Spin-off performance: An unrelenting anomaly

The stock market evidence of spin-off performance from 2000-2022

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Abstract

This thesis examines the long-term stock performance of spin-offs in Western Europe and Northern America from 2000-2022 for up to three years following each spin-off event. We employ a sizeable data sample relative to similar studies constituting 609 spin-offs, representing 77% of spin-offs within the same geography and time span. We employ several acknowledged normal performance estimation models to accurately estimate the abnormal returns, including the market model, the CAPM, and Fama & French's three-factor model.

Consistent with the idea that markets are efficiently inefficient, we suggest that spin-offs constitute an unrelenting anomaly, given the unique properties of this type of company. The anomaly can be associated with various market frictions, including asymmetric information caused by the information gap between shareholders and the company due to low analyst coverage, limited insights into historical financials, and limited understanding of the business, reinforced by behavioural biases.

This paper finds evidence that spin-offs initially exhibit negative abnormal returns following temporary supply and demand pressures resulting in a negative cumulated average abnormal return of 1.7% after 14 trading days, significant at the 1% level. However, we find that spin-offs yield positive cumulative average abnormal returns of 12.9% after 12 months, 19.7% after 24 months, and 28.5% after 36 months of trading, with all estimates being statistically significant at the 1% level. Moreover, it is established that a spin-off investment strategy is associated with a higher level of risk, manifested by its standard deviation of 0.2985, compared to a standard deviation of 0.1549 for the S&P500, with the difference being significant at the 1% level.

However, due to the higher annual excess returns, the spin-off investment strategy has yielded a Sharpe ratio of 0.9514 compared to a Sharpe ratio of 0.1976 for the S&P500 and consequently compensates investors with a higher return for every unit of risk. Lastly, we find no evidence that spin-offs operating in a different industry than the parent company yield a higher abnormal return for holding periods longer than 189 trading days, although we find evidence that the additional abnormal return is significant at the 10% level after 126 and 189 trading days.

Frequently used abbreviations and terms

Term	Definition
EMH	Efficient Market Hypothesis
Excess return	Return in excess of the risk-free rate
CAAR	Cumulated Average Abnormal Return
AAR	Average Abnormal Return
MRP	Market Risk Premium
SMB	Small Minus Big is the size factor in the Fama-French three-factor model
HML	High Minus Low is the value factor in the Fama-French three-factor model
CAPM	Capital Asset Pricing Model
SR	Sharpe ratio
Announcement date	The date that the spin-off has been announced to shareholders
Completion date	The date that the spin-off is confirmed and the shareholders of the parent company at this time are the ones being distributed shares in the spin-off pro rata from their holdings in the parent company
Effective date	The date the spin-off starts trading on the stock exchange with its own ticker

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1 Introduction

The discussion of active investors' ability to achieve higher returns than a passive investment strategy in the market portfolio without incurring higher risks, otherwise known as the Efficient Market Hypothesis (EMH), has been an ongoing debate in finance for decades (Hirshleifer, 2001). The debate culminated in 2013 when the Nobel Prize in economics was jointly awarded to Eugene Fama, the father of the efficient market hypothesis, and Robert Shiller, who gave rise to the field of behavioural economics (Pedersen, 2015). In a fully efficient market, security prices always equal the intrinsic value, and as soon as new information surfaces, prices immediately react to fully reflect the new information. If markets are fully efficient, there is no point in active investing because the prices already reflect as much information as you could hope to collect.

However, contradicting statements make the fully efficient market seem like something of a utopia and perhaps even unrealistic in practice. In the absence of active investors, there would not be anyone to make the market efficient in the first place. Further, given the fact that investors are paying billions of dollars in fees to active managers, there must be inefficiency in either the securities market (so that active managers can outperform the market and consequently compensate their investors and prove they are worth the money) or the market for asset management (because if the active managers were consistently unable to outperform, investors would be paying fees for nothing). When addressing this paradox, Lasse H. Pedersen (2015) concludes that it is logically impossible for all financial markets to be fully efficient.

Nonetheless, the fact that the market might not be fully efficient does not imply that the markets are fully inefficient either. Active managers are subject to human error. The study of behavioural finance (See Baker & Ricciardi, 2014) highlights certain shortcomings among investors, such as herding, panicking, and exuberating, disproving the claim that investors behave as Homo Economicus like the neoclassical finance and economics suggest. However, claiming that investors are naïve and market prices have limited relation to finance fundamentals seems equally unrealistic as it would imply that beating the market can be achieved by anyone with a bit of common sense. In reality, it is hardly that simple. Consistently beating the market over long periods of time is a rare phenomenon, although some active managers have achieved it. Most investment professionals hardly beat the market, and active money managers often underperform when considering their heavy fees (Pedersen, 2015).

Active money managers, hedge funds or otherwise, are notorious for their secrecy, and the fact that some investors are not even aware of the strategies they are pursuing emphasises this secrecy. Since sharing the ingredients to their secret source is probably out of the question if they wish to hold onto their not-so-skimpy management fee, the strategies they pursue and the rationalities behind them are not well described in the literature. Lasse H. Pedersen (2015) argues that because of the various inefficiencies originating from demand pressures and institutional frictions, some strategies that exploit these inefficiencies enable investors to be rewarded with consistent abnormal returns. As such, it is believed by ambassadors for a not fully efficient market that a very select number of areas in the market offer opportunities for the investors to obtain the sought-after abnormal returns. Some areas associated with consistent abnormal returns include spin-offs, mergers, bankruptcies, restructurings, rights offerings, risk arbitrage, merger securities, and recapitalisations.

Since financial literature dictates that abnormal returns, as the word implies, lie outside of the norm, the occurrence of abnormal returns is commonly referred to as an anomaly. However, if the abnormality is consistent, is it really accurate to consider it an anomaly? Spin-offs have been the source of abnormal returns for decades; hence, the abnormality seems to be *unrelenting*. Moreover, if the market has some degree of efficiency, this strategy should not remain abnormal and should thus be eliminated over time.

Several well-known and acknowledged investors have subscribed to the spin-off investment strategy, which has been something of a goldmine to some money managers. And much like a financial King Midas, infamous spin-off investor, Joel Greenblatt, has turned investors' money to gold through an impressive track record at the New York-based hedge fund he founded, Gotham Capital, where he averaged over 50% return for more than a decade (Greenblatt, 1999). Greenblatt has even written books educating his readers on how to follow his strategies to beat the market.

So, does this mean that beating the market by simply buying any spin-off you can get your hands on is the best investment advice you could ever receive? Unfortunately, the reality is not that simple, and consistently beating the market with the impressive margins of Greenblatt, entails far more skill and effort than knowing that some fragments of the stock market might offer the opportunity to exploit market inefficiencies. There is no magic formula to beating the market, and any investor wishing to obtain abnormal returns must dedicate a reasonable amount of time, effort, profits, and savings to pursue doing so. Nonetheless, some evidence supports that it has been achieved by following a select set of strategies, although future returns are never promised.

A vast body of evidence documents the impressive abnormal returns that have been manifested from spin-offs in Europe and the United States since 1965. These studies find that spin-offs, on average, yield a three-year abnormal excess return of 26.4%[1] (Cusatis et al., 1993; Desai and Jain, 1999; McConnell et al., 2001, Veld and Veld-Merkoulova, 2004; McConnell and Ovtchinnikov, 2004; Rüdisüli, 2005; Sudarsanam and Qian, 2007; Patel et al., 2012; McConnell et al., 2015; Ma and Oyeniyi, 2017). Hence, a passive investment strategy that acquires the stock of any spin-off once it trades as a separate unit has historically yielded an excess return that has been more rewarding than investing in the market portfolio.

This paper tests the performance of spin-offs in Western economies and encompasses a sample of spin-offs that represents 77% of the total number of spin-offs completed in Western Europe and Northern America from 2000-2022. Hence, we can say with some confidence that the findings speak to the general performance of spin-offs in this period and for the selected economies. Moreover, this paper represents a much more recent sample period compared to some of the leading studies in the area. Consequently, we test whether the *anomaly* that has been identified in previous studies is reoccurring or whether the market powers indeed have done their duties and eliminated the market inefficiencies and, consequently the abnormal returns.

1.1 Research question

As outlined, this paper investigates whether spin-offs offer their investors more attractive returns than what could have been achieved by investing in the market portfolio. Specifically, we investigate spin-offs as an anomaly from publicly listed Western European and Northern American firms from 2000 to 2022. Our guiding research question is:

- *Do spin-offs from publicly listed parent companies exhibit positive abnormal returns in the first 36 months after trading as an independent company?*

To fully explore this question, we investigate the following four hypotheses on spin-off performance:

[1] This figure has been calculated as the average of the cumulated average abnormal return found in each study illustrated in section 3.2.

H_1: Due to initial sell-off pressure, spin-offs yield a negative abnormal return in the first 30 days post-event.

This hypothesis focuses on the short-term performance of spin-offs, specifically in the first 30 days after trading independently. It suggests that the initial sell-off pressure could lead to negative abnormal returns during this period. Factors such as index selling, mismatch of ownership criteria, limited history, and low analyst coverage create an initial selling pressure (temporary supply-and-demand imbalance) on the shares.

H_2: A spin-off investment strategy that invests in all spin-offs from 2000-2022 yields a positive abnormal return over 12 months, 24 months, and 36 months.

This hypothesis suggests that a passive investment strategy investing in all spin-offs between 2000-2022, with a holding period of 12 months, 24 months, and 36 months, would yield positive abnormal returns. This hypothesis is based on a substantial body of literature examining the long-term returns of spin-offs and consistently finding abnormal returns using various risk-adjustment methods.

H_3: A spin-off investment strategy is more volatile than the aggregate market in the period 2000 to 2022.

Although not explored to a large extent in prior literature, some studies provide evidence that an investment strategy investing in spin-offs is associated with a larger degree of risk. This analysis thus enables the determination of whether a spin-off investment strategy exhibits a higher level of risk compared to the broader market over the 36 months post-event and whether this potentially added risk compensates the investor sufficiently.

H_4: When the spin-off operates in a different industry than the parent company, the spin-off is more likely to outperform the aggregate market.

This hypothesis suggests that the spin-offs operating in different industries from their parent companies might have a higher probability of outperforming the aggregate market. It highlights the potential impact of industry differences on spin-off performance. Conglomerates have diversified value propositions, which is discredited by investors who would instead conduct the diversification themselves. Hence, this hypothesis states that de-diversifying the business through, e.g., a spin-off will result in shareholder value for the subsidiary once it trades independently.

1.2 Delimitations

The process of conducting research requires the establishment of clear delimitations to streamline the focus and scope of the investigation, thereby enabling the research to provide novel insights and updated knowledge to the existing literature. This section intends to outline the delimitations of this paper by defining the parameters that have been set in order to ensure the validity and relevance of the findings. Divestitures encompass a broad spectrum within the different types of corporate restructurings, including sell-offs, spin-offs, split-offs, and equity carve-outs. To ensure a specific focus of this paper, the research has been limited to investigating spin-offs. Furthermore, the narrowed focus will only deal with the performance of the spun-off subsidiary and thus not consider the performance of the parent company. It is recognised that part of the potential wealth creation might be captured in the stock development of the parent company prior to the completion of the spin-off. I.e. some investors might buy shares in the parent company after announcing the spin-off with the purpose of receiving shares in the spin-off. The wealth creation for the joint entity between the announcement date and the completion date has been examined by several studies, further elaborated in section 3.2. Nonetheless, the focus of this study is on the long-term performance of the subsidiary, which explains this delimitation. As such, any effect prior to the completion date lies outside of the scope of this study.

In light of the delimitation mentioned above, the spin-off return has been calculated using the first closing price as the initial observation. This delimitation stems from the constraint that new investors cannot acquire the stock at the offering price unless they already own the parent company's stock and hence will be distributed shares in the spin-off on a pro-rata basis. Thus, our analysis focuses solely on the performance of spin-off investments following the completion date. The timeframe for performance evaluation has been delimited to 3 years to facilitate comparison with the existing literature, which is also based on performance evaluation up to 3 years post the completion date.

The study is delimited to include spin-offs completed in the period lasting from January 1, 2000, until December 31, 2022. The rationale behind this period is that periods before 2000 have been extensively covered in the existing literature, while spin-offs completed in 2023 do not have a sufficient trading history in order to be included in the study. Moreover, this paper is limited to a geographical scope, including Northern America and Western Europe. This geographical delimitation is motivated by mainly three factors. Firstly, in any comprehensive study, it is essential to ensure high data availability and reliability, which is why it has been necessary to limit the target location to these two regions. Secondly, in order to draw conclusions across the findings in this paper, it has been crucial that the regions included possess as many similar characteristics as possible. Finally, these regions have been chosen to reflect the findings in existing literature, which cannot be analogously applied to all geographies and hence facilitate comparison with the existing literature.

Furthermore, any potential transaction costs associated with buying and selling assets in financial markets, including trading stocks and currencies, will not be accounted for in this study. Although investors, in practice, are likely to incur bid-ask spreads and fees to the brokerage upon acquisitions and divestitures, this study assumes zero transaction costs for analytical purposes. Moreover, it is assumed that the acquirer has no market impact on orders. In practice, investors deploying a substantial amount of capital onto a stock, especially a small stock with limited traded volume, will likely impact the stock price in the opposite direction and consequently reduce the overall returns (Durbin, 2010).

Additional delimitations in this paper are discussed upon relevance.

1.3 Philosophy of science

Before commencing a comprehensive analysis in academic research, it is crucial to establish a standpoint in philosophy of science and align the reader with the author's perception of the topic under investigation. The reliability and applicability of theories and hypotheses are perceived differently across various fields of philosophy of science. This selection of a particular philosophical approach has significant implications for the perception of reality, the establishment of facts, and the claim to attaining valid knowledge. Researchers must thoroughly consider the philosophical underpinnings of their work to ensure that the methods and conclusions are well-founded.

This paper employs a deductive research approach that utilises existing theory and literature as the foundation for formulating research hypotheses, which are then subjected to empirical analyses. This approach ensures that the hypotheses are firmly rooted in the existing literature and provide a clear and testable framework for answering the research question. This progress can be described as a linear process, starting with theory and progressing through the formulation of hypotheses, data collection and screening, analysis, results, and conclusions regarding the hypotheses (Bryman & Bell, 2015). An integral part of this paper's approach is maintaining a neutral and objective perspective by outlining the methodology and scientific approach employed. The methodology and data collection process is described in depth in this paper to provide a clear understanding of the research process to increase transparency, reliability, and replicability of the findings.

Methodology refers to the practical steps in conducting research, while ontology and epistemology relate to the underlying philosophical assumptions about knowledge. Ontology concerns the objective nature of reality and its interpretation, whereas epistemology explores the subjective nature of knowledge creation and the relationship between the researcher and the topic of the study (Chalmers, 1999). The research paradigm refers to the philosophical framework that informs a researcher's approach to conducting a study. A paradigm is shaped by ontological and epistemological assumptions that influence how the researcher perceives reality and defines valid knowledge (Creswell, 2014).

This paper is based on the scientific paradigm known as critical rationalism, which was founded by Karl R. Popper (1959) and emerged from his critique of some positivistic standpoints. Critical rationalism is still recognised as an extension of positivism, with the aim of analysing quantitative observations. While positivism takes observations as the starting point for the analysis, critical rationalism employs an ontological framework that is also realistic but draws upon existing literature to form the framework for the overall research question. Hence, four hypotheses have been deduced based on the research question and the underlying theoretical framework. According to Popper, it is never possible to be certain that one has defined objective reality. The hypothetico-deductive approach allows for the falsification of preconceived expectations of hypotheses outcomes. Falsification is essential for scientific inquiry and is based on the principle that science must be falsifiable. This thesis adheres to this principle by utilizing falsifiable hypotheses in the pursuit of knowledge (Gattei, 2009).

1.4 Research design

In the previous section, it was determined that the standpoint in philosophy of science of this study is predominantly anchored in quantitative data. Hence, the approach is based on quantitative empirical evidence, where the answer to the research question will be grounded in numerical data, primarily of secondary nature. Multiple databases, such as FactSet and S&P Capital IQ, have been utilised for this purpose. A thorough description of the choice of databases will be further described in section 5.1.

Although the quantitative analysis constitutes the primary source of findings, this paper further includes qualitative analysis to provide a more comprehensive view of the research question. The qualitative data is two-folded, consisting of both primary and secondary data. The primary data is based on semi-structured interviews, while the secondary data is based on academic literature and market reports. The literature is based on prominent academic papers authored by acknowledged researchers within the area under investigation, while the market reports originate from market participants within financial markets. Hence, the secondary data is selected based on their individual reliability. Consensus estimates related to market outlooks are collected from a broad range of market participants to ensure objectivity, representing the broader predictions of the market, and thus eliminate potential bias in the findings.

Using multiple data sources enhances the triangulation of the findings by adding depth and validity to the overall research results. For this thesis, two semi-structured interviews were conducted to substantiate (1) the macroeconomic environment and outlook and (2) spin-offs as an investment strategy. The respondent for the first interview was Chief Strategist at Nordea, Josephine Cetti (Appendix 1). For the second interview, Oskar Andersson, Investment Manager at Polaris Private Equity and former Partner at Bodenholm Capital, was interviewed for the spin-off investment strategy (Appendix 2). The semi-structured approach allowed the interviewees to provide in-depth and insightful perspectives beyond the pre-defined questions, enhancing the validity of the findings.

Employing a mixed-method approach and multiple data sources can present a higher degree of complexity in the research design, which may pose challenges to the conclusions of the findings. In case of contradictory findings from the academic literature, these will be carefully examined to ensure a more nuanced understanding of the topic and a broader foundation for the conclusions of this paper. Furthermore, previous studies may not be applied analogously to this study, which requires certain assumptions to enable a comparison to prior studies, e.g., related to the data selection process or methodological approach.

1.5 Thesis structure

The structure of this paper is divided into a total of 10 chapters, with the remaining 9 chapters presented as follows. *Chapter 2* establishes the theoretical framework underpinning the research question by delving into the areas of corporate restructuring. *Chapter 3* reviews the academic literature surrounding spin-off performance and further relates to each hypothesis. *Chapter 4* presents the broader macroeconomic environment and outlook by examining key indicators and trends that may affect the activity level relevant to the research topic. *Chapter 5* thoroughly describes the databases applied in this paper, the selection criteria for spin-offs to be included, and a descriptive analysis of the final data sample. *Chapter 6* describes the methodological approach applied to investigate spin-off performance. *Chapter 7* presents the empirical results for each hypothesis obtained by applying the methodology to the final data sample as presented in the previous chapters. *Chapter 8* discusses the empirical results by contextualising them within the existing academic literature and exploring their implications for the theoretical framework and practice in general. *Chapter 9* concludes with the findings of this paper. *Chapter 10* presents areas of further research related to spin-off performance considering the findings from this paper.

2 Theoretical framework

The purpose of the theoretical framework of this paper is to provide the theoretical foundation for the subsequent empirical analysis anchored by generally adopted theory on the area of investigation. As such, this section includes corporate restructurings, the Efficient Market Hypothesis, hedge fund strategies, price discovery, conglomerate theory, portfolio theory, and behavioural finance. The framework thus constitutes an enveloping foundation by initially discussing the foundation in the broad literature before narrowing the scope to corporate restructurings, particularly spin-off investments. Moreover, the theoretical foundation enables a qualified analysis of the subsequent empirical results concerning the factors that drive potential abnormal returns and whether data indicates that investors can exploit inefficiencies in the market in the context of spin-off investments. In a thorough examination of these interrelated concepts, the paper aims to contribute to the existing body of spin-off literature. By doing so, this paper seeks to provide insights for both academic researchers and practitioners in the field of finance and investment management.

2.1 Corporate restructuring

Corporate restructurings refer to the various methods through which companies can modify their existing organisational structures, operations, or financial arrangements to enhance their efficiency, competitiveness, and shareholder value (Gilson, 2001). These processes often entail strategic changes such as mergers and acquisitions, divestitures, spin-offs, leveraged buyouts, and recapitalisations, each serving different purposes and objectives within the company's overall strategy. The figure below summarises some of the most used corporate restructuring methodologies (Pedersen, 2015).

Figure 2.1 | Types of corporate restructurings

Source: Patel et al., 2012

2.1.1 Motivations for Corporate Restructurings

The motivations for corporate restructurings can be diverse and are often driven by factors such as changes in the competitive landscape, financial distress, changes in management, and the need to unlock shareholder value (Wruck, 1990). Some common motivations for undertaking corporate restructurings include improvement of operational efficiency, improvement of financial performance, strategic realignment, or due to market pressure.

i) **Operational Efficiency:** Companies may undertake restructuring to improve their operational efficiency by streamlining processes, reducing costs, and eliminating redundancies (Baldwin & Clark, 2000).

ii) **Financial Performance:** Restructurings can help companies strengthen their balance sheets, reduce financial risk, and enhance shareholder value by optimising their capital structures or reducing debt (Gilson, 2001).

iii) **Strategic Realignment:** Companies may need to restructure in order to refocus on their core businesses or explore new growth opportunities (Galbraith, 2000).

iv) **Market Pressure:** Companies may face pressure from shareholders, analysts, or competitors to undertake restructuring in order to enhance their market position or unlock hidden value (Wruck, 1990).

Spin-off as a Corporate Restructuring

When using a spin-off as a form of corporate restructuring, the parent company separates a subsidiary or division into a standalone entity by distributing the shares of the new company to existing shareholders on a pro-rata basis (Cusatis et al., 1993). Spin-offs have historically facilitated unlocking shareholder value, improved operational efficiency, and enhanced focus on the core business. Further elaborated in Chapter 3, empirical research has shown that spin-offs previously have generated positive abnormal returns for shareholders, e.g. through mitigation of the conglomerate discount and increased operational efficiency (Hovakimian, 2016a; Khorana, 2011). Additionally, spin-offs can improve the market's ability to accurately value individual businesses as each entity becomes more transparent and focused (Cusatis et al., 1993).

2.2 Efficiency of markets

The level of efficiency present in the broad market and whether market actors, asset managers or otherwise, can exploit potential inefficiencies to beat the market and consequently achieve abnormal returns has been discussed since its introduction. The classic Efficient Market Hypothesis (EMH), defined by Fama (1970), is one of the cornerstones of modern financial theory and is essential for the perception of how the market operates. This hypothesis states that financial markets are fully efficient and thus always reflect all available information. As such, the EMH states that it is impossible for investors to consistently outperform the market or obtain risk-adjusted abnormal returns by exploiting publicly available information. The claims of this hypothesis have been investigated thoroughly in the literature, with empirical evidence supporting the quick price corrections when new information has been released (Fama, Fisher, Jensen, & Roll, 1969). This hypothesis has later been further developed and examined by segmenting the efficiency of the market in different forms, namely, weak, semi-strong, and strong (Malkiel, 1992), with the strong form suggesting that all relevant information is embedded in the stock prices at all times.

The inverse counterpart to the fully efficient market is the fully inefficient market, which entails that market prices are significantly influenced by investor irrationality and behavioural biases. Although the EMH has particularly impacted financial theory and practice, either extreme has been subject to criticism and challenges. E.g., De Bondt and Thaler (1985) found that markets may overreact to new information, and Jegadeesh and Titman (1993) present empirical support for the momentum anomaly. Hence, these findings are not consistent with the EMH.

Moreover, various studies within behavioural finance consider psychological effects and cognitive biases, suggesting human influences that affect markets and that humans do not always behave completely rationally. This is e.g. highlighted by Shleifer (2000), further elaborated in section 2.7. It has been argued that some extent of market efficiency is necessary to properly incentivise investors to gather and analyse information (Grossman and Stiglitz, 1980). Hence, if no one tried to beat the market, the market would likely not be efficient. Moreover, many investment professionals cannot beat the market, which suggests that the market is not inefficient either. Instead, the market is likely somewhere in the middle. Lasse Heje Pedersen (2015) thus presents the Efficiently Inefficient market, which suggests that certain strategies can yield abnormal returns. The different conceptions of market efficiency are summarised in the table below.

Figure 2.2 | Market efficiency distinctions

	Efficient Market Hypothesis	Inefficient Market	Efficiently Inefficient Markets
Market efficiency	The Idea that all prices reflect all relevant information at all times	The idea that market prices are significantly influenced by investor irrationality and behavioural biases	The idea that markets are inefficient but to an efficient extent. Competition among professional investors makes markets almost efficient, but the market remains so inefficient that they are compensated for their costs and risks
Investment Implications	**Passive investing** If prices reflect all information, efforts to beat the market are in vain. Investors paying fees for active management can expect to underperform by the amount of the fee.	**Active investing** If prices bounce around with little relation to fundamentals due to investors being naïve, beating the market would be easy.	**Active Investment by those with a comparative advantage** A limited amount of capital can be invested with active managers who can beat the market using a few economically motivated investment styles.

Source: Pedersen, 2015

As highlighted, the efficiently inefficient market presents a nuanced perspective to the discussion, acknowledging the significance of market efficiency whilst indicating the fact that inefficiencies exist in the market that can be exploited by investors. As such, this paper considers the market to be efficiently inefficient, with the extent of inefficiency varying depending on several market factors.

The hypothesis that investments in spin-offs, or any other specific investment strategy, can result in abnormal returns is thus contradictory to the beliefs of the efficient market. With regards to answering this paper's research question of whether spin-off investments can result in abnormal returns, a positive alpha implies that the market is not fully efficient and that some inefficiencies may exist due to specific characteristics and unique circumstances in certain segments of the broad market. These inefficiencies consequently enable an opportunity for investors to allocate research efforts to obtain information not embedded in a security's price and the ability to exploit this to receive abnormal returns. As discussed in the preceding literature review, spin-offs possess a certain degree of complexity and characteristics that may entail pricing inefficiencies. E.g., spin-offs are often under-researched, have little analyst coverage, and are overlooked by institutional investors. These factors may contribute to market frictions and entail contradictions with the EMH (Chapter 3). Moreover, abnormal returns further imply the fact that investors are compensated for something other than their systematic risk and the risk-free rate, which is implied by the asset pricing models based on EMH.

As such, Pedersen's (2015) perception of market efficiency supports this paper's hypothesis that inefficiencies exist and abnormal returns can be obtained in certain areas of the market. Hence, the conclusions of this paper may be contradictory to the EMH in favour of the efficiently inefficient market. By considering spin-off investments through this lens, this study seeks to contribute to the literature and the ongoing debate regarding the extent of market efficiency and the ability to create consistent abnormal returns for certain investors.

2.3 Hedge fund strategies

Building on the discussion regarding the extent of efficiency in the market, Pedersen (2015) presents a set of hedge fund strategies that high-performing hedge fund managers have used to generate abnormal returns. This section first discusses hedge fund strategies on a general level before delving into specific hedge fund theories and how spin-off investing fits these buckets.

2.3.1 Introduction to Hedge Funds

Hedge funds are a distinct category of investment funds that deviate from classic investment funds, such as mutual funds, in several ways. Most importantly, for many hedge fund strategies, the purpose of the fund is not to create higher absolute returns than the aggregate market but rather to generate positive returns regardless of how the market is performing (Pedersen, 2015). Mutual funds and ETFs are investment classes available to the general public and have a high degree of information. Moreover, since these investments are rather commoditised as their main purpose is to imitate some larger index or group of assets, they are, in essence, baskets of stocks. This offering is rather commoditised, manifested by their low management fees.

In contrast, hedge funds generally have relatively high management fees and low levels of information since they employ strategies that deviate from the general market. Moreover, hedge funds often use sophisticated investment methodologies that include, e.g., leverage, short-selling, and derivatives to obtain the objectives of the strategies, which further targets a more exclusive investor base composed of, e.g., high network individuals and institutional investors (Ackermann et al., 1999). Signifying the differences between hedge funds, hedge fund managers are only rewarded when they generate new profits by exceeding potential prior losses that investors may have endured, known as the High-Water Mark principle (Goetzmann et al., 2003).

2.3.2 *Overview of Hedge Fund Strategies*

Although numerous hedge funds and coherent hedge fund strategies exist, Pedersen (2015) presents three main groups of hedge fund strategies, which he believes has the ability to create abnormal return if appropriately executed and have done so in the past. These overall categories are summarised below.

Figure 2.3 | Overview of hedge fund strategies

Source: Pedersen, 2015

Equity Strategies

The first category of the main hedge fund strategies includes equity strategies, which involve taking long and short positions in individual stocks or equity indices that the fund manager believes are incorrectly priced by the market. Among the equity strategies, three specific strategies are found, including discretionary long/short equity, which is when the fund managers invest in an undervalued stock and equivalently short an overvalued stock. Moreover, this category also includes short bias, i.e., short-selling overpriced securities, and quantitative equity, which is when fund managers use advanced mathematical models and algorithmic trading to exploit inefficiencies in the market by taking the appropriate position in those securities. The extent to which the fund manager utilised fundamental analyses deviates depending on the strategy, e.g., the traditional long/short equity would generally be based on fundamental analysis to a larger extent than quantitative equity strategies (Pedersen, 2015). As such, this category generally relies on the fund managers' expectations of the market and specific securities as the strategies involve taking directional bets on the market through long and short positions rather than exploiting pricing inefficiencies, e.g., through potential arbitrages.

Macro Strategies

Macro strategies primarily focus on macroeconomic trends and take appropriate positions in several asset classes that would benefit from the macroeconomic development that the fund manager believes will materialise. These asset classes include equities, fixed income, currencies, and commodities. Although sharing the same overall purpose, two primary distinctions can be made for macro strategies, namely Global Macro and managed futures. Global macro primarily utilises systematic trend-following strategies such as large-scale economic trends and political events. Managed futures, on the other hand, utilise algorithms to identify price trends across different asset classes and take the appropriate position to benefit from these trends (Pedersen, 2015).

Arbitrage Strategies

Finally, the purpose of arbitrage strategies, which is the area of focus in this paper, is to exploit inefficiencies in the market to generate abnormal returns. Moreover, these strategies often seek to do so with limited market risk. This category includes several subcategories, including fixed-income arbitrage, where fund managers exploit price inefficiencies in fixed-income securities. Similarly, convertible bond arbitrage entails utilising mispricing between convertible bonds and the underlying assets (Pedersen, 2015).

Lastly, the event-driven arbitrage strategies are discussed. With this subcategory being the main focus of this paper, the specific ways to employ such strategies and how spin-off investing should be considered. Event-driven arbitrage refers to strategies where fund managers utilise mispriced securities that might occur in relation to specific events such as mergers and acquisitions, spin-offs, restructurings, bankruptcies, earnings announcements, or similar corporate events to generate abnormal returns (Bodie, Kane, & Marcus, 2014; Mitchell & Pulvino, 2001). Hence, an event-driven arbitrage strategy usually entails a comprehensive understanding of how the specific event theoretically impacts the security value. In addition to the inherent perceived benefit of investing using event-driven arbitrage strategies, investors that employ such strategies further use fundamental analysis and financial modelling to ensure that the investment is attractive and that the pricing inefficiency is of an adequate likelihood and magnitude (Klein and Lederman, 1995; Appendix 2). Hence, the investors seek to benefit from the expected price convergence as the market corrects the market inefficiencies and assimilate the implications of the event (Bodie et al., 2017). Numerous event-driven strategies can be identified. However, some of the most well-described strategies are briefly discussed below:

i) **Merger arbitrage:** In merger arbitrage strategies, investors seek to benefit from the pricing discrepancies between the deal price of an M&A transaction and the stock price of the target company (Baker & Savasoglu, 2002). Such strategies have a slightly different pay-off scheme that resembles non-linear pay-offs due to the risks of the merger not going through (Pedersen, 2015).

ii) **Spin-offs, split-offs, and carve-outs:** Traditional spin-off arbitrage strategies include taking a position in the parent company that is expected to perform a spin-off of a subsidiary, which entails being distributed shares in the spin-off while maintaining the position in the parent company and capitalising from the price adjustments as the market revaluates the spin-off as well as the parent company (Cusatis et al., 1993).

iii) **Other events:** Event managers can take advantage of various opportunities such as distressed investments, capital structure arbitrage, changes in capital structure, special security structures, and market dislocations. E.g., distressed investment arbitrage involves using securities from companies experiencing financial distress, such as bankruptcy or restructuring (Altman & Hotchkiss, 2006). Other special events that event managers can focus on include share buybacks, tender offers, corporate restructurings, and profits from potential mispricing in relation to these events (Anson, 2002).

As such, event-driven arbitrage strategies entail extensive knowledge and research on the events creating the opportunities and the underlying assets themselves. Moreover, a solid foundational understanding of how the market reacts to such events is necessary (Bodie et al., 2017). Generally, these strategies may create attractive returns due to their arbitrage nature. However, they are also embedded with significant risks, such as deal failures or unpredictable changes in market conditions that might negatively influence the position that the investor has taken to a significant extent and result in significant losses on the trade (Mitchell & Pulvino, 2001).

Spin-offs

When separating a subsidiary, several possibilities exist, as discussed in relation to corporate restructuring in general. These options include spin-offs, split-offs, and equity carve-outs. While spin-offs and split-offs are often not true arbitrage trades, carve-out offers can present true event-driven arbitrage to investors. As the parent company owns a significant share of the subsidiary, event managers can occasionally profit from trading the parent against the subsidiary if a negative stub value is present. This entails that an investor might be able to buy equity in the parent company for less than the value of its stake in the subsidiary (Pedersen, 2015).

Although spin-off investments do not constitute a classical arbitrage investment, they provide event managers opportunities to bet on the prospects of the subsidiary and the parent company, their management teams, and business potentials. One classical way of doing so for event-driven arbitrageurs is by capitalising on the price discrepancies and inefficiencies arising from the spin-off process by investing in the parent company performing the spin-off. The market's initial reaction to a spin-off announcement may not fully reflect the true value of the parent company and the spun-off entity, resulting in mispricing. Event-driven arbitrageurs can generate abnormal returns by taking advantage of these inefficiencies (Cusatis et al., 1993). Several successful spin-off investors, such as Joel Greenblatt, have demonstrated the potential for generating consistent profits using this strategy (Greenblatt, 1999). Another way of benefitting from corporate spin-offs is by investing in the spin-off once its shares are traded independently by capitalising on some of the characteristics that facilitate pricing inefficiencies. Further elaborated in Chapter 3, these characteristics have historically been associated with abnormal returns.

2.4 Price discovery

Having discussed how market inefficiencies can arise and how certain market participants can capitalise on these inefficiencies to generate profits, it implies that there is a temporary opportunity to exploit mispriced securities until the gap is closed and the security is no longer inefficiently priced. This entails that as more market participants become aware of the mispricing, the gap will eventually close, and the opportunity to generate returns will disappear. This concept is commonly referred to as price discovery, which is the process where market participants arrive at the equilibrium, i.e., the intrinsic value of a given asset. The fundamentals of price discovery were initially presented by Grossman, S. J., & Stiglitz, J. E. (1980), who argued that the perfectly efficient market is unrealistic in reality due to the fact that investors need to be compensated for the gathering and processing of information. This concept has since been expanded by several researchers adding to the theoretical implications of the price discovery process.

Madhavan, Richardson, and Roomans (1997) investigated the role of trades in the price discovery process, examining the informational content of trades on the New York Stock Exchange (NYSE). The authors found that both buyer-initiated and seller-initiated trades contribute to price discovery, with larger trades having a more significant impact on the process (Madhavan et al., 1997). Engle and Granger (1987) introduced the concept of co-integration, providing essential insights into the long-term relationships between financial variables. Their statistical framework for testing and estimating co-integrating relationships has been widely applied in studies of price discovery across various asset classes and markets (Engle & Granger, 1987).

Easley and O'Hara (1992) explored the role of time in the price discovery process, focusing on how information is incorporated into security prices over time. They developed a model that considers the impact of information arrival and the speed at which it is processed by market participants, shedding light on the dynamics of price discovery (Easley & O'Hara, 1992). More recent literature on this subject includes Kohl (2022), who added to the current theoretical fundament by examining stock issuance and its impact on the speed of price discovery. Kohl's (2022) findings suggest that stock issuance can affect the efficiency of price discovery, with implications for market liquidity and trading activity (Kohl, 2022).

The various findings in the literature on price discovery generally support the claim that price discovery encompasses various factors, including market microstructure, liquidity, fragmentation, and the role of informed traders. Moreover, this suggests that the market cannot always be fully efficient, implying that certain investment strategies might be able to exploit these temporary inefficiencies. Hence, by understanding the mechanisms and influences behind price discovery, market participants are better suited to navigate the complexities of financial markets and make informed investment decisions.

2.5 Conglomerate theory

Conglomerates have experienced various phases in their perception and valuation by the market over time. Historically, conglomerates were viewed as beneficial due to their diversified operations, which allowed them to mitigate risks and take advantage of synergies across different business lines (Khorana, 2011). As a result, they often traded at a premium compared to more focused companies (Rumelt, 1974). However, this perception shifted in the later decades of the 20th century, with conglomerates often trading at a discount in Western markets (Berger & Ofek, 1995). This phenomenon, known as the conglomerate discount, has been attributed to various factors, such as inefficient capital allocation, increased agency costs, and a lack of transparency (Rajan, et al., 2000).

The increasing accessibility to stock markets, accompanied by the liberalisation of these markets, has led to a materialisation of developments resulting in reduced transaction costs and ease of use for institutional and private investors (Kilinc, 2018). As a result, conglomerates in Western markets are trading at a discount to their intrinsic value due to the fact that investors are required to purchase the entire business while they may only be interested or mandated to invest in one of the business segments. As investors can achieve diversification by investing in multiple stocks, being diversified as a company is no longer viewed as a value-adding characteristic. Instead, it is argued that a clear strategic focus is necessary to maximise value (Kilinc, 2018). To mitigate the conglomerate discount, many conglomerates have turned to corporate spin-offs as a method of unlocking value by separating their distinct business lines into separate, more focused entities (Khorana, 2011). More recent studies, such as Hovakimian (2016), further emphasised this, finding that reducing diversification in companies has a significant value-adding effect. Arguably, as a result of this development, the overall level of the conglomerate discount has fallen significantly according to estimations found by Emrick et al. (2017), where the conglomerate discount dropped from 18% during the period 2001-2010 to 13% during 2011-2015 (Emrick et al., 2017).

The increasing investor scrutiny of the rationale for combining multiple business lines under a single corporate umbrella has led to a notable decline in the level of diversification and the number of unrelated segments as many conglomerates have adopted more focused business structures. Nonetheless, the trend towards the disappearance of conglomerates cannot be called dominant, even though conglomerates as a form of organising large businesses are becoming less attractive (Konina, 2022).

The Evolution of Conglomerates: Tech and Digital Conglomerates

The nature of conglomerates has evolved, with traditional conglomerates becoming less common while new forms of diversified businesses have emerged, particularly in the technology sector. Tech conglomerates, such as Meta, Alphabet, Amazon, and others, have grown to dominate various markets and industries through a combination of organic growth and acquisitions. These companies are often characterised by their extensive operations in multiple digital markets and platforms, and they have been referred to as *digital conglomerates* (Konina, 2022). However, these tech conglomerates' size and market power have raised concerns regarding antitrust issues and the potential for stifling competition and innovation (Wu, 2018). As a result, there have been discussions around the potential for tech conglomerates to undergo spin-offs or divestitures to address these concerns and unlock shareholder value. E.g., it has been suggested that Alphabet could spin off its successful subsidiary YouTube as its operations deviate significantly from the core business of Google (The Economist, 2023).

Implications on spin-off investments

With the research in this paper concentrating on spin-off investments, it is crucial to consider the evolving nature of conglomerates or diversified businesses in general and the potential implications for the strategy. The emergence of tech and digital conglomerates implies comfort around the future potential for spin-offs and divestitures. For example, large new-era conglomerates might even be forced to split the business due to antitrust concerns and market pressures, which may create opportunities for investors to exploit inefficiencies and consequently yield abnormal returns. Hence, by considering empirically founded knowledge on conglomerates in the theoretical framework of the paper, it is possible to understand the unique characteristics and dynamics of spin-off investments to a larger extent. This enables a deeper understanding of the factors driving abnormal returns and the potential for investors to exploit market inefficiencies in the context of spin-off investments.

2.6 Portfolio theory

Modern Portfolio Theory is a widely recognised framework for investment management, developed by Harry Markowitz in 1952. His study on portfolio optimisation was groundbreaking at the time of its origin, as investors gave minimal thought to portfolio construction and the concept of risk. The rationale behind Markowitz's framework relies on the mean-variance framework, which is based on achieving an efficient equilibrium between risks and returns. The mean-variance frameworks are based on optimising the expected return of an investment portfolio for a given level of risk or minimising the level of risk for a given level of expected return. This can be achieved by constructing a portfolio on the efficient frontier. The efficient frontier forms a graphical representation of the trade-off between risk and return (Markowitz, 1952).

Markowitz (1952) assumes that investors exhibit risk aversion, which implies a preference for investments with lower expected returns and known risk rather than higher expected returns and unknown risk. Assuming that investors are risk averse has been subject to criticism by several researchers, as it assumes that investors make decisions based solely on expected returns and variance of returns. In reality, investors may exhibit different risk preferences, while other factors such as liquidity, transaction costs, and taxes may also affect investment decisions (Pogue, 1970). Furthermore, the foundations of Modern Portfolio Theory are also based on the assumption that asset prices follow a Gaussian (normal) distribution. Assuming a Gaussian distribution for asset prices has been subject to criticism by several researchers, who argue that asset returns are often non-normal and exhibit more extreme events than would be expected from a Gaussian distribution (Cont, 2001).

In Markowitz's (1952) seminal work, he identified diversification as an essential cornerstone of Modern Portfolio Theory. An investor can reduce overall portfolio risk without sacrificing expected returns by constructing a portfolio of uncorrelated assets lying on the efficient frontier due to the effect of diversification. The diversification element of Modern Portfolio Theory is founded on the concept that the volatility of a portfolio of assets is less than the sum of the volatility of each individual asset, given imperfect correlations. This can be related to the overall risk consisting of systematic and idiosyncratic risk.

Systematic risk refers to the inherent risk present in the overall market. It is caused by different external shocks that affect the broad market. Hence, it is referred to as a non-diversifiable risk. On the other hand, idiosyncratic risk is specifically related to the individual asset or company. Hence, it is referred to as diversifiable risk (Huang, 2022). Therefore, the most efficient way to mitigate idiosyncratic risk is through diversification.

Modern Portfolio Theory provides one of the underlying arguments for the existence of conglomerates, namely diversification. As conglomerates constitute a package of bundled imperfectly correlated business lines, it is argued that they offer lower risk but maintain high expected returns. Hence they should be trading at a premium (Amihud & Lev, 1981). However, as described in section 2.5, this perception has shifted due to the increasing accessibility for investors to achieve similar risk reduction by diversifying through several securities in the stock market.

Modern Portfolio Theory has contributed to the development of various crucial concepts and metrics. One of these is the Sharpe ratio, developed by William Sharpe in 1966. The Sharpe ratio measures the risk-adjusted performance of an investment or portfolio. The ratio provides insights into the excess return, calculated as the return subtracted from the risk-free rate divided by its standard deviation or volatility. Hence, a higher Sharpe ratio indicates a better risk-adjusted performance. Jensen's Alpha (alpha) is a performance metric that measures the excess return of a given investment relative to its expected return based on its systematic risk (beta). A positive alpha indicates that the investment has outperformed its benchmark, giving its level of systematic risk, while a negative alpha indicates underperformance. Beta measures an asset's or portfolio's sensitivity to systematic risk. Specifically, beta quantifies the relationship between an asset or portfolio's returns and the overall market's returns. A beta value greater than one indicates more volatility related to a given investment or portfolio than the overall market, while a beta value below one indicates the opposite (Jensen, 1967).

2.7 Behavioural finance

The academic field of behavioural finance aims to understand the psychological aspects of financial decision-making and how they affect financial markets, managers, and investors through integrating insights from psychology, economics, and finance. The emergence of anomalies demonstrates evidence contrary to the empirical validity of the Efficient Market Hypothesis, as behavioural finance contests the notion of rationality and maintains that individuals may display irrational behaviour due to cognitive biases. The presence of irrational behaviour among investors can potentially result in market inefficiencies, which may arise from mispricing and anomalies (Baker & Ricciardi, 2014).

Decision-making rationality asserts that individuals possess the cognitive ability to assimilate and utilise all relevant information to reach the most optimal decision. However, the reality of decision-making involves time constraints, limited information, and the need for shortcuts or heuristics, which ultimately can lead to systemic deviations from rational behaviour and sound judgment. As Benjamin Graham once stated, *"The investor's chief problem - even his worst enemy - is likely to be himself."* (Baker & Ricciardi, 2014).

The familiarity bias is a widespread cognitive bias that refers to the tendency of investors to exhibit a preference for investments in a context where they perceive themselves knowledgeable or competent rather than contexts where they feel ignorant or uninformed. Investors may search for investments in familiar assets or companies over the unfamiliar, even when the latter may offer more attractive risk/return profiles (Huberman, 2001). An implication of familiarity bias is rooted in the tendency for investors to feel more comfortable investing in local/domestic assets rather than foreign assets, a phenomenon also known as **home bias** (French & Poterba, 1991). These biases can lead to suboptimal portfolio diversification and increased risk exposure.

Ambiguity aversion refers to the tendency of individuals to prefer options with known risks over options with unknown risks. This bias stems from the discomfort associated with unknown and ambiguous outcomes. As a result, investors tend to opt for familiar or easily quantifiable investments, even if they may not yield a higher expected return than the unambiguous investment (Ellsberg, 1961).

Thaler (1985) proposed the cognitive process of **mental accounting**, in which individuals categorise and evaluate financial outcomes by assigning them to separate mental accounts. This process can result in irrational decision-making, as individuals may treat money differently depending on the mental account to which it is assigned. Private investors tend to make distinctions in their minds that do not exist financially, such as viewing losses incurred separately from paper losses. This practice can lead to a reluctance to sell stocks after experiencing losses and prematurely selling stocks after earning a profit. Literature refers to this bias as the disposition effect due to investors' desire to avoid realising losses and to lock in profits, hence realising profits too early and holding losses too long (Shefrin & Statman, 1985).

Loss aversion, which in many ways relates to the disposition effect, is a key concept in prospect theory proposed by Kahneman and Tversky (1979). The concept of loss aversion pertains to the observation that individuals exhibit greater sensitivity towards a decrease in their investment than an equivalent increase. In prospect theory, utility is defined in terms of losses and gains relative to a reference point, which may be the return of a portfolio. The utility function exhibits a steeper slope for losses than gains due to individuals' heightened sensitivity to losses compared to gains, implying that losses are perceived to be more painful than the pleasure derived from gaining an equivalent amount. This can lead to investors holding on to losses in the hope of recouping these losses, even at the expense of missing out on attractive investment opportunities.

Confirmation bias refers to the tendency to seek out and prioritise information that confirms preexisting beliefs while disregarding or minimising information that contradicts them. Investors seek confirmation for their assumptions and may avoid critical opinions and reports that challenge their views. An investor may be more likely to look for information that puts their original point of view about an investment in a positive light rather than seeking out diverse perspectives and information that may contradict it. One-sided information tends to skew an investor's frame of reference, leaving them with an incomplete picture of a given investment, potentially resulting in faulty decision-making (Ackert & Deaves, 2010).

Herd behaviour is a common phenomenon in financial markets where investors follow the actions of others, often ignoring their own beliefs or analysis. Banerjee (1992) proposes a simple model to explain herd behaviour, showing how investors may disregard their private information and follow the actions of others, potentially leading to market inefficiencies. To avoid this bias, investors should resist following the crowd and avoid jumping on the bandwagon. Although it may feel comfortable investing with the herd, such a strategy will unlikely lead to superior long-term performance. The herding bias may lead to correlated decision-making and potentially increased market volatility. Ultimately increasing the risks for market bubbles or crashes as investors collectively buy or sell assets solely based on the actions of their peers rather than on fundamental valuations.

Representativeness is a heuristic introduced by Kahneman and Tversky (1972). They proposed that the degree of similarity between an event and its parent population determines how representative the event is. When an event is more representative than another event, people tend to judge it as having a higher probability of occurring. One of the implications of representativeness is known as the **extrapolation bias**. It refers to the tendency of individuals to overestimate the likelihood of a future event based on its similarity to a recent trend or pattern. For instance, investors may assume that the stock market will continue to rise in the future if it has been performing well for several months in a row. Ultimately, this can lead to investors labelling investments based on recent performance. Consequently, they ignore stocks when their prices have dropped below their intrinsic values (Baker & Ricciardi, 2014).

Overconfidence bias emerged from investors' tendency to overestimate their abilities, knowledge, and the accuracy of their predictions, synonymous with investors being confident that they possess above-average skills. According to Daniel, Hirshleifer, and Subrahmanyam (1998), investors tend to overestimate themselves more often than not, mainly when markets are rising.

Thaler and Ziemba (1988) describe **the favourite long-shot bias**, a phenomenon initially observed in the parimutuel betting markets, e.g., horse racing and lotteries, where the odds are often skewed towards long-shot bets, but has implications beyond the realm of gambling, such as the financial markets. Just as bettors may overestimate the chances of long-shot bets, investors may overestimate the prospects of high-risk and high-return investments. In other words, it describes investors' preference for high-risk, high-return investments over safer options, despite the lower likelihood of success. Thereby, investors tend to ignore the underlying risks and overestimate the potential returns, driven by emotions and heuristics rather than rational analysis.

3. Literature review

This section is organised by presenting a review of the literature and consequently developing the main hypothesis of this paper. Anchored in the academic sphere surrounding corporate spin-off performance and sources of said performance, this section seeks to illuminate the consensus findings in the literature and the characteristics that supports them.

3.1 Hypothesis 1: Initial sell-off

In the initial trading period after a spin-off has been separated from its parent, the stock generally depreciates both in absolute return and relative to a valid benchmark (Ma & Oyeniyi, 2016; Patel et al., 2012). Although agreeing on the initial underperformance, there are some discrepancies in the persistence of said underperformance. Patel et al. (2012) found that the underperformance lasted for the first 5 trading days, while Ma & Oyeniyi (2016) found that the initial underperformance persisted for the first month. Several logical reasons explain why this occurrence is not random but rather a consequence of the nature of the restructuring act. Patel et al. (2012) points to four main reasons that the value of spin-offs dips initially.

(1) Index selling

If the larger parent company was a member of an index (S&P500, NASDAQ100, DAX, etc.), index funds and institutional investors mandated to buy companies within that asset would have been allocated stocks in the spun-off entity, which no longer fits the mandate criteria. Hence, this will trigger a sell-off from the institutional investors, causing selling pressure on the stock and a subsequent negative effect on the stock price. This rationale also applies to other types of institutions where the new entity falls outside the mandated scope of the investor, e.g., not complying with dividend or market capitalisation thresholds (Ma & Oyeniyi, 2016).

(2) Ownership criteria

The new owners of the firm, i.e., the investors in the parent company that has been allocated shares in the newly spun-off entity, arguably now hold stocks in a company that they never bought intentionally[2]. Hence, the spin-off might not fulfil the investors ownership criteria and consequently can be sold off.

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[2] The investors interested in owning the spin-offs will sometimes acquire the parent company in order to receive the distributed shares in the spin-off after completion. Hence, the ownership criteria for these shareholders will be matched and not cause a sell-off effect.

(3) Limited History

Available financial information on the newly created spin-off might be scarce, which holds off some investors from investing initially.

(4) Low analyst Coverage

The coverage from Wall Street analysts on spin-offs is significantly smaller compared to the parent company. Analyst coverage serves several purposes, including limiting the information asymmetry in new equity offerings (D'Mello & Ferris, 2000). As such, the neglection from Wall Street analysts adds to the information gap between insiders and outsiders, which adds to the inherent risk of investing in the asset, consequently deterring investors from investing initially.

3.2 Hypothesis 2: Long-term stock market performance of spin-offs

Academics and practitioners have investigated corporate restructuring by spinning off subsidiaries and the effect of doing so on, namely the parent company and the subsidiary, since the early 1980s. Generally, the research that concentrates on the effect of spin-offs considers either the performance of the announcement for the shareholders of the parent company (see Hite and Owers, 1983; Miles and Rosenfeld, 1983; Schipper and Smith, 1983; Steward and Walsh, 1996; Daley et al., 2003; Kirschmaiser, 2003, etc.) or the long-term performance of the parent company, the spun off subsidiary, and the pro forma combined company (Cusatis et al., 1993; Desai & Jain, 1999; Veld and Veld-Merkoulova, 2004; Sudarsanam and Qian, 2007).

Veld and Veld-Merkoulova (2009) summarises the preceding studies published on this topic. In their paper, Veld and Veld-Merkoulova (2009) distinguish between studies analysing the wealth effects associated with spin-off announcements and studies analysing the long-term stock market performance of spin-offs. Tables 3.1 and 3.2 below list these studies supplemented by studies published after their 2009 paper.

Table 3.1 | Studies of the wealth effects associated with spin-off announcements

Paper characteristics		Sample characteristics			Abnormal return (%)		
Study authors	Publishment year	Samle size (N)	Geographical area	Period	Event window	Exess return (%)	Significance
Schipper and Schmidt	1983	93	US	1963-1981	(-1,0)	2.84	***
Hite and Owers	1983	123	US	1963-1981	(-1,0)	3.30	***
Miles and Rosenfeld	1983	55	US	1963-1980	(0,1)	3.34	***
Rosenfeld	1984	35	US	1963-1981	(-1,0)	5.56	***
Copeland et al.	1987	188	US	1962-1982	(-1,0)	3.03	***
Denning	1988	42	US	1970-1982	(-6,6)	2.58	*n.a.*
Seifert and Rubin	1989	51	US	1968-1983	(-1,0)	3.26	***
Ball et al.	1993	39	US	1968-1990	(-1,0)	2.55	*n.a.*
Vijh	1994	113	US	1964-1990	(-1,0)	2.90	***
Allen et. al	1995	94	US	1962-1991	(-1,0)	2.15	***
Michaely and Shaw	1995	9	US	1981-1988	(-1,1)	3.19	*n.a.*
Slovin et al.	1995	37	US	1980-1991	(0,1)	1.32	**
Sweard and Walsh	1996	78	US	1972-1987	(-1,0)	2.60	***
Johnson et al.	1996	104	US	1975-1988	(-1,0)	3.96	***
Daley et al.	1997	85	US	1975-1991	(-1,0)	3.40	***
Desai and Jain	1999	144	US	1975-1991	(-1,1)	3.84	***
Krishnaswami and Subramaniam	1999	118	US	1978-1993	(-1,1)	3.28	***
Mulherin and Boone	2000	106	US	1990-1999	(-1,1)	4.51	***
Murray	2000	25	UK	1992-1998	(-1,1)	-0.19	*n.a.*
Schauen et al.	2001	23	UK	1989-1996	(-1,1)	2.13	*n.a.*
Maxswell and Rao	2003	79	US	1976-1997	(0,1)	3.59	***
Kirchmaier	2003	48	Western Europe	1989-1999	(-1,1)	5.40	***
Veld and Veld-Merkoulova	2004	156	Western Europe	1987-2000	(-1,1)	2.62	***
Sudarsanam and Qian	2007	157	Western Europe	1987-2005	(-1,1)	4.82	***
Veld and Veld-Merkoulova	2008	91	US	1995-2002	(-1,1)	3.07	***

*Note: *, **, and *** notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%. "n" denotes the sample size.*
Sources: Veld-Merkoulova (2009)

Table 3.2 | Studies on long run stock market performance

Paper characteristics		Sample characteristics			Abnormal return (%)			
Study authors	Publishment year	Samle size (N)	Geography	Period	0.5 year	1 year	2 years	3 years
Panel A: Pro forma combined (parent + subsidiary)								
Cusatis et. al	1993	141	US	1965-1988		4.7	18,9**	13.9
Desai and Jain	1999	155	US	1975-1991		7.7	12.7	19,8***
Veld and Veld-Merkoulova	2004	45-61	Western Europe	1987-2000	-2.2	-2.3	4.2	2.0
Sudarsanam and Qian	2007	129	Western Europe	1987-2002		-2.3	8.3	8.4
Median					***-2.2***	***1.2***	***10.5***	***11.2***
Panel B: Parent companies								
Cusatis et. al	1993	131	US	1965-1988	6,8*	12,5*	26.7	18.1
Desai and Jain	1999	155	US	1975-1991		6.5	10.6	15.2
McConnell et al.	2001	80	US	1989-1995	8.6	13.5	19.2	5.1
Veld and Veld-Merkoulova	2004	68-106	Western Europe	1987-2000	3.9	-0.7	6.5	-0.4
Rüdisüli	2005	330-435	US / Europe	1980-2005		7.7	17.3	15.9
Sudarsanam and Qian	2007	129	Western Europe	1987-2002		-3.9	6.2	7.1
Median					***6.8***	***7.1***	***14.0***	***11.2***
Panel C: Subsidiaries								
Cusatis et. al	1993	146	US	1965-1988	-1.0	4.5	25.5**	33.6**
Desai and Jain	1999	162	US	1975-1991		15.7***	36.2***	32.3***
McConnell et al.	2001	96	US	1989-1995	8.9	7.2	5.8	-20.9
Veld and Veld-Merkoulova	2004	53-70	Western Europe	1987-2000	12.0	12.6	13.7	15.2
McConnell & Ovtchinnikov	2004	311	US	1965-2000	12.2	10.6**	8.2**	2.9**
Rüdisüli	2005	229-336	US / Europe	1980-2005		18.9***	30.9***	55.8***
Sudarsanam and Qian	2007	142	Western Europe	1987-2002		7.2	17.5	23.0*
Patel et al.	2012	151	US	1995-2012		13.4		
McConnell et al.	2015	153	US	2001-2013	4.8*	8.5*	17.1**	26.5**
Ma and Oyeniyi	2017	516	US	1989-2015	3.3*	8.4***	10.2**	22.08***
Median					***6.85***	***8.50***	***17.10***	***23.00***
Average					***6.70***	***10.22***	***18.34***	***26.42***

*Notes: *, **, and *** notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%. "n" denotes the sample size. The average abnormal return after 3 years on Panel C excludes McConell et al., 2001 as it is an outlier.*
Sources: Veld-Merkoulova (2009), Patel et al. (2012), McConell et al. (2015), Ma and Oyeniyi (2017)

In addition to evidently underlying the strong concentration of research focus on announcement day wealth effects, the tables illustrate that among the studies focusing on the abnormal returns of spin-offs over different time periods up until 3 years, most studies find statistically significant abnormal returns, indicating the attractiveness of the spin-offs at an aggregated level. Hence, prior literature indicates that investing in spin-offs, on average, yields a positive abnormal return relative to the benchmark[3]. However, the most recent study investigated returns of spin-offs in the period 1989-2015, which means that the past seven years of performance have not been investigated in the literature, while the vast majority of studies focus on earlier time periods. Hence, it is not certain that the same conclusions will be accurate for an updated sample period. As such, this paper contributes to the literature by analysing recent stock market evidence of spin-offs.

[3] Benchmarks differ by research papers and include traditional market benchmarks and more specific benchmarking, such as using matching firms.

Although the literature primarily focuses on the US market, Ma & Oyeniyi (2016) found that spin-offs outside the US exhibited similar performance characteristics as the ones inside the US. Hence, using the theoretical findings from the literature assumably describes similar markets to an acceptable degree for the purpose of establishing the theoretical framework of the investment strategy presented in this paper.

The literature generally supports the hypothesis that the spin-off is a value-adding action on average. Miles & Woolridge (1991) concluded that spinning off business units creates significant value for both the parent and the spin-off. Moreover, in addition to tackling the conglomerate discount, as Khorana (2011) argued as the main reason for de-diversifying businesses, Cusatis et al. (1993) found that one of the main reasons that the spin-offs exhibited abnormal returns was due to the fact that they experienced an unusually high incidence of takeover activity. I.e. it can be argued that spinning off business units is a low-cost methodology of transferring control of corporate assets to owners who create higher value. Whether this is being sponsors or otherwise, a more narrowly defined strategic focus of the business, can attract better-suited bidders, which consequently increases the value of the asset. Hence, overall conclusions from the literature support the hypothesis investigated in this paper; spinning off certain business segments offers the opportunity for owners with a higher perception of the value of the asset can own it without being forced to own the remaining business segments.

3.2.1 Success characteristics of spin-offs

Given that numerous studies have found that spin-offs have resulted in abnormal returns on average, the characteristics of the spin-offs that have outperformed have been investigated. As such, these characteristics indicate the rationality for the spin-off to signify whether investing in the spin-off is wise or not. As discussed in section 2.2 regarding the Efficient Market Hypothesis, if all information prevails in the market in its entirety, investors would solely be compensated for their systematic risk appetite, and consequently, there would be no opportunities for abnormal returns. Hence, in accordance with the efficient market theorem, investors will not be compensated for investigating the companies of interest prior to purchase, as any information that the investor could hope to gather would be embedded in the trading price. However, several assumptions must be present for this statement to hold true, which seems to contradict the evidence on spin-offs.

The literature on spin-offs indicates that certain attributes of spin-offs can help predict the winners and losers and consequently achieve positive abnormal returns. Emrick et al. (2017) identify several key attributes of spin-offs that have been present in the segment of spin-offs that have outperformed the aggregate market. The financial attractiveness of spin-offs for investment purposes can be summarised in five categories: improving capital efficiency, improving growth trajectory through M&A, preserving the benefit of size and scale, maintaining financial flexibility, and improving growth trajectory organically.

Improvement of capital efficiency

Emrick et al. (2017) found that improvement of capital efficiency was present in 89% of the successful spin-offs and consequently had the most impact on excess return. Improving capital efficiency is a common rationale for spin-offs, as it can increase the capital efficiency of both the parent and the subsidiary. The study considers subsidiaries that achieved a higher return on invested capital (ROIC) than their industry median as outperformers, with excess returns reaching 26%. However, subsidiaries that failed to generate a ROIC comparable with their industry peers exhibited significant underperformance. In general, subsidiaries with high capital intensity have underperformed. Similarly, parents achieved positive excess returns on average when their ROIC exceeded the industry median.

Improve growth trajectory

Improving growth trajectory has frequently been cited as a primary objective of spin-offs, and Emrick et al. (2017) found that when this criterion was satisfied, 71% of the spin-offs outperformed. Subsidiaries whose projected revenue growth after separation outpaced the growth of their industry peers delivered excess returns of 19%. However, in those cases where projected revenue growth lagged industry peers, excess returns for the subsidiaries averaged minus 7%. Similarly, parents that accelerated their growth trajectories post-separation showed meaningful outperformance. Using M&A to further drive growth also proved to be a major driver of shareholder value following spin-offs as subsidiaries that were able to improve their growth trajectory through M&A outperformed. However, there has been a decline in post spin-off acquisition activity, which partly explains the deteriorating performance of spin-offs in recent years.

Preserve the Benefit of Size and Scale

Emrick et al. (2017) found that 67% of the spin-offs outperformed when this factor was satisfied. Spin-offs often require a minimum critical size to be competitive and to secure capital market access. During the 2011-2015 period, larger spin-offs (with a market capitalisation exceeding USD 3 billion) generated post-completion excess returns of 12%, while smaller ones (with a market capitalisation below USD 1 billion) experienced two-year post-completion excess returns of -28%. This trend was also observed when spin-off size was measured relative to the parent's market capitalisation or revenue. Larger spin-offs also benefit from institutional factors such as research analyst coverage and index eligibility, which increase demand for their shares. Furthermore, the size and market share of the parent company may bestow competitive advantages, with those whose revenue exceeded the industry median generating two-year post-completion excess returns of 3% and those with lower revenue experiencing negative returns.

Maintain financial flexibility

Emrick et al. (2017 further found that maintaining financial flexibility is important for spin-offs. Subsidiaries that maintained their financial flexibility after the spin-off have outperformed, with excess returns of 64%.

Improving growth trajectory organically

Lastly, Emrick et al. (2017) found that improving the growth trajectory organically important for spin-offs. Subsidiaries that were able to improve their growth trajectory organically have outperformed, with excess returns of 58%.

3.3 Hypothesis 3: Risks and returns of a spin-off investment strategy

Given the evidence presented, it is clear that spin-offs historically, on average, have yielded attractive returns for their investors. Furthermore, these returns have compensated investors to a larger degree than the market in general. However, the excess return that can be achieved is difficult to compare across assets if the risk of the investment is not taken into consideration. Nevertheless, the risks associated with spin-off investment have not received similar academic attention as the returns. However, the study by Patel et al. (2012) found that the volatility of spin-off returns is substantially higher than that of their parent companies. The paper found that the standard deviation of returns following the first 30 trading days after the effective date was 11.7% for parents and 16.1% for the spin-offs. Moreover, the same study found that for returns over 12 months, the parent company had an average standard deviation of 42% over the 12-month period, while the spun off subsidiaries had an 82% average standard deviation, and hence almost twice the spread of the parent companies. As such, since these strategies appear to be embedded with a higher inherent risk, it is essential to consider whether the possibly larger return is sufficiently large to compensate investors for their added risk. Moreover, by examining this unexplored aspect of spin-off investments, this paper adds needed knowledge to the body of literature focused on spin-off investments.

3.4 Hypothesis 4: Effect of different industry on long-term spin-off performance

Although empirical literature generally has concluded that excess aggregated returns of spin-offs are significantly positive, the literature also recognises a great variety in the performance of spin-offs. Moreover, several empirical and theoretical explanations for this have been presented. One of such rationalisations includes spin-offs that are different in nature compared to its parent company gets spun off to increase the business focus within each entity. As such, an attraction of the spin-off is that it will have a significantly increased business focus relative to its prior state as part of the diversified parent company.

Traditionally, large, diversified businesses with little to no synergies between their business units have traded at a discount to their peers. Since the spin-off will become a separate entity and consequently no longer a part of the large, diversified business, there is no theoretical foundation for it to still trade at a discount, which creates an arbitrage opportunity between the market price and the intrinsic value of the business. Even though the conglomerate discount of modern conglomerates is somewhat different relative to the classic conglomerates (as presented in section 2.5), increased business focus and, consequently, de-diversifying the business will, in theory, position the company better for the right owners, which will extract excess value from the company. This is further supported from the perspective of portfolio theory (section 2.6); investors would rather diversify their investment portfolios themselves rather than have the businesses they invest in diversify on their behalf.

For these reasons, spin-offs have long been recognised as an effective tool to close the valuation gap and consequently unlock value for both parent and subsidiary (Emrick et al., 2017). The study further found that excess returns two years after completion were 19% higher when the parent company had three or more industry segments relative to having two or fewer, hence signifying the value creation of de-diversifying the business. Nonetheless, due to the clear value-adding mitigation procedure by spinning off business units, companies are increasingly becoming de-diversified, and spin-offs are increasingly coming from related businesses with a different strategic focus (Emrick et al., 2017). Hence, the overall reasoning for the spin-off is, to an increasing extent, important for extracting attractive returns for investors.

3.4.1 Improvement of industrial focus

Several studies (Hite & Owers, 1983; Schipper & Smith, 1983; Daley et al., 1997; Desai & Jain, 1999) suggest that spin-offs can result in benefits such as improved focus and elimination of negative synergies between the parent and subsidiary. Desai and Jain (1999) also found that spin-offs initiated to separate unrelated business divisions significantly improve operating and financial performance. Hite and Owers

(1983) found that firms focusing on de-diversification exhibited the largest abnormal returns in the period surrounding the spin-off announcement. Allen et al. (1995) found indirect evidence for the focus improvement motive, suggesting that spin-offs create value by correcting prior acquisition mistakes. Overall, empirical evidence suggests that the benefits of spin-offs mainly come from separating diverse units, which enhances focus and eliminates negative synergies. It can be argued that two main sources of increased value are possible, (1) the elimination of negative synergies between parent and subsidiary and (2) an improved valuation of separate entities after the spin-off. Given the positive long-term abnormal returns found by, e.g., Cusatis et al. (1993), it can be argued that the value creation not originated as a result of an improved valuation on the subsidiary comes from the elimination of negative synergies.

3.4.2 Information asymmetry

An additional explanation for the positive abnormal returns when the parent company is a diversified business is that the spin-off mitigates information asymmetry in such a case. According to Nanda and Narayanan (1997), the market's inability to observe individual divisional cash flows results in the mispricing of a firm's securities, which can be corrected through spin-offs. After a spin-off, detailed disclosure of individual profit and lost information in 8K and 10K statements eliminates the need for noisy estimation of division-specific information from consolidated financial statements. This change leads to greater accuracy in analysts' earnings forecasts and turnover among analysts following the firm's stocks. However, this process does not happen immediately. Spin-offs formally separate the operations and assets of the divisions, making manipulation of shared costs impossible and thus mitigating information asymmetry. Therefore, corporations engaging in spin-offs can enhance value by correcting valuation, even in the absence of negative synergies between divisions. As such, it can be argued that firms engaging in spin-offs have higher levels of information asymmetry about their value than other firms, and abnormal returns should be positively related to the degree of information asymmetry. Krishnaswami and Subramaniam (1999) find evidence that firms engaging in spin-offs have higher levels of information asymmetry. Hence, the study suggests that spin-offs can help bridge the information gap and ultimately increase the value of a firm.

3.4.3 Incentive alignment and compensation

When a subsidiary is part of a large multi-product firm, accurately measuring the performance of each subsidiary manager can be cumbersome. As such, a spin-off will enable more accurate performance measurement of a subsidiary, which further enables the possibility of optimising the incentive structure to sustain company performance and growth. Aron (1991) argues that the share price of a large multi-product firm is a very noisy signal of any divisional manager's productivity and, consequently, a poor benchmark for performance.

Steward and Walsh (1996) argue that spin-offs produce gains through distinct incentive agreements developed post-restructuring, which enhance the alignment of incentives of the various stakeholders in the company. Their study of 78 spin-offs discovered that after the spin-off, the boards of directors and compensation committees were mainly composed of outside directors, implying that the company implemented effective internal governance and control measures. They also found that the CEO's compensation in the spun-off subsidiary was generally tied to their performance. However, their study found no significant correlation between the gains from spin-offs and these improvements in contracting efficiency. Moreover, Krishnaswami and Subramaniam (1999), who provide empirical evidence for the implications of the information gap on spin-off performance, propose that a lack of transparency between a firm's managers and the market can create an imbalance in the information that could be rectified through spin-offs.

As such, the literature indicates that breaking up large companies with diversified businesses is a value-adding procedure given its mitigation effects on the conglomerate discount that might persist in some of such companies and that these corporate restructuring has been happening to a large extent, leaving back few conglomerates trading at a persistent discount. This causes a foundation for consideration regarding the relevance of an investment strategy utilising efficiently inefficient market frictions related to corporate restricting such conglomerates, further emphasised by the literature on spin-off investments. Nonetheless, this paper argues that this methodology remains relevant as empirical studies indicate that diversified business persists and continuously spin-off attractive non-core businesses. Nonetheless, this type of spin-off constitutes a smaller percentage of total spin-offs due to increased business focus on an aggregate level, which signifies the increasing importance of analysing the spin-off prior to investment.

3.4.4 Limitations and contributions of this paper

Wealth transfer from bondholders to shareholders

Other points in the literature include that wealth creation has been shown to move wealth from bondholders to shareholders. In a case study of the Marriot spin-off, Parrino (1997) found that the restructuring reduced the collateral on Marriot's existing debt while reducing the bondholders' claims on cash flows, evidently reducing the value of debt resulting in the share price soaring. However, neither Hite and Owers (1983) nor Schipper and Smith (1983) find evidence of wealth transfer on average in a larger sample of spin-offs. Both studies find that the announcement period bond returns are not significantly different from zero. Hence, this factor is not included in this paper.

Tax and regulatory motives

Schipper and Smith (1983) further examine the spin-offs initiated for tax or regulatory purposes. The hypothesis includes the argument that a regulated firm might spin off a subsidiary to avoid the regulation of the larger company or that spinning off a subsidiary overseas to avoid paying taxes in a different country than the parent company. However, the authors do not find any evidence to support this hypothesis on an aggregate level, for which reason this rationale is not included in the paper.

3.4.5 Shortcomings of the literature and contributions of this paper

Although significant research efforts have been dedicated towards corporate spin-offs and their parents, the literature is yet somewhat incomplete with respect to certain aspects. Specifically, the efforts of previous literature can be characterised by the following four statements.

i. The sample from a large proportion of prior literature focuses alone on the US market, and hence conclusions are not as well tested for all developed economies.
ii. An overweight of prior literature focus on the initial announcement performance of the parent company or the joint entity rather than the long-term performance of the subsidiary.
iii. Only a single report investigates the risks associated with spin-off investments. Since risks and return go hand in hand, this paper contributes to the literature by illuminating this aspect.
iv. Of the studies investigating the long-term performance of subsidiaries, the literature is generally based on sample periods from before 2000. Consequently, whether their conclusions still hold true in modern markets has not yet been verified.

Hence, it is assessed that this paper, focusing on the less investigated aspects of the general literature with a recent sample period, constitutes a valuable contribution to the literature.

4 Macroeconomic environment and outlook

In recent years, the global economy has been buffeted by various headwinds, such as the financial sector turmoil, policy tightening aimed at containing very high inflation, increasing geopolitical uncertainty, and three years of COVID. Despite these headwinds, companies continue to pursue corporate carve-out and spin-off transactions to generate value and streamline their business portfolios. However, increased market volatility, macroeconomic uncertainty, and geopolitical developments in 2022 may pose headwinds for future activity levels. Investors and leaders are now looking into a wide range of macroeconomic scenarios for 2023 and beyond. The big-picture question is which of the following three scenarios is most likely to occur: no recession, a mild recession, or a deep recession.

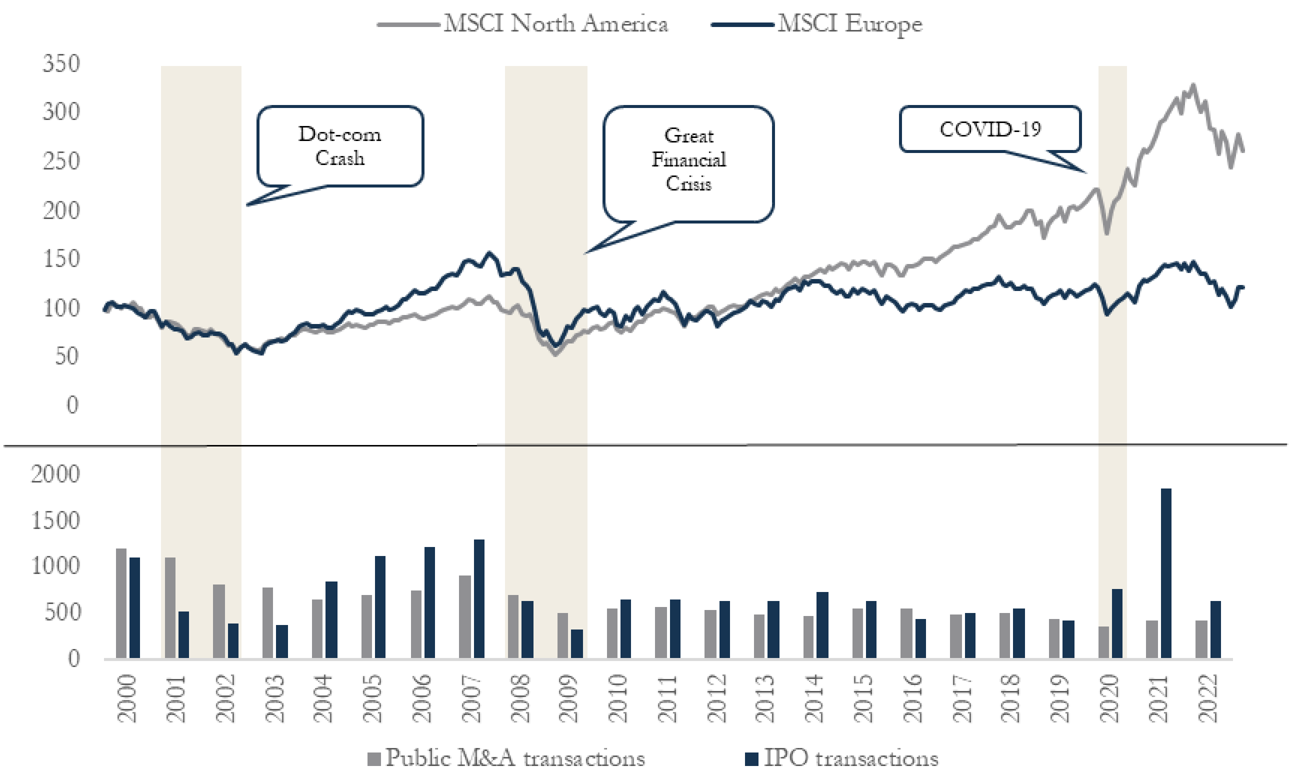
To shed light on these scenarios, we held an interview with Josephine Cetti, Chief Strategist at Nordea, to gain insight into her thoughts and expectations for the outcome of these scenarios:

"Our base scenario is still a relatively mild recession. We will see a slowdown in the economy in the US first because they were the ones who started raising interest rates quite aggressively in March 2022 and have also raised interest rates more than they have in Europe. So, they will be the ones to see an economic slowdown first."

Understanding the broader economic conditions and market expectations is essential for identifying opportunities and managing risk, especially in an era of heightened market volatility and economic uncertainty. Prior research has highlighted the significance of forward-looking behaviour among investors, indicating that they frequently adjust their investment strategies in response to expected changes in the macroeconomic environment (Racicot & Theoret, 2016). E.g., hedge funds that engage in active management of their market exposure by modifying their portfolio holdings in response to changes in the macroeconomic environment have been shown to generate superior risk-adjusted returns (Lambert & Platania, 2020). This suggests that forward-looking dynamics are essential in enhancing investment performance and that investors who can adeptly adjust their investment strategies in response to changing market conditions may achieve superior financial outcomes.

The co-movement between macroeconomic variables and financial markets is a primary topic of empirical investigation, highlighting its relevance to the area of systematic risk. This is particularly important when assessing financial crises and their contagious effects. Previous studies have demonstrated that the activity level of Mergers and Acquisitions (M&A) and Initial Public Offerings (IPOs) have a significant positive relationship with stock market performance and a significant negative relationship with market volatility (Jeon & Tran, 2011). Hence, it constitutes a critical source of information for investors and companies. Companies closely monitor investor behaviour, as companies are more likely to pursue M&A deals and IPOs in times when investors are more willing to provide capital and have risk-seeking behaviour. Companies are also more inclined to avoid pursuing IPOs during periods of market turmoil, as illustrated in Figure 4.1, where a significant decline in IPO activity can be observed during the dot-com crash and the great financial crisis.

Figure 4.1 | Stock market performance and M&A and IPO activity in North America and Europe



Sources: Own contribution, FactSet

In 2021, IPO activity surged to record levels due to low interest rates, ample liquidity, and improved economic conditions. Nevertheless, the market outlook for both M&A and IPO activity changed in 2022, primarily due to higher geopolitical uncertainty that has had contagious effects on the rest of the economy. As a result, the appetite for M&A and IPOs has been adversely impacted by market turbulence and a challenging macroeconomic environment reflecting concerns over inflation, energy and commodity prices, rising interest rates, and geopolitical tensions.

Despite these challenges, there is still an underlying push for companies to generate value by streamlining their business portfolios, as shareholder activism continues to drive the demand for companies to split their business in order to create greater value for shareholders (Kühnle, 2023). However, given the current economic environment, market participants are looking for any sign that suggests a bottoming out of negative data, as investors are forward-looking and vigilant about assessing when the outlook will improve. As such, decision-making today is driven by factors that will drive value returns on capital, given the higher cost of capital being factored in.

In 2022, it became apparent that the era of zero rates is being left behind as the geopolitical situation underwent a massive change following the COVID-19 pandemic and the Russian invasion of Ukraine. The move away from zero rates is expected to be sustained due to de-globalization and post-COVID labour shortages, which have ended two underpinnings of three decades of disinflation, resulting in higher inflation that supports the likelihood of interest rates staying higher in the foreseeable future (Harrison, 2023). The macroeconomic environment has made companies more cautious, according to Chief Strategist, Josephine Cetti:

"The companies are more cautious. Like everyone else, they are also waiting and fearful of what will happen. If you look at all the indicators again, there are some indicators we look at that show CAPEX plans. There is not much investment appetite among companies, even if you look at some of those who have invested the most. Some of the companies that have invested the most are tech companies. After 2022, they have really had to put the brakes on and focus on earnings and core business."

Extensive studies have been conducted over the years to investigate the relationship between stock market performance and macroeconomic variables with varying outcomes and conclusions, depending on the specific country or region under investigation. Variables such as GDP, interest rates, inflation, and unemployment are widely acknowledged as fundamental indicators for assessing the general well-being of the economy, and they often serve as the subject of consensus estimates when expectations for the economy are discussed.

A study by Asprem (1989) examines the explanatory power of macroeconomic variables on long-term stock market movements in ten Western European countries. The author discovers that inflation and interest rates have a significant negative relationship with stock prices, while unemployment rates surprisingly have a positive relationship with stock prices. Possible explanations could be that high unemployment rates may lead to lower labour costs, resulting in better company margins and profitability.

Furthermore, in the later stages of a boom period, companies may increase their employee staff in anticipation of rising demand. However, as favourable market conditions end, demand for goods and services may diminish, resulting in lower earnings. This can be attributed to the cyclical nature of expansions and contractions, where companies adjust their activity due to changes in consumer demand and economic conditions.

A more recent study by Humpe and Macmillan (2007) also examines the relationship between macroeconomic variables and stock market movements, focusing specifically on the United States. Their findings are consistent with those of Asprem (1989), as they also identify a significant negative relationship between inflation and interest rates with stock prices.

In general, when examining macroeconomic indicators, it is essential to consider their long-term relationship, as these indicators reflect changes in macroeconomic conditions after they have already occurred, meaning that they are lagging indicators. Therefore, they would not provide any sign that suggests a bottoming out of negative data. Despite their limitations in predicting short-term economic changes, they are widely utilised to evaluate the overall well-being of the economy.

Economists and market participants continually provide predictions and analytics for the current and future state of the economy. Forecasts are primarily based on consensus estimates for the US, which in the tables below is summarised for 2023-2025 alongside a longer-run forecast. Table 4.1 presents consensus estimates from 62 well-known market participants who are actively involved in the field of economics and finance, including economists, academics, and financial analysts (The Wall Street Journal, 2023).

Table 4.1 | Consensus forecasts from a panel of academic, business, and financial economists

Percent

Variable	Median				Central Tendency*			
	2023	2024	2025	Longer run	2023	2024	2025	Longer run
Federal Funds Rate	5.1	3.5	2.9	2.5	4.1-5.4	2.4-4.9	2.1-4.1	2.0-3.5
Change in real GDP	0.2	1.7	2.1	1.9	-0.6-2.0	0.5-3.0	1.5-3.0	1.5-2.5
Unemployment rate	4.2	4.5	4.3	4.0	3.6-5.2	3.6-5.4	3.6-5.0	3.5-4.5
PCE inflation	3.4	2.3	2.1	2.0	2.5-4.5	1.6-3.6	1.5-2.9	1.9-3.0

*Note: *The Central Tendency excludes the three highest and lowest projections for each variable in each year.*
Source: WSJ Economic Forecasting Survey. Data as of April 2023.

According to consensus forecasts from economists and market participants, the Federal Funds Rate is anticipated to peak around 5.1% during 2023 before gradually declining and reaching approximately 2.9% by the end of 2025. The reduction towards 2025 could positively affect transaction activity, making borrowing cheaper and reducing the cost of capital for companies.

The projected change in real GDP indicates relatively weak economic growth in 2023, with a growth rate of only 0.2%. However, the projected growth rate picks up in 2024 and 2025, with growth rates of 1.7% and 2.1%, respectively. The central tendency suggests a wide interval of negative 0.6% to positive 2.0% by the end of 2023. These figures suggest that the economy may experience a mild recession in the second half of 2023 or the beginning of 2024. This view is supported by Chief Strategist, Josephine Cetti:

"We keep postponing it. So, I think it is going to happen in around the fourth quarter, and the expectation is still that it will be a relatively mild recession, but many things can happen until then, so it is not 100%. We usually attach some probabilities to each scenario, and we would say there is a chance of a recession, especially with the recent turmoil in the banking sector. It might have become more of a soft-ish landing and will still be mild."

The unemployment rate has remained historically low, further supported by labour shortages in the US and Europe. The unemployment rate is expected to remain relatively constant during the next three years, but with a slight increase in 2024, which could be attributed to a possible mild recession. The labour shortage can be related to a booming service sector post-COVID-19, according to Chief Strategist, Josephine Cetti:

"The service industry constitutes a significant portion of the economy, such as in the US, where 70% of the economy is in the service industry. As long as the service industry is doing well, you can have a good overall economy. You can have a period of decline in manufacturing without a recession, but if service industries decline, that is when there is a problem."

Although inflation has slowed since the middle of last year due to easing supply bottlenecks and lower energy prices, it remains above the Federal Open Market Committee's (FOMC) objective of 2% (Federal Reserve, 2023). In response to the high inflation last year, FOMC had to increase interest rates and reduce securities holdings to tackle the inflation. The projections for Personal Consumption Expenditures (PCE) inflation suggest a continuation of the decreasing inflation rate from 3.4% by the end of 2023 to 2.1% by the end of 2025.

Table 4.2 presents consensus estimates from members of the Federal Reserve Board and presidents of Federal Reserve Banks for 2023-2025 together with a longer-run forecast (Federal Reserve, 2023).

Table 4.2 | Forecasts from Federal Reserve Board members and Bank presidents

Percent

Variable	Median				Central Tendency*			
	2023	2024	2025	Longer run	2023	2024	2025	Longer run
Federal Funds Rate	5.1	4.3	3.1	2.5	5.1-5.6	3.9-5.1	2.9-3.9	2.4-2.6
Change in real GDP	0.4	1.2	1.9	1.8	0.0-0.8	1.0-1.5	1.7-2.1	1.7-2.0
Unemployment rate	4.5	4.6	4.6	4.0	4.0-4.7	4.3-4.9	4.3-4.8	3.8-4.3
PCE inflation	3.3	2.5	2.1	2.0	3.0-3.8	2.2-2.8	2.0-2.2	2.0

*Note: *The Central Tendency excludes the three highest and lowest projections for each variable in each year.*
Source: Federal Reserve. Data as of March 2023

The predictions from Federal Reserve Board members and Federal Reserve Bank presidents are broadly in line with consensus estimates from economists and market participants, as stated in Table 4.1. Nonetheless, economists and market participants are slightly more optimistic about the future state of the economy than Federal Reserve Board members and Federal Reserve Bank presidents. The market participants anticipate a faster reduction of the Federal Funds rate, more rapid real GDP growth, and a less severe impact of a potential recession on unemployment. However, there is a more significant discrepancy in consensus estimates among market participants, which is reflected by the wider consensus interval.

5 Data

In any data-intensive analytical task, data collection, processing, and classification of data are essential to ensure the robustness of the empirical results. The first section introduces the databases applied in this thesis to identify and collect all relevant spin-offs that fit the criteria to be included in the final data sample. Subsequently, a comprehensive description of the data collection process is provided in which the criteria and the rationale behind each criterion will be outlined. This section highlights the significance of transparent and systematic criteria selection in ensuring the reliability and validity of the final data sample. Lastly, this section presents the descriptive statistics to provide readers with a comprehensive understanding of the final data sample and illuminate the spin-offs forming the basis of the analysis (Campbell, Lo, & MacKinlay, 1997).

5.1. Databases

This section presents the use of databases in this thesis and emphasises the importance of using recognised and reliable sources to identify and extract all relevant spin-offs and associated data accurately. FactSet is selected as the primary database due to its comprehensive suite of analytical tools that facilitate the identification and analysis of firms and transactions, making it an ideal database for this study. Furthermore, FactSet provides access to a wealth of global financial data, which is crucial for conducting a rigorous and robust analysis of spin-offs. Although FactSet is the primary database, the S&P Capital IQ platform has been utilised to complement and corroborate the data sample obtained from FactSet. However, S&P Capital IQ has solely been employed to validate the transactions, while historical stock prices, sector classifications and other company-specific information rely entirely on FactSet. Employing one primary database for gathering the data sample enables the avoidance of concatenating the same spin-offs in the data sample while promoting data accuracy and consistency, ultimately resulting in a streamlined analytical process.

All historical stock prices are denominated in local currency to eliminate concerns about potential currency effects that could distort the empirical results. Furthermore, the historical stock prices are adjusted for stock splits and dividends and represent the closing price of the given trading day. In terms of sector classification, numerous indicators are available for classification purposes. For this purpose, we utilise FactSet's Economic Sector Classification, which categorises companies into different sectors based on their primary business activities. This methodology is consistently applied across all companies to ensure data consistency across the analysis and compatibility with other widely used classification systems.

5.2 Sample selection

The data sample of this thesis comprises completed spin-off divestments in Northern America and Western Europe in a period of 23 years lasting from January 1, 2000, until December 31, 2022. The geographical location is based on the domicile of the spun-off entity. The gross sample was constructed using the FactSet screening tool and consisted of 1,804 spin-offs. Afterwards, the gross sample was gradually reduced to fit the criteria to be included in the final sample. The criteria applied in the screening tool in FactSet and the manual screenings applied subsequently are outlined below, along with the number of excluded observations indicated in parentheses, accompanied by a brief rationale of each criterion.

I) Transaction status: Only completed spin-offs (659)
II) Target location: Northern America or Western Europe (294)
III) Time period: January 1, 2000, until December 31, 2022 (55)
IV) Misclassified and non-existing firms (16)
V) Spin-offs without any historical stock prices in FactSet (97)
VI) Spin-offs without trading liquidity (43)
VII) Spin-offs with less than 180 trading days (28)
VIII) Outlier adjustments (3)

I) Transaction status: Only completed spin-offs (659)

Completed spin-offs have undergone all necessary steps, such as the distribution of shares to shareholders. Only completed spin-offs have sufficient data available for this analysis as it requires public trading history. Therefore, any pending or cancelled spin-offs have been removed from the data selection process by the screening tool in FactSet. This criterion resulted in an exclusion of 659 observations from the gross sample.

II) Target location: North America or Western Europe (294)

The data sample is limited to only include spin-offs geographically located in Northern America and Western Europe. These geographical regions are characterised as developed economies and, as a result of this, share many similar characteristics. In addition, these regions are known for their extensive data availability, high-quality accounting and legal standards, and high market efficiency relative to other geographical regions. As most of the gross sample consists of spin-offs performed in either Northern America or Western Europe, limiting the data sample to these regions ensures a robust sample size with high data availability. This criterion resulted in an exclusion of 294 observations from the gross sample.

III) Time period: January 1, 2000, until December 31, 2022 (55)

Deciding on a specific period for a screening process on spin-off performance is essential to ensure that the data sample is consistent with being: 1) relevant, 2) representative, and 3) manageable. The relevance is contingent upon including the most recently available observations to maintain the contemporary significance of the analysis. Secondly, setting a specific period that covers a sufficient timeframe helps ensure that the data is representative and, as a result, less biased towards historical events or economic cycles. Lastly, a specific period makes the data sample manageable in size and scope. As a result of the already implemented criterion I), this criterion excludes 55 observations from the gross sample.

IV) Misclassified and non-existing firms (16)

In the manual process of validating the spin-offs, a limited number of observations were removed due to misclassification and cases where it was impossible to confirm the spin-off entity's existence. This manual validation process is crucial as misclassified observations can skew the data distribution, ultimately leading to inaccurate and flawed statistical tests. This criterion resulted in the exclusion of 16 observations from the gross sample.

V) Spin-offs without any historical stock prices in FactSet (97)

In order to evaluate the performance of spin-offs, historical stock prices are a necessary metric, as per criterion *I)*. However, although the FactSet screening only considered completed spin-offs, obtaining stock prices for all spin-offs was not feasible. As a result, spin-offs without available stock prices had to be manually excluded from the dataset. This criterion resulted in the exclusion of 97 observations from the gross sample.

VI) Spin-offs without trading liquidity (43)

It is essential to remove illiquid stocks from the data sample because including them can lead to biased estimates of parameters, and they can distort the results and ultimately reduce the accuracy of statistical inference. If a newly spun-off entity lacks liquidity, obtaining an accurate measure of its market reaction to the event can be challenging. Illiquidity can lead to wide bid-ask spreads, which can distort the price impact of the spin-off. This exclusion of spin-offs with zero or very low liquidity allows for better comparability between the remaining spin-offs in the sample. This criterion resulted in the exclusion of 43 observations from the gross sample.

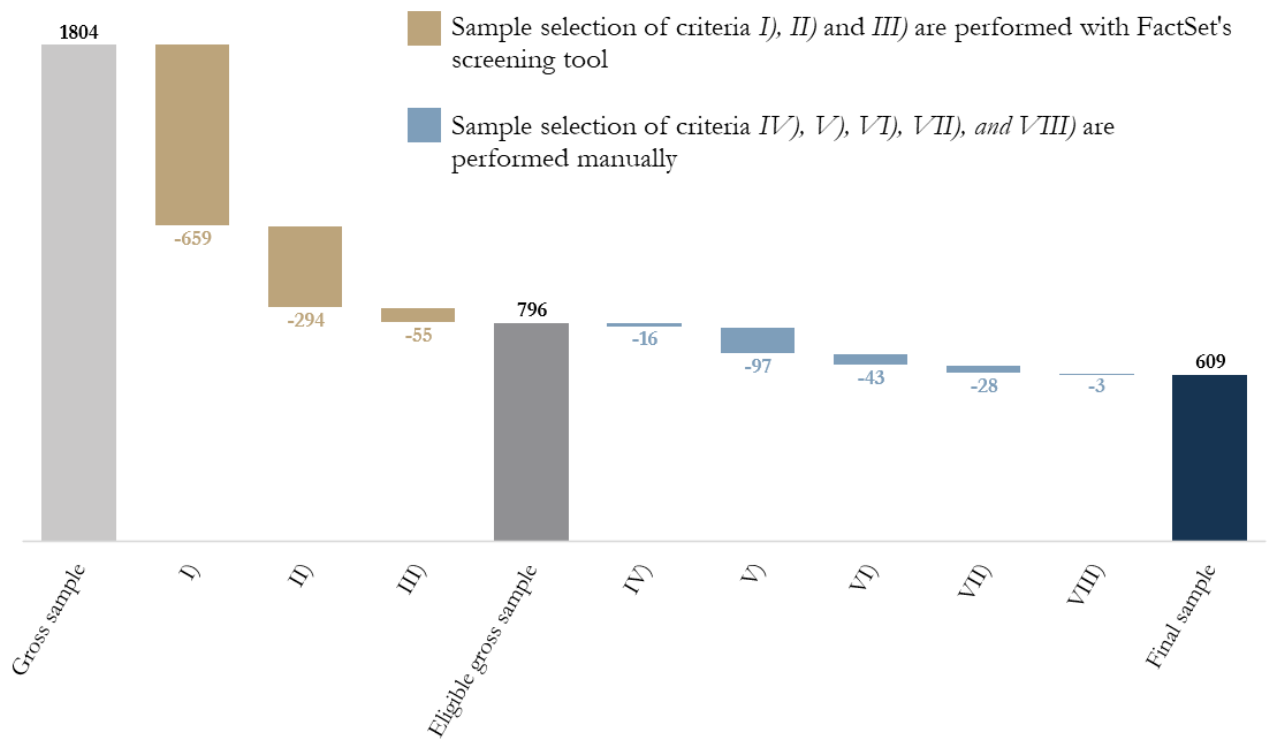
VII) Spin-offs with less than 180 trading days (28)

To ensure sufficient trading history for accurate beta estimates in the regression analysis, this thesis uses a minimum of 180 trading days. Furthermore, 180 trading days help smooth out the effects of short-term fluctuations and market noise. This criterion resulted in the exclusion of 28 observations from the gross sample.

VIII) Outlier adjustments (3)

Eliminating outliers from a sample is essential for ensuring the reliability and validity of research findings. Outliers, deviating significantly from the central tendency can distort statistical analyses and lead to inaccurate conclusions. By adjusting for these anomalies, researchers can obtain more robust and generalisable results, contributing to a higher quality of research (Stock & Watson, 2015).

Figure 5.1 | Sample selection process



Sources: Own contribution, FactSet

This final data sample is comparatively more extensive than those in previous literature on spin-off performance. According to Israel (1992), an evaluation of the sample size can be grounded on the sample sizes of previous studies. The literature includes several studies based on smaller sample sizes, affirming the validity of the data and justifying conducting the analysis based on the final data sample of 609 spin-offs. However, it is worth noticing that different screening processes employed in previous studies will affect the number of observations in the final data sample (See Table 3.2). Nevertheless, the size of the final data sample contributes to three factors that enhance the reliability of the results: (1) improved robustness, (2) reduced bias, and (3) increased precision. The improved robustness is related to a lower likelihood of outlier influence, as a greater sample smooths out the data. Secondly, an extensive sample is more likely to be representative of the overall population of spin-offs. Thirdly, the data distribution becomes increasingly reliable, resulting in more precise conclusions about the phenomena under investigation.

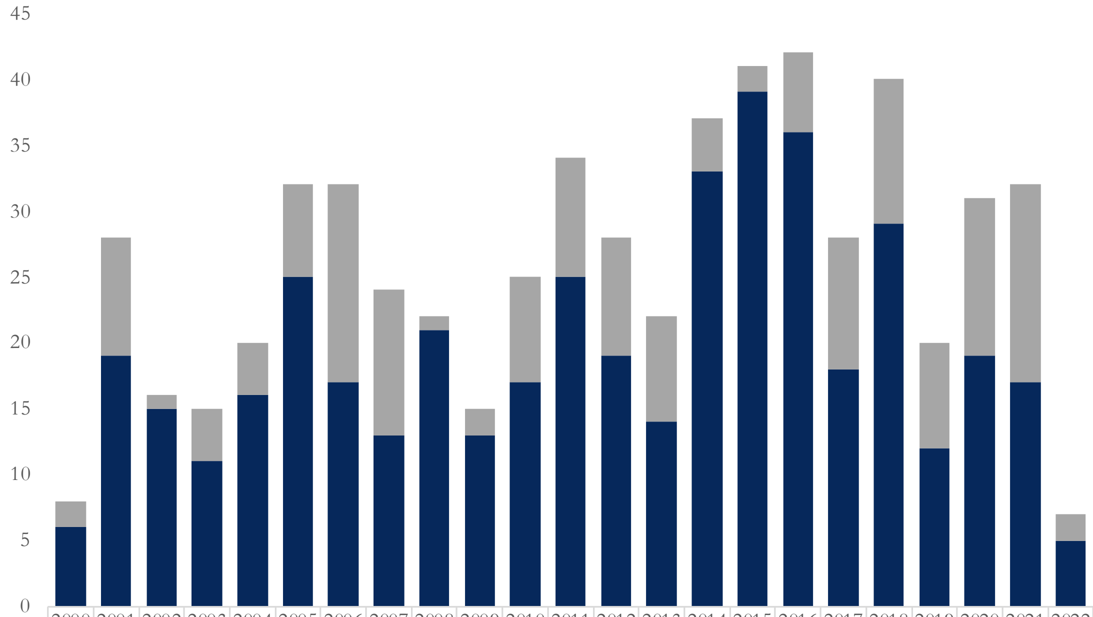
5.3 Descriptive statistics

This section presents descriptive statistics to provide readers with a summary of the main characteristics of the final data sample of this study. The final sample includes 609 spin-offs between January 1, 2000, and December 31, 2022, with a geographical location in Northern America or Western Europe.

Figure 5.2 provides an overview of the distribution of completed spin-offs in Northern America and Western Europe for each year across the sample period. However, it is important to acknowledge that the development observed across the sample period may not accurately represent the total number of Northern American and Western European spin-offs as the data has been undergoing a criteria screening as part of the selection process. In essence, reducing the sample size increases the risk of random trends within the final data sample. As described in section 5.2, the screening process involves five manual criteria, which may pose a risk of random trends.

The first three criteria do not affect the representation of the total number of Northern American and Western European spin-offs in the sample period. As a result of the limited manual criteria, the final sample represents 77% of the eligible sample, evidently entailing that the final data sample contains a relatively low risk of random trends. It should be noted that especially the year 2022, to a greater extent, has been exposed to exclusion due to criteria *VII)* in the screening process. Criteria *VII)* states that all spin-offs with less than 180 trading days are excluded from the final data sample. Hence, 2022 does not represent the total number of spin-offs this year.

Figure 5.2 | Number of spin-offs per year from 2000 to 2022



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Western Europe	2	9	1	4	4	7	15	11	1	2	8	9	9	8	4	2	6	10	11	8	12	15	2
Northern America	6	19	15	11	16	25	17	13	21	13	17	25	19	14	33	39	36	18	29	12	19	17	5

Sources: Own contribution, FactSet

The cyclical nature of spin-off activity, as illustrated in Figure 5.2, is heavily influenced by fluctuations in the general macroeconomic environment and stock market performance. Periods of heightened macroeconomic uncertainty and volatility tend to coincide with low levels of spin-off activity. In contrast, an increase in the spin-off activity typically characterises periods of robust financial activity. This relationship was apparent during the great financial crisis and the late years of the dot-com crash, during which the number of spin-offs was relatively modest compared to the average of 26 spin-offs per year from 2000 until the end of 2022.

From a visual inspection of Figure 4.1, in combination with previous research, it was evident that the activity level of M&A deals and IPOs have a significant positive relationship with stock market performance and a significant negative relationship with market volatility (Jeon & Tran, 2011). Further, the visual assessment of the activity levels indicates that spin-off activity demonstrates a closer tie to the IPO cycle relative to the M&A cycle, as evidenced by the fact that spin-offs exhibit a greater degree of fluctuations in tandem with IPO activity as opposed to M&A activity.

The relationship between fluctuations in the spin-off and IPO activity can be attributed to the decision-making process of the parent company. The parent company's decision to spin off a subsidiary is partly based on its expectations of whether the market will value the newly spun-off company's stock at an attractive level. This expectation is closely linked to the IPO cycle, as a liquid stock market is essential for attracting investors and ensuring the success of the spin-off. Thus, if a parent company concludes that the market will not value the newly spun-off subsidiaries' stock at an attractive level, it is likely to change its plans and either postpone the spin-off or pursue an alternative strategy. This decision-making process may help explain the observed correlation between spin-off and IPO activity, as both are closely tied to market conditions and investor sentiment.

In contrast, M&A activity may be less closely tied to macroeconomic conditions and stock market performance as they tend to be driven by different factors than IPOs. In fact, the motivation for performing a spin-off may have more in common with M&A as they both lie under the umbrella of corporate restructurings with the same motivations as presented in section 2.1, including operational efficiency and strategic realignment. Nevertheless, the importance of a favourable stock market with sufficient liquidity and positive investor sentiment cannot be ignored as it is crucial when trading public for the first time as a standalone company. The M&A activity does, in fact, not rely as much on the investor sentiment at the time in question as the IPO and Spin-off activity.

Table 5.1 provides a complete overview of the distribution of spin-offs based on the geographical location of the spun-off entity and the year of completion. The US is the most popular country for spin-offs, with 331 spin-offs in the final data sample. Canada and the United Kingdom constitute the second and third most popular countries for spin-offs, with 111 and 52 spin-offs, respectively. Notably, the number of spin-offs in the data sample is skewed towards the top three countries mentioned above, constituting 81% of the final data sample, including 17 countries.

Table 5.1 | Number of spin-offs by geographical location and completion year

Year	US	CA	UK	SE	FR	NO	CH	DE	IT	Other	Total	Cumulative (# of spin-offs)
2000	6		1							1	**8**	8
2001	14	4	5		4					1	**28**	36
2002	11	4	1								**16**	52
2003	5	6	3							1	**15**	67
2004	10	6				2				2	**20**	87
2005	12	13	1	1		1		1		3	**32**	119
2006	11	6	9	1	1	2	1			1	**32**	151
2007	10	3	5			2	2			3	**25**	176
2008	20				1					1	**22**	198
2009	10	3	1							1	**15**	213
2010	9	8	4		2			1	1		**25**	238
2011	12	12	1	1	1	1	1		1	5	**35**	273
2012	14	5	3					1	1	4	**28**	301
2013	12	2	2		1			1	1	3	**22**	323
2014	32	2	1			1			1	1	**38**	361
2015	35	4		1			1				**41**	402
2016	29	7	2	2				1	1		**42**	444
2017	11	7	3	3	1		1	1		1	**28**	472
2018	21	9	3	4	1		1	1	1		**41**	513
2019	10	2	1	2		1	1			3	**20**	533
2020	16	3	1	5		2	2	2		1	**32**	565
2021	16	2	4	3	1	1	1	2	3	1	**34**	599
2022	5	3	1							1	**10**	609
Total	**331**	**111**	**52**	**23**	**13**	**13**	**11**	**11**	**10**	**34**	**609**	

Note: "Other" includes Austria, Belgium, Denmark, Finland, Ireland, Mexico, Netherlands, and Spain.
Sources: Own contribution, FactSet

Table 5.1 shows the sector breakdown by spin-off and parent company based on FactSet's Economic Sector Classification. Based on the final data sample, 20 sectors are represented by parent companies, while spin-offs represent 19 sectors. The most spin-offs operate in the Finance sector, followed by Non-Energy Minerals with 90 and 82 spin-offs, respectively. Among the 609 spin-offs, 242 operate within a different sector than the parent company, while the remaining 367 operates within the same sector. Parent companies within Non-Energy Minerals, Technology Services, and Health Technology tend not to spin off subsidiaries of different sector classifications, as only 9%, 24%, and 24% of these sectors, respectively, operate within a different sector. In contrary, sectors such as Distribution Services, Industrial Services, and Commercial Services have the highest percentage of spun-off entities operating in a different sector than the parent company. These are well above the weighted average of 40% of spin-offs operating in a different sector than the parent company.

The sector breakdown is further divided into two regional subcategories covered in this paper, namely (1) Western Europe and (2) Northern America. The distribution can be more ambiguous when dividing the final data sample into subcategories based on sector classification and regions, as some categories may have very few observations. Nevertheless, it contributes to the overall data description of the sector distribution, further broken down by the two regions.

The most spin-offs from Western Europe operate within the Finance sector, with 25 spin-offs, while the Non-Energy Minerals sector contains the most spin-offs from North America, with a total of 77 spin-offs. Non-Energy Minerals are highly overrepresented in North America compared to Western Europe, with only 5 spin-offs operating in this sector. The same skewed sector distribution is evident within Energy Minerals, where North America has 32 spin-offs, whereas Western Europe has only 1 spin-off in this sector. Further, parent companies operating in the Non-Energy Minerals sector are highly underrepresented in the cohort of parent companies that spin off subsidiaries from a different sector classification. In contrast, in Western Europe, one-third of parent companies in the Non-Energy Minerals sector initiate spin-offs of subsidiaries from different classifications.

Table 5.2 | Sector breakdown by spin-off and parent company

	Total			Western Europe			Northern America		
Sector	**Spin-off**	**Parent**	**Different sector**	**Spin-off**	**Parent**	**Different sector**	**Spin-off**	**Parent**	**Different sector**
Finance	90	91	35%	24	25	36%	66	66	35%
Non-Energy Minerals	82	80	9%	5	6	33%	77	74	7%
Technology Services	48	29	24%	13	10	20%	35	19	26%
Health Technology	46	46	24%	10	8	50%	36	38	18%
Consumer Services	47	58	40%	7	9	44%	40	49	39%
Producer Manufacturing	42	42	45%	18	20	35%	24	22	55%
Energy Minerals	33	35	40%	1	2	100%	32	33	36%
Process Industries	29	27	48%	14	12	42%	15	15	53%
Electronic Technology	27	36	64%	8	10	70%	19	26	62%
Industrial Services	21	23	70%	8	13	62%	13	10	80%
Consumer Non-Durables	23	21	48%	6	3	67%	17	18	44%
Commercial Services	22	18	67%	5	4	50%	17	14	71%
Retail Trade	23	24	50%	8	11	55%	15	13	46%
Transportation	19	17	29%	11	9	22%	8	8	38%
Communications	16	14	43%	5	1	0%	11	13	46%
Consumer Durables	13	13	62%	6	8	63%	7	5	60%
Distribution Services	11	12	83%	8	6	67%	3	6	100%
Utilities	10	14	64%	4	4	50%	6	10	70%
Health Services	7	7	43%	1	1	100%	6	6	33%
Miscellaneous	0	2	100%	0	0	0%	0	2	100%
Weighted average			**40%**			**46%**			**38%**

Sources: Own contribution, FactSet

6 Methodology

This section presents the methodological approach applied to arrive at the empirical results presented and discussed in Chapter 7. As such, we thoroughly review the applied methodological approach utilising both quantitative and qualitative data points, enabling a multifaceted and holistic analysis.

This study examines the performance of spin-offs up to 36 months after being spun off. In order to obtain the necessary scientific evidence to reliably arrive at a conclusion for the research question of this paper as well as the supporting hypotheses, this paper applies an event study approach. The event study methodology is a widely recognised and broadly applied practice for empirically anchored finance research examining, e.g. asset pricing and the dynamics of said pricing following a significant catalyst (Campbell, Lo, & MacKinlay, 1997). Hence, the event study approach enables evaluation of the systematic impact of spin-offs on security returns. To conduct the event study, we first identify the sample of spin-offs within the time period of investigation and collect relevant data, described in Chapter 5. By applying the event study methodology and focusing on the 36-month post-event period, this study aims to provide a comprehensive understanding of the long-term performance of spin-offs.

6.1 Hypothesis 1 and 2: Initial and long-term stock market performance of spin-offs

The first hypothesis of this paper investigates the performance of spin-offs in the first 30 trading days after the spin-off trades independently on the stock exchange, whilst the second hypothesis investigates the first 12, 24, and 36 months after the spin-off. Nonetheless, these hypotheses utilise the same methodological approach with minor differences apart from the event window, which is addressed separately upon relevance.

Since the data of this paper is based on daily observations, the 12-, 24-, and 36-month period is approximated based on trading days per year. New York Stock Exchange (NYSE) has in 2020, 2021, and 2022 had an average of 252 trading days per year (New York Stock Exchange, 2023). Moreover, the data sample of this paper has an average of 252.09 trading days in the same calendar year across the companies in the sample. As such, the approximation of 252 trading days per calendar year seems appropriate.

The event window of hypothesis 1 is limited to 30 trading days post spin-off, whilst the event window of hypothesis 2 is limited to 756 trading days post spin-off. To appraise an event's impact, we require a measure of abnormal return and normal return. The abnormal return can be defined as the actual *ex post* return of the security for the duration of the event window less the normal return of the firm over the event window. Here, the normal return is defined as the return that would be expected if the event did not take place. Hence, for each firm *i* and trading day *t*, we get (Campbell, Lo, & MacKinlay, 1997):

$$\epsilon_{i,t}^{*} = r_{i,t} - E\left[r_{i,t} \mid X_t\right]$$

Where $\epsilon_{i,t}^{*}$, $r_{i,t}$, and $E(r_{i,t})$ constitute the abnormal, actual, and normal returns, respectively, for each trading day, *t*. Moreover, X_t is the conditioning information for the normal performance model. With respect to the performance of the spin-offs, we consider the returns relative to the expected return of the specific security. For this purpose, two measures are applied: (1) the average abnormal return (AAR) and (2) the cumulated average abnormal return (CAAR). AAR and consequently CAAR are based on daily observations, which enables interpretation of the AAR for all sample spin-offs on specific trading days post spin-off and accordingly the CAAR for the duration of the analysis. Hence, using this methodology, it is possible to determine (1) if an initial sell-off is present and (2) when the trend concludes. As such, estimating AAR and CAAR requires estimating the returns of the spin-off as well as the expected returns of the said spin-off.

6.1.1 Spin-off returns

To calculate the returns of each company *i* for each trading day *t* in the event window, the closing price adjusted for any distributed dividends or stock splits has been identified for each company for each trading day in the sample period. For hypothesis 1, 31 adjusted closing prices have been used to arrive at the raw returns of the first 30 days post spin-off, whilst hypothesis 2 uses 757 adjusted closing prices. To calculate the returns for a given trading day, *t*, we calculate the log returns as such:

$$r_{i,t} = ln\left(\frac{adjusted\ close_{i,t}}{adjusted\ close_{i,t-1}}\right)$$

Where $r_{i,t}$ is the log return of firm *i* at time *t*. The log returns have been chosen in favour of simple returns in the empirical analysis of this study for several reasons, as highlighted by the broad academic finance literature. Log returns have been widely recognised as a more suitable measure for financial data analysis in various research contexts (Berk & DeMarzo, 2017). One key advantage of log returns is their time additivity property, which allows for more straightforward aggregation and comparison of returns across different time horizons (Berk & DeMarzo, 2017; Hull, 2012). However, the main benefit of using log returns is their tendency to exhibit a more symmetric distribution, often approximating a Gaussian (normal) distribution (Berk & DeMarzo, 2017; Campbell et al., 1997). This property simplifies statistical analyses and consequently facilitates the application of parametric tests. Conversely, simple returns can display a skewed distribution, which may necessitate non-parametric tests or data transformations to meet the assumptions of standard statistical procedures (Stock & Watson, 2015). Lastly, log returns are particularly advantageous when dealing with large datasets or long time series, as they tend to exhibit fewer extreme values compared to simple returns (Berk & DeMarzo, 2017; Hull, 2012). This characteristic mitigates the influence of outliers and enhances the stability of statistical estimates. Given these considerations, log returns have been employed in the empirical analysis of this study to ensure a robust and consistent methodology. By utilising log returns, the analysis results are expected to be more reliable and better aligned with the assumptions underlying the statistical techniques applied for modelling purposes.

Excess returns

For the analyses and subsequent regression, the excess returns are used in favour of the absolute returns. The excess returns are determined as the absolute return less the risk-free rate, i.e:

$$Excess\ return: r_{i,t} - rf_{i,t}.$$

Where $r_{i,t}$ is the absolute return rate for firm *i* at trading day *t*, and $rf_{i,t}$ is the risk-free rate for firm *i* at trading day *t*. Hence, excess returns represent the return of an asset above that of a risk-free investment. The excess returns are the subject of investigation rather than the absolute returns for several reasons. E.g., comparing raw returns across different assets may lead to misleading conclusions if the assets are not traded in the same currency, as higher raw returns may simply reflect a higher risk-free rate during the period under investigation. Moreover, when regressing factors such as the market risk premium (MRP) on returns, it is more appropriate to work with excess returns. By moving the risk-free rate from the right-hand side of the equation to the left-hand side, we can ensure that the estimated coefficients represent the impact of the factors on the excess returns rather than on the raw returns. This approach enables a better understanding of the drivers of risk-adjusted performance and facilitates accurate comparisons across different assets or investment strategies. Going forward, the excess will be referenced to as simply, *r*.

Risk free rate

Since this paper uses the excess return of spin-offs, the daily risk-free rate should be subtracted from the absolute returns that have been identified in order to arrive at the excess return. Since the data sample contains spin-offs across 17 countries in Northern America and Western Europe (Chapter 5), most of which with different currencies, the risk-free rate should reflect the risk-free alternative for the specific spin-off at a given trading day to account for differences in interest rates and economic conditions across countries. Hence, using country-specific risk-free rates, the empirical results accurately reflect the unique risk characteristics of each market in the sample. Consequently, the excess returns are adjusted for potential differences in local risk-free investment alternatives.

To determine the risk-free rate for each country, the 1-year US Treasury bill has been selected as the base. Hence, it is assumed that the 1-year US T-bill is a risk-free investment, which seems reasonable, given the relatively low default risk and high liquidity associated with US government securities and the relatively short duration of the bond (Fama & French, 1989). The choice of a 1-year duration for the risk-free rate has been made to balance the need for a short-term, liquid investment with the desire to capture the longer-term performance of spin-off firms. A shorter duration would be more sensitive to short-term fluctuations in interest rates. In comparison, a longer duration might not be as relevant for each spin-off's relatively short investigation period.

To arrive at the country specific risk-free rate, a synthetic domestic treasury bill is calculated based on the yield to maturity on the US 1-year treasury bill and the USD/HC[4] spot rate and 1-year forward rate. This calculation is based on the forward rate formula, which demonstrates the relationship between forward rates, spot rates, and interest rates in a manner consistent with interest rate parity (IRP), a fundamental concept in international finance (Sercu, 2009):

$$Forward = spot\frac{1 + r_{Domestic}}{1 + r_{Foreign}}$$

Rearranging this formula to arrive at the domestic T-bill rate results in the formula below:

$$r_{Domestic} = \frac{Forward}{Spot}\left(1 + r_{Foreign}\right) - 1$$

In this case, the foreign currency is the US T-bill, and the forward rate is the 1-year forward exchange rate to ensure an identical duration as the treasury bill. Hence, this methodology reflects an investor in the home country (HC) purchasing USD for domestic currency at the spot rate at time *t=0*, and simultaneously investing the obtained USD in the treasury bill and thus receiving the yield on the T-bill until

[4] Home Country (HC) references the country where the relevant spin-off is domiciled and traded.

maturity, which in this case is 1 year. Then at time $t=t+1$, the proceeds from the US T-bill are sold for domestic currency at the forward rate. Using synthetic domestic T-bills further accounts for not all countries in the sample are entirely risk-free. E.g., Italy, which constitutes 10 of the spin-offs in the sample (Table 5.1), has a Baa3 rating, and Damodaran (2021) estimates its country risk premium to be 3.79%. As such, by constructing synthetic treasury bills, it is possible to account for each country's unique risk characteristics in our sample and ensure that a treasury bill is available with a 1-year duration for all countries regardless of local central banks' bond offerings.

Nonetheless, this methodology assumes that transaction costs are negligible and that the investor can transact at the mid-price, avoiding bid/ask spreads, which might not be obtainable in practice. In summary, this methodology ensures that the empirical findings of spin-off performance remain robust and accurately reflect the unique risk characteristics of each market by accounting for variations in risk across countries and providing a reliable foundation for the empirical estimations. Having obtained a 1-year domestic equivalent risk-free rate, this is converted to daily and subsequently logged before being subtracted from the raw returns to arrive at the logged excess returns for each spin-off i on any given trading day t.

6.1.2 Risk adjusting returns

Having determined the raw excess return of the spin-offs for the desired period, which constitutes the actual ex post return of the securities, the normal return is determined to arrive at the abnormal return. For this purpose, one of the most broadly applied methodologies in event studies is the market model, which entails subtracting the market risk premium from the excess return of the security for each trading day, t. As such, the normal return is determined by the market risk premium, and the abnormal return therefore becomes the potential outperformance or underperformance relative to the market risk premium. This model assumes a stable linear relation between the market return and the security return (Campbell, Lo, & MacKinlay, 1997). Although being one of the most adopted methodologies, numerous variations of this model exist. In addition to the market model, this paper includes the Capital Asset Pricing Model (CAPM) and the Fama-French three-factor model. Each of these models is applied to the defined raw excess returns, and the most appropriate model is subsequently selected to enable empirically anchored conclusions on the two hypotheses.

The Market-model

As discussed, the market model poses a simple and easily interpretable method for defining the expected return of a security on a specific trading day. The Market model can be expressed as below:

$$r_{i,t} - rf_{i,t} = \alpha_{i,t} + MRP_{i,t} + \epsilon_{i,t}$$

Where, $\alpha_{i,t}$ is the intercept term of security *i* at trading day *t* and hence the part of the actual ex post returns that cannot be attributed the to MRP and $\epsilon_{i,t}$ is the error term.

Capital Asset Pricing Model (CAPM)

The CAPM is perhaps the most widely used asset pricing model in finance, which defines the expected return of a security by its exposure to the market risk premium. CAPM assumes that investors hold a diversified portfolio; therefore, the only risk investors are concerned about is systematic risk (Sharpe, 1964; Lintner, 1965). The Model has long been considered a cornerstone of finance, offering a straightforward approach to estimating expected returns based on a single factor, the MRP (Berk & DeMarzo, 2017). As such, similar to the Market Model, the CAPM possesses the same single factor as in the market model. However, in the CAPM approach, the excess return of each spin-off is regressed on the appropriate MRP and consequently determines the relative exposure to the market risk premium. Hence, a beta term is introduced in this method, and the beta is thus not assumed to be equal to 1. The CAPM method can be expressed as below:

$$r_{i,t} - rf_{i,t} = \alpha_{i,t} + \beta_i MRP_{i,t} + \epsilon_{i,t}$$

Fama-French three-factor model

Although the CAPM is widely used in the finance literature, the CAPM has also been subject to a considerable amount of criticism for its oversimplification and inability to account for other relevant risk factors (Fama & French, 1993; Pedersen, 2015). As such, to mitigate this, Fama & French (1993) presented a multifactor model that, in addition to the MRP, extends the CAPM by incorporating two additional factors, namely a size factor, Small Minus Big (SMB), and a value factor, High Minus Low (HML). These factors have been shown to significantly contribute to explaining stock returns that are not captured in the single-factor model (Fama & French, 1993).

The model accounts for the empirical findings that small-cap and value stocks (those with high book-to-market ratios) tend to outperform the market. The Fama-French model captures these effects by including the size and value factors, which improves the explanatory power of the model compared to CAPM and the Market Model on data sets where these factors can help explain the development of the securities. Moreover, like the CAPM, the excess returns of the securities are regressed on the three factors to estimate betas for each of the factors to determine the exposure to each of these factors. For this reason, the development in security returns that can be attributed to the development in returns of other firms with similar characteristics is no longer unexplained and consequently no longer captured in the residual value, alpha. The Fama-French three-factor model can be expressed as below:

$$r_{i,t} - rf_{i,t} = \alpha_{i,t} + \beta_i^{MRP} MRP_{i,t} + \beta_i^{SMB} SMB_{i,t} + \beta_i^{HML} HML_{i,t} + \epsilon_{i,t}$$

Fama & French (2014) later introduced two additional factors to their three-factor model. The five-factor model adds two additional factors: profitability (RMW) and investment (CMA). Hence, the purpose of these additional factors is to explain the part of the return that can be associated with the general performance of companies with high levels of profitability or low levels of capital investments. Although these factors may, in some instances, improve the empirical results and explanatory power of the model, it is not always the case. The five-factor model may further exhibit issues such as multicollinearity and overfitting, especially when applied to datasets with limited observations (Pedersen, 2015). Moreover, reliable data for the RMW and CMA factors can be challenging to obtain for all companies in the spin-off sample that has been used for this analysis, which could compromise the robustness of the analysis. Hence, including these factors might decrease the explanatory power of the other factors in the model, potentially leading to misleading results and insignificant beta coefficients. As such, the three-factor model is applied in favour of the five-factor model.

Although the Fama-French multifactor model provides a more sophisticated approach to estimating the expected return of a given asset on a specific trading day and potentially improves the explanatory power of the model, the model may add unnecessary complexity to the analysis considering the fact that the primary focus of this paper is on the relationship between spin-off returns and market returns. The market model, on the other hand, solely focuses on this relationship, causing interpretation to be straightforward and enabling a clear conclusion on the spin-off returns relative to the market. As such, the Market Model is applied for the hypothesis testing for hypotheses 1 and 2. Nonetheless, the effect of each estimator is calculated, presented, and discussed alongside the remaining empirical findings.

Definition of market factors

To enable the estimation of the normal return for each spin-off *i* for each trading day *t*, the required factors are estimated and subsequently utilised for estimation purposes.

Market risk premium (MRP)

The MRP is used in all three models in this paper and is broadly adopted in the financial literature. The market risk premium is the excess return on the market and, consequently, the return on the market portfolio above and beyond the risk-free rate (Pedersen, 2015). This factor can be written as:

$$MRP_{i,t} = rm_{i,t} - rf_{i,t}$$

Where $rm_{i,t}$ represents the return on the market portfolio. Considering the fact that the data sample of this paper includes 17 countries and stretches over 23 years (Table 5.1), the market risk premium differs for each of these markets and time periods to ensure that the analysis accounts for differences across markets and sustains the robustness of the empirical results. As such, the market risk premium is estimated for each trading day in the investigation period from 2000 to 2022 for all relevant markets. This estimation is completed using leading local indices such as S&P500 for the US market, FTSE100 for the UK Market, and OMXC25 for the Danish market. The complete list of applied indices is found in Appendix 3. By using these market indices, the log return is determined using the same methodology as presented with respect to the security risk premium. Once the market return is determined for all relevant dates and markets, the local risk-free rate must be subtracted to arrive at the MRP. Here, the risk-free rates previously discussed are applied to ensure that market returns of specific markets are combined with the risk-free rate of the said market for the specific time period.

Small Minus Big (SMB)

The rationale of the SMB factor is that smaller firms generally outperform larger firms (Fama & French, 1993). As such, the SMB factor goes long on small stocks and short on large stocks. This way, the β^{SMB} measures a strategy's tendency to be tilted towards small stocks (Pedersen, 2015). Thus, movements in the returns that can be attributed to the general performance of the SMB factor will be captured in the $\beta_i^{SMB} SMB_{i,t}$ part of the equation and hence remove the effect for a potential alpha that can be explained by an omitted SMB factor.

For the empirical analysis of this paper, a market index for small-cap and large-cap companies is used as a proxy for the general performance of small and big companies. To account for the differences in the SMB factor by market, we employ a market-specific SMB factor. Moreover, the indices have been selected from the same providers to ensure that the definition of small and large companies in terms of size is similar for the same countries. For most countries, this is the FTSE large/small cap indices. The factor is calculated for each day for each market as stated below and subsequently matched to fit the trading days of the spin-offs based on their dominant market and spin-off completion date:

$$SMB_t = \ln\left(\frac{Small_t}{small_{t-1}}\right) - \ln\left(\frac{large_t}{large_{t-1}}\right)$$

The local indices that have been used to estimate the local SMB factor for each market are found in Appendix 3.

High Minus Low (HML)

The HML factor resembles the performance of companies with a low book-to-market ratio (B/M) relative to companies with a high B/M, as companies possessing this characteristic have proven to outperform the market over time (Fama & French, 1993). Hence, the HML factor explains the differences in the performance of value stocks compared to growth stocks, given that companies that are undervalued generally outperform those that are overvalued. As such, the HML factor goes long on stocks with a low B/M and short on stocks with a low B/M. Hence, the β^{HML} measures a strategy's tendency to be tilted towards stocks with a high B/M and, consequently, stocks that are subject to a cheap valuation (Pedersen, 2015). Thus, movements in the returns that can be attributed to the general performance of the HML factor will be captured in the $\beta_i^{HML} HML_{i,t}$ part of the equation and hence remove the effect for a potential alpha that can be explained by an omitted SMB factor.

$$HML = \ln\left(\frac{High_t}{High_{t-1}}\right) - \ln\left(\frac{large_t}{large_{t-1}}\right)$$

The local indices that have been used to estimate the local HML factor for each market are found in Appendix 3.

6.1.3 Estimation

With the normal performance models established, the parameters of the models are estimated using a subset of data, i.e. the *estimation window*. The most common method for determining this window is by using the period prior to the event for estimation purposes (Campbell, Lo, & MacKinlay, 1997). However, as we examine securities that trade on the stock exchange for the first time, the spin-off in the data sample has no available preceding data. Given the lack of historical data for spin-off firms for the first trading days after their separation from the parent company, we employ an ex-post approach to estimate the betas. This approach enables incorporating relevant information from the spin-off's trading history while minimising potential bias that would have occurred by using proxies. As such, we estimate the regression using the number of available trading days per spin-off, i.e. up to 756 trading days or until the spin-off is delisted for any reason. For the purpose of estimation, we utilise weekly returns[5] to mitigate noise from daily data (Berk & Demarzo, 2017).

Using the ex-post approach based on the available trading days of daily data for beta estimation provides sufficient and reliable, as it allows for a reasonable balance between stability in the estimation and the ability to capture changes in the risk exposure over time (Jacobs & Levy, 1988; Fabozzi & Francis, 1978). This approach has been widely adopted in previous studies and is considered a valid method in the finance literature. As discussed, this paper uses a univariate linear regression (CAPM) and a multivariate linear regression model (Fama-French 3-factor) to analyse the relationships between the independent variables, MRP, SMB, and HML and the dependent variable, security excess return. The regression methodology entails several assumptions, which need to be satisfied to ensure the validity and reliability of the results (Stock & Watson, 2015). These assumptions are discussed below.

Linearity: The regression model assumes that the relationship between each independent and dependent variable is linear (Stock & Watson, 2015). This implies that changes in the independent variables are associated with proportional changes in the dependent variable.

No Autocorrelation: The model assumes that the observations in the dataset are independent from each other (Stock & Watson, 2015). This entails that there should be no correlation between the error terms of different observations.

[5] Weekly returns are approximated using the cumulated excess return for four trading days.

No multicollinearity: Multicollinearity can occur when two or more independent variables are highly correlated (Stock & Watson, 2015). High multicollinearity might cause unstable estimation of the regression coefficients and consequently make it cumbersome to determine the individual effect of each independent variable on the dependent variable. Nonetheless, the multicollinearity assumption is only relevant for the Fama-French three-factor model, as the CAPM only has a single independent variable (MRP).

Homoscedasticity: The models further assume that the variance of the error terms is constant across all levels of the independent variables (Stock & Watson, 2015). Heteroscedasticity, which is the violation of this assumption, can lead to inefficient estimates and biased standard errors.

Normality of error terms: The regression model assumes the error terms are normally distributed (Stock & Watson, 2015). For modelling purposes, it is assumed that the residuals of the model are normally distributed and have a mean of zero. Hence, the difference between the actual excess returns and the expected excess returns are α, as the sum of the error terms is assumed to be zero:

$$\hat{\epsilon}_i^* \sim N(0, \sigma^2)$$

Lastly, the model should be correctly specified, meaning that all relevant independent variables are included and there are no unnecessary variables (Stock & Watson, 2015). Additionally, the functional form of the model should be appropriate for the data. By ensuring that these assumptions are met, the regression model provides valid and reliable estimates of the relationships between the factors included and the excess return on the security (Stock & Watson, 2015). Hence, under these assumptions, OLS is efficient.

We test if the assumptions of the regressions are met for all performed regressions, further elaborated in Appendix 4. Except for the normality assumption, we find no convincing evidence of significant issues that need to be addressed in the performed regressions. Nevertheless, it should be noted that violations of one or more of the OLS assumptions are common when working with financial data. Particularly, non-normality is a common characteristic of returns, as fat tails and skewness are common occurrences (Mandelbrot, 1963). Considering the large return spread for spin-off returns this characteristic seems intuitive. Even though non-normality is common, linear models such as the CAPM and Fama-French three-factor model still constitute best practices for financial data and consequently provide useful insights from a practical perspective. Moreover, linear regressions are known to be relatively robust to violations of the normality assumptions, particularly when the sample size is large (Hayashi, 2000). Considering that this study has one of the largest sample sizes compared to similar studies on spin-off performance (Chapter 3), as well as the common adoption of the CAPM and the Fama-French model for financial analyses, the linear regression models are considered appropriate for further analysis.

6.1.4 Determination and aggregation of abnormal returns

The abnormal return, alpha, becomes the most interesting term in the regression. A positive alpha is the clear objective of all active managers that can be achieved from a fund manager's skill or luck in the sense that unique, idiosyncratic factors may be present to positively affect the asset's performance. Conversely, a negative alpha suggests that the investment strategy has underperformed, given its level of systematic risk and characteristics. Thus, it suggests that the investment is not adequately compensating investors for the level of risk that is incurred.

Alpha is calculated based on realised returns and measures a strategy's value-added above and beyond the expected return (Pedersen, 2015). In that respect, it is essential to investigate this measure for the spin-off strategy, as it represents the return of the investment strategy over its expected return predicted by a given asset pricing model or, when using the market model, over its benchmark. Alpha measures the performance of an investment strategy or asset on a risk-adjusted basis, enabling isolation of the portion of the return that cannot be attributed to systematic movements in the general market or general characteristics (Jensen, 1968).

In short, the abnormal return allows for the assessment of the performance of the investment strategy on a risk-adjusted basis. By examining alpha, we can obtain knowledge on what drives the performance of an investment strategy and contribute to informed decisions with respect to future asset allocation and portfolio management. Having established the excess returns and the expected excess return for a given asset at a given time, AAR and CAAR can be calculated (Ritter, 1991):

$$AAR_t = \frac{1}{n}\sum_{i=1}^{n} ar_{i,t}$$

Where:

$ar_t^{Fama-French} = r_{i,t} - \left(\beta_i^{MRP} MRP_{i,t} + \beta_i^{SMB} SMB_{i,t} + \beta_i^{HML} HML_{i,t}\right)$

$ar_t^{CAPM} = r_{i,t} - \left(\beta_i MRP_{i,t}\right)$

$ar_t^{Market\ Model} = r_{i,t} - \left(MRP_{i,t}\right)$

As such, CAAR can be determined (Ritter, 1991):

$$CAAR_{q,s} = \sum_{t=q}^{s} AAR_t$$

6.1.5 Testing procedure

With the average abnormal return and cumulated average abnormal return determined for each trading day, a testing framework for determining whether these estimates are, in fact, different from zero to with an adequate level of confidence, a significance test of these estimates needs to be conducted (Campbell, Lo, & MacKinlay, 1997). For this purpose, we employ the t-test to determine the significance of the AAR and CAAR estimates (Stock & Watson, 2015). As such, we can determine whether the estimates on the spin-off event have led to value creation for the securities in the sample. Hence, the null of the t-test is:

$$H_0^{AAR}: AAR_t = 0 \quad ; \quad H_A^{AAR}: AAR_t \neq 0$$
$$H_0^{CAAR}: CAAR_t = 0 \quad ; \quad H_A^{CAAR}: CAAR_t \neq 0$$

This is done using the t-test (Stock & Watson, 2015):

$$t\ test\ statistic_{AAR_t} = \frac{\widehat{AAR_t}}{SE\left(\widehat{\mathrm{AAR_t}}\right)}$$
$$t\ test\ statistic_{CAAR_t} = \frac{\widehat{CAAR_t}}{SE\left(\widehat{\mathrm{CAAR_t}}\right)}$$

Where:

$$SE\left(\widehat{\mathrm{AAR_t}}\right) = \frac{\widehat{\sigma^2_{AAR_t}}}{\sqrt{n}}$$
$$SE\left(\widehat{\mathrm{CAAR_t}}\right) = \frac{\widehat{\sigma^2_{AAR_t}}}{\sqrt{n}}$$

6.2 Hypothesis 3: Risks and returns of a spin-off investment strategy

The performance of spin-off investment strategies has been the subject of considerable research with respect to their documented abnormal returns (Cusatis, Miles, & Woolridge, 1993). However, the risk profiles of these strategies relative to the aggregate market have been less explored. The third hypothesis of this paper investigates the risk associated with an investment strategy in spin-offs. Specifically, it seeks to conclude whether such an investment strategy is associated with higher volatility than the aggregate market. In contrast to the prior analyses, this empirical analysis does not consider the average returns during the 756 trading days after the effective days but rather considers the annual return during the entire sample period, 2000-2022. This analysis uses the standard deviation of historical returns as a proxy for investment risk, grounded in widely accepted portfolio theory (Markowitz, 1952).

6.2.1 Aggregate market benchmark

Since the analysis is now considered over the time period 2000-2022 rather than the number of trading days after the effective date, the benchmark must be an index that accurately reflects the characteristics of the spin-off sample. Moreover, since we want to compare the investment strategy to a market portfolio proxy, the market proxy must be relevant as an alternative for investors. For these reasons, comparing the volatility of returns of the spin-off investment strategy requires choosing an appropriate market portfolio proxy. As such, the empirical analysis uses the S&P500 as the market portfolio proxy and benchmark. The S&P500 has been selected for several reasons. Firstly, the S&P500 is a widely recognised and accepted benchmark for the performance of the US stock market. Since it represents a broad and diversified sample of large-cap companies across various sectors, this qualifies the index as a suitable representation of the overall market performance. Thus, using S&P500 ensures that our results are comparable to other studies and easily interpretable by investors and researchers alike. Secondly, this paper's sample composition is a major contributor to the choice of S&P500 since US companies constitute 54% of the sample. Using a US-based benchmark, specifically the S&P 500 as the performance benchmark, seems suitable.

6.2.2 Model assumptions

For the same reasons discussed in relation to hypotheses 1 and 2, we use excess returns, i.e. the absolute returns less the risk-free rate, for this analysis. Thus, this means that the market benchmark is the S&P500, less the yield to maturity on the 1-year US treasury bill. Although the investment strategy is evaluated over a relatively long period of time, 23 years, a risk-free investment alternative with a relatively short duration is still deemed appropriate due to the short hold of the assets in the investment strategy.

Concerning the market benchmark, it is assumed that the index is purchased at the closing price of the first trading day of 2000 and held for the entire period. Any distributed dividends are assumed to be reinvested.

This study employs monthly returns rather than daily, as monthly returns are often preferred in financial literature to estimate the standard deviation of returns. Monthly returns mitigate the impact of short-term fluctuations and noise in the data, leading to a more stable and accurate estimate (Lo & MacKinlay, 1988). This becomes particularly relevant for the long-term investment strategy, as daily returns can be subject to temporary market fluctuations that may not be representative of the overall trend (Campbell, Lo, & MacKinlay, 1997). Second, monthly returns can mitigate potential issues with non-trading days, creating biases in daily return calculations, as non-trading days are averaged out on a longer period (French, Schwert, & Stambaugh, 1987). Finally, studies have shown that autocorrelation in daily returns can lead to biased estimates of the standard deviation, while monthly returns exhibit lower autocorrelation and provide more reliable risk estimates (Bollerslev, Engle, & Wooldridge, 1988).

Since this paper is tracking the spin-offs for 756 trading days after their separation from their parent company, this period becomes the holding period for each spin-off. However, as previously discussed, some spin-offs trade for fewer than 756 days due to corporate takeover, default, or other delisting reasons. For these companies, the latest closing price becomes the assumed exit price. Hence, this strategy assumes that the spin-off strategy equally weights the assets in the strategy and that they are rebalanced monthly. As such, the investment strategy can be defined as a buy-and-hold strategy of the spin-offs in the sample from 2000-2022, where the spin-offs are purchased at the closing price on the first trading day and held for a total of 756 trading days after the effective date, unless fewer trading days after the effective spin-off date for any reason.

The monthly return of the spin-off investment strategy and the S&P500 can be calculated using these assumptions. In that respect, the standard deviations of these investments are calculated and subsequently annualised to ensure comparability with the annual excess return on the strategy. Here, the average excess return is calculated using the arithmetic average as opposed to the geometric average, since this is generally considered to be more accurate from a statistical point of view:

$$Arithmetic\ average\ excess\ return = \overline{(r_{i,t} - rf_{i,t})} = \frac{1}{T}\sum_{t=1}^{T}(r_{i,t} - rf_{i,t})$$

Moreover, we calculate the variance of daily returns: We estimate the variance by taking the average of the squared deviations from the mean return (Campbell, Lo, & MacKinlay, 1997):

$$\sigma(r_{i,t} - rf_{i,t}) = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left((r_{i,t} - rf_{i,t}) - \overline{(r_{i,t} - rf_{i,t})}\right)^2}$$

6.2.3 Hypothesis testing

To test whether the spin-off investment strategy is more volatile than the aggregate market, we compare the annualised standard deviations of the spin-off and market portfolios. For this purpose, we employ an F-test to determine if the difference in standard deviations is statistically significant. Hence, we test the null hypothesis that the difference between the annualised standard deviations of the spin-off investment strategy and the S&P500 is equal to zero:

$$H_0 = \sigma_{spin-off\ strategy} - \sigma_{market} = 0$$
$$H_A = \sigma_{spin-off\ strategy} > \sigma_{market}$$

To determine this, we estimate the F-statistic and the degrees of freedom before being able to determine the p-value. The F-statistic is calculated as the ratio of the squared standard deviations:

$$F\ test\ statistic = \frac{\sigma^2_{spin-off}}{\sigma^2_{market}}$$

We calculate the degrees of freedom for each sample by subtracting one from the number of observations. Using the F-statistic and the degrees of freedom, we compute the p-value of the estimate. The F-distribution is cumulative and consequently subject to the degrees of freedom of both the spin-off and S&P500 samples. Since this analysis uses monthly returns from January 2000 until December 2022, the number of observations is 276, which means the degrees of freedom for both the S&P500 and the spin-off index is 275. The F-test assumes normality of the underlying data, which is not always present in financial data.

The estimations from this analysis should be interpreted with some precaution with respect to analogously onto the risks associated with the strategy. Firstly, the results are based on historical data, and past performance cannot accurately predict future results. Hence, changes in market conditions, specific events during the analysis period, or miscellaneous factors could impact the relative performance of spin-offs and the aggregate market. The study is limited to the time frame of 2000-2022, and the results, consequently, might differ for other periods. Moreover, the results entail several assumptions, as discussed, such as the fact that the assets are equally weighted and rebalanced monthly. This simplifies the comparison but may not represent the actual investment strategies used by investors. Despite these limitations, the methodology presented in this study provides a solid indication of the risk characteristics of a spin-off strategy compared to the aggregate market.

6.2.4 Performance measures

Having determined the volatility associated with the strategy and whether the risks of the spin-off portfolio are larger than the market benchmark, it is analysed whether investors are adequately compensated for this potential additional risk. As such, we seek to measure the performance of the strategy on a risk-adjusted basis. For this purpose, we calculate the Sharpe ratio for both the investment strategy and the S&P 500. The Sharpe ratio, originally introduced by William F. Sharpe (1966), is a widely adopted measure of risk-adjusted performance in the finance literature and practice (Bodie, Kane, & Marcus, 2017; Damodaran, 2012). The Sharpe ratio is calculated as the average excess return of an investment strategy divided by its standard deviation. Here, the standard deviation acts as the risk proxy (Sharpe, 1994). Thus, the Sharpe Ratio (SR) is calculated as such:

$$SR = \frac{r_{i,t} - rf_{i,t}}{\sigma_i}$$

The Sharpe ratio provides a comprehensive view of performance by incorporating both return and risk into a single metric. Consequently, it enables a conclusion of whether an investment strategy has a higher or lower risk level relative to the excess return. A higher Sharpe ratio indicates that the investment strategy has delivered better returns relative to incurred risks, consequently making the strategy seem more attractive (Bodie et al., 2017).

6.3 Hypothesis 4: Effect of different industry on long-term spin-off performance

The fourth and final hypothesis of this paper examines if spin-offs operating in a different industry than their parent companies have a larger long-term abnormal excess return compared to the spin-offs operating in the same industry as their parent. Since the rationality behind this hypothesis, as discussed in Chapter 3, emphasises the claim that spin-offs that have been initiated to increase the business focus of both the parent company and the subsidiary will, on average, outperform spin-offs that are not executed for this reason. As such, this analysis is performed using the industry of the parent as well as the subsidiary as a proxy for the spin-off rationale. Hence, if the spin-off industry differs from the one the parent company is engaged in, it signals that the spin-off is performed to enhance the business focus of both the parent and the spin-off. As such, we find the primary industry of each spin-off in the sample and their corresponding parent companies based on the industry code that has been determined by the FactSet[6]. We introduce the use of the binary time-invariant variable *Different Industry*, being equal to 1 if the spin-off's primary industry is different from its parent and 0 if it is the same. This analysis applies a 756-trading day period post spin-off, equivalent to approximately 3 years of trading.

For this purpose, we perform a subsample analysis using the introduced binary variable. As such, the dataset has been divided into two subgroups to determine potential differences among them. The subsample analysis enables visualisation of the returns of each subgroup over time as well as the dynamics of their performance over the determined period of investigation. We employ statistical tests for several holding periods to determine whether spin-offs operating in a different industry than their parents will outperform their same-industry peers.

This approach enables an understanding of how the coefficient and the corresponding significance level changes over time. Consequently, the empirical results over different periods provide insights into the relationship dynamics between the factors and excess returns over time and whether the effects of the independent variables are stable or if they change as time post spin-off progresses. To ensure an adequately short incremental change in trading days to ensure that it is possible to observe the changes in both the estimate and the significance level over time, we test the difference in CAAR between the *Different Industry* and *Same Industry* subgroup on a sequence with a time step equal to 63 trading days, evidently resulting in 12 t-tests (63, 126, 189, 252, 315, 378, 441, 504, 567, 630, 693, and 756).

[6] We establish the industry of the spin-off based on sector data from FactSet, subsequently distributed to a matrix of industries, demonstrated in Appendix 6.

As such, the two-tailed t-tests are performed using the following null and alternative hypotheses:

$$H_0: CAAR_{Different\ Industry} - CAAR_{Same\ industry} = 0$$
$$H_A: CAAR_{Different\ Industry} > CAAR_{Same\ industry}$$

To perform the t-test, we estimate the standard deviation of CAAR for each subgroup for each holding period as the average absolute distance to the arithmetic mean.

$$\sigma(CAAR_t) = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left(\left(CAR_{i,t}\right) - CAAR_t\right)^2}$$

7 Empirical results

This chapter unfolds the empirical results obtained by applying the methodology described in Chapter 6 to the final data sample presented in Chapter 5. The presentation of the empirical results follows the hypotheses in chronological order. Section 7.1 examines the short-term performance of spin-offs within the first 30 days after trading as an independent company. Section 7.2 evaluates the long-term spin-off performance up to 36 months after the first trading day. Section 7.3 analyses the volatility of the spin-off investment strategy compared to the aggregate market over 36 months post-first trading day. Finally, section 7.4 investigates the impact on spin-off performance based on industry differences between the spin-off and the parent company.

7.1 Hypothesis 1: Initial sell-off

This hypothesis investigates the short-term performance of the spin-off investment strategy within the first 30 trading days post effective date. Although the performance of spin-offs has been thoroughly examined in previous literature and is generally well-documented from a historical perspective, relatively few researchers have conducted in-depth investigations into the short-term performance of spin-offs. Thus, this hypothesis explores the initial sell-offs impact on short-term spin-off performance. Table 7.1 provides an overview of the AAR_t and $CAAR_t$ during the first 30 trading days, and hence this period includes the entire data sample of 609 spin-offs.

Table 7.1 | Short-term abnormal return of spin-offs

Trading days after event	Companies trading	AAR_t	t-stat	p-value	Significance	$CAAR_t$	t-stat	p-value	Significance
1	609	0.022	3.767	0.000	***	0.022	5.896	0.000	***
2	609	-0.004	-0.908	0.364		0.019	4.430	0.000	***
3	609	0.001	0.310	0.757		0.018	4.054	0.000	***
4	609	-0.008	-2.473	0.014	**	0.009	1.920	0.055	*
5	609	-0.004	-1.351	0.177		0.004	0.786	0.432	
6	609	0.005	1.713	0.087	*	0.009	1.701	0.089	*
7	609	0.000	0.015	0.988		0.006	1.164	0.245	
8	609	-0.004	-1.304	0.193		0.000	0.050	0.960	
9	609	0.002	0.677	0.499		0.000	0.043	0.966	
10	609	-0.002	-0.649	0.517		-0.004	-0.735	0.463	
11	609	-0.002	-0.903	0.367		-0.005	-1.102	0.271	
12	609	-0.005	-2.416	0.016	**	-0.010	-1.951	0.052	*
13	609	-0.005	-1.790	0.074	*	-0.016	-3.094	0.002	***
14	609	-0.002	-0.753	0.452		-0.017	-3.338	0.001	***
15	609	0.003	1.181	0.238		-0.015	-2.695	0.007	***
16	609	0.004	1.878	0.061	*	-0.011	-1.994	0.047	**
17	609	0.000	0.189	0.850		-0.011	-2.024	0.043	**
18	609	0.001	0.541	0.589		-0.010	-1.831	0.068	*
19	609	0.006	2.698	0.007	***	-0.006	-0.837	0.403	
20	609	0.000	-0.259	0.795		-0.006	-0.692	0.489	
21	609	0.000	-0.006	0.995		-0.007	-0.592	0.554	
22	609	-0.002	-1.100	0.272		-0.010	-0.909	0.364	
23	609	0.002	1.444	0.149		-0.008	-0.689	0.491	
24	609	0.003	1.483	0.139		-0.005	-0.422	0.673	
25	609	0.003	1.542	0.124		-0.002	-0.168	0.867	
26	609	0.001	0.566	0.572		-0.002	-0.175	0.861	
27	609	0.001	0.724	0.469		-0.001	-0.091	0.928	
28	609	0.001	0.355	0.723		-0.001	-0.061	0.951	
29	609	0.001	0.353	0.724		-0.001	-0.047	0.962	
30	609	0.001	0.308	0.758		-0.001	-0.081	0.935	

*Note: *, **, and *** notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%.*
Sources: Own contribution, FactSet

During the first 30 trading days, only 10 days exhibit a negative AAR, while 9 of these days lie within the first 14 days of trading. This ultimately leads to the CAAR bottoming after 14 trading days from the effective date with a negative CAAR of 1.70%. The negative CAAR after 14 trading days is statistically significant at the 1% level as the p-value of <0.0001 is smaller than any conventional significance level, which provides strong evidence to support the alternative hypothesis. Hence, the null hypothesis, which states that the estimate of negative 1.7% is equal to zero, can be rejected in favour of the alternative hypothesis that the estimate is, in fact, lower than zero. As such, the evidence presented in Table 7.1 confirms the first hypothesis of this paper, stating that spin-offs, on average, are subject to temporary selling pressure due to a period of supply and demand imbalances. Moreover, CAAR becomes insignificant at the 1% level after 16 trading days and at the 10% level after 19 trading days. Hereafter, we fail to reject the null that the CAAR is different from 0 for the remaining trading days.

Moreover, the fact that the initial 14 days of trading results in a negative CAAR implies that investors that postpone the acquisition of a spin-off until after the initial sell-off has passed enhances the return on investment. This claim is supported by prior spin-off investor, Oskar Andersson from Bodenholm Capital, who, in his interview, highlighted the importance of time of entry for their spin-off investments (Appendix 2). It can be argued whether the table above provides substantial evidence for an investor to decide when to acquire the asset. With respect to putting this characteristic of spin-off performance into a practical investment strategy, Mr Andersson further commented that they would normally consider the amount of stocks that has changed hands in order to determine when the sell-off has passed rather than the trading days. This seems appropriate since simply using trading days as a proxy for the sell-off period might be biased by the liquidity of the stock as well as the share of index holders prior to the spin-off. Assuming that the same percentage of the stocks should shift hands before the sell-off period has passed and all investors that wish to sell will do so as early as possible, the time it takes for them to sell their assets will depend on the liquidity of the stocks. Hence, the sell-off period for each spin-off will depend on several factors, including the liquidity of the stock and type of owners that has been distributed stock in the subsidiary.

It would be naïve to think that when large shareholders of the parent company, who are not mandated or interested in holding shares in the subsidiary, such as index funds, places large selling orders on a given spin-off after it can be traded, will not affect the price of the stock negatively, which is the rationale behind the sell-off. It further seems illogical if the sellers do not deploy selling techniques to limit the market impact, such as masking their orders if they are interested in receiving the highest possible price for a given stock, as any rational investor would be (Durbin, 2010). However, it should be mentioned that the index holders are not particularly interested in the return of the spin-off, as they would be under different circumstances. Hence, if the parent company is part of an index and the shareholders of this parent company are distributed shares in the subsidiary, this subsidiary will constitute an almost unnoticeable share of the portfolio for the index fund. Hence, whether the fund gets a return of -10%, -30%, or -50% on the stock, it will be a drop in the ocean for the returns of the entire index (Appendix 2).

The AAR after the first trading day yields a statistically significant positive return of 2.2%, after which it gradually decreases until the CAAR bottoms after 14 trading days. Comparing the underperformance from the second trading day with the CAAR after 14 trading days results in a difference of 3.9 percentage points. The performance of spin-offs appears to improve in the subsequent weeks following the initial underperformance. The average spin-off rose 1.6 percentage points after bottoming on day 14 and until trading day 30. Evidently, this results in a CAAR of negative 0.1% after 30 days of trading as an independent company, although this estimate is insignificant. These findings align with previous research conducted by Ma & Oyeniyi (2016), who found an initial underperformance after 30 trading days of 2.28% significant at the 1% level. Moreover, Patel et al. (2012) identified an underperformance of 3.7%, bottoming out after just 5 trading days (significance undisclosed).

The presence of selling pressure in the context of a restructuring act is not a random phenomenon but is likely attributed to the nature of the act itself. The corporate restructuring act involves the separation of a subsidiary from the parent company, resulting in the distribution of shares to existing shareholders. This process can create a temporary excessive supply of shares on the ask side, leading to a decrease in share price due to the shortage of the bid side order book. This imbalance, also known as selling pressure, can cause a decrease in share price as sellers compete to sell their shares at a lower price, further contributing to the excess supply of shares on the ask side (Durbin, 2010). As discussed in section 3.1, several market frictions explain why an initial selling pressure is not random, including selling pressure from index funds and mismatch of ownership criteria. However, it should be noted that selling pressure is a temporary market inefficiency, and the share price may recover as the market adjusts to the new supply and demand dynamics.

Table 7.2 provides an overview of the $CAAR_t$, categorised by whether the spin-off subsidiary operates within the same or a different industry than the parent company.

Table 7.2 | Short-term abnormal return of spin-offs by *different industry*

	$CAAR_t$		Companies trading	
Trading days after event	Different industry	Same industry	Different industry	Same industry
1	0.0449	0.0075	242	367
2	0.0475	0.0005	242	367
3	0.0435	0.0016	242	367
4	0.0319	-0.0068	242	367
5	0.0239	-0.0096	242	367
6	0.0270	-0.0037	242	367
7	0.0228	-0.0056	242	367
8	0.0186	-0.0118	242	367
9	0.0161	-0.0103	242	367
10	0.0049	-0.0091	242	367
11	0.0055	-0.0127	242	367
12	0.0032	-0.0186	242	367
13	-0.0017	-0.0250	242	367
14	-0.0077	-0.0237	242	367
15	-0.0049	-0.0208	242	367
16	0.0012	-0.0189	242	367
17	0.0003	-0.0186	242	367
18	0.0033	-0.0192	242	367
19	0.0072	-0.0153	242	367
20	0.0080	-0.0152	242	367
21	0.0096	-0.0176	242	367
22	0.0066	-0.0214	242	367
23	0.0058	-0.0170	242	367
24	0.0087	-0.0140	242	367
25	0.0085	-0.0090	242	367
26	0.0104	-0.0103	242	367
27	0.0157	-0.0122	242	367
28	0.0145	-0.0108	242	367
29	0.0138	-0.0101	242	367
30	0.0129	-0.0101	242	367

Sources: Own contribution, FactSet

The empirical findings reveal that both categories exhibit positive first-day abnormal returns. In particular, spin-offs operating in a different industry than their parent company experience a first-day abnormal return of 4.49%, while spin-offs operating in the same industry as their parent company generate a more modest first-day abnormal return of 0.75%. However, despite the positive first-day abnormal returns, both categories of spin-offs experience a subsequent sell-off. Spin-offs operating in a different industry than their parent company bottom after 14 trading days yielding a negative CAAR of 0.77%, while spin-offs operating in the same industry as their parent company yield a negative CAAR of 2.50% bottoming after 13 trading days. Hence, the spin-offs operating in a different industry exhibited a change in CAAR of 5.26 percentage points from the second trading day to the bottom after 14 trading days, while the spin-offs in the same industries only had a difference of 3.25 percentage points. The fact that the spin-offs in different industries exhibit a higher first-day return and a steeper subsequent slope on the sell-off indicates a higher initial volatility. This additional trading volatility is intuitive since it is likely that a larger proportion of shareholders that have been distributed shares from the parent company find the subsidiary to mismatch their ownership criteria, given its distinction from the parent company, implying higher selling pressure. Meanwhile, investors interested in the subsidiary and not the parent company will likely postpone their acquisition until after the completion, implying a higher initial interest.

Table 7.3 provides an overview of the $CAAR_t$ after subgrouping the spin-off completion dates into four periods, with six years in each period except from 2000 until 2004, consisting only of five years.

Table 7.3 | Short-term abnormal return of spin-offs by *time period*

	$CAAR_t$				Companies trading			
Trading days after event	2000-2004	2005-2010	2011-2016	2017-2022	2000-2004	2005-2010	2011-2016	2017-2022
1	0.0224	0.0329	0.0199	0.0159	87	151	206	165
2	0.0232	0.0302	0.0124	0.0154	87	151	206	165
3	0.0167	0.0305	0.0127	0.0149	87	151	206	165
4	0.0029	0.0226	0.0036	0.0049	87	151	206	165
5	-0.0126	0.0109	0.0051	0.0040	87	151	206	165
6	-0.0179	0.0184	0.0028	0.0205	87	151	206	165
7	-0.0248	0.0202	0.0068	0.0071	87	151	206	165
8	-0.0209	0.0164	-0.0014	-0.0013	87	151	206	165
9	-0.0223	0.0120	-0.0032	0.0056	87	151	206	165
10	-0.0313	0.0068	-0.0149	0.0158	87	151	206	165
11	-0.0329	0.0041	-0.0164	0.0137	87	151	206	165
12	-0.0359	0.0014	-0.0219	0.0084	87	151	206	165
13	-0.0453	-0.0041	-0.0253	0.0011	87	151	206	165
14	-0.0560	-0.0037	-0.0256	0.0009	87	151	206	165
15	-0.0453	0.0041	-0.0267	-0.0001	87	151	206	165
16	-0.0468	0.0021	-0.0194	0.0068	87	151	206	165
17	-0.0436	0.0038	-0.0196	0.0030	87	151	206	165
18	-0.0402	0.0046	-0.0231	0.0081	87	151	206	165
19	-0.0349	0.0093	-0.0139	0.0037	87	151	206	165
20	-0.0309	0.0145	-0.0166	0.0018	87	151	206	165
21	-0.0350	0.0030	-0.0099	0.0031	87	151	206	165
22	-0.0351	-0.0008	-0.0106	-0.0055	87	151	206	165
23	-0.0261	0.0002	-0.0101	-0.0031	87	151	206	165
24	-0.0265	0.0018	-0.0054	0.0007	87	151	206	165
25	-0.0224	0.0055	-0.0007	0.0001	87	151	206	165
26	-0.0244	0.0055	0.0021	-0.0026	87	151	206	165
27	-0.0311	0.0089	0.0012	0.0027	87	151	206	165
28	-0.0326	0.0113	0.0059	-0.0033	87	151	206	165
29	-0.0347	0.0149	0.0040	-0.0025	87	151	206	165
30	-0.0374	0.0138	0.0034	-0.0008	87	151	206	165

Sources: Own contribution, FactSet

The positive CAAR after the first trading day is present for all four periods, after which they gradually decrease from the second trading day, except from the first period 2000-2004, which starts to decrease after the second trading day. The periods 2000-2004 and 2005-2010 yielded the highest positive CAAR after the first trading day of 2.24% and 3.29%, respectively. The initial sell-off within the first 30 trading days occurs for all four periods, resulting in a negative CAAR at the bottom, despite a positive CAAR after the first trading day. However, the initial sell-off appears to be most prominent for the first period, 2000-2004. Here, the CAAR bottoms after 14 trading days at a negative CAAR of 5.60%, with the difference from the positive start after 2 trading days to the bottom after 14 trading days being 7.84 percentage points. Although the second time period does not exhibit a dominant sell-off trend, the table indicates that the overall magnitude of the initial sell-off diminishes over time. This is emphasised by the fact that the third period exhibits a much less conspicuous sell-off trend, with the difference from the positive first day returns to the bottom after 15 days being 4.66 percentage points.

Given the attractiveness of spin-offs as an investment strategy, as highlighted in the literature review in Table 3.2, competition among investors has become increasingly intense over the years. Therefore, if active investors are eager to own the spin-off subsidiary after the completion date, they tend to buy shares in the parent company between the announcement date and the completion date, as the parent company distributes shares of the subsidiary to existing shareholders on a pro-rata basis. This results in a substantial change in the trading activity, shifting some of the trading activity from the post-completion date to the pre-completion date by buying shares in the parent company as a method of securing shares in the spun-off subsidiary (Andersson, Appendix 2). This trend is further strengthened by herd behaviour among investors, as described in section 2.7, in which investors tend to follow the actions of other investors instead of conducting their own objective analysis.

Index selling has become an inevitable phenomenon, speaking in favour of continuing initial sell-off. Due to ownership and mandate criteria, passive funds and some active investors may be forced to sell shares in the newly spun-off subsidiary. Concerning passive funds, this applies to all spin-offs, as they do not take a stance on whether to keep the shares in a newly spun-off subsidiary. With the increasing interest in spin-offs among active investors, they are more likely than before to support the stock price after the completion date for the attractive spin-offs, resulting in a lower level of underperformance. This is consistent with the empirical findings of a lower level of selling pressure over time.

Conclusion for hypothesis 1

The empirical results provide supporting evidence for the hypothesis that spin-offs are subject to an initial sell-off due to temporary supply and demand imbalances. We find a negative CAAR of 1.7% that is statistically different from zero at the 1% level. Moreover, we find that the CAAR bottoms after 14 trading days, whereafter the AAR becomes positive, consequently resulting in the fact that we fail to reject if the CAAR is different from zero after 19 trading days. As such, these findings imply that investors can enhance their returns by postponing the acquisition of a spin-off until the initial sell-off has passed. Through a subsample analysis, we find that spin-offs operating in the same industry as their parent and spin-offs operating in a different industry both are subject to an initial sell-off, although the spin-offs in different industries experience higher trading volatility. We further find evidence that the magnitude of the selling pressure becomes less prominent over time, suggesting that the increasing competition among spin-off investors has a diminishing effect on the initial sell-off.

7.2 Hypothesis 2: Long-term stock market performance of spin-offs

The previous hypothesis presented the empirical results on the short-term performance of spin-offs by exploring the initial sell-offs impact within the first 30 trading days. To further investigate the performance of spin-offs, this section examines the long-term performance in a period up to 3 years after the effective date. Table 7.4 displays the data distribution for 1, 2, and 3 years of trading as an independent company. The number of spin-offs in the three periods gradually tails off because some spin-offs have fewer trading days than the displayed periods.

Table 7.4 | Distribution of excess returns

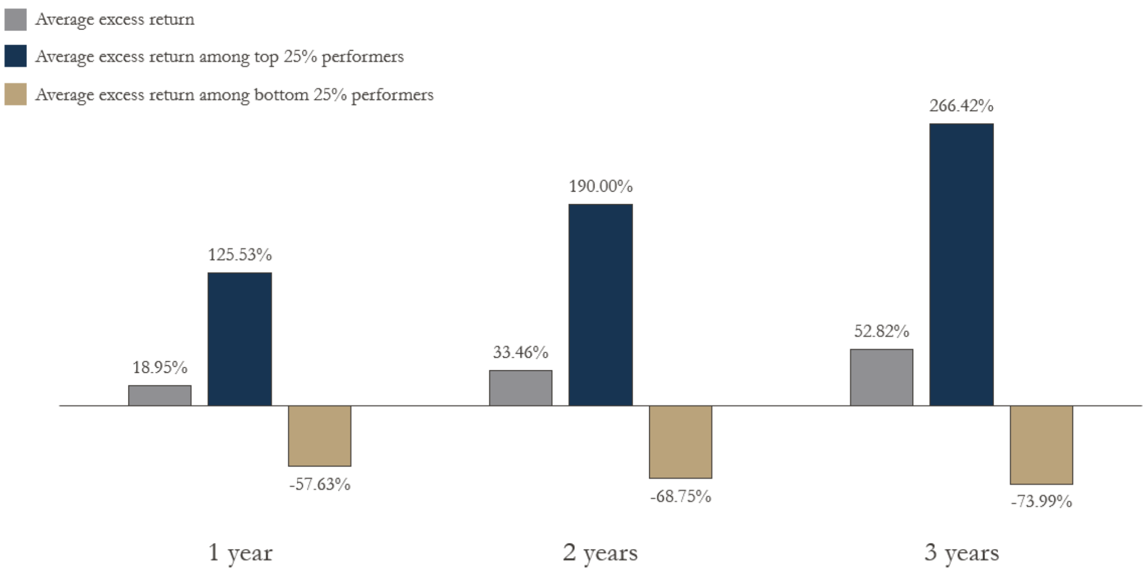
Days after event	252 (1 year)	504 (2 years)	756 (3 year)
Firms trading	595	528	460
Percentile/Rank			
Lowest	-0.9858	-0.9986	-0.9998
5%	-0.7451	-0.8881	-0.9004
10%	-0.6106	-0.7259	-0.7938
15%	-0.5013	-0.6169	-0.6591
20%	-0.4089	-0.5006	-0.5874
25%	-0.2900	-0.3994	-0.4722
30%	-0.2192	-0.2919	-0.3619
35%	-0.1439	-0.2060	-0.2527
40%	-0.0859	-0.1124	-0.1363
45%	-0.0271	-0.0417	-0.0019
50%	0.0238	0.0379	0.0879
55%	0.0830	0.1268	0.1842
60%	0.1379	0.2321	0.2798
65%	0.2108	0.3460	0.4159
70%	0.3254	0.4454	0.5599
75%	0.4297	0.5976	0.7945
80%	0.5213	0.8157	1.0932
85%	0.7272	1.0881	1.4955
90%	1.0310	1.5543	1.9736
95%	1.6132	2.8256	3.1253
highest	12.1718	9.3559	17.5078
Mean	0.1895	0.3346	0.5282

Sources: Own contribution, FactSet

The mean unadjusted spin-off excess return after 1 year of trading has yielded an excess return of 18.95% based on 595 spin-offs. After 2 years, the mean excess return was 33.46% based on 528 spin-offs, while after 3 years, the mean excess return was 52.82% based on 460 spin-offs. The trend in the mean excess returns over the 3 years following the commencement of trading illustrates that the mean excess return has progressed in a positive direction. In comparison with the median excess return for each of the three years, it is apparent that the mean significantly surpasses the median. Specifically, the median excess return for the first year of trading yielded 2.38%, for two years, it yielded 3.79%, and for three years, it yielded an excess return of 8.79%. The distribution of returns further illuminates some extremely positive and negative returns, with the best-performing spin-off after 1 year of trading yielding 1,217.18%, while the worst-performing spin-off almost lost the entire value with a negative return of 98.58%. After 3 years of trading, the distribution indicates even more extreme values, as the best-performing spin-off has yielded an excess return of 1,750.78%, while the worst-performing spin-off has yielded a negative return of 99.98%. The distribution suggests that investing in spin-offs can yield high returns but also carry a significant risk of loss. Thus, the positively skewed nature of the overall distribution can be attributed to the occurrence of some spin-offs with extremely positive returns, which in turn, appreciates the overall mean.

These findings align with previous research on long-term financial market returns, as a stock's value can only decline by a maximum of 100%, whereas its growth potential is theoretically infinite. As a result, the distribution of long-term stock returns is often characterised by a positive skewness, indicating that the magnitude of extreme positive returns is greater than that of extreme negative returns (Ritter, 1991).

Figure 7.1 | Dispersion of returns

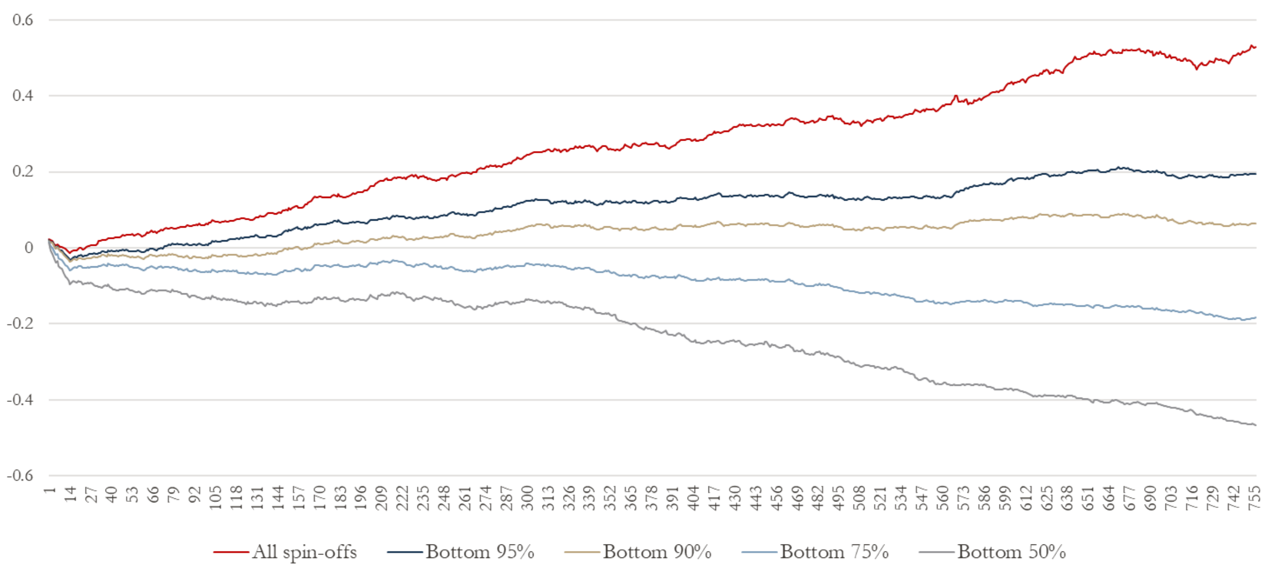


Sources: Own contribution, FactSet

As previously mentioned, the distribution of returns for spin-offs is characterised by the occurrence of both extremely positive and negative returns and a positively skewed shape, which highlights the importance of identifying the best-performing spin-offs, as these spin-offs are a key driver of overall returns. Figure 7.1 provides an overview of the average excess returns of the best-performing and worst-performing 25% of spin-offs, based on their performance over 1, 2, and 3 years of trading. In the first year as an independent company, the 25% best performers yielded an average excess return of 125.53%, while the bottom 25% yielded a negative excess return of 57.63% on average. With time progressing towards the 3-year mark, the performance gap becomes more extreme, with the top 25% of spin-offs yielding an average excess return of 266.42% and the bottom 25% yielding a negative average excess return of 73.99%. These findings prove a high degree of dispersion among spin-off returns.

Figure 7.2 provides a graphical representation of the 3-year performance of spin-offs. To better understand the overall performance of spin-offs and the sensitivity to the best performers, the figure illustrates the average performance of spin-offs within various percentiles, namely the bottom 95%, bottom 90%, bottom 75%, and bottom 50%. Hence, the best performers are gradually excluded.

Figure 7.2 | Sensitivity of spin-off excess returns



Sources: Own contribution, FactSet

As presented in Table 7.1, the spin-off sample has, on average, yielded a positive excess return of 52.82% after 3-years of trading. Previously it was concluded that the distribution was positively skewed, highlighting the magnitude of some extremely positive returns, raising the overall mean. These insights are further illustrated in Figure 7.2. When the top 10% of best performers are excluded, and the average performance is calculated based on the bottom 90% of spin-offs, the results reveal an excess return that is only marginally positive after the 3-year holding period at 6.44%. Removing the 25% best-performers results in a negative average excess return of 18.38% after the 3-year holding period. Finally, only investing in the bottom 50% of spin-offs results in a substantial loss of 46.56%.

These findings emphasise that spin-offs as an investment strategy have the potential to generate substantial returns as the average excess return exponentially declines as the best-performing spin-offs are removed from the sample. As such, the return of an investor is highly sensitive to the inclusion of relatively few outperforming spin-offs. Conversely, if the investor disproportionately invests in the segment of best-performing spin-offs, the investment strategy has the potential to create exceptionally lucrative returns. However, the investor must accurately identify the best-performing spin-offs to achieve this objective. Although the sensitivity to the best-performing companies applies to the general financial market for active investors, identifying the best performers is even more critical due to the more extensive range of outcomes for spin-offs. This implies that the strategy can be lucrative but poses a significant risk if the investor fails to identify the best performers.

The attractiveness of the strategy appears to be dependent on the fact that a small amount of the total investments yields most of the returns. Hence, if they cease to exist, the overall attractiveness of a spin-off investment strategy might also lose its charm. Alternatively, investing in all spin-offs has proven to be profitable but might not be feasible for an active investor who aims to optimise returns by selecting the best-performing companies. These findings are supported by Investment Manager, Oskar Andersson:

"… there is a huge range of outcomes in which the winners can be very big, but the losers can also be very big. So, it is all about doing your analysis to ensure you are buying a winner, not a loser."

From a visual assessment of Figure 7.2, the initial sell-off becomes increasingly prevalent as the best-performing spin-offs are excluded. Hence, the average excess return of the bottom 50% of spin-offs undergoes the most extensive initial sell-off during the first 30 trading days. This supports the theoretical explanation from H_1 that active investors are more likely to support the stock price for attractive spin-offs during the selling pressure from, e.g., index funds.

Table 7.5 provides an overview of the AAR_t and $CAAR_t$ during the first 756 trading days, equivalent to 36 months. As stated in the table, the number of spin-offs included gradually tails off because some spin-offs have fewer trading days than the entire 756 days after the effective date.

Table 7.5 | Long-term abnormal return of spin-offs

Trading days after event	Month equivalent	Companies trading	AAR_t*	t-stat	p-value	Significance	$CAAR_t$	t-stat	p-value	Significance
21	1	609	-0.0068	-0.5924	0.5538		-0.0068	-0.5924	0.5538	
42	2	609	0.0247	2.5529	0.0109	**	0.0177	1.1027	0.2706	
63	3	609	0.0117	0.9953	0.3200		0.0260	1.3114	0.1902	
84	4	609	0.0083	1.1565	0.2479		0.0310	1.6258	0.1045	
105	5	609	0.0132	1.5670	0.1176		0.0400	2.0114	0.0447	**
126	6	609	0.0025	0.3638	0.7162		0.0418	1.9232	0.0549	*
147	7	609	0.0171	2.5020	0.0126	**	0.0642	2.6465	0.0083	***
168	8	609	0.0209	2.7671	0.0058	***	0.0917	3.4463	0.0006	***
189	9	607	0.0030	0.4865	0.6268		0.0925	3.4496	0.0006	***
210	10	603	0.0089	1.2607	0.2079		0.1242	3.3898	0.0007	***
231	11	600	0.0089	1.0700	0.2851		0.1332	3.3747	0.0008	***
252	12	595	0.0058	0.7823	0.4343		0.1291	3.6994	0.0002	***
273	13	585	-0.0020	-0.3046	0.7608		0.1397	3.7501	0.0002	***
294	14	580	0.0066	0.9806	0.3272		0.1565	4.1431	0.0000	***
315	15	576	-0.0046	-0.6504	0.5157		0.1667	4.1633	0.0000	***
336	16	567	-0.0028	-0.4557	0.6488		0.1744	4.1707	0.0000	***
357	17	565	-0.0024	-0.3526	0.7245		0.1646	4.0933	0.0000	***
378	18	555	0.0027	0.4061	0.6849		0.1711	4.2399	0.0000	***
399	19	546	0.0061	0.6140	0.5395		0.1736	4.2816	0.0000	***
420	20	543	0.0096	1.4298	0.1534		0.1873	4.4568	0.0000	***
441	21	538	0.0027	0.4029	0.6872		0.1912	4.4171	0.0000	***
462	22	535	0.0092	1.3229	0.1864		0.1978	4.3988	0.0000	***
483	23	529	0.0146	1.8556	0.0641	*	0.2054	4.5670	0.0000	***
504	24	528	-0.0121	-1.7104	0.0878	*	0.1966	4.3253	0.0000	***
525	25	521	0.0083	0.9310	0.3523		0.1974	4.3223	0.0000	***
546	26	513	-0.0037	-0.5614	0.5747		0.2020	4.2769	0.0000	***
567	27	503	0.0103	1.4408	0.1503		0.2271	4.3044	0.0000	***
588	28	498	0.0079	0.9207	0.3577		0.2289	4.3958	0.0000	***
609	29	493	0.0175	1.8459	0.0655	*	0.2521	4.5217	0.0000	***
630	30	492	0.0150	1.8944	0.0588	*	0.2675	4.4911	0.0000	***
651	31	485	0.0073	0.9729	0.3311		0.2916	4.6025	0.0000	***
672	32	483	0.0134	1.0453	0.2964		0.2946	4.6401	0.0000	***
693	33	477	-0.0002	-0.0286	0.9772		0.2935	4.6069	0.0000	***
714	34	467	-0.0011	-0.1219	0.9030		0.2830	4.3005	0.0000	***
735	35	463	-0.0016	-0.1832	0.8547		0.2698	4.1308	0.0000	***
756	36	460	0.0095	1.1696	0.2428		0.2855	4.1102	0.0000	***

*Note: *AAR_t is CAAR for the preceding 21 trading days. Hence it is a 21-day rolling window CAAR approximating a monthly AAR*
, **, and * notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%.*
Sources: Own contribution, FactSet

During the 36 months of trading after the effective date, 29 of these months yielded a positive AAR, with 7 being statistically significant, at least at the 10% level. The fact that relatively few of the monthly AARs are statistically significant at conventional levels substantiates the large spread in spin-off performance over short periods of time. Moreover, the positive AARs are reflected in a steady increase in the CAAR, which after a slight decrease of 0.7% after the first month of trading, increases to 12.91% after the first 12 months of trading, 19.66% after the first 24 months of trading, and 28.55% by the end of month 36. The CAARs for all holding periods longer than 6 months are positive and significantly larger than zero at the 1% level. This emphasises that although there might be deviating fluctuations in the short-term spin-off performance, the long-term trend appears to be uniform. As such, the CAARs are all statistically significant at the 1% level after 12, 24, and 36 months. Hence, we can confirm H_2, which states that investing in all spin-offs from 2000-2022 yields a positive abnormal excess return on average 12, 24, and 36 months after the effective date.

These findings are consistent with prior literature, as presented in section 3.2, with most studies finding statistically significant positive abnormal returns for 1, 2, and 3 years after the commencement day. The consensus findings from the literature were, on average, 10.22% after 12 months, 18.34% after 24 months, and 26.42% after 36 months. These results are consistent with the findings in this paper.

With respect to the normality adjustment of each spin-off performance, three different models have been applied, whereas two require regression of the spin-off excess returns onto one or more factors. Since we have performed a regression for each spin-off for each of these methodologies, we have a total of 1,218 regressions with corresponding 4,872 beta coefficients. Due to the scale of this methodology, the commentary on the regression estimates is performed on an aggregated level rather than individually. Nevertheless, all coefficient estimates, including their respective p-values, are found in Appendix 5. Table 7.6 below summarises the average results from the regression estimations and highlights the average p-value to determine whether the factor significantly impacts the excess return of the spin-offs on average.

Table 7.6 | Average estimation results of namely CAPM regressions and Fama-French 3 factor model regressions

	Univariate Regressions | CAPM	Multivariate Regressions | Fama-French Three Factor Model		
	Beta_MRP	Beta_MRP	Beta_SMB	Beta_HML
Average estimate	0.824	0.742	0.540	-0.069
p-value	0.075	0.103	0.269	0.396
Significance	*			
Share p<10%	83%	75%	45%	25%
Share p<5%	79%	69%	37%	19%
Share p<1%	68%	60%	22%	8%
Share insignificant (10%)	17%	25%	55%	75%
Count	609	609	609	609

*Note: *, **, and *** notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%.*
Sources: FactSet, own contribution

As per Table 7.6, it is evident that the beta coefficient for the MRP factor in the CAPM model is equal to 0.824, where the multivariate regression for the Fama-French 3-factor model has a slightly lower beta on the MRP factor of 0.742 due to the introduction of the two additional variables, SMB and HML. The beta coefficients on SMB are, on average, 0.540, while the average beta on HML is -0.069. For comparison, the market model assumes a beta on MRP of 1, which seems to be comparable with the estimated results using the CAPM model. The Beta coefficient on SMB on 0.540 in the Fama-French model is lower than the beta on MRP, indicating that MRP has a greater degree of explanatory power for the development in the excess returns of the spin-offs as the returns seem to be more correlated to this factor. However, the coefficient on HML of -0.069, indicating that this factor has little explanatory power for the excess returns on the spin-offs in the sample.

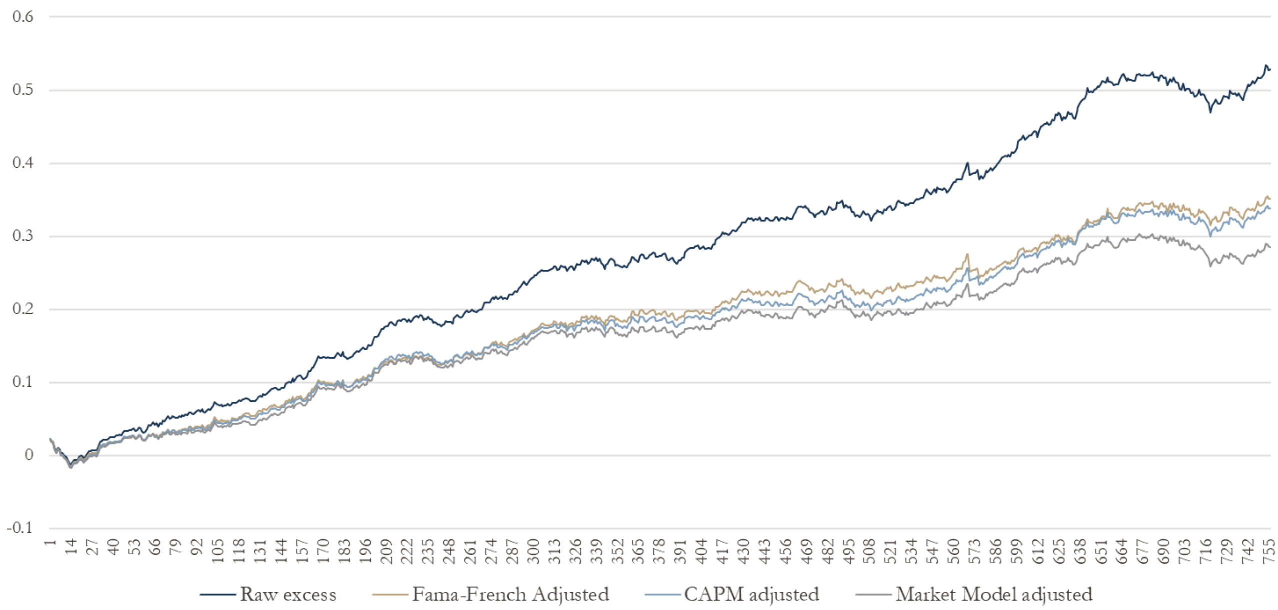
A beta of less than 1 indicates the security has less systematic risk than the factor it is regressed against. As discussed, since spin-offs have a large range of outcomes manifested by the dispersion of returns and while the excess return of the spin-offs on average have been superior to the market risk premium over a 3-year period, the data indicates that the spin-off sample has a higher average discrepancy from the mean, otherwise known as standard deviation. The fact that the beta coefficients are less than 1 for all factors indicates that a large proportion of the spin-off performance cannot be attributed to the development in the factors MRP, SMB, or HML but must be explained by variables not included in the regression model. Hence, since we cannot determine that the excess return, to a large extent, is correlated with well-known market factors, it should be considered idiosyncratic risk. As such, the movement in spin-offs appears to a large extent not to be correlated with the market but rather occur due to idiosyncratic shocks in the individual securities.

Moreover, the table shows that, on average, the beta coefficient on the MRP in the CAPM model has a p-value of 0.075, which is significant at the 10% level. As such, on average, we can reject the null hypothesis with 90% confidence that the effect MRP has on excess returns is equal to zero in favour of the alternative hypothesis that the MRP factor, in fact, affects the excess return of spin-offs in the CAPM model. Moreover, 68% of the MRP betas of the regressions have a beta coefficient that is significant at the 1% level, with 83% being significant at the 10% level. This implies that the MRP is a valid input for our model as the market development positively correlates with the spin-off returns and consequently has explanatory power for the performance.

However, when considering the Fama-French three-factor model with the two additional variables introduced in the regression model, it is apparent that the p-values for each of the beta estimates cannot reject the null hypothesis at any conventional significance level on average. Further, for the HML, only 25% of the regressions estimate a beta coefficient that is significant at the 10% level, while the SMB beta coefficients are only significant at the 10% level for 45% of the regressions. As such, it appears that the two factors, SMB and HML, not only are insignificant themselves, meaning that we fail to reject the null hypothesis that they do not have any explanatory power for the spin-off performance, but their presence further worsens and creates noise for the estimate on MRP, evidently causing the beta coefficient on MRP to be insignificant at any relevant significance level on average. Hence, the Fama-French adjustment appears to be a poor choice for the data. As such, the CAPM and the Market model should be considered with more confidence.

Illustrating the adjusted excess returns using the normal performance models discussed above, Figure 7.3 shows the cumulative average abnormal returns for four equally weighted portfolios using three different adjustment methodologies. The four portfolios plotted in order of their respective $CAAR_{i,t}$, are, from top to bottom: (1) Raw excess returns, (2) Fama-French adjusted abnormal excess returns, (3) CAPM adjusted abnormal excess returns, and (4) Market model adjusted abnormal excess returns.

Figure 7.3 | Long-term CAAR by normal performance models



Sources: Own contribution, FactSet

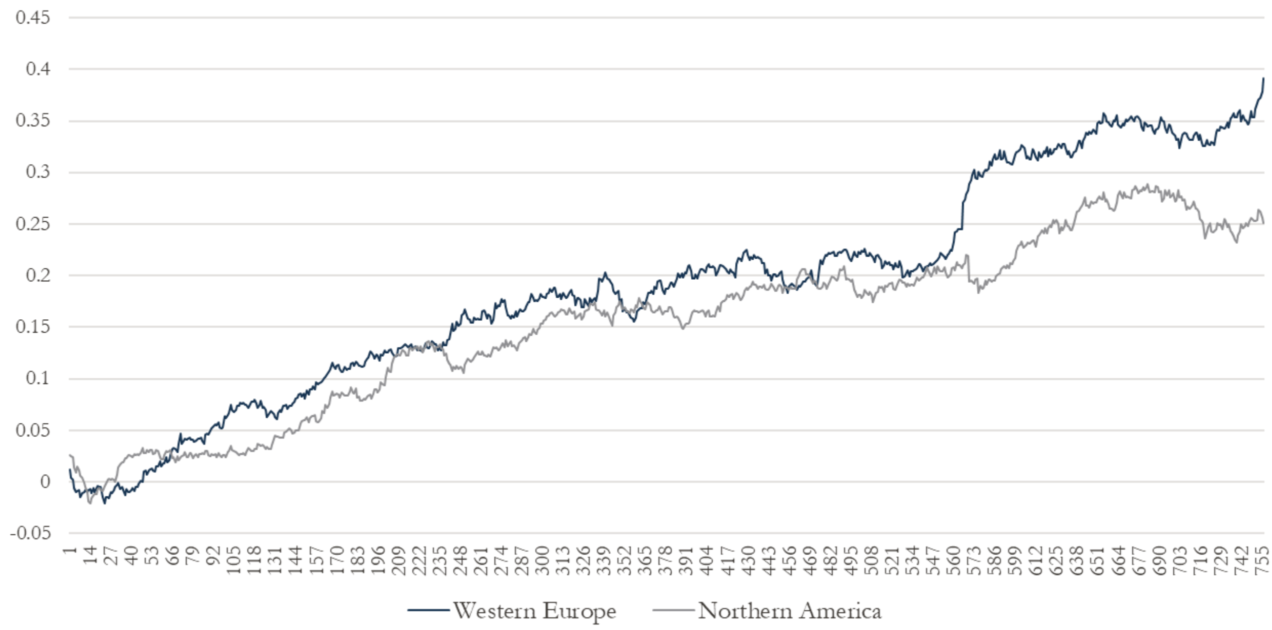
Focusing first on the raw excess returns, the analysis reveals a positive cumulative average excess return of 52.82% after 756 trading days, representing the unadjusted and hence the ex post realised average excess returns on spin-offs in the sample period. The CAAR is reduced to 35.08% in the 3-year period after adjusting the excess returns using the Fama-French three-factor model. Similarly, when adjusting the excess returns using the CAPM, the CAAR ends at 33.75% after 3 years. Finally, the Market Model adjustment results in a CAAR of 28.55% after 3 years. This suggests that the market model adjustment reduces the raw excess return to an even greater extent than the Fama-French three-factor model and CAPM. These findings suggest that spin-offs, on average from 2000 to 2022, have outperformed the market within the first 3 years of trading as independent companies. The fact that the market model adjusted line yields the lowest abnormal returns is hardly surprising, given that the estimated beta coefficients on MRP, SMB, and HML are lower than 1 on average. Moreover, the figure underlines that the Fama-French three-factor model and CAPM-adjusted excess returns, to a large extent, are highly similar. These findings reveal that the size factor (SMB) and value factor (HML) possess a low explanatory power over the excess returns, which causes the line to be placed close to the CAPM-adjusted returns. This further emphasises that the Fama-French adjustment predominantly depends on the MRP factor.

Since a 3-year period in spin-off literature is considered long-term due to the nature of spin-offs, traditional financial theory usually requires a 5-year period to ensure that the long-term trends on market factors are properly accounted for in the beta estimations (Berk & DeMarzo, 2017). As such, the true value of the beta, given less estimation constraints, might be larger than the regression coefficient suggests. As such, the market model is considered more appropriate as a normal performance model when analysing spin-offs, as it provides a more accurate representation of the overall MRP in addition to a simple interpretation that enables benchmarking the spin-off returns to the MRP and consequently provide an empirically founded answer to the research question.

The CAAR, with the different adjustments, implies that the market is not fully efficient in all fragments and that some inefficiencies may exist. This contradicts the EMH but is consistent with the concept of market inefficiency, where investors can obtain abnormal returns by exploiting market imperfections. Ultimately, these findings are consistent with Pedersen's (2015) perception about the existence of market inefficiencies and the claim that abnormal returns can be obtained in specific market segments.

Figure 7.4 subgroups the total sample into two regional subcategories, namely (1) Western Europe and (2) Northern America. The classification aims to clarify potential differences in CAAR across the two regions. The CAAR for each region is illustrated over the 3 years following the commencement of trading.

Figure 7.4 | Long-term CAAR by region



Sources: Own contribution, FactSet

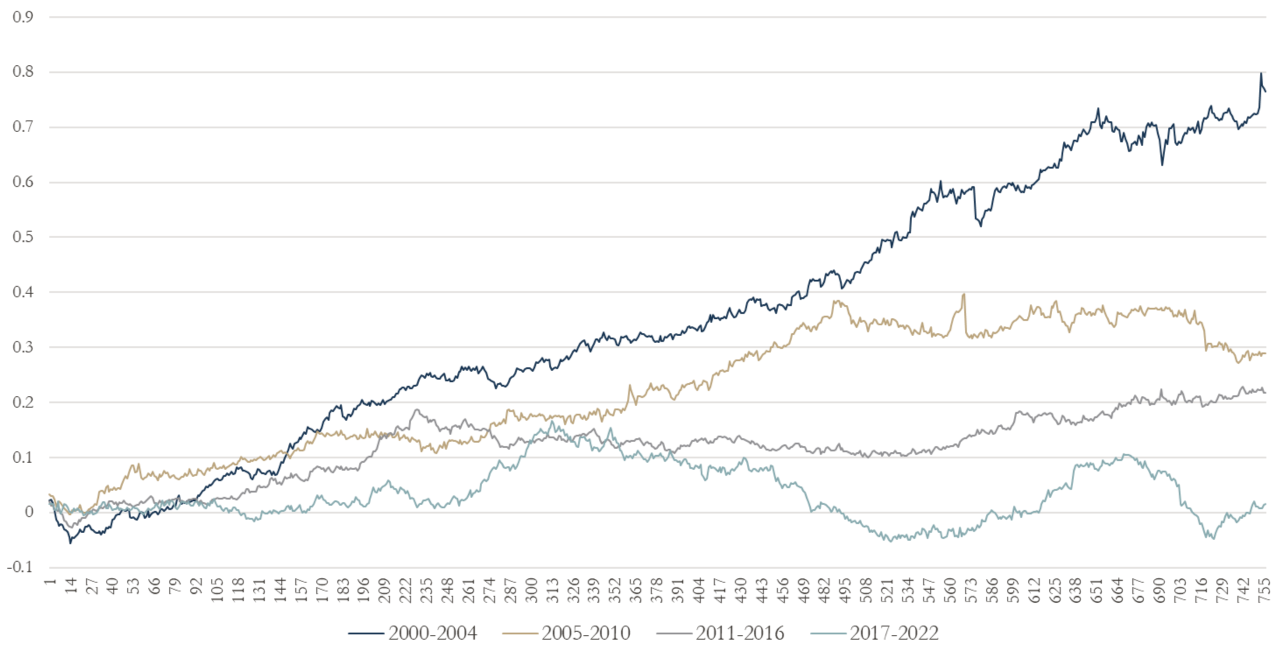
The figure shows that the two regions have followed a consistent pattern, with an overall upward trend. However, spin-offs from Western Europe have slightly outperformed those from Northern America on an aggregated level throughout the entire period, with only occasional exceptions. Hence, there has been no considerable difference between the CAAR in the first and second years of trading. Only in the period following the approximately 560 trading days can a substantial outperformance be observed among the Western European spin-offs relative to the Northern American spin-offs. Hence, spin-offs from Western Europe yielded a CAAR of 39.13% by the end of the 756 trading days, while spin-offs from Northern America yielded a CAAR of 25.11% by the end of the 756 trading days.

Following the interview with Oskar Andersson, one causal explanation for the slightly stronger performance of Western European spin-offs compared to the Northern American spin-offs may be caused by the overleveraging of some US spin-offs by their parent company prior to the spin-off. When asked about any characteristics that are usually associated with underperforming spin-offs, he highlighted the following:

"Overleveraged companies are probably the biggest issue. There have been a few examples of parent companies loading the spin-offs with debt in order to lower their own debt, which has been a characteristic of underperforming spin-offs. I think that it is more common in the US. There have been more examples from the US. In Europe, you do not really do that to the same extent. From my perspective, you have less aggressive management and boards in Europe than in the US. This is, of course, only based on my own experience, but as far as I have seen, it is more likely that the US spin-offs are more leveraged and opportunistic."

Figure 7.5 subcategorises the period lasting from 2000 until 2022 investigated in this paper into four time periods, namely (1) 2000-2004, (2) 2005-2010, (3) 2011-2016, and (4) 2017-2022. The categorisation aims to clarify potential differences in CAAR across time. The CAAR for each period is illustrated over the 3 years following the commencement of trading.

Figure 7.5 | Long-term CAAR by time period



Sources: Own contribution, FactSet

Based on the graphical representation, a clear pattern can be observed, indicating that more recent spin-offs have gradually delivered lower abnormal returns when compared to earlier periods. The 2000-2004 period yielded the most substantial CAAR over the 3-year period following the first trading day, with an abnormal return of 76.44% by the end of the 756 trading days. This period was followed by 2005-2010, which delivered the second highest CAAR, yielding 28.98% by the end of the 756 trading days. The 2011-2016 period ranks third, delivering a CAAR of 21.83% by the end of the 756 trading days. Finally, the newest spin-offs from the 2017-2022 period have demonstrated a more inconsistent performance. Within this timeframe, the highest CAA was achieved after 313 trading days, yielding an abnormal return of 16.63%. However, a significant decline can be observed in the following period, bottoming after 523 trading days, with a negative abnormal return of 5.32%. Ultimately, by the end of the 756 trading days, the spin-offs ended with a modest abnormal return of 1.60%, almost on par with the MRP.

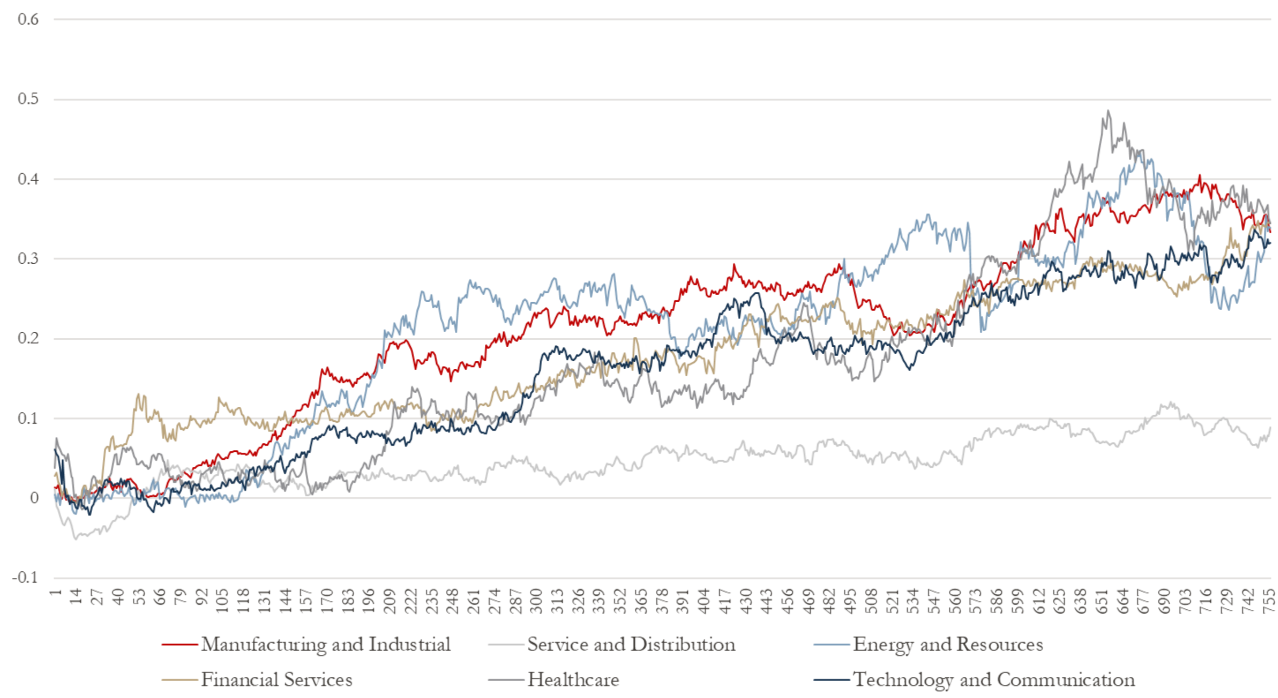
In addition to the long-term performance divided into the four periods, the initial sell-off can now be visually observed in relation to the results presented in Table 7.3 in H_1, which overall shows a decline in initial sell-off throughout the different time periods. Despite the period 2000-2004 having the most extensive initial sell-off among the four periods, the cumulative average abnormal return, after 3 years of trading, delivered a significantly larger abnormal return than the three other periods.

As highlighted in the literature review in Chapter 3, spin-offs have been an attractive investment strategy on an aggregated level. As corporations have sought to take advantage of tackling the conglomerate discount as well as the other benefits of spinning off subsidiaries, evidently attracting an increasing investor base, the competition has gradually intensified over the years. The evidence presented in Figure 7.5 seems to support that this phenomenon has materialised and has resulted in some of the abnormal returns that were previously achievable have been competed away. As such, this development indicates that the market powers have played a role in the segment of spin-off investment over time as the previously extraordinary abnormal returns of 76.44% over three years, in addition to the performance of the MRP in the same period, have been vastly reduced. This indicates that although the markets might not be fully efficient, large abnormal returns cannot be time-invariant. This view is supported by Oskar Andersson:

"[spin-off performance] has been more discussed in research and among investors, so there is a risk that some of the alpha has competed away because it historically has been a very attractive hunting ground for alpha in spin-offs."

In Chapter 5, the descriptive statistics provided an overview of which industries were represented in the final sample of this paper. The sample consists of spin-offs from 19 different industries, which subsequently have been grouped into 6 industry groups to investigate how performance has been distributed across industries. The grouping appears in Appendix 6. The 6 industry groups include (1) Manufacturing and Industrial, (2) Service and Distribution, (3) Energy and Resources, (4) Financial Services, (5) Healthcare, and (6) Technology and Communication. Figure 7.6 presents the CAAR for each industry over the 3 years following the commencement of trading.

Figure 7.6 | Long-term CAAR by industry group



Sources: Own contribution, FactSet

From a visual inspection of the development in the CAAR for each industry, it becomes evident that 5 out of 6 industry groups have broadly followed the same upward trend, ultimately yielding cumulative average abnormal returns by the end of the 756 trading days between 32.05% and 34.49%. Service and Distribution have underperformed for most of the 3 years relative to the other 5 industry groups. Nevertheless, it has shown a highly consistent trend without any larger fluctuations in the performance, except from the initial sell-off, in which it experiences the most extensive initial sell-off with a negative cumulative average abnormal return of 5.17% after 14 days of trading.

The figure provides insights into each industry's development, from which it becomes clear that Energy and Resources exhibit significant fluctuations relative to the other sectors. This characteristic may be attributed to the fact that it is generally an industry that is subject to conditions of high volatility, which makes it difficult for analysts and investors to perform accurate forecasts and valuations. A lack of attention from analysts and investors can result in greater price inefficiencies, ultimately contributing to higher volatility. These findings are supported by Investment Manager, Oskar Andersson:

" For us, in the past, then commodity-driven industries are much more difficult to invest in, and they are also, on average, in specific countries difficult to invest in due to the less rule of law. So, we have never invested in Energy and Resources because commodity prices are very difficult to forecast."

This view can be explained by ambiguity aversion, in which investors prefer options with known risks rather than those with unknown risks. This behavioural bias stems from the discomfort associated with uncertain and ambiguous outcomes, leading them to favour familiar and easily quantifiable investments over those that may offer higher expected returns. This behavioural bias can explain why investors may exhibit a preference for specific industries. Over the 3 years, the Energy and Resources sector has three times been identified as having the highest CAAR. However, the industry's susceptibility to conditions of high volatility may have contributed to greater ambiguity in investors' perceptions of its risk-return trade-off, resulting in reduced investment flows.

Appendix 7 and 8 provides a combined overview of the excess returns of the different industry groups over 1, 2, and 3 years, respectively, and is further shown for both regions. Looking at the overview, it becomes clear that some industries have performed better than others, with different industries yielding higher excess returns at different times. From an inspection of the individual periods, it becomes clear that during the period 2000-2004, Northern American spin-offs operating within Energy and Resources outperformed all other sectors by delivering an average excess return of 256.43% after 756 trading days, while the worst-performer was Western European Technology and Communication spin-offs, yielding an excess return of 4.72% after 752 trading days. During the following period from 2005-2010, the Financial Services spin-offs from Western Europe yielded the highest excess return of 130.83% after 756 trading days. Service and Distribution in Western Europe was the worst-performing sector, with a negative excess return of 34.84%.

From the two recent periods, it can be observed that during the period 2011-2016, it was Western European Healthcare spin-offs that yielded the highest excess return of 336.37%, while Northern American Healthcare spin-offs surprisingly were the worst-performing industry group in the same period by yielding a negative excess return of 23.42%. In the most recent period from 2017-2022, Western European Healthcare spin-offs continued the strong momentum by yielding the highest excess return of 71.90%, while the Service and Distribution sector in Northern America was the worst-performing industry with a negative excess return of 18.29%.

Conclusion for hypothesis 2

This paper provides empirical evidence that spin-offs completed between 2000 and 2022 yield a positive cumulated average abnormal return of 12.9% after 12 months, 19.7% after 24 months, and 28.5% after 36 months of trading. Moreover, our empirical results find that these estimates are significant at the 1%

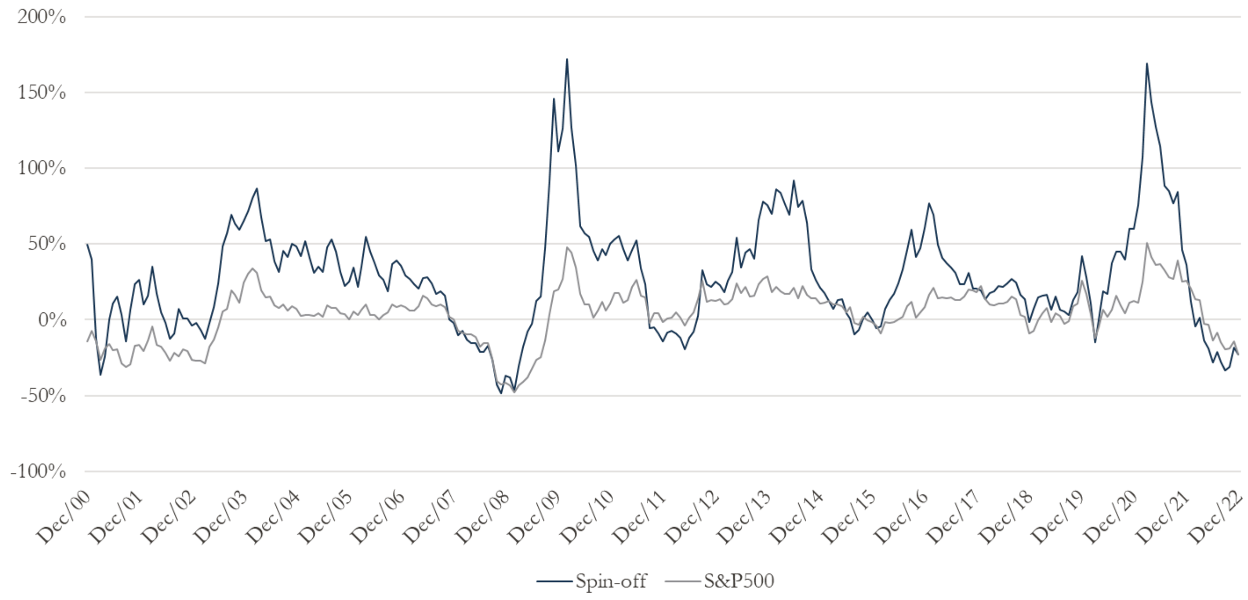
level. As such, the findings indicate that the market is not fully efficient in all fragments, supporting the claim that inefficiencies exist and that active investors can achieve abnormal returns. Furthermore, we find that the excess returns of the sample exhibit a positively skewed distribution, which highlights the importance of having the best-performing spin-offs in the portfolio to ensure abnormal returns. Specifically, we find evidence that these spin-offs constitute a disproportionately large amount of the average returns, evidently constituting a sensitivity towards outperformers. We find no evidence to support that the region and industry of the spin-off meaningfully constitute a differentiating parameter for predicting spin-off long-term CAAR. However, we find evidence that recent spin-offs gradually yield lower abnormal returns compared to earlier periods, supporting the claim that spin-off investments are becoming increasingly competitive and that some of the abnormal returns evident in former periods have competed away.

7.3 Hypothesis 3: Risks and returns of a spin-off investment strategy

This hypothesis investigates the risk and return performance measures of an investment strategy for spin-offs from 2000-2022 compared to the S&P500 index. Although the return of spin-offs has been subject to considerable research efforts and is generally well described historically, the embedded risk and, consequently, the volatility of returns is less studied in the finance literature. As such, the empirical findings from this hypothesis provide valuable insights into the spin-off literature and consequently contributes to the financial literature. With the empirical findings from H_2 supporting the hypothesis that spin-offs, on average, outperform a market benchmark over, namely 1 year, 2 years, and 3 years post-spin-off the overall returns of an investment strategy in spin-off seems attractive. Nonetheless, from these findings, it is difficult to infer what the annual return of such a strategy over time should be compared to an appropriate market benchmark. As such, the annual return based on a trailing twelve-month return is illustrated in Figure 7.7 below, based on monthly returns with monthly rebalancing relative to the S&P500 index from 2000-2022[7].

[7] Since the investment strategy measures trailing twelve months returns, the time series starts twelve months after the first trading day, i.e., December 2000.

Figure 7.7 | Trailing 12m return of spin-off strategy and market benchmark



Sources: Own contribution, FactSet

From Figure 7.7, it is evident that the spin-off strategy has a higher level of annual return as the line lies above the S&P500 for almost the entire period confirming the findings on the long-term performance of spin-offs from H_2. Moreover, the moves on the spin-off strategy seem to move with more velocity relative to the S&P500 in both directions, although not all movements can be explained by market movement. Nonetheless, the larger velocity of movements indicates a larger volatility of the strategy. As discussed, due to limited literature on spin-offs with respect to the risks associated with this strategy, benchmarking the empirical findings to prior studies and financial theory in general becomes less prevalent than otherwise. Nonetheless, it is the perception that this strategy has higher volatility for several reasons. E.g., the investment strategy has an average stock holding of 74 companies for the entire period, whereas the S&P500 holds 500 stocks at any given period. This implies that the idiosyncratic risk is larger for the spin-off strategy as finance literature entails that a larger number of stocks in a portfolio reduces the idiosyncratic risk and hence the overall risk of the strategy (Munk, 2021).

Comparing the different periods with each other, Figure 7.7 further confirms the findings from H_2. The annual returns of the first period that ends in December 2004 lie comfortably above the market benchmark for most of the period, while later periods, to a larger extent, follow the market benchmark development with steep spikes substantially above the market benchmark that drives up the average returns.

In Table 7.7 below, the annualised standard deviation for the two investments is demonstrated with the corresponding significance test to conclude whether the standard deviation on the spin-off strategy is larger than the S&P500 to an extent where statistical significance can be found.

Table 7.7 | Annualised standard deviation of spin-off strategy and market benchmark

Annualised standard deviation				
Spin-off strategy	S&P500	F-test statistic	p-value	significance
0.2985	0.1549	3.7125	0.0000	***

*Note: *, **, and *** notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%.*
Sources: Own contribution, FactSet

As per Table 7.7, the standard deviation on the spin-off strategy over the analysis period was 0.2985, while the S&P500 only had a standard deviation of 0.1549. These estimates confirm the hypothesis that the spin-off strategy is embedded with a larger overall risk compared to the market benchmark. Moreover, the F-test with the null hypothesis that the difference between the standard deviation of the spin-off strategy and the standard deviation of the S&P500 is equal to zero yields a p-value <0.0001. Hence, we can reject the null hypothesis at any relevant significance level in favour of the alternative hypothesis, stating that the spin-off strategy has a larger standard deviation. As such, it can be concluded that the standard deviation of the spin-off strategy is larger than the standard deviation of the S&P500 from 2000 to 2022, with statistical significance at the 1% level. As the standard deviation indicates the embedded risk of an investment (Markowitz, 1952), this confirms the hypothesis that the strategy has a larger embedded risk and H_3 can consequently be confirmed.

Having concluded that the spread on the spin-off strategy is significantly higher than the market benchmark, this supports the claim that the range of outcomes for spin-offs is greater. Moreover, the estimate for the standard deviation is approximately twice as high as the standard deviation on the S&P500 over the 22-year period, which substantiates the fact that the spin-off investment strategy is embedded with substantially larger risk, but also entails opportunities that might not be possible to obtain by investing in the aggregate market through market indices.

As discussed in Chapter 3, prior literature on spin-offs has found that factors such as asymmetric information, limited or no analyst coverage to provide insights to the business, and inadequate insights into historical financial performance make initial asset pricing of spin-offs somewhat cumbersome for investors. As such, once the spin-off begins trading and continuously reduces these knowledge barriers, the asset pricing entails less friction, and the prices over time will likely reflect the intrinsic value of the company. This process manifests the price discovery for spin-offs. The empirical findings in hypothesis 2 support this rationale and suggest that the spin-offs are, on average underpriced initially. Hence, the findings indicate that investors are, in fact, compensated for conducting research as all relevant information might not be effectively reflected in the security pricing.

The empirical results that confirmed H_2, suggests that spin-offs, on average, outperform the market. This begs the question of whether the excess return on spin-off investments above and beyond that of the excess return on the MRP is sufficiently high enough to compensate investors for the additional risk incurred. If not, this suggests that the investors could leverage their position in the market portfolio to match the risk level of the spin-off strategy and consequently outperform the returns on the spin-off strategy. As such, Table 7.8 below summarises the performance measures of the two strategies, including the annualised average excess return and the Sharpe ratio.

Table 7.8 | Performance measures of spin-off strategy and market benchmark

	Spin-off strategy	S&P500
Annualised excess return	0.2840	0.0306
Annualised standard deviation	0.2985	0.1549
Sharpe ratio	0.9514	0.1976

Sources: Own contribution, FactSet

As exemplified in Table 7.8, the spin-off strategy had an annualised excess return of 28.4% from 2000 to 2022. In the same period, the market benchmark, S&P500, yielded an annualised excess return of 3.06%. Considering these performance indicators, it is evident that the spin-off strategy, as presumed, yields a substantially higher annual return when comparing it to the market benchmark. It should be noted that the annualised excess return on the S&P500 in the period of 3.06% has been affected by the dot-com crash that occurred shortly after the investigation period began. Moreover, the S&P has been subject to additional market sell-offs, including the financial crisis in 2008-09, COVID-19, and the negative development at the latter end of the sample period, further combined with increased interest rates (Chapter 4). These conditions negatively affect the annualised excess return in the sample period for the S&P500. Nonetheless, the spin-offs have been trading under the same market conditions and should thus be a fair comparison.

The Sharpe ratio (SR) estimates suggest that the spin-off investment strategy has been far more attractive on a risk-adjusted basis. It is important to note that the SR is sensitive to the sample period and consequently the market conditions. As such, it can be problematic to comment on whether the level of the Sharpe ratio is attractive or not independently. However, comparing the two estimates with one another is an analogous measure since the external environment has been comparable. Clearly, investors would like to see a SR as high as possible as it indicates that the performance of the strategy has been more profitable for every unit of risk. However, the preference of investors might be slightly more complex than what is captured in the SR. Some investment strategies, including the ones employed by hedge funds, are associated with crash risk and skewed returns that do not fulfil the assumptions of normality for the risk measure included in the SR, the standard deviation of returns (Pedersen, 2015). Comparing these two estimates, it is evident that the spin-off investment strategy has compensated the investors substantially more for every unit of risk compared to the S&P500.

The fact that the spin-off strategy yields a higher return per unit of risk and since the spin-off strategy is embedded with higher idiosyncratic risk suggests that investors are not only compensated for the systematic risk of investments, which is assumed in the market model and CAPM. The rationale of this model entails that the rational investor should seek to diversify away their idiosyncratic risk in favour of investments in the market portfolio where all idiosyncratic risks are diversified away. Hence, investors should only invest in a combination of the market portfolio and the risk-free rate to ensure receiving the highest expected return for a given level of risk. This rationale builds on the EMH and the fact that investors are not compensated for any idiosyncratic risk that could be diversified away (section 2.6). Hence, the ex-post return should, on average equal the expected return. However, the empirical findings indicate that investors are compensated for their idiosyncratic risk and that the return per unit of risk is larger than for the market benchmark. Moreover, since H_2 of this paper concluded that the spin-offs strategy, on average, outperforms the market even when inspecting for additional explanatory factors such as the small factor (SMB) and the value factor (HML), this indicates that the market might not be efficient to the strong or semi-strong extent in all fragments of the market.

7.3.1.1 Conclusion H_3

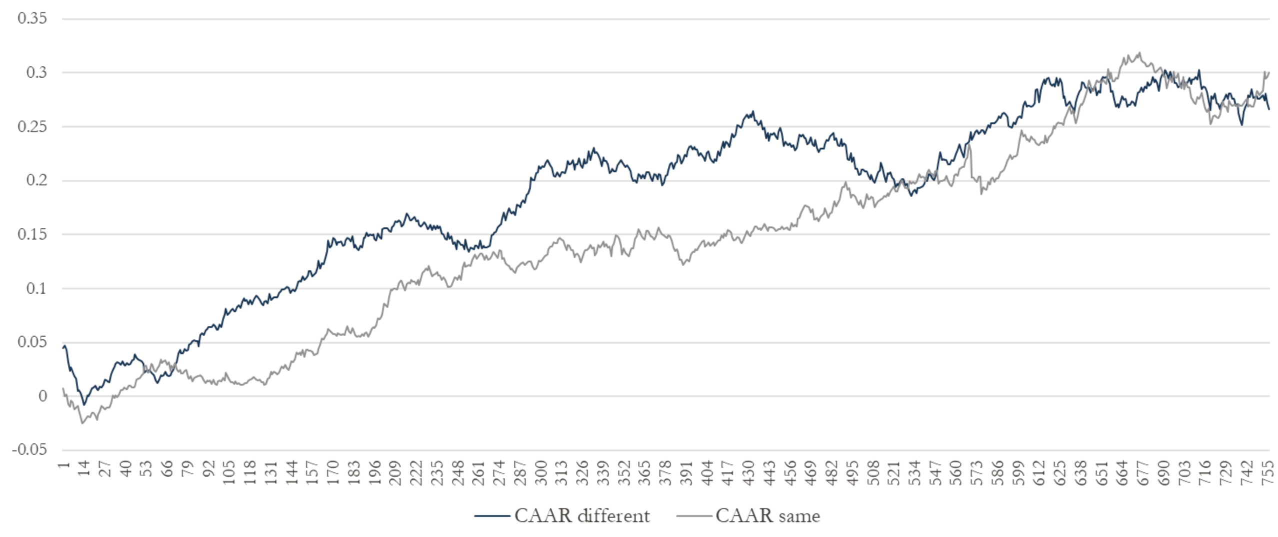
This paper concludes that the annual excess return on a spin-off strategy from 2000 to 2022 is higher than the market benchmark, S&P500. Specifically, the annualised excess return on the spin-off strategy in the sample period was 28.4%, while the S&P had an annualised excess return of 3.04%. This paper further finds that the spin-off returns are embedded with higher risks compared to the market benchmark. Specifically, the standard deviation of monthly returns from 2000 to 2022 for the spin-off strategy was 0.2985, while the standard deviation of monthly returns for S&P500 in the same period was only 0.1549. Testing whether these figures are statistically significant finds that we can conclude with 99% confidence that the standard deviation of returns for the spin-off strategy in the sample period is larger than the standard deviation of the S&P500. Hence, the estimated standard deviation and risk indicator of the spin-off strategy is larger, implying that the range of outcomes is greater for the spin-off strategy than the market index. Comparing the annualised return per unit of risk using the Sharpe ratio, the empirical results find that the spin-off strategy yielded a SR of 0.9514, while the S&P had a SR of 0.1976. This paper suggests that the fact that investors have been compensated more per unit of risk for a strategy with higher idiosyncratic risks is not in compliance with the EMH and the CAPM.

7.4 Hypothesis 4: Effect of different industry on long-term spin-off performance

The fourth hypothesis states that the spin-offs from parent companies operating as a diversified conglomerate, where the spin-off contributes to a de-diversification of said company, the performance of said spin-off will be greater than otherwise. As such, this analysis presents findings on the long-term performance of spin-offs operating in a different industry than their parent company versus those operating in the same industry.

Firstly, to enable a visual interpretation of the data, the total sample has been subcategorised into two subgroups, (1) the spin-offs operating in a different industry than their parent, and (2) spin-offs operating in the same industry as their parent. The subcategorised CAAR is plotted over trading days after the effective date in Figure 7.8 below.

Figure 7.8 | Long-term CAAR by *different industry*



Sources: Own contribution, FactSet

The figure shows that the line representing the CAAR for the subgroup of spin-offs operating in a different industry generally lies above the line representing the CAAR of spin-offs operating in the same industry. However, the two subgroups exhibit very similar development after approximately 480 trading days post the effective date. Moreover, the abnormal return after 3 years or 756 trading days appears to match each other very well. Hence, the figure indicates that the abnormal return is higher for spin-offs operating in a different industry than their parents for a limited period but that the abnormal return of the two subgroups is not different over the long term. Apart from the long-term performance of the two subgroups, the initial sell-off can also be observed from this figure. In that respect, it is evident that both subgroups are subject to a sell-off from trading day 1-14 after the effective date of the spin-off, confirming the conclusions from H_1. Moreover, it can be observed that although the spin-offs operating in a different industry exhibit a positive excess return the first trading day post spin-off, the subsequent sell-off results in negative excess returns after 14 trading days post spin-off (section 7.1).

Additionally, the figure indicates that the effect of operating in a different industry on abnormal returns is largest at the beginning of the period before the longer-term abnormal returns converge. Visually, the difference between the two lines appears to peak at around 200 trading days. Nonetheless, whether the difference between the two lines is significantly different from zero cannot be concluded from this figure. For this reason, Table 7.9 below summarises the difference between the cumulated average abnormal return between the two subgroups and corresponding tests for significance on the said difference for 756 trading days post spin-off with a 63 trading day interval:

Table 7.9 | $CAAR_{Differnt}$ versus $CAAR_{Same}$ significance tests 63 trading days interval

Trading days after event	$CAAR_{Different} - CAAR_{same}$	t-statistic	p-value	significance
63	-0.0121	-0.2985	0.765	
126	0.0711	1.6527	0.099	*
189	0.0908	1.6609	0.097	*
252	0.0126	0.1733	0.862	
315	0.0672	0.8235	0.411	
378	0.0563	0.6865	0.493	
441	0.0829	0.9440	0.346	
504	0.0208	0.0703	0.944	
567	0.0126	0.1179	0.906	
630	0.0064	0.0531	0.958	
693	0.0022	0.0169	0.987	
756	-0.0334	-0.2379	0.812	

*Note: *, **, and *** notes the statistical significance level of the mean return on the significance levels, respectively 10%, 5%, and 1%.*
Sources: Own contribution, FactSet

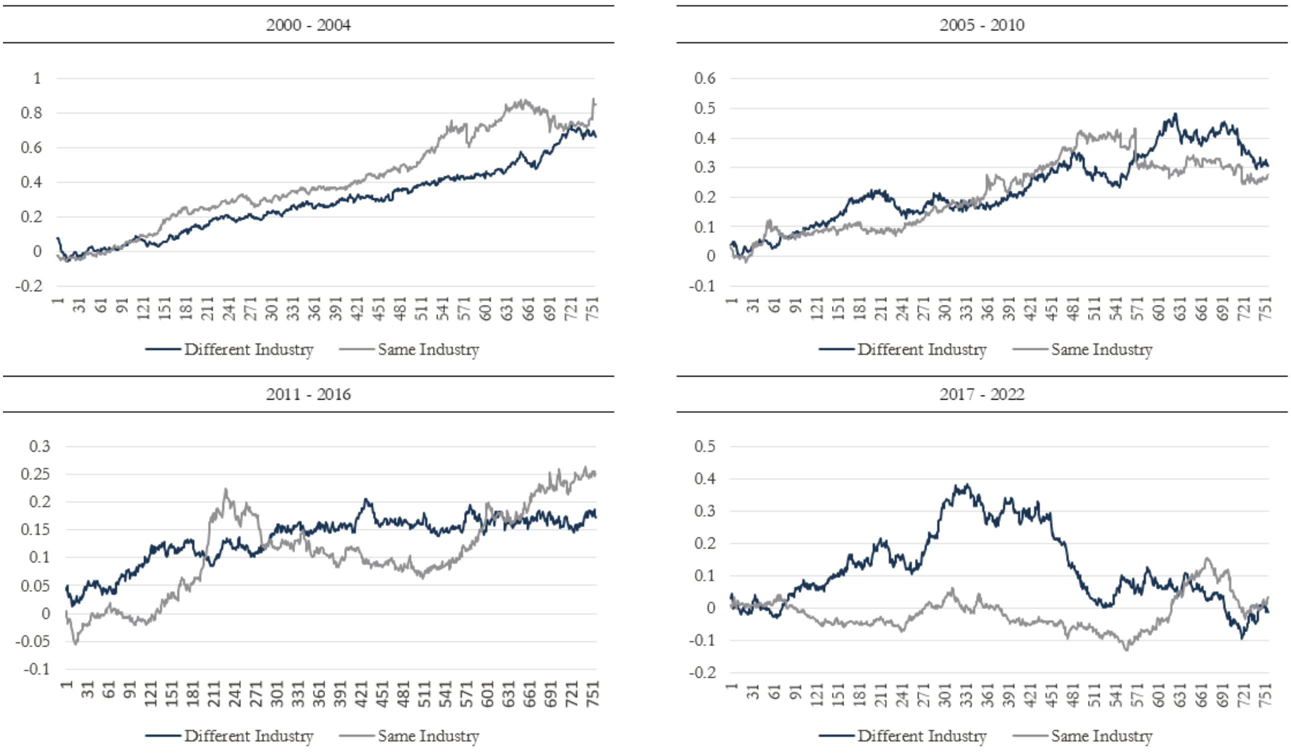
From the table, it is clear that with the exception of the difference on day 63 and 756, the difference is positive for all trading days. Hence, this indicates that the spin-offs operating in a different industry than their parents have had a higher CAAR than those operating in the same industry. Moreover, the largest differences are found after 189 trading days, where the spin-offs in different industries yielded a CAAR that was 9.08 percentage points higher than the spin-offs in the same industry. However, after this day, the differences seem to be gradually declining over time, with the exception of 441 trading days after the spin-off, where the average return of spin-offs in different industries was 8.29 percentage points higher than the same industry subgroup.

This development confirms the interpretation from Figure 7.8, which indicated that the spin-offs in different industries generally have yielded a higher return for a limited period before the effect wears off and the return becomes similar to their same industry peers. With respect to the significance of the differences, it is evident that only two of the tested trading days had a difference that was significantly different from zero at a relevant significance level. Hence, after 126 trading days and 189 trading days, the CAAR of spin-offs operating in a different industry than their parent was higher than those operating in the same industry at the 10% level. We do not find statistical significance at any relevant level for the remaining trading days. Consequently, we fail to reject the null hypothesis stating that the difference is, in fact, equal to zero for these periods. From these findings, it is evident that the spin-offs operating in a different industry have a positive but insignificant effect for holding periods longer than 189 trading days post the spin-off effective date.

As such, these results do not confirm the fourth hypothesis of this paper, stating that the spin-offs operating in a different industry than their parent outperforms relative to the spin-offs that do operate in the same industry. Emrick et al. (2017) found that spin-offs performed by parent companies that are more diversified and likely executed the spin-off as an attempt to increase the business focus outperformed the spin-offs from parents with a more focused business, which seems to contradict the findings of this paper. Nonetheless, Emrick et al. (2017) investigate the post-completion excess return of both the parent company and the spin-off, which might explain the discrepancy.

Hence, some of the added value from demerging a large diversified company might be captured in the parent company's stock rather than the spin-off stock post-completion. Additionally, Emrick et al. (2017) investigated spin-offs from 2001 to 2015 in the US, which means that the last period included in this analysis was not included in their paper. From H_2, we found that the last time period generally performed worse compared to the remaining time periods, which might have had an impact on the performance of the spin-offs operating in different industries. To gain comprehension of whether there are differences among time periods, the cumulative abnormal return of spin-offs for all subgroups over the four time periods is plotted in Figure 7.9 below.

Figure 7.9 | Long-term CAAR by *different industry* and time period

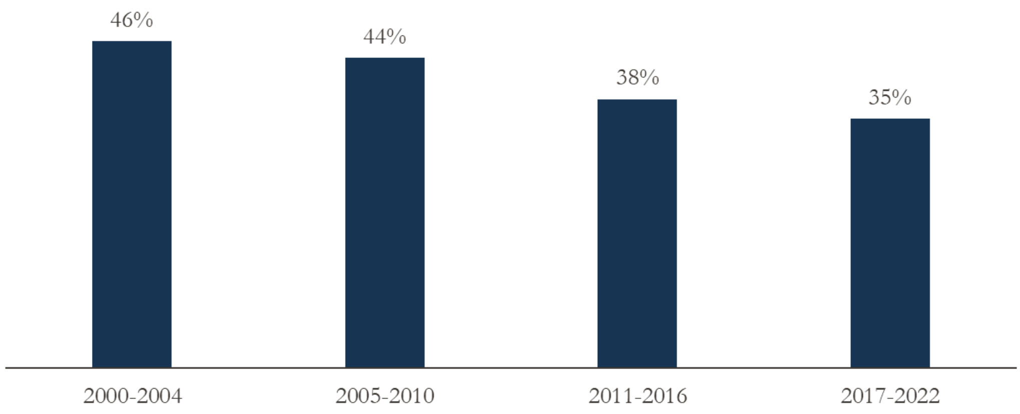


Sources: Own contribution, FactSet

Figure 7.9 indicates that none of the time periods exhibits substantial differences based on whether the spin-off operates in a different industry than its parent company. The 2000-2004, 2005-2010, and 2011-2016 time periods all exhibit a fairly similar development over the 3-year period. Surprisingly, the spin-offs in the same industries as their parent actually performed slightly better in the time periods 2000-2004 and 2011-2016. These findings generally do not support the expectations based on prior literature and consequently suggests that the different industry variable has a little explanatory effect over the long-term performance of spin-offs. The 2017-2022 period exhibits a high peak where the abnormal return of the spin-offs in different industries was higher than the ones in the same industries. However, this time period does not outperform over the entire period, and the effect seems to wear off. Generally, it appears that spin-offs in different industries than their parent have a higher abnormal return compared to the other subgroups, but from the findings on the overall sample, it was evident that this overperformance has not been sufficiently prevalent to create statistical significance for the long-term performance after 189 trading days.

Given the long-term increased focus on de-diversification to optimise corporate structures (Khorana, 2011), it can be argued that companies, in general, have become more diversified as it has proven to be rewarded by shareholders. As a larger proportion of the companies becomes increasingly focused, the spin-offs that contribute to a de-diversifying strategy become scarcer. As discussed, Emrick et al. (2017) found that spin-offs that contributed to de-diversifying a large, diversified company yielded more excess return for the parent company and the spin-off compared to those that were spun off due to other indicators. Moreover, it suggests that one reason for the declining spin-off performance can be explained by the fact that less diversified companies are to an increasing extent conducting spin-offs. The fact that these spin-offs constitute a smaller proportion of the total spin-offs in recent times contributes to a worsened overall performance.

Figure 7.10 | Share of spin-offs in different industry than parent company by time period



Sources: Own contribution, FactSet

From Figure 7.10, it can be observed that the share of spin-offs in the sample that operates in a different industry than their parent has gradually declined in each period, with the latest period containing 11 percentage points fewer spin-offs operating in different industries than their parents compared to the first period. As such, this confirms the findings from Emrick et al. (2017) and supports the hypothesis that spin-offs are, to a larger extent, conducted by companies with a focused business and hence completed for other reasons than de-diversifying the business. Nonetheless, in contrast to the points made by Emrick et al. (2017), this paper does not find evidence that the reduced share of spin-offs operating in a different industry than their parents contribute to a lower expected return for spin-offs with respect to long-term returns. However, this paper finds evidence that the abnormal excess return of spin-offs is larger for spin-offs in different industries than their parents compared to spin-offs in the same industry for 126 and 189 trading days post spin-off. As such, it can be argued that if the trend continues and fewer spin-offs in the future will be operating in a different industry than their parents, it will negatively impact the cumulated abnormal excess return for investors with an investment horizon shorter than a year.

The claim that spin-offs in different industries, on average, do not necessarily cause additional CAAR that is statistically significant over time is, to some extent, intuitive since many other factors that are not included in this analysis can contribute to enhanced spin-off performance. This point is further supported by the fact that Emrick et al. (2017) found that the biggest predictors of spin-off success were improvement of capital efficiency, improvement of growth trajectory through M&A, and establishment of a sustainable and attractive dividend policy. All these factors were a greater predictor than enhancing business focus, and since these factors are not included in this analysis, it underlines that properly understanding the business rationale behind the spin-off is essential to optimise the chances of attractive long-term abnormal returns. The importance of understanding the rationale behind the spin-off as an indicator for long-term performance was further confirmed through our interview with Mr Andersson (Appendix 2).

7.4.1.1 Conclusion H_4

This paper finds that spin-offs operating in a different industry than their parent companies have a higher CAAR than spin-offs operating in the same industry as their parent when the holding period is 126 or 189 trading days after the effective date. This paper finds evidence that the additional abnormal return is statistically significant at the 10% level 126 and 189 trading days after the spin-off effective date, but we find no evidence that the overperformance is significantly different from zero for longer holding periods. Moreover, the empirical results indicate that the effect is the largest after 189 trading days and then gradually declines throughout the sample period before the effect wears off completely. The development in the proportion of spin-offs in different industries than their parents as a percentage of total spin-offs performed for the period 2000-2022 has been steadily declining. This supports the hypothesis that due to the increasing popularity of spin-offs, businesses are becoming increasingly focused, and spin-offs are, to a lesser extent, completed to de-diversify the business. However, this paper finds no evidence that this trend reduces the expected return of spin-offs for investors with a longer time horizon than one year but rather suggests that other aspects, such as the spin-off rationale, are more important indicators for successful spin-offs.

8 Discussion

This chapter discusses the empirical findings and contextualises said findings, namely the concepts that constitute the foundation of financial theory and the inferred practical implications. Through a discussion of the implications of the empirical findings, we consider the future potential of spin-off investments based on namely the characteristics exhibited in the sample period, the expectations of the spin-off activity, and consequently, the opportunities arising in the field of spin-off investments.

8.1 Picking the winners is essential for success

The abnormality of spin-off returns over several decades has driven the proliferation of spin-off research aimed at investigating this anomaly, which has increasingly attracted the attention of active investors in their pursuit of abnormal returns in financial markets. Although this paper finds evidence that spin-offs, consistent with previous studies of spin-off performance, have proven to offer a lucrative opportunity to investors, the distribution of spin-off returns is characterised by skewness and consequently fat tails, indicating a greater likelihood of extremely positive and negative returns than would be anticipated under a Gaussian (normal) distribution. Consequently, discerning the winners from the losers is critical for investors seeking to capitalise on this opportunity while considering the higher risks involved. In light of these challenges, identifying the best-performing spin-offs and avoiding the worst-performing spin-offs has become increasingly essential in generating abnormal returns in the realm of spin-off investing.

From an investor's perspective, the shape of the distribution of returns constitutes a critical aspect of investment analysis, as the nature of the distribution and level of dispersion provide insights into the risk profile and uncertainty related to a given investment. For instance, two distributions may have identical mean returns, yet the likelihood of significant changes could differ significantly. Thus, it is critical in an investor's evaluation of the risk-return trade-offs associated with a specific investment (Fama, 1965).

This study found that spin-offs on an aggregated level have significantly outperformed the market within the first 3 years of trading as independent companies. However, this strategy necessitates acceptance of the weakest returns, and as a result, it exhibits a wide range of returns. As such, active investors are presented with an opportunity to carefully analyse and differentiate the best-performing spin-offs from the worst performers. To achieve an abnormal return, the active investors must accurately identify the best-performing spin-offs (or buy all spin-offs to ensure buying the best ones), as this investment strategy carries a substantial risk of underperformance if the investor does not manage to do so. Specifically, failing to buy the 25% best performers results in a negative excess return of 18.38%. Although the high sensitivity to the best performers is no new phenomenon in investing or spin-off investing, emphasised by McConnell et al. (2015), demonstrating that relatively few spin-offs largely drove the positive mean returns of spin-offs. Nevertheless, this paper finds that although the returns are embedded with higher risks than the aggregate market, the spin-off returns remain more attractive on a risk-adjusted basis.

The perception of the distribution of returns in financial markets has been a topic of research for more than a century. Financial market returns exhibit greater price movements that are not accounted for in the Gaussian model and, thus, challenge the traditional assumptions that stock market returns follow the Gaussian distribution (Mandelbrot, 1963). The findings in this study indicate that the distribution of spin-off returns is positively skewed with fat tails and a high degree of dispersion. Active investors pursuing abnormal returns by investing in spin-offs must be aware of this high-risk profile and uncertainty related to investing in spin-offs due to the more extensive range of outcomes for spin-offs compared to the aggregate market. This may lead to an underestimation of the risks involved, particularly for those investors relying on traditional risk models based on the Gaussian distribution. This emphasises that the risk measures used to indicate the compensation of investors may not accurately reflect the true risk level of spin-off investments due to the violation of the normality assumption.

The inherent uncertainty surrounding spin-off investments will likely deter many investors from pursuing these abnormal returns, which can be defined as ambiguity aversion in behavioural finance. Those investors possessing the required skills to value these spin-offs accurately can benefit from the difference between the stock price and the intrinsic value until the market price reflect the true value of the stock. Thus, an opportunity exists in this area of financial markets for investors willing to conduct an in-depth analysis and take on the higher risk associated with investing in spin-offs.

Despite an investor possessing the necessary competencies, success is contingent upon the availability of opportunities in the market to apply these skills. As purportedly stated by Napoleon Bonaparte, *"Ability is nothing without opportunity."* (Mauboussin & Callahan, 2020). The critical element thus lies in a combination of the investors' ability to identify attractive spin-offs whose intrinsic value is not reflected in the stock price and the existence of opportunities in the market. Despite the uncertainty related to spin-off investing, opportunities still exist for those willing to conduct proper due diligence and differentiate the best-performing spin-offs from the worst-performing ones.

8.1.1 Is different industry a poor indicator of spin-off rationale?

While conglomerates were once viewed favourably for their diversification benefits, their valuation and perception have undergone a shift over time. As a result of the democratisation of financial markets and increasing focus on streamlining businesses, the traditional conglomerates that historically traded at a premium due to their diversified nature and ability to spread risk across multiple business lines have gradually been separated into smaller pieces as modern Western market discredits this business model. To capture whether the rationale of the previous value driver for spin-offs affects the long-term performance of the spun off entity, we use *different industry* as a proxy to examine if the spin-off rationale can be considered *de-diversification*. As presented, our findings indicate that only a short-term outperformance is prevalent, while no convincing evidence for the effect on long-term returns has been identified. However, findings related to different industry performance is very much reliable on the applied industry classification, which may vary in the literature. Although there might exist differences in the applied terminologies, this discrepancy indicates that the fact that spin-offs operate in a different industry than their parents might not be a valuable indicator for the spin-off rationale. As such, even if the spin-off may contribute to an increased business focus for the parent company, this might not be the main rationale behind the spin-off.

Moreover, prior studies, including Emrick et al. (2017) and Khorana et al. (2011), have found somewhat contradictory findings, demonstrating that diversified parent companies generally produce better performing spin-offs. However, since they track the performance of both the parent and the spin-off, wealth creation cannot be subcategorised into the part related to the spin-off and the parent company. As such, this implies that the additional excess return might only affect the parent company and not the spin-off. This is somewhat intuitive as the parent company is far more known by market participants, and thorough analysis enables properly accounting for the incremental change, which might not be the case for the smaller subsidiary.

Further, with respect to considering the wealth creation for the spin-off specifically, it can be challenging to determine whether any effect on excess returns can be explained by the *different industry* indicator or by other factors. As discussed, numerous spin-off specific elements can influence the performance of said spin-off, and thus, the *different industry* variable is subject to a large degree of noise. Hence, the empirical results become somewhat ambiguous since we cannot determine whether the performance originates from *different industry* or whether the performance comes from other factors such as management team, profitability, investment needs, or other idiosyncratic factors with effect on the performance. These implications suggest that other motives might be driving these restructuring initiatives, which challenges the widely accepted view in the literature that corporate restructurings are typically driven by a need to refocus business operations. As a result, investors may need to reassess their evaluation criteria when considering spin-off opportunities. This means that investment decisions must be based on a more holistic view of the opportunity.

8.2 An unrelenting anomaly

This paper investigates the prospect for active investors to obtain abnormal returns from investments in spin-offs through four hypotheses founded in financial literature. Although spin-offs have been subject to a fair amount of research and the characteristics of spin-off returns have been well described, most of the studies investigate spin-off performance in earlier time periods than the 2000-2022 period that is examined in this paper. E.g., the paper by Cusatis et al. (1993) examines the stock market evidence from 1965-1990 and finds similar characteristics with 4.5%, 25.0%, and 33.6% CAAR after 1, 2, and 3 years, respectively. Although the magnitude of abnormal returns deviates to some extent between the research papers on spin-off performance, the overall direction and development appear to be somewhat time-invariant. Since we find evidence that supports three out of four possible hypotheses based on this literature, even when adjusting for size and value factors, the abnormality of spin-off returns seems to indicate *an unrelenting anomaly*.

The fact that we find abnormal returns in accordance with prior studies all employing different adjusting measures, including matching firms and similar, indicates that the conclusion that spin-offs provide more attractive returns for investors on a risk-adjusted basis seems robust. It can be argued that it, to some extent, is surprising that the empirical findings of this paper arrive at the same conclusions as much earlier studies. Since spin-off performance is a well-documented field of study and the consensus is that spin-offs provide a more attractive risk-adjusted investment, believers in the EMH would argue that market players would exploit any market inefficiencies as they materialise. However, the fact that the inefficiency within spin-off investments has endured thus far and consequently has not yet been eliminated indicates that the EMH might not apply to all fragments of the financial markets.

The EMH in the semi-strong form claims that assets in the market are efficiently priced and consequently reflect all publicly available information (Malkiel, 1992). Therefore, this relies on the investors' ability to accurately price the assets. For this purpose, one of the most commonly applied factor models for both practitioners and academics, the CAPM, states that investors are only compensated for systematic risk and, consequently, that the idiosyncratic risk, which can be diversified away, does not affect the expected returns (Berk & DeMarzo 2017). As such, the ex post abnormal return we find on spin-offs cannot be explained by the systematic risk and consequently entails that investors for our sample period have been compensated for the idiosyncratic risk embedded in the spin-offs, which is a further indication that the market is not fully efficient.

Other risk components have been added to the CAPM to account for risk components that might not be captured in the univariate model. Thus, the empirical results also include Fama & French's (1993) additional two factors, suggesting that investors are also compensated for a size component (SMB) and a value component (HML). Apart from the models applied in the empirical study, numerous factor models exist, including Fama and French's (2014) own 5-factor model, including a profitability factor (RMW) and an investment factor (CMA). Nonetheless, other studies, such as Cusatis et al. (1993) applying different risk-adjusting measures in addition to the three methodologies applied in our analysis, including matching firm-adjusted returns, still result in positive abnormal returns. As such, no factor has been identified that can attribute the abnormal returns to any other factor other than the fact that they are spin-offs. Although the CAPM and Fama-French model supports the EMH, none of the risk components embedded in these models can explain the excess return that the spin-offs in the sample have yielded, consequently leaving a positive alpha.

8.2.1 How can spin-offs be immune to market powers?

The fact that abnormal returns are present in our empirical results as well as the empirical results of numerous other studies on the long-term performance of spin-offs (See Veld & Veld-Merkoulova, 2009) and that our empirical results indicate that investors are compensated for idiosyncratic risk miscredits the EMH. Although it might seem straightforward to simply dismiss the validity of the EMH in practice based on this information, it would be negligent to avoid acknowledging the significant impact and widespread acceptance the hypothesis has had on the financial theory since Eugene Fama introduced the concept in 1970. As such, the anomaly that will not seem to go away might be explained by specific characteristics present for spin-offs but not for the general market.

When investors build their portfolios with the objective of maximising expected return for a given level of risk, this is based on ex-ante returns rather than ex-post returns (Berk & DeMarzo, 2017). Since the empirical results of this paper reflect the ex-post realised returns and the beta estimates are based on the knowledge that has not been available upon investing at time t=0, this might explain why investors have inaccurately priced the asset, leading to abnormal returns in spin-offs. Given the numerous uncertainties characterising spin-off investments, it seems plausible that there have been discrepancies in the expected and realised returns.

Several factors contribute to the fact that accurately estimating the expected returns are especially challenging for spin-offs, creating a substantial information gap (see Chapter 3). Factors such as asymmetric information, limited or no analyst coverage, limited information on historical and projected financials, and no stock trading history contribute to the cumbersome process of accurately pricing spin-off stocks initially. With respect to determining the discount rate, regardless of which model is applied, the information gap makes it difficult for investors to accurately estimate an appropriate beta given the lacking stock market evidence. As such, investors would likely use a benchmark or a peer group to base their valuation upon, resulting in an inaccurately estimated discount rate. Hence, WACC fallacies might arise since investors are employing an inaccurate discount rate on the company.

Moreover, the lack of analyst coverage and reliable historical financial figures for the spin-offs further affects the ability of investors to forecast financials accurately and, consequently, the free cash flow used in many valuation models (Berk and DeMarzo, 2017). Since these factors affect both the accuracy of forecasted free cash flow as well as the discount rate that this cash flow should be discounted with, it can be argued that the basis for investors to reliably estimate the price of such a stock can be particularly challenging. As such, with this many variables and uncertainties, investors have little to no chance of arriving at an accurate valuation, which might explain why active investors are reluctant to invest in spin-offs and why they are chronically under-priced. This characteristic is further emphasised by ambiguity aversion.

Furthermore, the fact that the uncertainties are as prominent as they are in spin-offs creates opportunities for investors. Since the market inaccurately prices the securities, it entails that the investors that have the ability to accurately price the security can benefit from the difference between the market price and the intrinsic value for the duration of the price discovery. This further indicates that investors conducting proper due diligence get compensated for their efforts, which is further not compliant with EMH.

8.2.2 Asset allocation increasingly flowing to passive funds

Throughout the sample period, the asset allocation on a general level has increasingly been moved to passive funds. This is supported substantially in financial literature. E.g., Anadu et al. (2020) found that as of March 2020, US stocks held in private Mutual Funds and ETFs accounted for approximately 14% of the domestic equity market, up from less than 4% in 2005. These figures do not include passively managed holdings outside of Mutual Funds and ETFs, contributing to a larger share of privately held funds. For instance, Blackrock (2017) estimated that 18% of all global equity at the end of 2016 was held by passive investors, where most of the holdings were outside Mutual Funds and ETFs. Moreover, the trend does not uniquely apply to the US market alone but is a general trend in developed economies (Sushko & Turner, 2018).

This development impacts spin-off investments in several ways. Firstly, the fact that passive funds, to an increasing extent, own large parent companies will likely ensure that spin-offs have a significant degree of liquidity initially after the effective date, given the fact that passive funds would have to sell their shares in the case of a mandate misfit. However, the increasing allocation towards passive funds also entails that a smaller proportion of overall capital is in the hands of active investors. Moreover, as discussed in relation to the frictions surrounding spin-off investments, some active managers might also be reluctant to invest in spin-offs due to the many initial uncertainties. The fact that active money managers possess a diminishing share of capital and that market frictions might make them reluctant to invest further contribute to the fact that the anomaly for spin-off excess returns has not been eliminated yet.

8.2.3 The efficiently inefficient market

This study finds evidence of abnormal risk-adjusted excess returns for spin-offs completed from 2000 to 2022, supporting the conclusions of prior literature on the field. Accordingly, the empirical findings do not support the EMH, which might be related to a number of market frictions concerning spin-off investments. Nonetheless, the results show that spin-offs are chronically under-priced initially, emphasising active investors' reluctance to invest before indicators have manifested and expectations for returns and development can be more accurately determined. However, although the spin-off securities market might still not be efficient, this paper finds evidence that spin-off securities are becoming increasingly efficient over time.

As discussed, the sample period on an aggregated level exhibits the same profound benefits as earlier research has found for other datasets. However, we find that the inherent benefit of spin-off investments is less prevalent for the latest sub-time period in our analysis, 2017-2022. As such, the fact that the abnormal returns are diminishing over time provides some indication of market efficiency. However, given the wide timespan, this indicates a lagged price discovery that might be associated with the market frictions concerting spin-offs as discussed. However, the fact that the risk-adjusted abnormal excess returns are diminishing over time places some comfort in the price discovery and, consequently, the EMH. In conclusion, our findings indicate that it is still possible to find investments that will compensate investors to a larger extent than the market compensates investors for every unit of risk. Our finding further suggests that the market, due to several factors, including market frictions and changes in asset allocation, is not, at least not in its entirety, fully efficient, but rather efficiently inefficient.

8.3 The next era of spin-off investments

This study found that the abnormal returns appear to diminish over time, indicating a potential decaying abnormality in this area of financial markets, which to some extent, supports the validity of the EMH. With corporations generally becoming less diversified as they have streamlined their businesses to unlock potential shareholder value, the traditional conglomerate has become less common. The so-called tech and digital conglomerates represent a new form of diversified company, which can become the next driver behind the spin-off activity. These conglomerates might even be compelled to divide their businesses in response to antitrust headwinds and market pressures. This could create new opportunities for investors to capitalise on market inefficiencies and achieve abnormal returns.

The level of interest in spin-offs largely depends on the prevailing conditions in the stock market and macroeconomic outlook. Periods of heightened uncertainty and volatility in the financial markets tend to make investors more cautious and hesitant to pursue new and risky investments. This was especially apparent when looking at the IPO activity in 2022. The general economic expectations among market participants point toward a normalised level of financial indicators around 2025. Until then, the spin-off activity will be affected by challenging market conditions. However, the higher level of antitrust and the emergence of new conglomerates suggest that spin-off activity will continue to endure. Despite this macroeconomic headwind for the spin-off activity, there is still an underlying push created by shareholder activism that will drive the demand for companies to spin off subsidiaries to unlock shareholder value.

Based on consensus estimates, economists and market participants hold a slightly more optimistic outlook regarding the future state of the economy than Federal Reserve Board members and Federal Reserve Bank presidents. This sentiment bodes well for transaction activity levels, as market participants primarily drive such activity by exploring new market opportunities. Conversely, a more pessimistic outlook among market participants could lead to reduced transaction activity and decreased liquidity in the stock market, which would not be conducive to promoting increased transaction activity.

Traditional conglomerate theory suggests that conglomerates tend to outperform other organisational structures during periods of economic downturn. This advantage stems from the presence of multiple business units within a conglomerate facilitating the pooling of cash resources, which can address temporary liquidity issues that may arise (section 2.5). As a result, in weaker economic conditions, conglomerates may be incentivised to maintain ownership of non-core subsidiaries to maximise their access to these shared cash resources implying that for the duration of financially distressed markets, spin-off activity will be negatively affected. This claim is supported by the general reduction in spin-off activity levels in weak economies in Chapter 5.

The uncertain outlook surrounding the financial markets, with a recession potentially lying around the corner, underlines the significance of thorough investment analysis when scanning for attractive spin-off opportunities. Although the frequency of completed spin-offs may diminish in the coming years due to market uncertainty, antitrust and rising investor activism will continue to present opportunities for active investors in pursuit of abnormal returns.

9 Conclusion

The empirical results find that the initial sell-off is statistically significant at the 1% level, bottoming after 14 trading days at negative 1.7% post event. Hence, we confirm $\boldsymbol{H_1}$ of this paper, stating that spin-offs are subject to temporary supply and demand imbalances. Specifically, we find that the sell-off is only prevalent in the first 14 trading days after the effective date, whereafter the AAR becomes positive, causing the CAAR to become insignificant after 19 trading days. The analysis further found that spin-offs operating in a different industry than their parent generally exhibit larger initial trading velocity than those operating in the same industry. Although the CAAR is less negative for the spin-offs in different industries at the higher bottom, these spin-offs demonstrated a steeper slope on the decline from day 1 to 14 due to a higher positive abnormal return on the first trading day. Through additional investigation of the dynamics of the initial sell-off, we find evidence that the initial sell-off becomes less dominant as time progresses. This development has been associated with increased competitiveness in spin-off investing, implying that a larger proportion of the shares are traded prior to the completion date and consequently between the announcement day and the completion date.

This paper finds that long-term excess return of spin-offs has been 18.95%, 33.46%, and 52.82% after 1 year, 2 years, and 3 years, respectively, in our sample period, driven by a small percentage of spin-offs that have performed particularly well. The excess returns of the spin-offs form a positively skewed distribution with significant dispersion stemming from a broad range of outcomes consisting of both extremely positive and negative returns. The positively skewed distribution reveals that a few spin-offs constitute a disproportionately large part of the mean return. We find that failing to pick the 10% best performers reduced the excess return after 3 years from 52.82% to 6.44% while failing to invest in the 25% best performers yields a negative excess return of 18.38%. Thus, the paper concludes that the success of the spin-off is highly sensitive to a few spin-offs performing exceptionally well, implying that investors employing this strategy either must invest in all spin-offs to ensure getting the winners or possess the ability to successfully pick the good performing companies.

Using the market model to estimate normal performance, we find evidence that spin-offs yield a statistically significant cumulative average abnormal return (CAAR) of 12.91% after 12 months, 19.66% after 24 months, and 28.55% after 36 months of trading with all estimates being statistically significant at the 1% level. Benchmarking the findings to consensus results in financial literature, where the average abnormal return has been 10.22%, 18.34%, and 26.42% after 12, 24, and 36 months respectively, we find that our abnormal returns are in line with previous findings. Hence, we confirm $\boldsymbol{H_2}$ of this paper.

This paper finds no evidence of a meaningful difference between abnormal spin-off returns based on the region or the spin-off industry. On the contrary, we find implications that the CAAR has gradually declined over time, with spin-offs completed between 2000 and 2004 yielding a positive cumulative average abnormal return of 76.44% after 36 months, while spin-offs completed between 2017 and 2022 yielded a positive cumulative average abnormal return of 1.60% after 36 months. It is concluded that this development emphasises that spin-off investments are increasingly competitive among investors and abnormal return over time is diminishing, implying the market powers in the EMH eliminate abnormal return over time, although the potential elimination of abnormal returns has materialised after several decades.

We find that a spin-off investment strategy with a 3-year holding period with monthly rebalancing between 2000 and 2022 had an annualised standard deviation of 0.2985 compared to a standard deviation of 0.1549 for the S&P500. We find that the risk of the spin-off strategy is larger than the one of S&P500 at the 1% level. As such, we can confirm $\boldsymbol{H_3}$. We further find that the spin-off investment strategy yielded an annualised excess return of 28.4%, with the S&P500 in the same period having an annualised excess return of 3.06%, evidently resulting in a Sharpe Ratio of 0.9514 for the spin-off strategy while the S&P500 had a Sharpe ratio of 0.1976. Hence, our findings suggest that investors are compensated with higher returns for every unit of risk in the spin-off strategy compared to the market benchmark, which contradicts the EMH.

Investigating whether the fact that spin-offs operate in a different industry than their parent companies compared to operating in the same industry influences abnormal returns, this paper finds that spin-offs operating in a different industry exhibited 7.1% and 9.1% higher abnormal returns after 126 and 189 trading days after the effective date, respectively, being significant at the 10% level. However, we do not find evidence that the additional abnormal return for spin-offs in different industries, although positive, was statistically significant at any relevant significance level for holding periods longer than 189 trading days. As such, the empirical results do not provide convincing evidence to conclude that spin-offs in different industries outperform spin-offs operating in the same industries as their parents in the long-term and consequently, we reject $\boldsymbol{H_4}$ of this paper. Further investigation reveals that the proportion of spin-offs operating in a different industry than their parents has declined over time, suggesting that fewer spin-offs are being executed to enhance business focus. However, due to the hypothesis conclusion, we find no evidence that this affects the long-term performance of spin-offs, although short-term returns might be affected.

Based on the empirical results, we discuss potential explanations for the fact that our empirical results find similar levels of abnormal returns as scientific papers investigating spin-off performance across various time periods and regions, which contradicts the base assumptions in the EMH. We argue that although the abnormal returns appear to be decaying, our findings suggest that the unique characteristics of spin-offs, which entails a variety of market frictions such as asymmetric information and behavioural biases, cannot be accurately reflected in security prices of the efficiently inefficient market, results in market opportunities for investors. Hence, we advocate that investors can gain an advantage by collecting information on the securities that are not reflected in the stock price, although consistently beating the market is incredibly rare. We further discuss the possibilities for spin-off investments in the future, where it is concluded that the unique properties of the spin-off fragment in financial markets constitute opportunities for investors and have proven to be an attractive investment strategy historically.

Reverting to our research question, based on the preceding conclusions, this paper concluded that spin-offs that have been completed between 2000 and 2022 have, on average, yielded statistically positive abnormal returns. The findings of this study are summarised in Table 9.1 below:

Table 9.1 | Conclusion framework

	Overall Assessment
H_1: Due to initial sell-off pressure, spin-offs yield a negative abnormal return in the first 30 days post-event.	✓
H_2: A spin-off investment strategy that invests in all spin-offs from 2000-2022 yields a positive abnormal return over 12 months, 24 months, and 36 months.	✓
H_3: A spin-off investment strategy is more volatile than the aggregate market in the period 2000 to 2022.	✓
H_4: When the spin-off operates in a different industry than the parent company, the spin-off is more likely to outperform the aggregate market.	✗

Source: Own contribution

10 Implications for further research

The findings of this paper provide valuable insights into the existing body of literature on spin-offs, finding that spin-offs remain a source of abnormal returns. Moreover, the results further pave the way for unexplored avenues for future research within spin-off performance.

We find that the SMB and HML factor was inappropriate in describing the excess returns of spin-offs in our sample, but other factors remain unexplored. Although various approaches have been applied in literature, including matching firm adjustments, Emrick et al. (2017) found that capital-intensive subsidiaries disproportionately underperformed, suggesting that capital intensity might explain some abnormal returns. Hence, a study employing the CMA factor (the investment factor) from the Fama-French five-factor model could investigate the explanation of the factor.

Moreover, this study finds a gradual decline in spin-off abnormal returns over time, supporting the claim that the mispricing in spin-offs might be eliminated over long periods of time. However, the total sample still exhibits positive abnormal returns in the 3-year period, thus not disproving the abnormality of returns in spin-offs. However, further research could explore this development and consequently investigate whether the development is a consistent pattern resulting in long-term abnormal returns on spin-offs that are no longer significantly larger than zero or whether the development is simply caused by idiosyncratic circumstances in the sample data. Hence, more recent data, including the spin-offs performed in later years that have not yet traded for a sufficient period of time, including the spin-offs that have not yet taken place, would provide needed input for this analysis and consequently determine whether spin-offs remain an anomaly or if the abnormality is evened out over time.

11 Bibliography

Abergel, F., Aoyama, H., Chakrabarti, B. K., Chakraborti, A., & Ghosh, A. (2014). Econophysics of Agent-Based Models. Springer.

Ackermann, C., McEnally, R., & Ravenscraft, D. (1999). The performance of hedge funds: Risk, return, and incentives. The Journal of Finance, 54(3), 833-874.

Ackert, L., & Deaves, R. (2010). Behavioral Finance: Psychology, Decision-Making, and Markets. Cengage Learning.

Allen, D. E., Kramarski, S., & Sotes-Paladino, J. (1995). Corporate restructuring: A note on the comparative performance of spin-offs and sell-offs in Australia. Accounting & Finance, 35(2), 137-152.

Altman, E. I., & Hotchkiss, E. (2006). Corporate financial distress and bankruptcy: Predict and avoid bankruptcy, analyze and invest in distressed debt. John Wiley & Sons.

Amihud, Y., & Lev, B. (1981). Risk Reduction as a Managerial Motive for Conglomerate Mergers. The Bell Journal of Economics.

Anadu, K., Kruttli, M., McCabe, P., & Osambela, E. (2020). The Shift from Active to Passive Investing: Risks to Financial Stability? Financial Analysts Journal, 23–29.

Anson, M. J. (2002). Handbook of alternative assets. John Wiley & Sons.

Aron, D. J. (1991). Using the capital market as a monitor: Corporate spin-offs and the share price of a large multi-product firm as a noisy signal for divisional managers' compensation. The Journal of Industrial Economics, 39(5), 565-579.

Asprem, M. (1989). Stock prices, asset portfolios and macroeconomic variables in ten European countries. Journal of Banking & Finance.

Bachelier, L. (1900). The Theory of Speculation.

Baldwin, C. Y., & Clark, K. B. (2000). Design Rules: The Power of Modularity. MIT Press.

Ball, R., Kothari, S. P., & Watts, R. L. (1993). Economic determinants of the relation between earnings changes and stock returns. Accounting Review, 68(4), 622-638.

Baker, H. K., & Ricciardi, V. (2014). How Biases Affect Investor Behaviour. The European Financial Review.

Baker, H. K., & Savasoglu, S. (2002). Limited arbitrage in international equity markets. Journal of Financial and Quantitative Analysis, 37(2), 297-318.

Banerjee, A. V. (1992). A Simple Model of Herd Behavior. The Quarterly Journal of Economics.

Berger, P. G., & Ofek, E. (1995). Diversification's effect on firm value. Journal of Financial Economics, 37(1), 39-65.

Berk, J., & DeMarzo, P. (2017). Corporate Finance (4th ed.). Pearson.

BlackRock, 2017, "Viewpoint: Index investing supports vibrant capital markets."

Bodie, Z., Kane, A., & Marcus, A. J. (2017). Investments (11th ed.). McGraw-Hill Education.

Bollerslev, T., Engle, R. F., & Wooldridge, J. M. (1988). A Capital Asset Pricing Model with Time-Varying Covariances. Journal of Political Economy, 96(1), 116-131.

Breusch, T. S., & Pagan, A. R. (1979). A Simple Test for Heteroskedasticity and Random Coeffi-cient Variation. Econometrica, 47(5), 1287-1294.
https://doi.org/10.2307/1911963

Bryman, A., & Bell, E. (2015). Business Research Methods. Oxford University Press.

Campbell, J. Y., Lo, A. W., & MacKinlay, A. (1997). The Econometrics of Financial Markets. Princeton University Press.

Chalmers, A. (1999). What is this thing called Science? Cambridge: Hackett Publishing Company Inc.

Chakraborti, A., & Ghosh, A. (2014). Econophysics of Agent-Based Models. Springer.

Cont, R. (2001). Empirical properties of asset returns: stylized facts and statistical issues. Palaiseau: Institute of Physics Publishing.

Copeland, T. E., Lemgruber, E. F., & Mayers, D. (1987). The spin-off and merger ex-date effects. Journal of Finance, 42(4), 943-958.

Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Nebraska: SAGE.

Cusatis, P. J., Miles, J. A., & Woolridge, J. R. (1993). Restructuring through spinoffs: The stock market evidence. Journal of Financial Economics, 33(3), 293-311.

Damodaran, A. (2012). Investment Valuation: Tools and Techniques for Determining the Value of Any Asset (3rd ed.). Wiley.

Damodaran, A. (2021). Country risk premiums.

Daley, L., Mehrotra, V., & Sivakumar, R. (2003). Corporate focus and value creation: Evidence from spinoffs. Journal of Financial Economics, 37(1), 257-281.

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor Psychology and Security Market Under- and Overreactions. The Journal of Finance.

De Bondt, W. F. M., & Thaler, R. H. (1985). Does the stock market overreact? The Journal of Finance, 40(3), 793-805.

Desai, H., & Jain, P. C. (1999). Firm performance and focus: Long-run stock market performance following spinoffs. Journal of Financial Economics, 54(1), 75-101.

D’Mello, R., & Ferris, S. P. (2000). The Information Effects of Analyst Activity at the Announcement of New Equity Issues. Financial Management, 29(1), 78–95.

Durbin, M. (2010). All About High-Frequency Trading. McGraw-Hill.

Easley, D., & O'Hara, M. (1992). Time and the Process of Security Price Adjustment. The Journal of Finance, 47(2), 577-605.

Ellsberg, D. (1961). Risk, Ambiguity, and the Savage Axioms. The Quarterly Journal of Economics.

Emrick, M., Khorana, A., & Servaes, H. (2017). The keys to success in spinoffs. Journal of Applied Corporate Finance, 29(2), 135-146.

Engle, R. F., & Granger, C. W. J. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. Econometrica, 55(2), 251-276.

Fabozzi, F. J., & Francis, J. C. (1978). Beta as a random coefficient. Journal of Financial and Quantitative Analysis, 13(1), 101-116.

Fama, E. F. (1965). The Behaviour of Stock-Market Prices. Journal of Business.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. International Economic Review, 10(1), 1-21.

Fama, E. F., & French, K. R. (1989). Business conditions and expected returns on stocks and bonds. Journal of Financial Economics, 25(1), 23-49.

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. The Journal of Finance, 47(2), 427-465.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. Journal of Financial Economics, 33(1), 3-56.

Fama, E. F., & French, K. R. (2014). A five-factor asset pricing model. Journal of Financial Economics : 1-22.

Federal Reserve. (2023). Monetary Policy Report. Washington: Board of Governors of the Federal Reserve System.

French, K. R., Schwert, G. W., & Stambaugh, R. F. (1987). Expected Stock Returns and Volatility. Journal of Financial Economics, 19(1), 3-29.

French, K. R., & Poterba, J. M. (1991). Investor Diversification and International Equity Markets. National Bureau of Economic Research.

Galbraith, J. R. (2000). Designing the global corporation. Jossey-Bass.

Gattei, S. (2009). Karl Popper's Philosophy of Science. Routledge.

Gilson, S. C. (2001). Managing Default: Some Evidence on How Firms Choose between Workouts and Chapter 11. In: Weiss, L. A. & Wruck, K. H. (Eds.), Information, Bankruptcy, and Financial Restructuring. MIT Press,

Goetzmann, W. N., Ingersoll Jr, J. E., Spiegel, M. I., & Welch, I. (2003). Sharpe's safety first criterion. Journal of Financial and Quantitative Analysis, 38(2), 277-303.

Greenblatt, J. (1999). You Can Be a Stock Market Genius: Uncover the Secret Hiding Places of Stock Market Profits. New York: Simon & Schuster.

Grossman, S. J., & Stiglitz, J. E. (1980). On the Impossibility of Informationally Efficient Markets. The American Economic Review, 70(3), 393-408.

Harrison, E. (2023). The Six Big Market Questions for 2023. Bloomberg.

Hayashi, F. (2000). Econometrics. Princeton University Press.

Hite, G. L., & Owers, J. E. (1983). Security price reactions around corporate spin-off announcements. Journal of Financial Economics, 12(4), 409-436.

Hirshleifer, D. (2001). Investor Psychology and Asset pricing. The Journal of Finance, LVI(4), 1533–1576.

Hovakimian, A. (2016a). Corporate diversification, risk and firm value. Journal of Corporate Finance, 41, 19-33.

Hovakimian, A. (2016b). Spinoffs, Excess Returns, and Analyst Coverage. Financial Management, 45(4), 909-936.

Huberman, G. (2001). Familiarity Breeds Investment. Review of Financial Studies.

Huang, L. (2022). Systematic Risk and Idiosyncratic Risk Literature Review. Coventry: Journal of Education, Humanities and Social Sciences.

Hull, J. C. (2012). Risk Management and Financial Institutions (3rd ed.). Wiley.

Humpe, A., & Macmillan, P. (2007). Can Macroeconomic Variables Explain Long Term Stock Market Movements? A Comparison of the US and Japan . CDMA Working Paper.

Israel, G. D. (1992). Determining Sample Size. Florida: University of Florida.

Jacobs, B. I., & Levy, K. N. (1988). Disentangling equity return regularities: New insights and investment opportunities. Financial Analysts Journal, 44(3), 18-43.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. The Journal of Finance, 48(1), 65-91.

Jeon, B., & Tran, A. (2011). The dynamic impact of macroeconomic factors on initial public offerings: Evidence from time-series analysis. Applied Economics.

Jensen, M. C. (1967). The Performance of Mutual Funds in the Period 1945-1964. Journal of Finance.

Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representativeness. Cognitive Psychology.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. The Econometric Society.

Khorana, A. (2011). Spin-offs: Tackling the Conglomerate Discount. Journal of Applied Corporate Finance, 23(1), 64-74.

Kilinc, U. (2018). Value creation in diversified firms. Journal of Business Strategy, 39(2), 32-39.

Kirschmaiser, S. (2003). The long-term performance of spin-offs. Working Paper, University of Bonn.

Krishnaswami, S., & Subramaniam, V. (1999). Information asymmetry, valuation, and the corporate spin-off decision. Journal of Financial Economics, 53(1), 73-112.

Klein, A., & Ledermann, T. (1995). The efficiency of European financial markets: A test of the strong form of the efficient market hypothesis. European Financial Management, 1(2), 111-126.

Kohl, N. (2022). Stock Issuance and the Speed of Price Discovery. Journal of Financial Economics.

Konina, N. (2022). Digital strategies in global market: Navigating in the fourth industrial revolution. Emerald Publishing Limited.

Kuhnle, K. (2023). Spin offs and carve outs. Financier Worldwide Magazine.

Lambert, M., & Platania, F. (2020). The macroeconomic drivers in hedge fund beta management. Economic Modelling.

Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. The Review of Economics and Statistics, 47(1), 13-37.

Lütkepohl, H. (2005). New introduction to multiple time series analysis. Springer Science & Business Media.

Ma, L., & Oyeniyi, T. (2017). Capital market implications of spinoffs. S&P Global.

Madhavan, A., Richardson, M., & Roomans, M. (1997). Why do security prices change? A transaction-level analysis of NYSE stocks. The Review of Financial Studies, 10(4), 1035-1064.

Malkiel, B. G. (1992). Efficient market hypothesis. In P. Newman, M. Milgate, & J. Eatwell (Eds.), The New Palgrave Dictionary of Money and Finance (pp. 739-743). Macmillan.

Mandelbrot, B. (1963). The Variation of Certain Speculative Prices. The Journal of Business.

Mauboussin, M. J., & Callahan, D. (2020). Dispersion and Alpha Conversion. Morgan Stanley.

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

McConnell, J. J., & Ovtchinnikov, A. V. (2004). Predictable long-term spinoff returns. Journal of Corporate Finance, 10(3), 339-363.

McConnell, J. J., Ozbilgin, M., Wahal, S. (2001). Spin-offs, Ex Ante. Journal of Business

McConnell, J. J., Sibley, S. E., & Xu, W. (2015). The Stock Price Performance of Spin-Off Subsidiaries, Their Parents, and the Spin-Off ETF, 2001–2013. The Journal of Portfolio Management.

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.

Miles, J. A., & Woolridge, J. R. (1993). Spinoffs: Reshaping corporate strategy. Journal of Business Strategy, 14(3), 47-51.

Mitchell, M. L., & Pulvino, T. C. (2001). Characteristics of risk and return in risk arbitrage. The Journal of Finance, 56(6), 2135-2175.

Munk, C. (2021). Financial Markets and Investments. Wiley.

Nanda, V., & Narayanan, M. P. (1997). Disentangling value: Financing needs, firm scope, and divestitures. Journal of Financial Intermediation, 6(3), 242-263.

Parrino, R. (1997). Spinoffs and wealth transfers: The Marriott case. Journal of Financial Economics, 43(2), 241-274.

Patel, P. N., Yao, S., Carlson, R., Banerji, A., & Handelman, J. (2012). Do Spin-Offs Create or Destroy Value? . Credit Suisse.

Pedersen, L. H. (2015). Efficiently Inefficient: How Smart Money Invests and Market Prices Are Determined. Princeton University Press.

Pogue, G. A. (1970). An Extension of the Markowitz Portfolio Selection Model to Include Variable Transactions' Costs, Short Sales, Leverage Policies and Taxes. The Journal of Finance.

Racicot, F.-E., & Theoret, R. (2016). Macroeconomic shocks, forward-looking dynamics, and the behavior of hedge funds. Journal of Banking & FInance.

Rajan, R., Servaes, H., & Zingales, L. (2000). The cost of diversity: The diversification discount and inefficient investment. The Journal of Finance, 55(1), 35-80.

Ritter, J. R. (1991). The Long-Run Performance of Initial Public Offerings. The Journal of Finance, 46(1), 3-27.

Rüdisüli, R. (2005). Value creation of spin-offs and carve-outs. Business.

Rumelt, R. P. (1974). Strategy, structure, and economic performance. Harvard University Press.

Schipper, K., & Smith, A. (1983). Effects of recontracting on shareholder wealth: The case of voluntary spin-offs. Journal of Financial Economics, 12(4), 437-467.

Sercu, P. (2009). International Finance: Theory into Practice. Princeton University Press.

Shapiro, S. S., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Sam-ples). Biometrika, 52(3/4), 591-611. https://doi.org/10.2307/2333709

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. Journal of Finance, 19(3), 425-442.

Sharpe, W. (1966). The Sharpe Ratio. The Journal of Portfolio Management.

Shefrin, H., & Statman, M. (1985). The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. The Journal of Finance.

Shleifer, A. (2000). Inefficient markets: An introduction to behavioral finance. Oxford University Press.

Steward, G. B., & Walsh, J. P. (1996). Stock market reactions to corporate spin-offs: Explanations and implications. Journal of Business Strategy, 17(3), 57-62.

Stock, J. H., & Watson, M. W. (2015). Introduction to Econometrics, Global Edition. Pearson.

Sudarsanam, S., & Qian, M. (2007). The determinants and value impact of the choice of spin-off method. European Journal of Finance, 13(1), 1-22.

Sushko, Vladyslav and Grant Turner, 2018, "The implications of passive investing for securities markets," BIS Quarterly Review (March): 113-129.

Thaler, R. (1985). Mental Accounting and Consumer Choice. Marketing Science.

Thaler, R. H., & Ziemba, W. T. (1988). Anomalies: Parimutuel Betting Markets: Racetracks and Lotteries. Journal of Economic Perspectives.

The Economist. (2023, February 23). It's time for Alphabet to spin off YouTube: It could be worth more than Netflix. Schumpeter

The Wall Street Journal. (2023, April 15). About The Wall Street Journal Economic Forecasting Survey.

Veld, C., & Veld-Merkoulova, Y. (2004). Do spin-offs really create value? The European case. Journal of Banking & Finance, 28(5), 1111-1135.

Veld, C., & Veld-Merkoulova, Y. V. (2009). Value creation through spin-offs: A review of the empirical evidence. International Journal of Management Reviews, 11(4), 407-420.

Wruck, K. (1990). Financial Distress, Reorganization, and Organizational Efficiency. Journal of Financial Economics, 27, 419-444.

Wooldridge, J. M. (2013). Introductory Econometrics: A Modern Approach (5th ed.). South-Western Cengage Learning.