

Lappeenranta-Lahti University of Technology LUT  
School of Business and Management  
Degree Programme in Strategic Finance and Business Analytics (MSF)

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**Do spin-off anomalies exist? Empirical evidence from the Nasdaq Helsinki**

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## **ABSTRACT**

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### **Do spin-off anomalies exist? Empirical evidence from the Nasdaq Helsinki**

Master's Thesis  
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70 pages, 7 figures, 14 tables, and 6 appendices

Examiners: Professor Eero Pätäri  
Associate Professor Sheraz Ahmed

Keywords: Spin-off, spin-off anomaly, abnormal returns, Jensen's Alpha

For decades, the existence of spin-off anomalies has been discussed in the financial literature. By investing in spin-off companies or their parent companies, investors have an opportunity to exploit market opportunities and therefore earn higher returns than the market offers. Earlier studies have mainly concentrated on the US markets and only a limited number focused on Europe.

The objective of this research was to find out if spin-off and their parent companies offer abnormal returns also in the Nasdaq Helsinki (previously known as the Helsinki Stock Exchange). This research was carried out as quantitative research and included a total of 20 spin-offs conducted between 2002 and 2021. Regression is used as a research method and abnormal returns are measured with Jensen's Alpha. Data is collected mainly from Eikon Refinitiv, Yahoo Finance, and Bank of Finland Databases.

The main findings from this research are that by investing in spin-off companies, investors earn risk-adjusted positive abnormal returns compared to the average market returns. Returns are greatest right after the completion of the spin-off, during the first 5 day holding period. For longer holding periods, spin-off companies offered abnormal returns, however not as significantly greater than for shorter periods. No evidence for parent companies' abnormal returns is found in this research. Returns for those are negative or significantly indifferent from zero against the corresponding market index.

## TIIVISTELMÄ

Lappeenrannan-Lahden Teknillinen Yliopisto LUT  
Kauppakorkeakoulu  
Degree Programme in Strategic Finance and Business Analytics (MSF)

Tuulia Mattila

### **Osittaisjakautuneiden yritysten anomalia: Empiirinen tutkimus Helsingin pörssistä**

Pro gradu-tutkielma  
2022

70 sivua, 7 kuvaajaa, 14 taulukkoa and 6 liitettä

Tarkastajat: professori Eero Pätäri  
apulaisprofessori Sheraz Ahmed

Avainsanat: Osittaisjakautuminen, osittaisjakautuneiden yritysten anomalia, epänormaali tuotto, Jensenin alfa

Osittaisjakautuneiden yhtiöiden anomalia on jo vuosikaudet puhututtanut talouskirjallisuudessa. Sijoittamalla osittaisjakautuneisiin yrityksiin tai näiden emoyhtiöihin, sijoittajat voivat voittaa markkinat ja saada epänormaalia tuottoa verrattuna keskimääräiseen markkinatuottoon. Aiemmat tutkimukset aiheesta ovat keskittyneet pääosin Yhdysvaltoihin ja vain muutama tutkimus on käsitellyt eurooppalaisten yhtiöiden jakautumisia.

Tämän tutkimuksen tavoitteena on selvittää, tarjoavatko osittaisjakautuneet yritykset ja heidän emoyhtiönsä epänormaaleja tuottoja myös Helsingin pörssissä. Tutkimus tehtiin kvantitatiivisena tutkimuksena ja se sisälsi yhteensä 20 jakautumista vuosien 2002 ja 2021 välillä. Tutkimusmetodina käytettiin regressiota ja epänormaalia tuottoa markkinaan verrattuna mitattiin Jensenin alfalla. Aineisto on kerätty pääosin Eikon Refinitivin, Yahoo Financen ja Suomen pankin tietokannoista.

Tutkimuksen tärkeimpinä tuloksina voidaan pitää osittaisjakautuneiden yritysten tarjoamaa riskikorjattua epänormaalia tuottoa verrattuna keskimääräiseen markkinatuottoon. Suurimmat tuotot ovat saatavissa melko pian jakautumisen jälkeen. Myös pidemmällä tarkastelujaksolla osittaisjakautuneet yritykset ovat tarjonneet epänormaaleja tuottoja. Tuotot ovat kuitenkin hieman maltillisempia kuin lyhyemmällä aikavälillä. Merkkejä emoyhtiöiden epänormaaleista tuotoista ei tutkimuksessa löydetty, sillä ne olivat joko negatiivisia tai markkinatuottoja vastaavia kaikilla tarkastelujaksoilla.

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Vantaa, May 2022

Tuulia Mattila

## TABLE OF CONTENTS

1	INTRODUCTION .....	1
1.1	Background.....	1
1.2	Focus and research objectives .....	2
1.3	Research questions.....	3
1.4	Key concepts .....	5
1.5	Delimitations .....	7
1.6	Structure of the thesis .....	8
2	THEORETICAL FRAMEWORK.....	10
2.1	Efficient market hypothesis .....	10
2.2	Financial market anomalies.....	12
3	MEASURING ABNORMAL RETURNS .....	14
3.1	Capital asset Pricing Model (CAPM).....	14
3.2	Jensen's Alpha.....	15
4	CORPORATE DIVESTITURES.....	17
4.1	Types of divestitures.....	17
4.2	Motives for spin-offs .....	19
5	EFFECTS OF A SPIN-OFF TO STOCK PRICE DEVELOPMENT .....	21
5.1	Reactions to spin-off announcements .....	21
5.2	Take-over activities.....	23
5.3	Cross-industry spin-offs .....	25
5.4	Information asymmetry.....	26
5.5	European spin-offs.....	27
5.6	Summary .....	29
6	DATA .....	32
6.1	Data selection and collection .....	32

6.2	Data sample characteristics .....	34
7	METHODOLOGY .....	40
7.1	Analysis methods.....	40
7.2	Risk-adjusted returns .....	41
8	RESULTS .....	42
8.1	Returns against OMXHGI.....	42
8.2	Jensen's Alpha.....	47
9	DISCUSSION AND CONCLUSION .....	52
9.1	Main findings .....	53
9.2	Comparison to previous research .....	56
10	LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH...	58
	REFERENCES .....	60
	APPENDICES.....	64
	Appendix 1 Data sample of the research.....	64
	Appendix 2 Industries and sectors for parent and spin-off companies.....	65
	Appendix 3 Returns against OMXHGI, parent companies.....	66
	Appendix 4 Returns against OMXHGI, spin-off companies .....	66
	Appendix 5 Jensen's Alphas, corresponding p-values, and r <sup>2</sup> , parent companies	67
	Appendix 6 Jensen's Alphas, corresponding p-values, and r <sup>2</sup> , spin-off companies .....	69

## LIST OF FIGURES

Figure 1 Positioning of the research.....	2
Figure 2 Types of corporate divestitures .....	17
Figure 3 Number of spin-offs per year, Nasdaq Helsinki.....	32
Figure 4 Development of OMXHGI between 2002 – 2022.....	38
Figure 5 Development of the 1-month EURIBOR rates between 2002 – 2022 .....	39
Figure 6 Performance against the index, parent companies.....	42
Figure 7 Performance against the index, spin-off companies .....	43

## LIST OF TABLES

Table 1 Thesis structure .....	9
Table 2 Research focusing on short-term implications .....	30
Table 3 Research focusing on long-term implications.....	31
Table 4 Number of spin-offs per year.....	35
Table 5 Cross-industry versus same-industry spin-offs .....	36
Table 6 Number of parent and spin-off companies per sector .....	37
Table 7 Returns compared to the index, parent companies.....	43
Table 8 Returns compared to the index, spin-off companies .....	44
Table 9 Parent companies' performance against the index, same and cross-industry spin-offs.....	45
Table 10 Spin-off companies' performance against the index, same and cross-industry spin-offs.....	46
Table 11 Jensen's Alpha for parent companies .....	47
Table 12 Jensen's Alpha for spin-off companies.....	48
Table 13 Jensen's Alpha for parent companies, same and cross-industry spin-offs	49
Table 14 Jensen's Alpha for spin-off companies, same and cross-industry spin-offs .....	50

## **ABBREVIATIONS**

IPO	Initial public offering
EMH	Efficient market hypothesis
CAPM	Capital Asset Pricing Model
OLS	Ordinary least squares
MAR	Mean adjusted return approach
CAAR	Cumulative average adjusted return
BHAR	Buy-and-Hold abnormal return

# 1 INTRODUCTION

## 1.1 Background

The efficient market hypothesis (EMH), one of the greatest paradigms of the financial markets, has widely been argued over the past decades. According to the theory, investors cannot gain more returns than the market offers, and finding assets that provide positive abnormal returns compared to the corresponding market index is impossible. (Latif et al 2011) However, more and more inefficiencies or market anomalies have been identified, which put doubts on the theory.

The spin-off anomaly is one of the identified financial anomalies. According to the theory, companies engaging themselves in spin-off activities gain positive abnormal returns compared to the corresponding market index. The existence of spin-off anomalies has been widely debated in the financial literature within the past decades and the origin of studies focusing on spin-off anomalies extends to as early as the 1980s. Most studies focused on the US markets, in which spin-offs have become more and more popular in the last decades.

However, it seems that spin-offs as a way to become public are not as common in Europe as in the US. Therefore, fewer studies focus on the European markets as well. Results from the previous studies vary to certain extent, which puts questions about the existence of spin-off anomalies. Many studies focusing on the US markets have found evidence of positive abnormal returns. However, returns raised from the European spin-offs have been more dissenting.

This research aims to find out whether spin-off anomalies exist also in Finland. Nasdaq Helsinki (previously known as the Helsinki Stock Exchange) can be seen as a frontier market and the number of spin-offs conducted is limited to approximately 30 within the past 30 years. As a result, only a few studies are focusing on Finnish spin-offs. This research includes a total of 20 spin-offs (10 parent companies and 10 spin-off

companies) that have been conducted in the Nasdaq Helsinki main list between 2002 and 2021.

This research utilizes two different methods to detect the possible outperformance of companies engaged in spin-off activities. First, company returns are run against the general index OMXHGI to get an overall view of returns. Additionally, Jensen's alpha is utilized to detect any risk-adjusted abnormal returns against the market index. Performance is analysed separately for both parent and spin-off companies for certain predefined holding periods between 5 days to 180 days. Additionally, many earlier studies have detected variations of returns within certain characteristics. As said, abnormal returns are analysed also for spin-offs classified as same-industry and cross-industry spin-offs.

## 1.2 Focus and research objectives

The focus of this research is on the interception of three different fields: financial economics, strategic management and behavioural finance as expressed in Figure 1 below.



*Figure 1 Positioning of the research*

Determinants of a stock price are core components of corporate finance theories. Additionally, theories regarding efficient markets and shareholder value are closely related to the field. Furthermore, market anomalies are commonly be seen as a result of biased and irrational investors. Investor behaviour in the markets is studied in the field of behavioural finance.

To cope in the constantly changing world, companies need to adapt and change their strategy based on the ongoing situation. Corporate divestitures are one way for companies to change their strategy and business. For instance, by divesting subsidiaries in different fields, companies may improve their efficiency by focusing on their core competencies. Decisions of corporate divestitures are strategic and thus closely related to strategic management.

### 1.3 Research questions

This section lists research questions for this thesis. This research has two main research questions and three sub-questions for the RQ1 that help to answer the question.

***RQ1. Do spin-off companies offer positive abnormal returns compared to the markets?***

The main research question of this thesis is relatively simple and can be answered with yes/no. However, to find out the reasons for such performance, this research question will have sub-questions. Answering those questions is vital to get a comprehensive picture of this topic.

Sub-questions for this research are determined as follows:

***SRQ1.1. Why do companies involve themselves in spin-off activities?***

To answer this question, the motives behind corporate divestitures need to be studied. In addition, different types of corporate divestitures are identified in the current literature. Therefore, the main differences and characteristics of each type of divestiture need to be discussed.

As mentioned, there are different types of divestitures with each having different features. It is believed that spin-off companies have some similar characteristics that could explain their outperformance against to the markets. Many earlier studies proved evidence that companies with negative synergies may benefit from spin-off thus creating abnormal returns for their shareholders.

***SRQ1.2. Do the returns between same-industry and cross-industry spin-offs differ?***

The difference between same-industry and cross-industry spin-offs is discussed and further analyzed in this research. As many studies have found evidence that the cases classified as cross-industry spin-offs generate greater returns than those classified as same-industry, this aspect is included also in this research. Overall, this question helps to understand the special characteristics of the spin-off companies and thus helps answer the main research question.

***SRQ1.3. How abnormal returns are defined?***

To answer the main research question of this thesis, abnormal returns must first be defined. There are many common measures for abnormal returns, which will be discussed in this research.

The first main research question focuses on spin-off companies. However, parent companies play also a vital part in this research. As a consequence, this research also has a second research question as follows:

***RQ2. Do parent companies also outperform against to the market?***

Many studies have found that parent companies engaging themselves in spin-off activities may also outperform after the spin-off. This thesis will also include the performance comparison of parent companies against the corresponding market index to get a comprehensive picture of a topic.

Research questions and their answers are reviewed again in the discussion part of this thesis.

#### 1.4 Key concepts

This section provides definitions of the core terms and concepts of this thesis. Some terms may have different meanings and therefore it is of utmost important to ensure that the reader of this thesis is familiar with the used key terms.

The term the **parent company** is used for an original company from which a new, independent company has been spin-offed. Other studies have used a term “initiating company” for this purpose. This term is used for the company after the completion of a spin-off.

The term the **spin-off company** refers to a new independent company that has been spin-offed from the parent company. The term is used after the company is traded independently in the markets. The term **original company** is used when discussing a pre-spin-off phase, including both a parent company and a spin-off company.

**Pro-rata distribution** means that shares of spin-off companies are distributed to the parent company's shareholders in the same proportion as they hold the parent company's shares. This is the common way of distributing shares during spin-off activities.

**Cross-industry spin-off** refers to a situation in which the parent company and spin-off company operates in different industries or their industry codes are different. This term is often used in the discussion of a stock price development after the spin-off. When discussing same-industry spin-offs, both parent and spin-off company operates within the same industry. Morningstar classifications are used to define industries for companies included in this research.

According to the **Act on the Taxation of Business Income 52 c §**, in a spin-off, a company divest one or more subsidiary at its current state and retain at least one subsidiary in the parent company. The parent company's shareholders receive shares of the spin-off company based on the number of shares held by the parent company. This is applicable in Finland.

**ROA** refers to an operating-return-on-assets ratio, which is calculated as an operating income divided by assets at the time of the completion of the spin-off. For instance, Daley et al (1997) used ROA to compare the original company to the parent company and the spin-off company in the post-spin-off phase. Thus, operations become comparable with each other.

Also, the terms **agency theory** and **information asymmetry** are used when discussing the effects of a spin-off to stock price development. In this thesis, **agency theory** focuses on the managerial aspect within the original company. Managers for the original company may not operate in the best interest of the subsidiary, which will be spin-offed. This issue may be solved through a spin-off.

**Information asymmetry** is often referred to as a situation in which the other party has more accurate information than the other. In this research, information asymmetry focus on the difference in profitability and operating efficiency between the operations

of the parent company. This may result in a misvaluation of the company's securities by the markets.

Another important concept for this thesis is **abnormal returns**, which measure the differences between the investor's actual returns compared to the expected returns. Other terms used for the concept are abnormal returns or outperformance compared to the market. This research includes also **risk-adjusted returns**, which are the company or market returns subtracted by the corresponding risk-free rate.

## 1.5 Delimitations

There are many interesting types of corporate divestitures, such as equity carve-outs and split-offs to be studied. However, this research is limited only to the spin-offs due to the nature of the data. In spin-offs, the performance of retained and divested subsidiaries can be observed in both pre-and post-spin-off phases. This would not be possible with other types of divestitures. (Daley et al 1996) However, this research will focus only on abnormal returns against the market return rather than analyzing the performance of an original company to a parent and spin-off company.

It was an intentional decision to limit data for this research to only one market: the Nasdaq Helsinki despite the small sample size. The decision was made due to the writer's interests. Another option would have been to add data from other Nordic markets. However, by excluding data from the other Nordic markets, this research would provide a more comprehensive and insightful description of the phenomenon under certain conditions instead of a more generic one. In case the phenomenon is not clear enough, this small sample size might not provide reliable results. Additionally, any significant outliers may distort the results.

Furthermore, the original data sample included spin-off companies that were listed on other exchanges than Nasdaq Helsinki. Despite a fact that other researchers (see e.g. Veld & Veld-Merkoulova, 2004) have included cross-border spin-offs, these

companies were decided to be left out. Also, Finnish companies listed in the Nasdaq First North list were excluded due to the obligation for reportage and improved transparency of the companies listed on the main list. This would improve the accuracy of the results.

## 1.6 Structure of the thesis

The rest of this thesis is structured as follows: the second part goes through a theoretical framework including an efficient market hypothesis and financial market anomalies. The third section introduces methods and tools used to measure abnormal returns including the capital asset pricing model (CAPM) and Jensen's alpha, which were chosen to be the applicable methods for this research. The fourth section introduces different types of corporate divestitures and motives for spin-offs. The fifth section is a literature review concerning research on the effects of spin-offs on stock price development.

The sixth section presents the chosen methodology for this research followed by the data selection and collection process and data sample characteristics (section 7). Section 8 includes the empirical analysis and results of the research. Section 9 concludes the study with a discussion regarding the key takeaways and a review of research questions. Lastly, the limitations of this research and insights for further research are discussed. Table 1 below presents the structure for this research including section titles and the main content discussed.

Table 1 Thesis structure

INTRODUCTION	<ul style="list-style-type: none"><li>• Background, focus, and research objectives</li><li>• Research questions</li><li>• Key concepts and delimitations</li></ul>
THEORETICAL FRAMEWORK	<ul style="list-style-type: none"><li>• Efficient market hypothesis</li><li>• Financial market anomalies</li></ul>
MEASURING ABNORMAL RETURNS	<ul style="list-style-type: none"><li>• Capital Asset Pricing Model (CAPM)</li><li>• Jensen's Alpha</li></ul>
CORPORATE DIVESTITURES	<ul style="list-style-type: none"><li>• Types of divestitures</li><li>• Motives for spin-offs</li></ul>
EFFECT OF A SPIN-OFF TO SHARE PRICE DEVELOPMENT	<ul style="list-style-type: none"><li>• Literature review of the relationship between spin-offs and abnormal returns</li></ul>
METHODOLOGY	<ul style="list-style-type: none"><li>• Analysis methods</li><li>• Risk-adjusted returns</li></ul>
DATA	<ul style="list-style-type: none"><li>• Data selection and collection</li><li>• Data sample characteristics</li></ul>
RESULTS	<ul style="list-style-type: none"><li>• Returns against OMXHGI</li><li>• Jensen's Alpha</li></ul>
DISCUSSION AND CONCLUSION	<ul style="list-style-type: none"><li>• Main findings</li><li>• Comparison to previous research</li><li>• Conclusion</li></ul>
LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH	<ul style="list-style-type: none"><li>• Limitations</li><li>• Recommendations for further research</li></ul>

## 2 THEORETICAL FRAMEWORK

This section provides theoretical background of the key concepts for this research. First, the efficient market hypothesis (EMH) and its forms are discussed in the light of risk-adjusted abnormal returns. EMH works in a central role in this research as if the markets were efficient, arbitrage opportunities would not exist. However, there are certain inconsistencies in the markets, which may result in mispriced asset prices. These inconsistencies are called financial anomalies. Anomalies are the most important and central phenomenon of this research and will be discussed in-depth later in this section.

### 2.1 Efficient market hypothesis

Efficient market hypothesis (EMH) as a term has been widely debated in financial literacy for the past decades. It was first presented by Fama (1970), who argued that stock prices should reflect all available information and thus gaining risk-adjusted abnormal returns or “beating the market” is not possible. As a result, both technical and fundamental analyses are useless to gain abnormal returns or exploit arbitrage opportunities.

A theory of random walk is closely tied with the efficient market hypothesis. In random walk, stock price changes are random and independent of past changes. According to the random walk theory, stock prices adjust immediately to any new information and therefore stock price changes in the coming days are only the result of new information on that point rather than a dependency on past days' stock price changes. (Malkiel 2003)

Fama (1970) argued that stock prices should reflect all available information at the current state of point. Assumptions for EMH states that investors cannot constantly earn positive abnormal returns. However, it might irregularly be possible. In addition, there are no transactions costs or taxes and all market participants should have

costless access to the information. Investors should be rational with homogenous expectations.

Consistent with Fama, Modigliani and Miller (1958) also assumed that investors behave rationally aiming at profit maximization. There are many active, rational investors aiming at profit maximization in efficient markets. However, due to human nature, not all investors can be rational so there may also be investors, whose investment decisions are irrational. As a result, the trading activities of these two cancels each other out due to the uncorrelated trades. By doing so, there should be no effect on the stock prices.

All market participants have costless access to important information approximately at the same time. The current stock price can therefore be seen to be the best estimation of a business' intrinsic or fundamental value at that point in time. Markets are rational and stock prices react instantly to any new information and therefore gaining continuous abnormal returns over and above markets would not be possible. (Ross et al 2017)

Fama (1970) divided the level of market efficiency into three forms or stages: weak, semi-strong, and strong based on the type and level of information that is available. In the weak form, current stock prices only reflect relevant historical data, such as trading volume and previous stock market price development. As stock prices cannot be used to predict the coming development due to the independency of changes, gaining positive abnormal returns would only be possible by using fundamental analysis or private information. (Latif et al 2011)

In a semi-strong form of market efficiency, stock prices are reflected by the public information as well as past information. Public information may include for instance earnings forecasts, dividends, and stock split announcements. (Yalçın 2010) Thus, gaining abnormal return is possible only by using insider information.

In the strong form of EMH, stock prices include all relevant information: past, public and private. Therefore, beating the market would not be possible if the strong form of EMH held. (Latif et al 2011) EMH has been widely criticized in the financial literature as more and more market inefficiencies and anomalies have been identified.

## 2.2 Financial market anomalies

As mentioned earlier, if EMH holds, gaining positive abnormal returns would not be possible. However, there has been evidence that sometimes a share or a group of shares may perform in a contrary to the arguments of EMH. These inconsistencies are called market anomalies and they work as indicators of market inefficiency. Some anomalies emerge regularly while others may develop only once and then vanish. (Latif et al 2011)

According to Tversky & Kahneman (1986), an anomaly can be seen as “*a deviation from the presently accepted paradigms that is too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system*”. This subsection defines different types of financial anomalies: market anomalies and pricing anomalies and discusses them in light of EMH assumptions.

Many researchers divide financial anomalies into market anomalies and pricing anomalies. In market anomalies, company returns are in contradiction to the assumptions of efficient market hypothesis. Some common market anomalies to be mentioned can be seen for instance small-cap effect. The small-cap effect assumes that companies having smaller capitalization tend to perform better than companies with larger capitalization.

Additionally, spin-off anomaly can be seen as a one form of a market anomaly. In a spin-off anomaly, investors may exploit market opportunities and receive greater returns than what the market on average offers by investing in spin-off companies.

Spin-off activities will be discussed more thoroughly in the coming section of this thesis. In pricing anomalies, an individual asset or a portfolio of securities provides greater returns than predicted by the appropriate pricing model. (Latif et al 2011)

### 3 MEASURING ABNORMAL RETURNS

The purpose of this section is to go through central theories and used methods to define and measure abnormal returns. This research applies Jensen's Alpha to examine whether investing in a portfolio of spin-off companies provides abnormal returns compared to the portfolio of a corresponding market index. Other common tools to measure abnormal returns can be identified as the Treynor measure and the Sharpe Ratio.

Jensen's alpha can be seen as an extension of the capital asset pricing model (CAPM). Therefore, CAPM and its formula are introduced in the first section. The second section presents Jensen's Alpha and its application to measure risk-adjusted returns.

#### 3.1 Capital asset Pricing Model (CAPM)

Markowitz (1952) developed a model of portfolio theory, which can be seen as the first step in the creation of the capital asset pricing model (CAPM). Later on, further Sharpe (1964) and Lintner (1965) developed the model in their asset pricing researches. (Fama & French 2004) Markowitz's portfolio theory (1952) assumes that investors are risk-averse and thus choose to invest in portfolios with the lowest possible variance while maximizing the expected return of a portfolio. He argued that systematic, or market risk cannot be diversified away. Therefore, only the unsystematic, also known as the company risk can be eliminated by diversification.

CAPM measures the relationship between the expected return and the risk of an individual asset. According to the model, the expected return of an individual asset should equal a corresponding risk-free rate and a market risk premium multiplied by the asset's beta. The model presumes that the markets are efficient. (Fama & French, 2004)

The formula for the CAPM can be expressed as follows:

$$R_i = R_f + \beta_i^* (R_m - R_f)$$

In which,

$R_i$  is the expected return of an individual asset

$R_f$  is the risk-free rate

$\beta_i$  is the beta of an individual asset

$R_m$  is the expected return of the markets

### 3.2 Jensen's Alpha

Jensen's Alpha was introduced by Michael Jensen in 1968 as an extension to the CAPM. The model measures the abnormal return of the portfolio and compares it to the theoretical return provided by the capital asset pricing model. The difference is described in the model by the alpha  $\alpha$ . The formula for Jensen's Alpha can be expressed as follows:

$$\alpha = R_i - (R_f + \beta (R_m - R_f))$$

In which,

$R_i$  is the expected return of an individual asset

$R_f$  is the risk-free rate

$\beta_i$  is the beta of an individual asset

$R_m$  is the expected return of the markets

Like in the CAPM, also Jensen's Alpha assumes that unsystematic risk has been diversified away. Alpha is given in percentages and can be either positive, negative or

zero compared to the corresponding market return. It measures whether a portfolio or an individual asset out-or underperforms in comparison to the market portfolio on a risk-adjusted basis. If an individual asset or a portfolio generate abnormal returns compared to the risk-adjusted market returns, alpha is positive. Counterwise, if the returns of an asset or portfolio are less than the return of the same beta market portfolio, alpha is negative.

Jensen's Alpha is a widely used tool in the financial markets to assess the portfolio performance and it can be used with multiple different assets: shares, bonds, and derivatives, for instance.

## 4 CORPORATE DIVESTITURES

According to Moschieri and Mair (2008), divestitures can be seen as a “*parent company’s disposal and sale of assets, facilities, product lines, subsidiaries, divisions, and business units*”. Usually, divesting assets are non-core for the central business. Different types of corporate divestitures are identified in the literature and will be introduced and discussed in the following sub-sections. The focus will still be on the corporate spin-offs and motives behind the spin-off activities due to their central role in this research.

### 4.1 Types of divestitures

Current literature identifies four different types of corporate divestitures: equity carve-outs, direct sale of assets, corporate split-offs, and corporate spin-offs. This subsection focus on the first three types and corporate spin-offs will be discussed separately.

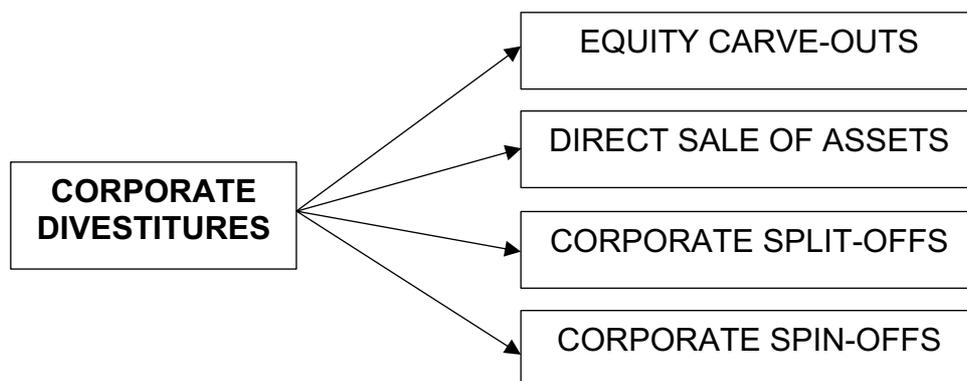


Figure 2 Types of corporate divestitures

In equity carve-out, a company sells a part of its business or a subsidiary through an initial public offering (IPO) to new potential shareholders. Generally, the parent company retains the majority of the shares and thus keeps the management control.

As a result, only a minority of the shares are offered to external shareholders. (Slovin et al 1995) In the direct sale of assets, an original company sells a proportion of its business or a subsidiary directly to the third party. Such rearrangements are usually privately negotiated and thus any information regarding the activities may be hard to find. (Slovin et al 1995)

Both, equity carve-out and direct sale of assets generate cash flows to the parent company. Powers (2001) argued that companies engaging themselves in equity carve outs or direct sale of assets have higher leverage than companies engaging in spin-offs activities. Thus, such companies may need external financing, which could explain their divestiture choice. Furthermore, companies may conduct equity carve-outs over other divestiture methods, if markets are expected to value the subsidiary's equity more favorably than managers. (Slovin et al 1995) On the other hand, Nanda (1991) argued that companies choosing equity to carve out over other models are more likely to be undervalued by the markets. Undervaluation concerns the parent company's equity.

A spin-off is defined as a new entity, that has been created through a pro-rata distribution of the shares to the parent company's shareholders. This means that both the parent company and spin-off company have first the same shareholder base. After the spin-off, a new entity is independent from the parent company and thus has full autonomy. After the spin-off, both companies are traded independently in the markets. (Huson & MacKinnon 2003) Possible reasons why companies may favor spin-offs over other divestiture methods are discussed separately in the section below.

In split-offs a parent company floats its subsidiary and offers its shares to existing shareholders of a parent company in exchange for their current shares. Split-off is similar to a spin-off and the main difference arise from the distribution of the new entity's shares. Whereas in spin-offs the parent company and spin-off company have an identical shareholder structure in a split-off, shareholders relinquish their current shares as an exchange to the shares of a spin-off company.

## 4.2 Motives for spin-offs

Any corporate divestitures activities cause costs to the companies. Unlike other modes of corporate divestitures, spin-off activities do not generate any cash inflow to companies. (Krishnaswami & Subramaniam 1999). Still, there are several reasons why companies engage themselves in spin-off activities. This section examines the motives behind the spin-offs and why companies may choose a spin-off instead of other types of divestitures.

As mentioned already, spin-offs do not generate any cash flows unlike equity carve-outs or direct sale of assets. Therefore, spin-offs may be subject to tax benefits under certain conditions. Such benefits may be one reason why companies would prefer spin-offs over other methods. If a spin-off fills the requirements of the Act on the Taxation of Business Income 52c§, it does not cause any capital gains to the parent company that would be subject to taxes in Finland (Vero 2020).

Furthermore, in case the operations between the initiating and spin-offed company are diverse, both the parent company and spin-offed company might enjoy the economies of scale after the spin-off. This concerns removing negative synergies that will be discussed later on. As a result, both can focus merely on the core operations. Such benefits may arise especially if the parent and spin-off company operate in different industries. (Hite & Owers 1983) This is also called and will be later referred to as cross-industry spin-offs.

Additionally, the improved focus has been argued to be one key driver through mitigation of negative synergies between the parent and the spin-off company. (Schipper et al 1983) Also, Desai and Jain (1999) derived similar findings that companies usually spin-off subsidiaries that underperform. The improved focus has a positive impact on the operational performance of both parent and spin-off companies. Not surprisingly, improved operating performance has been positively correlated with the increased stock prices.

Furthermore, Wallin (2012) proposed that companies with diverse operations may be misvalued by the markets. By engaging in spin-off activities, the overall market value for both: parent and spin-off companies can be improved. Especially in conglomerate companies, sum-of-the-parts methods is often used as a valuation method, which may derive different result than the valuating company as a whole. Quiry & Dallochio (2014) came to similar conclusions that markets may not understand the secondary businesses and thus undervalue them.

Undervaluation is certainly considered to be one key driver for spin-offs when a company is about to raise external capital from the markets. Krishnaswami & Subramaniam (1999) argued that spin-offs could improve companies' access to capital markets by mitigating information asymmetry. Their study found that companies engaging in spin-off activities raised significantly more external capital than their industry peers in the period of two years after the spin-off.

Additional motives identified by the literature are for instance vast operating volatility of subsidiaries or legal and regulatory pressures to separate businesses (Cusatis et al 1993).

## 5 EFFECTS OF A SPIN-OFF TO STOCK PRICE DEVELOPMENT

Many studies have found evidence that a spin-off can lead to abnormal positive returns compared to the markets. Surprisingly, not only the spin-offed companies have beat the market, but also the initiating companies. Cusatis et al (1993) found out that the spin-off companies exceeded the S&P500 index on average by 30 % during their first three years as independent companies. Additionally, also parent companies offer abnormal returns compared to the S&P500 index on average by 18 % during the first three years.

The following subsections will go through the current literature around the theme and scenarios in which circumstances spin-off companies have outperformed compared to the markets. Finally, all research will be summarized, and the research methods used will be discussed more in-depth.

### 5.1 Reactions to spin-off announcements

Many earlier research on the positive abnormal returns provided by the spin-off activities has focused on the parent company and its stock price development at the time when a spin-off has been announced. Neither the performance of the spin-off company nor the parent company's performance after the completion has been included in the research.

Hite & Owers (1983) studied 123 spin-offs executed from 1963 to 1981 in the US and their stock price reactions to the spin-off announcements. The study showed, that on average, parent companies provided 7 % abnormal positive returns. The timeline to be studied was 50 days before the announcement of the completion of the spin-off. However, results varied between the different motivational factors behind the spin-off activities.

Their study divided the spin-offs into three different categories based on the motivational reasons behind the spin-off activities: 1) make a company more attractive and thus facilitate opportunities for a possible merger, 2) removing negative synergies and thus divide operations based on their specialties and 3) challenging operational environment in terms of legal or regulatory difficulties. In addition, the study has a fourth group including companies that did not state any specific reason or the reason was relatively rare, and therefore separate group was not justified.

The first two groups experienced positive abnormal returns (0.116 and 0.145 respectively). Counterwise, the third group provided negative returns for the event period (-0.047). However, when measuring the returns only at the first announcement of spin-off activities, returns for the third group were also positive (0.034). Also, the fourth group showed positive returns for the event period (0.066). Still, for event window -1 to 1 of the spin-off announcement, all groups provided statistically significant positive returns.

Consistently with the earlier results, Schipper & Smith (1983) derived also similar conclusions by examining a total of 177 voluntary spin-offs in the US from 1963 to 1981. Approximately 53 % of the sample companies provided positive abnormal returns to their shareholders. They derived three possible reasons for the abnormal returns.

Firstly, shareholders' wealth could be increased at the expense of bondholders. If the assets are not allocated in the same proportion as debt to the parent and spin-off company, the parent company's bondholder's collateral may be diminished. In addition, approximately 20 % of companies with abnormal returns stated alleviation of regulatory and tax constraints to be a motive for spin-offs. However, neither transferring wealth from the bondholder nor the alleviation of regulatory and tax constraints accounted for the total abnormal returns in the sample.

In addition, separating the parent companies and subsidiaries businesses, allocation of resources, and management focus may be improved. This would lead to improved productivity. Only 22 % of the initiating companies provided abnormal returns

operated in the same industry as the spin-off company. Schipper & Smith argued that separating dissimilarities lead to improved focus and managerial efficiency and thus explains the increase in shareholders' wealth.

Also, a study by Miles and Rosenfeld (1983) focused on the parent company's stock price reaction to the spin-off announcement. Their study included a total of 55 spin-off activities in the US between 1963 and 1980. Overall, the parent company's stock price reaction and its positive adjusted returns were significant during the first trading day after the announcement. Many of the spin-off announcements were published after the trading was ended on that specific day, which might be a reason for such a strong reaction on the next day.

To find out whether the size of a spin-off affects the magnitude of stock price reactions, the sample was divided into sub-samples based on the size of the subsidiary that was spun-off. Large spin-offs constituted the companies, which spin-offed a subsidiary having an equity market value of at least 10 % of the market value of the parent company's common stock as of the spin-off date. Small spin-offs included subsidiaries with less than 10 % of the equity value. Research implied that the larger the spin-offed subsidiary is to the equity value of the parent company, the more significant the abnormal returns for shareholders are. For the whole sample, the cumulative average adjusted return was 22,1 % while for large spin-offs 30 % for the full sample period.

## 5.2 Take-over activities

As mentioned, many earlier research focused only on the abnormal returns provided to the parent company's shareholders. In addition, the timeline was relatively short and focused merely on the pre-spin-off phase and how the stock price reacted to the actual spin-off announcement. Such research excluded any long-term positive abnormal returns for the parent company as well as the stock price development of the spin-off company.

Cusatis et al (1993) focus on the long-term returns of both parent and spin-off companies. They studied spin-offs activities in the US from 1965 to 1988 and returns provided to shareholders for the period up to three years after the spin-off announcement. Both, parent companies and spin-off companies provided positive abnormal returns for the full sample period. However, abnormal returns were claimed to be mainly a consequence of corporate restructuring activities in the post-spin-off phase. Cusatis et al (1993) showed that parent companies were involved in takeover activities fourfold compared to the control groups over three years after the spin-off announcement. Control groups included companies that operate in the same industry with the closest market value at the time of completion of a spin-off. The same number for the spin-off companies was almost threefold compared to the matched peer companies. Surprisingly, only companies associated with takeover activities provided significant abnormal returns for their shareholders. Parent companies or spin-off companies that were not involved in takeover activities after the spin-off announcement provided returns that were not significantly different from zero. Take-over activities can be divided into friendly take-overs and hostile take-overs. However, the nature of the activities was not elaborated in this research.

Following Cusatis et al (1993), Chemmanur and Yan (2004) examined the value-improving characteristics of management. They focus merely on how the probability of takeovers can be increased within the spin-off companies. Their research provided evidence that companies relinquishing control of the spin-offed department, are more likely to be taken over. As such, these companies are likely to provide long-term abnormal returns for their shareholders. Evidence showed that such companies tend to improve their performance even without possible value-improving takeover activities. As already discussed, also Hite and Owers (1983) identified the attractiveness of possible mergers as one motivational driver behind the spin-off activities.

### 5.3 Cross-industry spin-offs

As proposed by Hite & Owers (1983), specialization of the operations may lead to positive abnormal returns for the parent company. A phenomenon has been significant, especially in the situations, in which parent- and spin-off companies' operations are relatively diverse and thus they operate in different industries. Improved focus and removal of negative synergies are argued to be the motives behind the spin-off activities. Consistent with the earlier research, these are associated with increased shareholder wealth.

Similar findings have also been made in some later research. For instance, Daley et al (1996) studied if cross-industry spin-offs provide significant positive abnormal returns compared to the same-industry spin-offs at the time of the spin-off announcement. The study included a total of 85 completed spin-offs in the US between the years 1975 and 1994 with a timeline of two years before and two years after the spin-off year.

Overall, the sample provided positive abnormal returns of 3,4 %, which is consistent with the earlier research [See (Hite & Owers 1983) and (Schipper & Smith 1983)]. The sample was divided then into cross-industry spin-offs and same-industry spin-offs. A total of 60 spin-offs were categorized as cross-industry spin-offs and 25 as same-industry spin-offs. Cross-industry spin-offs offered abnormal returns on average of 4,3 % (significance level of 1 %) compared to same-industry spin-off abnormal returns of 1,4 % (insignificant at a level of 10 %). It seems that cross-industry spin-offs created almost all of the abnormal returns for the entire sample.

Surprisingly, only the parent companies provided abnormal returns in the cross-industry spin-offs. This can be seen as a result of the increased corporate focus and management efficiency. Therefore, management can focus on leading the core operations resulting in improved operating performance and thus return of assets (ROA). There was only a little evidence that cross-industry spin-offs create value also to spin-off companies' shareholders.

Also, Desai and Jain (1999) concluded that companies' spin-offing units in different industries tend to outperform the market in the long run compared to the companies divesting units operating in the same industry. The findings prove that improved focus is also positively related to improved operating performance. The research was conducted in the US between the years 1975 and 1991 with a sample size of 155 spin-offs. A total of 111 parent companies were categorized as focus-increasing spin-offs and 44 companies as non-focus increasing spin-offs. For a three-year sample period, focus-increasing spin-offs gained abnormal returns of 33,36 % while non-focus increasing spin-offs resulted in -14,34 % for the same sample period. Overall, returns provided by focus-increasing spin-offs seem to be in line despite differences in methods.

#### 5.4 Information asymmetry

One reason argued to be behind the abnormal returns of spin-off companies has been the mitigation of information asymmetry in the markets. Krishnaswami and Subramaniam (1999) argued that spin-offs eliminate the market's information asymmetry regarding the profitability and efficiency of the operations of individual departments of companies. Markets may misvalue companies due to the information asymmetry as the value of individual units is misunderstood. Information asymmetry is significantly reduced after the completion of a spin-off. They also found out that companies engaging themselves in spin-off activities usually have greater information asymmetry than their peer companies.

Huson and MacKinnon (2003) studied the information asymmetry between investors. Their study showed that spin-offs accumulate information asymmetry among investors. Informed investors benefit at the expense of uninformed investors, which is a consequence of the increase in idiosyncratic volatility. This may lead to the positive development of a stock price. Information asymmetry increases especially if the parent and spin-off companies operate in different industries. An increase in information

asymmetry is mainly due to the increased transparency within the companies and thus informed investors' information became more valuable.

Similarly, Habib et al (1997) discussed also information asymmetry between informed and uninformed investors and managers of companies. Due to spin-off activities, the number of individual shares traded in the market increases. This would improve the informativeness of the market's pricing system. As a result, managers can make better decisions regarding investments. Furthermore, uninformed investors would not as easily misvalue the assets. These benefits would lead to an increase in company value.

## 5.5 European spin-offs

As seen from the previous subsections, previous literature regarding the effects of spin-offs focuses mainly on the US markets. Unlike in Europe, spin-offs have played a common part in a corporate restructuring in the US already in the 1950s. However, within the past few years, few studies have also focused on the European markets as spin-offs have also become more popular in Europe. Most studies still excluded Eastern Europe due to data availability restrictions.

Kirchmaier (2003) focused on both short-term and long-term implications of the spin-offs executed in Europe for the period between 1989 and 1999. The total number of spin-offs included in the research was 48. Consistent with the studies from the US, the announcement effect was visible. Spin-off companies gained on average abnormal returns of 4,1 % for 0, 1 day and 6,1 % for – 2 to 1 days (significance level of 1 %). In addition, the study included also long-term effects of the stock price performance. On average, the sample outperforms markets by 4 % for the three years after the spin-off announcement. However, these results were statistically insignificant.

Furthermore, performance differed between the parent and spin-off companies. While spin-off companies provided statistically significant positive abnormal returns of

approximately 17 % for three years after the spin-off, parent companies lagged – 5,9 % behind the market, although the latter return difference was statistically insignificant.

Also, Veld & Veld-Merkoulova (2004) research the short-term implications of the spin-offs in the European markets. Their study included a total of 156 spin-offs that were conducted between 1987 and 2000. The sample included spin-offs, in which a parent company is a European and the divesting unit can be either from the same or from a different country. The United Kingdom was heavily represented with 45 % of the sample followed by Sweden (15 %), Germany ( 9 %), and Italy ( 7 %). The research resulted in an abnormal return of 2,66 % for three day-window. However, in the long-run European companies were not able to provide returns significantly different from zero after a spin-off.

The study included three proxies, which could result in abnormal returns: increased industrial focus, information asymmetry, shareholder rights, geographical focus, and relative size. It seems that there is a positive relationship between the abnormal returns and companies divesting a unit in a different industry. Other proxies did not significantly affect the abnormal returns. These results are undeviating with research from the US markets stating that companies engaging in focus-increasing spin-offs or cross-industry spin-offs tend to provide greater returns than those classified as same-industry spin-offs.

Qian and Sudarsanam (2007) studied a spin-off announcement effect and long-term implications up to three years after the spin-offs. The study includes a total of 170 European companies entitled to spin-off activities from 1987 to 2005. Their research found evidence that parent companies engaging themselves in spin-off activities have more likely weaker corporate governance than their control companies.

For short-term implications, the spin-off announcement effect resulted in a CAAR of 4,82 % over a three-day window (-1, 1). Furthermore, long-run performance was observed between 1987 and 2002 to have the three-year post-spin-off phase. Consistent with Veld and Veld-Merkoulova (2004), abnormal positive returns are earned mainly around the announcement, whereas long-term, either parent or spin-off

companies did not earn any abnormal returns for the full sample. However, in line with studies from the US [see e.g. (Cusatis et al 1993) and (Chemmanur and Yan 2004)], possible takeover activities seem to have a positive relationship with abnormal returns in Europe as well.

## 5.6 Summary

Overall, most of the research was conducted as an event study, which is a suitable method for detecting an effect of an identifiable phenomenon, such as spin-off, on a financial variable, such as stock returns. An event study is a very common tool to detect abnormal returns for spin-off companies. Event windows for central studies for the field of research differ to some extent. Most research has focused on the short-term effect of a spin-off announcement. However, few researchers have extended event window up to five years.

Short-term implications and spin-off announcement effect are measured in a typical three-day event window (-1, 1) and cumulative average abnormal returns are measured for the period. Long-term effects are investigated with the Buy-and-Hold abnormal returns (BHAR) methodology.

Additionally, many researchers used the market model approach, which is probably the most common model to gauge abnormal returns. (Brooks 2014) Earlier research used ordinary least squares (OLS), which assumes that the expected return of an individual asset is a linear function of a market portfolio return, in other words, there should be a stable linear relationship. Other methods used are for instance mean-adjusted return approach (MAR) or matched-firm-adjusted returns.

Following Table 2 demonstrates the central research for the topic focusing on a short-term, spin-off announcement effect. It includes research methods, cumulative average abnormal returns, and event windows. As can be seen, most of the research has focused on the US markets, and only a few addressed European markets. However,

the results after the spin-off announcement seem to be relatively similar in both continents. All studies documented positive abnormal returns compared to the corresponding market indices.

Table 2 Research focusing on short-term implications

<b>Researcher</b>	<b>Year</b>	<b>Region</b>	<b>Sample size.</b>	<b>Time frame</b>	<b>Method</b>	<b>CAAR</b>	<b>Event window</b>
Hite & Owers	1983	US	123	1963-1981	OLS	+ 7 % + 3,3 % ***	-50, 0 -1, 0
Schipper & Smith	1983	US	177	1963-1981	OLS	+ 2,8 % ***	-1, 0
Miles & Rosenfeld	1983	US	55	1963-1980	MAR	+ 3,3 % *** + 7,6 % ***	-1, 0 -10, 0
Daley et al	1996	US	85	1975-1994		+ 3,4 % ***	-1, 0
Desai & Jain	1999	US	144		Matched firm	+ 3,8 % ***	-1, 1
Krishnaswami & Subramaniam	1999	US	113	1978 - 1993	CLR	+3, 3 % ***	-1, 1
Kirchmaier	2003	EU	48	1989-1999	MAR	+ 5,4 % ***	-1, 1
Veld & Veld-Merkoulova	2004	EU	156	1987-2000	Matched firm	+ 2,6 % ***	-1, 1
Qian & Sudarsanam	2007	EU	170	1987-2005	Matched firm	+ 4,8 % ***	-1, 1

Significance levels for the results provided in the table above are as: \* significance level of 10 % ( $p < 0,1$ ), \*\* significance level of 5 % ( $p < 0,05$ ) and \*\*\* significance level of 1 % ( $p < 0,01$ )

Additionally, many researchers have focused on the long-term implications. Consistently with studies focusing on short-term returns, nearly all studies documented abnormal returns. However, it is notable that while US studies have reported relatively high CAARS, abnormal returns from European spin-offs have been negative or insignificantly different from zero. Table 3 goes through the studies included in the literature review focusing on the long-term implications.

Table 3 Research focusing on long-term implications

<b>Researcher</b>	<b>Year</b>	<b>Region</b>	<b>Sample size.</b>	<b>Time frame</b>	<b>Method</b>	<b>CAAR</b>	<b>Event window</b>
Cusatis et al	1993	US	146	1965 - 1988	Matched-firm	+ 4,7 % + 18,9 % ** + 13,9 %	0, 1 year 0, 2 years 0, 3 years
Desai & Jain	1999	US	155	1975 - 1991	Matched-firm	+ 7,7 % + 12,7 % + 19,8 %	0, 1 year 0, 2 years 0, 3 years
Kirchmaier	2003	EU	34	1989 - 1999		+ 1,3 % + 2,6 % - 0,3 %	0, 6 months 0, 1 year 0, 2 years
Veld & Veld-Merkoulova	2004	EU	61	1987 - 2000		- 2,33 % + 4,24 % + 2,01 %	0, 1 year 0, 2 years 0, 3 years
Qian & Sudarsanam	2007	EU	99	1987 - 2002		- 2,0 % + 7,0 % + 2,0 %	0, 1 year 0, 2 years 0, 3 years

Significance levels for the results provided in the table above are as: \* significance level of 10 % ( $p < 0,1$ ), \*\* significance level of 5 % ( $p < 0,05$ ) and \*\*\* significance level of 1 % ( $p < 0,01$ )

## 6 DATA

The purpose of this section is to present the fundamental data selection process, data collection methods, and sources used to complete the empirical analysis part of this research. The first part introduces the data selection process, data collection methods used as well as the sources. Lastly, the second part provides insights into the data sample characteristics.

### 6.1 Data selection and collection

This section will review the data selection and collection processes used in this research. Figure 3 demonstrates a total number of spin-offs conducted on the Nasdaq Helsinki since 1994 per year. Later on, this section specifies why certain spin-offs have been excluded. As can be seen, almost 40 % of all spin-offs conducted were before the year 2002.

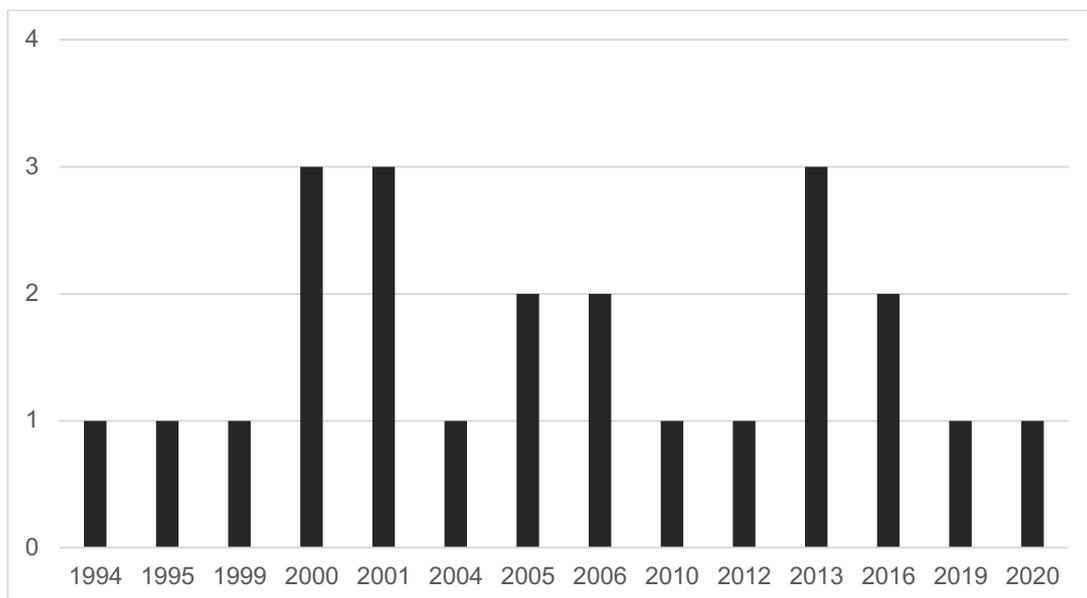


Figure 3 Number of spin-offs per year, Nasdaq Helsinki

The data selection process for this research follows the criteria below. A number of excluded companies is stated in the parenthesis.

1. Data availability: parent or spin-off companies do not have daily stock price information in the used databases. Furthermore, if OMXHGI or 1 month-Euribor rates were not available for the specific holding periods, companies were excluded. In addition, companies were excluded, if data authenticity and reliability were questioned. (23)
2. A company associated with other spin-off activities: the company was excluded if the company spin-offed another unit during the sample period. If the sample periods did not overlap, observations were decided to keep in the study. (0)
3. Overlapping activities: parent or spin-off companies decided to leave out of the study if they were involved in other activities, such as mergers and acquisitions during the observation period, which could have an impact on the stock price development. (1)
4. Spin-off companies were excluded in case they were not listed on Nasdaq Helsinki main list or were listed in another country than Finland. (2)
5. The company (either parent or spin-off) was delisted during the predefined holding periods. (0)
6. The spin-off was not completed by the end of the year 2020. (0)

The initial amount of spin-off activities identified in the Nasdaq Helsinki for the period 1994 – 2020 was 23. As this research extends to as early as the beginning of 1990, accurate data was relatively hard to discover for all: stock prices, indices, and risk-free rates. In addition, many databases only have historical stock price data for the past 20 years or did not include delisted companies. As a result, all companies conducting spin-off activities before the year 2002 were excluded from this research.

Unfortunately, a relatively large proportion of spin-off activities conducted on Nasdaq Helsinki happened during that timeline.

In addition, there were other restrictions on data availability and thus, a total of three parent companies and two spin-off companies were also excluded from the sample. Furthermore, one parent company was associated with more than one spin-off activity. However, in this case, observation periods did not overlap, so the parent company was decided to keep in the research.

Furthermore, one parent company merged with another company on the same day as the spin-off was completed. This parent company was removed from the sample to improve the reliability of this research. Possible abnormal returns could have been a result of a spin-off or a merge, which would distort the results. Also, two spin-offed companies were either not listed or listed outside Finland, which were removed. Some earlier research included also cross-border spin-offs. However, in this case, they were decided to be excluded due to the difference in currencies, index, and risk-free rates. The final data sample used in this research is 10 for parent companies and similarly 10 for spin-off companies. Still, this research includes companies whose corresponding parent or spin-off companies are excluded.

Market data, including stock prices and market index, were obtained mainly from the Thomson Reuters DataStream, Eikon Refinitiv, Investing.com, Nasdaq, Trading Economics, and Yahoo Finance online databases. 1-month Euribor rates are obtained from the Bank of Finland and Eikon Refinitiv databases. This research includes also some categorical variables, such as industry codes. Morningstar classifications were used for that purpose.

## 6.2 Data sample characteristics

Data used in this research consist of mainly stock prices for parent companies and spin-offed companies, daily prices for OMXHGI index, and 1-month Euribor rates for predefined holding periods.

Market data includes daily stock closing prices that are adjusted to splits and dividends. According to MacKinlay (1997), studies employing daily stock price data to gauge any abnormal performance against corresponding indices lead to better and more precise results than using monthly, quarterly or annual data. Additionally, using hourly data could lead to any redundant noise, thereby weakening the statistical significance of the results.

Table 4 below demonstrates the annual distribution of spin-off activities on Nasdaq Helsinki. The table also includes spin-offs, in which either parent company or spin-off company was decided to leave out of this research. As can be seen, a number of spin-offs is relatively evenly distributed for the whole observation period. The amount of spin-off activities is unfortunately small, which may cause issues with the reliability of the results.

*Table 4 Number of spin-offs per year*

<b>Year</b>	<b>Number of spin-offs</b>
2004	2
2005	1
2006	2
2010	1
2012	1
2013	2
2014	1
2019	1
2020	1
<b>Total</b>	<b>12</b>

Data for both parent and spin-off companies have a total of 180 observations for each company. Stock prices and indices are both adjusted for any stock splits and dividends. All companies have been listed in the main list of the Nasdaq Helsinki. As this research focus on the Finnish stock exchange, the currency for stock prices is euro.

This research also includes additional categorical variables, which provide more comprehensive and insightful answers to the research questions. For instance, a binary variable was used to observe whether there was a difference between the returns of a cross-industry or same-industry spin-offs. Following Table 5 describes the number of cross-industry versus same-industry spin-offs for the full sample. To determine sector and specific industries, Morningstar classifications have been used. As can be seen, spin-offs are evenly distributed between cross-industry and same-industry spin-offs.

*Table 5 Cross-industry versus same-industry spin-offs*

<b>Year</b>	<b>Cross-industry spin-offs</b>	<b>Same-industry spin-offs</b>
2004	1	1
2005		1
2006	1	1
2010	1	
2012		1
2013	1	1
2014		1
2019	1	
2020	1	
<b>Total</b>	<b>6</b>	<b>6</b>

Following Table 6 demonstrates the total number of spin-offs per sector. It can be seen that a significant amount of both parent and initiating companies have been classified as industrials or basic material companies.

*Table 6 Number of parent and spin-off companies per sector*

<b>Sector</b>	<b>Number of parent companies</b>	<b>Number of spin-off companies</b>
<i>Industrials</i>	3	4
<i>Technology</i>	1	2
<i>Financial Services</i>	1	0
<i>Basic Materials</i>	3	2
<i>Machinery</i>	1	0
<i>Health Care</i>	1	1
<i>Energy</i>	0	1

More profound analysis of the parent companies and spin-off companies, specific spin-off dates, and used holding periods and sectors and industries can be found in the appendices (appendix 1 and appendix 2).

OMXHGI is used as a proxy for the market portfolio. It is a general index that includes all companies listed in the Nasdaq Helsinki main list regardless of the company's market capitalization or size. Dividends are also assumed to be reinvested. The index gives a comprehensive and overall view of the development of the Nasdaq Helsinki. In addition, the index has been calculated for all predefined holding periods used in this research, which provides equal circumstances for the empirical part of this research and thus improves the reliability.

Figure 4 demonstrates the development of the index for the full sample period 2002 – 2022. The drift has been more or less inclining in spite of the periods of the financial crisis 2007, the euro crisis of 2011, and lastly the COVID-19 crisis.

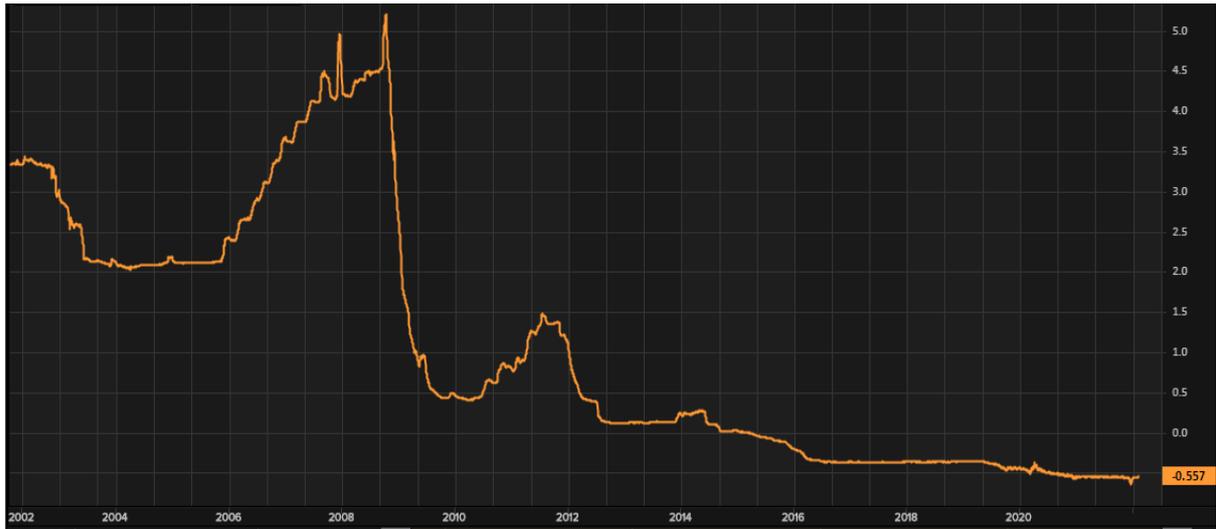


Source: Refinitiv Eikon 2022

Figure 4 Development of OMXHGI between 2002 – 2022

1-month Euribor rate is used as a risk-free rate for the corresponding observation periods. Generally, interest rates with short maturity are seen as excellent proxies for risk-free rates due to their riskless nature. Euribor rates are a natural choice for European studies. Yield rates are calculated daily, so required data is available for the full sample.

Figure 5 will represent the development of the 1-month Euribor for the 21st-century. Yield rates have had a declining trend line. Similarly, to the development of OMXHGI, the financial crisis of 2007 and euro crisis in 2011 are clearly visible in the chart and rates declined dramatically especially in 2009 from approximately 5 % to 0,5 %. For the past 7 years, rates have been negative.



Source: Refinitiv Eikon 2022

Figure 5 Development of the 1-month EURIBOR rates between 2002 – 2022

## 7 METHODOLOGY

### 7.1 Analysis methods

Many earlier researches used event studies as applicable methods. However, in this research it would not have been a suitable option as this research does not include any pre-spin-off phase. This research measures only any abnormal returns for parent or spin-off companies against the corresponding market index for a certain observation period in post-spin-off phase. Pre-defined holding periods for which any abnormal returns are studied are +5 days, +10 days, +30 days, +60 days, +90 days, and +180 days after the completion of the spin-off. Each holding period includes only trading days, so any weekends or holidays are excluded.

Day 1 will be the first day the spin-off company is traded independently. Such a period was chosen to get a comprehensive and reliable picture of the phenomenon. It measures any short-term implications of the spin-off event to both initiating and spin-off companies. Still, the longest observation periods are reasonable long to mitigate any possible daily stock price deviations. First, company returns are compared against OMXHGI to see any percentage difference between the returns. Abnormal returns are then calculated on a daily basis for the whole sample period by utilizing Jensen's Alpha.

Null hypothesis for this research is determined as follows:

*H<sub>0</sub>: Spin-off companies or their parent companies do not offer positive abnormal returns against the market return.*

## 7.2 Risk-adjusted returns

Many earlier research use market model approach to gauge any abnormal performance of parent and spin-off companies against the corresponding market index. However, a suitable approach for this research was chosen to be an economic model and possible abnormal returns compared to the markets are measured with Jensen's alpha. The method was introduced more in-depth in Section 3, measuring abnormal returns. Jensen's alpha has been widely used in the field of finance to detect risk-adjusted abnormal returns of financial securities compared to returns from the market portfolio.

Risk-adjusted abnormal returns for both parent and spin-off companies are measured with Jensen's Alpha. The study was conducted by utilizing the Microsoft Excel tool and its linear regression function to find out the corresponding alphas. Jensen's alphas are calculated for 5 days, 10 days, 30 days, 60 days, 90 days, and 180 days holding periods by using the daily logarithmic returns. Regression function provided also r squared and corresponding p-values for alphas. P-values measure the statistical significance of abnormal returns.

Furthermore, instead of arithmetic returns, the logarithmic return form was decided to be used for both stock market returns and the index. By doing so, the variance of the returns could be reduced, and market data could be interpreted as continuously compounding returns. Company and index returns were turned into logarithmic in Microsoft Excel by utilizing the LN function as follows:

$$= LN (P_t / P_{t-1})$$

in which

LN is Microsoft Excel's function for logarithm

P = price of an individual asset or index

T = time

## 8 RESULTS

### 8.1 Returns against OMXHGI

To get a comprehensive picture of the returns, abnormal returns compared to the OMXHGI index were computed for both parent and spin-off companies. Figure 6 demonstrates the overall view of parent companies' performance against the index. In general, the sample was divided relatively evenly for companies that outperform against the index and for those that underperform. Notably, 80 % of parent companies still performed worse than the index for a 5 day holding period. For other holding periods, differences were not significant.

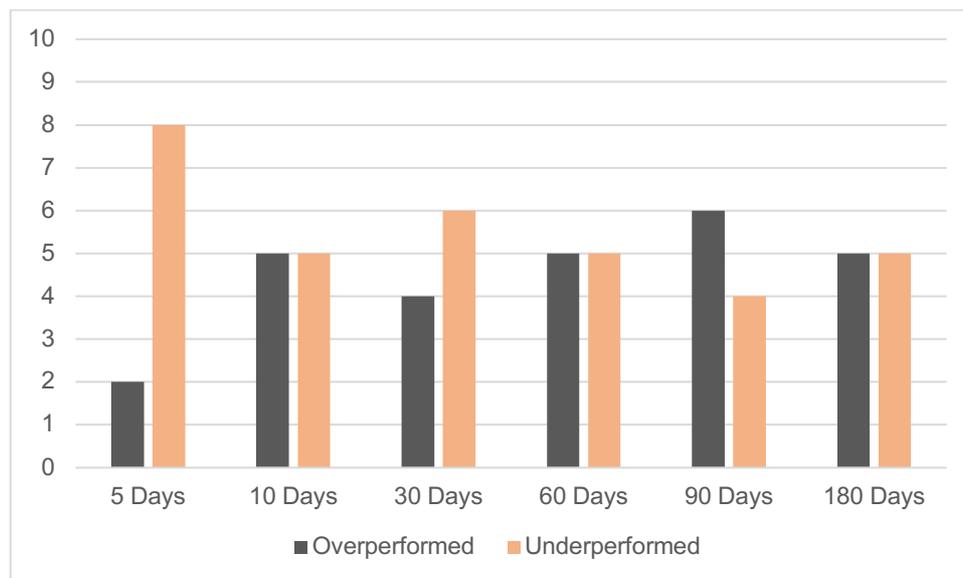


Figure 6 Performance against the index, parent companies

Similar values were also conducted for spin-off companies and can be found in Figure 7 below. Results seem to be in a contradiction to parent companies' performance. While most of the parent companies underperform against OMXHGI, the performance of spin-off companies is the opposite. The majority of spin-off companies outperform the index for almost all holding periods, with an exception of the 30 day holding period, where 5 companies outperform and 5 underperform. For other holding periods, 60 % - 90 % of spin-off companies performed better than the OMXHGI.

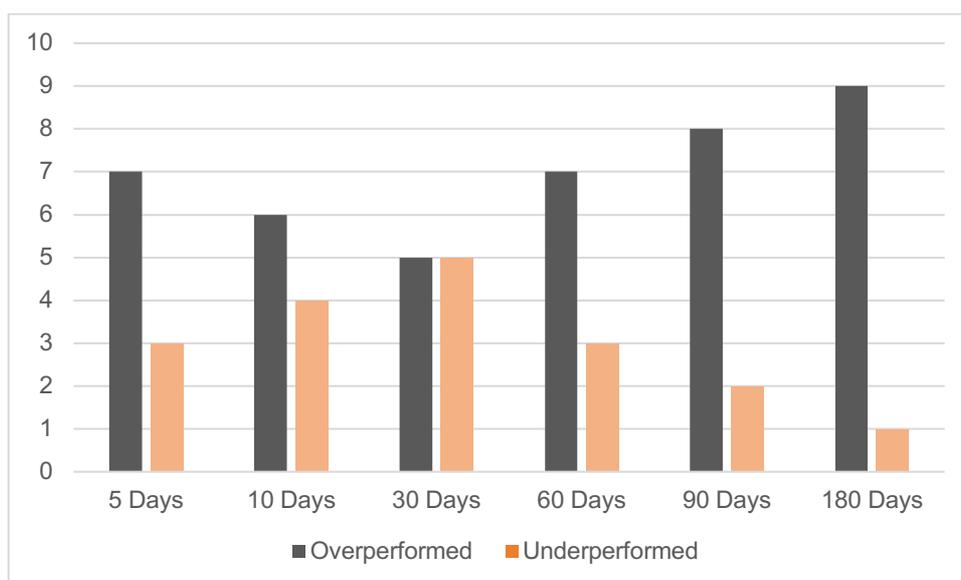


Figure 7 Performance against the index, spin-off companies

To get a more insightful and comprehensive view of the returns, minimum, maximum, median, and average returns against OMXHGI were calculated for each observation period. Results are presented separately for parent companies and spin-off companies in Tables 7 and 8.

Table 7 Returns compared to the index, parent companies

	5 Days	10 Days	30 Days	60 Days	90 Days	180 Days
<b>Minimum</b>	-25,75 %	-30,84 %	-38,92 %	-44,22 %	-49,79 %	-58,02 %
<b>Maximum</b>	7,28 %	10,72 %	19,17 %	29,54 %	28,93 %	46,73 %
<b>Median</b>	-1,47 %	-1,13 %	-4,07 %	-1,78 %	3,22 %	0,56 %
<b>Average</b>	-4,55 %	-6,63 %	-7,37 %	-2,64 %	-2,33 %	-4,85 %

It can be seen that parent companies did not gain any positive abnormal returns on average compared to OMXHGI in any holding periods meaning that the index

performed better than the company in each holding period. Companies performed relatively worse in the shorter holding periods and after 60 days, differences somewhat diminished to only a few percent. When looking at median positive abnormal returns, values for 90 and 180 day holding periods were positive. The difference between the minimum and maximum values is significant indicating high variance in the performance of companies. Also, relatively significant differences between the minimum and the maximum values for all observation period indicates the high variance. Notable is that none of the parent companies were able to gain positive abnormal returns compared to the index for all observations period.

*Table 8 Returns compared to the index, spin-off companies*

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
Minimum	-11,42 %	-12,98 %	-9,87 %	-15,90 %	-11,83 %	-4,51 %
Maximum	24,11 %	35,19 %	33,95 %	27,32 %	30,48 %	38,18 %
Median	4,54 %	5,52 %	-1,21 %	8,98 %	18,25 %	6,96 %
Average	5,28 %	6,88 %	3,86 %	7,12 %	15,65 %	12,32 %

Opposite to parent companies, spin-off companies gained positive abnormal returns compared to OMXHGI in all holding periods meaning that companies outperformed against the index. Especially in 90 day and 180 day holding periods, spin-off companies gained positive abnormal returns of approximately 15 and 12 % on average against the OMXHGI respectively.

Also, median returns have a relatively similar trend to average returns. Additionally, minimum returns for spin-off companies were not as worse as for parent companies while maximum returns exceeded in almost all holding periods. Additionally, none of the spin-off companies underperform against the index for all holding periods and a total of three companies (Neste Oyj, Tikkurila Oyj, and Neles Oyj) outperformed against the index in all holding periods.

Many earlier studies argued that abnormal returns may be a result of the mitigation of negative synergies. This is the case especially if the parent and spin-off companies worked in different industries. As said, average returns against the index were calculated also for same-industry spin-offs and cross-industry spin-offs to find out whether synergy benefits may explain the outperformance also in the Nasdaq Helsinki. Morningstar classifications are used to divide spin-off activities between cross-industry and same-industry spin-offs.

Parent companies' returns against the OMXHGI classified as same industry and cross-industry spin-offs can be shown in Table 9. The total number of spin-offs classified in the same industry was six and four for companies classified as cross-industry. The first line represents the same industry spin-offs and the second line cross-industry spin-offs. Average returns are in relative line with overall results. However, it seems that parent companies divesting spin-offs in different industries seem to perform worse than those parent companies, which operate in the same industry as the spin-off divested. This is in contradiction with the earlier studies.

*Table 9 Parent companies' performance against the index, same and cross-industry spin-offs*

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Minimum</b>						
same	-12,54 %	-12,74 %	-27,10 %	-17,31 %	-26,45 %	-46,07 %
cross	-25,75 %	-30,84 %	-38,92 %	-44,22 %	-49,79 %	-58,02 %
<b>Maximum</b>						
same	2,89 %	3,39 %	16,70 %	22,63 %	28,93 %	31,01 %
cross	7,28 %	10,72 %	19,17 %	29,54 %	21,91 %	46,73 %
<b>Median</b>						
same	-0,62 %	0,57 %	-1,22 %	-1,78 %	3,22 %	-6,65 %
cross	-5,63 %	-15,37 %	-18,05 %	-7,31 %	0,71 %	0,56 %
<b>Average</b>						
same	-2,62 %	-2,57 %	-2,97 %	0,49 %	0,52 %	-6,38 %
cross	-7,43 %	-12,71 %	-13,96 %	-7,32 %	-6,61 %	-2,54 %

Table 10 presents how the performance against the index differed between cross-industry and same-industry spin-offs. The total number of same-industry spin-offs is six and cross-industry four. Consistently with the previous table, the same industry spin-offs are in the first line and cross-industry spin-offs in the second line. It is notable that cross-industry spin-offs seem to outperform same-industry spin-offs mainly in short holding periods (1 to 60 days), on average. Performance of same industry spin-offs on the other hand is significantly better in longer holding periods (90 day and 180 day), on average.

*Table 10 Spin-off companies' performance against the index, same and cross-industry spin-offs*

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Minimum</b>						
same	-11,42 %	-12,98 %	-9,87 %	-10,76 %	-5,34 %	-4,51 %
cross	-2,37 %	-1,52 %	-4,26 %	-15,90 %	-11,83 %	1,51 %
<b>Maximum</b>						
same	21,53 %	22,03 %	11,88 %	18,10 %	30,48 %	38,18 %
cross	24,11 %	35,19 %	33,95 %	27,32 %	27,85 %	13,52 %
<b>Median</b>						
same	1,57 %	3,21 %	-5,65 %	8,98 %	19,15 %	13,26 %
cross	9,20 %	11,47 %	7,44 %	16,80 %	18,25 %	6,96 %
<b>Average</b>						
same	2,12 %	2,03 %	-1,00 %	4,37 %	17,33 %	15,71 %
cross	10,03 %	14,16 %	11,14 %	11,25 %	13,13 %	7,24 %

Generally speaking, it can be stated that investing in spin-off companies could be seen as a good strategy for investors to receive abnormal returns from the markets. Opposite, investing in parent companies do not bring a similar advantage as the parent companies tend to underperform against the index. More detailed analysis and specific company returns for both parent and spin-off companies against the index can be found from the appendices (Appendix 3 and 4).

## 8.2 Jensen's Alpha

Possible positive abnormal returns for parent and spin-off companies compared to the OMXHGI were also conducted on a risk-adjusted basis by utilizing Jensen's Alpha. 1-month Euribor rate was used as a risk-free rate and was converted into daily returns. This section presents the alphas for both parent and spin-off companies against the OMXHGI. Additionally, alphas are expressed also separately to same industry and cross-industry spin-offs.

Table 11 demonstrates minimum, maximum, median, and average Alphas for parent companies.

*Table 11 Jensen's Alpha for parent companies*

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Minimum</b>	-5,05 %	-3,05 %	-1,41 %	-0,63 %	-0,51 %	-0,29 %
<b>Maximum</b>	2,46 %	1,04 %	0,62 %	0,45 %	0,33 %	0,19 %
<b>Median</b>	-0,18 %	-0,04 %	-0,10 %	-0,01 %	0,09 %	0,02 %
<b>Average</b>	-0,61 %	-0,68 %	-0,21 %	-0,02 %	0,01 %	-0,02 %

Consistent with the average returns against OMXHGI presented above, parent companies received on average negative alphas in nearly all holding periods. Negative alpha interprets that parent companies underperform against the index when taking risk-adjusted returns into account. The only exception is with 90 day-holding period, in which parent companies achieved an alpha of 0,01 % against the OMXHGI. Worse results were identified in 5 day and 10 day holding periods when parent companies achieved an alpha of -0,61 % and - 0,68 % respectively. Overall, alphas for holding periods between 60 to 180 days are not significantly different from zero.

Furthermore, when looking at results on a company level, none of the parent companies on a risk-adjusted basis achieved positive alphas for all observation periods. Outokumpu Oyj on average managed to generate the highest alpha of all parent companies while Sievi Capital Oyj and Cramo Oyj performed worst. Notably, during the 180 day observation period, Boels Top holding N.V announced a public bid on Cramo Oyj's shares, which elevated the stock price almost 30 %. Therefore, when observing only a 180 day holding period, Cramo Oyj received a positive alpha. Detailed company alphas can be found in Appendix 5.

Jensen's Alphas were calculated also for spin-off companies (shown in Table 12).

*Table 12 Jensen's Alpha for spin-off companies*

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Minimum</b>	-3,65 %	-1,81 %	-0,42 %	-0,28 %	-0,11 %	0,01 %
<b>Maximum</b>	6,52 %	2,36 %	0,72 %	0,37 %	0,42 %	0,24 %
<b>Median</b>	1,52 %	0,34 %	0,03 %	0,16 %	0,22 %	0,06 %
<b>Average</b>	1,21 %	0,42 %	0,09 %	0,12 %	0,21 %	0,10 %

In line with earlier results, also Jensen's alphas were positive for spin-off companies in all holding periods. However, when compared to the earlier results, in which company returns were analyzed against the OMXHGI, abnormal returns gauged in a risk-adjusted manner were not as high. The highest alphas were achieved for a 5 day holding period, during which spin-off companies generated an alpha of 1,21 %, on average. Abnormal returns of spin-off companies against the OMXHGI presented earlier had an incremental trend to some extent. However, risk-adjusted returns do not seem to have a similar trend as average returns do not significantly differ between the 10 day and 180 day holding periods. Jensen's Alphas were calculated separately for spin-offs classified as same or cross-industry spin-offs. Detailed results for each holding period are shown in Table 13.

Table 13 Jensen's Alpha for parent companies, same and cross-industry spin-offs

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Minimum</b>						
same	-2,11 %	-1,61 %	-0,92 %	-0,25 %	-0,31 %	-0,27 %
cross	-5,05 %	-3,05 %	-1,41 %	-0,63 %	-0,51 %	-0,29 %
<b>Maximum</b>						
same	0,60 %	0,23 %	0,62 %	0,42 %	0,33 %	0,19 %
cross	2,46 %	1,04 %	0,59 %	0,45 %	0,25 %	0,14 %
<b>Median</b>						
same	-0,18 %	0,11 %	-0,10 %	-0,01 %	0,09 %	0,02 %
cross	-0,48 %	-1,37 %	-0,42 %	-0,09 %	0,03 %	0,00 %
<b>Average</b>						
same	-0,43 %	-0,34 %	-0,08 %	0,03 %	0,05 %	0,00 %
cross	-0,89 %	-1,19 %	-0,42 %	-0,09 %	-0,05 %	-0,04 %

Results are again consistent with earlier findings and average alphas for cross-industry parent companies are negative. Worse alphas were identified in the 5 day and 10 day holding periods (-0,89 % and -1,19 % respectively). For longer holding periods from 30 day to 180 day, alphas improved to a certain extent, still generating negative values but not significantly different from zero. Furthermore, the range between the minimum and maximum values for parent companies classified as cross-industry is relatively larger for all holding periods than for parent companies classified as same-industry spin-offs.

Average alphas for same-industry parent companies are mostly negative. However, 60 day and 90 day holding periods succeeded to gain positive alphas of 0,03 % and 0,05 %. For the 180 day holding period, alpha was 0,00 % meaning companies performed similarly to the OMXHGI on a risk-adjusted basis. Still, the overall results interpreted are not significantly different from zero.

Following Table 14 shows Jensen's Alphas also for spin-off companies, classified as same-industry (a total of 6 companies) and cross-industry (a total of 4 companies) spin-offs.

*Table 14 Jensen's Alpha for spin-off companies, same and cross-industry spin-offs*

	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Minimum</b>						
same	-3,65 %	-1,81 %	-0,42 %	-0,15 %	-0,01 %	0,01 %
cross	-1,63 %	-0,24 %	-0,09 %	-0,28 %	-0,11 %	0,03 %
<b>Maximum</b>						
same	3,82 %	2,36 %	0,35 %	0,26 %	0,42 %	0,24 %
cross	6,52 %	2,15 %	0,72 %	0,37 %	0,34 %	0,09 %
<b>Median</b>						
same	0,88 %	0,40 %	-0,10 %	0,12 %	0,25 %	0,13 %
cross	2,71 %	0,34 %	0,22 %	0,28 %	0,22 %	0,05 %
<b>Average</b>						
same	0,30 %	0,26 %	-0,02 %	0,09 %	0,23 %	0,12 %
cross	2,58 %	0,65 %	0,27 %	0,16 %	0,17 %	0,06 %

Spin-off companies classified as same-industry spin-offs received mainly positive alphas with an exception of a 30 day holding period, which resulted in alpha of -0,02 %. Companies classified as cross-industry managed to receive positive alphas on all predefined holding periods. Still, same-industry spin-offs seemed to outperform cross-industry spin-offs in the long run: for 90 day and 180 day holding periods. Cross-industry spin-offs on average received an alpha of 2,58 % during the first 5 days after the spin-off completion. Otherwise, alphas for both groups were still not significantly indifferent from zero in other holding periods.

Also, Jensen's alphas support the earlier results that investing in spin-off companies may help investors to exploit market opportunities and receive abnormal returns compared to the expected market returns. Greatest returns are offered shortly after the completion of the spin-off. For longer holding periods, returns are seen as more

moderate. Investing in parent companies does not bring a similar advantage to investors. Conversely, it could lead to negative or relatively similar returns to what the market offers.

Detailed analysis of Jensen's alphas for each company, corresponding p-values, and other significant results can be found in Appendix 6. Unfortunately, only a few alphas received a p-value less than 0,05 meaning that overall results cannot be seen as statistically significant (95 % confidence level).

## 9 DISCUSSION AND CONCLUSION

The objective of this research was to find out whether spin-off and parent companies outperformed against market index. OMXHGI index was used as a proxy for the market portfolio. The data sample included a total of 20 spin-offs that were conducted between 2002 – and 2020 and listed afterward to the Nasdaq Helsinki main list. The total number of parent companies was 10 as well as the number of spin-off companies. This research also includes companies, which corresponding spin-off or parent companies were excluded. The decision to add individual companies was made due to the small sample size.

This empirical part of this research was carried out as a quantitative study. The applicable method to detect any positive abnormal returns was chosen to be Jensen's Alpha to measure returns in a risk-adjusted manner. 1-month Euribor was used as a risk-free rate.

Abnormal returns were measured in seven different predefined holding periods: 5 days, 10 days, 15 days, 30 days, 60 days, 90 days, and 180 days. Corresponding alpha values were calculated for each parent and spin-off company separately. In addition, companies were divided into two categories based on whether the spin-off was classified as cross-industry or same-industry. Many earlier research stated that companies dividing a unit in different industries tend to perform better than companies divesting units in the same industry.

Overall, spin-off companies seem to outperform OMXHGI for nearly all holding periods. Consistently with earlier research, returns of companies classified as cross-industry were greater than those classified in the same industry. Results for parent companies were however contrary and no evidence of positive abnormal returns against the market index was found.

## 9.1 Main findings

Due to the relatively small sample size, any outliers would have a significant effect on the results. As said, for instance, alphas for Cramo Oyj were negative for the first five holding periods. However, during the 180 day observation period, Boels Topholding N.V announced a public bid on Cramo Oyj's shares, which elevated the stock price almost 30 %. Additionally, similar findings were made with Neles Oyj. Neles Oyj, classified as a spin-off company received a public bid from Alfa Laval AB during the predefined holding period leading to an increase of Neles Oyj's stock price by approximately 30 %. However, the bid was announced nearly after the completion of the spin-off so a similar effect to Cramo Oyj's case was not visible. Still, these public bids probably had a certain impact on the returns for both parent and spin-off companies.

This research included two main research questions as stated in the first section. In addition, research question 1 included also three sub-questions. Research questions stated for this research were as follows:

### ***RQ1. Do spin-off companies offer positive abnormal returns compared to the markets?***

Based on the empirical analysis of this research, spin-off companies do offer positive abnormal returns to investors compared to the market return. Abnormal returns were identified when analyzing the performance of spin-off companies against OMXHGI considering risk-adjusted returns. Positive abnormal returns were identified during all predefined holding periods.

Returns against OMXHGI were the greatest for longer observation periods: 90 day and 180 day. Compared to the market index, abnormal returns were 15,65 % and 12,32 % respectively. For shorter holding periods (5 day to 60 day), abnormal returns against OMXHGI were 5,28 %, 6,88 %, 3,86 % and 7,12 % respectively.

Furthermore, spin-off companies managed to receive positive alphas for all predefined holding periods. However, when measuring risk-adjusted returns, abnormal returns were not as significant. Average alphas received by spin-off companies were 1,21 %, 0,42 %, 0,09 %, 0,12 %, 0,21 % and 0,10 % for holding periods from 5 days to 180 days respectively. As can be seen, the greatest returns were made during the first 5 days after the completion of the spin-off. After that, returns converge to zero.

***SRQ1.1. Why do companies involve themselves in spin-off activities?***

Motivational factors behind the spin-off decision lie around negative synergies and divided focus between departments. Many earlier research (see e.g. Hite & Owers 1983) argued that by dividing units into different industries, the parent company can remove negative synergies within the company and improve focus. These companies may result in misvaluation by the markets. Benefits raise especially in cross-industry spin-offs.

Additional factors why companies engaged themselves in spin-off activities are for instance legal and regulatory pressure to separate businesses (see Cusatis et al 1993).

***SRQ1.2. Do the returns between same-industry and cross-industry spin-offs differ?***

Returns against OMXHGI and Jensen's alphas were conducted also separately for spin-offs classified as same-industry and cross-industry spin-offs. As said earlier, removing negative synergies was identified to be one of the greatest motivational factors for spin-off activities. Negative synergies lie especially for cross-industry spin-offs.

Average returns for spin-offs classified as same industry against OMXHGI are 2,12 %, 2,03 %, -1,00 %, 4,37 %, 17, 33 % and 15,71 % for all predefined holding periods respectively. Returns are mainly positive, except for the 30 day holding period, during which same-industry spin-off companies performed on average -1,00 % worse than

the OMXHGI. Greatest returns were achieved for 90 day and 180 day holding periods with over 15 % abnormal returns compared to the market index.

Average returns spin-off companies classified as cross-industry against OMXHGI are 10,03 %, 14,16 %, 11,14 %, 11,25 %, 13,13 % and 7,24 % for all holding periods respectively. Companies classified as cross-industry outperform the same industry spin-offs for the first four holding periods from 5 days to 60 days. However, for the last holding periods, the same industry spin-offs seem to offer greater returns.

Jensen's alphas were also conducted separately. Values for same industry spin-offs are 0,30 %, 0,26 %, -0,02 %, 0,09 %, 0,23 % and 0,12 % and for cross-industry spin-offs 2,58 %, 0,65 %, 0,27 %, 0,16 %, 0,17 % and 0,06 % respectively. Trend is similar than with the returns against OMXHGI. Spin-off companies classified as cross-industry spin-offs outperform same-industry spin-offs for holding periods from 5 days to 60 days. However, for 90 days and 180 days, same-industry spin-offs seem to offer greater returns.

### ***SRQ1.3. How abnormal returns are defined?***

There are many different techniques to measure abnormal returns. This research uses Jensen's alpha to detect any risk-adjusted abnormal returns compared to the corresponding market index. In addition, company returns are run against OMXHGI also for all corresponding holding periods.

### ***RQ2. Do also parent companies outperform compared to the market?***

Unlike other research focusing on spin-off anomalies, any evidence of parent companies achieving positive abnormal returns against the market was not found. Overall, average returns against OMXHGI were all negative. However, same-industry parent companies achieved positive returns compared to the index for 60 day and 90 day holding periods. Still, returns were close to zero. Overall returns for parent

companies are -4,55 %, -6,63 %, -7,37 %, -2,64 %, -2,33 % and -4,85 % for predefined holding periods respectively.

When looking Jensen's Alphas for the parent companies, average values are mainly negative (-0,61%, -0,68 %, -0,21 %, -0,02%, 0,01% and -0,02 % respectively). The only exception was with the 90 day holding period when parent companies achieved an alpha of 0,01%. In general, all holding periods received alphas not significantly different from zero. Worse performance was during the 5 day and 10 day holding periods with alphas of -0,61 % and -0,68 %.

Similar results were identified also when same-industry and cross-industry spin-offs were analyzed separately. Average alphas for parent companies classified as same industry are -0,43 %, -0,34 %, -0,08 %, 0,03 %, 0,05 % and 0,00 %. Compared to previous results against OMXHGI, performance is slightly better. For parent companies classified as same-industry corresponding values are -0,89 %, -1,19 %, -0,42 %, -0,09 %, -0,05 % and 0,04 %. Notably, parent companies classified as cross-industry performed worse than those classified as same-industry on average. These results are in a contrary to the previous research.

## 9.2 Comparison to previous research

Earlier research focused mainly on the announcement effect with a holding period ending to +1 day after the spin-off or long-term effects with a holding period of up to three years. Studies focusing on the US markets mainly found evidence from abnormal positive returns for all holding periods, results varied from 4,7 % to 19,8 %. Returns gained by the European companies are however controversial. Abnormal returns are somewhat close to zero for all periods. Returns gained were between -2,33 % to 7 %. Still, many researchers concluded that investors can exploit market opportunities and gain returns greater than the market by investing in spin-off companies. Similar conclusions can also be drawn from this research.

However, some studies focusing especially on the US markets found evidence that also parent companies provide abnormal returns. For instance, Cusatis et al (1993) argued that abnormal returns provided by the parent companies were mainly a result of the restructuring activities after the spin-off and specifically from the takeover activities. Their research proved that parent companies engaging themselves in spin-off activities were fourfold involved in takeover activities compared to their peers with an observation period up to three years after the spin-off announcement. However, parent companies that were not included in takeover activities did not provide significant abnormal returns against the market.

In addition, also companies included in this research have been involved in certain takeover activities. Unfortunately, as the observation period was decided to be relatively short after the spin-off, similar findings were not made. Only Cramo Oyj and Neles Oyj were engaged in public bids during their respective holding periods. However, many other companies were involved in takeover activities after their respective holding periods and were, later on, bought out.

## 10 LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The purpose of this section is to state limitations in this study and give recommendations for further research focusing on the same or similar topic.

As stated already in the introduction, this research was limited to Nasdaq Helsinki in Finland due to the writer's interests. Unfortunately, the number of spin-off activities conducted has been limited to approximately 30 within the past 30 years. Furthermore, many of the spin-offs are conducted at the beginning of 2000s limiting the data sample of this research even more due to the lack of reliable and accurate data. The most restrictive factor for this research was the number of companies. Other researchers from the US have a sample size between 55 to 177. The respective amount for the European studies has been between 34 to 170.

Due to the small sample size, the empirical part of this research is relatively vulnerable to any outliers in the data. To improve the reliability of the results, the sample size needs to be expanded. Thus, I would recommend future research focusing on the same topic to include spin-offs conducted in other Nordic stock exchanges, such as Nasdaq Stockholm, Nasdaq Copenhagen, Oslo Børs, or Nasdaq First North-list. Having also other Nordic spin-offs included would increase the sample size and thus improve the reliability of the results. These marketplaces could be considered a good addition due to the similar economic situation in the countries.

Investing in spin-off companies may help investors to exploit market opportunities and earn abnormal returns on average. Still, this research has a relatively short observation period. Having longer holding periods is one that could be considered for further research. Many spin-off companies also on the Nasdaq Helsinki have received a public bid after a certain time of operating as an independent company. Some earlier research (see e.g. Cusatis et al (1993)) argued that spin-off companies are more likely takeover targets, which may cause their outperformance against the index. By having longer observation periods, the impact of public bids would be examined as well.

Moreover, it would be interesting to see if an announcement effect is also visible for Nordic spin-offs. Unfortunately, listing prices for all spin-offs were not available for all companies included in this research, and thus announcement effect was excluded. Additionally, the first-day effect, i.e., the difference between the opening price and closing price, would also be an interesting topic as many earlier studies have found evidence of its existence. Again, due to restrictions in data, such effects were not considered in this research.

## REFERENCES

Act on the Taxation of Business Income 52 c § (29.12.2006/1424) available at:

<https://www.finlex.fi/fi/laki/ajantasa/1968/19680360#O4P52c>

Brooks, C., (2014) *Introductory Econometrics for Finance 3<sup>rd</sup> Edition*, Cambridge University Press

Chemmanur, T., J., Yan, A. (2004) A theory of corporate spin-offs, *Journal of Financial Economics* 72: 259-290.

Cusatis, P. J., Miles, J. A., Woolridge, J. R. (1993) Restructuring through spinoffs: The stock market evidence, *Journal of Financial Economics* 33: 293-311.

Daley, L., Mehrotra, V., Sivakumar, R., (1996) Corporate focus and value creation: Evidence from spin-offs, *Journal of Financial Economics* 45: 257-281.

Desai, H., Jain, P., C. (1999) Firm performance and focus: long-run stock market performance following spinoffs, *Journal of Financial Economics* 54: 75-101.

Fama, E. (1970) Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance* 25(2): 383-417

Fama, E., French, K., (2004) The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives* 18(3): 25-46

Habib, M., A., Johnsen, D., B., Naik, N., Y., (1997) Spinoffs and information. *Journal of Financial Intermediation* 6: 153-176

Hite, G., Owers, J. (1983) Security price reactions around corporate spin-off announcements. *Journal of Financial Economics* 12: 409-436.

Huson, M., R., MacKinnon, G. (2003) Corporate spinoffs and information asymmetry between investors. *Journal of Corporate Finance* 9: 481-503

Kirchmaier, T. (2003) The Performance Effects of European Demergers. *Centre for Economic Performance Discussion Paper*, 566.

Krishnaswami, S., Subramaniam, V., (1999) Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics* 53: 73-112.

Latif, M., Arshad, S., Fatima, M., Farooq, S., (2011) Market Efficiency, Market Anomalies, Causes, Evidences and Some Behavioral Aspects or Market Anomalies. *Research Journal of Finance and Accounting* 2

MacKinlay A. G. (1997), Event Studies in Economics and Finance. *Journal of Economic Literature* 35: 13-39

Malkiel, B. G. (2003) The Efficient Market Hypothesis and Its Critics. *Journal of Economic Perspectives* 17(1): 59-82.

Markowitz, H. (1952) Portfolio selection. *The Journal of Finance* 7(1):77-91

Miles, J., A., Rosenfeld J., D. (1983) The Effect of Voluntary Spin-off Announcements on Shareholder Wealth. *The Journal of Finance* 38(5): 1597-1606.

Modigliani, F., Miller, M., H. (1958) The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review* 48(3): 261-297

Moschieri, C., Mair, J. (2008) Research on corporate divestitures: A synthesis. *Journal of Management and Organization* 14(4): 399-422.

Nanda, V. (1991) On the Good News in Equity Carve-Outs. *The Journal of Finance* 46(5): 1717-1737

Powers, E., A., (2001) Spinoffs, Selloffs and Equity Carveouts: An Analysis of Divestiture Method Choice. *SSRN Electronic Journal* Available at:  
DOI: 10.2139/ssrn.257600

Qian, B., & Sudarsanam, S. (2007). Shareholder Value Gains from European Spinoffs. *EFMA conference paper*.

Quiry, P., Dallochio, M, Le Fur, Y., Salvi, A. (2014) *Corporate Finance: Theory and Practice* 4th Edition John Wiley and Sons Ltd.

Ross, S., A., Westerfield, R., W., Jordan, B., D. (2017) *Essentials of Corporate Finance*, 9<sup>th</sup> edition, McGraw-Hill Education, New York

Schipper, K., Smith, A., 1983. Effects of recontracting on shareholder wealth: the case of voluntary spin-offs. *Journal of Financial Economics* 12: 437-467.

Slovin, M., B., Sushka, M., E., Ferraro, S., R. (1995) A comparison of the information conveyed by equity carve-outs, spin-offs and asset sell-offs. *Journal of Financial Economics* 37:89-104

Tversky, A., & Kahneman, D., (1986) Rational Choice and the Framing of Decisions. *Journal of Business* 59(4): 251-278

Veld, C. & Veld-Merkoulova Y., V. (2004) Do spin-offs really create value? The European case. *Journal of Banking and Finance* 28: 1111-1135

Vero (2020) Yritysjärjestelyt ja verotus – jakautuminen, section 2.1. available at:  
<https://www.vero.fi/syventavat-vero-ohjeet/ohje-hakusivu/49340/yritysjarjestelyt-ja-verotus---jakautuminen/>

Wallin, W. W., (2012) The bibliometric structure of spin-off literature. *Innovation: Management, policy & practice* 14(2): 162-177.

Yalçın, K., C., (2010) Market Rationality: Efficient Market Hypothesis versus Market Anomalies *European Journal of Economic and Political Studies* 23.

## APPENDICES

### Appendix 1 Data sample of the research

<b>PARENT COMPANY</b>	<b>YEAR</b>	<b>SPIN-OFF DATE</b>	<b>SPIN-OFF COMPANY</b>	<b>CROSS-INDUSTRY</b>
Kemira Oyj	2004	13.10.2004	Kemira GrowHow Oyj	No
Fortum Oyj	2004	18.4.2005	Neste Oyj	Yes
Kone Oyj	2005	1.6.2005	Cargotec Oyj	No
Outokumpu Oyj	2006	25.9.2006	Outotec Oyj (excluded)	Yes
Orion Oyj	2006	1.7.2006	Oriola Oyj	No
Kemira Oyj	2010	26.3.2010	Tikkurila Oyj	No
Sievi Capital Oyj	2012	1.1.2012	Scanfil Oyj	Yes
Metso Oyj (excluded)	2013	31.12.2013	Valmet Oyj	Yes
YIT Oyj	2013	30.6.2013	Caverion Oyj	No
Digia Oyj	2014	1.5.2016	QT Group Oyj	No
Cramo Oyj	2019	30.6.2019	Adapteo Oyj (excluded)	Yes
Metso Oyj (excluded)	2020	30.6.2020	Neles Oyj	Yes

Appendix 2 Industries and sectors for parent and spin-off companies

<b>PARENT COMPANIES</b>	<b>INDUSTRY</b>	<b>SECTOR</b>
Kemira Oyj	Chemicals	Basic Materials
Fortum Oyj	Utilities - Renewable	Machinery
Kone Oyj	Specialty Industrial Machinery	Industrials
Outokumpu Oyj	Steel	Basic Materials
Orion Oyj	Drug Manufacturers - General	Health Care
Sievi Capital Oyj	Asset Management	Financial Services
YIT Oyj	Engineering & Construction	Industrials
Digia Oyj	Information Technology Services	Technology
Cramo Oyj	Equipment Rentals	Industrials
<b>SPIN-OFF COMPANIES</b>	<b>INDUSTRY</b>	<b>SECTOR</b>
Kemira GrowHow Oyj	Chemicals - Fertilizers	Basic Materials
Neste Oyj	Oil & Gas Refining & Marketing	Energy
Cargotec Oyj	Specialty Industrial Machinery	Industrials
Oriola Oyj	Pharmaceutical Retailers	Health Care
Tikkurila Oyj	Specialty Chemicals	Basic Materials
Scanfil Oyj	Electronic Components	Technology
Valmet Oyj	Specialty Industrial Machinery	Industrials
Caverion Oyj	Specialty Business Services	Industrials
QT Group Oyj	Software - Application	Technology
Neles Oyj	Conglomerates	Industrials

Appendix 3 Returns against OMXHGI, parent companies

<b>PARENT COMPANIES</b>	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
Kemira Oyj 2010	-0,43 %	1,08 %	-7,97 %	-5,31 %	0,98 %	-21,51 %
Fortum Oyj	-2,25 %	-2,31 %	-4,15 %	2,46 %	14,67 %	5,57 %
Kone Oyj	-0,55 %	1,60 %	2,95 %	14,03 %	14,40 %	23,44 %
Outokumpu Oyj	7,28 %	10,72 %	19,17 %	29,54 %	21,91 %	-4,45 %
Orion Oyj	-4,41 %	-8,81 %	-3,99 %	1,76 %	5,46 %	8,20 %
Kemira Oyj 2004	-0,69 %	0,05 %	16,70 %	22,63 %	28,93 %	31,01 %
Sievi Capital Oyj	-25,75 %	-28,42 %	-31,95 %	-44,22 %	-49,79 %	-58,02 %
Yit Oyj	2,89 %	3,39 %	1,55 %	-12,88 %	-26,45 %	-46,07 %
Digia Oyj	-12,54 %	-12,74 %	-27,10 %	-17,31 %	-20,17 %	-33,37 %
Cramo Oyj	-9,00 %	-30,84 %	-38,92 %	-17,07 %	-13,24 %	46,73 %

Appendix 4 Returns against OMXHGI, spin-off companies

<b>SPIN-OFF COMPANIES</b>	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
Kemira						
GrowHow Oyj	0,32 %	-1,09 %	-8,27 %	-4,05 %	11,16 %	-4,51 %
Neste Oyj	6,26 %	3,53 %	1,84 %	18,41 %	27,85 %	13,52 %
Cargotec Oyj	-8,53 %	-11,55 %	-6,09 %	-10,76 %	-5,34 %	2,90 %
Oriola Oyj	2,81 %	8,25 %	-5,22 %	10,16 %	30,48 %	38,18 %
Tikkurila Oyj	7,98 %	7,50 %	11,88 %	18,10 %	14,50 %	1,43 %
Scanfil Oyj	24,11 %	19,41 %	13,04 %	-15,90 %	-11,83 %	1,51 %
Valmet Oyj	-2,37 %	-1,52 %	-4,26 %	15,18 %	15,08 %	9,84 %
Caverion Oyj	-11,42 %	-12,98 %	-9,87 %	7,81 %	23,80 %	32,62 %
QT Group Oyj	21,53 %	22,03 %	11,60 %	4,94 %	29,39 %	23,61 %
Neles Oyj	12,14 %	35,19 %	33,95 %	27,32 %	21,43 %	4,09 %

Appendix 5 Jensen's Alphas, corresponding p-values, and r2, parent companies

<b>PARENT COMPANIES</b>	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
<b>Kemira Oyj 2010</b>						
Alpha	0,04 %	0,20 %	-0,11 %	-0,03 %	0,09 %	-0,03 %
P-value	0,88	0,40	0,60	0,79	0,48	0,79
R square	0,56	0,49	0,07	0,01	0,02	0,02
<b>Fortum Oyj</b>						
Alpha	0,73 %	-0,09 %	0,01 %	0,11 %	0,25 %	0,06 %
P-value	0,44	0,63	0,95	0,49	0,11	0,58
R square	0,04	0,47	0,16	0,19	0,05	0,17
<b>Kone Oyj</b>						
Alpha	-0,12 %	0,23 %	0,15 %	0,27 %	0,24 %	0,19 %
P-value	0,89	0,69	0,59	0,18	0,10	0,10
R square	0,059	0,009	0,127	0,0001	0,005	0,054
<b>Outokumpu Oyj</b>						
Alpha	2,46 %	1,04 %	0,59 %	0,45 %	0,19 %	-0,07 %
P-value	0,10	0,17	0,08	0,06	0,37	0,64
R square	0,10	0,14	0,21	0,25	0,20	0,26
<b>Orion Oyj</b>						
Alpha	-0,74 %	-1,61 %	-0,14 %	0,02 %	0,08 %	0,07 %
P-value	0,26	0,03	0,72	0,93	0,61	0,54
R square	0,61	0,02	0,16	0,12	0,10	0,18
<b>Kemira Oyj 2004</b>						
Alpha	-0,25 %	0,02 %	0,62 %	0,42 %	0,33 %	0,17 %
P-value	0,73	0,96	0,17	0,12	0,10	0,17
R square	0,46	0,22	0,54	0,57	0,52	0,49
<b>Sievi Capital Oyj</b>						
Alpha	-5,05 %	-2,66 %	-0,85 %	-0,63 %	-0,51 %	-0,29 %
P-value	0,09	0,07	0,11	0,03	0,02	0,10
R square	0,09	0,05	0,02	0,06	0,03	0,03

Yit Oyj						
Alpha	0,60 %	0,21 %	-0,09 %	-0,25 %	-0,31 %	-0,27 %
P-value	0,52	0,64	0,81	0,29	0,07	0,04
R square	0,32	0,54	0,31	0,25	0,25	0,22
Digia Oyj						
Alpha	-2,11 %	-1,10 %	-0,92 %	-0,21 %	-0,15 %	-0,15 %
P-value	0,46	0,33	0,02	0,46	0,51	0,32
R square	0,07	0,09	0,08	0,09	0,05	0,07
Cramo Oyj						
Alpha	-1,70 %	-3,05 %	-1,41 %	-0,28 %	-0,14 %	0,14 %
P-value	0,26	0,14	0,07	0,54	0,68	0,54
R square	0,28	0,15	0,00002	0,03	0,05	0,01

Appendix 6 Jensen's Alphas, corresponding p-values, and r2, spin-off companies

<b>SPIN-OFF COMPANIES</b>	<b>5 Days</b>	<b>10 Days</b>	<b>30 Days</b>	<b>60 Days</b>	<b>90 Days</b>	<b>180 Days</b>
KemiraGrowHow Oyj						
Alpha	0,29 %	0,07 %	-0,04 %	-0,01 %	0,22 %	0,05 %
P-value	0,60	0,82	0,86	0,95	0,14	0,72
R-square	0,01	0,01	0,00	0,001	0,004	0,04
Neste Oyj						
Alpha	6,52 %	0,19 %	0,10 %	0,29 %	0,34 %	0,06 %
P-value	0,05	0,82	0,83	0,31	0,12	0,77
R-square	0,63	0,25	0,08	0,13	0,09	0,11
Cargotec Oyj						
Alpha	-1,71 %	-1,11 %	-0,16 %	-0,15 %	-0,01 %	0,07 %
P-value	0,16	0,06	0,59	0,41	0,93	0,53
R-square	0,14	0,05	0,12	0,03	0,07	0,07
Oriola Oyj						
Alpha	1,57 %	1,31 %	-0,18 %	0,14 %	0,38 %	0,24 %
P-value	0,27	0,25	0,61	0,50	0,09	0,11
R-square	0,76	0,30	0,03	0,01	0,02	0,08
Tikkurila Oyj						
Alpha	1,47 %	0,74 %	0,31 %	0,26 %	0,14 %	0,01 %
P-value	0,31	0,34	0,29	0,18	0,34	0,88
R-square	0,21	0,14	0,44	0,44	0,38	0,31
Scanfil Oyj						
Alpha	2,73 %	0,49 %	0,34 %	-0,28 %	-0,11 %	0,03 %
P-value	0,74	0,90	0,79	0,68	0,81	0,91
R-square	0,34	0,22	0,06	0,07	0,04	0,04
Valmet Oyj						
Alpha	-1,63 %	-0,24 %	-0,09 %	0,27 %	0,23 %	0,09 %
P-value	0,63	0,85	0,83	0,36	0,31	0,53
R-square	0,14	0,04	0,0003	0,01	0,0030	0,02

Caverion Oyj						
Alpha	-3,65 %	-1,81 %	-0,42 %	0,11 %	0,28 %	0,20 %
P-value	0,36	0,30	0,47	0,77	0,37	0,30
R-square	0,32	0,19	0,12	0,12	0,07	0,08
QT Group Oyj						
Alpha	3,82 %	2,36 %	0,35 %	0,18 %	0,42 %	0,19 %
P-value	0,43	0,29	0,61	0,63	0,14	0,29
R-square	0,0001	0,02	0,01	0,03	0,01	0,02
Neles Oyj						
Alpha	2,69 %	2,15 %	0,72 %	0,37 %	0,22 %	0,05 %
P-value	0,37	0,49	0,53	0,51	0,59	0,82
R-square	0,00	0,35	0,14	0,10	0,04	0,07