Motivation and performance of spin offs

European evidence from 2000 to 2017

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Abstract

In this paper we analyse share performance at announcement and in the years following execution, for a sample of 92 parent firms and 103 spun off entities, from 2000 to 2017. We find significant announcement effects, as well as evidence supporting long run outperformance of both the parent and spun off entities. Additionally, we study the effects of various factors on the share performance, including changes in the macroeconomic environment and differences for "focus increasing" spin offs. This delivers some interesting results that motivate further research, but don't confirm these theories as is.

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1. Introduction

Corporate spin offs as defined by the CFA Institute, are "a form of restructuring in which shareholders of the parent company receive a proportional number of shares in a new, separate entity; shareholders end up owning stock in two different companies where there used to be one." In other words, a corporate spin off is the divestiture of a part of the company by a parent company to its existing shareholders.

These corporate actions have a significant footprint in the real world, with many large-scale spin offs occurring across the United States and Europe. Despite this, they have received very little academic research when compared to the more renowned area of mergers and acquisitions. This is particularly acute for Europe with a vast majority of academic literature focusing on American spin offs. There has also been a lull in research on spin offs with very few new papers written since the financial crisis a decade ago, and no European papers using samples including the financial crisis and the following years.

Both these gaps in the previous literature call for new research into spin offs. As such we look at European spin offs, using a sample from 2000 to 2017. Our research briefly touches on a range of different areas, in order to highlight potential areas of further research, and to help guide future papers looking at European papers.

Our paper aims to confirm that previous, hitherto accepted theories, are still supported by the recent evidence, in particular, the positive announcement effects associated with spin offs. We also use our modern sample to shed light on other, more disputed theories, as well as to briefly look into new areas that piqued our interest. These include analyses on how spin off performance changes through different time periods and economic conditions.

2. Literature review

2.1. US literature

The modern literature on spin offs blossomed in 1983 with three key American papers: Schipper and Smith (1983), Hite and Owers (1983), and Miles and Rosenfeld (1983) investigating the impact of the announcements of voluntary spin offs on shareholder wealth. Each paper finds significant positive share price performance at announcement. Both Schipper and Smith, and Hite and Owers, are unable to find evidence showing that this is due to a transfer of wealth from debt holders to shareholders. Hite and Owers go on to try and split spin offs by their publicly stated purpose, finding positive excess returns for spin offs that separate diverse business areas and that facilitate mergers, and find negative returns over the entire event period for firms responding to legal or regulatory difficulties.

The literature expanded to cover post announcement effects with Custatis et al (1993). They look at performance up to three years post announcement and find that both spun off as well as parent firms experience abnormal returns over this long-term time horizon. As such, the abnormal returns that are witnessed at announcement underestimate the total value that spin offs create.

Daley et al (1997) build on Custatis et al (1993) by looking at post announcement effects, and developing a key area within the literature: namely, the effect of increasing firm/management focus on value creation. This develops the general divestiture literature, where researchers such as John and Ofek (1995) find that sales of non-core/unrelated assets, or focus increasing sales, lead to greater performance from the remaining assets. Daley et al (1997) find that only spin offs involving units in different industries create significant value at announcement. They then look into whether value creation comes from performance improvements or bonding effects, where capital markets discount the value of the pre spin off firm because of the potential for cross subsidizing less productive/profitable divisions/areas. They don't find any evidence of bonding, but identify significant evidence for improvements in operating performance (through increasing ROA) for cross industry spin offs, while finding no such evidence for same industry spin offs.

Daley et al (1997) observe that operational performance gains are related to the parent company, which supports the theory that spin offs allow managers to focus on the core operations of a firm which they are best suited to do, which in turn creates shareholder value. They explain that performance from focus increasing actions such as focus increasing spin offs could come from two sources: Firstly, managers may be well suited to manage the core assets of a firm but poorly suited to manage the non-core assets. Therefore removing the non-core assets will free up managers to fully focus on the core operations of the business that they are better suited for. Secondly, there could be a better alignment of incentives in the subsidiary that may not have been possible or beneficial when the subsidiary was not its own publicly traded entity. In support of these theories, Daley et al find that improvements in operating performance are associated with the parent company, instead of the spun off entity.

Desai and Jain (1999) find superior abnormal returns at announcement for focus increasing spin offs. Importantly, they also find that abnormal returns continue past announcement for focus increasing spinoffs, finding significant positive abnormal returns for both firms taken together and separately after 1,2, and 3 years. While not statistically significant, they find negative returns for non-focus increasing spin offs over the same periods, with a total 3-year return difference of 47.70%. They add to this analysis by looking at how operating performance behaves during the same period using operating cash flow to total assets as their measure. This is followed by an examination of the motivation of non-focus increasing spin offs, with their results showing that firms are likely to embark on these to remove underperforming subsidiaries.

Developing on this, Ahn and Denis (2004) also find operating improvements from spin offs, with changes in investment decisions leading to increased investment efficiency; however Colak and Whited (2007) find that once certain firm characteristics and endogeneity are taken into account, they are unable to show significant improvements in investment efficiency from spin offs.

A closely related and likely contributing factor of the general focus increasing effect is the alignment of management incentives. D J Aron (1991) incorporates information asymmetry into her analysis of division manager incentives. She argues that a spin off, or the potential of a spin off, can help improve a divisional manager's incentives. Taking advantage

of the fact that the stock price of a spun off firm is a "cleaner signal of managerial productivity" than when the business area is parent of a parent firm. Daley et al (1996) put forward the better alignment of managerial incentives as potential source of abnormal returns from multi industry spin offs. Their thinking differs from D J Aron (1991), as they suggest a spin off will enable better contracts to be written afterwards for each units management, post spin off while D J Aron (1991) looks at the possibility of future spin offs on current management behaviour.

Another key topic with the wider literature is the role of information asymmetry for the motivation and results of spin offs. Nanda and Narayanan look at this theory in the broader context of divestitures. They formalise the theory, assuming that the market cannot observe division specific cash flows, which misvalues the firm's securities. They build an equilibrium whereby an undervalued firm that needs to raise capital will resort raising through a divestiture, or raise capital after a divestiture. While an overvalued firm will raise through an equity issue, without splitting divisions.

Krishnaswami and Subramahin (1997) look at the effect of asymmetric info in the case of spin offs. They find that firms that engage in spin offs have a greater level of information asymmetry than other similar firms (controlling for industry and size). They also find that after the spin off, their measures for information asymmetry fall for the related firms. Finally, they observe that firms with higher growth opportunities and firms with liquidity constraints (i.e. firms with a greater need for external capital) are more likely to engage in spin offs. Firms that engage in spin offs also increase the frequency of equity issuance and raise a greater amount of capital in the two years following a spin off. This is consistent with Nanda and Narayan's original theoretical structure.

This spur of the theory is further developed by Chemmanur and Liu (2011) who look at a firm's choice to engage in spin offs, carve-outs, or tracking stock issues in the context of information asymmetry between insiders and investors with spin offs creating the most information, therefore reducing asymmetric information by the greatest amount. They find that insiders with the most favourable private information choose to engage in spinoffs.

2.2. European literature

The first significant papers on share performance for spin offs in a European context are Veld and Veld-Merkoulova (2002), and Qian and Sudarsanam (2007). They both use samples starting 1987 and going through to 2000 and 2002 respectively and look at announcement as well as long run performance. Each paper finds significant announcement effects. However, unlike the previous US literature, they don't find compelling evidence for long-run excess performance. This pointed to European spin offs not creating a long-run abnormal performance.

Both, Veld and Veld-Merkoulova as well as Qian Sudarsanam, then take a deeper look into the motivations and behaviour of spin offs and develop their own theories.

Veld and Veld-Merkoulova (2002) look at the effects of information asymmetry on spin offs, both, generally and for focus increasing spin offs. By looking at the shareholder protections, and in turn the information asymmetry of spin offs in each European country, they were able to show that this difference in results to previous US literature exists in fact not due to differences in shareholder protection and therefore information asymmetry between the US and Europe. They were also able to add to the focus increasing literature by showing that focus increasing spin offs generated significantly greater performance at announcement than non-focus increasing spin offs.

Qian and Sudarsanam (2007) look at how investor sentiment affected the market reaction and thus the performance of spin offs at announcements. In particular, they look to see if investor demand for increased focus and "glamour stocks" impacts announcement effects. They find evidence for this positive effect of investor demand, and their results support the catering theory, whereby spin offs that take place to cater to investors demand for "glamour stocks" have a lower long run return than other spin offs. This supports their behavioural argument for outperformance at announcement.

Boreiko and Murgia (2010) also looked at European spin offs, using a sample of firms from 1985 to 2005 and analysing the reasons and motivations for spin offs as well as their performance. They find that governance and management "earthquakes" such as a takeover

threat are often the cause for spin offs. Similarly to the US research, they do find significant announcement and long run outperformance from spin offs. However they propose alternative sources of these excess returns looking into and testing the impact of M&A activity, an increase in corporate focus and the source of the spun off unit (internally generated as compared to previous M&A).

In terms of the announcement effects, they find that the mean stock returns for focus increasing spin offs are significantly higher (when looking at them in isolation) than their non focus increasing equivalents, however results differ for the median returns and no significant effects when conditioned on the spun off entity's source were found. Boreiko and Murgia find that when you split by the spin offs origin, there is no significant difference between focus and non-focus increasing spin offs for internally generated units, but there is a dramatic significant difference for spin offs originating from prior acquisitions.

When looking at long run abnormal returns, using their primary method for calculating long run returns, Boreiko and Murgia find significant average excess returns for parent firms and spun off firms over the 3-year horizon to the 5% level. They also found significant positive results for internally generated spin offs (equal weighted only), as well as for spin offs where there is no related M&A activity within the 3-year horizon (equal weighted only). Their results as such neither confirm nor deny the focus increasing theory, but point to the significance of the source of the spun off entity.

3. Motivation

3.1. Developing and contrasting European literature

In recent years, there has been a significant number of spin offs both in the US and Europe, with high profile examples such as Fiat spinning off Ferrari and eBay spinning off PayPal. Despite the growing importance of spin offs, the academic literature on the topic is limited when compared to its more popular counterpart M&A. This lack of research is particularly acute in the context of European spin offs with a vast majority of the past research being focused on US firms. European spin offs are worth separate researching because of the differences in corporate characteristics and behaviour between US firms and European firms as well as the different legislative and geographical features of European countries.

Different findings for European firms could be due to a variety of factors. Faccio and Lang (2002), for instance, show that Western European firms are far more likely to be family controlled. Differences in ownership structure such as this will potentially impact both the motivation and performance of spin offs. Differing tax and regulatory structures, both between Europe and the US as well as between different European countries, may affect the performance of spin offs. Rossi and Volpin (2004) show that the determinants and characteristics vary with differences in in regulation. It is possible that regulation will also have a significant impact on the characteristics and performance of spin offs. As discussed earlier; there have been several differences between the smaller European literature and the more comprehensive US literature. As the sample sizes in past European paper are relatively small (generally 60-160 observations). We believe that looking at the effects of spin offs with a new sample from a different time period will add to the literature and either help gap the differences between US and European results; or support the previous European literature.

This is particularly important when looking at the long run performance effects of spin offs. The US literature generally found there to be significant long run positive returns from spin offs, with these positive abnormal returns being influenced by the spin off characteristics, such as focus increasing/decreasing. This has significant implications on the wider financial literature, with the results being in conflict with the efficient market hypothesis, which would predict that all the abnormal performance should be captured by the

announcement effects. Veld and Veld-Merkoulova (2002) however, did not find compelling evidence for long run value creation. As such, a new sample from a different period could help shed light on this difference in results, and can significantly develop the current literature.

To help with this aim, we will base our analysis on previous methodologies and therefore create a level of consistency between papers. This is value adding in itself, even for announcement effects, as there have been very few papers that have used the same methods of analysis, and as such the past results drawn from different periods and geographies aren't completely comparable. We will use Veld and Veld-Merkoulova's (2002) methodology for several reasons. Firstly, its scope of research is very similar to our paper looking at announcement effects long-run effects and focus increasing spin offs. Their paper is also the first significant piece of research looking into European spin offs, which brings the benefit of having a sample period with very little overlap to our own.

This motivation also holds for the smaller sub areas of the literature. In particular we are interested to see how the focus-increasing hypothesis holds up in a European context. This branch makes up a significant portion of current literature, with differing results across past papers in the US and Europe. We will look at industry based focus increasing spin offs, and we will categorize a focus increasing spin off as one where the spun off firm operates in a different industry to the parent. The opportunity to increase the range of analysed firms and to give a greater insight into both the characteristics of these spin offs, as well as their stock performance effects is highly appealing.

The scope of our paper is mostly limited to the characteristics of the involved firms as well as the performance effect of focus increasing spin offs, and not the sources of shareholder value e.g. improvements in operating performance or related M&A. We will however, relate our results to previous papers, and discuss areas of further research based on our findings.

3.2. Contrasting results at the national level

There is also plenty of scope to look at the differences between European countries, and there are several reasons to do this. Firstly, it could be useful to create a base of results for future research to use when analysing the effects of local business conditions (e.g. taxes and regulation), on both the motivation and the performance of spin offs. Secondly, it will help give us greater clarity when analysing the differences between US and European results, as well as giving more granular results on each country and helping set a base for future country specific research. In particular, we are interested in analysing the differences between Continental Europe and the UK given the greater similarities in business environment and culture between the US and the UK relative to other European countries. If we find that spin offs in Europe behave differently to the US, an analysis of the UK will help give us insight into how/why this is the case, and may help bridge the gap between European and US spin offs.

3.3. Contrasting results of different periods and conditions

Further motivation for our research is analysing the effect of both the dot com crash and, perhaps more importantly, the financial crisis of 2008, when firms faced an almost unprecedented level of pressure. This period is likely to have altered firm behaviour and forced management to change their priorities while at the same time it will likely have changed investor behaviour. With Qian and Sudarsanam (2007) finding evidence for investor sentiment affecting announcement effects, this unique period could provide interesting insights both in a standard economic sense, whereby factors such as increased leverage or lower cash flows affect motivation and performance, as well as behavioural reasons from different stakeholders. As such, this period may result in very different spin off behaviour and effects on performance. This will likely be the case in the general sense, whereby characteristics of spun off entities and performance effects may be different to that of other periods as well as in the specific case of the impact of focus increasing spin offs. This period therefore may give us a unique insight into the motivations and performance of spin offs, and help shed light on the previous results. Moreover, this may also provide a basis for further research into spin offs during crises'.

4. Sample selection and characteristics

4.1. Sample selection

We used SDC to gather our original list of spin offs announced by firms listed in European countries between January 1st, 2000 and June 30th, 2017. Our search was limited to spin offs that show a combined market value of the parent entity and spun off entity of at least $50 million. This was due to the poorer available information, which made it harder to confirm the exact details of the spin offs, as well as the different characteristics that smaller companies might exhibit. We also checked that the real market value for the combined entities didn't fall below this boundary, by examining each case in year 2000 dollar terms. This is to prevent the boundaries for entrance in the sample changing over time, as $50 million entities in 2017, will be considerably smaller than equivalent entities in 2000 and may in turn exhibit the different characteristics of "small" firms, therefore creating bias in our sample, especially when looking at differences between periods. With these restrictions, we obtained a sample of 157 spin offs.

In order to be certain that these spin offs were genuine, and not mischaracterised, we examined each spin off and manually checked that it was an actual spin off (meaning a spin off whereby the parent company does not maintain control over the spun off entity). We did so using multiple sources such as: company reports, financial news outlets, and regulatory filings. While this was a laborious and time consuming process, it yielded many miss characterised spin offs, as well as several spin offs where the parent maintained control of the spun off entity. In total we cut out 42 observations from our sample, to leave us with a sample of 115. We then used Reuters and Bloomberg to gather the required data for each spin off. We primarily used Bloomberg, but also checked the results with Reuters, and in a few select cases, used it to fill gaps in the data available on Bloomberg. The use of both sources had substantial benefits as it allowed us to verify our results. There were several spin offs that were missing significant portions of information on both databases. As such, we had to remove them from our sample and we finally ended up with a sample of 92 parent firms and 103 spun off entities. It must be noted that our sample of spun off entities is greater than the sample of parent companies. This is due to several original companies in our sample that spin

off into more than two entities. In these particular cases, we only include the parent company once, while accounting for each spun off entity in the spun off firm analysis.

When calculating the market cap for parent and spun off entities for some spin offs, the first day for which a verified market cap is available is slightly (less than 3 days) later than the effective date. In this case we use first day of market cap to calculate the comparative sizes of each entity. We are aware that this could potentially skew our results if parents or spin offs behave differently at effective date. However, given that no earlier market cap was available this was the only option to keep a significant sample size for the analysis.

4.2. Benchmarks

We compare both the announcement and long run returns of our sample to two related index groups. Our first index group will be the industry specific STOXX Europe 600 indices. This is to account for idiosyncratic industry specific performance, such as financial stocks falling precipitously during 2008. The industry index is chosen based on the first two digits of every company's GICS. On the other hand we include the performance of the relative national indices according to Bloomberg. This helps us in controlling for extraordinary national returns, such as UK returns following the Brexit vote.

4.3. Sample characteristics

Our sample consists of 92 firms that are listed in Europe and whose spin off was announced at any point in time, between January 1st, 2000 and June 30th, 2017. These 92 firms spun off to 103 firms and are incorporated in 18 countries and listed in 6. For some of our analyses we split the total period into 4 different sub-periods: Firstly, we look at the dot com bubble, running from 2000 to 2002. We follow this up with the period from 2003 to 2007. Our third period includes the financial crisis and its aftermath, from 2008 to 2010. Lastly, we look at the years following the financial crisis from 2011 to 2017. Over the total period, the highest average number of annual spin offs occurred in the period 2003-2007 (9.5), followed by; 2008-2010 (8.5), 2000-2002 (5.5), and 2011-2017 (4.7).

Table 1 - Sample firms by country of incorporation

Country of Incorporation	GB	FI	SE	CH	NL	DE	IT	ES	BE	PT	NO	HU	US	FR	JE	IE	AT	MT
Number of Spin Offs	29	8	12	7	2	4	7	1	2	3	3	1	1	6	2	1	2	1
Average Market Cap ($ mm)	7,276.4	3,733.0	3,653.3	7,098.8	10,225.9	12,953.3	4,661.1	61,321.1	1,098.7	1,343.1	3,335.6	59.3	7,859.6	23,487.0	14,596.8	19,855.1	2,510.7	1,341.7
Relative Size of Spin off (%)	0.18	0.36	0.55	0.26	0.52	0.29	0.78	0.03	0.16	0.16	0.39	0.64	0.42	0.16	0.21	0.23	0.41	0.11
Focus increasing	14	3	6	4	1	2	4	0	0	2	1	1	0	2	0	0	1	0
Non Focus increasing	15	5	6	3	1	2	3	1	2	1	2	0	1	4	2	1	1	1
Days to completion	148.7	315.5	588.4	180.3	212.5	358.0	162.1	32.0	66.0	79.7	89.0	61.0	166.0	171.5	117.5	343.0	88.0	53.0
2000-2002	7	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2003-2007	13	3	4	1	0	2	3	1	2	1	1	1	0	0	0	0	0	0
2008-2010	7	1	4	2	0	0	1	0	0	2	0	0	1	2	1	0	0	0
2011-2017	2	3	3	3	1	2	3	0	0	0	2	0	0	4	1	1	2	1

The sample of European spin offs announced between January 1st 2000 to June 30th 2017 split by country of incorporation. A list of spin offs was retrieved from the SDC data base and cleaned for several reasons. First, misidentified spinoffs were excluded from the sample this includes spin offs where the parent remains controll over the company after the listing. Second, we removed utility companies due to their unique characteristics. Third, firms with a market capitalizaiton of below $50bn were removed. Finally, firms with not enough data points for a meaningful analysis were dropped. All financial data comes from Bloomberg. Country abbreviations: GB - Great Britain, FI - Finland, SE - Sweden, CH - Switzerland, NL - Netherlands, DE - Germany, IT - Italy, ES - Spain, BE - Belgium, PT - Portugal, NO - Norway, HU - Hungary, US - United States, FR - France, JE - Jersey, IE - Ireland, AT - Austria, MT - Malta

Table 1 splits the sample firms by their country of incorporation. It is clear that British firms have, with 29 occurrences, taken part in comfortably the greatest number of spin offs followed by: Sweden, Finland, Italy and Switzerland (12, 8, 7 and 7 respectively). While we can make a meaningful assessment of average market cap in the national split, a few additional spin offs in countries with little spin off activity could distort this perception of the market capitalizations drastically which is why we use them with care. It is interesting to note that the average market cap of firms engaging in spin offs in countries with a high total number of spin offs are considerably smaller than the total sample average. In particular, Ireland and Spain have one reported spin off each both of which being very large transactions. Compared to the overall European average market capitalization of $7.8bn, the sample suggest that the market capitalization of firms in countries with a higher number of spin offs is below European average with the above mentioned five countries with most spin offs averaging a spin off size of $5.8bn. On average, the spun off firms' market cap is around ⅓ of the post spin off market cap of the parent company.

The relative size of Italian spun off firms, averaging 77% of their Parents' market cap, is exceptionally high. Roughly half of the spin offs are categorised as industry focus increasing. This means that the first two digits of the GICS of the spun off firm differ to the ones of the parent company. The days to completion, indicating the time that passed between the announcement date (when the spin off was first publicly announced) and the effective date (the day on which the spin off was effective) average close to 230. This number is driven by the particularly high numbers for spin offs of firms incorporated in Sweden and Germany (588 and 358 days respectively). The high average in Sweden is due to one firm's extraordinary long period of completion. Almost 50% of the British spin offs occurred between 2003 and 2007 with the distribution of other countries' spin offs being more even.

Table 2

Sample firms by country of listing

Country of Listing	United Kingdom	Finland	Sweden	Germany	Italy	Portugal	Belgium	France
Number of Spin Offs	33	1	3	45	1	1	1	7
Average Market Cap ($ mm)	7,252.89	14.13	2,385.67	7,101.32	121.49	236.46	2,197.46	21,782.88
Relative Size of Spin off (%)	0.17	2.63	0.15	0.32	11.21	0.32	0.16	0.24
Focus increasing	15	1	1	19	1	1	0	3
Non Focus increasing	18	0	2	26	0	0	1	4
Days to completion	172.42	237.00	1,361.00	198.98	236.00	76.00	66.00	183.71
2000-2002	7	1	0	3	0	0	0	0
2003-2007	15	0	1	13	1	1	1	0
2008-2010	9	0	1	9	0	0	0	2
2011-2017	2	0	1	20	0	0	0	5

The sample of European spin offs announced between January 1st 2000 to June 30th 2017 split by country of incorporation. A list of spin offs was retrieved from the SDC database and cleaned for several reasons. First, misidentified spinoffs were excluded from the sample this includes spin offs where the parent remains control over the company after the listing. Second, utility companies were due to their unique characteristics removed. Third, firms with a market capitalization of below $50bn were excluded. Finally, firms with not enough data points for a meaningful analysis were dropped. All financial data comes from Bloomberg. Country abbreviations: GB - Great Britain, FI - Finland, SE - Sweden, CH - Switzerland, NL - Netherlands, DE - Germany, IT - Italy, ES - Spain, BE - Belgium, PT - Portugal, NO - Norway, HU - Hungary, US - United States, FR - France, JE - Jersey, IE - Ireland, AT - Austria, MT - Malta

Table 2 shows the sample characteristics broken down by country of listing. The classification here is based on the associated index according to Bloomberg. Interestingly, the split by listing location substantially differs from the split based on country of incorporation. 84% of the observed spin offs occur alone by companies listed in Germany or the United Kingdom with 45 and 33 out of 92 spin offs listed in these two countries respectively. Both, the United Kingdom and Germany, have similar average market caps of between $7.1bn and $7.3bn. Companies listed in France, with 7 spin offs the third biggest listing location, exceed these numbers by a big margin and have an average market cap of $21.8bn. Again, the split between focus increasing and non-focus increasing spin offs is relatively even. In terms of the days to completion, a duration of 170-200 days for the majority of spin offs (Germany, the United Kingdom and France) is in line with expectations. The already, above average days to completion that Sweden showed in Table 1 increased dramatically looking at the country of listing to 1,361 days. This is again due to a potentially wrongly documented spin off that was supposedly announced in 2000 but effective only in 2010. In terms of the period in which the spinoff was announced, one can see that the in the United Kingdom listed firms experienced a spin off boom in the period after the dot com bubble with an absolute low of the average amount of annual spin offs in the period from 2011-2017. Firms listed in Germany on the other hand show in all periods relatively constant average annual spin off numbers.

5. Methodology

5.1. Hypothesis

The main hypothesis we want to test in this thesis is: Shareholders of firms that are involved in spin offs receive abnormal returns on this investment compared to holding just an index portfolio. We split this hypothesis in two parts: the announcement day abnormal returns and the long run abnormal returns.

5.2. Event study methodology

In line with previous literature, we base our analysis on the event - methodology used by Dodd and Warner (1983). While in their study they looked directly at excess returns calculated using the market model for excess returns, or prediction error, we decided to keep the return of the firm and the return of respective indices separate to have the freedom to look at both, national and industry, indices. As described in our sample selection section, the "national index" we are using depends on the country of listing of the firm and was assigned based on the relative index of the firm according to Bloomberg. The "industry index" is the STOXX Europe 600 industry index that relates to the individual's firm first two digits of the GICS. Due to the interesting events that occurred during our sample period and that had significant influence on stock markets, all return analyses are conducted based on the whole sample period as well as split down into the four period mentioned in the data characteristics part, namely the dot com bubble (2000-2002), the period between the two recent crises (2003-2007), the recent financial crisis (2008-2010) and the period since (2011-2017). All returns we look at are set up as an equal weighted portfolio of the sample firms. Additionally we look at the performance of firms listed in the United Kingdom vs. Germany, the parent and spun off entity separately as well as in the long run a value weighted combination of the parent and the spun off entity based on market caps at effective date. The analysis is conducted using the program R and the lists retrieved from the respective databases SDC, Bloomberg and Reuters.

5.2. Announcement effect

In order for us to assess the effect that the spin off announcement has on the returns of shareholders of the individual firms, we analyse the equal weighted daily returns of t - 2 days to t + 3 days with t being the day of the spin off announcement. This we compare to the respective indices' performance over the same period of time also weighted equally. Our analysis on the statistical significance of the abnormal returns at announcement of the spin off is based on methods widely used in past literature. After careful evaluation of this previous literature, we decided to follow Veld and Veld-Merkoulova (2002) in using a paired t test to analyse the data. In this first test we want to assess whether the returns of the two parts of the firm involved in the spin off are significantly higher than the returns of the industry and national index. As first brought up by Student (1908), the paired t test can be used to show this as it displays if two data sets are statistically different from one another by showing that the mean of the difference between the two is statistically significantly different from zero.

5.3. Long run returns

When looking at the long run returns to investors, we do so over a period of three years starting with the effective date (first date of trading). For the following years, returns for stocks and indices are rebased to the effective date (= 1) and accumulated until t + 3 years with t being the effective date. In the long run, stock prices are being adapted to the extend as that they are readjusted for all dividends, stock splits and the like that occurred over the observation period. All returns are being compared to the rebased cumulative returns of the respective indices. The long run returns of both the parent as well as the spun off entity are part of our analysis. Additionally, we also create a portfolio of the parent and the spin off, weighted using the respective market caps at the effective date. If a firm spun off more than one unit, we look at one combination of the parent and several spun off firms as compared to several portfolios with one parent and one spun off firm each. While laborious in R, this analysis of combined entities helps us show the total returns to a shareholder of the parent company pre spin off over the period from the announcement to three years post effective date. We use the same t test for the long run returns as we do for the announcement day returns.

In order to test the robustness of our long run results, and to see if the performance effects aren't due to endogeneity, and spin off firm characteristics, we did an additional multivariate analysis. Previous papers looking at long run out performance have generally avoided using multivariate analysis.

6. Results

A major motivating factor for our research was to compare and contrast previous results, and to distinguish the differences between US and European spin offs. In order to allow for a meaningful analysis we therefore need to base our methods on those used previously. As such, we drew our conclusions from our univariate analysis, which was in line with previous European papers. In order to check the robustness of our long run results, and to offer further insight we also use multivariate analysis controlling for several key corporate characteristics, such as absolute and relative size as well as the debt to equity ratio.

6.1. Announcement day results

Table 3 shows the results of a sign test for the total observation period as well as the four identified sub periods. Over the whole sample, we observe a mean of the difference to the index returns from here onwards of 2.49% or 2.55% (using the country or industry index as benchmark respectively) with a return only on the day of announcement of 2.71%. Taking into account the two days around announcement, the cumulative return totals to 3.55% for the entire sample period. This return is significant at the 0.01% level. Over time, this return can be observed in Graph 1 where equally weighted average daily returns of the parent firms around the announcement day are being shown. These returns are calculated as the average of stock price at point x over stock price in x - 1 and then compared to the average of the respective STOXX Europe 600 industry and the respective country indices. While there appears to be a slight elevation of stock returns compared to index averages also on the days before and after announcement, a clear peak on the announcement day to the 2.49%/ 2.55% mean of the difference can be observed.

This significant (at the 1% level) outperformance over the 3 day window, that our announcement effect results showed across the whole sample against both indices was to be expected, and is in line with the previous literature going back to the three key papers in 1983 and is visualized in graph 1. It adds to this literature by providing an update to previous findings, with positive announcement effects being shown with a far more recent sample. This in itself offers meaningful results, showing that this effect has not changed over time.

Table 3

Total return at announcement over time

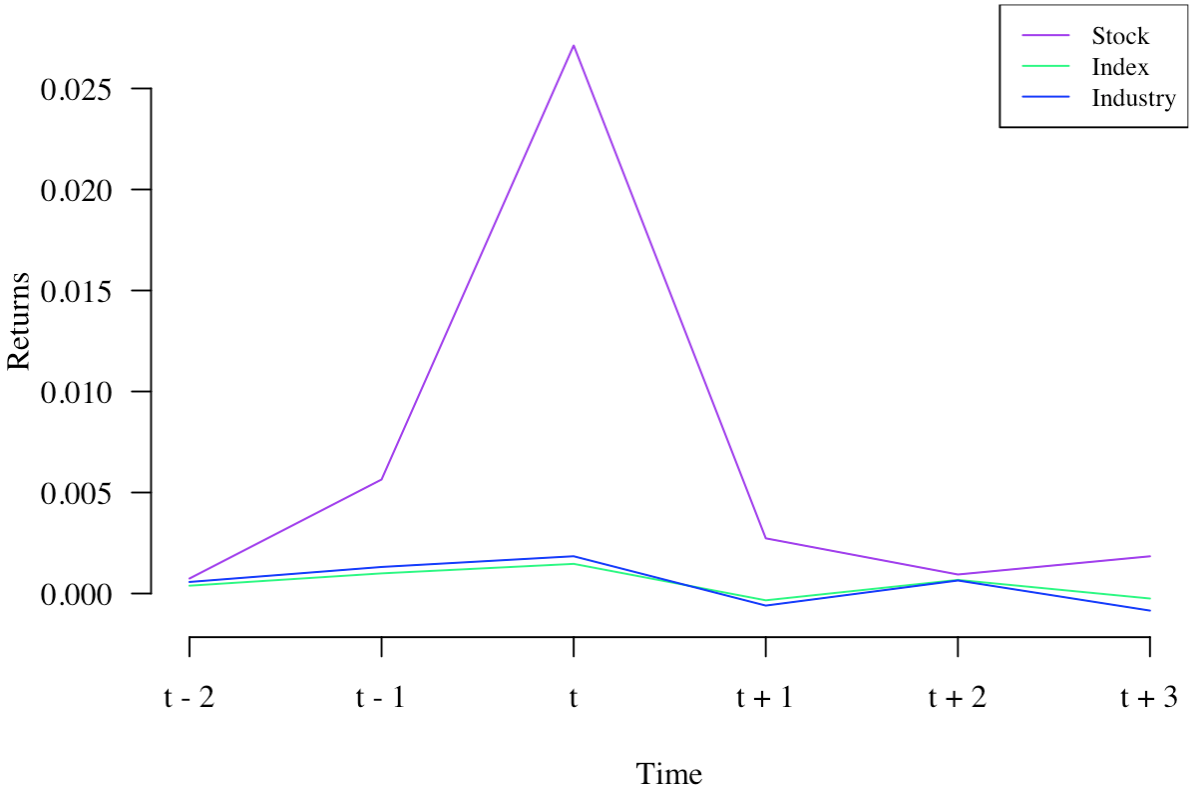
	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
2000-2017 *(n = 92)*							
-1 to 0	1.81 **	0.04	0.48%	1.71 **	0.05	0.44%	0.56%
0	3.75 ***	0.00	2.49%	3.77 ***	0.00	2.55%	2.71%
0 to +1	1.29	0.10	0.25%	1.69 **	0.05	0.48%	0.27%
-1 to +1	4.07 ***	0.00	1.69%	4.34 ***	0.00	1.86%	3.55%
2000-2002 *(n = 13)*							
-1 to 0	1.10	0.15	1.36%	1.14	0.15	2.08%	1.63%
0	1.15	0.14	3.91%	1.49	0.09	7.53%	4.13%
0 to +1	-0.35	0.64	-0.32%	0.22	0.42	0.27%	-0.80%
-1 to +1	1.02	0.16	-2.66%	1.55 *	0.08	-1.70%	4.97%
2003-2007 *(n = 37)*							
-1 to 0	1.82 **	0.04	0.68%	1.92 ***	0.03	0.74%	0.42%
0	2.73 ***	0.00	2.64%	2.94 ***	0.00	2.92%	2.38%
0 to +1	0.24	0.40	0.08%	0.69	0.25	0.24%	0.23%
-1 to +1	2.95 ***	0.00	1.75%	2.80 ***	0.00	1.53%	3.03%
2008-2010 *(n = 15)*							
-1 to 0	0.46	0.33	0.14%	-0.17	0.57	-0.07%	0.10%
0	-1.36	0.90	-0.77%	-1.56	0.93	-1.04%	-0.18%
0 to +1	2.00 **	0.03	1.58%	2.34 **	0.02	1.74%	1.04%
-1 to +1	3.55 ***	0.00	1.29%	3.83 ***	0.00	1.22%	0.95%
2011-2017 *(n = 27)*							
-1 to 0	0.48	0.32	0.25%	0.42	0.34	0.18%	0.50%
0	3.26 ***	0.00	3.78%	3.06 ***	0.00	3.53%	4.09%
0 to +1	0.35	0.36	0.19%	0.40	0.34	0.21%	0.43%
-1 to +1	3.02 ***	0.00	1.78%	2.80 ***	0.00	1.48%	5.02%

Average daily returns for the whole sample of 92 European spin offs in the period from January 2000 to July 2017; in total and split by period of announcement (2000-2002, 2003-2007, 2007-2010 and 2011-2017). The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the day of announcement as well as the previous and the following day. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

When looking at returns split by periods in table 3, we can observe statistical significance at announcement only for the non-crisis periods. Here, means of the difference reaches 2.64% and 2.92% (for country of listing and industry index as benchmark respectively) for the period from 2003 to 2007, with statistical significance at the 1% level with an announcement day return of 2.38%. For the period from 2011 to 2017, we observe means of the difference of 3.78% and 3.53% (for country of listing and industry index as benchmark respectively, both at 1% significance level as well.

Graph 1

Daily returns at announcement for the whole sample



Equally weighted average daily returns of the parent firm around announcement day. t represents the announcement day, t-2 to t+3 the (business)-days around that day. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 business day. Stock prices are being compared to equally weighted average daily returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

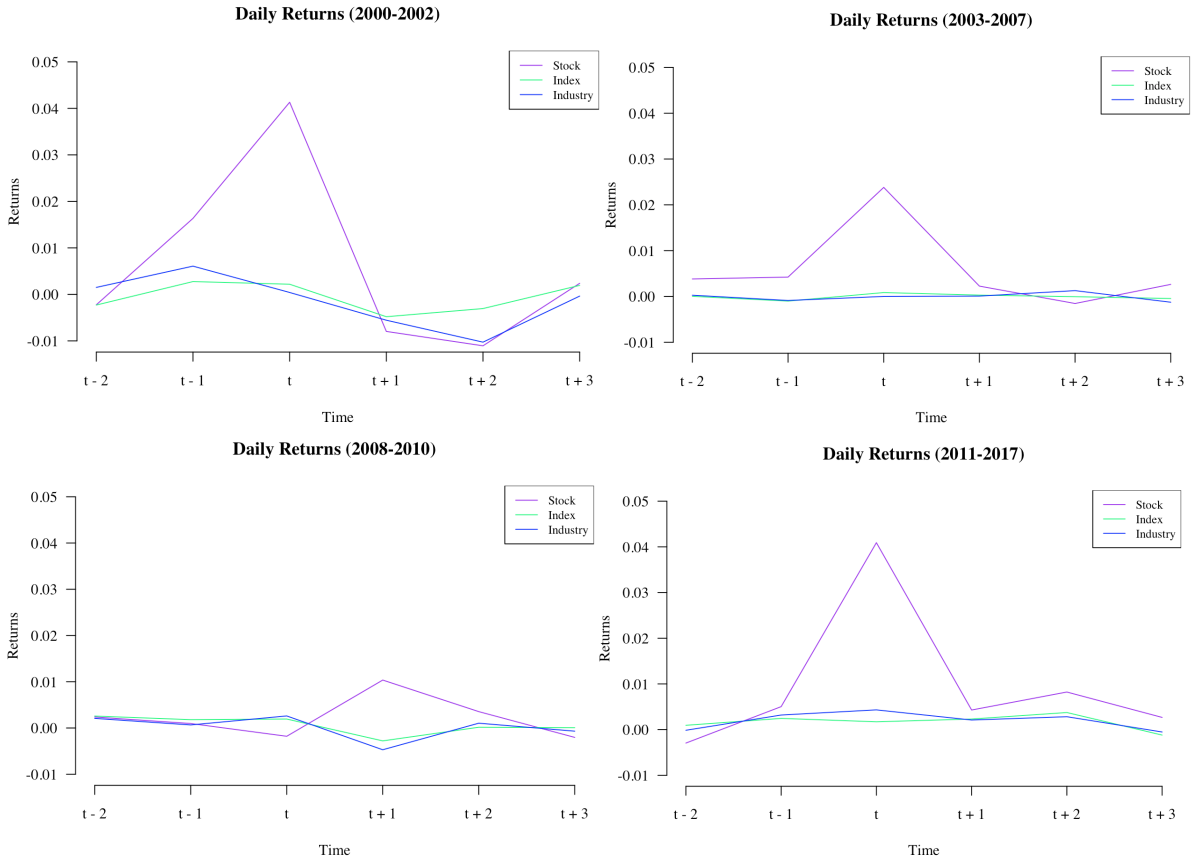
Our next sub-topic is the analysis of differences in performance between time periods. Our announcement effect results showed significant (at 1%) abnormal returns for all periods other than 2000-2002. The lack of significant announcement effects may be explained by to differing motivations during this period. For instance Hite and Owens (1983) found announcement effects to be negative when the firms were engaging in spin offs in response to regulatory or legal pressures/reasons. Given the changing regulatory and business environment during the tech bubble crash this may also be an explanation the lack of significant announcement effects.

Returns by period are also visualized in graphs 2-5. Again, equally weighted average daily returns of the parent firms around the announcement day are being shown. These returns are calculated as the average of stock price at point x over stock price in x - 1 and then

compared to the average of the respective STOXX Europe 600 industry and the respective national indices. It can be seen that for the two periods with statistically significant results, 2003-2007 and 2011-2017, the return pattern appears as for the total period, with one significant peak at the announcement date. At the same time the evolution of returns around the announcement date is much more unstructured in the two crisis periods of our sample (2000-2002 and 2008-2010) while spin offs announced in the first period still show a peak at announcement.

Graph 2-5.

Daily returns at announcement for firms announcing their spin off for different time periods



Equally weighted average daily returns of the parent firm around announcement day for the periods 2000-2002, 2003-2007, 2008-2010, and 2011-2017. t represents the announcement day, t-2 to t+3 the (business)-days around that day. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 business day. Stock prices are being compared to equally weighted average daily returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

We present separate results for focus vs. non-focus increasing spin offs as well as for firms listed in the UK vs. firms listed in Continental Europe (excluding Germany) and Germany in table 4. For most of these subgroups we find statistically significant results at least the 5% level. The announcement day abnormal returns are again calculated as the average of the stock price at point x over the stock price in x - 1 and then compared to the average of the respective STOXX Europe 600 industry and country indices.

Table 4

Total returns at announcement vs. firm characteristics

	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
Non focus increasing *(n = 49)*							
-1 to 0	1.07	0.14	0.20%	0.42	0.34	0.08%	0.30%
0	2.44 ***	0.01	1.66%	2.64 ***	0.01	1.78%	1.92%
0 to +1	-0.13	0.55	-0.05%	0.48	0.32	0.18%	-0.18%
-1 to +1	2.03 **	0.02	0.29%	2.69 ***	0.00	0.76%	1.74%
Focus increasing *(n = 43)*							
-1 to 0	1.51 *	0.07	0.80%	1.70 **	0.05	0.89%	0.86%
0	2.89 ***	0.00	3.44%	2.76 ***	0.00	3.49%	3.62%
0 to +1	2.28 **	0.01	0.83%	2.04 **	0.02	0.86%	0.79%
-1 to +1	3.66 ***	0.00	2.29%	3.45 ***	0.00	2.15%	4.38%
Listed in UK *(n = 33)*							
-1 to 0	-0.08	0.53	-0.01%	-0.22	0.59	-0.05%	-0.06%
0	2.14 **	0.02	2.74%	2.06 **	0.02	2.88%	2.79%
0 to +1	-1.39	0.91	-0.56%	-0.74	0.77	-0.35%	-0.56%
-1 to +1	1.54 *	0.07	2.17%	1.64 *	0.06	-0.09%	2.22%
Listed in Germany *(n = 45)*							
-1 to 0	1.34 *	0.09	0.53%	1.18	0.12	0.43%	0.68%
0	2.94 ***	0.00	2.39%	3.01 ***	0.00	2.38%	2.77%
0 to +1	2.18 **	0.02	0.76%	2.21 **	0.02	0.80%	0.71%
-1 to +1	3.72 ***	0.00	1.78%	3.93 ***	0.00	1.89%	3.49%
Listed in Continental Europe excl. DE *(n = 14)*							
-1 to 0	1.33	0.10	1.29%	1.45 *	0.08	1.25%	1.68%
0	1.16	0.13	1.99%	1.18	0.13	2.15%	2.32%
0 to +1	1.15	0.13	1.00%	1.09	0.15	0.83%	0.83%
-1 to +1	1.94 **	0.04	0.28%	1.80 **	0.05	0.05%	3.07%

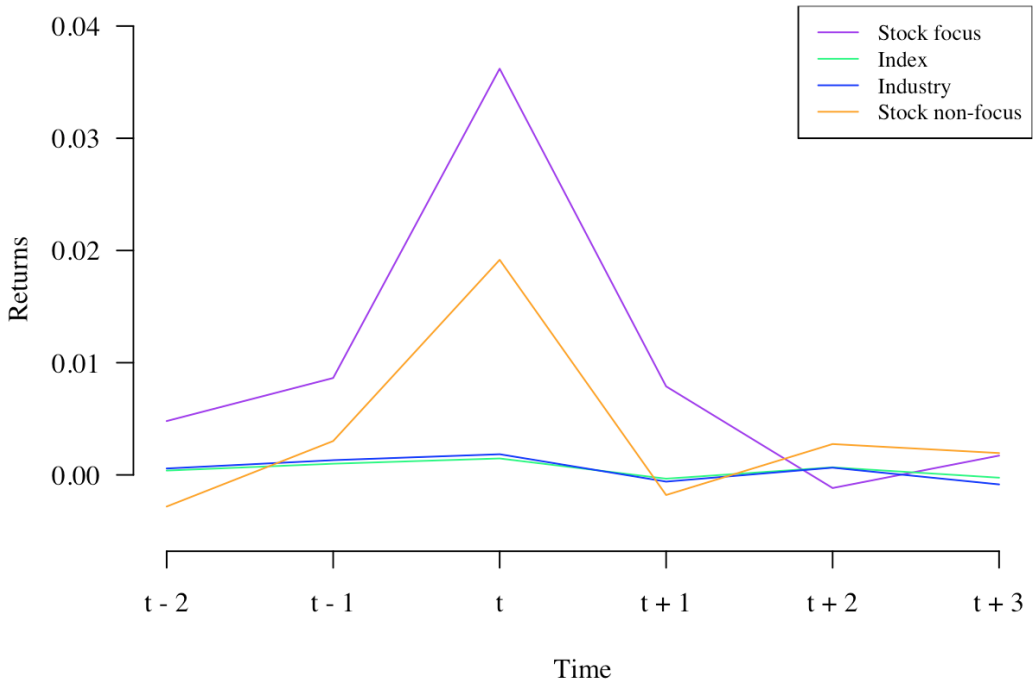
Average daily returns for the whole sample of 92 European spin offs in the period from January 2000 to July 2017 split by different characteristics; firms are split by the potential change in focus post spin off (focus increasing or non-focus increasing) as well as the listing location of the parent (UK, Germany, Other). The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the day of announcement as well as the previous and the following day. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

Firms whose spin off implies an increase in focus (as defined earlier being a spin off where the spun off entity has a different two digit GICS than the parent) show announcement day means of the difference of 3.44% and 3.49% for country of listing and industry index as benchmark respectively with an announcement day return of 3.62%. Firms that do not

increase their corporate focus in terms of industry of operation through the spin off on the other hand only show announcement day abnormal returns of 1.66% and 1.78% for country of listing and industry index as benchmark respectively, 50% below returns of their focus increasing pendants. Again, this can also be seen graphically in graph 6 where we show the same development of announcement day returns as in graphs 1 and 2-5 while splitting the return of the parent stock into focus increasing and non-focus increasing. One can see that the peak at announcement day for focus increasing stock is as described higher than the one for firms that don't increase their corporate focus through the spin off. More observations and comments are, due to size of the sample and length of observation period, difficult to make.

Graph 6

Daily returns at announcement split into focus increasing and non focus increasing spin offs



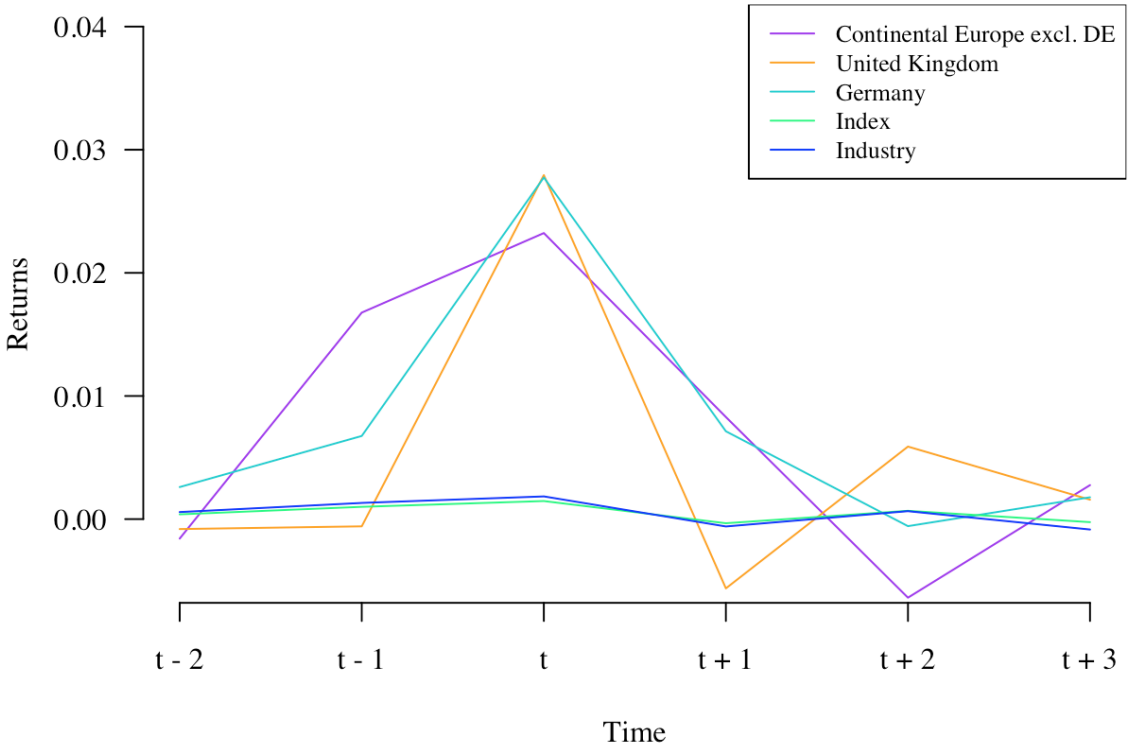
Equally weighted average daily return of the parent firm around announcement day split by stocks that increase their corporate focus after spin off and firms that do not. t represents the announcement day, t-2 to t+3 the (business)-days around that day. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 business day. Stock prices are being compared to equally weighted average daily returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

When looking at the announcement effect in terms of countries by listing, a different pattern can be observed; not all observed returns being statistically significant. Firms listed in Continental Europe (excluding Germany) show no statistically significant results at or around announcement. The sample for this subgroup of spin offs is with 15 observations comparably

small though. Firms listed in Germany show results at 1% significance level of a mean of the difference to country of listing/ industry index of 2.39% and 2.38% respectively. At the same time, returns around the announcement day are also statistically significant in this case. For the day before announcement, the abnormal return of 0.53% and 0.43% (listing index and industry index respectively) at a 10% significance level. The abnormal returns the day after the announcement of the spin off of 0.76% and 0.80% (listing index and industry index respectively) are even significant at a 1% level. At the same time, firms listed in the United Kingdom show slightly higher abnormal announcement day returns of 2.74% and 2.88% for country of listing and industry index as benchmark respectively. However, results around announcement day are not statistically significant. Graphically this is shown in graph 7.

Graph 7

Daily returns at announcement split by country of listing



Equally weighted average daily return of the parent firm around announcement day split by stocks that are listed in the United Kingdom vs stocks that are listed in Continental Europe. t represents the announcement day, t-2 to t+3 the (business)-days around that day. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 business day. Stock prices are being compared to equally weighted average daily returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Based on this analysis we see statistically significant abnormal announcement returns for the data set as a whole and most subgroups. In periods of financial crises, returns and therefore our results are less structured and not significant. This is in line with the findings of

past papers. The abnormal announcement day returns of firms increasing their corporate focus may be due to a pay out of the conglomerate discount that is covered in the wider finance literature after spin off. In order to test if this is a driving factor, future research will need to test focus increasing announcement returns against non-focus increasing announcement returns. Due to endogeneity, this will require complex and time consuming econometric methods. We cannot make a meaningful statement on the difference between the different listing locations especially in comparison to the US. It is interesting to note however, that cumulative returns around announcement for firms listed in Germany are with 3.49% return far higher than the returns firms listed in the UK generate (2.22%).

6.2. Long run returns

Long run returns of spin offs are an area where there is very little consensus among papers. This is particularly true for European ones. The subtopic started with Custatis et al (1991) showing abnormal excess long run returns for US firms. This was supported by another US paper, Desai and Jain (1999). This contrasts however with European papers such as Veld and Veld-Merkoulova (2002) and Qian and Sudarsanam (2007) who don't find compelling evidence for long run outperformance.

When looking at the returns in the long run, we do so with annual returns for a period of 3 years. Given that shareholders will own both, the parent company's as well as the spun off entity's share, we look at the returns for these two separately and as a value weighted combination.

6.2.1. Parent company

Similarly to the methodology carried out for announcement day abnormal returns, we also look at the long run returns in different ways. First we analyse the sample over time to account for potential skewing effects of financial crises. Then we split the sample according to whether firms increase focus with the spin off (again, measured by a change in the first two digits of the GICS) as well as by their listing location as in UK listing, German listing, other listing.

Table 5 shows results of a t test for the total observation period as well as the four identified sub periods. Over the whole sample period, we only find statistically significant abnormal returns for the 3-year horizon and when the respective STOXX Europe 600 industry index is used as benchmark. The mean of the difference here is 15.94% after three years with a significance level of 5%. We cannot find significant results when the respective country indices are used as benchmark. Our univariate results over the whole sample period for parent firms' long run returns fall short of providing conclusive results. Very interesting however, are the differences between 1y, 2y, and 3y results, with significant positive results only available after 3 years, insignificant underperformance after one year, and a mix of insignificant positive and negative results after 2 years. This seems reasonable, as shorter term outperformance is more likely to be identified and covered by announcement effects while longer term effects, e.g. after 3 years will likely be far harder to predict, and won't be incorporated in announcement effects.

Looking at the different periods, we find the most significant results for the long run excess returns in the period of the dot com bubble (2000 to 2002). The three-year mean of the difference at a significance level of 5% here amounts to 22.00% and 35.08% for country of listing and industry index as benchmark respectively. For the following two periods, we find results significant at the 10% level for the three year cumulative excess returns relative to the industry indices. In the period 2003-2007 the three-year mean of the difference reaches 23.96%, in the period of the recent financial crisis (2008-2010), we observe 22.12%. The returns of the parent company in the last period are not statistically significantly higher than the national and industry indices.

For long run parent performance, we were only able to find significant outperformance at the 5% level for the period of 2000-2002. These findings may be related to our announcement effect findings for the same period, as during that time, announcement effects did not adequately account for future performance improvements. As this occurred during the tech bubble crisis, and firms will likely have been under unique pressures, further research would be warranted. Firstly, to see if this time period really did have significantly different announcement effects and long run returns. Secondly, to identify the potential differences in spin off characteristics and motivation, as well as market behaviour to explain this difference.

Table 5

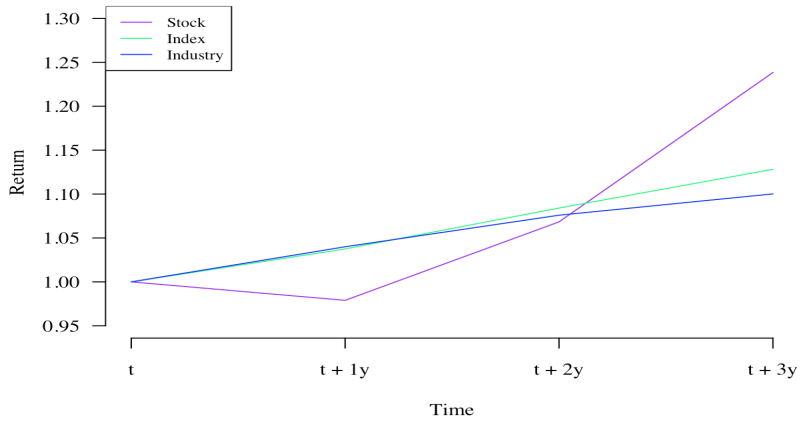
Total long run return of the parent firm over time

	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
2000-2017 (n = 92)							
1y	-0.98	0.84	-4.29%	-0.77	0.78	-3.61%	-2.10%
2y	-0.14	0.56	-0.90%	0.56	0.29	3.79%	6.83%
3y	1.21	0.12	10.34%	1.77 **	0.04	15.94%	23.84%
2000-2002 (n = 13)							
1y	-0.82	0.78	-4.73%	1.26	0.14	9.16%	-25.29%
2y	-0.21	0.58	-1.99%	1.31	0.13	14.05%	-28.66%
3y	2.29 **	0.03	22.00%	2.20 **	0.05	35.08%	-1.16%
2003-2007 (n = 37)							
1y	-0.28	0.61	-2.01%	-0.45	0.67	-3.54%	-7.07%
2y	-0.62	0.73	-6.71%	0.05	0.48	0.53%	11.69%
3y	0.81	0.21	14.22%	1.32 *	0.10	23.96%	20.59%
2008-2010 (n = 15)							
1y	0.36	0.36	4.97%	0.51	0.31	6.76%	10.41%
2y	0.72	0.24	9.78%	1.12	0.14	15.22%	13.84%
3y	0.95	0.18	11.98%	1.59 *	0.07	22.12%	34.70%
2011-2017 (n = 27)							
1y	-1.82	0.96	-11.93%	-1.93	0.97	-12.51%	-8.48%
2y	-0.16	0.56	-2.21%	-0.30	0.62	-4.10%	9.64%
3y	-0.02	0.51	-0.28%	-0.13	0.55	-2.10%	19.81%

Average cumulative annual returns for the parent firms of 92 European spin offs in the period from January 2000 to July 2017; in total and split by period of announcement (2000-2002, 2003-2007, 2007-2010 and 2011-2017). The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on an annual basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a pared t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

Graph 8

Long run cumulative returns for the whole sample period (Parent)

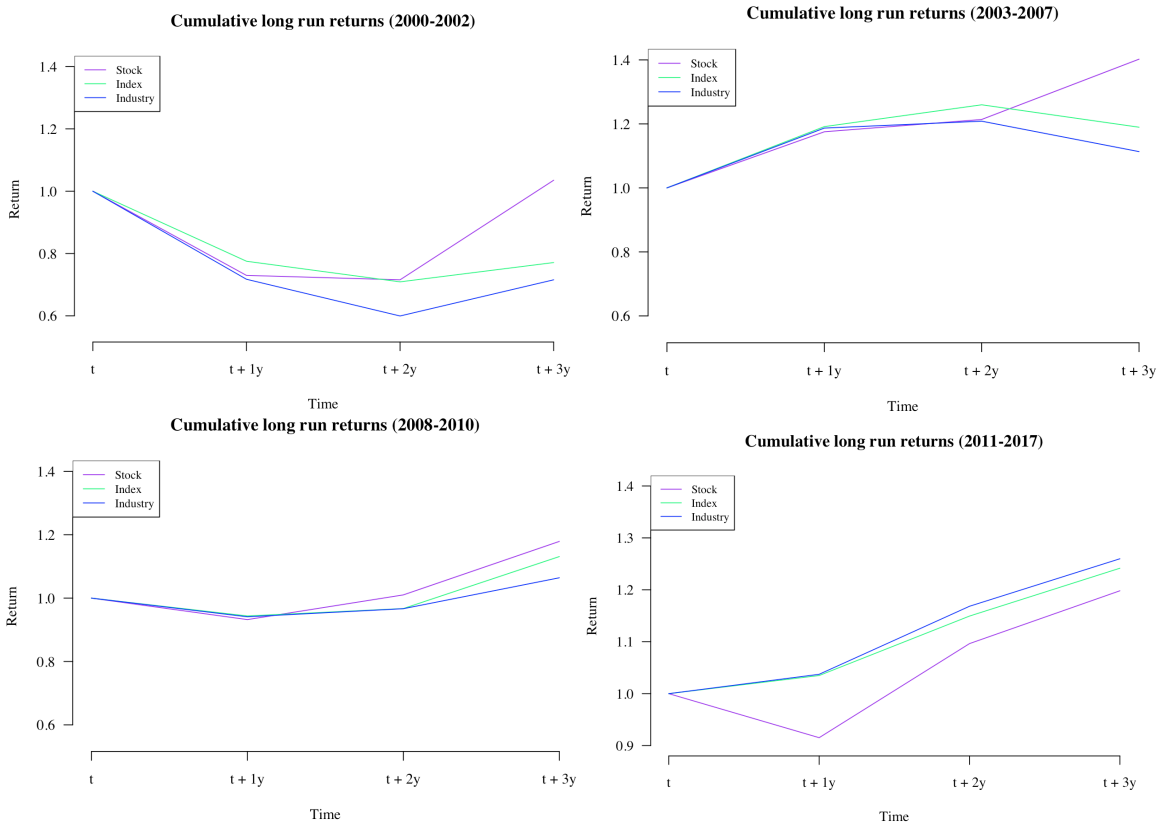


Equally weighted average cumulative annual return of the parent firm from effective date to plus three years. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

In Graph 8 we see results for the entire observation period, graph 9-12 shows them split into the different periods. Shown are equally weighted average annual cumulative returns of the spinning of firm as well as the two benchmark indices. While for the whole sample period, the two average benchmark indices show rather constant positive returns over three years, the stock returns of parent firms spinning off parts only exceeds the benchmark after two years of holding.

Graph 9-12

Long run cumulative returns split by periods (Parent)



Equally weighted average cumulative annual return of the parent firm from effective date to plus three years by periods. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%). Worthy of note: the "stock", "index" and "industry" performance is based on the entire sample period.

Table 6 shows results of our analysis for the sample split by the characteristics focus vs. non-focus and listing location. Partly due to the increasingly smaller size of the sample, significant results proved allusive. While we cannot find any significance for the returns of firms that are not increasing their corporate focus through the spin off, we find a 3-year

cumulative excess annual return of 19.37% compared to the industry benchmark at a 10% significance level for firms that increase focus.

When looking at the different listing locations, we only find significant results for selected excess returns to the industry index as benchmark. Firms listed in the UK show a three-year mean of the difference of 23.83% at a 10% significance level. With same significance, two-year cumulative excess returns for firms listed in Germany amount to 14.31%, while the three-year equivalent reaches 25.81% at 5% significance. European firms that are listed neither in the UK nor in Germany don't show significant results.

Table 6

Long run return of the parent firm vs. firm characteristics

	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
Non focus increasing *(n = 49)*							
1y	-1.83	0.96	-9.71%	-1.39	0.91	-7.85%	-6.97%
2y	-0.13	0.55	-1.17%	0.34	0.37	2.95%	8.57%
3y	0.40	0.35	4.55%	1.08	0.15	12.09%	21.03%
Focus increasing *(n = 43)*							
1y	0.23	0.41	1.55%	0.17	0.43	1.25%	3.03%
2y	-0.06	0.52	-0.57%	0.43	0.33	4.67%	5.06%
3y	1.27	0.11	15.80%	1.39 *	0.09	19.37%	26.65%
Listed in UK *(n = 33)*							
1y	-1.35	0.91	-7.53%	-0.85	0.80	-7.13%	-11.94%
2y	-0.45	0.67	-4.44%	0.46	0.33	5.70%	-10.31%
3y	0.83	0.21	11.59%	1.39 *	0.09	23.83%	11.72%
Listed in Germany *(n = 44)*							
1y	0.18	0.43	1.28%	0.60	0.28	4.10%	9.00%
2y	0.78	0.22	7.98%	1.48 *	0.07	14.31%	22.65%
3y	1.26	0.11	16.68%	2.06 **	0.02	25.81%	37.69%
Listed in Continental Europe excl. DE *(n = 14)*							
1y	-1.66	0.94	-12.63%	-2.57	0.99	-18.46%	-15.36%
2y	-1.66	0.94	-17.40%	-2.54	0.99	-25.22%	-7.93%
3y	-0.62	0.73	-8.79%	-1.43	0.91	-19.91%	4.94%

Average cumulative annual returns for the parent firms of 92 European spin offs in the period from January 2000 to July 2017 split by different characteristics; firms are split by the potential change in focus post spin off (focus increasing or non-focus increasing) as well as the listing location of the parent (UK, Germany, Other). The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

While we have difficulties using our findings to compare the UK results to the US results and thus point to characteristics of the two to explain differences to other European countries, it is interesting to mention the discrepancy in returns that firms listed in the

different countries generate. While firms listed in Germany already showed the highest accumulated announcement return, the parents firm show the most significant long run return reaching statistically significant 37.69% as compared to firms listed in the UK with 11.72% or other European countries 4.94%. This is surprising as we did not expected abnormal returns already in the first year or a big difference between Germany and the other countries of listings.

6.2.2. Spin off company

The analysis of the returns of the spun off entity delivers the most significant and positive returns and the results can be found in table 7.

Table 7

Total long run return of spun off entity over time

	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
2000-2017 *(n = 103)*							
1y	2.29 **	0.01	11.32%	2.60 ***	0.01	13.01%	13.34%
2y	2.58 ***	0.01	35.70%	2.49 ***	0.01	35.82%	37.17%
3y	3.19 ***	0.00	41.18%	3.13 ***	0.00	42.10%	48.59%
2000-2002 *(n = 13)*							
1y	0.31	0.38	6.67%	0.94	0.20	32.82%	-16.43%
2y	1.26	0.12	47.58%	1.20	0.14	76.16%	17.98%
3y	2.04 **	0.04	60.95%	1.70 *	0.09	74.40%	40.48%
2003-2007 *(n = 43)*							
1y	1.44	0.08	10.21%	1.52	0.69	10.75%	22.94%
2y	1.30	0.10	37.38%	1.37 *	0.09	39.46%	49.76%
3y	1.40 *	0.09	36.22%	1.75 **	0.05	45.68%	46.84%
2008-2010 *(n = 19)*							
1y	0.24	0.41	2.68%	0.15	0.44	1.59%	-0.08%
2y	0.21	0.42	2.57%	-0.01	0.51	-0.16%	2.31%
3y	1.21	0.12	23.31%	0.87	0.20	17.95%	30.67%
2011-2017 *(n = 28)*							
1y	2.54 ***	0.01	20.92%	2.36 ***	0.01	19.64%	20.55%
2y	2.78 ***	0.01	54.56%	2.57 ***	0.01	48.45%	51.07%
3y	3.05 ***	0.00	58.33%	3.16 ***	0.00	53.20%	65.92%

Average cumulative annual returns for the spun off entities in 92 European spin offs in the period from January 2000 to July 2017; in total and split by period of announcement (2000-2002, 2003-2007, 2007-2010 and 2011-2017). The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on an annual basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

When looking at the entire sample period, results for all periods show statistical significance (at 99% except for 1y country index benchmark where we only find 95%) with

mean of the differences' from 11.32% to 35.70% to 41.18% using the country indices as benchmark and 13.01% to 35.82% to 42.10% using the respective industry index as benchmark.

Our univariate results over the whole sample period, for spun off firms offer far greater consistency with significant outperformance against national indices, and industries than the results for the parent firms. While we don't test the significance of the difference between spun off and parent long run returns, it appears that spun off firms outperform their national indices and industries by a considerably greater margin than parent firms over the 3-year period. Whatsmore, the spun off firms show significant outperformance for 1y, 2y, and 3y. This contrasts with the parent results to a great degree. This difference in results is consistent with Qian and Sudarsanam (2007), who found significant (at the 10% level) 3y outperformance for the spun off firms, without finding significant outperformance for the parent firms. The significant outperformance at 1y for spun off firms points to the announcement effect taking into account less of the spun off firms performance improvements relative to the parent. This seems reasonable given the smaller nature of the spun off entity, and the reduced attention it would receive from existing shareholders at announcement. The stock price outperformance after 1y may also be due to changes in ownership, as new investors, that are better able to analyse the value of the spun off firm, and are better suited to owning it are now able to invest buy shares in it. This follows on from Custatis et al's (1993) conclusions that spin offs create value by providing a cheap way of transferring ownership to other market players.

Interestingly, we don't find the same pattern of consistent significance across all time periods. While the first three periods show only significant results at 90% to 95% for the three-year horizon, all returns in the last period (2011-2017) are significant at the 99% level (except for 1y return using the industry index as benchmark). Mean of the difference here cumulates from 20.92% to 54.56% to 58.33% and from 19.64% to 48.45% to 53.20% using country index and industry index as benchmark respectively.
While we do not show this using a t test, our findings suggest that the returns of the spun off entity are far greater than the returns the parent firm generates at the same time.

Table 8 adds to this analysis by period by showing results for the spun off entities by different characteristics, still being the split into focus increasing and non-focus increasing spin offs and the different listing locations. The means of the difference in every year are significant at 99% level and increase from 16.60% to 28.84% to 35.37% cumulative excess return using the respective country indices as benchmark and from 17.80% to 29.54% to 39.78% cumulative excess returns using the industry index as benchmark. This compares to the results we find for the focus increasing spin offs, which are less significant but higher, at 48.13% three year cumulative excess return using the country specific index as benchmark and significant at 95% level. This adds to the analysis of the parent firms where we also observe similar cumulative 3-year returns for both focus and non-focus increasing spin offs.

Table 8

Long run return of the spun off entity vs. firm characteristics

	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
Non focus increasing *(n = 58)*							
1y	2.68 ***	0.00	16.60%	2.97 ***	0.00	17.80%	20.90%
2y	2.71 ***	0.00	28.84%	2.91 ***	0.00	29.54%	35.83%
3y	3.30 ***	0.00	35.37%	4.12 ***	0.00	39.78%	50.12%
Focus increasing *(n = 45)*							
1y	0.52	0.30	4.09%	0.71	0.24	5.92%	3.38%
2y	1.50 *	0.07	44.34%	1.35 *	0.09	44.25%	38.88%
3y	1.77 **	0.04	48.13%	1.43 *	0.08	44.15%	46.58%
Listed in UK *(n = 33)*							
1y	-0.01	0.51	-0.10%	0.05	0.48	0.39%	-1.93%
2y	0.48	0.32	4.54%	-0.01	0.53	-0.60%	97.24%
3y	1.89 **	0.04	25.24%	1.55 *	0.07	20.69%	124.74%
Listed in Germany *(n = 5)*							
1y	1.91 *	0.06	67.70%	2.01 *	0.05	71.23%	89.95%
2y	2.61 **	0.03	166.68%	2.58 **	0.03	163.48%	177.63%
3y	0.98	0.22	69.64%	1.12	0.19	63.09%	120.91%
Listed in Continental Europe excl. DE *(n = 65)*							
1y	2.13 **	0.02	11.60%	2.36 **	0.01	12.62%	15.46%
2y	1.93 **	0.03	38.62%	1.94 **	0.03	38.42%	45.45%
3y	2.50 ***	0.01	46.19%	2.61 ***	0.01	48.35%	55.41%

Average cumulative annual returns for the spun off entities 92 European spin offs in the period from January 2000 to July 2017 split by different characteristics; firms are split by the potential change in focus post spin off (focus increasing or non-focus increasing) as well as the listing location of the parent (UK, Germany, Other). The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

Significant at 95% level are excess returns of spin offs listing in European countries other than Germany and the United Kingdom. The mean of the difference here cumulates

from 11.60% to 38.62% to 46.19% if using the country index as benchmark and from 12.62% to 38.42% to 48.35% if the respective industry index is used as benchmark.

An interesting finding regarding the spin off firms is the fact that the spun off entities' listing location differs dramatically to the listing location of the parent with far less firms listing in Germany but rather other European countries (excl. UK). The returns we find are similar for UK and German listing, again not supporting a claim of differences in returns of spin offs in the UK and continental Europe.

6.2.3. Combination of parent and spin off

In the actual event of a spin off, the shareholders will end up with shares to both the parent as well as the spun off entity. Therefore it is interesting to observe the returns to a portfolio of both shares, weighted by their market cap at effective date.

We analyse the results for said portfolio in the same fashion as was done with the stand alone entities before: We look at the whole sample and then split by several characteristics, namely the four time period, focus vs. non-focus increasing spin offs and the country of listing. Findings for the total analysis as well as the split by time periods can be found in table 9. We find that for the whole period, holding the spin off and parent shares will return a cumulative annual excess return (as mean of the differences) of 13.03% and 13.77% for two years and 22.65% and 24.42% for three years using the country index and industry index as benchmark respectively. Both results for the two-year period are significant at the 95% level, 3-year results at the 99% level.

Our results for the value weighted combined entities, as would be expected fall in between the results for the spun off firms and the parents, with completely insignificant positive and negative results of 0.04% and -0.79% against industry and national indices respectively. There is then significant outperformance for 2y and 3y which again supports the view that announcement effects are more able to account for near term performance increases. This is a key set of results, as it goes against the previous European literature on long run outperformance of Veld and Veld-Merkoulova (2002), and Qian and Sudarsanam (2007) who show no significant outperformance from the combined entity over 1y, 2y and 3y. These results instead fit the previous US literature of Custatis et al (1991), and Desai and

Jain (1999), and signal that European spin offs may create long run outperformance in a similar manner to US spin offs. Off the back of these findings, further research into long-run performance of European spin offs is called for. Primarily, one needs to work out why there is a difference in results between European papers, and whether it is due to changing business environment and spin off characteristics.

Table 9

Total long run return of the combined entity over time

	Index			Industry			Total
	t stat	p-value	mean of the difference	t stat	p-value	mean of the difference	avg. return
2000-2017 (n = 92)							
1y	-0.20	0.58	-0.79%	0.15	0.44	0.65%	0.04%
2y	1.79 **	0.04	13.03%	1.75 **	0.04	13.77%	16.84%
3y	2.55 ***	0.01	22.65%	2.63 ***	0.01	24.42%	33.81%
2000-2002 (n = 13)							
1y	-0.42	0.66	-3.38%	11.46 ***	0.00	13.27%	-24.04%
2y	0.82	0.22	11.41%	3.44 ***	0.04	22.61%	-12.59%
3y	2.22 **	0.04	43.81%	1.42	0.20	49.96%	30.40%
2003-2007 (n = 37)							
1y	0.12	0.45	0.77%	0.31	0.38	2.18%	19.08%
2y	1.52 *	0.08	27.08%	1.40 *	0.09	26.94%	53.12%
3y	1.79 **	0.05	36.02%	2.17 **	0.03	43.19%	62.33%
2008-2010 (n = 15)							
1y	0.41	0.34	5.09%	0.57	0.29	6.91%	-7.10%
2y	0.43	0.34	5.47%	0.83	0.21	10.24%	-4.48%
3y	0.49	0.32	6.51%	0.96	0.18	14.15%	10.07%
2011-2017 (n = 27)							
1y	-0.94	0.82	-4.96%	-1.11	0.86	-6.04%	-2.80%
2y	0.77	0.23	9.89%	0.47	0.32	6.05%	18.08%
3y	1.02	0.16	16.97%	0.93	0.18	14.34%	33.05%

Average cumulative annual returns for the theoretically combined entity of parent firm and spun off entity of 92 European spin offs in the period from January 2000 to July 2017; in total and split by period of announcement (2000-2002, 2003-2007, 2007-2010 and 2011-2017). The portfolio is build based on weighted averages using market caps at the effective date. The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on an annual basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

When looking at the periods separately, only few statements can be made on statistical significance of our results. This is due to the fact of a much smaller sample size and the before mentioned phenomenon of a reducing sample size over time. Results using the industry index as benchmark in the first period are due to the small sample size disregarded. For the rest of the results, the only significance can be found for the 3-year horizon. For the period 2000 to 2002, the cumulative annual excess return of 43.81% compared to the country index as benchmark is significant at the 95% level. In the period from 2003 to 2007 both, the three-year cumulative excess return using the country index and the industry index as

benchmark are significant at the 95% level. The means of the difference are 36.02% and 43.19% (country and industry respectively). No other result is statistically significant.

Due to constraints, and other priorities, we did not test the significance of the differences between time periods or went into further detail for other firm characteristics. However these results do display that further research is again warranted, both into the impact of crisis periods as well as on the change in long run outperformance over time. This relates to US data, as Europe embraced spin offs far later than the US, and as such, further research into US spin offs may be able to give insight into the performance of future spin offs with changes in behaviour/performance potentially coming from a variety of sources: from lower interest rates to behavioural aspects.

6.3. Final remarks

Considering the importance of long run outperformance in relation to the broader finance literature and the efficient market hypothesis in particular, this set of results, especially for the spun off firms and the combined entities, is significant in its own right as the outperformance exhibited goes against the efficient market hypothesis. Further in depth research covering endogeneity is necessary, and due to the difficulties and time constraints, we will be unable to do this in our paper.

6.4. Robustness of results

In addition to our simple univariate analysis to show significant outperformance of spin off related stocks, we also tested the robustness of these results using a multivariate regression.
The results of this brief multivariate analysis of long run outperformance were slight disconcerting. We find that our spin off outperformance is only significant when controlling for just market cap and beta while our parent results weren't significant against both indices when we used any control variable. This raises question marks about the actual robustness of our results and highlights, that our long run outperformance shown by the univariate analysis could be driven by the spun off firms' characteristics rather than the spin off action itself. The fact that past papers have generally steered clear from using multivariate analysis, points to it being poorly suited to this analysis. In addition, combining this with the very low, and sometimes even negative R-squared, these results don't necessarily negate our univariate findings.

7. Critical discussion

In our long run general analysis, firm characteristics and endogeneity are big issues that we don't entirely account for. We regressed against both industry and national indices to help minimise very simple industry and national effects. However, this still leaves a wide range of specific firm characteristics uncontrolled. We attempted to shed light on the effects of some of these characteristics in explaining our results in our brief multivariate analysis. This raised serious concerns, as our long run effects became insignificant when controlling for a selection of simple firm characteristics. This is especially concerning when you consider Colak and Whited (2007) who, when controlling for firm characteristics and endogeneity found that their significant improvements in investment efficiency from spin offs, disappeared completely. While this looks at the operational effect of spin offs, it is likely that these effects would also pass on to long run stock outperformance.

The issue of firm characteristics and endogeneity could also be a major factor in our country specific, and time specific results. As differences in announcement and long run results may simply be down to different firm characteristics through different times and geographies. Further research will need to use creative econometric techniques to cover for these effects, and even then it may not be possible to adequately control for these characteristics. Differences in spin off characteristics may even prove to be an interesting topic in its own right.

As our research is primarily focussed on the share performance, the source of these gains requires further analysis. The excess shareholder returns may not even result from operational improvements. For instance, our research doesn't take into account M&A, both prior to and following spin offs. Custatis et al (1993) found that one third of parent spin off combinations were involved in spin offs, and they found evidence to suggest that abnormal returns were limited to these firms. This may also be the case in a European context, and requires further research in a European context. Another non-operational factor that deserves further consideration is the effect of tax and regulatory changes due to spin offs. These factors may also have a significant role in our time specific and country specific results given the changes in regulation over the last two decades, and the varying tax and regulatory regimes across Europe.

Another problem that we do not address in our previous analysis is the fact that spin offs are not equally distributed for the different characteristics. When we make statements about differences in returns of focus increasing vs. non-focus increasing spin offs or the different listing locations, these might be misleading and not fully comparable as the differences might be due to the timing of the spin offs. An analysis based on different industries of operation or market characteristics based on listing location, corporate focus or the time period would be very important to conduct to be able to have even more significance in the results. Due to the small sample size this was again not possible to include in this paper but would be very interesting to include in an analysis involving a longer time period and US data.

The penultimate piece of our critical discussion refers to the role of information asymmetry on our focus increasing results. As our research is focused on the share performance, it is almost impossible to differentiate whether focus-increasing effects are down to greater capital allocation benefits through improving information asymmetry or through genuine improvements in the performance of the split assets. This issue will require fundamental research focusing on the operating metrics as well as proxies for information asymmetry.

A potential shortcoming of our paper, and potential avenue of further research is the restrictive nature of our sample. In particular, our removal of all firms with a market cap of less than $50 million may have adversely affected our analysis. While we wanted to remove smaller firms due to their different characteristics and difficulties in obtaining information, we also cut our sample size down significantly. Given the nature of previous European results, especially when looking at long run performance, a larger sample may have added more value to the literature.

8. Conclusion

In conclusion, we have looked into European corporate spin offs using a far more recent sample than previous literature. This has helped us support several previous theories. In particular, we have added to the already considerable evidence of significant announcement effects. We have also found evidence to support the focus increasing spin off theory, with significant long run parent outperformance only being found for focus increasing spin offs.

On top of using an updated sample to assess previous theories we also looked at several different sub topics to help highlight areas that requested further research. One sub topic was the performance of spin offs through different time periods and wider economic conditions. We were generally unable to provide conclusive results as the spun off firms and parents had different performance anomalies over the whole period. We also looked at the differences between different countries, and once again we did not find any compelling evidence for differences between countries.

As well as finding evidence to support previous literature and develop our own areas of interest we have also been able to identify several unexpected results that deserve further research. For instance, the general finding for long run parent outperformance, whereby significant results are generally found after a longer time period. Our results point to announcement effects only being able to capture nearer term parent performance improvements. This contrasts with the spun-off entities that generally show significant outperformance after 1 year.

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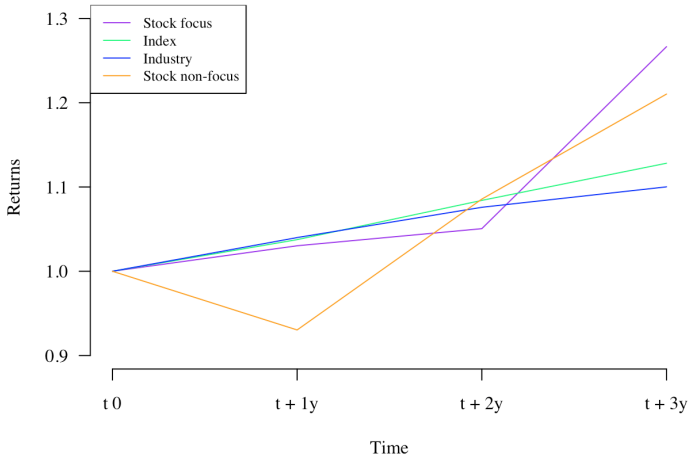
APPENDIX

Graph I

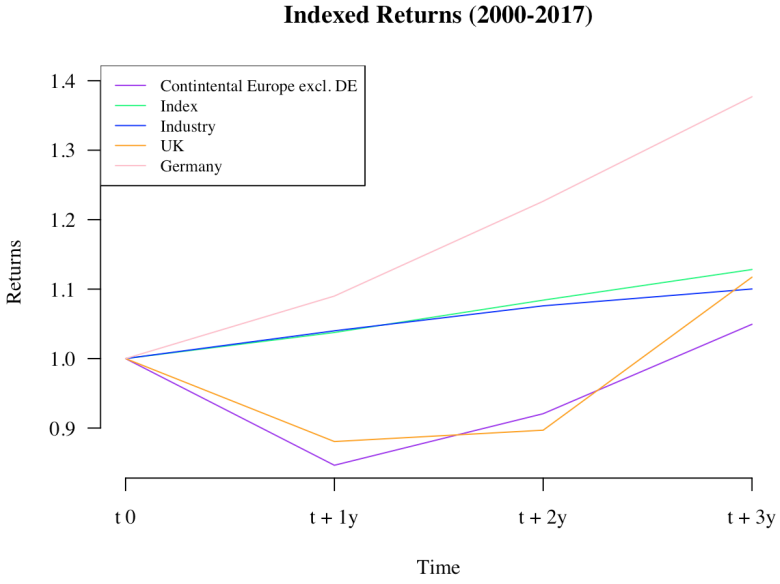
Long run cumulative returns split into focus and non focus increasing spin offs (Parent)



Equally weighted average cumulative annual return of the parent firm from effective date to plus three years looking at firms split by focus increasing and non-focus increasing spin offs. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Graph II

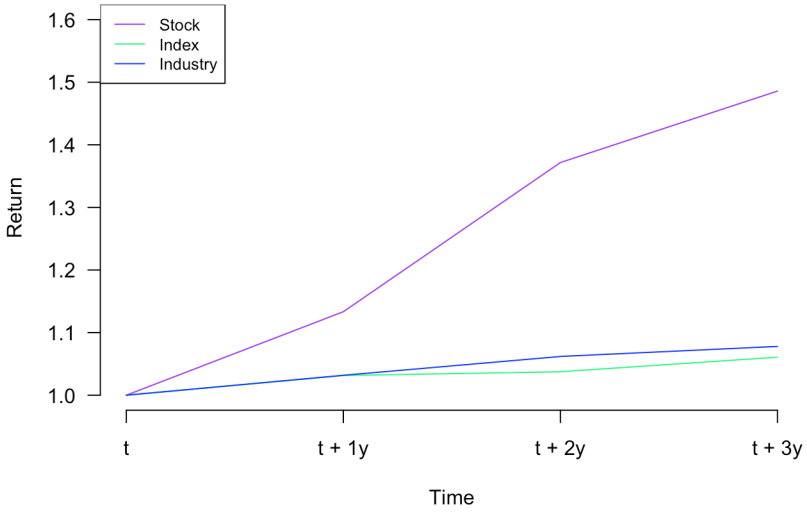
Long run cumulative returns by country of listing (Parent)



Equally weighted average cumulative annual return of the parent firm from effective date to plus three years looking at firms split by listing location of the parent. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Graph III

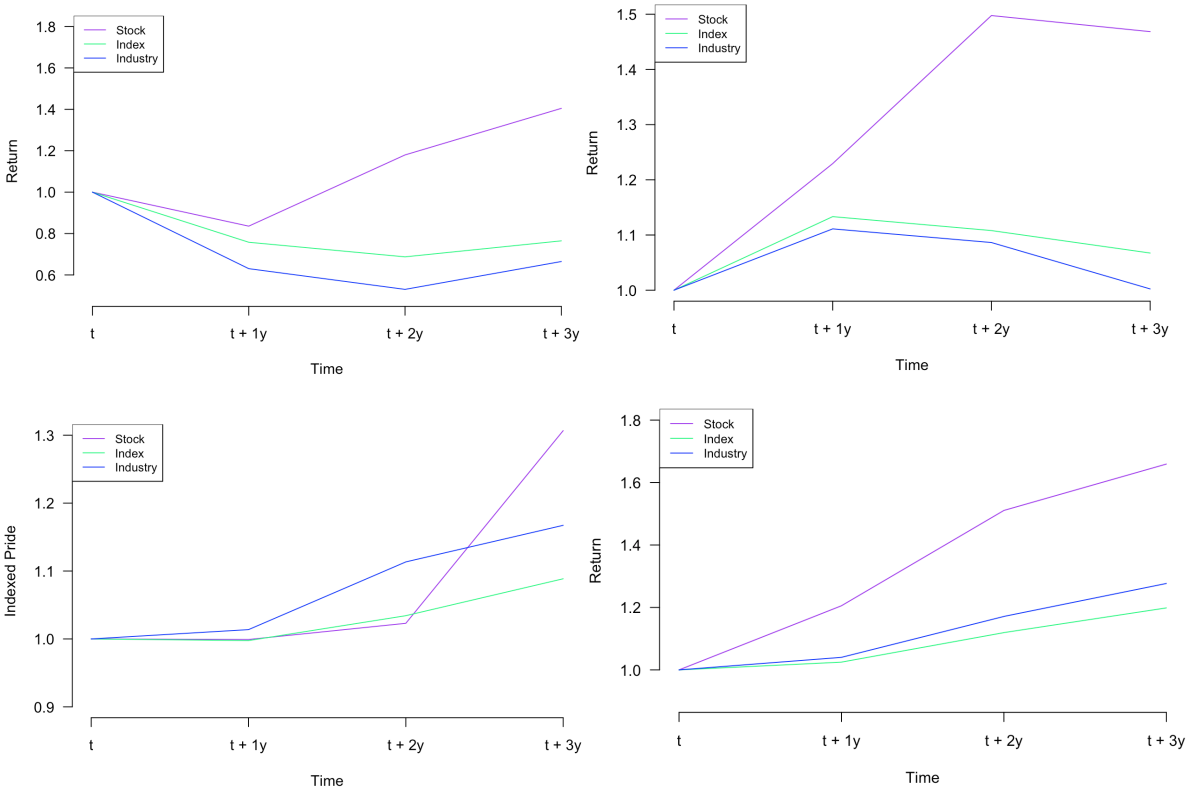
Long run cumulative returns for the whole sample period (Spin Off)



Equally weighted average cumulative annual return of the spun off entity from effective date to plus three years. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Graph IV - VII

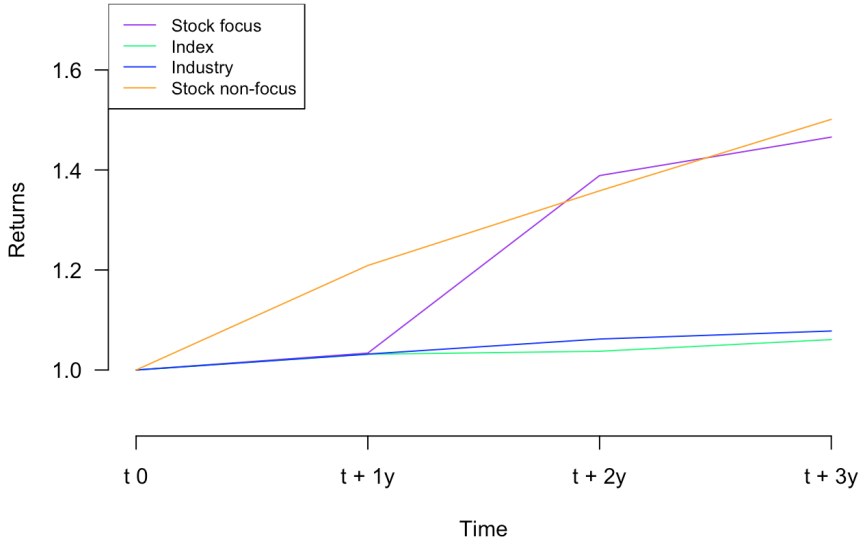
Long run cumulative returns split by periods (Spin Off)



Equally weighted average cumulative annual return of the spun off firm from effective date to plus three years by periods. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%). Worthy of note: the “stock”, “index” and “industry” performance is based on the entire sample period.

Graph VIII

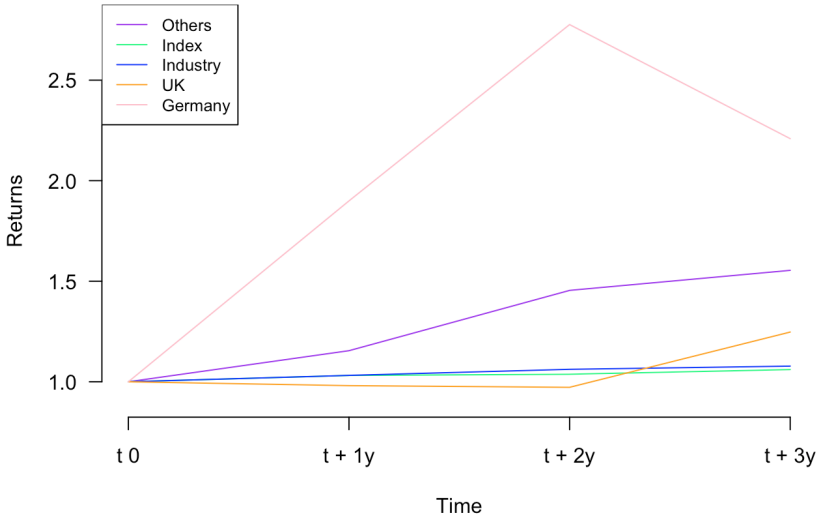
Long run cumulative returns split into focus and non focus increasing spin offs (Spin Off)



Equally weighted average cumulative annual return of the spun off firm from effective date to plus three years looking at firms split by focus increasing and non-focus increasing spin offs. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Graph IX

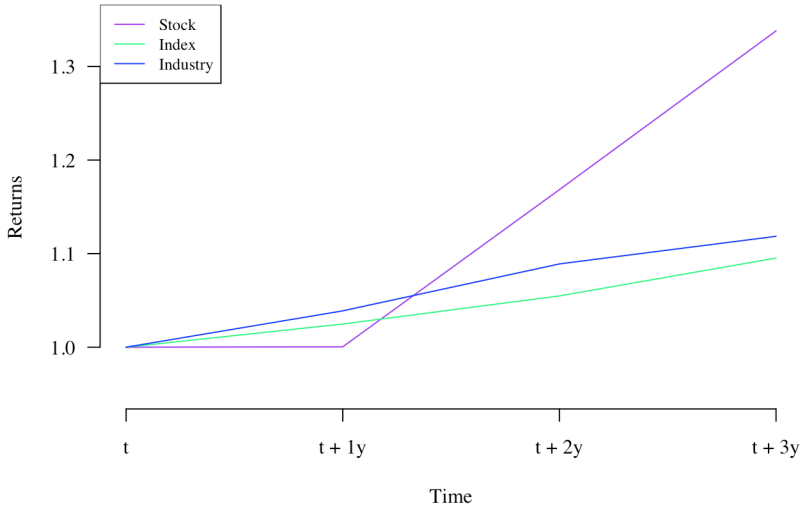
Long run cumulative returns by country of listing (Spin Off)



Equally weighted average cumulative annual return of the parent firm from effective date to plus three years looking at firms split by listing location of the parent. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Graph X

Long run cumulative returns for the whole sample period (Combined entity)



Equally weighted average cumulative annual return of the combination of parent and spun off entity from effective date to plus three years. Returns are calculated as the stock price at point x divided by the stock price at point x - 1 year. Stock prices are being compared to equally weighted average cumulative annual returns (calculated as the stock returns) of the respective STOXX Europe 600 industry and the respective country index. Returns are presented as decimals (0.025 = 2.5%).

Table I

Multivariate regression of abnormal long run returns for corporate spin offs (vs. index)

	(1)	(2)	(3)	(4)
(Intercept)	0.58	0.59	0.76	0.15 *
Beta * Risk premium	0.58	0.58	0.92	
Market cap parent	0.00			
Relative size	-0.04	-0.04		-0.05 *
D/E	0.00	0.00		
Beta	0.03			
R-squared	0.05	0.05	0.02	0.06
Adj. R-squared	-0.06	-0.01	0.01	0.05

Results of a multivariate regression of 92 European spin offs in the period from January 2000 to July 2017 on long run abnormal returns to the national index. The analysis is based on different control variables including Beta* market risk premium, market capitalization of the parent, the relative size of the spin off (as market cap spin off over market cap combination), the debt to equity ratio and the individual beta. The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1

Table II

Multivariate regression of abnormal long run returns for corporate spin offs (vs. industry)

	(1)	(2)	(3)	(4)
(Intercept)	0.55	0.68	0.75	0.20 **
Beta * Risk premium	0.53	0.58	0.82	
Market cap parent	0.00			
Relative size	-0.05	-0.05 *		-0.05
D/E	0.00	0.00		
Beta	0.10			
R-squared	0.08	0.08	0.02	0.04
Adj. R-squared	-0.03	0.02	0.00	0.02

Results of a multivariate regression of 92 European spin offs in the period from January 2000 to July 2017 on long run abnormal returns to the industry index. The analysis is based on different control variables including Beta* market risk premium, market capitalization of the parent, the relative size of the spin off (as market cap spin off over market cap combination), the debt to equity ratio and the individual beta. The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired t test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

Table III

Multivariate regression of abnormal long run returns for corporate spin offs (vs. index)

	(1)	(2)	(3)	(4)
(Intercept)	0.38	0.39	0.48 ***	0.61 **
Beta * Risk premium	-0.10	-0.12		-0.23
Market cap spin off	0.00	0.00	0.00	
D/E	0.00	0.00		
Beta	0.00			
R-squared	0.05	0.01	0.00	0.01
Adj. R-squared	-0.07	-0.01	-0.01	0.00

Results of a multivariate regression of 103 spin off entities of European spin offs in the period from January 2000 to July 2017 on long run abnormal returns to the national index. The analysis is based on different control variables including Beta* market risk premium, market capitalization of the parent, the relative size of the spin off (as market cap spin off over market cap combination), the debt to equity ratio and the individual beta. The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.

Table IV

Multivariate regression of abnormal long run returns for spun off entities (vs. industry)

	(1)	(2)	(3)	(4)
(Intercept)	0.34	0.31	0.59 **	0.47 ***
Beta * Risk premium	0.01	-0.02	-0.16	0.00
Market cap spin off	0.00		0.00	
D/E	0.00	0.00		
Beta	0.00			
R-squared	0.02	0.02	0.01	0.00
Adj. R-squared	-0.12	-0.05	-0.02	-0.01

Results of a multivariate regression of 103 spin off entities of European spin offs in the period from January 2000 to July 2017 on long run abnormal returns to the industry index. The analysis is based on different control variables including Beta* market risk premium, market capitalization of the parent, the relative size of the spin off (as market cap spin off over market cap combination), the debt to equity ratio and the individual beta. The sample of spin offs is retrieved from the SDC database and fed with Bloomberg data. Returns are calculated on a daily basis as the quotient of two stock prices and shown for the first three years after announcement rebased to 100 at t 0 = effective date. The significance of the mean of the difference is tested with a paired test. This test shows if the difference in returns is statistically different from zero. With the null-hypothesis being that the average excess return is 0%. Significance codes: 0 '***' 0.01 '**' 0.05 '*' 0.1.