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Spin-off Impact on Shareholder Wealth: A worldwide study on market reactions to spin-off announcements

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Abstract

This thesis investigate the spin-off wealth effect and its determinant factors for spin-offs announced in the period 2000-2019. The sample is distributed over three regions; Europe, Asia-Pacific, and the US, with 103, 248 and 164 sample transactions, respectively. We conduct an event study and find a positive wealth effect during the three-day event window of 2.63%, 2.67% and 3.57% for the respective regions, significant at the 1% level. Through cross-sectional regressions, we find evidence that an increase in geographical focus and whether the spin-off later is completed are determinant factors for the wealth effect around announcement. Contrary to previous findings, we can not find evidence that industry focus or information asymmetry can explain short-term abnormal return.

Key words: Corporate restructuring, Divestiture, Spin-off, Average cumulative abnormal return, Diversification, Information asymmetry

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1 Introduction

The introduction contains a review of the background to divesting and spin-off research, relevant definitions in this thesis as well as the problem description, aim and limitations of the study.

1.1 Background Description

A corporate restructuring strategy can be built on different methods and be motivated by a variety of reasons. While mergers and acquisitions create opportunities to expand into new geographical areas and business segments, divesting rather intends to streamline a company. Even though the motives for divesting vary, Cusatis et al. (1993) describe that it often concerns mitigating negative synergies between parent and subsidiary, overcoming a market undervaluation of the parent based on a diversification discount or a striving to reduce agency and overhead costs. There are several ways to conduct a divestment, as described by Tübke (2004), where the most common ones are equity carve-out, buy-out, sell-off, split-up or spin-off.

This study will focus on spin-offs as a method for divesting, which is defined as the procedure of separating an entity from the parent organization with a shift in ownership from the parent to the parent's shareholders. Often when a public company performs a spin-off, the spun-off subsidiary is listed on the stock market directly, but it could also remain private. Tübke (2004) further describes how in a spin-off, the majority of the new subsidiary's shares are distributed to the parent's shareholders on a pro-rata basis in the form of a stock dividend. Pro-rata is a Latin expression for proportional allocation, and it means that the shareholders' share of ownership in the parent company also will apply to the subsidiary. Furthermore, as a spin-off simply distributes shares among existing shareholders, it is not cash-generating for the parent company.

This study will only examine pure spin-offs, which is when the parent gives up all its ownership of the subsidiary to its shareholders. A spin-off is unique to other divesting method in that the shareholders remain ownership, but direct instead of indirect, and have a continued interest in the company. This signals that the divestment is motivated by reasons other than merely wanting to dispose a poorly performing division, which may be the case in other divesting methods. It is therefore of great interest to examine spin-offs and the underlying motives, particularly. Spin-offs are described by Hite & Owers (1983) as the mirror image of a merger. While mergers can provide positive synergies, spin-offs can instead mitigate the negative effects of having a too diversified business. Like mergers, spin-offs have been shown to induce an increase in shareholder wealth around announcement. In a review of 26 studies on spin-offs during the time period 1962-2005,

Veld & Veld-Merkoulova (2009) provide evidence that spin-off announcements are associated with a positive short-term abnormal return.

A lot of research has been done to detect the sources of the shareholder wealth effect, but there is no clear consensus in today's literature. Typically, either certain characteristics of the parent company or the relationship of the parent to the subsidiary is investigated. Two extensively researched factors though, are reduction in diversification and information asymmetry.

Berger & Ofek (1995) argue that, by reducing diversification, managers are relieved from tasks that are unrelated to the core business and thus negative synergies are removed. Many empirical studies, for instance Desai & Jain (1999) and Veld & Veld-Merkoulova (2004), provide evidence that supports this reasoning. The information asymmetry theory is discussed by Denis et al. (2002), where the authors argue that diversified companies experience higher levels of information asymmetry, leading investors to value the company at a discount, which can be mitigated by spinning off non-core business entities. This argument has empirical support in a study made by Krishnaswami & Subramaniam (1999). This theoretical reasoning and its empirical evidence have led investors and scholars to believe that reduced diversification and information asymmetry are factors explaining the positive price reaction to spin-off announcements.

However, more recent research, for instance Santalo & Becerra (2008) and Erdorf et al. (2013), question the previous findings. Erdorf et al. (2013) dispute that a premium or a discount is driven only by the level of diversification, but it is rather determined by other underlying firm characteristics. Santalo & Becerra (2008) argue that the valuation effect from diversification varies between industries; value creating in industries where specialized firms hold a small combined market share, but value destroying in industries where most competitors are specialized. Also information asymmetry has later been questioned as a determinant factor by for instance Veld & Veld-Merkoulova (2004), who find no significant relation between spin-off wealth effect and information asymmetry for European spin-offs. These factors and other aspects such as relative size of the spin-off, tax or regulatory advantages and shareholder rights have been researched with the intention of finding the source of the spin-off wealth effect. The divided views about the source to value creation motivates further research on the subject, and determinant factors are therefore of attention in this study.

Researchers on the spin-off wealth effect, including Veld & Veld-Merkoulova (2009), Chai et al. (2018) and Truong (2017), express the need for further research on the spin-off wealth effect and its determinant factors, particularly outside of the US. Although some

factors that may explain the spin-off wealth effect have been studied vastly, it remains to discover if the casual effect applies to more recent spin-off announcements and other geographical areas, as well as to find additional explanatory factors.

1.2 Definitions

When we in this report mention *parent company*, we refer to the company that performs the spin-off and give up the ownership in its subsidiary. *Subsidiary* and *spun-off subsidiary* or *entity* refer to the company that has been spun off and separated from the parent. The *announcement date* is the date when the spin-off is first announced to the public. The *completion date* is the date on which the spin-off is performed, which also coincides with the first trading day in cases where the subsidiary is listed in connection to the spin-off. This thesis will focus on detecting abnormal return, which in general terms refers to the difference between the actual return of a company and the expected return based on a benchmark, which can be constructed in various ways. *Abnormal return* and *average cumulative abnormal return* may be used interchangeably when the current event window is clearly specified. Value creation is in this thesis defined as an increase in share price.

1.3 Problem Description and Analysis

As mentioned, a corporate restructuring strategy can consist of transactions to expand or to divest. The ultimate goal, whatever the transaction, is to increase firm value (Tübke (2004)). However, it is not always straightforward for a company's management to predict what strategic action will unlock the most value, and contribute the most to a company's future growth. Some restructuring decisions may even decrease firm value depending on investor expectations and perceptions. Furthermore, it is not only the general restructuring method that determines the actual change in value, but also the motives behind the strategic decision, such as increasing focus or reducing information asymmetry, and the consequences that follow (Tübke (2004)). This is what motivates empirical research not only on the return associated with restructuring announcements, but also the sources to that return. Empirical research on the spin-off wealth effect can thereby offer rigorous empirical evidence and insights to corporate management that provide guidance for detecting and executing value creating strategies.

As described in the background description, the views on the sources to the spin-off wealth effect are still diverse and previously proven factors are questioned in more recent studies. Relying on the conclusions from older studies could lead to misbelief on what kind of spin-off is value creating and not, which is why testing decreased diversification, in particular, on new data is beneficial. Information asymmetry is still a highly interesting factor with close connection to the motive behind a spin-off decision, which has been

tested scarcely especially in Asia-Pacific (APAC). Although that factor is associated with measurement difficulties and implicit proxies, is the effect on firm value direct and logical which motivates further research on the investor perception of spin-off's ability to decrease information asymmetry. To further explore the price reaction to spin-off announcement, we also test the explanatory strength in a factor reflecting whether the spin-off later was completed and a factor reflecting analyst coverage as a proxy for information flow. The connection to restructuring strategy may be weaker for these two factors, but the limited empirical testing together with the fact that those factors might be relevant to control to be able to determine the explanatory strength in other variables indicates a need for further empirical research in this area. The reasoning for all factors are discussed further in section 2 Theoretical Framework.

Furthermore, a majority of the earlier empirical studies have been made on US spin-offs, and even though studies made on European spin-offs have increased during the last decades, they are still inferior to the number of American studies. Studies made on APAC spin-offs are the most scarce, and at the same time, a great number of spin-offs are performed in that geographic region, see table 5 in section 3.3 Sample Selection. This indicates a will among companies in APAC to perform this kind of divesting, which motivates further research on the shareholder wealth effect and its sources in this region specifically. Further research on US spin-offs is motivated mainly by the emerged opposing views on the diversification discount, since increased industry focus in many studies have been concluded to be a determinant factor for value creation. This leads us to perform our analysis on the three geographical regions Europe, APAC and the US.

In this study, the following research questions will be answered:

- Is a corporate spin-off value creating?
- What factors can explain value creation associated with spin-off announcements?

1.4 Aim of the Study

The aim of the study is to contribute to the empirical research made on spin-offs as a corporate divestment method. The contribution comprises 1) a greater understanding for the short-term effect on shareholder wealth following a spin-off, 2) further trial of already suggested explanatory factors as sources of value creation and 3) proposal of other factors that may explain spin-off value creation.

1.5 Limitations of the study

Both Asia-Pacific and Europe consist of a large number of smaller countries and the US is a single country, but to perform general analyses of the effect of different factors we treat the regions equally. Differences between the countries in Asia-Pacific and Europe could impact the comparability. One way to avoid this would be to analyse the countries in Asia-Pacific and Europe separately. However, this would lead to insufficient sample sizes which would hurt the reliability.

Furthermore, the information contained in an announcement release may be limited and can also differ between countries due to differences in regulation. This may lead to some portion of the short-term reaction being too diffuse to derive all its magnitude to specific factors. It could also be that a part of the reaction is too firm-specific to draw aggregate conclusions.

2 Theoretical Framework and Literature Review

This section contains the applicable theoretical framework, a brief review of empirical evidence from earlier studies on the spin-off subject, as well as our hypothesis development.

2.1 Theoretical Framework

The theoretical framework is divided into three parts; the Rationale Behind a Spin-off Decision, other factors that impact price reactions and lastly the Efficient Market Hypothesis.

2.1.1 Rationale Behind a Spin-off Decision

The reasoning preceding the decision to divest, and in particular to perform a spin-off, often concern a strive to reduce the firm's level of diversification, either global or industrial, or to reduce the information asymmetry between the firm and its external stakeholders. Below follows a theory-based discussion about the rationale behind the decision to perform a spin-off and its impact on firm value.

There are various reasons for a firm to be globally diversified. Denis et al. (2002) mention the chance to further exploit the firm's assets, increase operating flexibility and satisfy the investor demand to hold a globally diversified stock for risk-reducing purposes. There is an internalization theory of synergies formulated by Morck et al. (n.d.) that might explain the strive to become global. The theory builds upon the existence of information-based assets within the firm that give increasing returns when used on a larger scale, and that

are cumbersome to sell. The theory state that this would give incentives for firms to internalize all available markets for those assets. Hence, global diversification would increase the value for firms with various crucial intangible assets such as operating or managerial skills. Denis et al. (2002) further discuss how global diversification can increase flexibility to external shocks and thereby reduce the firm's risk exposure. With the argument that corporations are able to diversify globally at a lower cost than individuals, Denis et al. (2002) state that investors should be willing to pay a premium for globally diversified firms.

However, as there are reasons for diversification, Denis et al. (2002) also declare the rationale for reduced diversification, realized through spin-offs. Greater global or industrial diversification is normally followed by a higher level of complexity of the firm, which can result in increased agency and overhead costs for management and monitoring. The complexity may also give rise to higher information asymmetry, since it becomes more difficult for external stakeholders to completely grasp the composition of the firm. Common for both geographical and industrial diversification is that it may lead to inefficient use of revenues from profitable divisions to finance less profitable divisions, so-called cross-subsidies.

Many empirical studies during the 1990s have provided evidence supporting the suggested existence of a diversification discount (Lang & Stulz (1994), Berger & Ofek (1995)). The discount is argued to stem from the undertaking of value-reducing investments and cross-subsidies. Berger & Ofek (1995) detect that the loss in value is distinctly greater for unrelated diversification. Lang & Stulz (1994) conclude that they cannot find evidence for the creation of valuable intangible assets that would weigh up the loss in value that comes from diversified firms' worse performance. However, later studies arrive at different conclusions. Erdorf et al. (2013) discuss how more recent research on the subject has lacked a clear consensus, and it is rather suggested that the existence of a premium or a discount on a company derives from other characteristics than its level of diversification. Campa & Kedia (2002) further argues that failing to account for the reasons that made a firm diversify may lead to incorrectly drawing the conclusion that a discount origins solely from the level of diversification, rather than the firm's underlying characteristics. Other studies have provided evidence that the valuation effect of diversification is not homogeneous across industries, such as Santalo & Becerra (2008). They show that diversification is value creating in industries with few specialized competitors, and value destroying when there is a large number of specialized firms in the industry.

Another rationale for performing a spin-off is to decrease the firms level of information asymmetry, which is the difference in information held by the firm's management and its external stakeholders. Habib et al. (1997) discuss the reasoning for performing a spin-off can contribute to an increase in firm value through a decrease in information asymme-

try. For spin-offs where the subsidiary becomes listed on the stock exchange following completion of the spin-off, Habib et al. (1997) argue that the separate stock market listing results in a higher number of traded stocks and a more informative price system. They further argue that this ought to improve the quality of management's investment decisions as well as reduce investors' uncertainty about the value of a division's assets. The private investors' information is captured in the stock price, which managers use to conduct investment decisions. As the stock price more accurately reflects the value of the division's assets, the manager can perform better investment decisions and thereby increase the value of the company.

2.1.2 Other factors that impact price reactions

There could also be factors less related to the spin-off or its motives that can explain the magnitude of the abnormal return around announcement. One factor of that kind is analyst coverage, which can be seen as a proxy for information flow (Hong et al. (2000)). It is an interesting factor to consider since it tests the existence of market inefficiencies as it is based upon the premise that information is being disseminated at different speeds. A positive relation between abnormal return and analyst coverage could be explained with that the reaction is faster and more concentrated for companies with great coverage, and thereby greater in the three-day event window. This would further be evidence against a semi-strong efficient market since it would allow for a momentum investment strategy based on public information (Fama (1970)). On the contrary, a negative relationship could instead be related to information asymmetry. The level of information asymmetry is assumed to be reduced with greater analyst coverage, according to a study by Hilary (2006), resulting in these firms having a smaller valuation discount to mitigate when performing a spin-off. This gives a negative relation, as higher information asymmetry firms have a greater potential gain in reducing the information imbalance with a spin-off.

A discussed and tested factor that is related to the investor perception of the parent firm is the *completed*-factor, grouping spin-offs based on whether they are completed or withdrawn after announcement. Vroom & Frederikslust (1999) discuss two possible reasons for why spin-offs that end up being completed would experience a greater abnormal return. First, existing shareholders and other stakeholder to companies with a reputation for not carrying out announced events and that is frequently changing its strategy might account for this as the spin-off is announced. Second, management has less incentive to follow through with a transaction if the stock market reacts negatively to its announcement. Both Copeland et al. (1987) and Vroom & Frederikslust (1999) provide empirical evidence that supports the above discussion. However, when tested for more recently, Veld & Veld-Merkoulova (2009) and Chai et al. (2018) find the opposite or no relationship between completion and abnormal return. A negative relation could, according to

Veld & Veld-Merkoulova (2009), be explained with that the announcement was more unexpected. Reasonable, theoretical logic that could explain a negative relation between completion and firm value is scarce other than the mentioned suggestion. This means that there is a lack of alternative theoretical interpretations of the connection between whether the spin-off is completed, and information or perceptions known at the day of announcement.

2.1.3 Efficient Market Hypothesis

The Efficient Market Hypothesis is a hypothesis within stock market price behaviour that claims that all available information about an asset is reflected in its price. In an extensive review of the theoretical and empirical literature at the time by Fama (1970), it is concluded that, even though there is some evidence for dependence in successive price changes during time-periods shorter than a day, there is not enough evidence to refute that the market is efficient. Evidence of dependence on price changes during time-periods of more than a day is more scarce, and this supports the theory of an efficient market. An implication of the market being efficient is that stock prices ought to react to new information in a rapid manner, supported by Fama et al. (1969). This means that the market almost instantly receives and adjust expectations in accordance with any new information, which thereafter is reflected in the stock price. Putting this in the context of a spin-off announcement, it is so that even though the processes that unlock value within the companies in the spin-off may take months or years to realize, the investor's expectations of increased value change instantly. This implies that the perceived total increase in value should be reflected in the stock price within just a few days, which in turn motivates the need to examine value creation from spin-offs in a short-term perspective.

Theoretically, assets on an efficient market are priced based on their equilibrium expected return, which is a function of the asset's inherent risk, explained by Fama (1970). Although the definition of risk is miscellaneous, the common belief is that all available information is employed in order to determine the expected return. Given that a stock's price today depends on the future expected return, all available information is by definition reflected in today's stock price. The hypothesis builds on the idea of an ideal market that effectively allocates resources and capital which results in better investment decision making and investors being assured that securities are priced fairly. This logic directly eliminates the possibility of employing investing strategies based on already available information that would generate any return in excess of the equilibrium expected return. This connects to the idea of investing being a "fair game", since investors cannot expect to consistently outperform the market without some information superiority. The Efficient Market Hypothesis further implies that no investment strategy should be able to yield long-term abnormal returns since it is assumed that securities are fairly valued, and hence

only yield the return that corresponds to a fair compensation for the security's inherent risk.

2.2 Literature Review

In the literature review we summarize the findings in previous empirical studies on the spin-off announcement wealth effect and the explanatory strength in tested determinant factors. Below is a table that displays a selection of earlier studies; the researched region and time-period, the sample size, the event window length and the resulting average cumulative abnormal return (CAAR). CAAR is the average of the sample firms' abnormal return accumulated in the event window. In the following review we focus on a selection of the studies included in the table.

Table 1: **Studies on short-term spin-off wealth effect**

Study	**Market**	**Period**	**Sample Size**	**Event Window**	**CAAR %**
Hite & Owers (1983)	US	1963-1981	123	[−1,0]	3.30***
Miles & Rosenfeld (1983)	US	1963-1980	55	[0,1]	3.34***
Schipper & Smith (1983)	US	1963-1981	93	[−1,0]	2.84***
Desai & Jain (1999)	US	1975-1991	144	[−1,1]	3.84***
Krishnaswami et al (1999)	US	1978-1993	118	[−1,1]	3.28***
Vroom & Frederikslust (1999)	World	1990-1998	210	[−1,1]	2.54***
Kirchmaier (2003)	Europe	1989-1999	48	[−1,1]	5.40***
Veld & Veld-Merkoulova (2004)	Europe	1987-2000	156	[−1,1]	2.62***
Sudarsanam & Qian (2007)	Europe	1987-2005	157	[−1,1]	4.82***
Veld & Veld-Merkoulova (2008)	US	1995-2002	91	[−1,1]	3.07***
Vyas et al. (2015)	India	2012-2014	51	[−1,1]	1.47***
Boreiko & Murgia (2016)	Europe	1989-2005	97	[−1,1]	4.80***
Truong (2017)	Australia	2002-2011	61	[−1,1]	3.58***
Chai et al. (2018)	Australia	1999-2013	87	[−1,1]	2.93***
Padmanabhan (2018)	India	2003-2014	63	[−15,15]	6.48**
Aggarwal & Garg (2019)	India	11-12,15-16	76	[-1,1]	1.82***

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. CAAR is the average of the sample firms' abnormal return accumulated in the event window. The table displays a selection of empirical studies on the short-term spin-off wealth effect. It is not exhaustive nor represent the distribution of studies in terms of geographical region or time-period.

Vroom & Frederikslust (1999) examine the wealth effect of 210 spin-off announcements

made between 1990 and 1998. An abnormal return of 2.60% is found during the three-day event window, significant at the 1% level. Moreover, the factors *industry focus*, *completion*, *tax-status* and *the parent's legal origin* are researched as predictors for the wealth effect. A positive relationship is found for spin-offs that end up completed as well as for spin-offs that increase industry focus. Furthermore, the authors can conclude that taxable spin-offs show a negative return, while spin-offs performed in countries with English legal origin are associated with positive return.

The main focus of the study by Krishnaswami & Subramaniam (1999) is to empirically test the information hypothesis and determine the existence of a relationship between information asymmetry and gains associated with corporate spin-offs. The information hypothesis state that a spin-off ought to be value-increasing because it could lower the information asymmetry between the firm and external stakeholders regarding profitability and operating efficiency in its different divisions. As expected, Krishnaswami & Subramaniam (1999) find that companies that perform a spin-off have a higher level of information asymmetry compared to other similar companies. The authors use five different measures for information asymmetry and conclude that all measures are higher for divesting companies preceding a spin-off, but decrease substantially after the spin-off completion, providing support to the information hypothesis. Krishnaswami & Subramaniam (1999) find evidence that firms with high growth opportunities and that are liquid-constrained are more likely to perform a spin-off, building on the rationale for the spin-off decision. This indicates that firms tend to resolve their information asymmetry issues, through a spin-off, before raising substantially more capital from the external capital markets.

Veld & Veld-Merkoulova (2004) examine spin-offs made in 15 different countries in Europe and announced between 1987 and 2000, and find evidence of a 2.62% abnormal return in the three day event window. Furthermore, the cumulative abnormal return is 3.57% for companies that, following the spin-off, increase their industrial focus and 0.76% for non-focus increasing spin-offs. Furthermore, the difference between the sub-samples is significantly different from zero, suggesting that industry focus is seen to be value-creating. However, the significance disappears in the cross-sectional regression when Veld & Veld-Merkoulova (2004) control for *relative size*, *information asymmetry*, *shareholder rights*, and *geographical focus*. This indicates that even though industry focus has some effect on abnormal return, the importance is limited. Unlike Krishnaswami & Subramaniam (1999) the authors cannot find evidence of a relation between the level of information asymmetry and abnormal return, neither by sub-sampling nor by cross-sectional regression.

Sudarsanam & Qian (2007) also examine the European spin-off wealth effect and look at 170 announcements made between 1987 and 2005, and the impact of investor sen-

timent and increased industry focus. The abnormal return find in the three-day event window is 4.82%, significant at the 1% level, which is somewhat higher than previous studies. Furthermore, the authors provide evidence that spin-offs that increase industry focus are associated with a higher abnormal return around announcement. In addition to this, evidence is provided that spin-offs of glamour stocks also have an positive wealth effect, where glamour are defined as popular stocks characterized by high earnings growth rate and a stock price rising faster than the market average.

Through a review of 26 event studies conducted to determine stock return around the announcement of corporate spin-offs, Veld & Veld-Merkoulova (2009) find a significant and positive average abnormal return of 3.02% during the event window, which generally is either two or three days; (-1,0), (0,1) or (-1,1). The abnormal return in the studies range from 1.32% to 5.56% and significant at the 1% level in most studies. There is only one study, which is on the UK market, whose results differ substantially from the others. Veld & Veld-Merkoulova (2009) can with a meta-analysis conclude that abnormal returns are higher for relatively large spin-offs, for spin-offs that are associated with regulatory or tax advantages and for spin-offs that lead to increased industry focus. The last conclusion supports the idea that divestment of a non-core business unit is seen to be value-increasing by investors. The significance of the *relative size*-factor is believed to be connected to *industry focus*, since a focusing activity is expected to be followed by a greater stock market reaction when the divestiture is relatively large. They also find that spin-offs that are later completed are associated with lower abnormal returns, than spin-offs that are withdrawn. The authors suggest that this can be explained with that non-completed spin-offs probably were less expected by the market or, alternatively, their announcements provided more information. Furthermore, the variable for the factor *information asymmetry* is not significant which question whether this is a motive for conducting a spin-off.

As many as 20 of the 26 reviewed event studies are done in the US, which the authors explain with that spin-offs are much more common there. The remaining six event studies are distributed as follows: three in Western Europe, two in the UK and one in Malaysia. The American studies jointly cover a time period from 1962 to 2002, and the non-American studies from 1986 to 2005. This displays the extensive research made in the US before the turn of the millennium. In the meta-analysis, the authors also include a US-dummy which turned out to be non-significant, indicating that the abnormal return is not country-specific.

Vyas et al. (2015) examine the price reaction around spin-off announcement in India between the years 2012 and 2014, and detect a 1.47% abnormal return in the three-day

event window. The abnormal return remains positive and significant, at least at the 5% level, in event windows ranging from (0,1) to (-5,5), The authors further conclude that the return is greater for small demergers, defined by the market capitalization of the parent company. The authors also detect a slightly greater return when the subsidiary remains private after the spin-off. However, the authors do not test this difference in mean for significance, so it is not possible to declare that either size of the parent or whether the subsidiary is listed has a significant effect on the abnormal return.

Through their empirical study made on Australian spin-offs announced between 2002 and 2011, Truong (2017) finds a significant cumulative abnormal return of 3.58% in the three-day event window. The author concludes that the return is slightly larger for companies that, with the spin-off, increase their industrial focus. This difference, however, turned out to be insignificant which means that there is not sufficiently strong evidence that industrial focus effect the short-term wealth effect in Australia. However, the quite small sample-size of 61 naturally result in small sub-samples, only 17 companies perform a focus-increasing spin-off, which questions the credibility of the conclusion. Through multivariate regressions, Truong (2017) find that firms that have higher leverage before performing the spin-off yield a larger short-term abnormal return. The authors cannot find evidence of any effect on abnormal return neither for an eventual listing of the subsidiary nor for relative size of subsidiary to parent. Due to limited access to analyst coverage, the authors can not examine the explanatory strength in the *information asymmetry* factor.

In a recent study on Australian spin-off announcements, Chai et al. (2018) provide evidence of an abnormal return of 2.93% in the three-day event window. The study is conducted with a sample size of 103 observations. Furthermore, the authors examine if the following variables are determinant factors for the wealth effect; *industry focus*, *completion*, *geographical focus* and *information asymmetry*. However, unlike many previous studies, no evidence is found that these factors can explain abnormal return. The amount of bank debt of the parent company is also investigated, but no significant effect is found.

Even though Indian firms jointly conduct many spin-offs, relatively few studies have been made on this geographical region. Padmanabhan (2018) and Aggarwal & Garg (2019) are two studies made on the Indian market, where the event study methodology is used to analyze the spin-off announcement impact for Indian firms. The results from both of these studies are in line with the existing literature from the US, the UK and Australia. However, none of these studies analyse possible determinant factors to the wealth effect.

2.3 Hypotheses Development

The theoretical reasoning and empirical evidence are united in that one could expect a wealth effect when announcing to perform a spin-off. The same conclusion is reached in different time-periods and on different geographic market; an abnormal return is recognized for the days around spin-off announcement. We therefore expect to find similar results.

Hypothesis 1: *Spin-off announcement generates a positive, short-term abnormal return*

The theoretical view on diversification impact on firm value has for quite some time been that it gives a valuation discount. Hence, performing a spin-off that results in increased industrial or geographical focus should give positive stock market reactions. This idea has gained support in empirical studies on short-term price reactions and its sources, from both the US and Europe. However, more recent theories and empirical research suggest that it is arbitrary whether diversification gives a discount or a premium, and that it rather depends on underlying firm characteristics than the resulting level of diversification. Given the rising critique to earlier findings and an apparent loss in explanatory strength for industry focus, we do not expect to find evidence that a simple reduction in diversification is a determinant factor for the wealth effect.

Hypothesis 2a: *A decrease in diversification cannot explain spin-off abnormal return*

Furthermore, the information asymmetry factor involve difficulties both in constructing a reliable proxy and gaining access to sufficient data, and the empirical evidence has been somewhat diverse even though the theoretical view has a clear consensus. Given the distinct theoretical logic and by testing several proxies, we expect a positive relation between information asymmetry and abnormal return.

Hypothesis 2b: *Parent companies with higher information asymmetry experience a greater short-term price reaction*

The positive relation between completion and abnormal return have been argued for theoretically and supported with empirical evidence. However, the unexpected results in the review of Veld & Veld-Merkoulova (2009) question the simple explanation assumed earlier. Given that the theoretical explanation is stronger for a positive relation, we expect to find that in our study.

Hypothesis 2c: *Spin-offs that are completed experience a greater short-term price reaction*

One could expect both a negative or a positive relation between analyst coverage and abnormal return. A positive relation would, as mentioned, support the reasoning that greater analyst coverage contribute to faster spread of corporate announcements, and a negative relation would indicate that firms with lighter or absent analyst coverage suffer from higher information asymmetry. Analyst coverage in absolute terms is scarcely used as a proxy for information asymmetry, which could indicate that it is more suitable as a proxy for information flow, and we therefore expect to find a positive relation.

Hypothesis 2d: *Parent companies with more extensive analyst coverage experience a greater short-term price reaction*

3 Methods and Choice of Methodology

The methodology for answering this thesis' research questions consist of (1) an event study to test the parent company's actual return against the expected return followed by testing on sub-samples and (2) cross-sectional regressions to test the explanatory strength in different factors to find explanations for the abnormal return.

3.1 Event Study

We conduct an event study, as described by MacKinlay (1997), to test for short-term abnormal return. We will use a fixed event window, as recommended by Krivin et al. (2003), which is the most common method when investigating a large number of observations, since determining a specific event window for each observation would be too cumbersome. Our event window ranges over three days, similar to the majority of recent spin-off studies, as shown in the summary of earlier empirical studies in table 1 under section 2.2 Empirical Evidence. The three-day event window implies that closing stock prices for the parent are gathered for the day preceding and the day following the spin-off announcement as well as the day of the announcement, called the event date. We consistently use the adjusted closing price since it gives a more accurate value of a firm's stock as it accounts for corporate actions such as dividends and rights offerings. In the cases where the announcement date is on a non-trading day, the event date is instead classified as the next trading day following the announcement. The three-day event window is commonly used in empirical research since it is likely to capture the stock price reaction related to the spin-off, yet not capture the reaction from any other information released in close connection to the spin-off disclosure. We include a day before the announcement take

into account potential leakage of information that would give an early price reaction.

When calculating the expected return, we use the market model as it is described by MacKinlay (1997). The market model is a statistical method for measuring normal performance, explaining and predicting stock performance with a company's beta, the sensitivity to market movements, and alpha, the stock's return when the market return is zero. The parameter estimates, beta and alpha, are calculated with the daily return for each stock and its corresponding index during an estimation window of 200 days. The estimation window spans from the 20^{th} to the 220^{th} trading day preceding the event date, ensuring that the event date and any early price reaction connected to the event is excluded from the estimation period. The sample consists of parent companies listed on an exchange in either APAC, the US or Europe. A wide index has been selected for each region to act as a proxy for market return. For the exchanges in APAC with a significantly greater amount of spin-off transactions during the investigated time-period, which would motivate a better fitting index, we have selected a wide, country-specific index to represent the market return. The concerned countries are India, South Korea, Australia and Hong Kong/China. For specifications on the used indices in each region, see table 27 in the appendix.

$$r_{it} = \alpha_i + \beta_i r_{mt} + \varepsilon_{it} \tag{1}$$

$$var(\varepsilon_{it}) = \sigma^2_{\varepsilon_i} \tag{2}$$

Equation 1 above is a time-series regression performed for each stock, where r_{it} is the daily return for security i during the estimation window, r_{mt} is the daily return for the respective index during the estimation window, α_i, β_i and $\sigma^2_{\varepsilon_i}$ are the market model parameters and ε_{it} is the zero mean error term. Since $\sigma^2_{\varepsilon_i}$ is unobserved, the variance of the abnormal return in the event window is used as an estimate instead. The parameter estimates and the index return during the event window are used to calculate the expected return for each stock during the event window.

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i r_{mt} \tag{3}$$

$$AR_{it} = r_{it} - R_{it} \tag{4}$$

Where R_{it} is the expected daily return of security i and the daily abnormal return AR_{it} is the difference between actual and expected return. The cumulative abnormal return,

CAR, is the abnormal return aggregated over the event window for each stock, where t is the first day of the event window and T is the last day of the event window. We will examine the robustness in our conclusions by testing our hypothesis in event windows of different lengths.

$$CAR_i(t,T) = \sum_{t=1}^{T} AR_{it} \tag{5}$$

$$CAAR(t,T) = \frac{1}{N}\sum_{i=1}^{N} CAR_i(t,T) \tag{6}$$

CAAR is then the cumulative abnormal return averaged over the sample firm and N is the number of sample firms. We perform a t-test using robust standard errors to test for significance in the average cumulative abnormal return, CAAR.

$$t - statistic = \frac{CAAR}{\sigma_{AR}\sqrt{n}} \tag{7}$$

Where σ_{AR} is the standard deviation of the abnormal return during the event window, and n is the number of days in the event window.

There are some potential hazards with performing an event study. For instance, the length of the event window can affect our results in two ways. If having a large range, one increases the risk of including other information that influences the stock price. We mitigate this by dropping sample firms that have other transaction announcements within the event window, discussed further in section 3.3 Sample selection. However, with a small range one increase the risk of excluding abnormal return associated with the announced event, since information leakage might induce reaction before the event window or the price reaction might not be completely instant. The extent of these issues are shown in section 4.1 Results. In addition to the event window risks, we identify two potential flaws in estimating the expected stock return. Firstly, by only basing expected return on the stock's market beta, we risk overlooking other relevant variables that can predict stock return. Furthermore, in the market model there is always a risk for poor parameter estimates, due to high variance in historical values, which may give inaccurate predictions of expected returns. To mitigate this and prevent the severity of the potential impact, we choose an estimation window that is quite long. At least 50 trading days is required to compute the market model parameters (MacKinlay (1997)), and we actively set our limit a lot higher than that, described further in section 3.3 Sample Selection.

3.2 Cross-sectional Regression

To explain any detected abnormal return we perform several cross-sectional regressions, for each geographical region separately. The method is similar to the one of Desai & Jain (1999) and Veld & Veld-Merkoulova (2004). Cross-sectional regression is a statistical method that intends to detect casual effects between the magnitude of the abnormal return and characteristics specific to the event, explained by MacKinlay (1997). Hence, with cross-sectional regression, we attempt to detect the source of abnormal return.

$$\begin{aligned} CAR_i(t,T) = &\beta_0 + \beta_1 IndustryFocus + \beta_2 GeoFocus + \beta_3 BidAskSpread + \\ &\beta_4 TradingVolume + \beta_5 AnalystCoverage + \beta_6 Completed + \\ &\beta_{cv} RelativeSize + \beta_{cv} HotMarket + \beta_{cv} SmallCap + \\ &\beta_{cv} MidCap + \beta_{cv} RevenueGrowth + \varepsilon \end{aligned} \tag{8}$$

The dependent variable on the left-hand side is the three-day cumulative abnormal return for the sample firms, and the explanatory variables on the right-hand side are our explanatory and control variables (cv). We will perform multiple linear regressions with a different amount of included variables to detect what variables have a significant effect on $CAR_i(t,T)$. To control for multicollinearity we generate a correlation matrix and conduct VIF-tests. We will examine the robustness in our conclusions by testing the factors using different proxies and including different control variables. A number of control variables will be included in all regressions to mitigate the risk that omitted variables, believed to have an effect on the dependent variable, influence the casual effects or cause endogeneity. The explanatory and control variables are discussed further below.

Industry Focus

Industry focus is an extensively researched determinant factor, with several findings of a significant effect (Veld & Veld-Merkoulova (2009) and Daley et al. (1997)). This suggest that core focusing spin-offs generate a greater abnormal return than non-focusing, which is based on the premise of a diversification discount. Divisions that are unrelated to the parent's core business increase the firm value when divested, since it will eliminate any dis-economies of scale. When the parent and the spin-off after completion have different two-digit SIC codes, the spin-off is assumed to be focus-increasing, and non-focus-increasing otherwise. The dummy variable *industry focus* equals 1 for focus-increasing and 0 for non-focus-increasing spin-offs. In the case of multiple spin-offs from the same parent on the same date, increased industry focus is assumed if one subsidiary or more is in another industry.

Geographical Focus

How an increase in geographical focus impact firm value is questioned in literature and a unified answer is not found. Veld & Veld-Merkoulova (2004) argue that spinning off a foreign entity can lead to a loss in economies of scale and relative advantage towards internationally operating competitors. Furthermore, geographical diversification might also impose a discount on a company, discussed by Denis et al. (2002). This could then be mitigated by spinning off a foreign subsidiary and thus be beneficial to carry out. The dummy variable *geo focus* equals 1 if the parent and subsidiary headquarters are located in different countries. In the case of multiple spin-offs from the same parent on the same date, increased geographical focus is assumed if one subsidiary or more have their headquarter in another country than the parent.

Information Asymmetry

A diversified conglomerate is believed to have a higher level of information asymmetry between the company and its stakeholders. This can result in an undervaluation because of greater uncertainty. Companies can mitigate the issue of information asymmetry and gain a more accurate valuation by spinning off a part of the business. Krishnaswami & Subramaniam (1999) provide evidence that companies that perform spin-offs have a higher level of information asymmetry than their peers, and that the abnormal return from the spin-off increase with the level of information asymmetry. We will use four different proxies to measure information asymmetry; bid-ask spread and trading volume will be tested in the main regressions, while standard deviation of analyst forecasts and price volatility will be tested in the robustness test.

The bid-ask spread is the difference in what market makers are willing to buy and sell a stock for. A relatively large spread indicates that the market maker requires greater compensation for holding the stock, which partly is due to the risk of the market maker to trade with investors of superior knowledge (Leuz & Verrecchia (2000)). Hence, the spread can be a hedge towards adverse selection coming from information asymmetry. The relative bid-ask spread is calculated by subtracting the ask price from the bid price and dividing with the average of ask- and bidprice. The average, relative bid-ask spread is then the mean of the daily relative bid-ask spread between 150 and 10 trading days before the event date.

To compute trading volume we follow Leuz & Verrecchia (2000), and take the median of the daily turnover ratio calculated for the days between 300 and 20 days preceding the event date. The daily turnover ratio is calculated as the number of shares traded that day times the closing share price, divided with the firm's market capitalization. A flaw in this proxy is that it measures the stock's liquidity, which can be affected by many other

factors than merely information asymmetry.

The relative standard deviation of analysts' forecast of a stock's target price gives a measure of the consensus and alignment in analysts' estimates for the company. The information asymmetry is assumed to be lower if analysts' forecasts are closer to each other. Krishnaswami & Subramaniam (1999) test the standard deviation of earnings forecast and find it to be significant at the 5% level. Since we do not have access to the data regarding earnings forecasts, we instead test the target price forecasts. The relative standard deviation of target price is calculated by dividing the standard deviation of the analysts' target prices to the target price mean, as of 10 days before the event date.

Price volatility is widely used as a proxy for information asymmetry. According to Krishnaswami & Subramaniam (1999), information asymmetry is greater when managers hold on to value-relevant information that is not shared by the market, and that the price volatility of stock returns demonstrates this. We, similar to Chai et al. (2018), calculate price volatility as the standard deviation of the daily adjusted stock return between 300 to 20 days before the event date. However, Leuz & Verrecchia (2000) argue that price volatility as a proxy has some flaws as it is influenced by other factors than information asymmetry. Price volatility can for instance be influenced by what type of investors that are interested in the stock; Bushee & Noe (2000) show that investors with short-term strategies are associated with aggressive trading, which results in higher volatility.

Analyst Coverage
We cannot find any previous studies on spin-off announcements that have tested *analyst coverage* as a potential determinant factor. Analyst coverage can be seen as a proxy for information flow (Hong et al. (2000)) or for information asymmetry (Hilary (2006)), which give different expected coefficient signs. With these conflicting effects, these relations are expected to counteract each other, making the dominant effect visible. However, there is also a risk that the effects cancel each other out completely. We define analyst coverage as the number of analysts that cover the firm. A potential flaw with the variable is that analyst coverage might be correlated with firm size, discussed by Hardy & Matson (2004). To mitigate this, we include firm-size dummies in our cross-sectional regression to control for the parent's absolute size.

Completed
As discussed in the theoretical framework, section 2.1.2, theoretical reasoning and empirical evidence is found for both a positive and a negative relation between completion of the spin-off and its abnormal return around announcement. The *completed*-dummy in our study equals 1 if the transaction ends up completed. Transactions that have been an-

nounced recently and are without completion date are excluded to properly measure the completion effect, since spin-offs generally take some time to realize. More than 90% of our sample transactions had finished their transaction one and a half year after they were announced. On the basis of this, if a transaction was implemented after $1st$ of January 2019 and has not yet been completed, we will exclude it from the regression.

Control Variables
We include a number of control variables that may explain cumulative abnormal return, in order to avoid that the causal effect of omitted variables influence the variable of interest. The control variables are discussed below.

Similar to Sudarsanam & Qian (2007), we control for time-related relations with abnormal return using a Hot market dummy. This is a proxy for market activity, where one could expect more activity when returns are believed to be higher, and vice versa. We can also conclude that the number of announcement per year differ, seen in table 5, which motivates controlling for time-clustering. The dummy equals 1 when the spin-off is announced in a year with above-average amount of spin-off announcements, and 0 otherwise.

Moreover, relative size is a vastly examined factor for explaining wealth effects around spin-off announcements. Veld & Veld-Merkoulova (2008) and Krishnaswami & Subramaniam (1999) among others have provided evidence for abnormal return associated with relative size. The literature shows that a large subsidiary, in proportion to the parent, is divested, experience a greater price reaction. We define relative size as the ratio of the market value of equity for the subsidiary to the combined market value of equity for parent and subsidiary, as of 90 days after the completion date. We use a 90 day lag since the transaction completion date often mismatches with the first trading day. By having a 90-day lag, we take into account nearly all transactions where the subsidiary becomes listed after completion, yet limit the risk of capturing too significant changes in the share price due to actions happening after the completion date. The reason we do not use the market value of equity on the subsidiary's first trading day, is that it may be listed long after the spin-off completion and presumably unrelated to the spin-off. In the case a parent spin-off more than one subsidiary at the same date, the combined size for the subsidiaries is used.

Furthermore, as Sudarsanam & Qian (2007), we also control for the parent growth preceding the spin-off announcement. Krishnaswami & Subramaniam (1999) provide evidence that companies that experience high growth are more likely to perform a spin-off, as it is difficult for high-growth companies with high information asymmetry to get external financing from capital markets. In short, a positive relation between growth and wealth

effects is expected. Similar to Schipper & Smith (1983), we define growth as the three-year average annual revenue growth preceding the event date.

As mentioned, we will also control for the size of the parent, based on the three market capitalization categories small-, mid- and large cap. This method is used by Vyas et al. (2015), to mitigate any size-related effects. Although there is no strict definition for small, mid and large-cap, most indices use similar ranges. We therefore use a common classification for all regions, and set our limits to the following; small cap is a company with a market cap below MUSD2,000; mid cap is a company with a market cap between MUSD2,000 and MUSD10,000; large cap is a company with a market cap above MUSD10,000. This is similar to the definition of Standard & Poor. The small, mid and large-cap dummies equals 1 when the market cap is within the respective range.

Excluded Variables

Even though we examine quite a few variables in this study, there are some interesting factors that we may exclude. Krishnaswami & Subramaniam (1999), among others, analyze how tax and regulative advantages with the spin-off affect the wealth effect, and Vroom & Frederikslust (1999) examine the influence of the parent's legal origin. These factors and variables approximating corporate governance and shareholder protection are excluded in our study due to cumbersome gathering of data and this thesis' time constraint. Like Chai et al. (2018), we would have wanted to control for leverage, but due to data limitations we were not able to do so.

Table 2: **Observations in each factor**

Variable	**Europe**	**APAC**	**US**	**Total**
Continuous				
Bid-ask spread	100	187	153	440
Stdev target price	70	118	121	309
Price volatility	103	248	164	515
Trading volume	102	247	163	512
Analyst coverage	103	248	164	515
Dummy				
Industry focus	96	219	144	459
Geographic focus	103	248	164	515
Completed	100	246	162	508
Full sample size	**103**	**248**	**164**	**515**

The data is cleared for double counts, illiquid stocks and M&A-overlaps. The table displays the frequency of observations that have data for the respective variable.

Above is a frequency table displaying the number of observations for each variable and region. The total sample consists of 515 observations, with APAC accounting for nearly half of that. Data is available to a large extent for the variables used, as shown in the table above.

3.3 Sample Selection

Our sample consist of the parent and subsidiary companies connected to a spin-off announced between the years 2000 and 2019, performed by parent companies whose main listing is on a stock exchange in APAC, Europe or the US. The parent in our sample is thereby always publicly traded and the subsidiary could be either private or public. The 20 year time-period gives a good sample size and it is clear that there is an increase in the number of spin-off announcements after year the 2000, especially in APAC and Europe. See the below frequency table.

Table 3: **Frequency spin-off transactions**

Time-period	**Europe**	**APAC**	**US**	**Total**
1990-1994	0	0	3	3
1995-1999	3	2	32	37
2000-2004	26	11	35	72
2005-2009	33	86	66	185
2010-2014	42	153	117	312
2015-2019	30	132	93	255
Total	134	384	346	864

Screening made in Capital IQ. The screening displays the frequency of spin-off transactions where 100% of the subsidiary's stock is distributed. It further returns spin-off transactions where the parent is a publicly traded company and the subsidiary is either public or private. The data is raw from Capital IQ and not cleaned. Differences in the number of spin-off transactions in our screening to the sample size of empirical studies performed in the above time-periods may be due to differences in database accessibility or disparities in the screening criteria.

We are aware that the chosen time-period comprises both the dot-com bubble at the beginning of the new millennium and the financial crisis in 2008, both of which had a major influence on the world's stock markets, something that might affect the frequency of spin-off transactions as well as the market reactions. To test for any time-related bias we test our hypothesis during different sub time-periods in the robustness test. Furthermore, a great part of the previous empirical studies made on short-term stock price reactions at spin-off announcement cover a time-period that ends in the late 1990s which makes it needless for us to stretch our time-period further back than the year 2000.

We will only examine pure spin-offs, which is a spin-off where 100% of the new entity's shares are distributed to the parent's shareholder, and the parent company no longer has any ownership in the subsidiary following the spin-off. A reason for this is that the general rule that makes it possible for shareholders to defer tax-payment in a spin-off transaction is that a great majority of the subsidiary's shares must be distributed. The exact required percentage differs between countries (PricewaterhouseCoopers (2006)), so by choosing 100% we ensure that the tax liability does not vary within the sample. Another reason for only examining pure spin-offs is to increase comparability between the transactions.

For the event study we use stock price data of the parent before and during the event. For the cross-sectional regression, we use data of both the parent and subsidiary before and after the announcement as well as after the spin-off completion. Daily stock prices are gathered from Capital IQ and daily index prices are gathered from Bloomberg. From Capital IQ we also gather the data needed to perform the cross-sectional regression, e.g. market capitalization, SIC-codes, bid-ask spread, headquarter location, revenue growth and target prices.

We clean our sample based on a number of criteria in order to drop transactions that risk hurting the comparability and reliance of the model. Initially, we clean the data for illiquid stocks to be able to properly estimate the market model parameters and therefore drop all stocks that have more than ten non-trading days between 300 to 20 days before the event date. For European stocks, the limit for non-trading days has been increased to 50 to accurately reflect illiquid stocks. This is to avoid dropping European stocks that have few non-trading days but have trading days that mismatch with the MSCI Europe index, which is used to represent the whole European region that have many country-specific holidays.

Furthermore, when a parent announce to spin off more than one subsidiary on the same date, this is displayed as separate transactions, so we drop all transactions that imply a double count. We then combine all the subsidiaries into one, to properly calculate the size and focus variables. Lastly, we clean the data set for transactions where the parent is involved in a merger or acquisition (M&A) that is announced between two days preceding and two days following the spin-off announcement, hence we clean for a five-day M&A-overlap. In this case, the parent's stock return during the event window would not accurately represent the reaction to the spin-off announcement, and it is therefore not representative. See the below table for the steps of the sample cleaning and the resulting sample sizes.

Table 4: **Sample cleaning**

Cleaning	**Europe**	**APAC**	**US**	**Total**
Initial sample	132	382	312	826
- Illiquid stocks	24	111	119	254
- Double counts	2	18	8	28
- M&A overlap	3	5	21	29
Final sample	103	248	164	515

Sample retrieved from Capital IQ. Our sample consists of spin-off transactions where 100% of the subsidiary's stock is distributed. The parent is a publicly traded company and the subsidiary is either public or private.

One could argue that there is a need to further clean the data for other announcements that overlap with the spin-off event window, but given that it is firm specific events, rather than systematic, the final results are not believed to be substantially affected. It would also be too cumbersome in proportion to the obtained benefit to clean for all events that may affect a few observations. We choose to limit the cleaning to M&A-overlap, even though that as well is firm-specific, since that information is fairly accessible and its announcement effect is extensively tested and concluded to have an impact on the short-term stock return, (Adnan et al. (2016), Dranev et al. (2019)).

To handle outliers in the continuous variables, we winsorize the observations in each variable at the 1^{st} and 99^{th} percentile. This means that we replace all the data points up until the 1^st percentile, with the number on the 1^{st} percentile, and we replace all the data points above the 99^{th} percentile, with the number on the 99^{th} percentile. After winsorizing, we use scatter plots to visually determine if the distribution of the observations is reasonable. We also use detailed descriptive statistics to evaluate if the minimum and maximum observations seem to be legit. Through this, we reassure that all outliers are replaced by winsoring at the 1^{st} and 99^{th} percentile.

The final total number of sample firms is 515, which is distributed slightly uneven between the three geographical regions. Given that the APAC-firms consist of about 48% of the sample, there is a risk that relationships between abnormal return and spin-off factors existing for those firms dominate the results for the worldwide-analysis. To mitigate any effect coming from this unevenness, we will perform analysis for the short-term abnormal return and its sources both for the full sample and for each geographical region separately. Furthermore, there is some clustering in the sample distribution over time. To correct for this we will use the control variable *Hot market* to control for any extra return that comes

from a spin-off being announced in a period of above-average spin-off announcements. See the below table for an overview of how the sample spin-off announcements are distributed over the studied time-period. The distribution is presented in the form of a histogram in figure 1 in the appendix.

Table 5: **Observations by announcement year**

Year	**Europe**	**APAC**	**US**	**Total**	**Year**	**Europe**	**APAC**	**US**	**Total**
2000	0	2	6	8	2010	6	26	5	37
2001	1	1	6	8	2011	8	25	12	45
2002	3	0	4	7	2012	5	14	6	25
2003	5	1	4	10	2013	9	21	17	47
2004	7	0	2	9	2014	3	17	22	42
2005	8	2	2	12	2015	4	19	15	38
2006	9	12	3	24	2016	6	24	9	39
2007	9	14	9	32	2017	4	18	13	35
2008	3	12	7	22	2018	8	16	12	36
2009	1	19	3	23	2019	4	5	7	16
		Europe		**APAC**		**US**		**Total**	
Total		103		248		164		515	

Sample retrieved from Capital IQ. Our sample consists of spin-off transactions where 100% of the subsidiary's stock is distributed. The parent is a publicly traded company and the subsidiary is either public or private. The data is cleaned for double counts, illiquid stocks and M&A announcement overlaps. See figure 1 in the appendix for a histogram of the sample distribution.

Below is a summary of the sample composition in terms of firm size by market cap. We note that especially the APAC-sample is heavily weighted to small cap firms, which is due to our choice to use a common definition for classifying firm size for all sample firms. Given that we use the firm size-threshold only to compute control variables, it can be justifiable to make that generalisation. However, it would probably be more accurate to use region-specific threshold to be able to fully comment on the firm size distribution in terms of small-, mid- and large cap.

Table 6: **Sample: firm size**

Market cap	**Europe**	**APAC**	**US**	**Total**
Average	10,307.48	2,303.34	15,382.02	8,080.25
Median	1,644.00	276.03	4,623.75	736.50
Min	8.20	0.50	0.92	0.50
Max	171,701.00	183,554.70	157,679.40	183,554.70
% Small cap	52.4	82.3	39.0	62.5
% Mid cap	28.2	13.7	29.3	21.6
% Large cap	19.4	4.0	31.7	15.9

Market cap is the market value of equity of the parent company ten days before the spin-off announcement date. The values are reported in million USD (MUSD). We use the following definitions of small, mid and large cap firm that is the following; small cap is defined as a company with a market cap below MUSD2,000; mid cap is defined as a company with a market cap between MUSD2,000 and MUSD10,000; large cap is defined as a company with a market cap above MUSD10,000.

4 Results and Analysis

We present results and analysis in two separate parts. In the results, the statistical results from the event study and cross-sectional regressions are presented together with interpretations, a critical discussion about its reliability and a comparison to earlier empirical results. In the analysis, the result's implications for corporate restructuring strategy and eventual support to the theoretical framework is discussed.

4.1 Results

This section presents the statistical results from the event study, hypothesis 1 and 2 separately. We perform the cross-sectional regressions for each geographical region separately. However, we do not expect different results between the regions, but separate them in order to better interpret and compare the results with earlier empirical research, as the large majority of spin-off research is made on specific regions.

4.1.1 Hypothesis 1

To test our first hypothesis we conduct an event study with the market model methodology to compare expected return to actual return. We then test the abnormal return, aggregated over the three-day event window, averaged over the sample firms, to determine its significance.

Table 7: **CAAR (%) by geographic region**

Event window	**Europe**	**APAC**	**US**	**Worldwide**
(-1,1)	2.63***	2.67***	3.57***	2.95***
	(3.934)	(5.216)	(3.146)	(6.450)
Observations	103	248	164	515

Robust t-statistics in parentheses. ***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. CAAR is the average cumulative abnormal return, aggregated over the event window and averaged over the sample firms.

Above is the obtained results, performed for each geographical region and the full, worldwide sample. It is clear that all regions have a positive abnormal return in the three-day event window, significant at the 1% level, providing support for the existence of a positive stock market reaction to spin-off announcements. US has a CAAR on a level that is consistent with several American studies, including Desai & Jain (1999), Krishnaswami & Subramaniam (1999) and Maxwell & Rao (2003) with 3.84%, 3.28% and 3.59%, respectively.

The existing empirical results for the level of CAAR in Europe and APAC are somewhat more varying than in the US, but our results are still consistent with the average level. The results are perceived to be reliable given that the CAAR is significant at the 1% level for all three regions both separately and jointly, and the sample sizes are fairly large compared to other studies. However, there is always a risk of unintentionally capturing reactions that are driven by other events than the spin-off announcement, or not completely capturing the whole spin-off reaction with this event window length. Below is a table displaying the CAAR tested during different event windows, both before and after the event date.

Table 8: **CAAR (%) in different event windows**

Event window	**Europe**	**APAC**	**US**	**Worldwide**
(1,10)	0.44	0.54	0.15	0.40
(1,5)	0.49	0.60	0.50	0.55
(0,1)[1]	2.32***	2.14***	2.94***	2.43***
(0)[1]	1.80***	1.00***	2.00***	1.48***
(-1,0)[1]	2.11***	1.53***	2.63***	2.00***
(-5,1)	0.52	1.97***	1.24	1.45***
(-10,-1)	0.32	1.81***	0.11	0.98**
(-15,-1)	0.93	2.06**	-0.619	1.01*
Observations	100	241	152	493

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. CAAR is the average cumulative abnormal return, aggregated over the event window and averaged over the sample firms. The M&A-overlap threshold is here 30 days (15 days before and after the event date) to prevent overlap with the longer event windows.

[1]For this event window, the five-day M&A-overlap threshold has been used. This implies that the number of observations is 103, 248, 164 and 515, respectively.

We note that the price reaction is concentrated mostly in the three-day window around the spin-off announcement. However, APAC shows a pre-event abnormal return which was not expected. This is most likely due to early leakage of information, inducing a price reaction prior to the event. This may imply that the real price reaction associated with the spin-off announcement is greater than what is accumulated in the three day event window for APAC. Another explanation is that the market models produce poor estimates for computing expected return. For both Europe and the US we can assume that the real price reaction is captured in the three-day event window. Common for all geographical regions is that the reaction quickly diminishes when the event window is stretched to include more than one day after the event. This provides evidence that supports a semi-strong efficient market by Fama (1970), claiming that market adjustments to public information are quick and new information is captured in the price instantly.

Table 9: **CAAR (%), Leakage analysis**

Event window	**Europe**	**APAC**	**US**	**Worldwide**
(-2,-1)	0.42	0.86***	0.84	0.76***
(-4,-3)	0.25	0.77**	0.47	0.57**
(-5,-3)	0.11	1.11***	0.40	0.69***
(-10,-5)	-0.35	0.18	-1.20	-0.35
(-15,-10)	0.48	0.27	-1.70**	-0.30
Observations	100	241	152	493

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. The day before the event date is denoted as (-1).

With further investigation of the early price reaction detected in table 8, it can be concluded that even though the (-15,-1) CAAR is significant at the 5% level for APAC, the abnormal return comes mainly from the five days preceding the event date. It is reasonable to assume that the significance found for the Worldwide-sample originates from the relationship in the APAC-firms, given that APAC accounts for such a large portion of the total sample. As it becomes clear that the pre-event reaction is in relatively close connection to the event date while there is no post-event abnormal return at all, we can reasonably assume that the discovered early reaction is due to information leakage, rather than poor market model estimates. Similar signs of leakage are found also by Sudarsanam & Qian (2007) and Kirchmaier (2003) in the event window (-10,-1) on European spin-offs. However, neither Chai et al. (2018) nor Vyas et al. (2015) finds significant abnormal return during the event window (-10,-1) on Australian or Indian spin-offs, respectively, suggesting that it is the spin-offs of other countries that drive the early abnormal return in our APAC-sample.

4.1.2 Hypothesis 2

To analyze the abnormal return around spin-off announcement further and determine the factors explaining its existence, we perform event study testing on sub-samples and cross-sectional regressions. In the sub-samples only, a dummy has been created for each continuous variable to divide the sample into two groups based on the average for that specific variable; one group is equal to or above average, and the other group is below.

Table 10: **Sub-sampling, diversification**

CAAR(%)	**Focus increasing**	**Non-focus increasing**	**Difference in mean**
Industry	3.29***	2.70***	-0.59
	(5.859)	(3.812)	(-0.650)
Observations	236	223	459
Geographical	1.99	3.02***	1.03
	(0.834)	(6.631)	(0.423)
Observations	38	477	515

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. A firm is considered to increase its *industry focus* when there is a difference in the parent's and subsidiary's two-digit SIC codes. An firm is considered to increase its *geographical focus* when the subsidiary's headquarters are located in another country than the parents.

The impact on wealth effect from reduced diversification is heavily studied both theoretically and empirically, with support for two opposing views. Our results indicate that industry focus-increasing spin-offs generate a slightly greater abnormal return, however, the difference in mean is not significant. The division between focus- and non-focus increasing spin-offs is fairly even and the sample sizes are large. As a comparison, Daley et al. (1997) find that cross-industry spin-offs have a significant abnormal return of 4.30% in the two-day event window while its 1.40% and insignificant for own-industry spin-offs. They also find that the difference in mean is significant at the 1% level.

For the *Geographical focus* sub-sample, the results suggest that parents spinning off a domestic subsidiary experience a greater wealth effect than if the subsidiary is foreign. The CAAR for the focus increasing is 1.99% while it is 3.02% for the non-focus increasing. However, the difference is not significant. Worth noting is that more than 90% of the sample fall into the latter group, which might explain the insignificant CAAR of the focus-increasing sub-sample. Veld & Veld-Merkoulova (2004) find a significant abnormal return of 2.65% for domestic spin-offs, and an insignificant abnormal return of 2.81% for foreign spin-offs. However, their sample is even more uneven distributed than ours, with only 8 spin-offs in the latter group. Chai et al. (2018) show the same results regarding the sub-sample's respective CAAR and significance as well as the uneven distribution. In general, the consistent uneven sub-samples complicates drawing conclusions about the wealth effect from eventual geographical focus.

Table 11: **Sub-sampling, information asymmetry**

CAAR(%)	**High**	**Low**	**Difference in mean**
Bid-ask spread	4.08***	2.61***	-1.46
	(3.046)	(5.460)	(-1.029)
Observations	119	321	440
Trading volume	2.58***	3.23***	0.64
	(2.699)	(6.733)	(0.600)
Observations	179	333	512

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. The *bid-ask spread* is the average daily spread between 150 and 10 days before the event date, where the spread is calculated by subtracting askprice with bidprice and dividing with the average of ask- and bidprice. *Trading volume* is the median daily turnover ratio between 300 and 20 days before the event date, where daily turnover ratio is calculated as the number of shares traded times share price, divided by market cap.

Our result does not suggest that the level of information asymmetry is a significant determinant factor for the cumulative abnormal return. The division between the two subsamples is relatively even for the two variables and the sample sizes are large. Moreover, the difference between the High and Low groups for the proxies is as expected; parents with higher information asymmetry preceding the spin-off tend to experience a greater wealth effect around the announcement. Note that the interpretation of the *Trading volume* proxy is that low trading volume indicates high information asymmetry. However, the difference in the mean values is insignificant for both variables, even though the difference for especially *Bid-ask spread* is quite substantial.

Krishnaswami & Subramaniam (1999) does not perform sub-sampling for information asymmetry but get significant and positive coefficients for four of their five proxies in a cross-sectional regression. Their proxies differ from ours due to differences in access to and usage of databases, given that their sample consists solely of American spin-offs. Another result is presented by Veld & Veld-Merkoulova (2004), using proxies similar to Krishnaswami & Subramaniam (1999), who find a relationship reversed from the expectations and insignificant both in sub-samples and cross-sectional regression.

Table 12: **Sub-sampling, Analyst coverage**

CAAR (%)	**Extensive**	**Limited**	**Difference in mean**
Analyst coverage	2.07***	3.41***	1.34*
	(5.131)	(5.144)	(1.728)
Observations	177	338	515

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. *Analyst coverage* is the number of analysts covering the parent company.

Our results for sub-sampling on analyst coverage suggests that companies with more limited analyst coverage experience a greater wealth effect. The difference in mean is also significant at the 10% level. This relation is the reverse to what we expected, based on the belief of a greater reaction in the three-day event window for companies with more extensive analyst coverage due to a faster information spread. The detected relation might be explained with that lightly covered companies suffer from greater information asymmetry, and that a spin-off has greater potential in mitigating that issue. Companies with above-average coverage would in that case have a smaller potential gain in reducing information asymmetry by performing a spin-off. We suspected that small companies generally have lighter analyst coverage and that the *analyst coverage* variable would rather display a relation between wealth effect and firm size. This is further examined by in the cross sectional regressions and in the robustness test, which give continued support of *analyst coverage* as a proxy for information asymmetry also when firm size is controlled for. About 32% of our sample has zero analysts covering, according to our data gathering, either due to absent coverage or missing data. We reach the same results when excluding this group, and the difference becomes significant even at the 5% level, see table 24 in section 4.2 Robustness test.

Table 13: **Sub-sampling, Completed**

CAAR (%)	**Completed**	**Withdrawn**	**Difference in mean**
Completed	2.38***	5.37***	2.99**
	(5.136)	(3.967)	(2.089)
Observations	406	102	508

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. A spin-off is classified as *Completed* when there is a registered completion date.

Similar to what Veld & Veld-Merkoulova (2009) find in their review, our result suggests that spin-offs that are later withdrawn experience a greater abnormal return around announcement, than do spin-offs that are completed. Moreover, the difference is significant

at the 5% level. We have data for almost the entire sample, meaning that all three regions are present in the sub-samples. Together with a substantial sample size in each group, the results can be thought to be reliable. This suggests a relation between completion and return which oppose the results of Vroom & Frederikslust (1999) and Copeland et al. (1987). Veld & Veld-Merkoulova (2009) argue that their unexpected results can be explained with the suggestion that spin-offs that are later withdrawn were perceived as more unexpected by investor, or their announcements contained more information, and therefore experience a greater price reaction.

In the following paragraphs, we investigate whether the relations detected in the sub-samples hold in the cross-sectional regressions where we introduce control variables. We also expect to find stronger evidence of other relations, as we minimize potential bias in the coefficients when controlling for other factors. We test our six variables of interest in each geographical region separately. In each regression we control for *hot market*, *firm size* and *revenue growth*. In the 8^{th} regression we also control for *relative size*, calculated with the market cap for parent and subsidiary. We avoid controlling for relative size in the other regressions because it would limit our sample to the spin-offs where the subsidiary becomes listed.

Table 14: **Europe: Cross-sectional regression output**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry focus	0.028*						0.028*	0.021
Geo. focus		-0.025					-0.034*	-0.074***
Bid-ask spread			1.504				-1.307	-3.668
Trading volume				1.154			2.068	3.913
Analysts					0.000		0.000	-0.000
Completed						-0.023	-0.024	-0.022
Relative size								-0.071**
Hot market	0.001	-0.000	-0.006	-0.004	-0.003	-0.012	-0.008	-0.001
Small cap	0.013	0.008	-0.005	0.014	0.011	0.008	0.032	0.054*
Mid cap	0.007	-0.001	-0.001	0.002	0.002	0.004	0.013	0.003
Revenue growth	0.047	0.055	0.032	0.044	0.043	0.043	0.054	0.098**
Observations	96	103	100	102	103	100	91	72
R^2	0.062	0.037	0.040	0.023	0.020	0.039	0.106	0.240
Adjusted R^2	0.010	-0.012	-0.011	-0.028	-0.030	-0.012	-0.006	0.100

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 in the appendix for variable definitions.

Visible in the regression output for Europe, is that the coefficient for *industry focus* is

positive and significant at the 10% level, when relative size is not controlled for. This is in line with the results of Veld & Veld-Merkoulova (2004) and Sudarsanam & Qian (2007), even though our results are weaker. Boreiko & Murgia (2016) get results similar to ours, but they also test the wealth effect for industry focus spin-offs with previously acquired subsidiaries, where they find significance, which they think explain the former insignificance. The coefficient *geographical focus* is negative and significant at the 10% and 1% level in the 7^{th} and 8^{th} regression, respectively, which support the relation detected in the sub-sample. This strengthens the belief of a lower perceived value creation when a parent spins off a foreign subsidiary. For this factor, we get stronger evidence than Veld & Veld-Merkoulova (2004), who find the difference in mean to be significant but not the coefficient in their multivariate regression.

The coefficient sign for *bid-ask spread* and *trading volume* in the 7^{th} and 8^{th} regression is the reversed to our expectations and the results in the sub-samples, and they are insignificant. This might be explained with either that high information asymmetry is not a noticeable issue for parents doing spin-offs in Europe, or that our chosen proxies do not accurately reflect the level of information asymmetry. Seen in table 28 in the appendix is that the European sample firms have lower information asymmetry than the worldwide average, according to the majority of the metrics. Neither Veld & Veld-Merkoulova (2004), who use normalized standard deviation of forecasts, can find evidence for a relation between abnormal return and information asymmetry. However, Boreiko & Murgia (2016) find some significance for two other information asymmetry proxies, one of them being price volatility. We do not find the same evidence when using price volatility as a proxy instead, see table 23 in section 4.2 Robustness test.

Contrary to what was seen in the sub-samples, the coefficient for neither *analyst coverage* nor *completed* is significant. The latter is in line with the results of a European study by Kirchmaier (2003). Interesting is that the coefficient for *relative size* is negative and significant at the 5% level, which contradicts the results of Veld & Veld-Merkoulova (2004), Sudarsanam & Qian (2007) and Boreiko & Murgia (2016), all European studies. Finally, we check for multicollinearity by conducting a VIF-test, which produce a maximum and mean VIF-value of 5.18 and 2.00, respectively, which, according to Hair et al. (1998), is an acceptable level of correlation between the variables.

Table 15: **APAC: Cross-sectional regression output**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry focus	0.009						-0.004	0.000
Geo focus		-0.018					-0.004	0.004
Bid-ask spread			0.249				0.358	1.953
Trading volume				-1.164			-0.615	-0.496
Analysts					-0.001		-0.002*	-0.002
Completed						-0.031**	-0.031*	-0.037*
Relative size								0.061**
Hot market	0.011	0.003	0.011	0.002	0.004	-0.002	0.019	0.034*
Small cap	-0.005	-0.003	0.002	0.001	-0.020	-0.007	-0.025	-0.051
Mid cap	-0.024	-0.024	-0.012	-0.022	-0.029	-0.027	-0.020	-0.041
Revenue growth	0.002	0.002	0.022	-0.000	0.006	0.003	0.040	0.088***
Observations	219	248	187	247	248	246	162	123
R^2	0.014	0.011	0.016	0.016	0.015	0.035	0.084	0.182
Adjusted R^2	-0.009	-0.010	-0.011	-0.004	-0.005	0.015	0.024	0.101

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 in the appendix for variable definitions.

As shown in the above table, the coefficient for *analyst coverage* is negative and significant at the 10% level when relative size is not controlled for. The presented result is expected, as the sub-sample shows a significant difference in mean. This implies that stronger analyst coverage is associated with lower abnormal return. However, the evidence is weak being only 10%, and in addition to this, no significance is found in the 5^{th} or 8^{th} regression.

The coefficient for *completed* is negative and significant at the 10% level in both the 7^{th} and 8^{th} regression. This result is in line with the findings of Veld & Veld-Merkoulova (2009) in their review as well as our sub-sample, indicating that spin-offs that later are withdrawn experience a greater abnormal return. On the other hand, it contradicts a recent study on Australian spin-offs by Chai et al. (2018), as well as a world-wide study by Vroom & Frederikslust (1999).

We cannot conclude anything from the diversification and information asymmetry proxies, which is in line with the sub-sampling results. In a recent study on Australian spin-offs, Chai et al. (2018) do not find significance for neither diversification nor information asymmetry either. Finally, we check for multicollinearity by conducting a VIF-test, which provides a maximum and mean VIF-value of 6.43 and 2.10, respectively, which, according to Hair et al. (1998), is an acceptable level of correlation between the variables.

Table 16: **US: Cross-sectional regression output**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry focus	-0.007						0.003	0.004
Geo. focus		0.011					0.052***	0.053**
Bid-ask spread			1.301				2.647	2.803**
Trading volume				2.907			13.716***	11.585***
Analysts					-0.001		-0.002**	-0.001
Completed						-0.045	-0.051	-0.063***
Relative size								0.086**
Hot market	-0.032	-0.027	-0.020	-0.037	-0.027	-0.039	-0.037	0.003
Small cap	0.051*	0.036	0.011	0.040	0.021	0.030	-0.013	0.006
Mid cap	0.024**	0.020*	0.020	0.014	0.010	0.022*	-0.024	-0.021
Revenue growth	0.059	-0.046	-0.065	-0.070	-0.047	-0.048	-0.052	0.106**
Observations	144	164	153	163	164	162	134	112
R^2	0.061	0.024	0.045	0.043	0.025	0.037	0.323	0.529
Adjusted R^2	0.027	-0.007	0.012	0.013	-0.006	0.006	0.268	0.477

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 in the appendix for variable definitions.

The regression output for US undoubtedly provides more significant evidence than the other regions, even though it does not have the largest sample size. Furthermore, the adjusted R^2 in the 8^{th} regression is high, 0.477, which means that the model explains a large degree of the variation. It is furthermore noticeably higher for the American sample firms than for both the European and the Asian/Pacific.

The coefficient for *Geographical focus* is positive and somewhat reliable with significance at the 1% and 5% level in the 7^{th} and 8^{th} regression, respectively. This indicates that an increase in geographical focus gives an additional positive effect. On the other hand, this opposes our results for Europe and some earlier literature from Europe and Australia, for instance Chai et al. (2018) and Veld & Veld-Merkoulova (2004), who find no significant results for the geographic focus. Furthermore, the coefficient for *industry focus* is positive, but not significant. The same result is found in a more recent study by Veld & Veld-Merkoulova (2008). However, many of the other studies on American spin-offs have provided evidence for a positive wealth effect for industry focus-increasing spin-offs, for instance Daley et al. (1997) and Krishnaswami & Subramaniam (1999).

As for information asymmetry, *trading volume* has strong evidence for a positive relationship, with significance at the 1% level in both the 7^{th} and 8^{th} regression. This would

imply that a lower level of information asymmetry gives a stronger positive reaction. This is not what we expected, and it contradicts the results from the sub-sample as well as much of the existing American literature, for example Krishnaswami & Subramaniam (1999). Our results might be explained with that *trading volume* also can be a measure of how liquid a stock is and might therefore not only reflect the level of information asymmetry for a company. The second proxy, *bid-ask spread*, is in line with the results of the above mentioned literature and our expectations. However, the evidence is somewhat weak with significance at the 5% level only for regression 8^{th}, and no significance in the difference in mean for the sub-samples.

The coefficient for *analyst coverage* is negative and significant at the 5% level, relative size is not controlled for. This is in line with the sub-sample result as well as the regression result from APAC, which suggests that greater analyst coverage is associated with lower abnormal return.

Similar to the sub-sample and regression output from APAC, *completed* also seems to have a negative and significant relationship with wealth effect, when relative size is controlled for. This allow us to consider the results to be relatively reliable, although coefficient in the 7^{th} regression is not significant. This is in line with the results from the review by Veld & Veld-Merkoulova (2009), that mainly examine American studies. Lastly, a positive coefficient, significant at the 5% level, is found for *relative size*, which is similar to the findings of many US studies, including Krishnaswami & Subramaniam (1999) and Miles & Rosenfeld (1983). Finally, we check for multicollinearity by conducting a VIF-test, which provides a maximum and mean VIF-value of 2.89 and 1.53, respectively, which, according to Hair et al. (1998), is a low correlation between the variables.

4.2 Robustness Test

To determine the robustness in our results, we perform robustness tests for both the short-term wealth effect and the determinant factors of attention in this thesis. Although we test several proxies for information asymmetry, there are still variables that are omitted which naturally risk inducing a bias in the regression coefficients or eliminate significance. For improved testing of the information asymmetry factor, one would have wished to control for the aspects that weakens each proxy and that may affect the abnormal return. A flaw for the *trading volume* proxy for instance, is that it may reflect the liquidity in the stock, rather than the level of information asymmetry. For testing the effect of *completed*, it would have been valuable to control for how unexpected a spin-off is, to rule out or gain stronger evidence for that as a possible explanation. Since that aspect is difficult to capture in a quantitative measure, we are not able to do so. Omitted variables can affect

both the direction of our conclusions, but also how strong our evidence is. However, we consider that the variables that have the most obvious impact on both explanatory and dependent variables are controlled for, so that our results together with elaborations in the following robustness tests gives a sufficient basis for drawing conclusions.

Table 17: **CAAR (%) different time-periods**

Time period	**Europe**	**APAC**	**US**	**Worldwide**
2013-2019	2.22*	3.72***	1.80	2.77***
	(1.836)	(5.315)	(1.487)	(4.682)
Observations	38	120	95	253
2007-2012	2.94**	1.49*	7.03**	3.00***
	(2.119)	(1.821)	(2.137)	(3.213)
Observations	32	110	42	184
2000-2006	2.79***	2.87*	4.44**	3.38***
	(3.419)	(1.846)	(2.660)	(4.462)
Observations	33	18	27	78

Robust t-statistics in parentheses. ***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. CAAR is the average cumulative abnormal return, aggregated over the event window and averaged over the sample firms.

Above is the average cumulative abnormal return tested in different time-periods. The first period, from 2000 to 2006, enclose the dot-com bubble and both the associated fall and steady recovery in stock prices. The second period, from 2007 to 2012, enclose the financial crisis in 2008 with a preceding rise in stock prices followed by a steep fall and later a steady recovery. The third period, from 2013 to 2019, covers the recovery period from the financial crisis, with steadily increasing stock prices. It is visible that the CAAR is significant and on a steady, positive level in all periods for the worldwide sample, but more variation is seen especially for the US sample. The most surprising for the US sample is the vividly large CAAR in the second period, followed by a relatively low and insignificant CAAR in the third period for the US sample.

The results above also indicate that APAC sample firms experience a larger and more significant wealth effect during the third period, while the results for Europe in general is quite uniform, even though there is a decrease in significance. The detected trends over time motivate the need to run cross-sectional regressions and control for the time-period. The result of this is shown in table 32 in the appendix. We can conclude that the change in result is limited to APAC in terms of a loss in significance for the *completed* coefficient and a positive and significant coefficient for *third period*, the latter being expected from the table above. There is no significance in the coefficient for either the *second period* or *third period* for the US. This allows us to conclude that the spin-off wealth effect have a

clear and robust existence, even though there is some time-dependent variation.

Table 18: **Change in business segments**

Mean	**Europe**	**APAC**	**US**	**Total**
Change in Herfindahl index				
1y prior event	0.511	0.712	0.569	0.620
Completion year	0.678	0.767	0.666	0.711
Change	-0.166***	0.054**	0.097***	0.091***
Observations	47	111	102	260
Change in number of business segments				
1y prior event	3.847	2.983	3.277	3.244
Completion year	2.194	1.673	2.313	1.992
Change	-1.652***	-1.309***	-0.963***	-1.251***
Observations	72	184	137	393

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. *1y prior event* is defined as one year prior to the spin-off announcement. *Completion year* is defined as the completion date of the spin-off transaction.

We use Herfindahl's index and the change in number of business segments as an alternative proxy for industry focus. Similar to Desai & Jain (1999), we calculate Herfindahl's index as the sum of squares of each business segment's revenue as a proportion of total revenue. A larger Herfindahl index indicates more narrow focus, while a decrease in the number of business segments naturally is interpreted as a more narrow focus. As shown in the result section 4.1.2, weak to no evidence is provided for a positive effect from increased *industry focus*. However, the results from the above table strongly indicate that an actual increase in industry focus has occurred. All regions have significantly reduced the number of business segments. In addition to this, the Herfindahl index has increased for both APAC and the US. These results indicate that *industry focus* is not a weak proxy as it ought to capture the firms' focus-increasing activities. This strengthen our beliefs that the non-significant results in section 4.1.2 is not due to a weak proxy, but rather indicate that an increase in *industry focus* is not a determinant factor.

Table 19: **Change in geographical segments**

Mean	**Europe**	**APAC**	**US**	**Total**
Change in Herfindahl index				
1y prior event	0.5455	0.7874	0.7244	0.7204
Completion year	0.588	0.759	0.7051	0.7089
Change	0.043	-0.028	-0.019	-0.011
Observations	33	83	53	169
Change in number of geographical segments				
1y prior event	4.369	2.380	2.571	2.800
Completion year	2.369	1.858	1.914	1.968
Change	-2.000***	-0.522**	-0.657**	-0.832***
Observations	46	134	70	250

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. *1y prior event* is defined as one year prior to the announcement. *Completion year* is defined as the completion date of the transaction.

The same proxies are also tested for geographical diversification. No significance is found in the Herfindahl index, but a decline in the number of geographical segments is noted in all regions, significant at least at the 5% level. The decline indicate that the proxy *geographical focus* accurately reflects whether firms are implementing geographical focusing. Europe in particular is showing a large reduction in geographical segments. This suggests that the wealth effect for European companies decrease when there is an increase in geographical focus, shown in section 4.1.2 Results, and that the result is not due to with flaws in the proxy.

Table 20: **Sub-sampling, information asymmetry**

CAAR(%)	**High**	**Low**	**Difference in mean**
Stdev target price	2.40***	1.85***	-0.55
	(3.708)	(4.631)	(-0.724)
Observations	117	192	309
Price volatility	4.57**	2.56***	-2.01
	(2.368)	(7.883)	(-1.029)
Observations	100	415	515

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. *Stdev target price* is calculated by dividing the standard deviation of the analyst target prices to the target price mean, as of 10 days before the event date. *Price volatility* is calculated as the standard deviation of the daily stock returns between 300 to 20 days before the event date.

Above is the sub-sampling for our alternative information asymmetry proxies, which suggests the expected relation, where parents with higher pre-spin-off information asymme-

try experience a greater wealth effect. However, as for the other proxies, the difference in mean is not significant. The drawbacks with the two proxies above are that *stdev target price* requires analyst coverage and reported target prices, which decrease the sample size substantially, and *price volatility* has a great risk of being affected by other aspects than the level of information asymmetry.

Table 21: **Europe: Other information asymmetry proxies**

VARIABLES	(1)	(2)	(3)	(4)	(5)
Bid-ask spread	-3.548				
Trading volume		1.179			
Stdev target price			-0.005		
Price volatility				-0.374**	
Analyst coverage					0.001
Industry focus	0.021	0.017	0.005	0.021	0.025*
Geo. focus	-0.073***	-0.065***	-0.060***	-0.068***	-0.030*
Completed	-0.022	-0.012	-0.052	-0.026	-0.020
Relative size	-0.072**	-0.064*	-0.026	-0.080**	-0.064**
Hot market	-0.003	0.003	-0.007	0.007	-0.004
Small cap	0.046*	0.021	-0.008	0.023	0.018
Mid cap	0.006	0.000	-0.008	0.003	0.011
Revenue growth	0.094**	0.089**	0.044	0.082**	0.054
Observations	72	75	56	75	95
R^2	0.234	0.192	0.208	0.219	0.087
Adjusted R^2	0.123	0.0805	0.0530	0.110	0.00209

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 in the appendix for variable definitions.

The above regression output for Europe tests the significance in all of the proxies for information asymmetry, as well as *analyst coverage* which partly belongs to that group. All proxies are tested in a regression where it is the only variable concerning information asymmetry, since there is some correlation among them, see correlation matrix in table 33 in the appendix. This does not give any other evidence than the previous results for the European sample, with weak or no significance for *industry focus*, significance for *geographical focus* and no significance for information asymmetry. Given that the most flawed proxy for information asymmetry has a negative and significant coefficient, it is assumed that it shows a negative effect experienced by illiquid or in other way volatile stocks rather than an affect that origin from the level of information asymmetry.

Table 22: **APAC: Other information asymmetry proxies**

VARIABLES	(1)	(2)	(3)	(4)	(5)
Bid-ask spread	2.336*				
Trading volume		-0.623			
Stdev target price			-0.064		
Price volatility				-0.085	
Analyst coverage					-0.001
Industry focus	-0.001	0.015	-0.013	0.015	0.016
Geo. focus	-0.000	-0.004	-0.005	-0.003	0.002
Completed	-0.043**	-0.034*	-0.064	-0.035*	-0.033*
Relative size	0.059**	0.023	0.027	0.018	0.019
Hot market	0.030*	0.016	0.000	0.012	0.018
Small cap	-0.025	-0.018	-0.027	-0.016	-0.039
Mid cap	-0.030	-0.043	-0.041	-0.042	-0.051
Revenue growth	0.085***	0.028	0.034	0.034	0.032
Observations	123	155	81	155	155
R^2	0.170	0.071	0.093	0.073	0.074
Adjusted R^2	0.104	0.0135	-0.0214	0.0157	0.0163

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 in the appendix for variable definitions.

The above results for APAC give scarce additional evidence. The coefficient for *completed* is still negative and significant in most regressions. The 3^{rd} regression has a substantial reduction in sample size, only about 30% of the full sample for APAC is represented, which might explain the loss in significance. The coefficient for *bid-ask spread* is positive and significant at the 10% level in the 1^{st} regression that also has the highest adjusted R^2 which, together with the assumption of *bid-ask spread* being the most appropriate proxy, gives some support to the explanation of high information asymmetry as a determinant factor for abnormal return. Otherwise, we get the same results for *industry focus*, *geo focus* and *analyst coverage*.

Table 23: **US: Other information asymmetry proxies**

VARIABLES	(1)	(2)	(3)	(4)	(5)
Bid-ask spread	1.643*				
Trading volume		9.906**			
Stdev target price			0.101		
Price volatility				0.618*	
Analyst coverage					0.000
Industry focus	0.002	0.010	0.011	0.004	0.003
Geo. focus	0.043	0.047**	0.043**	0.046**	0.043
Completed	-0.030*	-0.069***	-0.054*	-0.042**	-0.041**
Relative size	0.124	0.108**	0.024	0.092*	0.131*
Hot market	0.002	-0.023	0.000	0.007	-0.010
Small cap	0.009	-0.006	0.017	0.010	0.013
Mid cap	-0.030	-0.043	-0.041	-0.042	-0.051
Revenue growth	0.218	0.105***	-0.002	0.107**	0.159
Observations	112	121	99	121	121
R^2	0.239	0.439	0.109	0.454	0.221
Adjusted R^2	0.172	0.394	0.0190	0.410	0.158

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 in the appendix for variable definitions.

The evidence for information asymmetry as a determinant factor is much more visible for the US sample firms. The coefficients for *bid-ask spread*, *trading volume* and *price volatility* are all positive and significant at least at the 10% level, and the adjusted R^2 is high, especially in the regressions with the two latter proxies. The coefficient for *completed* remains negative and is significant in all regressions. Although the significance varies for the *geographical focus* coefficient, it is still positive in all regressions, in contrast to the results of the European sample firms. The coefficients for *industry focus* remains insignificant.

Table 24: **Sub-sampling, Analyst coverage**

CAAR (%)	**Extensive**	**Limited**	**Difference in mean**
Analyst coverage	1.92***	3.65***	1.74**
	(4.561)	(5.313)	(2.1535)
Observations	145	203	348

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. *Analyst coverage* is the number of analyst covering the parent company. For this sub-sampling, all sample firms with zero analyst coverage are excluded, as that is due to either absent coverage or missing data.

When excluding the sample firms with zero analyst coverage, due to unclear interpretation of that value, the same result as in the previous sub-sample is shown and the difference in mean is significant even at the 5% level. In the below table we examine if the average abnormal return for each day around the event date differs for firms of great versus light

analyst coverage, both in terms of the magnitude and speed of reaction. There is no visible indication of the reaction being slower for companies with light coverage, rather the opposite as the abnormal return for day -1 is significant at 1% level for the light coverage-firms but not the others. Furthermore, the cumulative abnormal return in event window (-3,3) for firms with light coverage is 4.23% against 1.90%, and the difference is also significant at the 5% level. This provides evidence against information speed being a determinant factor, or alternatively against *analyst coverage* being a righteous proxy for information flow.

Table 25: **Price reaction (%) different analyst coverage**

	Great Coverage		**Light Coverage**	
Event window	Abnormal return	Cumulative abnormal return	Abnormal return	Cumulative abnormal return
+3	-0.00	1.90***	0.11	4.23***
+2	-0.31*	1.91***	-0.06	4.12***
+1	0.68**	2.22***	1.11***	4.18***
0	1.29***	1.53***	1.66***	3.07***
-1	0.17	0.24	0.76***	1.42***
-2	0.16	0.07	0.22	0.66*
-3	-0.09	-0.09	0.43**	0.43**
Obs.	166	166	327	327

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. A company is assumed to have great coverage when its coverage is above the sample mean, and light coverage when it is below.

4.3 Summary of the Results

There is clear evidence of a short-term abnormal return for all regions, accumulated over the three-day event window, which is in line with the existing literature. Our result for sub-sampling on *analyst coverage* suggests that companies with more limited analyst coverage are associated with a greater wealth effect, while the result for *completion* shows that spin-offs that are later withdrawn experience a greater abnormal return around announcement. For the European sample firms, we find strong evidence of a negative effect from *geographical focus*, suggesting that there is less value creation when the parent spins off a foreign subsidiary. The only evidence found for Asian-Pacific sample firms is the *completion* variable; indicating that transactions that are later withdrawn are associated with a greater return. Interestingly, US provide a much higher adjusted R^2 than the other regions, meaning that the model explains a larger degree of the return. Furthermore, US shows significant results that *geographical focus* gives an additional positive effect, and

that greater *analyst coverage* is associated with lower abnormal return. Similar to APAC, the evidence in US also shows that transactions that are later withdrawn are associated with greater return.

4.4 Analysis

In this section we describe the implications of our result for corporate restructuring strategy and discuss eventual support to the theoretical framework.

Short-term Wealth Effect
Our results indicate that it exists a positive, short-term wealth effect around the spin-off announcement. This implies that investors on average react positively to spin-off announcements, perceiving that the restructuring will initiate additional value creation. The reaction is instant and in close connection to the announcement, which provides support for a semi-strong efficient market by Fama (1970). The strategic decision to divest thereby has potential in increasing firm value, but the underlying motive and spin-off characteristics play a great role in the outcome.

Diversification
Existing literature suggests that core focusing spin-offs generate larger abnormal return than non-focusing, based on the theory of a diversification discount discussed by Berger & Ofek (1995). However, the regression results from section 4.1.2 provide little to no evidence of an *industry focus* wealth effect. In addition to this, the robustness test in section 4.2 indicates that the sample firms actually have increased their focus in the years surrounding a spin-off. Therefore, we can somewhat reliably conclude that a focus-increasing spin-off cannot with certainty mitigate a diversification discount, or that a discount does not exist in the first place. It is possible that our results provide evidence that the connection behind industry diversification and a valuation discount is more complex than previously suggested, as argued by Campa & Kedia (2002) and Erdorf et al. (2013). The explanation may be found in specific firm characteristics, or alternatively in the industry's competitive structure, as suggested by Santalo & Becerra (2008). This would further complicate the decision making preceding a divestiture, since managers would need to consider a lot more then merely the breadth of diversification.

Furthermore, all regions provide different results for *geographical focus* as a determinant factor. In Europe, it seems to be a negative relation, and the European sample firms also have the largest decrease in geographical segments. The negative relation is possibly due to a perceived loss in economies of scale and relative advantage towards international competitors for European firms, discussed by Denis et al. (2002). On the contrary, we find a

positive relation for American firms, who also show a decrease in geographical segments, although smaller. The positive relation indicate that American spin-offs are perceived to mitigate a diversification discount, which supports the theoretical reasoning that geographically diversified firms are more complex and have higher agency and overhead costs, also discussed by Denis et al. (2002). Finally, the results for APAC is not evident enough to interpret. This is something that also make a spin-off decision more complicates, as it suggests that geographical focus is perceived differently in different regions.

Information Asymmetry
The evidence for the relation between the level of information asymmetry and price reaction is weak and inconsistent in our results. An already mentioned obstacle is the selection of relevant proxies, and our choices of proxies persistently provide differing evidence in the three regions, even though the result for US firms is leaning slightly towards a positive relation. The theoretical connection between a reduction in information asymmetry and firm value presented by Habib et al. (1997) concerns gains coming from more informative price systems, an improvement in investment decisions and a reduction in investors' uncertainty about asset values, which we cannot provide supporting evidence for. It is unclear whether the level of information asymmetry, in general, affects firm value, and in turn, whether investors perceive a spin-off as a way for corporations to increase transparency. This might be explained with that asymmetric information is less of an issue for firms today and thus, there is a smaller potential gain for firms attempting to reduce it. Alternatively, our proxies might not properly reflect the level of information asymmetry.

Analyst Coverage
We do not find strong evidence for the relation between analyst coverage and spin-off wealth effect in each region, but the full-sample result indicates a negative relation. This supports the view of analyst coverage as a proxy for information asymmetry, as done by Hilary (2006), rather than information flow. This would in turn provide evidence for the information asymmetry theory discussed above, implying that companies with lighter analyst coverage have higher information asymmetry and experience a greater wealth effect due to greater potential gains from performing a spin-off. This also indicates that divesting might be an alternative tool for firms to lower their information asymmetry, if the analyst coverage on the company is not expected to increase. However, the evidence is not sufficient to draw a distinct conclusion.

Completed
Our results provide fairly reliable evidence that withdrawn spin-offs experience a greater wealth effect than completed ones. The coefficient is negative for all regions, however, the results for Europe are not significant. The logic behind this might be that non-completed

spin-offs are a greater surprise to the market, thus creating a greater reaction, suggested by Veld & Veld-Merkoulova (2009). The results are somewhat surprising, as it contradicts earlier research by e.g. Vroom & Frederikslust (1999) and Copeland et al. (1987). The authors intuitively suggest that a positive relationship should exist, because management has less incentive to follow through with a transaction if the stock market reacts negatively to the announcement. Even though this insight is not directly useful for formulating restructuring strategies, factors that explain price reactions can still be a crucial factors to control for in future research which in turn benefit corporate strategy.

Other Findings
The research on the spin-off wealth effect and its determinant factors began in the US and the most research is still performed there. It is clear that the model explains a much greater portion of the variations in the US sample firms' return than for the other two geographical regions. The fact that the scope in spin-off research have been established in American studies might explain the difference in degree of explanation. To be able to construct models of a greater degree of explanation for European and Asian & Pacific firms, it might be beneficial to ignore some of the factors tested on American firms. One should perhaps rather take into account firm and market characteristics of the researched region, and consider eventual substantial or crucial differences between that region and the US when testing determinant factors.

Furthermore, this is what might explain the varying results from more recent studies on factors with strong evidence in earlier studies. Even though some of the movement from a strong consensus regarding determinant factors might be due to a more complex explanation for a diversification discount, the evidence is scattered for information asymmetry and relative size as well.

5 Conclusions

The purpose of our study is to contribute to the empirical research made on spin-offs as a corporate divestment method. It aims to provide further knowledge on the short-term wealth effect and its determinant factors, as well as suggestions for additional factors to explain the abnormal return. The results are intended to be utilized for corporate restructuring strategies regarding what circumstances and spin-off characteristics contribute to value creation.

In this study we analyse a total of 515 spin-off announcements conducted in the period 2000-2019, divided over three regions. In line with existing literature, evidence is provided for a positive wealth effect during the three-day event window of 2.63%, 2.67%

and 3.57% for Europe, APAC and the US, respectively. We find support that an increase in geographical focus and whether the spin-off later is completed are determinant factors for the wealth effect around announcement.

The relation between geographical focus and price reaction proved to be the opposite between the American and Asian & Pacific sample firms, positive in the former and negative in the latter, implying that an increase in geographical focus is perceived differently by investors in different regions. The connection to eventual completion of the spin-off refers to whether the announcement was expected or not, where the unexpected spin-offs experience a greater wealth effect. We do not find evidence for increased industry focus or reduced information asymmetry as explanations for wealth effect. A general limitation in this study is the accessibility to the relevant data, which to some extent hinders both testing of variables of interest and controlling for proven factors.

The conclusion of our findings is that spin-offs are value creating, and the wealth effect is partly explained by if the transaction increases domestic focus and whether the announcement is expected or not. The practical implication of our study is that corporate managers should consider that investor perceptions can vary between geographical regions, and that investor preconceptions, more or less unrelated to the spin-off, can have an impact on the price reaction.

Suggestions for further research
We suggest further research on the logic behind the additional return gained by parents who do not complete the spin-off, as the unexpected aspect is one possible explanation but perhaps not the most accurate. Further research on the industry focus-effect could examine whether the subsidiary is in an industry with generally high valuation, and what impact it has on abnormal return. We also suggest further investigation in the explanation for the higher degree of explanation that is for the US sample firms. A possible approach might be to compare firm characteristics, transaction activity and transaction characteristics between regions or countries to detect systematic differences that may influence valuation and investor perceptions. This could lead to finding more suitable determinant factors to test for European and Asian/Pacific spin-offs.

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Appendices

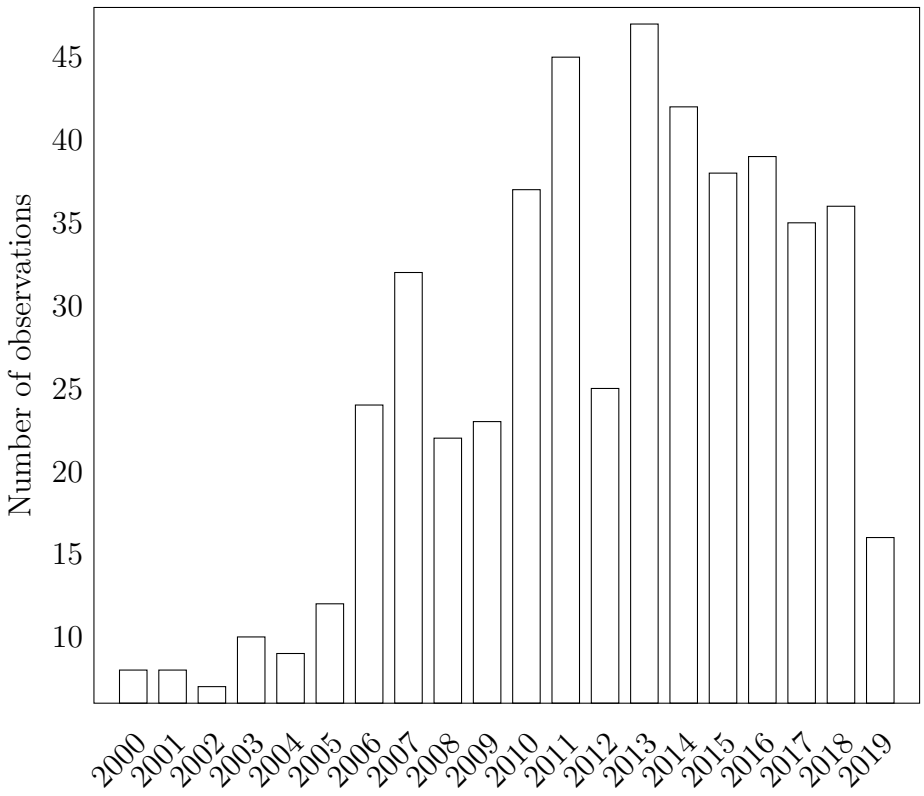
Table 26: **Sources to abnormal return**

Variable	**Proxy for**	**Definition**
Industry focus	Diversification	Industry focus equals 1 if the spin-off transaction is focus increasing, defined as a difference in the parent and subsidiary two-digit SIC codes
Geographical focus	Diversification	Geographical focus equals 1 if the spin-off transaction is focus increasing, defined as a difference in what country the parent's and subsidiary's headquarter is located in
Bid-ask spread	Information asymmetry	The bid-ask spread is defined as the average spread between 150 and 10 days before the event date, where spread is calculated by subtracting askprice with bidprice and dividing with the average of ask- and bidprice.
Trading volume	Information asymmetry	Trading volume is defined as the median daily turnover ratio between 300 and 20 days before the event date, where daily turnover ratio is calculated as the number of shares traded times share price, divided by market cap
Stdev target price	Information asymmetry	Stdev target price is calculated by dividing the standard deviation of the analyst target prices to the target price mean, as of 10 days before the event date
Price volatility	Information asymmetry	Price volatility is defined as the standard deviation of the daily stock returns between 300 to 20 days before the event date
Completed		The Completed variable equals 1 if the announced spin-off transaction later was completed
Analyst coverage		The number of analysts covering the parent company
Relative size		Relative size is calculated as the ratio of the subsidiary market cap to the combined market cap for parent and subsidiary, as of 90 days after the completion date

Table 26: (continued)

Hot market	Hot market equals 1 if the number of transactions for the announcement year is above the mean for the researched time period
Small cap	The dummy Small cap equals 1 if the parent company have a market cap below MUSD2,000
Mid cap	The dummy Mid cap equals 1 if the parent company have a market cap between MUSD2,000 and MUSD10,000
Large cap	The dummy Large cap equals 1 if the parent company have a market cap above MUSD10,000
Revenue growth	Revenue growth is defined as the three-year average annual revenue growth, as of the event date

Figure 1: **Total sample, distributed over time**



The above histogram display the distribution of the full sample of 515 spin-off announcements.

Table 27: **Indices**

Region	**Index**
Asia-Pacific	MXAS Index
Australia	AS52 Index
Europe	MXEU Index
Hong Kong	HSCI Index
India	BSE500 Index
South Korea	KOSPI Index
US	SPX Index

Table 28: **Sample: information asymmetry proxies, mean values**

Variable	**Europe**	**APAC**	**US**	**Total**
Bid-ask spread	0.007	0.010	0.008	0.009
Trading volume	0.003	0.004	0.007	0.005
Price volatility	0.031	0.049	0.088	0.057
Target price	0.131	0.143	0.125	0.133
Analyst coverage	7.67	3.11	9.96	6.15
Avg. observations	93	203	142	437

Shown is the sample mean for each variable and geographic region.

Table 29: **Europe: Cross-sectional regression output**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry focus	0.028*						0.028*	0.021
	(1.880)						(1.913)	(1.398)
Geo. focus		-0.025					-0.034*	-0.074***
		(-1.421)					(-1.929)	(-4.326)
Bid-ask spread			1.504				-1.307	-3.668
			(1.292)				(-0.560)	(-1.427)
Trading volume				1.154			2.068	3.913
				(0.559)			(1.130)	(0.817)
Analysts					0.000		0.000	-0.000
					(0.147)		(0.408)	(-0.143)
Completed						-0.023	-0.024	-0.022
						(-0.878)	(-0.817)	(-0.582)
Relative size								-0.071**
								(-2.070)
Hot market	0.001	-0.000	-0.006	-0.004	-0.003	-0.012	-0.008	-0.001
	(0.100)	(-0.008)	(-0.439)	(-0.274)	(-0.231)	(-0.735)	(-0.408)	(-0.032)
Small cap	0.013	0.008	-0.005	0.014	0.011	0.008	0.032	0.054*
	(0.817)	(0.550)	(-0.302)	(0.858)	(0.639)	(0.481)	(1.299)	(1.803)
Mid cap	0.007	-0.001	-0.001	0.002	0.002	0.004	0.013	0.003
	(0.545)	(-0.043)	(-0.084)	(0.189)	(0.172)	(0.294)	(0.791)	(0.143)
Revenue growth	0.047	0.055	0.032	0.044	0.043	0.043	0.054	0.098**
	(1.305)	(1.354)	(0.881)	(1.225)	(1.202)	(1.160)	(1.223)	(2.307)
Observations	96	103	100	102	103	100	91	72
R^2	0.062	0.037	0.040	0.023	0.020	0.039	0.106	0.240
Adjusted R^2	0.010	-0.012	-0.011	-0.028	-0.030	-0.012	-0.006	0.100

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the event window. See Table 26 for variable definitions.

Table 30: **APAC: Cross-sectional regression output**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry focus	0.009						-0.004	0.000
	(0.789)						(-0.289)	(0.020)
Geo focus		-0.018					-0.004	0.004
		(-1.299)					(-0.272)	(0.214)
Bid-ask spread			0.249				0.358	1.953
			(0.489)				(0.668)	(1.428)
Trading volume				-1.164			-0.615	-0.496
				(-1.360)			(-0.690)	(-0.547)
Analysts					-0.001		-0.002*	-0.002
					(-1.566)		(-1.804)	(-1.487)
Completed						-0.031**	-0.031*	-0.037*
						(-2.455)	(-1.868)	(-1.803)
Relative size								0.061**
								(2.249)
Hot market	0.011	0.003	0.011	0.002	0.004	-0.002	0.019	0.034*
	(0.826)	(0.239)	(0.738)	(0.199)	(0.345)	(-0.146)	(1.333)	(1.924)
Small cap	-0.005	-0.003	0.002	0.001	-0.020	-0.007	-0.025	-0.051
	(-0.213)	(-0.115)	(0.081)	(0.025)	(-0.763)	(-0.317)	(-0.815)	(-1.180)
Mid cap	-0.024	-0.024	-0.012	-0.022	-0.029	-0.027	-0.020	-0.041
	(-0.940)	(-0.943)	(-0.437)	(-0.781)	(-1.155)	(-1.065)	(-0.686)	(-1.079)
Revenue growth	0.002	0.002	0.022	-0.000	0.006	0.003	0.040	0.088***
	(0.103)	(0.128)	(1.008)	(-0.013)	(0.320)	(0.200)	(1.419)	(2.958)
Observations	219	248	187	247	248	246	162	123
R^2	0.014	0.011	0.016	0.016	0.015	0.035	0.084	0.182
Adjusted R^2	-0.009	-0.010	-0.011	-0.004	-0.005	0.015	0.024	0.101

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the event window. See Table 26 for variable definitions.

Table 31: **US: Cross-sectional regression output**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry focus	-0.007						0.003	0.004
	(-0.349)						(0.153)	(0.351)
Geo. focus		0.011					0.052***	0.053**
		(0.154)					(3.116)	(2.274)
Bid-ask spread			1.301				2.647	2.803**
			(0.821)				(0.796)	(2.466)
Trading volume				2.907			13.716***	11.585***
				(0.584)			(2.930)	(3.273)
Analysts					-0.001		-0.002**	-0.001
					(-0.965)		(-2.038)	(-0.743)
Completed						-0.045	-0.051	-0.063***
						(-0.984)	(-0.871)	(-3.423)
Relative size								0.086**
								(2.006)
Hot market	-0.032	-0.027	-0.020	-0.037	-0.027	-0.039	-0.037	0.003
	(-1.291)	(-1.033)	(-0.631)	(-1.327)	(-0.981)	(-1.375)	(-1.246)	(0.218)
Small cap	0.051*	0.036	0.011	0.040	0.021	0.030	-0.013	0.006
	(1.682)	(1.385)	(0.463)	(1.541)	(0.952)	(1.225)	(-0.480)	(0.300)
Mid cap	0.024**	0.020*	0.020	0.014	0.010	0.022*	-0.024	-0.021
	(2.104)	(1.819)	(1.600)	(1.100)	(0.721)	(1.956)	(-1.039)	(-0.939)
Revenue growth	0.059	-0.046	-0.065	-0.070	-0.047	-0.048	-0.052	0.106**
	(0.655)	(-0.549)	(-0.641)	(-1.037)	(-0.560)	(-0.565)	(-0.626)	(2.123)
Observations	144	164	153	163	164	162	134	112
R^2	0.061	0.024	0.045	0.043	0.025	0.037	0.323	0.529
Adjusted R^2	0.0271	-0.00720	0.0122	0.0130	-0.00616	0.00623	0.268	0.477

***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the event window. See Table 26 for variable definitions.

Table 32: **Including time-period control variable**

VARIABLES	**Europe**	**APAC**	**US**
Industry focus	0.021	-0.002	0.004
	(1.401)	(-0.141)	(0.345)
Geo. focus	-0.072***	0.000	0.054**
	(-4.232)	(0.005)	(2.352)
Bid-ask spread	-3.739	1.898	2.575**
	(-1.451)	(1.396)	(2.201)
Trading volume	4.021	-0.475	11.669***
	(0.651)	(-0.515)	(3.193)
Analyst coverage	0.000	-0.002	-0.001
	(0.011)	(-1.573)	(-0.804)
Completed	-0.021	-0.034	-0.065***
	(-0.575)	(-1.646)	(-3.639)
Relative size	-0.072*	0.052*	0.084*
	(-1.988)	(1.896)	(1.882)
Second period	-0.013	0.015	-0.001
	(-0.595)	(0.893)	(-0.062)
Third period	-0.006	0.041***	-0.007
	(-0.248)	(3.015)	(-0.321)
Small cap	0.059	-0.045	0.006
	(1.625)	(-1.027)	(0.295)
Mid cap	0.005	-0.037	-0.020
	(0.231)	(-0.945)	(-0.870)
Growth rate	0.105**	0.086***	0.105**
	(2.332)	(2.726)	(2.124)
Observations	72	123	112
R^2	0.244	0.179	0.529
Adjusted R^2	0.0906	0.0895	0.472

Robust t-statistics in parentheses. ***, ** and * denotes significance at the 1%, 5% and 10% level, respectively. Dependent variable is cumulative abnormal return for each stock during the three-day event window. See Table 26 for variable definitions.

Table 33: **Cross-correlation table**

Variables	Industry focus	Geo. focus	Bid-ask spread	Trading volume	Analyst coverage	Completed	Relative size	Hot market	Small cap	Mid cap	Revenue growth
Industry focus	1.000										
Geo. focus	0.071	1.000									
Bid-ask spread	0.260	0.030	1.000								
Trading volume	-0.090	0.025	-0.133	1.000							
Analyst coverage	-0.147	0.073	-0.274	0.164	1.000						
Completed	-0.208	-0.053	-0.137	0.045	0.157	1.000					
Relative size	-0.336	-0.163	-0.207	0.159	-0.068	0.158	1.000				
Hot market	-0.039	0.049	0.005	0.060	0.084	-0.270	0.029	1.000			
Small cap	0.154	-0.027	0.304	-0.129	-0.694	-0.187	0.035	-0.021	1.000		
Mid cap	-0.129	-0.022	-0.189	0.082	0.238	0.140	0.097	0.014	-0.677	1.000	
Revenue growth	0.118	0.026	0.036	0.009	-0.077	-0.042	-0.189	-0.058	0.114	-0.094	1.000