-33.2	-20.8	20.2	18.6
p-value	0.000	0.000	0.000	0.016	0.585	0.003	0.000	0.006	0.148	0.269

Appendix 3

Mann-Whitney U-test of differences of three-year BHARs (excluding takeovers)

The table shows the results of Mann-Whitney U-test for differences in BHAR performed for all pair combinations of our sample groups. The BHARs are calculated for a 36 months holding period with two different benchmarks: the MSCI index for the respective Nordic country, except Iceland, and a matching firm which is the firm with the market value closest to but higher than that of the sample firm immediately after the listing. The table reports the mean ranks, and the p-values results from the Mann-Whitney U-test.

	NS	PE	NS	SO	NS	CO	PE	SO	PE	CO	SO	CO
Number of listings	180	86	180	46	180	26	86	46	86	26	46	26
MSCI Nordix Index												
Mean rank	133.0	134.6	103.6	152.3	101.1	120.5	55.7	86.8	54.1	64.5	38.0	33.8
p-value	0.874		0.000		0.121		0.000		0.152		0.405	
Matching firm												
Mean rank	133.6	133.2	107.4	137.3	99.5	130.9	59.9	78.8	52.4	70.2	36.7	36.1
p-value	0.967		0.006		0.012		0.007		0.014		0.907	

Appendix 4

Industry distribution

The number of listings in our sample by industry and pre-listing ownership. The industry classification is based on the Industry Classification Benchmark (ICB) one-digit industry codes, retrieved from Datastream.

	Classification			
Industry	NS	PE	SO	CO
Basic Materials	3	1	5	3
Consumer Goods	22	10	3	2
Consumer Services	20	15	3	2
Financials	43	4	13	0
Health Care	20	14	4	0
Industrials	23	19	18	14
Oil & Gas	16	8	5	5
Technology	48	26	6	4
Telecommunications	6	3	3	0
Utilities	2	0	0	0
Total	203	100	60	30

Appendix 5

Three-year median BHARs (%) by industry

The number of listings in our sample by industry and the corresponding median BHARs, measured from the closing price on the first day of trading to the earlier of a sample firm's three-year anniversary date and its delisting date. The returns are benchmarked against MSCI country indices The industry classification is based on the Industry Classification Benchmark (ICB) one-digit industry codes, retrieved from Datastream.

		Benchmark		
Industry	No.	Index	Matching firm	Average
Basic Materials	12	12.8	25.1	19.0
Consumer Goods	37	-19.9	3.7	-8.1
Consumer Services	40	-26.0	-36.2	-31.1
Financials	60	-14.3	-5.7	-10.0
Health Care	38	-32.0	-24.5	-28.3
Industrials	74	-8.9	7.0	-0.9
Oil & Gas	34	-22.1	-8.1	-15.1
Technology	84	-35.7	-43.0	-39.4
Telecommunications	12	-11.1	2.4	-4.4
Utilities	2	-105.2	-39.6	-72.4
Full sample	393	-22.2	-15	-18.6

Appendix 6

OLS regression with the three-year BHAR as dependent variable

The table reports the output from a regression of BHARs on up to six explanatory variables. Focus is a dummy variable, taking the value 1 if the observation is a focus-increasing demerger, and 0 otherwise. IPO volume is the number of listings in the year of the listing, divided by 100. For listings in the first quarter of 2014, we use 25 respectively. Log(Market value) is the natural logarithm of the market value immediately after the listings. Ind and Tech are dummy variables taking the value 1 if the observation is an industrial or technology company, respectively, and 0 otherwise. The industry classification is based on the Industry Classification Benchmark (ICB) one-digit industry codes, retrieved from Datastream. BM is the book-to-market ratio for an observation after the first day of trading. Sweden and Norway are two dummy variables, taking the value 1 if the sample firm is listed on a Swedish or Norwegian stock exchange, respectively. The p-values, in parentheses, are based on bootstrapping by resampling 1,000 times with replacement.

Focus-increasing dummy	Index	Matching firms
Focus	0.181	0.110
	(0.004)	(0.029)
IPO volume	0.070	-0.068
	(0.143)	(0.157)
Log(Market value)	0.031	0.083
	(0.500)	(0.076)
Ind	0.072	0.056
	(0.399)	(0.456)
Tech	-0.047	-0.024
	(0.340)	(0.640)
BM	0.052	0.085
	(0.351)	(0.089)
Sweden	0.103	0.075
	(0.128)	(0.272)
Norway	0.081	0.089
	(0.309)	(0.227)
R^2 adjusted	0.049	0.038
No. of observations	354	354