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Nordic Corporate Spin-offs

An empirical study of long-term shareholder value creation through corporate spin-offs in the Nordic countries.

Jonas Ø. Green and Olav S. Roalkvam

Supervisor: Svein-Arne Persson

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NORWEGIAN SCHOOL OF ECONOMICS

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Abstract

This thesis investigates the long-term shareholder value creation associated with Nordic corporate spin-offs completed between 1996 and 2022. The Nordic region is fascinating, as it is an under-researched area on this topic. Our sample consists of 77 Nordic spin-off pairs. We examine abnormal returns up to 9 years post-spin-off. Additionally, we look at possible factors that could explain the value creation.

We find that subsidiaries have significant positive long-term abnormal returns after approximately 3 to 5 years post-spin-off. In contrast, parent companies exhibit no clear pattern of value creation or destruction in the long term. The combined proforma portfolios (a value-weighted portfolio of the subsidiary and the parent) indicate potential value creation. However, the evidence could be more uniformly robust. Regarding different factors that explain value creation, we find that subsidiaries listed in the same industry as their parent companies yield significant long-term abnormal returns and perform better than subsidiaries listed in a different industry. Additionally, we find that relatively large subsidiaries, compared to their parents, tend to perform better than smaller ones.

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1 Introduction

This thesis investigates the long-term shareholder value creation associated with Nordic corporate spin-offs. We define 'long-term' as up to 9 years post-spin-off. In this chapter, we discuss the motivation for writing the thesis. Therefore, we present the historical background for spin-offs and dive into the holes in the literature that this thesis will fill. Following this, we explain our research question in more detail. Lastly, we discuss the limitations of our study and provide a structural overview of the thesis.

This thesis aims to aid companies in making better restructuring decisions by exploring value creation from spin-offs over nine years rather than the usual three post-a spin-offs and focusing on the Nordics. This region has yet to be extensively studied in this context.

1.1 Background

Between 1960 and 1980, U.S. and European financial markets experienced a trend of conglomeration and diversification. Shleifer and Vishny (1991). Companies actively pursued acquisitions of unrelated businesses, aiming to scale up and diversify their revenue sources. This strategic expansion resulted in a high number of mid-to-large-sized conglomerates.

However, in the subsequent era from the 1980s, many conglomerates faced challenges in managing their expansive and diverse portfolios (Davis et al., 1994). The 'conglomerate discount' became a known term partly because the conglomerates' constituent units might be more valuable if operated independently, Maksimovic, V., & Phillips, G. (2006). The financial markets evolved significantly during this time, becoming increasingly liberalized and accessible. This transformation allowed investors to diversify their portfolios by investing in individual pure-play companies. Hence, it reduced the reliance on conglomerate stocks to achieve diversification.

This shift, where conglomerates were now viewed unfavorably and traded at a discount, led to a wave of divestitures. Consequently, corporate spin-offs became a strategic priority for many conglomerates. Following these market shifts, the study of corporate spin-offs became a popular topic for U.S. researchers. European researchers gained attention to this area in the early 2000s. However, the Nordic region has yet to be extensively studied,

making it exciting to investigate further.

1.2 Motivation and Contribution

Our motivation for this study is its contribution to existing literature about corporate restructuring. We write this thesis to improve decision-making for companies on this topic. The thesis contributes with insightful knowledge about the long-term value creation from spin-offs in four main areas:

- It studies a region that is yet to be extensively studied.
- It extends the timeline of long-term spin-offs from 3 to 9 years. (Most previous research on long-term value creation from spin-offs investigates only three years post-spin-off. However, our study extends this timeline up to 9 years.)
- It employs a variety of methodologies and financial metrics (enhancing the robustness and reliability of our findings)
- It explores different aspects of value creation, providing more in-depth insights into our findings. (Specifically, we examine value creation for subsidiary and parent companies following spin-offs. In addition, we examine a combined 'Pro-forma' entity, a value-weighted combination of parent and subsidiary firms, to track the actual value created for original shareholders.)

These four areas contribute to the overall goal of aiding companies in making more informed decisions regarding corporate restructuring.

1.2.1 Region of Interest

There have been many research studies internationally on the long-term value creation from corporate spin-offs. Many of them, especially U.S. studies, have proven spin-offs to be an effective alternative for corporate restructuring. Desai and Jain (1999) is a famous example of a U.S. study proving significant long-term value creation from spin-offs. However, the Nordic region needs to be more studied on this topic. This information gap can lead to sub-optimal dissolution strategies for Nordic companies. Therefore, we are motivated to investigate spin-off wealth effects in the Nordics, as it can contribute to covering the information gap and improve decision-making.

It was crucial to evaluate the Norwegian sample size to assess whether to focus our analysis solely on Norway or expand it to include all Nordic countries. The number of Norwegian spin-offs needed to be higher for only investigating Norway. However, the Nordic market in total is large enough for a meaningful analysis. Additionally, for a Nordic analysis to be meaningful, the Nordic countries must share some similarities. Building on this notion, a key shared characteristic among the Nordic countries is their financial stability (NCM, 2023). Regarding living standards, the Nordic countries consistently rank among the highest globally (McWhinney, 2023). Additionally, they boast some of the lowest levels of income inequality, OECD (2023). The Nordic countries are also known for their small, open economies. (Mjøset, 2009). They also engage in a high level of trade and economic cooperation, Hilmarsson, H. (2019). In summary, the Nordic countries share many similarities, enabling us to draw meaningful conclusions about them.

While the Nordic countries share many similarities, they exhibit significant variations in their industrial compositions. Norway is notable for its asset-heavy offshore industries, including oil, gas, and shipping. Finland is home to many industrial, materials, and technology companies. Sweden has a solid financial, industrial, and technological presence. Lastly, Denmark's dominant sector is healthcare. Iceland is excluded from our analysis as the data sample is too small. The significant variation in industrial composition among the Nordic countries provides a broad and diversified picture of the spin-off market. However, the country-specific variations need to be accounted for if a company uses our thesis to make a restructuring decision. This thesis does not delve into industry- or country-specific differences.

1.2.2 Long-term Horizon

Our study focuses on the long-term shareholder value creation from spin-offs, examining up to 9 years post-spin-off. Hence, our study extends the timeline beyond the three-year window typically used in previous research studies. The extended timeline allows us to assess the value added from spin-off activity over many years. We chose a more extended timeframe because corporate restructurings take time to integrate and create value entirely. Only examining a three-year window can exclude essential findings related to value creation after three years post-spin-off.

1.2.3 Robustness and Uniqueness

Our thesis provides robust results by using several methodologies and financial metrics. This enhances the contributions of our thesis discussed earlier.

To assess the long-term value creation of spin-offs, we use abnormal returns. Abnormal returns are the returns of the different subgroups involved in a spin-off, parents, and subsidiaries, subtracting an expected return. However, applying only one method for calculating expected returns makes the result prone to potential drawbacks of that methodology. However, by applying several methodologies, we can mitigate the drawbacks of each individual method and obtain more robust results that are more accurate and reliable.

We use three methods to calculate expected returns and obtain three different abnormal returns for the subgroups.

The first method is the "Calendar Time Approach" (CTA). We use the CTA to obtain abnormal returns by regressing average returns for a subgroup, e.g., subsidiaries or parent companies, against the Fama French three factors. In this way, the expected return is built up of the regression's three factors: a market risk premium, a size premium, and a value premium. The spin-off study by McConnell and Ovtchinnikov (2004) uses this approach, and it is also advocated by Fama (1998) and Mitchell and Stafford (2000).

For the second method, the expected return is based on the market index where the stock is listed. We call this method the Matching Country Benchmark Approach (MCBA). Dasilas et al. (2011) is a spin-off study using the MCBA. The MCBA is also a commonly used method outside spin-off studies to obtain abnormal returns.

In the third method, we calculate the expected return for each company by predicting the values using the same three factors as in the CTA method. We call this method the Prediction Benchmark Approach (PBA). Comparing spin-off returns to a company-specific benchmark is done in several renowned spin-off studies such as Desai and Jain (1999) and Veld and Veld-Merkoulova (2004). The PBA has its roots in this methodology and we follow Pettengill, Chang, & Huang's, (2011) application to apply the PBA.

The names for these three methods are not concise among previous studies; however, we

give them our own names to enhance clarity.

We will briefly explain how our diversified methodological approach provides more robust results and strengthens our contribution.

An advantage of the CTA is that it accounts for the cross-sectional dependence between stocks. Cross-sectional dependence is when individual stock returns depend on each other in overlapping weeks, which can lead to overstated test statistics, as statistical tests often assume independence between observations (Fama, 1998; Mitchell & Stafford, 2000). The CTA method effectively addresses cross-sectional dependence by averaging returns across a group of stocks within each period, thereby integrating the correlations among different stocks.

The MCBA shows a clearer picture of a stock's performance relative to the market it is a part of. The market is a good proxy for how an average stock should perform; it indicates abnormal returns measured against the average stock in its respective market.

The PBA accounts for the characteristics of each stock by predicting accurate expected returns for each stock. Additionally, our study uniquely employs the PBA, setting it apart in spin-off analysis. Unlike standard methods that rely on similar companies' stock returns, the PBA predicts benchmarks for each stock. Predicting a stock's expected returns is crucial in the Nordic context, where suitable comparisons are scarce and few spin-off samples exist. This approach involves over 60,000 FF3 regressions and predictions, updated weekly for precision. In this way, the PBA accounts for each stock's characteristics, strengthening the study's accuracy.

The methods' combined strengths give various angles for the abnormal returns, producing more robust results. Additionally, these strengths also help fill the weaknesses of the other methods.

For instance, one of the main downsides of CTA and MCBA is that the expected return ignores individual company characteristics, which can lead to abnormal returns that only reflect part of the picture. The PBA accounts for this potential partial view by creating individual predicted benchmarks for each company.

A limitation of the CTA method is that it uses just one linear regression over several years, assuming constant relationships between the three factors (market risk, size,

and value premium) and returns. This constant relationship assumption can lead to inaccuracies if these relationships change over time, like in 9 years. However, the MCBA and PBA methods overcome this by updating expected returns weekly, independent of past expectations.

The PBA method's primary drawback is the risk of variance in the predictions. Sometimes predictions can deviate significantly more than, e.g., an index, increasing the risk of error and outliers. The MCBA reduces this risk, as the index does not have similar possible fluctuations in expected return.

Furthermore, the PBA and MCBA do not account for cross-sectional dependence. As mentioned above, the CTA accounts for this.

Lastly, two of our three methodologies, namely MCBA and PBA, utilize two different financial metrics each, adding to the robustness of our thesis. These financial metrics are Buy-and-Hold Abnormal Returns (BHAR) and Cumulative Abnormal Returns (CAR). Hughson et al. (2008) recommend BHAR to reflect actual returns precisely. However, they caution that BHAR's long-term compounding effects can skew results, potentially leading to outliers. Using CAR avoids this issue, offering a different perspective on the results and making them more reliable.

Given the unique strengths and weaknesses of each method and performance metric, we employ a combination of these approaches in assessing long-term value creation. In this way, we mitigate the drawbacks of each individual method and get more robust results compared to other studies that do not do this.

In summary, this Section provides insights into spin-off value creation in a region yet to be extensively researched. Furthermore, we examine a longer horizon post-spin-off than most other studies on the topic in an international context, which provides a more accurate assessment of spin-off value creation in the long term. Lastly, our study provides a unique and thorough perspective that can help Nordic companies to make better restructuring decisions.

1.3 Research Question

Building on section 1.2, we intend to answer the following research question, which is the foundation of this study:

Do Nordic corporate spin-offs create long-term shareholder value?

An examination of the following subquestions will answer the research question:

1. Are there any long-term shareholder wealth effects associated with spin-off activity? How do the parent and its spun-off subsidiary perform separately, and what is the Pro-forma (value-weighted portfolio of subsidiary and parent) effect?
2. What factors can explain possible shareholder wealth effects in the long term?

1.4 Limitations

In the following, we describe the study's limitations.

One limitation is that our study had a smaller sample size (77 for each subgroup, e.g., subsidiaries and parents, reduced to 22 by year nine) compared to European and American studies, which often exceed 100 observations. See Table 2.1 in chapter 2. Our relatively small sample size was due to the smaller Nordic market. The limitation is that outliers in such a small data set can affect results, possibly misrepresenting the trend. To address this, we focused on median values and used financial metrics like Cumulative Abnormal Return (CAR), which are less affected by outliers than Buy-and-Hold Abnormal Return (BHAR).

We could extend the study's timeframe to increase the sample size. However, this posed challenges. Firstly, confirming genuine spin-offs from older data was difficult, as many listed as such were found not to be true spin-offs, especially with limited digital records pre-2000s. Secondly, data from too far back may not reflect current market trends. We decided against including older data to ensure accuracy and relevance, focusing on more recent and reliable information. This is why our study uses data from 1996 until the present.

Additionally, previous studies commonly use three factors to explain why spin-offs create value. Namely, the relative size of the spin-off, how much the spin-off increases the

corporate focus for parent and subsidiary, and how much information asymmetry there is between the spin-off internally and the market. However, we had limited data needed to calculate the information asymmetry variable. Our access to the Institutional Brokers Estimates System (IBES) and Bloomberg did not provide the historical standard deviations of analysts' earnings forecasts. These are required to generate a proxy for information asymmetry. However, the information asymmetry variable mainly impacts the short term; thus, not including this in a long-term study is not a crisis.

Furthermore, the literature this thesis builds on is quite old. In the sample of existing literature in Table 2.1 chapter 2, the newest study is from 2007. After extensive research, we have not found relevant literature from recent years.

Lastly, a limitation of our thesis is the lack of access to Small minus Big (SMB) and High minus Low (HML) data for each Nordic country. After extensive research, we found that such data is only publicly available for Norway, possibly due to the relatively small Nordic markets. We considered creating our fictional stock index to create historical SMB and HML values in the Nordics, but this would lead to survivorship bias if not updated over time. To make the index representative each year, updating hundreds of companies quarterly over 26 years (the study's duration) is overly time-consuming. Additionally, we discussed using European values for SMB and HML from Kennedy—R—French's database. However, we decided to use Ødegaard's SMB and HML values for Norway as a proxy for the Nordic region. This choice was made because Norwegian values align more closely with the overall Nordic market than the broader European data.

Understanding the impact of this limitation is critical to assessing our analysis limitation and precision, as country-specific data might yield more accurate results. Therefore, we test the impact of the Norwegian SMB and HML factors by comparing results obtained with the CAPM and FF3 models. Norwegian SMB and HML factors may not fully represent the Nordic market, but their inclusion offers a more nuanced analysis of spin-off value creation.

Lastly, as a side note, we also considered studying the impact of SMB and HML factors on spin-off value creation in general. However, for accurate results, Nordic-region-specific SMB and HML data are needed. Using Norwegian data for a Nordic-wide study could introduce bias. They are potentially underestimating the effects of SMB and HML in

other Nordic countries. However, this would be an interesting study for the future.

1.5 Structure

This paper is structured in the following way:

- Chapter 2 reviews the literature and previous research on corporate spin-offs.
- Chapter 3 presents the theoretical background and critical financial concepts applicable to this study.
- Chapter 4 introduces the methodologies employed in this study.
- Chapter 5 describes the data collection process: Sample collection, validation, and characteristics.
- Chapter 6 describes a more detailed hypothesis based on our primary research question and previous research.
- Chapter 7 objectively interprets the empirical findings obtained in our study and compares them with those of previous research. After this, the hypotheses are either accepted or rejected.
- Chapter 8 examines our study's empirical results, comparing them to existing theories, assessing their validity and robustness, and offers our perspective on our findings in relation to previous research.
- Chapter 9 summarizes the study's key findings in terms of a conclusion.

2 Literature

This section explores past studies on how corporate spin-offs create value and examines the long-term effects and critical factors that explain the value created by these spin-offs.

2.1 Spin-off Definition

A corporate spin-off is a distribution of 100% of its ownership in an independent firm as a non-cash stock dividend to existing shareholders. The spun-off subsidiary becomes a listed independent firm with its employees, assets, management, products, and technology. Existing shareholders receive the equivalent of the equity loss in the parent firm's new spin-off listed subsidiary (Fontinelle, 2021).

2.2 Value Creation Associated with Spin-offs

Author	Year	Region	Research Period	Sample Size	Firm / Security	Abnormal Return T+6M	T+12M	T+34M
Cusatis et al.	1993	USA	1965-1988	131	Parent	+6.80%*	+12.50%**	+18.10%
				146	Subsidiary	-1.00%	+4.50%	+33.60%**
Michaely & Shaw	1995	USA	1981-1988	30	Subsidiary	-36.60%***	-59.13%***	
Desai & Jain	1999	USA	1975-1991	155	Parent	+6.51%	+10.58%	
				162	Subsidiary	+15.69%***	+36.19%***	
				155	Proforma	+7.69%	+12.70%	
McConnel et al.	2001	USA	1989-1995	80	Parent	+8.64%	+13.48%	+5.14%
				96	Subsidiary	+8.90%	+7.21%	-20.87%
Powers	2001	USA	1989-1998	187	Parent		+2.49%	
				187	Subsidiary		-6.25%	
Veld & Veld-Merkoulova	2004	Europe	1965-2000	68-106	Parent	+3.88%	-0.65%	-0.41%
				53-70	Subsidiary	+11.96%	+12.58%	+15.15%
McConnel & Ovtchinnikov	2004	USA	1990-2003	267	Parent	+10.70%	+5.91%	-2.21%
				311	Subsidiary	+12.20%	+10.59%**	+2.87%**
Rudisuli	2005	USA & Europe	1980-2005	330-435	Parent		+7.70%***	
				229-336	Subsidiary		+18.90%**	+55.80%**
Sudarsanam & Qian	2007	Europe	1994-2006	129	Parent	-3.90%	-6.20%	
				142	Subsidiary	+7.20%	+17.50%	
				129	Proforma	-2.30%	+8.30%	

Table 2.1: Literature overview

Table 2.1 presents a comprehensive summary of various studies on the long-term abnormal returns of corporate spin-offs, focusing on the performance of parent companies, subsidiaries, and proforma entities. The studies span from 1993 to 2007 and cover the USA and Europe, with research periods ranging from the mid-1960s to the mid-2000s. Sample sizes vary, with some studies examining over 300 spin-offs.

Generally, U.S. studies suggest a more positive effect of spin-offs than Europe. Furthermore, most research covers up to 3 years post-spin-off. For parents, most findings yield positive abnormal returns; however, Woolridge et al.(1993) and Rudisuli (2005) were the only studies yielding significant results and only up to 1 year. The pro forma generally shows small, often nonsignificant, positive returns. Michaely and Shaw (1995) noted significant returns after three years. For subsidiaries research consistently shows positive, significant abnormal returns for subsidiaries, with U.S. studies generally yielding more significant results than those in Europe.

As no relevant research studies were completed after 2007, we must characterize our sample of previous studies as quite old.

2.3 Value Explaining Factors Associated with Spin-offs

A multitude of studies have detailed unusual returns after corporate separations. Alongside these findings, several theories, backed by empirical data, aim to shed light on the factors driving these financial outcomes. In this section, we will explore some of these critical factors.

2.3.1 Corporate Focus

Spin-offs often arise from a company's desire to enhance corporate focus. While they could lose synergies from the parent company, excessively diversified firms might also need more managerial attention, limiting overall performance. As pointed out by Berger & Ofek in 1995, cross-subsidies in such firms can cause value losses. By divesting unrelated business divisions, companies can avoid this potential issue.

A common reason to complete a spin-off is to sharpen corporate focus. A vast amount of research studies have thoroughly investigated the financial implications of this. Existing literature typically defines a spin-off as focus-increasing if the parent firm and the spun-off subsidiary have different 2-digit SIC codes (Lin, Y. 2020).

Daley and his colleagues in 1997 discovered that focus-increasing spin-offs see significant value creation around the announcement time. However, several studies, including the ones performed by Desai and Jain (1999) and Veld and Veld-Merkoulova (2004), observed positive returns around the announcement period for increasing and non-increasing spin-

offs. However, it was generally found that focus-increasing spin-offs performed better at announcements than their counterparts.

In a long-term context, focus-increasing spin-offs have delivered significantly higher returns than others, as Desai and Jain's (1999) study highlighted. Similar patterns are seen in the parent companies, but the results are insignificant. However, Veld and Veld-Merkoulova (2004) did not find long-term superiority for focus-increasing spin-offs in Europe. Concerning operational performance, focus-increasing spin-offs significantly increase return on assets (ROA). Several renowned research studies support this hypothesis, such as Daley et al. (1997) and Desai and Jain (1999).

Daley et al. (1997) support the idea that spin-offs streamline operations. They concluded that enhancements in operational performance are primarily seen in the parts of the company that stay with the parent. The studies illustrated that such activities boost productivity and are more about cost efficiency than sales growth. Contrary to earlier assumptions, Chemmanur and his team noted that spun-off companies were not lagging behind their parents before the spin-off.

2.3.2 Relative Spin-off Size

A spin-off subsidiary's performance and value creation are often said to be influenced by its relative size. The common belief is that the bigger the size of the spin-off, the greater the value added. This is tied to the notion that a company's focus can enhance efficiency.

Schipper and Smith (1983) propose that managerial productivity can be optimized by reducing the diversity and scale of a firm's assets. A diminished asset base also implies fewer internal transactions. Additionally, spinning off a more substantial unit will likely eliminate more activities that erode value, thereby amplifying the value of the remaining assets.

Supporting this theory, Hite and Owers (1983), Miles and Rosenfeld (1983), Krishnaswami & Subramaniam (1999), and Veld and Veld-Merkoulova (2004) found that larger spin-offs yield higher announcement returns (short-term returns) compared to smaller counterparts. Chemmanur and Yan (2004) present a contrasting view, positing that when a parent company spins off a larger portion of its assets, it becomes a more attractive takeover target, thereby increasing shareholder value.

However, no past research has demonstrated this relative size factor to be a determinant of positive long-term abnormal returns.

2.4 SMB and HML impact on Spin-off Value Creation

Previous research strongly suggest that SMB and HML factors are essential when measuring value creation from spin-offs. Firstly, previous spin-offs and value creation studies have primarily used variations of the Fama-French model or benchmarks like indexes and industry portfolios, never the Capital Asset Pricing Model (CAPM). Several studies have also found the HML and, especially, the SMB factor, to be significant in explaining value creation from spin-offs, such as Grane & Person, 2018 and McConnell & Ovtchinnikov 2004.

3 Theoretical Background

This section discusses various theories and concepts related to corporate spin-offs. Several financial theories contradict or support the idea that corporate spin-offs can create value. Our analysis will directly or indirectly test these theories. The section also explains two risk-adjusted factor models for assessing the abnormal returns associated with spin-offs.

3.1 The Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH) was developed in the 1960s by economists like Eugene Fama. It suggests that financial markets efficiently reflect all available information in asset prices, meaning it is impossible to consistently earn above-average returns using public information (Downey, 2023). We include this theory in our analysis to see how it compares with our results. EMH states that neither parent companies nor subsidiaries should experience unusual positive returns after a spin-off event.

Furthermore, the EMH is based on three primary forms or levels of efficiency. (Downey, 2023).

Weak Form Efficiency:
This form of the EMH asserts that all past trading information, such as historical stock prices and trading volumes, is already reflected in current stock prices. Therefore, technical analysis, which relies on past price patterns and trends, is considered ineffective in consistently predicting future stock prices. In other words, if a stock price follows a predictable pattern based solely on historical data, that pattern would already be factored into the current price, making it impossible to profit from historical data alone.

Semi-Strong Form Efficiency:
This form of the EMH asserts that all publicly available information, including past trading data and all other public information (e.g., financial statements, news releases, and economic indicators), is already reflected in current stock prices. According to the semi-strong form of the EMH, fundamental analysis, which involves analyzing a company's financial statements and economic conditions, cannot consistently provide an advantage for investors since all relevant information is already incorporated into stock prices.

Strong Form Efficiency:
The strong form of the EMH posits that all public or private information is fully reflected in stock prices. This means that even insiders with private information cannot consistently profit from their knowledge by trading in the market. Insider trading would be futile in a strongly efficient market, as stock prices would already account for undisclosed information.

The EMH has been a subject of debate and criticism over the years. Critics argue that markets are not perfectly efficient due to factors like market anomalies, investor psychology, and the limits of rationality. Despite its criticisms, the EMH remains a central framework in modern financial theory, asserting that financial markets are informationally efficient and that it is challenging to achieve consistent above-average returns by trading on publicly available information. However, it is essential to recognize that market efficiency is a spectrum, and in reality, markets may exhibit varying degrees of efficiency at different times and under different conditions.

3.2 The Irrelevance of Capital Structure

The Modigliani-Miller Theorem, developed by economists Franco Modigliani and Merton Miller in the 1950s and 1960s, is a foundational concept in corporate finance that addresses the irrelevance of capital structure in certain circumstances. Understanding this theorem is crucial in the context of corporate spin-offs and shareholder value creation. The theorem is often expressed in two propositions:

MM Proposition I:
In a perfect market, the total value of a firm is equal to the market value of the total cashflows generated by its assets and is not affected by its choice of capital structure.

MM Proposition II:
A firm´s cost of equity increases linearly in the debt-to-equity ratio. The total cost of capital is not affected by leverage.

Perfect Capital Market:

- Investors and firms can trade the same set of securities at competitive market prices equal to the present value of their future cash flows.

- No taxes, transaction, or issuance costs are associated with security trading.
- A firm's financing decisions do not change the cash flows generated by its investments or reveal new information about them.

Thus, according to Modigliani Miller, there will be no value creation from spin-offs in a frictionless world. It states that all financial transactions, such as spin-offs, are zero-NPV transactions that will neither destroy nor create value. (Chen, 2022).

However, the real world is not frictionless. Tax and financial distress costs are examples of frictions violating the perfect capital market conditions. With such frictions, capital structure may affect value. This implies that spin-offs may create value for shareholders. This thesis aims to investigate whether it does so or not.

3.3 The Capital Asset Pricing Model

We use a Fama-French model to assess long-term value creation from spin-offs. However, since the Fama-French model is an extension of CAPM, understanding CAPM is relevant for our analysis.

The CAPM is a foundational theory in finance that helps investors and financial analysts assess the expected return on investment. Developed by William Sharpe, John Lintner, and Jan Mossin in the 1960s, the CAPM provides a framework for understanding the relationship between risk and return in financial markets.

The core idea behind the CAPM is that the expected return on investment should be directly related to its systematic risk, as measured by beta, and the risk-free rate of return. Hence, the CAPM is a single-factor model.

$$R_i = r_f + \beta_1(R_{mkt} - r_f) \tag{3.1}$$

There are many assumptions underlying the CAPM. Below are some of the most important:

- All investors are risk-averse by nature.
- Investors have the same period to evaluate information.
- There is unlimited capital to borrow at a risk-free rate of return.

- Investments can be divided into unlimited pieces and sizes.
- There are no taxes, inflation, or transaction costs.
- Risk and return are linearly related.

Despite its widespread use, the CAPM has faced criticism, such as its reliance on the efficient market hypothesis and its sensitivity to the choice of the risk-free rate and market risk premium. Furthermore, spin-off research often prefers the Fama-French models, as we have yet to find a single study using CAPM in this field.

3.4 The Fama-French Three-Factor Model

Due to the limitations of the CAPM, several alternative models have been developed to understand the relationship between risk and reward in investments. One of them is the Fama-French Three-Factor Model (FF3).

FF3, developed by Nobel laureate Eugene Fama and Kenneth French in the early 1990s, is an extension of the CAPM that aims to provide a more comprehensive framework for understanding stock returns. This model recognizes that two other factors beyond the market risk premium can influence stock returns.

$$R_i = r_f + \beta_1(R_{mkt} - r_f) + \beta_2 SMB + \beta_3 HML \tag{3.2}$$

SMB (Small minus Big)
The SMB factor captures the risk premium associated with the size of a company. It is calculated by comparing the returns of small-cap stocks (those with lower market capitalization) to large-cap stocks (those with higher market capitalization). A positive SMB value indicates that small-cap stocks outperformed large-cap stocks.

HML (High minus Low)
The HML factor represents the risk premium associated with a company's book-to-market ratio. It is calculated by comparing the returns of high book-to-market (value) stocks to low book-to-market (growth) stocks. A positive HML value indicates that value stocks outperformed growth stocks.

4 Methodology

4.1 Research Overview

Section 4.1 is our research overview and can be summarized as follows. We focus on three aspects of value creation: subsidiaries, parents, and pro forma. We use abnormal returns as a proxy for value creation and use three methodologies to get different angles on abnormal returns, thus increasing the result's robustness and reliability. We conduct a quantitative and deductive study to ground the study in established research and make it broadly applicable. Lastly, we used the FF3 model instead of the CAPM and found the FF3 model to give more accurate results in assessing value creation from spin-offs.

4.1.1 Spin-off Entities

Value creation refers to the types of companies affected by a spin-off event, namely the parent and subsidiary companies. When we refer to a 'spin-off,' it is regarding the event of a smaller subsidiary being spun off a parent. Additionally, we track a combined portfolio, called pro forma, of both entities' stocks, weighted by their market capitalizations at the spin-off time. This approach helps us evaluate the overall investment performance post-spin-off, reflecting the value created for investors who held stocks through the spin-off transition. In total, we are analyzing the individual effect of spin-offs on subsidiaries, the parent, and the pro forma. These three angles of spin-off value creation, subsidiary, parent, and Pro-forma, are called 'subgroups.'

To evaluate the long-term value creation of spin-offs, we measure the stocks' abnormal or excess returns, a standard approach. We are taking the returns of the different subgroups involved in a spin-off and subtracting an expected return. In this way, we can quantitatively measure actual value creation for the subgroups. After subtracting the expected return from the actual return, we find out if the stock performed better or worse than expected, thus acting as a proxy for value creation.

However, there is no universally correct and approved way of calculating expected returns because each method has drawbacks. Applying only one method for calculating expected returns exposes the result to the drawbacks of that methodology. However, by applying

several methodologies, we can mitigate the drawbacks of each individual method and obtain more robust results that are more accurate and reliable. This is one of the cornerstones of our research approach.

4.1.2 Methodologies for Abnormal Returns

We present three methodologies to capture the long-term value effect following spin-off events, enhancing the study's robustness. These three methods were commonly used in previous spin-off studies to evaluate the impact of spin-offs. The first method is the Calendar-Time Approach (CTA), which regresses average returns for each subgroup against the Fama-French 3 factors to obtain abnormal returns after the spin-off. Secondly, we use the Matching Country Benchmark Approach (MCBA), which compares the subgroup's returns to a market benchmark. Lastly, we use the Prediction Benchmark Approach (PBA). For each subgroup, the returns of each company are compared against company-specific expected returns. Together, these three methodologies function as a robustness test for each other, giving more reliable results.

We also use two financial metrics for the MCBA and PBA methods: Buy-and-Hold Abnormal Returns (BHAR) and Cumulative Abnormal Returns (CAR). Each metric has its strengths and limitations, further enhancing the reliability of our results.

4.1.3 Quantitative and Deductive Study

There are primarily two ways to view reality: constructivism, which proposes that knowledge is constantly evolving and that reality is subjective (Bryman & Bell, 2017). The second view is positivism, the perspective this study adopts. Positivism posits an objective reality independent of observer biases (Bryman & Bell, 2017).

This study is deductive and leans heavily on quantitative research techniques. Deduction means basing hypotheses on prior empirical findings. The quantitative methodology typically complements the positivist perspective. It emphasizes eliminating subjectivity to discern patterns applicable across various contexts. (Bryman & Bell, 2017). In this way, we ensure that our research is grounded in established empirical evidence and enables us to apply our findings broadly, contributing to the field of spin-offs and value creation.

4.1.4 Impact and Validation of Norwegian SMB and HML Values

In the introduction, we outlined our goal of assessing the validity of using Norwegian SMB and HML values in the Nordic market. To test this validity, we incorporate the CAPM into our analysis, replacing the FF3 model in our CTA and PBA methodologies by excluding HML and SMB factors.

Our approach involves examining the influence of spin-offs on abnormal returns across various subgroups, subsidiaries, parent companies, and pro-forma portfolios using the Calendar Time method but with CAPM for the regression. Additionally, we will use CAPM to forecast expected returns for these subgroups, applying the Prediction Benchmark Approach without HML and SMB values.

After analyzing spin-off value creation with the CAPM, we compare the differences in results between the CAPM and FF3 models. The only difference is that FF3 includes two additional factors - SMB and HML. Therefore, if the results between the CAPM and FF3 differ, it is attributable to these additional factors. Previous studies have found SMB and HML factors to be significant. Thus, we expect them also to have explanatory power for spin-off value creation in the Nordics. This assumption makes the potential impact of SMB and HML, given that there is a difference in CAPM and FF3, also relevant in explaining the spin-off effect. Any difference would then indicate that the SMB and HML factors affect our study on spin-off value creation. If the results between the two models are the same, it suggests that our Norwegian SMB and HML values have an insignificant effect and are not a good proxy for the Nordic market. Thus increasing the limitation of only having accessible Norwegian SMB and HML factors.

4.1.5 FF3 vs CAPM

Our findings from comparing FF3 and CAPM results also advocate using FF3 over the CAPM model. We found that the CAPM and FF3 provided similar results for subsidiaries and substantial differences for parent companies. This suggests that the accuracy of our results is improved by using FF3, as the SMB and HML values have an effect.

Additionally, most previous research on spin-off value creation uses FF3 instead of the CAPM to assess abnormal returns. Thus, our choice of FF3 over the CAPM aligns with most previous studies.

The main reason FF3 is usually the preferred factor model in the assessment of spin-off-related abnormal returns is that the model better explains variations in stock returns than the CAPM. The rationale is that FF3 expands the CAPM by adding two other factors to the market risk premium, specifically the SMB and the HML factors. Several studies, such as Grane & Person (2018) and McConnell & Ovtchinnikov (2004), show that these factors are essential in spin-off research.

To sum up, our choice of employing FF3 over the CAPM is validated based on the improved accuracy of our results and in line with previous studies on spin-off value creation.

4.2 Abnormal Returns with 3 Methodologies

Section 4.2 details how we use our three methodologies to calculate abnormal returns for the subgroups following a spin-off event. These methodologies are presented briefly in subsection 4.1.2. Lastly, as mentioned before, we conduct three different methodologies, as they have their weaknesses and strengths, but together give a more comprehensive picture of the spin-off's impact on value creation. Details on the strengths and weaknesses of these methodologies are covered in subsection 4.3.2, while Section 4.2 is dedicated to their application.

4.2.1 Abnormal returns from Calendar Time Approach (CTA)

Application Overview:

The spin-off study by McConnell and Ovtchinnikov (2004) uses the Calendar Time Approach in a spin-off study. This approach is also advocated by Fama (1998) and Mitchell and Stafford (2000). We use the CTA with the Fama-French 3 (FF3) model as our financial framework. We calculate the weekly average returns for each subgroup (Parents, Subsidiary, Pro-forma) post-spin-off, standardizing the time frame for each spin-off within a group. These returns are then regressed against the FF3 model's three factors: market risk, size, and value premium. The remaining portion of the returns, represented by the constant term in our regression, goes beyond the FF3's expected benchmark and indicates the unique value contribution of an asset. (Smith & Doe, 2022). We finally obtained such abnormal returns for subgroups and periods of interest up to 9 years. We focus on determining if these abnormal returns are significantly positive, suggesting value creation from spin-offs over up to 9 years.

Mathematical Approach:

1. Risk-Free Rate Adjusted Returns (RR):

For each company in a subgroup and week 't,' we calculate RR as the difference between the company's return and the risk-free rate for that week and country:

$$RR_{i,t} = R_{i,t} - RF_{c,t} \tag{4.1}$$

This is done for all weeks in our analysis period.

2. Portfolio Return Calculation:

The return for a subgroup 'p' in week 't' is the average of these for all companies in the subgroup. N is the number of companies in the subgroup for the current week:

$$\mathrm{RR}_{p,t} = \sum_{s=1}^{N} \mathrm{RR}_{s,t} \tag{4.2}$$

3. Standardizing the Start Point:

All subgroups start calculating returns from the first-week post-spin-off, ensuring uniformity in the analysis period.

4. Comparing Against FF3 Factors:

The weekly portfolio returns are compared to the FF3 factors in a weighted manner:

$$\mathrm{RR}_{p,t} = \alpha + \beta_1(\mathrm{RM}_{p,t} - \mathrm{RF}_{p,t}) + \beta_2\mathrm{SMB}_{p,t} + \beta_3\mathrm{HML}_{p,t} + \varepsilon_t \tag{4.3}$$

Here, RR is the portfolio's risk-free-rate adjusted return, RM is the market return, SMB and HML are factor returns, and epsilon is the error term.

5. Statistical Significance Test:

To evaluate the significance of our findings, we calculate t-statistics for the intercept (alpha) and factor sensitivities (betas) using:

$$t = \frac{\text{Coefficient Estimate}}{\text{sd(Coefficient)}} \tag{4.4}$$

4.2.2 Abnormal Returns from Matching Country Benchmark Approach (MCBA)

Application Overview:

The MCBA is the second methodology we apply to calculate and evaluate abnormal returns. A study that also utilizes such an approach is Dasilas et al. (2011). The MCBA is also a commonly used method outside spin-off studies to obtain abnormal returns. In MCBA, we calculate weekly abnormal returns for each company in a subgroup. This involves using a country-specific index as the benchmark for each company's expected return and subtracting this from their risk-free-rate adjusted return. Unlike CTA, which computes one abnormal return for an entire period and subgroup, MCBA assesses returns weekly for each company within a subgroup. Obtaining weekly abnormal returns for each company allows us to calculate cumulative abnormal returns, such as BHAR and CAR. We calculate the BHARs and CARs for each company and then determine their median values (MBHARs and MCARs) for each subgroup and period. These medians are then tested for statistical significance using Mann-Whitney and Wilcoxon tests for MBHARs due to their non-normal distribution and t-tests for MCARs, which typically have a normal distribution. Significant results in MBHARs or MCARs indicate evidence of value creation in that subgroup following spin-off events.

Mathematical Approach:

1. Abnormal Returns (AR):

For each stock in a subgroup (Parents, Subsidiaries, Proforma), we calculate abnormal returns $AR_{i,t}$ weekly by subtracting the expected return $E(RR_{i,t})$ from the risk-free-rate adjusted return $RR_{i,t}$:

$$AR_{i,t} = RR_{i,t} - E(RR_{i,t}) \tag{4.5}$$

2. Cumulative Abnormal Returns (CAR):

We sum the ARs for each company over a period from t to T to get the CAR:

$$CAR_{i,T} = \sum_{t=1}^{T} AR_{i,t} \tag{4.6}$$

3. Buy-and-Hold Abnormal Returns (BHAR):

We calculate both expected and actual buy-and-hold returns (BHRs) for each company, then find BHAR by taking the difference between the actual and expected BHR over the same period:

$$BHAR_{i,T} = \left[\prod_{t=1}^{T}(1 + R_{i,t})\right] - \left[\prod_{t=1}^{T}(1 + R_t^{\text{bm}})\right] \tag{4.7}$$

4. Median Calculations:

Median values of BHAR and CAR (denoted as MBHAR and MCAR, respectively) are calculated from the data set.

Following the computation of Abnormal Returns (AR) and their various metrics, we conduct significance testing. This step is pivotal for validating our hypotheses and interpreting the patterns within our data.

Hypotheses Testing BHAR:

In our hypothesis testing for BHAR measures, we address the non-normal distribution of BHARs, often leading to skewed results. Since BHARs typically do not follow a normal distribution, as confirmed by our empirical findings and supported by literature, we use non-parametric tests.

Wilcoxon Signed Rank Test: This test assesses if there is a significant difference between our sample's median and a known median (usually zero), ideal for non-normally distributed data like BHAR, Rüdisüli (2005). It involves ranking the differences from zero, summing these ranks, and calculating the Z score for significance when the sample size is over 30, using:

$$z = \frac{S - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}} \tag{4.8}$$

We refer to critical values from tables, Webb (2023) for smaller samples. We use the test to check if each subgroup differs significantly from 0.

Mann-Whitney Test: To compare distributions between subsidiary and parent companies, we use the Mann-Whitney Test, a robust method for comparing two populations. It is

beneficial for our analysis as it focuses on medians, providing a clearer picture unaffected by skewed returns Rüdisüli (2005). The test calculates the Z score for significance when sample sizes are large enough using:

$$z = \frac{R - \frac{n_1(n_1+n_2+1)}{2}}{\sqrt{\frac{n_1 n_2(n_1+n_2+1)}{12}}} \tag{4.9}$$

Both tests are applied to BHARs for each relevant period of up to 9 years, using a two-sided approach to ensure comprehensive analysis. This methodology effectively addresses the challenges posed by non-normal distributions in our data.

Hypotheses Testing CAR:

We follow a different methodology for CARs, utilizing the approach of Rüdisüli (2005). He uses t-tests on CAR measures on spin-offs, as they typically follow a more normally distributed pattern.

The methodology for testing the CARs' significance involves the following steps for two groups of tests: 1. MCAR is significant above 0, and 2. Subsidiaries MCAR is significantly above the parents. The source for all these calculations follows Otneims and Berentsen's GitHub page, professors at the Norwegian School of Economics (2023).

One sample t-test: For testing, if CARs are significantly different from zero, our null hypothesis is that the median CAR equals zero. Alternative hypothesis: The median CAR is not equal to zero. We use a 2-sided t-test to test the null hypothesis. The t-test assumes that subjects are randomly drawn from a population and have a normal distribution. The test statistic is calculated as follows:

$$t = \frac{\sqrt{n} \cdot MCAR_t}{\sigma(CAR_t)} \tag{4.10}$$

The test statistic has n-1 degrees of freedom, and a p-value less than 0.05 rejects the 0 hypothesis.

Two-sample t-test: For testing, if there is a significant difference between subsidiary and parent company MCARs, the null Hypothesis is: The median CAR of spin-offs is equal to the median CAR of parent companies, and the alternative Hypothesis is: The median

CAR of spin-offs is different from the median CAR of parent companies.

We calculate the t-statistic based on the assumption about variances:
- If variances are assumed to be equal:

$$T = \frac{X_1 - X_2}{\sqrt{S_p^2 \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \tag{4.11}$$

Where S_p^2 is the pooled variance, and X_1 and X_2 is the respective subsidiary and parents MCAR. The pooled- , subsidiary and parent variance is denoted S_p^2, S_1^2 and S_2^2 respectively.

$$S_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}} \tag{4.12}$$

- If variances are not assumed to be equal, we use:

$$T = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \tag{4.13}$$

Further, the degrees of freedom are determined for equal variances as $n_1 + n_2 - 2$. For unequal variances, we use the more complex calculation the freedom degrees, which accounts for sample variances and sizes:

$$df = \frac{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)^2}{\frac{\left(\frac{S_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2 - 1}} \tag{4.14}$$

Lastly, we find the p-values for a two-sided test to determine if the MCAR of spin-offs is significantly different from that of parents.

All single sample variances are calculated as follows:

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}} \tag{4.15}$$

4.2.3 Abnormal Returns from Prediction Benchmark Approach (PBA)

Application Overview:

In spin-off studies, standard methods often use stock returns of similar companies as benchmarks for expected returns, as seen in works by Cusatis et al. (1993), Desai and Jain (1999), Veld and Veld-Merkoulova (2004), and McConnell and Ovtchinnikov (2004). However, this method is less suitable in the Nordic context due to the difficulty in finding appropriate benchmarks and the necessity to include all spin-offs, given the limited number of such events. The PBA addresses this by predicting company-specific expected returns weekly using the FF3 factors and updating beta coefficients weekly based on the previous year's data. Like the MCBA, PBA calculates weekly abnormal returns for each company, allowing us to compute cumulative metrics like BHAR and CAR and their median values (MBHARs and MCARs) for each subgroup and period. Both PBA and MCBA differ from the CTA in calculating MCAR and MBHAR. Additionally, they both undergo similar significance tests using Mann-Whitney and Wilcoxon for MBHARs and t-tests for MCARs to assess value creation post-spin-off. The main difference between MCBA and PBA is in the expected return calculation: MCBA uses a country-specific index, whereas PBA uses predictive modeling based on FF3 factors. We follow Pettengill, Chang, & Huang's, (2011) application of the PBA.

Mathematical Approach:

The PBA has the same mathematical approach as the MCBA after predicting the expected return, $E(RR_{i,t})$. The expected returns differentiate these methods; as such, we will explain in detail how the expected return is calculated for the PBA in this subsection. We calculate the following methodology approach used by Pettengill, Chang, & Hueng, 2011.

To calculate the $E(RR_{i,t})$ for each company 'i' and week, 't,' we use the previous 52 weeks' worth of data to train an FF3 model and determine the FF3 factor's beta values. Additionally, we proactively refine our model's accuracy by excluding the highest and lowest returns during the training period. We do the same when choosing the error term. If left unchecked, such extreme values could distort the model, misrepresenting the typical relationship between returns and explanatory factors. The following equation obtains the betas:

$$RR_{i,t} = B_1(RM_{p,t} - RF_{p,t}) + B_2 SMB_{p,t} + B_3 HML_{p,t} + \varepsilon_t \tag{4.16}$$

These values are then used to predict the subsequent week's stock return. We use the formula below, multiplying each of the betas by the respective factor for the week t+1, denoted with a line over the factor. These factors are then the actual historical values for week t+1. We use region-specific indexes and interest rates for the market risk premium and Norwegian SMB and HML values. The predicted stock value is our expected return for stock i in week t+1. Additionally, to accurately capture the expected return, we must include the model's error term in our predictions; omitting this would unnaturally flatten the variance around the regression line. Since a lower variance in the benchmark could disproportionately affect compounded returns, we enhance our forecast by incorporating a randomly chosen residual from the training data, ensuring that the model reflects realistic performance variances.

$$RR_{i,t} = B_1(\overline{RM_{p,t}} - \overline{RF_{p,t}}) + B_2\overline{SMB_{p,t}} + B_3\overline{HML_{p,t}} + \varepsilon_t \tag{4.17}$$

This process, characterized by its rolling nature, extends to all stocks. We temporarily substitute the parent company's returns for subsidiaries that do not have a full year of return data post-spin-off. However, the return data is updated with weekly subsidiary data each week following the spin-off.

After we have obtained the expected returns using FF3 training and prediction methods, the methodology follows the MCBA method's steps, calculating MBHAR and MCAR and assessing their significance.

4.3 Methodology Decisions

While section 4.2 focuses more on the application of the methodology, this section focuses more on the 'why?'. We describe the reasoning behind our methodology.

4.3.1 Weekly vs Monthly Data Intervals

When conducting long-term stock analysis, it is common to use monthly data. However, our approach, particularly the PBA method, is better suited to weekly data. We also

apply weekly data in our MCBA and CTA methodologies to maintain consistency. In our PBA method, we prefer weekly data over monthly. Monthly data gives us only 12 points per year, which might not be enough to spot all trends when training our model. As Campbell, Lo, and MacKinlay (1997) have pointed out, having more data points helps us reduce the errors in our estimates. Expanding our training period to increase the monthly training observations is not ideal for subsidiaries. They depend on parent return data post-spin-off for the length of the training period. A long training period would affect the accuracy of the returns used in the predictions. Additionally, since our predictions focus on just one week ahead, using data from the last year is more effective. Short-term trends from this period will likely influence the upcoming week more than long-term trends.

4.3.2 Choice of Methodologies

As mentioned earlier, we include three methodologies to mitigate the drawbacks of each individual method, thus giving a more comprehensive picture and minimizing the risk of inaccurate results. In this subsection, we delve into how our three methodologies achieve this.

The MCBA asses if stocks outperform their respective markets. Using indexes as expected returns is reliable, as market trends are generally stable, mirroring the expected average stock returns. A limitation of using the MCBA is its inability to adjust for individual stock characteristics, such as varying risk levels. For example, subsidiaries often have higher risks than their larger, established parent companies, but if not accounted for, it could introduce a bias favoring the subsidiaries.

The PBA compensates for individual stock characteristics. It leverages detailed information to create precise expected returns, potentially leading to more accurate abnormal returns. We aim to replicate this by using the most up-to-date information available before our prediction period and identifying trends in the FF3 factors for each stock. One could argue that this method achieves a highly precise benchmark and that the only way to get a more precise one would be to include additional explanatory variables. However, the risk of this prediction method lies in the variance of predictions, which can sometimes deviate significantly more than with an index, thereby increasing the risk of error.

Furthermore, both the PBA and MCBA carry the risk of cross-sectional correlation.

Cross-sectional correlation is when individual stock returns depend on each other in overlapping weeks. This can lead to overstated test statistics, as statistical tests often assume independence between observations (Fama, 1998; Mitchell & Stafford, 2000).

We also employ the CTA, which uses the FF3 factors to adjust each portfolio to the characteristics of the portfolio. This is an advantage over the index portfolio. However, a key difference is that the CTA method averages the returns of a subgroup. Hence, it does not adjust for each firm's characteristics but for the characteristics of the portfolio of firms. This is an excellent way to generalize about a group of stocks. It also accounts for the cross-sectional dependency problem by integrating the correlations among different stocks.

A potential downside of the CTA is that it involves running a regression over several years. This results in coefficients that are then applied to the entire period. It does not allow for updating coefficients as frequently as the PBA. This could lead to an argument that although both methods consider the three factors, the PBA uses more time-updated values. At the same time, the CTA is limited to finding a coefficient for each factor over, say, nine years.

By using all these methods, we achieve a robust analysis, each with its strengths and weaknesses. Over an extended period, there will be instances where omitting nuances of each stock results in a poor benchmark. Sometimes, the PBA model might predict entirely off. By varying with multiple methods, we get a clearer picture of how value creation is associated with spin-offs, where combining all three methods minimizes the risk of inaccurate results.

4.3.3 Choice of Financial Metrics

Lastly, 2 of our three methodologies, namely MCBA and PBA, utilize two different financial metrics each, adding to the robustness of our thesis. These financial metrics are Buy-and-Hold Abnormal Returns (BHAR) and Cumulative Abnormal Returns (CAR). Hughson et al. (2008) recommend BHAR to reflect actual returns accurately. However, they caution that BHAR's long-term compounding effects can skew results, potentially leading to outliers. Using CAR avoids this issue, offering a different perspective and making the results more robust.

Additionally, our study strongly emphasizes median values for both BHAR and CAR, as the median is generally less affected by skewness and, therefore, is particularly suitable for evaluating BHAR. Researchers like Clark-Carter (2010) advocate for the median as a measure that more accurately reflects the central tendency of a sample, which aligns with our objective to assess the typical performance of companies post-spin-off.

4.4 Value-creating Factors

In this study, we want to examine two factors that explain the value creation associated with corporate spin-offs. We investigate increased corporate focus and the size of the spin-off relative to the original parent company. Contrary to most previous research, we do not examine the information asymmetry factor due to the lack of available data related to this factor, as explained in section 1.4. Details about these factors are described in the literature section 2.3. The following section describes the methods used to measure the effect of each factor on returns after a spin-off event.

4.4.1 Proxies

We will use a dummy variable approach to assess the impact of various factors on stock returns. By assigning values of 1 or 0 to distinct subsamples, we can analyze each one individually and evaluate all factors collectively.

Corporate Focus

The approaches of Desai and Jain (1999) and Veld and Veld-Merkoulova (2004) measure the wealth effect associated with improvements in corporate focus using a two-digit SIC code. We will use a similar approach. However, we will apply one-tier GICS codes instead. Specifically, parent and subsidiary pairs, where the subsidiary's GICS code changes after the spin-off, will be given a dummy variable of 1, and 0 otherwise. This method splits the initial sample into two groups: Spin-off pairs with heightened corporate focus and those without.

Relative Size

Building on prior studies in this field, we define the relative size variable as the market capitalization of the subsidiary compared to the combined market capitalization of both the parent and the subsidiary, with values taken from the subsidiary's first trading day

(Veld & Veld-Merkoulova, 2004).

Previous research from the U.S. indicates that the median size of spin-offs lies between 20% and 22%. Meanwhile, European studies have documented medians between 24% and 30% (Desai & Jain, 1999; Hite & Owers, 1983; Krishnaswami & Subramaniam, 1999; Sudarsanam & Qian, 2007). We have not encountered any previous research on relative median size in the Nordic region.

We follow the dummy approach, dividing the firms into two separate groups. A dummy variable is assigned a value of 1 if the relative size surpasses the median and 0 if not. Hite & Owers (1983) employed a similar method.

4.4.2 Test of Factor Variables

We test the factor variables over the same periods tested for stock returns, up to 9 years. We use the same methodology used to study long-term stock returns: CTA, MCBA, and PBA. Our goal is to understand the financial benefits for shareholders before the spin-off, so we compare these factors to the pro-forma returns, meaning only one return value per spin-off pair.

Testing Methodology of Factors: CTA

We utilize the methodology described in section 4.2.1 for the calendar time approach. The only difference is that we look at four separate groups: those spin-offs that have increased focus, those with non-increased focus, those who are relatively big, and those who are relatively small. We run FF3 regressions and obtain a constant term, which provides information about each group's abnormal returns and, thus, how each group's performance is associated with spin-offs. These four groups will further be referred to as sub-factor groups.

By partitioning the data into four distinct datasets and performing separate regressions for each, we effectively isolate and analyze the relationship specific to each sub-factor group and their respective abnormal returns. Therefore, the calendar time approach can answer whether a subgroup of the factors is related to abnormal returns different from 0.

Testing Methodology of Factors: MCBA and PBA

For the MCBA, we use the weekly proforma abnormal returns as the dependent variable.

We use the matching country index as an expected return. Then, for each proforma return and each week, we assign the correct dummy variable for the two factors, relative size and focus increase, either 1 or 0. We then run a regression with proforma abnormal returns as the dependent variable and the two dummy variables as explanatory variables for the periods of interest up to 9 years:

$$AR_{i,t} = B_1 \text{Dummy}_{\text{Focus Increase}} + B_2 \text{Dummy}_{\text{Relative Size}} + \varepsilon_t \tag{4.18}$$

We use the same methodology for the PBA, just using the predicted returns as expected returns to calculate the abnormal returns. The dummy variables are then tested for significance with a t-test.

Because the MCBA and PBA regress the abnormal returns against the factors Focus Increase and Relative size, it does not isolate the effect of one of the four sub-factor groups. Thus, it is not optimal to determine whether each of the four sub-factor groups exhibits positive or negative abnormal returns. Instead, it gives insights into, e.g., whether focus-increasing spin-offs perform better than non-focus-increasing spin-offs.

5 Data

This section outlines the methodology for data collection and validation of subsidiary-parent pairs. Data is collected from Bloomberg and Refinitiv databases, focusing on Nordic countries between 1996 and 2022. It details sample validation, factor data collection, and the characteristics of the spin-offs, including their industry- and country distributions and market capitalization. All values are collected in USD.

5.1 Sample Collection

Identifying a comprehensive list of subsidiary-parent pairs presented challenges. We relied on both Bloomberg and Refinitiv databases to obtain data on potential spin-offs. Using the Refinitiv database, we collected 152 entries classified under "Demergers" to capture spin-offs between 1996 and 2022. The Bloomberg database yielded 590 potential spin-offs using the "Spin-Off" filter for the same period. We identified 742 potential subsidiary-parent pairs, as detailed in Table 5.1. A significant portion of these prospective spin-offs came from Sweden and Norway.

Data Source	**Norway**	**Sweden**	**Denmark**	**Finland**	**Total**	**Year**	**Event**
Bloomberg	132	401	17	40	590	1996-2022	Spin-off
Refinitiv	95	31	7	18	152	1996-2022	Demerger
Total	227	432	24	58	742	-	-

Table 5.1: Screening Spin-offs

5.1.1 Sample Validation

Bloomberg and Refinitiv are famous and well-used reliable databases. Interestingly, there was conducted a study on the differences in 2015 by Bollaert & Delanghe. They found that Refinitiv provides more accurate announcement dates, while Bloomberg excels in acquisition data. However, validating spin-off data remains critical to our data collection process.

Firstly, we refined our list by cross-examining the Bloomberg- and Refinitiv data to remove duplicates. Secondly, we double-checked each pair to verify the existence of a genuine spin-off. Given the scarcity of literature and datasets on this topic for the Nordic countries,

it became evident that most pairs from our primary list were not authentic spin-offs. If we could not conclusively verify a spin-off, it was excluded. This rigorous validation reduced our dataset significantly, leaving us with 77 confirmed spin-off-parent pairs. An overview of the countries these spin-offs originated from is provided in Table 5.2. The timeframe of these spin-offs spans from 1996 to 2022.

Year	Denmark	Finland	Norway	Sweden	Total
1996	0	0	0	2	2
1997	0	0	0	1	1
1998	0	0	0	0	0
1999	0	0	0	0	0
2000	1	0	0	0	1
2001	0	1	0	3	4
2002	0	0	0	0	0
2003	0	0	0	0	0
2004	0	0	1	1	2
2005	0	2	0	2	4
2006	0	0	0	4	4
2007	0	0	1	2	3
2008	0	0	0	3	3
2009	0	0	0	0	0
2010	0	1	0	0	1
2011	0	0	0	3	3
2012	0	0	0	2	2
2013	0	0	0	2	2
2014	0	0	1	2	3
2015	0	0	0	0	0
2016	0	1	1	2	4
2017	1	0	0	5	6
2018	0	0	0	5	5
2019	1	0	1	1	3
2020	0	0	5	5	10
2021	0	0	3	6	9
2022	0	0	2	3	5
Total	3	5	15	54	77

Table 5.2: Completed spin-offs per year and country

Our definition of a spin-off aligns with Fontinelle's (2021) description: "A spin-off is a distribution of 100% ownership in an independent firm, as a non-cash stock dividend." After going through the original list of 742 spin-offs, 91 of them were confirmed spin-offs according to our definition. Furthermore, for a spin-off to be included in our study, it had to be listed on a Nordic stock exchange for at least one year. This necessitated the exclusion of any pairs listed less than a year before the end of July 2023. Ten were eliminated from the pool of 91 validated spin-offs due to inadequate listing duration, and four were discarded because of unavailable stock data, yielding a final tally of 77 spin-off

pairs.

Moreover, for the 77 remaining pairs, we undertook a secondary validation phase, ensuring the accuracy of the spin-off listing dates. We also inspected potential acquisitions, delistings, and mergers involving these spin-offs. Given our primary objective—to evaluate the spin-off's value creation—it was deemed essential to exclude data after any acquisition of the spin-off. This is because post-acquisition data no longer mirrors the original firm's performance. However, if the spin-off-initiated acquisitions, such data was retained, as these actions inherently define the spin-off's corporate trajectory. Excluding such data could significantly deplete our dataset, especially for long-term analysis.

5.2 Other Data Collection and Validation

In addition to the Fama-French 3-Factor Model, we use country-specific indices as benchmarks in assessing abnormal returns. Hence, we need country-specific data regarding index returns and interest rates. We sourced most of our data, except for HML and SMB values from Ødegaard (2023), from Bloomberg. Table 5.3 provides a comprehensive overview of all financial data used in our analysis.

Data Type	**Name**	**Period**	**Region**	**Data Source**
Policy Rate	Lending Rate	2003-2022	Denmark	Bloomberg
Policy Rate	Refi Rate	1999-2022	Europe	Bloomberg
Policy Rate	Repo Rate	1996-2022	Sweden	Bloomberg
Policy Rate	Sight Deposit Rate	1996-2022	Norway	Bloomberg
Benchmark Index	OMXC25 index	2010-2022	Denmark	Bloomberg
Benchmark Index	OMXH25 index	1999-2022	Finland	Bloomberg
Benchmark Index	OMXS30 index	1996-2022	Sweden	Bloomberg
Benchmark Index	OBX index	1996-2022	Norway	Bloomberg
Benchmark Index	VINX Benchmark Cap NOK NI	2001-2022	Nordic	Bloomberg
SMB	SMB Oslo Stock Exchange	1996-2022	Norway	Ødegaard, B. A
HML	HML Oslo Stock Exchange	1996-2022	Norway	Ødegaard, B. A
Company Industry	GICS First-Tier Classification	1996-2022	Nordics	Bloomberg
Company Value	Market Capitalization	1996-2022	Nordics	Bloomberg
Company Return	Cumulative Total Return	1996-2022	Nordics	Bloomberg

Table 5.3: Data overview

5.2.1 Interest Rates

We downloaded interest rates for each country from Bloomberg. These rates are set by the central bank's policy rates in each nation and are commonly utilized as reliable proxies

for risk-free rates in financial models like CAPM and FF3. Damodaran (2012) and other empirical studies affirm the appropriateness of using these policy rates as estimates for the risk-free rate.

Since interest rates are not updated weekly, we forward-filled data using the last available rate until the next update. The datasets for Finland and Denmark were first available in 1999 and 2003, respectively. While no spin-offs occurred in Finland before 2001, we backtracked the 2003 rate for Denmark to cover the first spin-off in 2000. Given the gradual nature of interest rate changes, this approach is fitting significantly as it only impacts one spin-off. As we collect annual interest rates, we convert them to weekly by compounding them in formula 5.1:

$$(1 + R_{\text{yearly}})^{\frac{1}{52}} - 1 \tag{5.1}$$

5.2.2 Market Returns

We sourced historical market return data from Bloomberg, using a distinct index for each country to ensure precision. These country-specific indices are OMXC25, OMXH25, OMXS30, and OBX. Each of these indices represents the most traded stocks in its country, and they are all widely accepted as benchmarks for the broad market in its country.

The Danish index, OMXC25, commenced in 2010. For the preceding data gap, we adopted the VINX Benchmark index, which covers Nordic countries, as a proxy. However, as VINX only has records from 2001 onwards, we utilized the OMXS30 index for 2001-1995 and 1999-1995 for Denmark and Finland, respectively. This approach is justified given the absence of country-specific indices during these years and only one spin-off in each country during the specified intervals.

5.2.3 SMB and HML

We collected daily values for the SMB and HML factors using Ødegaard's (2023) database. This database contains stock market data from Norway only. As we could not extract similar data for the remaining Nordic countries, we decided to use this Norwegian data as a proxy for the Nordic market. We also considered SMB and HML values for Europe as a proxy for the Nordics. This data is easy to access from the data library of Kenneth

R. French. However, these values were highly different from Ødegaard's Norwegian SMB and HML values, and we decided that the Norwegian data would serve as a better proxy for the Nordics. To meet our objectives with the data, we aggregated the daily values retrieved from Ødegaard's database every week.

The SMB and HML values from Ødegaard's database are calculated in the same way as in the data library of Kenneth R. French.

5.3 Dataset for Long Term

In addition to SMB and HML values aggregated every week, our final dataset for long-term analysis consists of weekly excess returns for each country. That is the actual market return minus the risk-free rate in that country for each week. The data ranges from January—1996 throughout 2022.

5.4 Factor Data

We also collected data for which industry the parents and subsidiary are categorized within, according to the first-tier classification GICS. Alongside the GICS, we also need market capitalization data. Both were collected from Bloomberg. We needed historical data on this as we utilized the market cap value and GICS value on the day of the spin-off event. If the market cap value was unavailable on the spin-off day, we used the earliest available market cap value for the parent and subsidiary post-spin-off. Ideally, we would use pre-spin-off values to avoid bias from the spin-off effects. However, since subsidiaries lack data beforehand and using pre-spin-off values solely for parents would introduce bias, we determined that applying a consistent approach for both entities was preferable.

5.5 Sample Characteristics

Table 5.2 above shows the distribution of completed spin-offs in the Nordics covering 1996–2022. Sweden has the highest number of corporate spin-offs, with 54 spin-offs recorded. Norway is the second most popular country for corporate spin-offs, with 15 spin-offs during the entire period. Finland and Denmark have only 5 and 3 completed spin-offs, respectively. The total number of completed spin-offs is 77.

The table also displays that the popularity of spin-offs fluctuates over time. Between 1996

and 2022, the three years with the most completed spin-offs in the Nordics are 2020, 2021, and 2017. The popularity of spin-offs has increased during the period we are investigating. From 1996 to 2009, a total of 24 spin-offs were completed. Between 2009 and 2022, 53 spin-offs were completed. Hence, more than twice as many completed spin-offs during the second half of 1996 and 2022.

Although Sweden has the highest number of completed spin-offs, it does not have the highest mean value per spin-off. In Table 5.4, Denmark has the highest mean spin-off market cap of 1.987 billion USD with only three completed spin-offs. Finland and Sweden have the second and third-highest average market caps per spin-off. Norway has the lowest average market cap per spin-off.

Regarding average market caps for the parent companies, Denmark is number one with 9.289 billion USD. Finland is second, with an average parent market cap of 1.685 billion USD. In Sweden and Norway, the average market caps of parent companies are 1.342 and 1.105 billion USD, respectively.

Country	Count	MCAP Subsidiary	MCAP Parent	Relative Size (%)	Incr. Focus (%)
Danmark	3	1,987,160,000	9,289,850,000	35.01	66.67
Finland	5	1,685,780,000	3,737,290,000	36.26	40.00
Norge	15	1,105,870,000	2,361,850,000	41.25	46.67
Sverige	54	1,342,340,000	2,388,540,000	32.34	48.15

Table 5.4: Summary statistics by Country. (Values are in USD)

The relative sizes in the Nordics are large compared to other regions. Previous studies in the U.S. have averages around 20-22% and in Europe, 24-30% (Desai & Jain, 1999; Hite & Owers, 1983; Krishnaswami & Subramaniam, 1999; Veld & Veld-Merkoulova, 2004; Sudarsanam & Qian, 2007). As an increase in this factor typically is related to spin-offs doing well, it is interesting that our spin-offs have large relative sizes. Furthermore, the focus increase variables are about 50/50, representing both the non-focus- and focus-increasing groups of spin-offs.

Among the 77 subsidiary companies in our sample, the most popular industry is "Industrials," counting 21 spin-offs. This can be seen in Table 5.5. The second and third most popular industries among the subsidiary companies are "health care" and "consumer discretionary," with 14 and 9 companies, respectively. Based on average

GICS	Subsidiary MCAP	Parent MCAP	Parent Industry Count	Subsidiary Industry Count	Relative Size (%)	Corporate Focus (%)
Communication services	3,583,043,000	2,392,255,000	0	5	59.96	100
Consumer discretionary	745,739,000	1,574,746,000	9	9	32.13	44.44
Consumer staples	4,417,312,000	4,080,181,000	2	5	51.98	60
Energy	2,263,811,000	7,867,723,000	6	6	22.34	50
Financials	214,124,100	539,231,400	5	3	28.42	66.67
Health Care	86,370,990	82,504,460	0	1	51.14	100
Health care	203,555,600	506,153,200	12	14	28.68	28.57
Industrials	1,643,845,000	3,912,370,000	26	21	29.58	38.09
Information Technology	215,936,400	359,208,300	0	4	37.54	50
Materials	510,921,000	3,540,819,000	5	6	12.60	66.67
Real estate	380,077,900	1,198,456,000	2	3	24.07	33.33

Table 5.5: Summary statistics by Industry. (Values are in USD. Corporate Focus and Relative Size column uses the subsidiary's origin as grouping basis.)

subsidiary value, the "Consumer Stables" industry ranks first, with a mean subsidiary value of 4.41 billion USD. Based on the GICS first-tier classification, we collected subsidiary companies from 11 industries.

Among the parent companies in our sample, there are eight different industries, according to GICS. The three most popular industries are the parent companies, "Industrials," "health care," and "consumer discretionary." The largest industry by average market value for the parent companies is "Energy," with a mean market cap of 7.86 billion USD. Furthermore, "Communication Services" has the highest mean relative size of approximately 60%. The lowest mean relative size is in the "Materials" industry, with a relative mean size of 12.6%. The industry with the highest fraction of spin-offs that increased corporate focus is "Communication services" with 100%, while the lowest industry was "Real estate" with 28.57%.

In addition, it is difficult to say anything about the relative size and who changes industry. There seems to be some randomness to this. Lastly, there is little pattern across countries for changing industries, indicating that changing industries might be more strategically specific for the individual firm.

6 Hypothesis

Based on existing research and literature, we have formulated some null hypotheses to test if any wealth effect is associated with corporate spin-offs and, if so, what factors can explain this value creation. In our context, "long-term" refers to a horizon of up to 9 years post-spin-off. The hypotheses focus specifically on the Nordic countries, excluding Iceland, from 1996 to 2022. Lastly, the proforma portfolio refers to the value-weighted mixed returns between parents and subsidiaries.

Our methodology assesses value creation from spin-offs using abnormal returns as a proxy. We examine the value creation from three perspectives: the subsidiary, the parent company, and a pre-investor, pro-forma portfolio. Additionally, we explore the value creation dynamics between parents and subsidiaries. With this in mind, we clarify our research question, formulating four hypotheses about whether spin-offs create additional value:

The long-term performance effect following spin-off yields nonsignificant abnormal returns for parent shareholders *(Hypothesis I a)*, subsidiary shareholders *(Hypothesis I b)*, proforma shareholders *(Hypothesis I c)*, and nonsignificant differences in abnormal returns for parent companies and their subsidiaries *(Hypothesis I d)*.

Our secondary research question explores the factors behind value creation in spin-offs. To delve deeper into this, we have formulated specific hypotheses to identify what contributes to this value creation:

Focus-increasing and non-focus-increasing spin-offs do not exhibit significant long-term abnormal returns *(Hypothesis II a)*, with no notable difference between the two groups *(Hypothesis II b)*.

Relatively large and relatively small spin-offs do not exhibit significant long-term abnormal returns *(Hypothesis III a)*, with no notable difference between the two groups *(Hypothesis III b)*.

These hypotheses provide a more precise understanding of what we are investigating, and we will discuss our Empirical findings in Chapter 7.

7 Empirical Findings

This chapter first examines the results regarding abnormal returns of each methodology in section 7.1—Calendar Time Approach, Matching Country Benchmark Approach, and Prediction Benchmark Approach—across different subgroups: parents, subsidiaries, and proforma portfolios (A value-weighted mix of subsidiary and parent). We present objective findings for each methodology and compare them with existing literature. After analyzing these methodologies, we summarize the findings across the three methodologies and conclude our central hypothesis regarding value creation from spin-offs.

Next, in section 7.2, we focus on value-creating factors in spin-offs, assessing each methodology finding objectively and individually. We compare our findings against prior studies. Finally, we summarize the findings across the three methodologies and conclude with the hypothesis concerning the factors that drive value creation in spin-offs.

7.1 Value Creation from Spin-Offs

7.1.1 Calendar-time Portfolio (CTA)

In this section, we present the empirical findings from the CTA regarding abnormal returns following spin-off events for each subgroup (parent, subsidiary, and pro-forma portfolio).

Table 7.1 presents 15 separate regressions; five different periods of interest range from 0 up to 1,3,5,7 and 9 years. Within each period of interest, three regressions are computed for each subgroup. Each regression is an FF3 model, with the dependent variable being the average risk-free-adjusted returns of each subgroup. The constant term represents the abnormal return after being adjusted for the market risk premium, a size premium, and a value premium.

		Period: 52 Weeks	
FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.171	0.210	0.198
SMB	-0.728	-0.794	-0.775
HML	0.142	0.024	0.060
rmrf	0.673*	0.737*	0.717*
Adj. R-squared	0.066	0.092	0.084

		Period: 156 Weeks	
FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.207*	0.157*	0.175*
SMB	-0.261	-0.313	-0.262
HML	0.099	0.031	0.039
rmrf	0.834***	0.803***	0.752***
Adj. R-squared	0.115	0.137	0.155

		Period: 260 Weeks	
FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.188**	0.128*	0.127*
SMB	-0.164	-0.205	-0.175
HML	0.265	0.189	0.235
rmrf	0.848***	0.970***	0.930***
Adj. R-squared	0.164	0.227	0.277

		Period: 364 Weeks	
FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.186**	0.165*	0.159**
SMB	-0.134	-0.306	-0.191
HML	0.175	0.434*	0.314*
rmrf	1.013***	1.060***	1.050***
Adj. R-squared	0.228	0.175	0.271

		Period: 468 Weeks	
FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.216***	0.304**	0.253***
SMB	-0.201	0.428	0.263
HML	0.100	-0.142	-0.031
rmrf	0.885***	0.836***	0.873***
Adj. R-squared	0.224	0.049	0.111

Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.1: CTA: Value creation analysis

Factors and Adjusted R^2:

Across most periods and subgroups, the market factor is often significant, while the HML and SMB are not significant. This indicates that the market factor is critical in explaining the returns. The adjusted R-square values, indicating the model's ability to explain return

variations, are relatively low at around 10-25%. McConnell and Ovtchinnikov (2004) had around 15-50% levels for up to 3 years post-spin-off. There is a trend of increasing adjusted R-squared values over time, suggesting improved model efficacy in explaining return fluctuations. Year 9 is an exception to this trend.

Parent Abnormal Return:

Previous U.S. studies, like those by Desai and Jain (1999) and Cusatis et al. (1993), report positive abnormal returns for parent companies, though they often lack significance. These studies generally cover a 3-year post-spin-off period. European studies by Kirchmaier (2003) and Veld & Merkoulova (2004) found positive but nonsignificant results for three years.

Our findings are similar to these studies, suggesting slightly above-average positive abnormal returns for parents. Our findings show positive yet non-significant returns in the first year and significant positive values up to three years for parents post-post spin-off.

There is little previous research after three years post-spin-off, so it is not easy to compare our results. However, generally, our findings suggest an increase in positive abnormal returns after the 3-year mark. We see stable, significant abnormal returns between 3 and 9 years.

Subsidiary Abnormal Return:

The subsidiary companies show similar, yet higher, abnormal returns than their parent firms. They do not have significant abnormal returns in the first year, but from the third to ninth period, they yield higher significant abnormal returns than the parents. These returns often exceed the significant 1% threshold, indicating strong, sustained performance over time.

Research consistently shows positive, significant abnormal returns for subsidiaries, with U.S. studies generally yielding more significant results than those in Europe. Critical studies in the U.S. by Desai and Jain (1999) and McConnell and Ovtchinnikov (2004) found significant positive returns for spin-off subsidiaries. In contrast, European research like Sudarsanam and Qian (2007) and Kirchmaier (2003) also noted positive returns for subsidiaries but with less statistical significance. These studies usually cover up to three years post-spin-off.

Our findings are consistent and similar for the first three years compared to previous research, as most studies do not investigate a more extended period post-spin-off.

Pro forma Abnormal Return:

The proforma abnormal returns are positive and significant at 5% in all years except the first. This gives strong evidence and suggests that the combined proforma portfolio gives a positive abnormal return following a spin-off event. The proforma portfolio's significance is generally between the parents and subsidiaries.

Studies from the U.S. and Europe on proforma abnormal returns post-spin-off, covering up to three years, generally show small, often nonsignificant, positive returns. Michaely and Shaw (1995) noted significant returns after three years. Our results align with these findings but show slightly higher, significant long-term returns for the proforma portfolio.

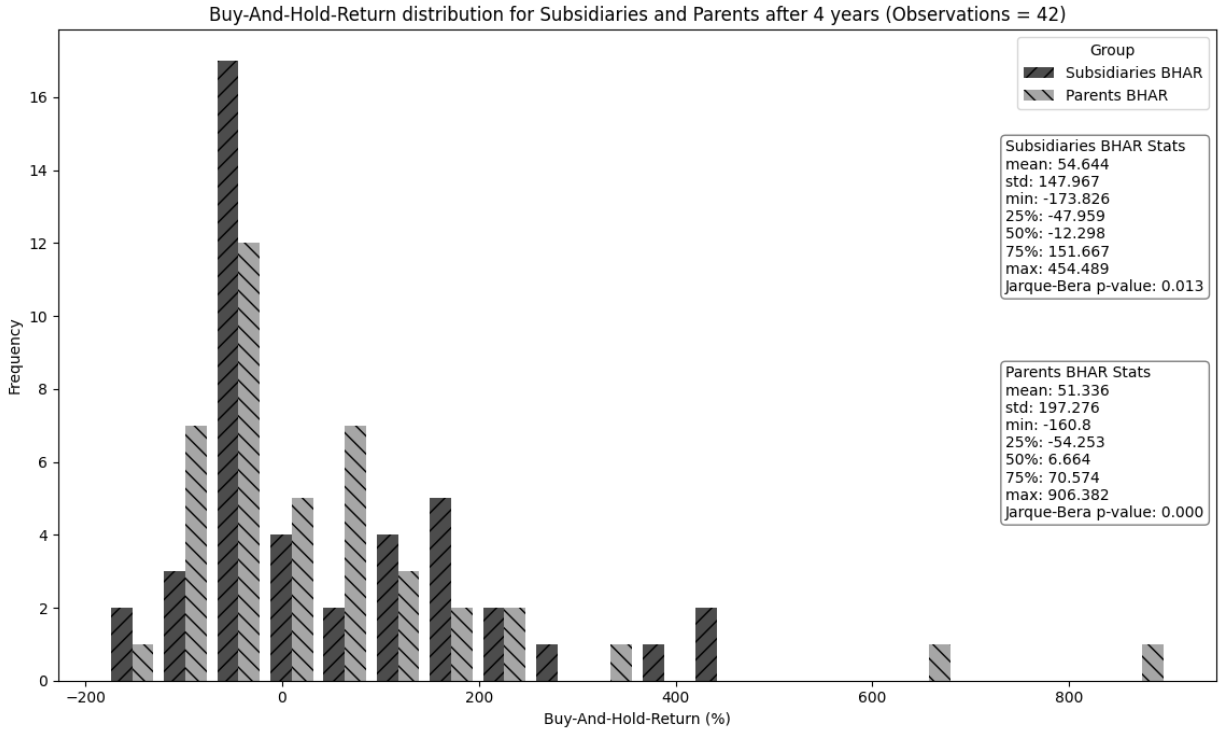
There needs to be more studies that expand over three years; however, this makes it difficult to compare our results to similar studies over this period.

7.1.2 Matching Country Benchmark Approach

This section examines the empirical findings for the Matching Country Benchmark Approach (MCBA). We first analyze the abnormal return distributions and then focus on the abnormal returns of different subgroups regarding value creation from spin-off events.

Following our methodology, we use non-parametric tests for Buy-and-Hold Abnormal Returns (BHAR) due to their skewed, non-normal distribution. We test this assumption by showing the distribution of BHAR for parents and subsidiaries four years post-spin-off in Figure 7.1.

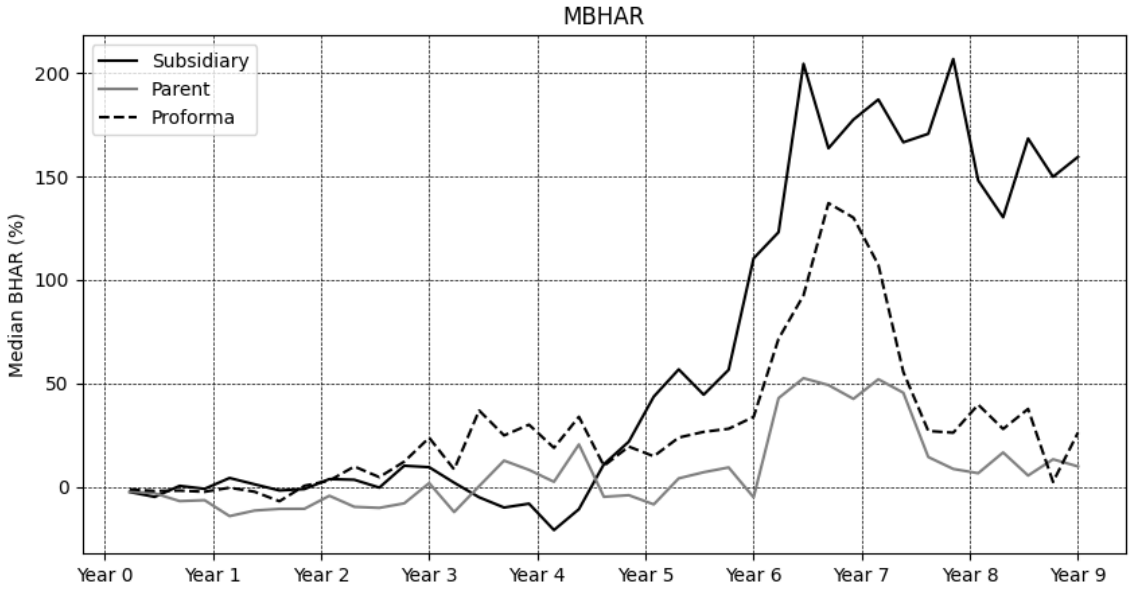
Figure 7.1: BHAR Distribution | MCBA



Both parent companies and subsidiaries show distributions with a distinct peak and rightward skew, leading to Jarque-Bera p-values below 0.05. Consequently, we reject the hypothesis of a normal distribution, validating our choice of non-parametric testing for BHAR.

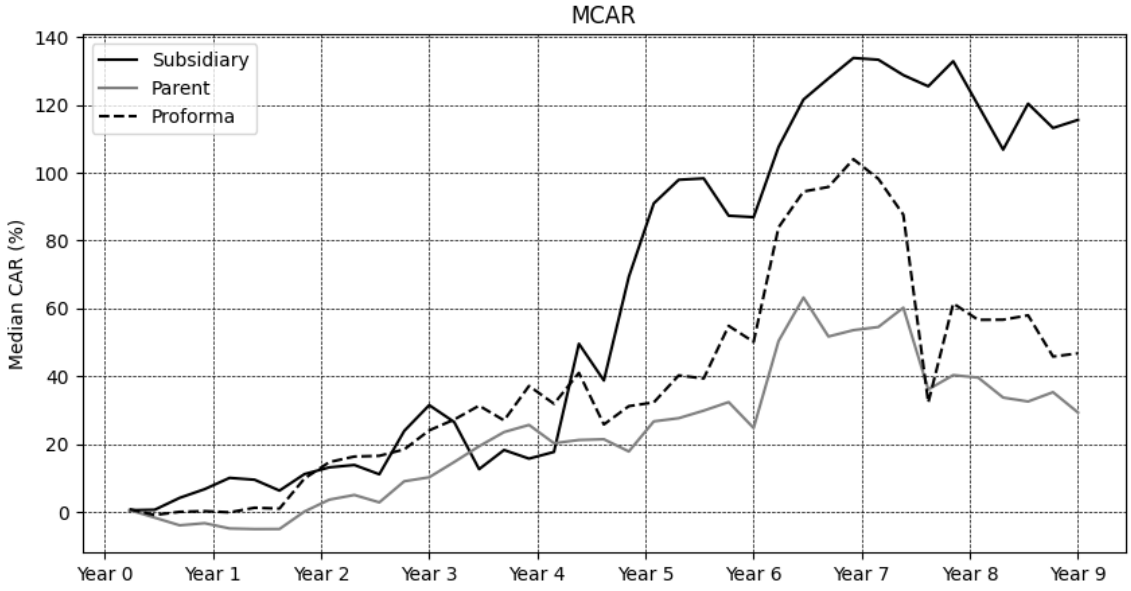
Figures 7.2 and 7.3 below present the median Buy-and-Hold-Abnormal-Return (MBHAR) and median Cumulative-Abnormal-Return (MCAR) over 468 weeks, equivalent to nine years post-spin-off. It plots these values separately for parents, subsidiaries, and pro forma, making it easy to compare the differences in abnormal returns between the subgroups.

Figure 7.2: Median BHARs



N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Figure 7.3: Median CARs



N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.2 shows significance tests conducted for the MBHAR and MCAR values in Figures 7.2 and 7.3. After 1, 3, 5, 7, and 9 years post-spin-off, they test for if each subgroup significantly differs from 0, giving deeper insight regarding value creation post-spin-off

for each subgroup. Lastly, we also test if there is a significant difference between the subsidiary and parent MBAHR and MCAR values.

	Parent		**Subsidiaries**		**Proforma**		**Difference**	
	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR
T0 to T1	-7.63	-4.229	2.67	7.343	-3.74	-1.533	10.30	11.573**
T0 to T3	1.75	8.43	9.43	29.138*	23.68**	24.016*	7.68	20.296
T0 to T5	0.29	11.859	13.36**	48.158*	-3.41*	23.546	13.07	36.300
T0 to T7	44.68*	53.678	179.88***	133.796***	136.334	102.858***	135.20	80.119***
T0 to T9	9.80	26.540	159.44*	109.062**	26.17	46.733	149.65	82.521***

Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.2: MCBA: Value creation significance

Parent Abnormal Return:

As mentioned, when discussing parent abnormal returns for the CTA, most studies show weak positive returns that are not significant. Our findings suggest below-average abnormal returns for the first three years compared to previous studies regarding the MBHAR, while the MCAR is more in line with previous studies.

After three years, our findings suggest a slight increase in abnormal returns up to 7 years, suggesting that value creation for parent companies might take some time to integrate. After three years, parent companies have a slight positive effect following spin-off events. However, these abnormal returns are primarily insignificant, yielding only one significant value after seven years. Furthermore, this positive effect drops off between 7-9 years. It is difficult to state that parent companies yield significant positive abnormal returns in the long run. However, there is a pattern of periods with positive abnormal returns.

Subsidiary Abnormal Return:

Most studies find positive and often significant abnormal returns in the initial three years post-spin-off for subsidiaries, as discussed under the CTA results. Our MCAR results support this somewhat, with significant values after three years. However, MBHAR presents a more conservative view of subsidiary performance during these years. Our findings are consistent with previous findings but generally slightly below the average findings of abnormal returns subsidiaries.

However, our most exciting finding is that both measures show the same findings regarding

subsidiaries' sudden steep increase in abnormal returns after four years. Both measures finding this makes the results even more robust and reliable, indicating that subsidiaries have a significant positive effect from spin-offs. However, it takes a relatively long time to show itself—4 years. The abnormal returns increase between 4 and 6 years, indicating much value-adding happening in these years, stabilizing at a high abnormal return after this. These findings are also supported, with significant abnormal returns beginning after three years but increasing significantly after this.

Pro forma Abnormal Return:

In discussing proforma abnormal returns in the Calendar Time Approach, we note that studies typically show moderate positive results for three years post-spin-off, with some significant findings. Our results align with this, showing non-significant returns in the first year and increasing to significant levels over three years, but generally suggesting a positive steady trend. Notably, our findings are more similar to U.S. findings than European ones, as indicated by U.S. studies like Cusatis et al. (1993) and Desai and Jain (1999).

Our analysis shows that MCAR and MBHAR exhibit steady positive returns up to the sixth year. Beyond this, a significant increase in abnormal returns occurs at the seven-year mark, followed by a decline before the eighth year. While the significance tests indicate some consistency in positive abnormal returns, this is not uniform across all periods, with notable fluctuations like the MBHAR reverting to zero after eight years. Despite these variations, the evidence suggests a trend of primarily positive long-term abnormal returns for proforma entities.

Difference between Subsidiaries and Parent Abnormal Return:

Previous literature shows generally higher long-term abnormal returns for the subsidiaries than the parents three years post-spin-off. We conduct significance tests to test this difference directly, and we find supporting evidence in the Nordics that subsidiaries also outperform parents three years post-spin-offs with generally a higher difference in abnormal returns and one significant difference after one year for MCAR.

Beyond three years, subsidiaries show increasingly higher abnormal returns than parents, particularly noticeable after the fourth year. During this period, subsidiaries significantly outperform parents over the nine-year timeframe. This trend is supported by significant

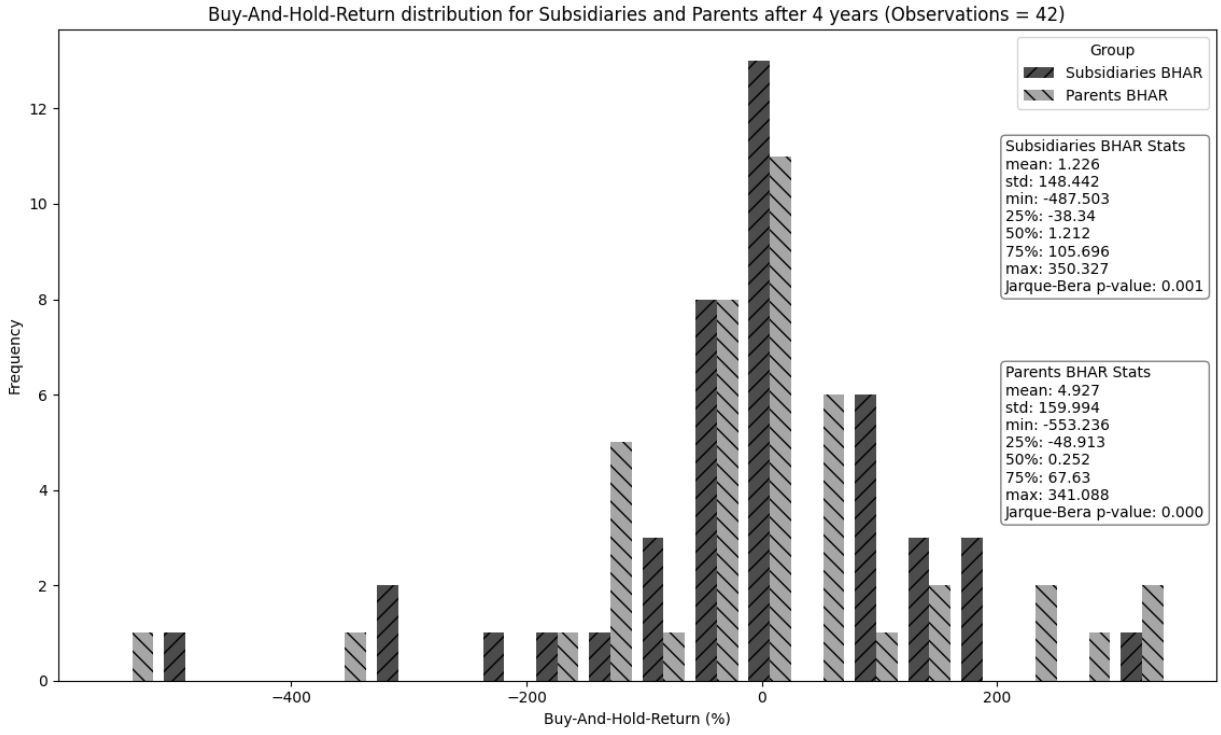
MCAR values observed in the seventh and ninth years, underscoring subsidiaries' superior performance. Our findings indicate that the value creation observed for pre-spin-off investors, evident in the proforma analysis, is mainly attributable to the performance of subsidiaries.

7.1.3 Prediction Benchmark Approach

This section examines the empirical findings of the Prediction Benchmark Approach (PBA). We first analyze the abnormal return distributions and then focus on the abnormal returns of different subgroups regarding value creation from spin-off events.

Figure 7.4 tests the assumption that BHARs have a skewed, non-normal distribution by showing the distribution of BHAR for parents and subsidiaries four years post-spin-off. The Jarque-Bera p-value suggests a non-normal distribution, in line with our assumptions about BHAR distribution discussed in the methodology chapter.

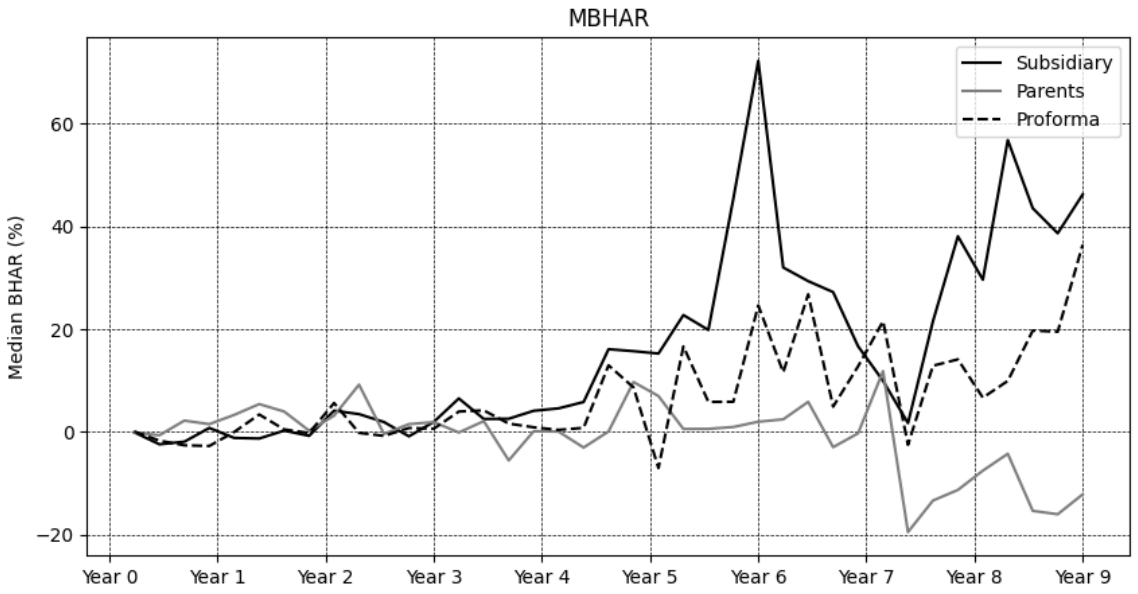
Figure 7.4: BHAR Distribution | PBA



Figures 7.5 and 7.6 below present the MBHAR and MCAR, respectively, using the predicted benchmark approach to compute the abnormal returns. This is over 468

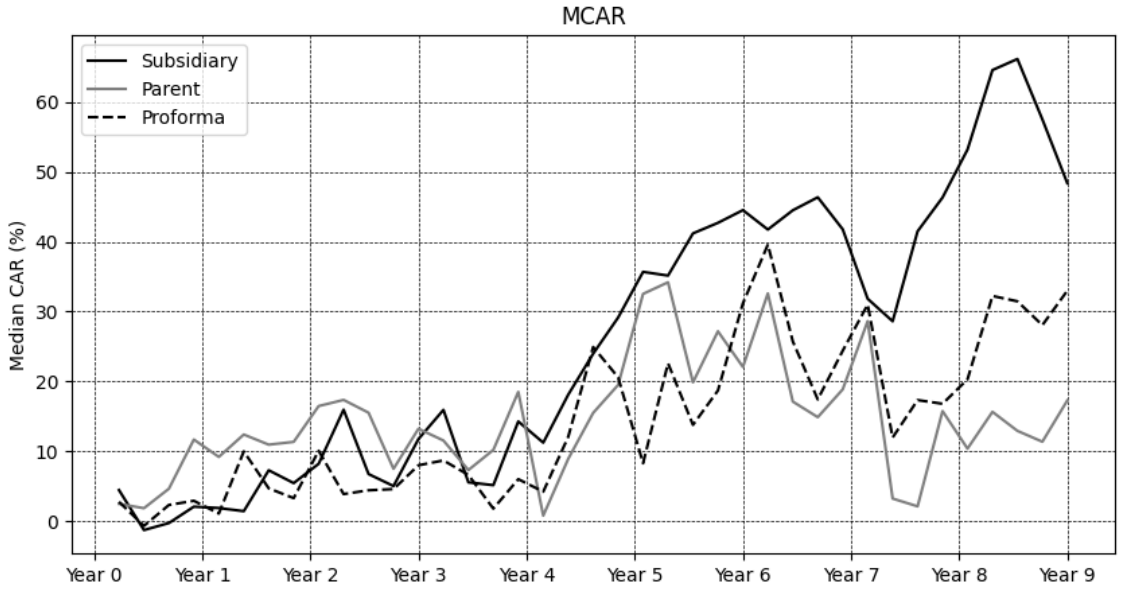
weeks, equivalent to nine years post-spin-off. It plots these values separately for parents, subsidiaries, and pro forma.

Figure 7.5: Median BHARs



N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Figure 7.6: Median CARs



N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.3 shows significance tests conducted for the MBHAR and MCAR values in Figures 5 and 6 for each subgroup after 1, 3, 5, 7, and 9 years post-spin-off. These tests if the MBHAR and MCAR values are significantly different from 0. Lastly, we also test if there is a significant difference between the subsidiary and parent MBAHR and MCAR values.

	Parent		**Subsidiaries**		**Proforma**		**Difference**	
	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR
T0 to T1	1.04	6.778	-1.07	1.368	-0.85	3.597	-2.11	-5.410
T0 to T3	1.90	12.556	1.94	11.739	0.61	7.994	0.05	-0.816
T0 to T5	11.24	18.173	9.35	23.846	15.71	22.187	-1.89	5.673
T0 to T7	4.71	19.147	26.75	45.194	10.82	21.616	22.03	26.04***
T0 to T9	-12.19*	17.185	46.23**	48.275	36.44	33.000	58.42 **	31.09 ***

Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.3: PBA: Value creation significance

Parent Abnormal Return:

MBHAR indicates that parent companies' abnormal returns are neutral until a negative trend emerges after seven years, becoming significantly negative at the nine-year mark. In contrast, MCAR shows a slightly positive trajectory, although it is not statistically significant. Notably, MCAR also reveals a performance dip around the seven-year point. The PBA suggests that parent companies perform as expected, perhaps slightly better, in the first seven years post-spin-off. However, there is a potential for slight underperformance from year seven to nine. In summary, the evidence neither strongly supports nor refutes the presence of positive abnormal returns.

Our initial three years post-spin-off findings align with previous studies, which typically show slightly positive yet nonsignificant returns during this period.

Subsidiary Abnormal Return:

Figures 7.5 and 7.6 depict MBHAR at around 0% during the initial four years and MCAR at slightly above 0%. After four years, both metrics increased substantially. After four years, MCAR shows a consistent, gradual increase, while MBHAR varies more. However, the overall trend is a substantial increase in performance compared to pre-years.

Statistical analysis partially confirms these trends. MCAR is statistically significant under the 1% level in period 9, supporting long-run excess returns. However, the absence of

significance in other measures and periods casts some doubt on this conclusion.

Contrary to most studies that report strong significance in the first three years for subsidiaries, our findings are more conservative and diverge from median results.

Pro forma Abnormal Return:

The proforma abnormal returns show similar trends as the subsidiaries, only weaker. The combined portfolio shows 0 abnormal returns and a slight but non-significant increase after four years. This is likely the effect of the subsidiaries' increased performance. After four years, there are consistently positive abnormal returns, but they are never significant. This suggests possible long-term outperformance of expectations, but the evidence is relatively weak.

Comparing our first three-year results with prior research, we observe similarities, especially with European studies that report positive but non-significant outcomes. This suggests that Nordic proforma portfolios have a performance comparable to European firms after spin-offs, while U.S. proforma returns post-spin-off slightly surpass those in the Nordic market.

Difference between Subsidiaries and Parent Abnormal Return:

Figures 7.5 and 7.6 indicate that subsidiaries outperform parent companies after five years. Significance tests for MBHAR and MCAR show that subsidiaries significantly outperform the parents from years 7 to 9. This demonstrates that subsidiaries achieve better long-term abnormal returns than their parent companies over 7 to 9 years.

7.1.4 Summary of Findings Value Creation

Our study provides valuable insights into the long-term effects of Nordic corporate spin-offs. By using diverse methodologies and financial metrics, we enhance the accuracy of our results. Our thorough investigation aims to aid decision-making in corporate restructuring. The following section will compile all findings for each subgroup across all methodologies to address our hypotheses thoroughly. This approach solidifies our analysis and contributes significantly to understanding value creation in Nordic spin-offs, extending past the standard three-year analysis period in a relatively under-researched region.

Hypothesis I a: The long-term performance effect following spin-off yields nonsignificant abnormal returns for parent shareholders.

Parents' abnormal performance following a spin-off yielded significant positive and negative results. Although the general trend was positive, nonsignificant results were slightly above 0. As we also found negative abnormal returns after seven years, we naturally conclude that we accept the null hypothesis of nonsignificant abnormal returns.

Hypothesis I b: The long-term performance effect following spin-off yields nonsignificant abnormal returns for subsidiary shareholders.

Our results show that subsidiaries generally exceed market performance in the long term. The significant abnormal returns observed for subsidiaries point to a consistent trend of value creation in the Nordic region post-spin-off, particularly noticeable after four years. Thus, we dismiss the null hypothesis of nonsignificant abnormal returns, concluding that subsidiaries demonstrate robust and significant abnormal returns, especially from the fourth year following spin-offs.

Hypothesis I c: The long-term performance effect following spin-off yields nonsignificant abnormal returns for proforma shareholders.

Two out of three methodologies yielded more extended periods of significant results, while the third did not. Although not as strong as the subsidiaries, we still find some evidence for the proforma portfolios' slightly significant abnormal returns in the long run. We conclude that the result is inconclusive. We cannot accept the null hypothesis of nonsignificant abnormal returns, and neither do we feel comfortable saying that the abnormal returns are for sure above 0. More research regarding the proforma portfolio is needed to conclude either outcome.

Hypothesis I d: The long-term performance effect following spin-off yields nonsignificant differences in abnormal returns for parent companies and their subsidiaries.

Refuting Hypothesis I d, our analysis reveals a significant difference in the long-term performance between parent companies and their subsidiaries. Subsidiaries generally exhibit more robust performance, indicating a more favorable outcome following the spin-off.

7.2 Value-Explaining Factors

In Section 7.1, we identified signs of value creation following spin-offs. This leads us to explore further the factors influencing this value creation, aiding companies in making informed decisions about spin-offs.

We focus on the pro-forma portfolio, which combines the value-weighted returns of parents and subsidiaries, representing the pre-spin-off asset base of parent firms for passive shareholders.

Our analysis assesses value creation by examining two key factors: the degree of increased focus and the relative size of the spin-offs. Using the Calendar Time Approach (CTA), we categorize our proforma return samples into four sub-factor groups: spin-offs with increased focus, those without increased focus, and those relatively large or small. Then, we compare the risk-adjusted returns of the four sub-factor groups against the Fama-French 3-Factor model, primarily to see if each group is associated with abnormal returns.

Then, we apply the Matching Country Benchmark Approach (MCBA) and Prediction Benchmark Approach (PBA) methods. These involve regression analyses with proforma abnormal returns as the dependent variable and the dummy factors: focus increase and relative size as explanatory variables. This comparison does not necessarily determine if abnormal returns are significantly above or below 0. However, instead, it compares the performance of each pair of sub-factor groups.

Through these methods, we gain a dual perspective on how increased focus and relative size affect value creation in spin-offs, offering a clearer understanding of these influencing factors.

7.2.1 Calendar-time Factor Testing

T0 to T1:

Factor	Increased Focus	Non-Increased Focus	Relative Size Big	Relative Size Small
const	0.194	0.353	0.435	-0.088
SMB	-0.933	0.098	0.605	-0.591
HML	-0.464	0.186	-0.254	0.279
rmrf	0.733*	0.407	0.873*	0.531*
Adj. R-squared	0.088	0.009	0.083	0.070

T0 to T3:

Factor	Increased Focus	Non-Increased Focus	Relative Size Big	Relative Size Small
const	0.031	0.301***	0.203	0.139
SMB	-0.351	0.016	-0.408*	-0.040
HML	0.056	0.054	0.100	-0.215
rmrf	0.755***	0.722***	0.949***	0.633***
Adj. R-squared	0.185	0.184	0.223	0.168

T0 to T5:

Factor	Increased Focus	Non-Increased Focus	Relative Size Big	Relative Size Small
const	0.040	0.250***	0.261***	0.011
SMB	-0.113	0.078	-0.106	-0.135
HML	0.109	-0.013	0.177	0.044
rmrf	0.954***	0.869***	0.980***	0.885***
Adj. R-squared	0.307	0.290	0.287	0.329

T0 to T7:

Factor	Increased Focus	Non-Increased Focus	Relative Size Big	Relative Size Small
const	0.073	0.334***	0.273**	0.041
SMB	-0.047	0.045	0.032	-0.016
HML	0.025	0.054	0.402*	0.006
rmrf	0.908***	0.963***	1.091***	0.892***
Adj. R-squared	0.338	0.174	0.226	0.374

T0 to T9:

Factor	Increased Focus	Non-Increased Focus	Relative Size Big	Relative Size Small
const	0.041	0.452***	0.278*	0.053
SMB	-0.063	0.828**	0.555*	0.034
HML	0.026	-0.277	-0.084	0.056
rmrf	0.866***	0.902***	0.728***	0.910***
Adj. R-squared	0.387	0.081	0.047	0.435

Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.4: CTA: Value explaining factors

Table 7.4 presents the CTA results for the value-creating factors. It presents five periods from 0 up to 1,3,5,7, and 9 years and the sub-factor groups for each period. 'Const' is a proxy for abnormal returns.

Corporate Focus:

Our analysis reveals a clear pattern in spin-offs: when subsidiaries remain in the same industry as their parent companies, they exhibit significantly positive long-term abnormal returns. In contrast, subsidiaries that change industries also show positive returns, which are insignificant and comparatively lower.

Our findings for the first three years post-spin-off challenge the prevailing trends in existing research. While studies like Desai and Jain (1999) typically report better performance for focus-increasing spin-offs, and Veld and Veld-Merkoulova (2004) found no significant difference, we observe significantly higher abnormal returns for non-focus-increasing spin-offs within three years. This deviation from most previous research is notable, indicating that the Nordic market may respond differently to industry focus in corporate spin-offs, particularly over the long term.

Relative Size:

Most long-term studies find the size factor nonsignificant for up to three years. Our findings for the first three years are relatively consistent with these, as we have no significant values, but there are still notably higher returns for the larger spin-offs.

Overall, the general trend in our findings is that relatively big spin-offs perform better than relatively small ones. Neither group has negative returns, but the larger spin-offs, consistently have higher returns. This difference also becomes bigger from the 5-year mark, where the relatively large spin-offs yield strong, significant abnormal returns, compared to nonsignificant results for the relatively small spin-offs.

7.2.2 Mathcing Country Benchmark Approach

Table 7.5 represents the findings when using the MCBA to test the relative size and focus increase factor's impact on value creation post-spin-offs. Each column represents a regression model for a specific period, up to 9 years post-spin-off. The rows show the coefficients for 'Relative Size' and 'Corporate Focus' and their significance levels. The regressions are regressed against weekly ARs for each pro-forma portfolio.

	T0-T1	**T0-T3**	**T0-T5**	**T0-T7**	**T0-T9**
const	-0.089	0.057	0.065	0.113	0.160*
Relative Size	0.318*	0.209*	0.227**	0.269**	0.327***
Corporate Focus	-0.024	-0.141	-0.145	-0.200*	-0.297**
R-squared Adj	0.0004	0.0003	0.0005	0.0007	0.0008

Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.5: MCBA: Value explaining factors

The adjusted R-squared values are shallow, explaining close to 0 percent of the variation in abnormal returns. However, dummy variables are an excellent way to measure a factor's average impact in 2 different scenarios, which are either 1 or 0. In this way, this regression still indicates which of, e.g., focus- or non-focus increasing spin-offs impact abnormal returns the most.

Corporate Focus:

'Corporate Focus' shows negative increasing coefficients across all periods, with significant results at the 5% and 1% levels for years 7 and 9. This suggests that spin-offs with a narrower focus might underperform compared to those with a wider operational scope , contradicting most other studies that typically find increased focus more beneficial.

Relative Size:

The 'Relative Size' coefficient is consistently positive and significant at the 5% level or better across all periods, implying that larger spin-offs tend to outperform smaller ones. Other research found the factor of relative size to be nonsignificant in determining long-term returns after spin-offs.

7.2.3 Prediction Benchmark Approach

Table 7.6 describes the same as Table 7.5, but instead of using the MCBA to calculate the abnormal returns, we use the PBA.

	T0-T1	T0-T3	T0-T5	T0-T7	T0-T9
const	0.233	0.151	0.155	0.184*	0.197*
Relative Size	0.123	0.192	0.154	0.142	0.222
Corporate Focus	-0.300	-0.218	-0.212	-0.239*	-0.304**
R-squared Adj	-0.0001	0.0002	0.0002	0.0003	0.0004

Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.6: PBA: Value explaining factors

Relative Size:

The coefficients for 'Relative Size' are nonsignificant across the different periods; however, they are always positive, indicating that big spin-offs slightly outperform smaller spin-offs in terms of abnormal returns in the long run. However, compared to MCBA, the weaker results are more congruent with previous research findings, mainly appointing the factor as nonsignificant in explaining abnormal returns.

Corporate Focus:

'Corporate Focus' shows a consistent negative relationship with abnormal returns, with significance at the 5% level or better in several time periods. This suggests that a narrower corporate focus leads to worse excess returns than broader-focused companies.

7.2.4 Summary of Findings Value Explaining Factors

In summary, our findings on value-explaining factors in the Nordics differ significantly from previous U.S. and European studies. Contrary to most studies deem relative size nonsignificant, we observe it notably impacting return performance post-spin-off. Additionally, while general theory and studies suggest focus-increasing spin-offs outperform non-focus-increasing ones, our findings in the Nordics show the reverse.

For hypotheses marked with "a," we base our conclusions on the calendar time approach, focusing on abnormal returns for each sub-factor group. We concentrate on benchmark approaches for hypotheses with a 'b,' evaluating performance differences between paired factor subgroups.

Hypothesis II a: Neither focus-increasing nor non-focus-increasing spin-offs show any significant long-term abnormal returns:

The calendar time approach shows no significant results for the focus-increasing group, aligning with Hypothesis II a. However, it contradicts the null hypothesis for the non-focus increasing group, indicating strong significance in long-term abnormal returns.

Hypothesis II b: There is no difference in long-term abnormal returns between focus-increasing and non-focus-increasing spin-offs.

Both benchmark approaches oppose the null hypothesis and put forward strong evidence that non-focus-increasing spin-offs perform better than focus-increasing spin-offs.

Hypothesis III a: Neither relatively large nor small spin-offs show significant long-term abnormal returns.

The calendar time approach yields no significant results in either direction for the small spin-offs and aligns with hypothesis IV a. For the big spin-offs, there is significant evidence that big spin-offs yield positive long-term abnormal returns.

Hypothesis III b: There is no difference in long-term abnormal returns between relatively large and small spin-offs.

Although not significant for both the benchmark approaches, our findings oppose the null hypothesis and suggest that big spin-offs have higher abnormal returns than small spin-offs.

7.3 Impact and Validation of Norwegian SMB and HML

Lastly, we will compare the results of FF3 and CAPM using the Calendar Time Approach (CTA) and the Prediction Benchmark Approach (PBA) to assess the impact of the SMB and HML factors, as well as how valid these Norwegian factors are for the Nordic market.

We will present the CAPM and FF3 results using the CTA first. After this, we compare the graphs and significant values for CAPM and FF3 using the PBA method. Even though the FF3 results are represented earlier in section 7.1.1 and 7.1.3, we show them here again, making it easier to compare

Table 7.7: FF3 vs CAPM - Calendar Time Approach

FF3

Period: 52 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.171	0.210	0.198
SMB	-0.728	-0.794	-0.775
HML	0.142	0.024	0.060
rmrf	0.673*	0.737*	0.717*
Adj. R-sq.	0.066	0.092	0.084

Period: 156 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.207*	0.157*	0.175*
SMB	-0.261	-0.313	-0.262
HML	0.099	0.031	0.039
rmrf	0.834***	0.803***	0.752***
Adj. R-sq.	0.115	0.137	0.155

Period: 260 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.188**	0.128*	0.127*
SMB	-0.164	-0.205	-0.175
HML	0.265	0.189	0.235
rmrf	0.848***	0.970***	0.930***
Adj. R-sq.	0.164	0.227	0.277

Period: 364 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.186**	0.165*	0.159**
SMB	-0.134	-0.306	-0.191
HML	0.175	0.434*	0.314*
rmrf	1.013***	1.060***	1.050***
Adj. R-sq.	0.228	0.175	0.271

Period: 468 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.216***	0.304**	0.253***
SMB	-0.201	0.428	0.263
HML	0.100	-0.142	-0.031
rmrf	0.885***	0.836***	0.873***
Adj. R-sq.	0.224	0.049	0.111

CAPM

Period: 52 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.172	0.185	0.181
SMB	-	-	-
HML	-	-	-
rmrf	0.653*	0.730*	0.705*
Adj. R-sq.	0.067	0.088	0.082

Period: 156 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.213**	0.152*	0.172**
rmrf	0.830***	0.798***	0.748***
SMB	-	-	-
HML	-	-	-
Adj. R-sq.	0.122	0.140	0.159

Period: 260 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.213***	0.141*	0.148**
rmrf	0.846***	0.970***	0.928***
SMB	-	-	-
HML	-	-	-
Adj. R-sq.	0.162	0.225	0.272

Period: 364 Weeks

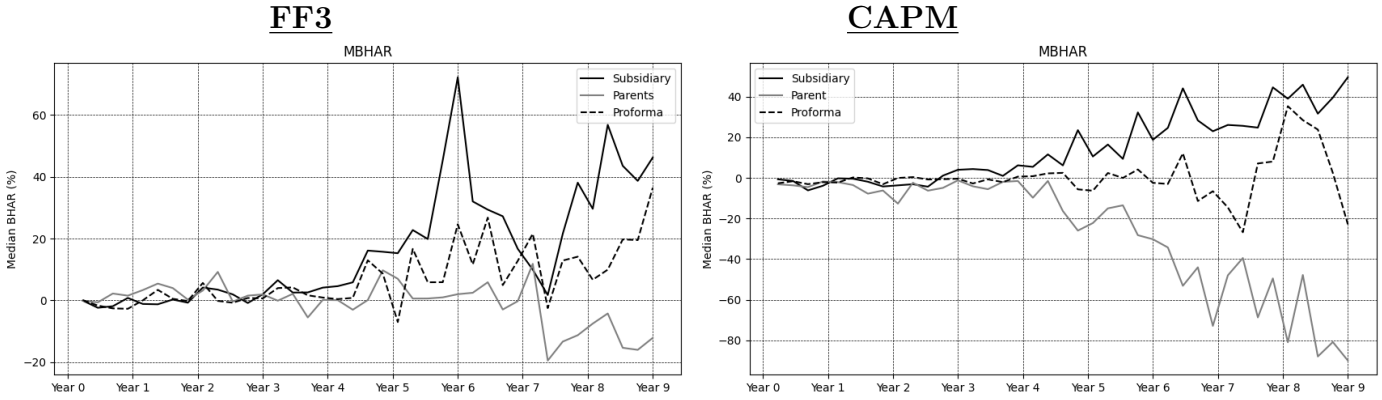
FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.201***	0.203**	0.188***
rmrf	1.019***	1.069***	1.057***
SMB	-	-	-
HML	-	-	-
Adj. R-sq.	0.228	0.164	0.263

Period: 468 Weeks

FACTOR	SUBSIDIARY	PARENT	PROFORMA
const	0.215***	0.312**	0.263***
rmrf	0.892***	0.824***	0.866***
SMB	-	-	-
HML	-	-	-
Adj. R-sq.	0.223	0.048	0.111

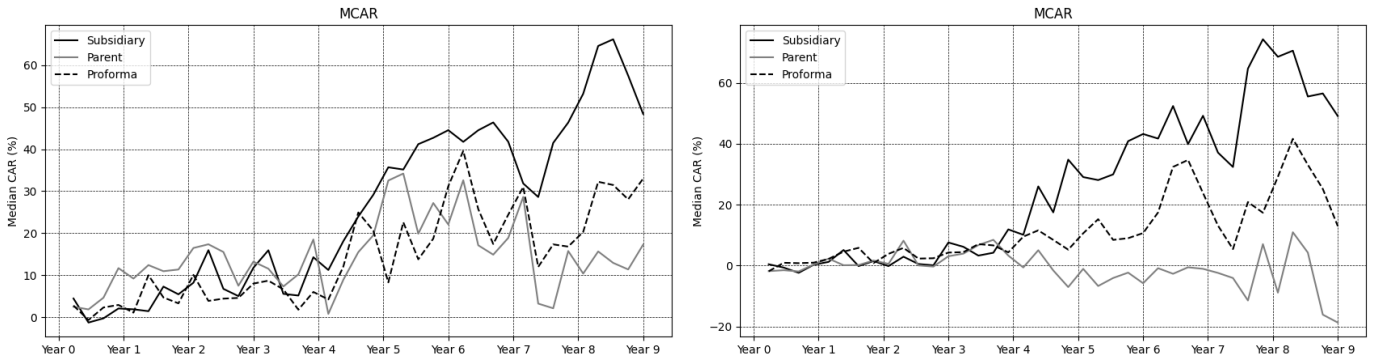
Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Figure 7.7: Prediction Benchmark Approach | **MBHAR**



N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Figure 7.8: Prediction Benchmark Approach | **MCAR**



N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

Table 7.8: FF3 vs CAPM - PBA Significance

FF3

	Parent		**Subsidiaries**		**Proforma**		**Difference**	
	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR
T0 to T1	1.04	6.778	-1.07	1.368	-0.85	3.597	-2.11	-5.410
T0 to T3	1.90	12.556	1.94	11.739	0.61	7.994	0.05	-0.816
T0 to T5	11.24	18.173	9.35	23.846	15.71	22.187	-1.89	5.673
T0 to T7	4.71	19.147	26.75	45.194	10.82	21.616	22.03	26.04***
T0 to T9	-12.19*	17.185	46.23**	48.275	36.44	33.000	58.42 **	31.09 ***

CAPM

	Parent		**Subsidiaries**		**Proforma**		**Difference**	
	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR	MBHAR	MCAR
T0 to T1	-3.43	0.925	-2.12	-0.450	-2.24	4.661	1.31	-1.374
T0 to T3	-1.23	2.928	3.97	7.002	-0.42	4.291	5.20	4.074*
T0 to T5	-19.65	-8.527	18.93	33.495*	-4.82	5.790	38.58*	42.022***
T0 to T7	-59.00	-3.194	31.32	47.990	-9.90	25.540	90.32*	51.183
T0 to T9	-89.89**	-25.242	49.48	48.232	-22.88	12.960	139.37*	73.474***

Significance levels: *** p $<$ 0.001, ** p $<$ 0.01, * p $<$ 0.05. N = 77 (52 weeks), N = 48 (156 weeks), N = 38 (260 weeks), N = 30 (364 weeks), N = 22 (468 weeks)

For the CTA method in Table 7.7, we first notice how the adjusted R-squared increases marginally from the CAPM to the FF3 model. Even though this increase is just marginal, it is after the adjusted R-squared accounts for adding more variables to the FF3 model. The FF3 model explains the variation in returns slightly better when adding the SMB and HML factors, but not as much as expected.

The constant terms are very similar. The values both become significant from year 3. Moreover, they follow the same pattern, with the most substantial significance for subsidiaries, then pro forma and parents. However, a noticeable slight difference is that the constant terms are marginally less significant and lower overall for the three subgroups. This also aligns with the lower adjusted R-squared, where the CAPM model explains marginally less. The marginal lesser explanation is left over in the abnormal returns, yielding a slightly higher and constant return than the FF3.

The PBA suggests both similar and different results, as seen in Figures 7.7 and 7.8 and Table 7.8. CAPM and FF3 perform very similarly for the subsidiary group, suggesting the Norwegian SMB and HML factors have a small impact. However, for the parent group, there is a big difference between CAPM and FF3. CAPM shows strong negative abnormal returns after nine years, while FF3 suggests neither positive nor negative abnormal returns

after nine years. The graphs show that this decline for parents starts around five years and goes as far down as -80% abnormal return for CAPM using the MBHAR.

Previous literature, as described in section 2.4, suggests that SMB and HML influence the value creation from spin-offs. Thus, there should be a difference between using CAPM and FF3. From the calendar time approach, the differences between CAPM and FF3 are smaller than expected. Nevertheless, there is marginal evidence of a marginal effect from SMB and HML. The more significant difference shows itself when using the PBA method, but there are also similarities for subsidiaries.

In conclusion, our findings indicate that Norwegian SMB and HML factors may not fully represent the Nordic market, as there are more similarities between CAPM and FF3 than expected. However, their inclusion offers a more nuanced analysis of spin-off value creation, as there are significant differences between CAPM and FF3. As such, this limitation should not be a problem for the accuracy and reliability of our results.

8 Discussion

Information	Parent	Subsidiary	Proforma	Difference
	Significant?			
Equity				
Calendar-Time Portfolio	Yes*	Yes**	Yes*	
Matching Country Portfolio	No ' '	Yes**	Yes*	Yes *
FF3 Predicted Firm Benchmark	No ' '	No ' '	No ' '	Yes *
Factors				
Calendar-Time Portfolio:				
Increased Corporate Focus			No ' '	
Non-Increased Corporate Focus			Yes**	
Big Relative Size			Yes*	
Small Relative Size			No ' '	
Matching Country Portfolio Benchmark:				
Corporate Focus			Yes, but negative**	
Relative Size			Yes*	
FF3 Prediction Benchmark:				
Corporate Focus			Yes, but negative*	
Relative Size			No ' '	

Diff column is Subsidiary - Parent returns. (***) 0.1% significance, (**) 1% significance, (*) 5% significance, (' ') No significance, two-sided test. The stars yielded, are the average starts for the 5 periods inspected and for both measures (MBHAR and MCAR). Scores are assigned as follows: (***) = 3, (**) = 2, (*) = 1, () = 0. Then an average score is calculated for the 5 periods and both measures where utilized, and rounded off to the closest score.

Table 8.1: Summary of findings

This chapter discusses the empirical findings, summarized in Table 8.1. This table represents the average findings by showing the average significance levels for the findings. The table separates the findings related to if there is value creation associated with spin-offs under 'Equity'. The 'Factors' section focuses on the value-creating factors.

First, the long-term results for stock returns are examined. Finally, the results of the long-term consequences of the explanatory factors are analyzed.

8.1 Value Creation from Spin-Offs

8.1.1 Discussion of Sample

Status	Number
Still listed	45
Acquired	7
Delisted	3
Total	**55**

Table 8.2: Overview of removed subsidiaries from sample post spin-off

In our nine-year post-spin-off analysis, we initially observed 77 spin-off pairs, which gradually decreased to 22 by the ninth year. The reasons behind the removal of 55 subsidiaries from our study are explained in Table 8.2. 45 of those 55 subsidiaries were removed because they had IPOs less than nine years ago. Those subsidiaries are still listed but have not been listed for nine years. The remaining ten were removed due to acquisitions and delistings.

A critical insight from Table 8.2 is the relationship between acquisitions and delistings. Removing a company, especially one performing well, can negatively impact our results in the subsequent year. Removing a poorly performing company might lead to improved results. The exclusion of delisted companies generally has a positive effect on our findings. Since acquisitions often signal a company's success, their removal negatively influences the following year's results. With seven acquisitions and only three delistings in our sample, this trend reinforces our positive findings.

However, concluding anything specific regarding the results of the 45 still-listed companies is challenging because they could have either a positive or negative impact. These companies represent a significant segment of our removed sample, diminishing the impact of the seven acquisitions and three delistings on our overall results. However, our approach remains unbiased, particularly in not overly excluding delisted companies.

8.1.2 Discussion of Findings

Our examination yielded varied results regarding the impact of spin-offs on stock return performance. In the upcoming sections, we will analyze the implications across all the timeframes we investigated. These discussions aim to align our findings with established financial theories and previous studies in the field. We will start by evaluating the long-term performance outcomes of these spin-offs. Following this, we will critically assess the methodological approaches utilized in our long-term analysis.

Our analysis of Nordic corporate spin-offs reveals complex implications for market efficiency, particularly concerning the efficient market hypothesis (EMH). The semi-strong form of EMH suggests that significant abnormal long-term returns should not occur if the market efficiently incorporates all public information.

The nonsignificant abnormal returns for parent firms align with the semi-strong market efficiency, indicating that their market prices likely reflect all available public information.

Proforma portfolios, however, show a mix of positive but inconclusive significant long-term abnormal returns, partially challenging the semi-strong market efficiency. This implies that the market does not fully account for all available information in these cases.

Subsidiaries, in contrast, present a more complex scenario. In the first year, their nonsignificant abnormal returns comply with the EMH. However, beyond the first year, significant outperformance observed in subsidiaries across various periods and methodologies contradicts semi-strong market efficiency. This suggests that the market may not fully process information related to spin-offs.

Subsidiaries might represent new risks not fully accounted for in market prices, suggesting their outperformance could be a risk premium rather than risk-free returns. This aligns with semi-efficient markets but indicates they may not fully adjust to risks specific to subsidiaries. A portion of this risk premium might also be reflected in the proforma company's value-weighted performance.

Our study shows consistently negative SMB (size) values for subsidiaries, contradicting the expectation of a small-cap premium, where smaller firms are presumed to have higher risk and returns. Instead, negative SMB values imply that our subsidiaries resemble larger,

more established companies in terms of risk.

This could be due to two factors. Firstly, our spin-off sample is relatively larger than other studies, with a mean relative size of about 35%, against the typical 20-30% in other studies. This suggests that our subsidiaries are closer in size to larger firms than those usually analyzed, possibly influencing their risk profile.

Another reason for subsidiaries exhibiting risk profiles similar to larger companies could be a market underestimation of their actual risks. This misjudgment might lead to mispricing, with subsidiaries not being valued accurately and failing to incorporate all available information. This risk underestimation could explain the abnormal returns observed over extended periods, thus challenging the semi-strong Efficient Market Hypothesis (EMH) form, which assumes that market prices reflect all public information.

Our findings reveal a notable trend: subsidiaries and parent companies show relatively similar performance until the fourth year post-spin-off. At this point, subsidiaries experience a significant surge in abnormal returns. This suggests that the value creation process in spin-offs, typically involving large corporations and significant structural changes, takes time to become apparent to the public.

Our analysis highlights the enduring nature of value creation by subsidiaries post-spin-off. Once they generate value, this trend remains robust, reflecting long-term value creation and a sustained competitive edge. Furthermore, the study's robustness is reinforced by consistent findings of positive abnormal returns for subsidiaries, evident across three different methods. This surge in returns, particularly noticeable around the fourth year, is consistently observed, whether through average values in the CTA, market comparisons in the MCBA, or company-specific factors in the PBA, applying to both BHAR and CAR measures. This uniformity across various metrics and methods underscores the reliability of our findings for the subsidiaries.

In summary, while our study on Nordic spin-offs aligns somewhat with semi-strong market efficiency, it also uncovers complexities and nuances, particularly in subsidiary performance. These results underscore the evolving market perceptions post-spin-off.

8.2 Value-Explaining Factors

This section focuses on the value-creating factors in Nordic corporate spin-offs, linking our findings with financial theory and prior research, especially regarding their long-term impact. We observe both confirmatory and contradictory results to previous studies.

The relative size factor contradicts past research, showing significant positive effects on long-term returns. The corporate focus factor significantly affects long-term performance in the Nordic context, contradicting earlier studies highlighting the importance of considering regional differences.

We begin by analyzing the impact and significance of the corporate focus factor, then conclude with a detailed review of the relative size factor, placing our findings in the broader framework of academic research on corporate spin-offs.

8.2.1 Corporate Focus

Our study on corporate focus in Nordic corporate spin-offs, detailed in Chapter 7, contrasts with broader European trends. Utilizing the Global Industry Classification Standard (GICS) instead of the two-digit SIC system, our findings diverge from typical European results. European studies often link focus-increasing spin-offs with higher value creation. However, our research shows non-significant long-term abnormal returns for such Nordic spin-offs, indicating a complex relationship between corporate focus and value creation in this region. We observe significant abnormal returns for non-focus increasing spin-offs after three years and lower returns for increased focus spin-offs compared to non-increasing focus ones after five years.

The dynamics of spin-offs in the smaller Nordic markets differ notably from larger economies like the U.S. and Europe. Subsidiaries that remain within their parent company's industry may thrive better in these markets due to their familiarity and established presence. In contrast, those venturing into new industries face challenges such as limited market space, difficulties in attracting investment and customers, higher per-unit costs, and less competitive pricing due to the lack of economies of scale.

In smaller markets, subsidiaries entering new industries struggle with fewer niche opportunities, limited market data, and consumer insights, posing market penetration and

growth hurdles. Meanwhile, subsidiaries that stick to their parent company's industry can leverage existing market relationships and knowledge, navigating the smaller market more effectively.

Analysis using the Fama-French 3-Factor Model reveals that the non-increased focus group showed positive SMB factors, akin to smaller companies. In contrast, the increased focus group had negative SMBs, resembling larger companies. This indicates different risk profiles, with smaller companies typically bearing higher risk.

Our findings contrast European and U.S. studies, highlighting the need to consider specific market nuances. In the Nordic context, the higher returns for non-corporate focus spin-offs could stem from these market-specific entry barriers and challenges.

8.2.2 Relative Spin-off Size

In section 7.2, our analysis of relative size in Nordic corporate spin-offs reveals that larger spin-offs tend to outperform smaller ones, especially after the third year. This aligns with European studies and suggests benefits like improved managerial efficiency and elimination of value-destroying activities in larger firms, which become apparent over time in the Nordic markets.

Our findings show significant abnormal returns from larger spin-offs after three years, both in the calendar-time portfolio approach (CTPA) and the matching country portfolio approach (MCPA). Interestingly, larger spin-offs often exhibit higher SMB values, leading the market to view them similarly to smaller companies. This aligns with the general observation that smaller stocks often outperform larger ones.

We see mixed and mostly nonsignificant HML values for small and large spin-offs, indicating that the market does not categorize them as strict value or growth stocks. Thus, HML values do not explain the performance differences between small and large spin-offs in our sample.

Overall, our findings suggest that in the Nordic market, the advantage of larger spin-offs becomes evident only after a more extended period, particularly beyond the 3-year mark. This might indicate a deviation from other markets regarding the impact of spin-off size, with a delayed effect in the Nordic context.

8.3 Reflections

Our study reveals the complexity of value creation in Nordic corporate spin-offs over nine years, showing that identifying exact sources of value gains from spin-off activities is challenging. Although extensive research has been conducted, the precise contributors to value creation in spin-offs need to be clearly defined.

Previous studies have explored various potential sources of value in spin-offs, such as operational improvements, changes in takeover activity, and regional differences. However, their findings are often inconclusive or only weakly supported.

Spin-offs might indicate a proactive management approach focused on shareholder value maximization, encompassing financial, operational, and market perception aspects. Sudarsanam and Qian (2007) highlighted the role of market psychology in these processes.

Each spin-off is distinct and must be evaluated individually by investors, considering the specific attributes of the subsidiary and the rationale behind the spin-off.

Managers in conglomerates also face the challenge of maximizing business value, deciding whether a unit is more valuable independently or as part of the conglomerate, based on internal capabilities and external market conditions.

In summary, while our study provides insights into Nordic spin-offs, it also emphasizes their complex and diverse nature. A comprehensive understanding of spin-off value creation involves analyzing financial and operational factors and strategic and psychological elements that affect market responses and managerial decisions.

8.4 Suggested Further Research

This thesis on Nordic corporate spin-offs suggests new research avenues, especially in studying spin-off dynamics in individual Nordic countries. The differences in spin-off characteristics across these nations imply that local legislation, tax, and market factors could significantly affect outcomes. Country-specific studies are needed to understand how these factors influence spin-offs' wealth effects, aiding investors and managers in decision-making.

The methodological expansion could also enhance insights. Addressing Loughran and

Ritter's critiques about evaluating market efficiency in long-term returns using various portfolio weighting methods, like value-weighting, would enrich our study. A value-weighted approach, as opposed to the equal-weighted method used here, could offer a more precise view of the total wealth effect of spin-offs, improving our understanding of their overall impact.

Further research on the wealth effects of Nordic spin-offs is necessary. Our study's approach to calculating expected returns could be refined by considering additional factors such as security maturity time and specific credit risks. A more detailed analysis of return volatility about these aspects would offer a clearer understanding of wealth transfer in spin-off events.

Investigating the sources of wealth transfer in Nordic spin-offs, similar to Maxwell and Rao's 2003 study, would deepen our understanding. Their research underlined the importance of collateral and coinsurance effects in spin-off outcomes. Analyzing these elements in the Nordic context could reveal how spin-offs affect various shareholder groups, including bondholders, providing new insights into these market dynamics.

Our thesis found inconclusive evidence regarding the long-run wealth effect of proforma portfolios, with significant abnormal returns that needed to be more consistent across all methodologies and measures. Further research in this area could clarify the overall value effect of spin-offs and inform better corporate decision-making.

Another intriguing research area is investigating why the corporate focus factor in Nordic spin-offs differs from those in Europe and the U.S. This would involve exploring the distinct characteristics of Nordic, European, and U.S. markets and identifying the factors behind this divergence in corporate focus.

Additionally, understanding why larger companies generally perform better but take longer to create value in Nordic spin-offs compared to other markets would be valuable.

Future research could include country-specific analyses, methodological enhancements, and an in-depth examination of wealth transfer mechanisms. Such studies would extend this thesis's findings and enrich the overall understanding of corporate spin-offs in the Nordic region, providing valuable insights for academia and industry.

9 Conclusion

This thesis investigates the wealth effects associated with corporate spin-offs in the Nordics, a region that has remained largely unexplored on this topic. Most previous U.S. studies show that corporate spin-offs, as a restructuring method, contribute to the overall value-creation in the long term. On the contrary, most European studies present only limited evidence to support this overall value generation. The specific factors driving this value creation are nonsignificant for most European studies. U.S. studies show a mix between significant and nonsignificant factors.

This thesis enhances current research in two significant ways. First, by analyzing the long-term value creation by spin-off events in the Nordics, we provide insights into a region that remains largely unexplored. Second, while most studies focus on short-term effects, typically spanning up to three years, our investigation extends to the wealth effects observed up to nine years following a spin-off. This approach offers a more comprehensive understanding of the actual long-term value created by spin-off events. A more extended examination period also tests the robustness of the long-term value creation from a spin-off event.

We employ three distinct methodologies: the calendar-time approach, the prediction benchmark approach using advanced machine learning tools, and the country-matching benchmark. These diverse methods, including MBAHR and MCAR measures, enhance the robustness of our thesis.

Our methodologies revealed significant abnormal returns for spin-offs, particularly after the fourth- and until the ninth year post-spin-off. This trend underscores a consistent pattern of value creation in the long term for spin-off companies. Findings from all three methodologies indicate a consistent, positive long-term impact on spin-off entities, suggesting successful value generation post-spin-off.

The long-term analysis of parent companies following spin-offs showed a different trend. While there were periods of significant positive abnormal returns, the long-term effect approximated abnormal returns close to zero. This suggests that, unlike their spin-off counterparts, parent companies do not exhibit a clear pattern of value creation or destruction in the long term, as their abnormal returns hover around a baseline.

The proforma portfolios, combining parent firms and the spun-off entity, exhibited a higher return than parent companies, suggesting potential value creation. However, the evidence supporting this is not robust across all methodologies. Some significant abnormal returns were noted, but they were not consistent enough to confirm strong value creation in the long term, leaving room for further investigation.

Our study found that subsidiaries operating in the same industry as their parent company performed significantly better than those operating in another industry. Hence, it challenges previous research and highlights the Nordic market's unique characteristics. Regarding relative size, larger spin-offs outperformed smaller ones, aligning with previous studies. However, it was noted that this outperformance takes longer to manifest in the Nordics compared to other markets.

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