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Value creation from spin-offs: European evidence over 1998-2015

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Abstract

We investigate the short term and long term abnormal returns of spin-offs over the 1998 – 2015 period by measuring the abnormal returns for parents at announcement and abnormal returns for spin-offs and their parent firms for periods of up to three years following the completion of the spin-off. The research is performed by event study of parent firm return around the announcement of the spin-offs and by benchmark portfolios of parent and subsidiaries against the Fama-French three-factor model. The abnormal returns for parent firms are also controlled for industry focus, relative size of spin-off and information asymmetry. Subsidiary abnormal returns are controlled for take-over activity after completion. As expected we find significant abnormal return for the parent in the three-day interval around the announcement of 1.86%, further we also find that abnormal returns for subsidiaries after completion of spin-off are positive and significant. None of the control variables shows predicted and consistent performance not in the short run nor in the long run.

Keywords: Spin-off, Demerger, Efficient market
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1. Introduction

In a typical corporate spin-off, a corporation (customarily called the "parent") forms a new, separate corporation and ownership of a subset of the assets of the parent is transferred to the newly created corporate entity. A spin-off is a pro-rata distribution of the shares of a firm's subsidiary to the shareholders of the firm. As a result of a spin-off, the subsidiary becomes a totally independent company, with initially the same shareholder base as the parent company. Following the transaction, the former parent shareholders own two share certificates as opposed to one share certificate in the original business. Spin-offs constitute a unique method of divestiture, as they involve no cash transaction. Thus, spin-offs cannot be motivated by a desire to generate cash, as is often the case with other modes of divestitures. Furthermore, spin-offs represent a unique source of data for a researcher. Unlike, for example, acquisition transactions, spin-off distributions allow us to clearly observe the isolated performance of both post-spin-off entities, permitting a direct comparison with the performance of the pre-spin-off firm.

Another reason for looking into the investment performance of spinoffs is their similarity to initial public offerings (IPOs) and opposite nature as compared to merger and acquisition transactions (M&A). Similarly to IPOs, spinoffs represent newly traded shares on the stock exchange, but are not driven by a need to generate cash. A widespread opinion that M&A is a value-increasing operation creating synergies across businesses, suggests that a spin-off, as its antipode, would lead to value destruction. Nevertheless, a spin-off is a very common divestiture method that even became a significant consideration for investment managers, when Cusatis et al. (1993) have documented positive abnormal returns for spin-offs and their parents for periods of up to three years. Such results have important implications for the efficient market hypothesis.

A number of researchers have studied spin-offs both in the short and long run using various market specifications and identifying diverse drivers of the stock performance. However, most of them focused on the US market. Our thesis seeks to expand the body of academic literature on spin-offs taking place in Europe.

The rest of this paper is organized as follows. Section 2 will present in detail the previous research done on spin-offs, which mostly focuses on quantifying excess returns and explaining the reasons for them. Based on this information we will present our hypotheses in Section 3. The data used in the study and the methodology are explained in Sections 4 and 5, respectively. We

summarise our empirical findings in Section 6. Section 7 concludes the paper with a discussion of results, their implications and suggestions for future research.

2. Literature review

2.1 Short- and Long-Run Excess Returns

A broad body of literature dating back to 1980s documents a positive stock price reaction around announcements of spin-offs. Focused primarily on the US market these first studies find statistically significant evidence of abnormal returns in the order of 1.3-5.6% (Hite and Owers, 1983; Miles and Rosenfeld, 1983; Schipper and Smith, 1983; Rosenfeld, 1984; Slovin et al., 1995). The first study on European markets appears in 2000, as this form of divestitures became more common, accumulating sufficient amount of data for a research. Despite the change of the region, the range of the results if equally significant and of similar range: 2.1-5.4%. The only exception is the study of Murray (2000) for the UK, which reports a non-significant abnormal return of -0.19% for the event window between day -1 and day 1. Schauten et al. (2001) who document a positive excess return for the same country and for the same event window undermine the reliability of this study.

The summary of the studies in Table 1 proves that spin-offs are unambiguously associated with positive excess returns around the announcement date. A few academics studied if spin-offs, primarily in the US, affect the stock performance in the long run. Cusatis et al. (1993), Desai and Jain (1999) and McConnell and Ovtchinnikov (2004) find that subsidiaries involved in a spin-off, significantly outperform matching firms. Particularly important are the results of Cusatis et al. (1993) as they also point to significant excess returns for a parent firm. These conclusions undermine the efficient market hypothesis, according to which investors' expectations about the prospective performance of spinoffs and their parents should be accurately incorporated in the announcement date returns. The results of Cusatis et al. (1993) were broadly discussed in both financial industry and academic world. Fama (1998) criticized their approach to calculating t-statistics, assuming the returns of the event firms to be independent. Based on the methodology by Lyon, Barber, and Tsai (1999) suggested to calculate cross-correlation-adjusted *t*-statistic, McConnell, Ozbilgin, and Wahal (2001), Veld and Veld-Merkoulova (2004) and Sudarsanam and Qian (2007) found no significant abnormal returns for any of the spin-off participants. This

confirms that the market efficiently responds to the spin-off announcements by rapidly incorporating expected future gains into security prices. The results of long-run spin-off effects are summarized in a Table 2.

Nevertheless, some studies demonstrate that certain categories of spin-offs exhibit abnormal returns in both the short and long run. Some of the most researched factors are improvement in industrial and geographical focus, tax and regulatory advantages, transfer of wealth from bondholders to shareholders and lower information asymmetry.

Table 1: Studies of the wealth effects associated with spin-off announcements.

Authors	Year	Region	Research period	Sample size	Event window	Excess return	Signifi cance	Event window	Excess return	Signifi cance
Schipper and Smith	1983	USA	1963-1981	93	(-1, 0)	+2.84%	***	(-5, +5)	+3.50%	
Hite and Owers	1983	USA	1963-1981	123	(-1, 0)	+3.30%	***			
Miles and Rosenfeld	1983	USA	1963-1980	55	(0, 1)	+3.34%	***	(-5, +5)	+7.30%	
Rosenfeld	1984	USA	1963-1981	35	(-1, 0)	+5.56%	***			
Copeland et al.	1987	USA	1962-1982	188	(-1, 0)	+3.03%	***			
Denning	1988	USA	1970-1982	42	(-6, 6)	+2.58%	n.a.			
Seifert and Rubin	1989	USA	1968-1983	51	(-1, 0)	+3.26%	***			
Ball et al.	1993	USA	1968-1990	39	(-1, 0)	+2.55%	n.a.			
Vijh	1994	USA	1964-1990	113	(-1, 0)	+2.90%	***			
Allen et al.	1995	USA	1962-1991	94	(-1, 0)	+2.15%	***	(-4; +4)	+2.49%	***
Michaely and Shaw	1995	USA	1981-1988	9	(-2; +2)	+4.46%	*			
Slovin et al.	1995	USA	1980-1991	37	(0, 1)	+1.32%	**			
Seward and Walsh	1996	USA	1972-1987	78	(-1, 0)	+2.60%	***			
Johnson et al.	1996	USA	1975-1988	104	(-1, 0)	+3.96%	***			
Daley et al.	1997	USA	1975-1991	85	(-1, 0)	+3.40%	***			
Desai and Jain	1999	USA	1975-1991	144	(-1, 1)	+3.84%	***			
Krishnaswami and Subramaniam	1999	USA	1978-1993	118	(-1, 1)	+3.28%	***	(0)	+1.80%	***
Mulherin and Boone	2000	USA	1990-1998	106	(-1, 1)	+4.51%	***			
Murray	2000	UK	1992-1998	25	(-1, 1)	-0.19%				
Schauten et al.	2001	UK	1989-1996	23	(-1, 1)	+2.13%	n.a.			
Gertner et al.	2002	USA	1981-1996	160	(-1, 1)	+3.90%	***			
Maxwell and Rao	2003	USA	1976-199	79	(0, 1)	+3.59%	***			
Kirchmaier	2003	Europe	1989-1999	48	(-1, 1)	+5.40%	***	(5, +5)	+5.50%	***
Veld and Veld-Merkoulova	2004	Europe	1987-2000	156	(-1, 1)	+2.62%	***	(0)	+1.19%	***
Rudisuli	2005	USA and Europe	1990-2003	772	(-1, 0)	+2.80%	***	(-10, +10)	2.8	***
Sin and Ariff	2006	Malaysia	1986-2002	85	(-1, 0)	+1.80%	*			
Sudarsanam and Qian	2007	Europe	1987-2005	157	(-1, 1)	+4.82%	***	(0)	+3.45%	***
Veld and Veld-Merkoulova	2008	World	1995-2002	91	(-1, 1)	+3.07%	***			
Lehtonen	2008	Europe	1994-2006	164	(-1, 1)	+1.83%	***			

The t-statistics test the hypothesis that the mean holding-period returns equal zero: * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level; two-tailed tests.

Table 2: Studies of the long-term wealth effects associated with spin-off completion.

Authors	Year	Region	Research period	Sample size		T+6M Excess return	T+6M Significance	T+12M Excess return	T+12M Significance	T+24M Excess return	T+24M Significance	T+36M Excess return	T+36M Significance
Cusatis, Miles, and Woolridge	1993	USA	1965-1988	131	Parent	+6.80%	*	+12.50%	**	+26.70%	**	+18.10%	
				146	Subsidiary	-1.00%		+4.50%		+25.00%	**	+33.60%	**
				141	Pro-forma			+4.70%		+18.90%	**	+13.90%	
Michaely and Shaw	1995	USA	1981-1988	30	Subsidiary			-36.60%	***	-59.13%	***		
Desai and Jain	1999	USA	1975-1991	155	Parent			+6.51%		+10.58%		+15.18%	
				162	Subsidiary			+15.69%	***	+36.19%	***	+32.32%	***
				155	Pro-forma			+7.69%		+12.70%		+19.82%	***
McConnell, Ozbilgin, and Wahal	2001	USA	1989-1995	80	Parent	+8.64%		+13.48%		+19.21%		+5.14%	
				96	Subsidiary	+8.90%		+7.21%		+5.75%		-20.87%	
Powers	2001	USA	1981-1998	187	Parent			+2.49%					
				187	Subsidiary			-6.25%					
Kirchmaier	2003	Europe	1989-1999	34	Parent	-4.90%		0-99 day window		-5.90%		0-699 day window	
				41	Subsidiary	-4.20%		0-99 day window		17.30%	*	0-699 day window	
				34	Pro-forma	-7.30%	*	0-99 day window		+4.20%		0-699 day window	
Veld and Veld- Merkoulova	2004	Europe	1987-2000	68-106	Parent	+3.88%		-0.65%		+6.49%		-0.41%	
				53-70	Subsidiary	+11.96%		+12.58%		+13.72%		+15.15%	
				45-61	Pro-forma	-2.23%		-2.33%		+4.24%		+2.01%	
McConnel and Ovtchinnikov	2004	USA	1965-2000	267	Parent	+10.70%		+5.91%		+4.64%		-2.21%	
				311	Subsidiary	+12.20%		+10.59%	**	+8.20%	**	+2.87%	**
Rudisuli	2005	USA and Europe	1990-2003	330-435	Parent			+7.70%		+17.30%		+15.90%	
				229-336	Subsidiary			+18.90%	***	+30.90%	***	+55.80%	**
Sudarsanam and Qian	2007	Europe	1980-2005	129	Parent			-3.90%		+6.20%		+7.10%	
				142	Subsidiary			+7.20%		+17.50%		+23.00%	
				129	Pro-forma			-2.30%		+8.30%		+8.40%	
Lehtonen	2008	Europe	1994-2006	164	Pro-forma			-18.78%	***	-24.75%	***		

The t-statistics test the hypothesis that the mean holding-period returns equal zero: * denotes significance at the 10% level, ** denotes significance at the 5% level, and *** denotes significance at the 1% level; two-tailed tests.

2.2 Factors

2.2.1 Improvement of industrial focus

Corporate focus hypothesis is one of the most researched reasons behind value creation through divestitures. Berger and Ofek (1995) proved that diversified firms trade at a discount compared to concentrated firms. The hypothesis suggests that diverse businesses within one firm divert managers' attention, undermining a company's performance, which translates into value destruction. In this context spin-off is a relatively simple way to improve the focus of the firm and to eliminate the diversification discount.

Daley et al. (1997), Krishnaswami and Subramaniam (1999), Desai and Jain (1999) and Veld and Veld-Merkoulova (2004) find that focus increasing spin-offs outperform the non-focus increasing spin-offs in terms of abnormal returns around the announcement date. The mean difference between the subsamples in their studies is in the range of 1.7-2.9% and is statistically significant at conventional levels.

Few researchers have studied long-run effects of cross-industry divestitures. A theoretical model by Chemmanur and Yan (2000) proves that the long-term positive abnormal returns are increasing in the case of cross-industry spin-offs. Desai and Jain (1999) found that focus-increasing spin-offs in the US significantly improve shareholder wealth also in the long run, while a study of Veld and Veld-Merkoulova (2004) on the European market showed no significant results.

2.2.2 Geographical focus

According to Veld and Veld-Merkoulova (2004), an increase in geographical focus resulting from a spin-off of a foreign division can have a two-fold effect on stock returns. On the one hand, an announcement of such a divestiture can lower the firm value through reduced economies of scale, signalling of a poor earlier decision to expand abroad and relative disadvantage compared to more geographically diversified competitors. On the other hand, increase in geographical focus can increase the firm value thanks to reduced monitoring and coordination costs of a less complex firm, a perception that management is fixing an initially wrong decision to expand internationally and reduced possibility of cross-subsidization of underperforming divisions. Veld and Veld-Merkoulva (2004) find geographical focus

insignificant in explaining abnormal announcement returns. On the contrary, significant negative long-run effects are thought to be caused by negative earnings surprises. A study by Lehtonen (2008) finds no relationship between geographical focus and abnormal returns.

2.2.3 Size

Prior studies conclude that spin-off announcement returns are higher in cases when a larger proportion of assets is spun-off. A parent that divests a larger proportion of its assets becomes a more likely target for a take-over, thus creating shareholder value (Chemmanur and Yan, 2004). This hypothesis was proved in several studies by Hite and Owers, 1983; Miles and Rosenfeld, 1983; Krishnaswami and Subramaniam, 1999; and Veld and Veld-Merkoulova, 2004. The results, however, remain significant only in the short run. Kirchmaier's (2003) study opposes the general conclusions. According to him, the size effect reverses in the long run: small European spin-offs perform better on the stock market in the long run than large spin-offs.

2.2.4 Corporate governance

It is often argued that managers in Anglo-Saxon countries are more dedicated to create shareholder value than in continental countries (La Porta et al., 1998). Consequently, managerial decisions made in a country with higher shareholder protection are more likely to improve shareholder wealth. Nor Veld and Veld-Merkoulova (2004), nor Sudarsanam and Qian (2007) find this factor significant.

2.2.5 Information Asymmetry

None of the above-mentioned factors differentiates spin-offs from other divestiture methods. Based on this notion, Krishnaswami and Subramaniam (1999) suggest analysing spin-off returns from a perspective of information asymmetry between the company management and the capital market, which results in a valuation discount. The authors argue that the separation of businesses is likely to improve the accuracy of information processing about each post-spin-off firm, and thus correct the mispricing. Krishnaswami and Subramaniam (1999) found not only that information problems decrease significantly after the completion of the spin-off, but also that highly diversified firms with high level of information asymmetry are more likely to engage in a spin-off in the first place. Their evidence that firms with higher levels of information asymmetry experience higher abnormal returns in the announcement period supports the efficient market hypothesis.

Contrary to the expectations, Veld and Veld-Merkoulova (2004) find a stronger positive link between low information asymmetry and CAR than between high information asymmetry and CAR. Although separately both sub-samples produce significant results, their difference is not significant at conventional levels. Similarly, Sudarsanam and Qian (2007) do not find evidence of information asymmetry effect on spin-off returns.

2.2.6 Timing

Managers have a power to decide when to undertake certain corporate actions, such as for example carve-outs (Rudisuli, 2005). Consequently, many studies look into managers' ability to "time" these events to benefit from market conditions. Powers (2003) and Hand and Skantz (1999) documented that carve-outs occur during bull market periods and are thus conducted, to benefit from potentially overvalued equity. Although a spun-off entity is listed on the stock market, unlike a carve-out this share distribution involves no cash transfer, and thus is less dependent on the market conditions. Nevertheless, a positive market environment is required to enable a good start of the subsidiary firm as an independently listed company (Haas, 2003) which drives managers' actions. The empirical studies provide mixed support for this hypothesis. Sudarsanam and Qian (2007) find no proof of managers' ability to time the market to produce significant abnormal returns. Chemmanur and Paeglis (2000) document that spin-offs underperform the S&P500 by -7.2% in the year prior to the restructuring announcement. Contrary to that, according to Rudisuli (2005), ACARs of parent firms with positive raw returns in the two years before the transaction substantially exceed ACARs of firms with negative pre-transaction returns. Additionally he documents higher excess returns around the announcement date for parents with relative low price multiples.

2.2.7 Takeovers

Several studies (Cusatis et al. (1993), Desai ad Jain (1999) and McConnell et al. (2001)) observed an unusually high takeover activity for both the parents and the subsidiaries following spinoffs. Moreover, Cusatis et al. (1993) noted that excess stock returns are limited to a subsample of spin-offs involved in takeovers. They argue that a creation of small pure play businesses creates value by providing a relatively low-cost method of transferring control of corporate assets to bidders. Chemmanur and Yan (2000) theoretically proved that a post-spinoff

takeover threat encourages incumbent managers to work harder to prevent a loss of control to a potential rival, leading to long-term positive abnormal returns.

3. Data Selection

This study analyses a sample of European spin-offs. Initially all European countries are taken into account. In order to be part of our data set, both parent and offspring firms must be independently managed and separately listed on the stock market after the completion of the spin-off. To satisfy our selection criteria, a majority of parent's shares in a subsidiary must be distributed to existing parent shareholders at a pro-rata basis. In addition, no cash transfer can be involved.

3.1 Data Description

To conduct our investigation, an initial sample of spin-offs is pooled from the Mergermarket and FactSet databases. The search is conducted over the period from December 1997 to December 2013[3] in Mergermarket and January 1998 to December 2013 in FactSet using Mergermarket's deal detail "Demerger"[4] and FactSet's deal definition "Spin-off"[5]. The initial gross pooled list includes 264 spin-off announcements over the time period 1998 to 2013. Initially the search includes all European countries and in the final sample we ended up with the following 15 countries: Austria, Belgium, Switzerland, Germany, Spain, Finland, France, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Sweden and United Kingdom.

The data selection this study uses the following screening criteria. The reduction of observations following the application of a criterion is reported in parentheses:

a) The same spin-off announcement are included in both Mergermarket and FactSet lists (79)

[3] Mergermarket data is only available from December 1997, the search is limited to announcements in 2013 in order to be able to study long-term returns

[4] Definiftion: Occurs when a company decides to split off one of its subsidiaries to its shareholders, resulting in the creation of a separate business divorced from the activities or influences of the former parent; in other words, the shareholders end up holding two share certificates (one for each company) as opposed to one share certificate in the original business. Note that neither the company nor shareholders receive any cash as a result of the deal (as opposed to as flotation or IPO where the company receives cash).

[5] Definition: Parent of the target is distributing new shares in a subsidiary to its shareholders, generally resulting in the creation of a newly independent public company. In cases where a portion of the stock of the subsidiary is already publicly held, the parent of the target is spinning off the remaining shares to shareholders

b) Parent or subsidiary firms were unidentifiable or their share prices were missing in FactSet (45)
c) Parent firms are not traded in Europe (14)
d) Subsidiary firms are already listed prior to the spin-off (7)
e) Parent firms are listed in Russia or Turkey (6)[6]
f) Other types of restructuring transactions are mistakenly recorded as spin-offs such as asset redistribution as part of a merger deal (4)
g) The announced spin-off was never completed (2)
h) Less than 50% of interests in subsidiary firms are distributed to existing shareholders (1)
i) Limited trading history for a parent firm (1)

The final sample includes 105 spin-off announcements and 104 completed European spin-offs. One of the deals is included in the announcement data, but excluded in the completion data since the parent is listed in Europe but the spun off subsidiary was listed in the US. The final sample includes 104 completed European spin-off deals during the sample period, including 100 spin-off parent and 104 offspring firms, where two parent firms demerged two or more subsidiaries at the same time and another three parent firms conducted two or more spin-offs at different times during the sample period i.e. these three firms are included more than once in the announcement data. Thus, the number of European spin-offs will be 102, as we consider the firms announcing spin-offs at different times as different observations, since the estimation periods of each deal do not overlap. The earliest year with spin-off data available in our sample is 1998. Table 3 show the distribution of 105 announced spin-off deals by parents' listing country and announcement year.

For the completed spin-off sample, parent firms operate in 36 different industries while their subsidiaries operate in 39 different industries[7]. In total, both parent and offspring firms operate in 44 different industries. Table 4 lists the industry breakdown for the spin-offs and parents by two-digit Standard Industrial Classification (SIC).

[6] Excluded due to very different market characteristics or difficulty in finding suitable market returns and data for risk-free rate calculations
[7] Defined as the two-digit SIC level

Table 5 shows the distribution of spin-offs over time by spin-off completion date and mean, median, max and min equity market values.[8] Further, Table 6 displays parent summary statistics for sizes[8] of all parents and subsidiaries as well as the relative size of the subsidiary to the total value of the parent and subsidiary at completion date.

The announcement dates of the spin-offs are crosschecked with press releases and news updates since we are interested in the initial market reaction to the spin-off announcement. Spin-off completion date is crosschecked to the stock price data in FactSet to confirm the completion status and obtain accurate completion dates. When there are errors in the initially reported announcement and completion details, we amend the sample data based on the verified information.

Total return to shareholders data and market value data is collected from FactSet. Stock market indices for each geographic market are used for the overall market development and are collected from FactSet.

Table 3: Spin-offs by announcement date and country

Year	AT	BE	CH	DE	ES	FI	FR	IE	IT	NL	NO	PL	PT	SE	UK	Total
1998				1												**1**
1999									1		1				1	**3**
2000															1	**1**
2001															3	**3**
2002					1										2	**3**
2003		1		2		1			2		1				3	**10**
2004		1				1					2		1	1	1	**7**
2005	1	1	2			1	1	1			3			2	2	**14**
2006			1					1			4			3	8	**17**
2007											2			1		**3**
2008			2			1							1		2	**6**
2009			1				3								1	**5**
2010									1	2				1	2	**6**
2011			1	1		1	1		1		1	4		2	1	**13**
2012			1	1			1	1			1			1	1	**7**
2013						2			1		1				2	**6**
Total	**1**	**3**	**8**	**5**	**1**	**7**	**6**	**3**	**6**	**2**	**16**	**4**	**2**	**11**	**30**	**105**

[8] Closing share price on first trading day in EUR times the number of shares outstanding.

Table 4: Industry breakdown for parents and subsidiaries by two-digit Standard Industrial Classification (SIC)

Industry	Parent	Subsidiary	Industry	Parent	Subsidiary
Administration of Economic Programs	0	1	Hotels, Rooming Houses, Camps, and Other Lodging Places	2	0
Administration of Environmental Quality and Housing Programs	1	0	Industrial and Commercial Machinery and Computer Equip.	4	5
Amusement and Recreation Services	1	1	Insurance Carriers	0	1
Building Construction - General Contractors & Operative Build.	1	1	Measure/Analyze/control Instruments; Photo/Med/Opt Gds	3	4
Building Mat., Hardware, Garden Sup. & Mobile Home Dealers	1	0	Metail Mining	3	2
Business Services	15	10	Miscellaneous Manufacturing Industries	2	0
Chemicals and Allied Products	10	7	Miscellaneous Retail	0	2
Communications	5	3	Motion Pictures	1	1
Construction - Special Trade Contractors	1	3	Nondepository Credit Institutions	1	2
Depository Institutions	2	2	Oil and Gas extraction	4	3
Eating and Drinking Places	2	2	Paper and Allied Products	2	2
Electric, Gas and Sanitary Services	2	2	Petroleum Refining and Related Industries	0	1
Electronic, Electrical Equipment & Components	6	4	Primary Metal Industries	2	4
Engineering, Accounting, Research, Management	1	3	Printing and Publishing and Allied Products	1	1
Fabricated Metal Products	0	1	Real Estate	2	4
Fishing, Hunting and Trapping	2	2	Rubber and Miscellaneous Plastic Products	0	1
Food And Kindred Products	1	0	Security & commodity Brokers, Dealers, Exchanges & Serv.	5	2
Food Stores	1	1	Stone, Clay, Glass, and Concrete Products	0	1
General Merchandise Stores	1	3	Textile Mill Products	0	1
Health Services	1	0	Transportation	4	9
Holding and Other Investments Offices	0	1	Transportation Equipment	2	2
Home Furniture, Furnishings and Equipment Stores	1	2	Wholesale	7	8

Industry classifications are based on two-digit SIC codes obtained from FactSet.

Table 5: Spin-off distribution and equity value by completion year

Year	Quantity	Average	Median	Max	Min
1999	3	485	582	811	61
2000	1	153	153	153	153
2001	4	2,746	218	10,538	9
2003	7	1,892	1,514	5,883	52
2004	8	591	251	1,927	15
2005	10	989	510	4,149	57
2006	19	872	318	5,350	1
2007	7	594	94	2,713	7
2008	6	1,546	601	6,661	33
2009	2	2,814	2,814	5,221	407
2010	7	1,062	913	3,343	19
2011	12	2,032	461	10,477	17
2012	10	204	52	1,058	18
2013	7	824	315	2,492	14
2014	1	997	997	997	997
Total	**104**	**1,104**	**370**	**10,538**	**1**

Market value (share price x shares outstanding) is calculated for the distribution day for each spin-off. Share price data and no of shares outstanding are collected from FactSet

Table 6: Subsidiary and parent equity value and relative size of spin-off

	Mean	Median	Max	Min
Subsidiary size	1,104	370	10,538	1
Parent size	6,428	1,402	126,423	12
Subsidiary as % of total	29%	22%	92%	1%

Market value (share price x shares outstanding) is calculated for the distribution day for each spin-off subsidiary and parent firm. Share price data and no of shares outstanding are collected from FactSet. Subsidiary as % of total is equal to the total market value of the spun-off subsidiary equity to the sum of the market values of the equity of the parent and the subsidiary on the day of the spin-off.

4. Methodology

4.1 Announcement returns

The announcement effects of the spin-offs are measured using a standard event study methodology as described in Sudarsanam and Qian (2007) and Veld and Veld-Merkoulova (2004). The abnormal returns are defined as a difference between the observed stock return and expected stock returns

$$AR_{it} = R_{it} - E\ (R_{it})$$

where AR_{it} is the abnormal return, R_{it} is the realised return and $E\ (R_{it})$ is the expected return on firm *i* for period *t*. In turn, the expected returns are defined by a market model

$$R_{it} = \alpha_i + \beta_i R_{Mt}$$

where the parameters α_i and β_i are estimated by regressing the security returns R_i on the market return R_m for the estimation period that ranges from day -250 to day -31 relative to the spin-off announcement date denoted as day 0. The market return R_m is defined as total market index return for each corresponding country.

Cumulative abnormal returns (CARs) are then computed as the sum of daily abnormal returns over the event window (t; T). CAR for firm i during the period (t; T) is given by:

$$CAR_{it} = \sum_{t=1}^{T} AR_{it}$$

We compute CARs over different event windows: (-1, +1); (0; +1) and (0) and test if the mean of these returns across different stocks is statistically different from zero using a t-test.

Researchers propose different methodologies to estimate the announcement period abnormal returns to corporate events, including abnormal returns based on three- and four-factor models, abnormal returns relative to reference portfolios, etc. Since Kothari and Warner (2006) concluded that alternative methodologies provide qualitatively similar results for estimating short-run abnormal returns to events, we focus on the model presented above.

Hypothesis 1: Parent company experiences significant positive abnormal returns around the announcement of a spin-off.

4.2 Long-run abnormal returns

Computation of long-run excess returns poses certain methodological difficulties. One of the widely used approaches is the matching firm approach, which has been commonly accepted

for the US market studies. The firms are normally matched according to their industry, size and market-to-book ratio. However, as this thesis is focused on European markets, finding an appropriate match within the same country proved to be close to impossible. At the same time, we cannot use the approach used for the test of the announcement returns, as the coefficients estimated over a certain estimation period prior to the completion of a spin-off would not be representative. First, the parent firm has a different risk-return profile before and after the transaction. Second, since there is no prior data to estimate the betas of the spin-offs, we would not be able to evaluate the performance of subsidiaries. Therefore, we followed the methodology of Ikenberry et al. (1995) and McConnell et al. (2001) and assessed parent and subsidiary post-spin-off returns by estimating Fama-French (1993) three-factor model.

In order to do it we regress the average monthly return on the portfolio of parent (subsidiary) stocks less the risk free rate against the contemporaneous returns of the three factors of the Fama and French model.

$$R_P - R_F = \alpha + \beta_1(R_M - R_F)_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

where $(R_P - R_F)_t$ is the average monthly return on the portfolio of parent (subsidiary) stocks less the contemporaneous return on a risk-free bond in calendar month *t*; $(R_M - R_F)_t$ is a market premium; SMB_t is the difference between the value-weighted average return on the small- cap portfolios and large-cap portfolios; and HML_t is the difference between the value-weighted average return on the high book-to-market portfolios and low book-to-market portfolios. These data are European stock markets aggregates and were collected from Kenneth R. French website.[9]

We form a time series of calendar monthly returns on parent (subsidiary) portfolio with a composition changing over time. Every new parent (subsidiary) stock is added to the portfolio in the calendar month of the stock's ex-date, XD (initial listing date, ID), and removed in the calendar month that marks either the end of the holding period under consideration or when the security is delisted or acquired. Regressions are estimated for holding periods of 6, 12, 24, and 36 months. The intercept α corresponds to the monthly abnormal returns earned by the parent or subsidiary portfolio over each holding period.

There is a discussion in the literature whether equal-weighted or value-weighted returns should be used to compute portfolio returns. Loughran and Ritter (2000) advocate for equal-weighted returns are more relevant from an investor's point of view as they are better at

[9] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

predicting the abnormal returns associated with a random event. Contrary to that, Fama (1998) argues that value-weighted returns more accurately capture the total investors' wealth effects and therefore should be studied. Brav et al. (2000) illustrated this point very well by building a hypothetical portfolio of 1000 firms, 999 of which were small and had $1 million market capitalization and one large firm had $1001 million market capitalization. They presented a scenario where all small firms underperform by 50%, while a large one over-performs by 50%. Equal-weighted returns would show a significantly mispriced portfolio return of -50%, while value-weighted approach would lead to a conclusion that a performance is zero. In the context of our study, we prefer to analyse equal-weighted returns, as it allows us to test if a random spin-off will be associated with abnormal long-run performance.

Despite mixed evidence from the existing literature on long-run abnormal returns, we put forward a hypothesis that:

Hypothesis 2: Long-run abnormal returns of a spin-off parent and/or subsidiary are not statistically different from zero.

If both hypothesis 1 and 2 for a parent company are confirmed by the data, this will serve as a support for efficient market hypothesis.

4.3 Factors

The variables that are used in this analysis were some of the most frequently significant variable in the US market studies, and are thus most likely to provide meaningful results in Europe. The prior research in documented in detail in Section 2.

Increase in **industrial focus** is defined by a dummy variable which equals 1 if the two-digit SIC code of the subsidiary is different from the two-digit SIC code of the parent, signifying a spin-off of an unrelated division, and equals 0 if the codes are the same. Based on the previous research we put forward the following hypotheses:

Hypothesis 3a: Industrial focus proxy is significantly and positively related to CARs around the announcement date.

Hypothesis 3b: Industrial focus proxy has positive, but insignificant relationship with abnormal returns in the long run.

Similarly to industrial focus, a dummy variable for **geographical focus** equals 1 if a foreign division is spun off and 0 if a domestic division is spun off. We would expect to find no

significant results for this variable, however as only two deals in our sample are cross-border, we do not test for this effect.

To control for the transaction size effect, we follow the previous research and compute the **relative size** as a fraction of the market value of equity of the divested subsidiary relative to the sum of the market capitalizations of the parent and the subsidiary at the spin-off completion date (Sudarsanam and Qian, 2007, Krishnaswami and Subramaniam, 1999, Veld and Veld-Merkoulova, 2004, etc.). Following this, we construct a dummy variable that is equal to 1 if relative size of spin-off is larger than the median relative size and 0 otherwise. Consequently, we suggest:

Hypothesis 4a: Larger spin-offs are significantly and positively related to CARs around the announcement date.

Hypothesis 4b: Relative size is not related to abnormal returns in the long run.

To measure **information asymmetry** we used analysts' earnings forecasts obtained from Institute of Brokerage for Investment Services (IBES). The idea is that higher discrepancies between analysts' estimates point at higher information asymmetry. The proxy is measured as the standard deviation of all earnings forecasts made in the last month of the fiscal year preceding the spin-off announcement year (Krishnaswami and Subramaniam, 1999). Again, for the purpose of future analysis we convert the variable into a dummy, where 1 indicates the standard deviation of earnings forecast above the median, and 0 – below the median. Based on the previous research we suggest that:

Hypothesis 5a: High information asymmetry is predicted to be positively associated with the spin-off excess returns around the announcement date.

Hypothesis 5b: Information asymmetry is predicted to be unrelated to abnormal returns in the long run.

We examine the proposition of Cusatis et al. (1993) that abnormal returns are limited to the firms that experience a **takeover** following the spin-off by creating a dummy variable that equals 1 in case of a takeover and 0 otherwise. Of all the parent firms involved in spin-offs, only two were subject to a takeover within the 3 years following the share distribution. Therefore, we limit this part of our research to subsidiaries only.

Hypothesis 6: Spun-off subsidiaries that were taken over within 3 years after the share distribution, experience higher abnormal returns than non-taken over firms.

4.3.1 Testing the factors

Following Veld and Veld-Merkoulova (2004), we split our total sample into subsamples based on the above-mentioned factors. The mean difference of CARs in these samples is then tested with t-test to see if CARs are statistically different between the sample with different industry focus, relative size and information asymmetry characteristics.

We employ similar strategy to our long-run abnormal returns defined by Fama-French three-factor model. A portfolio over each holding period is reconstructed as six other portfolios. Each new portfolio contains only stocks that satisfy one requirement based on the control variables: industrial focus, relative size and information asymmetry. We repeat the estimation procedure from Section 4.2 to see if these controls have the power to determine long-run abnormal returns. This way we can test hypotheses 3-5.

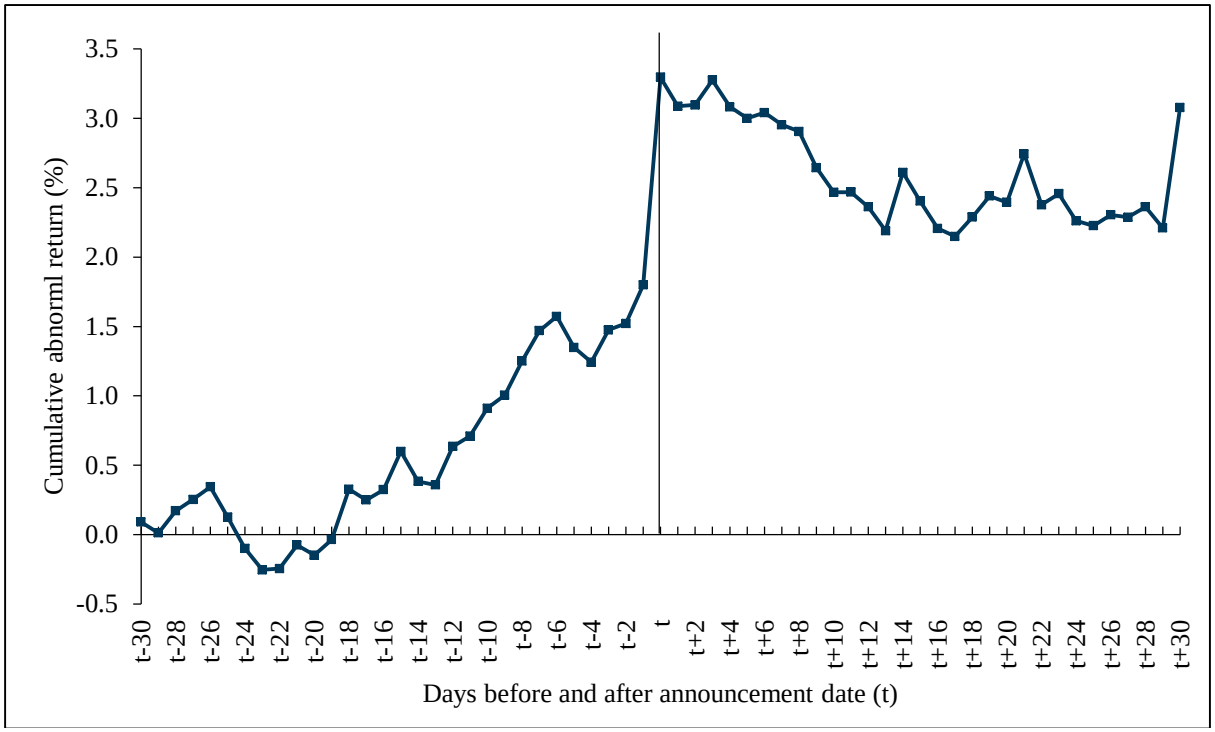
5. Empirical Findings

5.1 Announcement effect

In Figure 1, a plot of equally weighted cumulative average abnormal returns of all spin-offs is depicted for the 61 trading days surrounding the announcement date. The calculations are based on the announcement data including 102 separate spin-off announcements by parent firms. Rumours from t-30 to t-10 account for an increase of approximately 0.91%, twice less than in Rudisuli (2005). There is a more substantial increase closer to the announcement date with a sharp peak of 1.5% at t=0. On the same day, CAR reaches its maximum of almost 3.3%. Following the announcements, cumulative average abnormal returns decrease slightly to approximately 2.5%

The event study results for the whole sample of European parent firms are included in Table 7 and show a cumulative average abnormal return of 1.89% for the event window from day -1 to day +1. Furthermore, the event window of day 0 to day +1 as well as the announcement day 0 show cumulative average abnormal returns of 1.61% and 1.66% respectively. The abnormal returns are significant at the 1% level for all event windows reported. The results are in line with previous studies in Europe as well as the American studies mentioned in the literature review, giving us the basis to confirm Hypothesis 1.

Figure 1: Cumulative abnormal return of parent firms for event window (-30; +30)



Equally weighted cumulative abnormal returns for the 61 trading days surrounding the announcement date, based on a sample of 102 spin-offs occurring in Europe between December 1997 and December 2013; Transactions are adjusted for the corresponding country's gross stock market returns; t indicates the announcement date

Table 7: Abnormal returns around the announcement date: completed spin-offs

Event window	**(-1; +1)**	**(0; +1)**	**(0)**
N = 102			
CAR	1.892***	1.614***	1.664***
p-value	*(0.002)*	*(0.008)*	*(0.001)*

Cumulative average abnormal returns for the whole sample of 102 spin-off announcements by European companies from 1998 to 2013. Abnormal returns are based on the market model, estimated over a 220 day-period for each company (from day -250 to day -31). Transactions are adjusted for the corresponding country's gross stock market returns. Asterisks indicate significance at the 10% (*), 5%(**) and 1%(***) level.

In the next step we regress the cumulative abnormal returns for the parent firm over the event window of (-1; +1) obtained during the event study on the control variables, namely industrial focus, relative size of a spin-off as well as information asymmetry. For the regression containing the information asymmetry measure the number of observations decreased to 91 from the initial 102, since the IBES database is missing estimations for some of the parent firms. We regress CARs on one control variable at a time and finally we include all of them in one estimation. As displayed in Table 8 the only variable that is statistically significant is information

asymmetry, however, with the opposite sign as to what was expected. The information asymmetry coefficient, both in the single and multiple variable regression, has a negative sign implying that higher information asymmetry has a negative effect on cumulative average abnormal returns. This contradicts our Hypothesis 2a.

The coefficient for industrial focus is negative in the single variable regression and positive in the multiple variable regression, however, with no statistical significance. Contrary to what was expected and to previous studies we do not find a positive effect of an increase in industrial focus on cumulative average abnormal returns, and thus, cannot confirm Hypothesis 3a.

Relative size of the completed spin-off to the total equity value of parent and subsidiary is not estimated to have statistically significant effects on cumulative average abnormal returns. However, the coefficient is positive in both the single and multiple variable event study in line with expectation.

Table 8: Regression of cumulative abnormal returns around spin-off announcement (-1; +1)

Variable	**(1)**	**(2)**	**(3)**	**(4)**
Intercept	2.353**	1.759**	3.663***	2.831**
	(0.012)	*(0.022)*	*(0.000)*	*(0.025)*
Industrial focus	-0.682			0.0902
	(0.572)			*(0.935)*
Relative size		0.264		1.322
		(0.827)		*(0.269)*
Information assymmetry			-2.746**	-2.513**
			(0.016)	*(0.043)*
Number of observations	102	102	91	91

Regression coefficients for the three-day cumulative average abnormal returns for the completed announcements of 102 spin-offs by European companies from 1998 to 2013. Industrial focus is a dummy variable equal to 1 if the first two digits of the primary SIC code of a subsidiary to be spun-off are different from the first two digits of the primary SIC code of the parent company, 0 otherwise. The normalized standard deviation of forecasts is measured as the standard deviation of the analyst earnings forecasts in the last months of the fiscal year preceding the spin-off announcement, divided by the stock price. The relative size is equal to the ratio of the market value of the spun-off subsidiary equity to the sum of the market values of the equity of the parent and the subsidiary on the day of the spin-off. Asterisks indicate significance at the 10% (*), 5%(**) and 1% (***) level, based on White hetereoscedasticity-adjusted standard errors. P-values are reported in parentheses.

We extend the analysis above by examining returns at subsample level and testing the differences for significance. Table 9 presents the event study results for different sub-samples of the parents announcing spin-offs. In panel A of Table 9 the event study results are compared for companies that increase industrial focus versus companies that do not. In total, 69 companies

increase industrial focus through the announced demerger and the mean cumulative abnormal return for these is 1.67%. The mean cumulative abnormal return for the smaller sample of 33 firms that do not increase industrial focus is 2.35% and hence 0.68 percentage points higher than its counterpart of focus-increasing spin-offs. This is contrary to what was expected since focus-increasing spin-offs are thought to have a positive correlation with abnormal returns. However, the hypothesis that the difference between the groups is equal to zero cannot be rejected at conventional levels of statistical significance.

Table 9: Announcement period (-1; +1) abnormal returns by sub-sample

Panel A : Cumulative average abnormal returns (-1; +1) for sub-samples based on industrial focus

	Increase in industrial focus			Do not increase industrial focus			Difference	
	Mean	S.E.	N	Mean	S.E.	N	Mean	S.E.
CAR	1.67	0.78	69	2.35	0.92	33	0.68	1.20

H1: Difference ≠ 0, p-value: 0.5729

Panel B: Cumulative average abnormal returns (-1; +1) for sub-samples based on relative size of spin-offs

	Large spin-off			Small spin-off			Difference	
	Mean	S.E.	N	Mean	S.E.	N	Mean	S.E.
CAR	2.02	0.94	51	1.76	0.76	51	-0.26	1.21

H1: Difference ≠ 0, p-value: 0.8274

Panel C: Cumulative average abnormal returns (-1; +1) for sub-sambles based on information asymmetry

	High information asymmetry			Low information asymmetry			Difference	
	Mean	S.E.	N	Mean	S.E.	N	Mean	S.E.
CAR	0.92	0.89	46	3.66	0.68	45	2.75	1.12

H1: Difference ≠ 0, p-value: 0.0163

Three-day cumulative average abnormal returns for sub-samples of 102 announcements of spin-offs by European companies from 1998 to 2013 that were subsequently completed. Abnormal returns are based on the market model, estimated over a 220 day-period for each company (from day -250 to day -31). Industrial focus increasing spin-offs are defined as spin-offs of subsidiaries that have a two digit SIC-code that is different from the parent company. The relative size is equal to the ratio of the market value of the spun-off subsidiary equity to the sum of the market values of the equity of the parent and the subsidiary on the day of the spin-off, the relative size is defined as large (small) if the ratio is above (below) the median for all spin-off announcements. High (low) level of information asymmetry is defined as being above (below) the medium asymmetry value. The significance of the means is tested using a t-statistic. The difference in means is tested using a t-statistic. Asterisks indicate significance at the 10% (*), 5%(**) and 1% (***) level.

Panel B compares the abnormal returns for spin-offs with a relative size above median for the whole sample with abnormal returns for spin-offs below median. The larger spin-offs has a mean abnormal return of 2.02% while the smaller spin-offs has a mean abnormal return of

1.76%. This result is in line with our reasoning that a parent who spins off a larger proportion creates more value for shareholders. However, the test indicates that the difference of the means of the two groups is not significantly different from zero.

In the last panel C we compare the sub-samples of parent firms with high information asymmetry to the parent firms with low information asymmetry. The high information asymmetry sub-sample is associated with a mean cumulative average abnormal return of 0.92% while the low information asymmetry firms have a mean of 3.66%. Further, we find that the difference between the means of the two groups is not zero with a significance level of 1.6%. Hence, we find the inverse relationship to what was expected, however, Veld and Veld-Merkoulova (2004) present similar findings for European spin-offs.

5.2 Long-term effect

Long-run abnormal returns are assessed by using the Fama-French three-factor model as a performance benchmark. The average monthly return on the portfolio of parent (subsidiary) stocks less the contemporaneous return of a risk-free bond is regressed against the contemporaneous returns of the three factors of the Fama and French model. The results for the parents are presented in panel A of Table 10, and results for subsidiaries are presented in panel B.

For parents, we only find significant returns for the 36-month holding period where the intercept is 0.524 (t-statistic = 1.67), which implies an attractive total excess return of 20.7% over the holding period. However, this result is significant only at the 0.1 level. In addition to this, for both the 6- and 12-month period the abnormal returns are negative, although not significant. With this evidence combined, we cannot conclude that parent experiences long-run post-spin-off abnormal returns that are statistically different form zero.

For subsidiaries, we find statistically significant returns for the 12-, 24- and 36-month period where the highest intercept is recorded for the 12-month holding period of 1.328 (t-statistic = 2.14), implying a total excess return of 17.1% over the holding period.

Thus, when measured against the Fama-French three-factor model the strategy of buying spin-off subsidiaries over the period 1999 – 2015 has provided positive results, while for the parents the excess returns are absent.

Table 10: Fama-French regressions of spin-off parent and subsidiary portfolios

	Coefficients Estimates				
N = 186	**AR**	**Mkt Return**	**SMB**	**HML**	**R^2**
Panel A - parents (months relative to ex-date [XD])					
6	-0.0437	0.605***	0.525*	-0.116	0.223
	(-0.09)	*(5.17)*	*(1.95)*	*(-0.69)*	
12	-0.125	0.874***	0.654***	-0.0721	0.460
	(-0.32)	*(8.39)*	*(2.67)*	*(-0.37)*	
24	0.457	0.810***	0.518**	0.0425	0.475
	(1.29)	*(10.90)*	*(2.37)*	*(0.28)*	
36	0.524*	0.812***	0.458**	0.0271	0.538
	(1.67)	*(11.59)*	*(2.26)*	*(0.19)*	
Panel B - subsidiaries (months relative to initial listing date [ID])					
6	1.199	0.455*	0.194	-0.324	0.053
	(1.48)	*(1.76)*	*(0.44)*	*(-1.15)*	
12	1.328**	0.633***	0.484	-0.401	0.180
	(2.14)	*(3.29)*	*(1.37)*	*(-1.35)*	
24	0.734*	0.743***	0.682***	-0.420**	0.364
	(1.66)	*(7.38)*	*(3.03)*	*(-2.00)*	
36	0.818**	0.785***	0.742***	-0.356*	0.446
	(2.09)	*(9.36)*	*(3.76)*	*(-1.83)*	

Panel A (Panel B) shows the coefficients of the following time-series regression for spin-off parent (subsidiary) stocks over the holding periods XD-6, XD-12, XD-24 and XD-36 (ID-6, ID-12, ID-24 and ID-36):

$$R_P - R_F = \alpha + \beta_1(R_M - R_F)_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

where $(R_P\text{-}R_F)_t$ is the average monthly return on the portfolio of parent (subsidiary) stocks less the contemporaneous return on a risk-free bond in calendar month t; $(R_M\text{-}R_F)_t$ is a market premium across European stock markets; SMB_t is the difference between the value weighted average return on the small-cap portfolios and large-cap portfolios; and HML_t is the difference between the value-weighted average return on the high book-to-market portfolios and low book-to-market portfolios. The data was collected from Kenneth R. French's website. Asterisks indicate significance at the 10% (*), 5%(**) and 1% (***) level. T-statistics are reported in parentheses.

To further analyse the sample of parent firms after spin off completion we add the previously used control variables (industry focus, relative size and information asymmetry) to check their effects on abnormal returns over different holding periods. Table 11 presents the results for each holding period and each sub-sample portfolio of parent firms. The results follow similar patterns to the results reported for the sample of parent firms around announcement of the spin-off. The only 10%-significant results for long-run returns are for the subsample of non-focus increasing firms over the 24- and 36-month holding periods and for the firms with low

information asymmetry over the 36-month holding period. Thus, non-focus increasing spin-offs are responsible for 0.793% abnormal monthly return over the 24-month holding period and 0.827% over the 36-month holding period. This translates to 20.9% and 34.55 excess return to investors respectively.

To control for takeover activity and possible effects on abnormal returns after spin-off completion we create a portfolio of subsidiary firms excluding firms that are taken over during the three years following the spin-off completion. A similar portfolio is not created for parent firms since only two are taken over during the period. The abnormal returns for the subsidiary portfolio excluding the firms involved in M&A activity (Table 12) show similar abnormal returns for the different holding periods and sometimes even higher. For example, the 12-month holding period for the portfolio including firms that are taken over is 1.38% while the portfolio where they are excluded has an abnormal return of 1.47% (or 19.1% excess return over the 12-month holding period) at similar significance levels. This is contrary to what we expected, however, the result is still ambiguous and there is no clear conclusion to be made without further analysis outside of the scope of this thesis.

Table 11: Sub-sample portfolios of parent firms by industry focus, relative size and information asymmetry for different holding periods

	Industry focus		Relative size		Information asymmetry			Industry focus		Relative size		Information asymmetry	
	Increased	**Non-increased**	**Large**	**Small**	**High**	**Low**		**Increased**	**Non-increased**	**Large**	**Small**	**High**	**Low**
	Panel A: 6 month holding period (N = 177)							***Panel B: 12 month holding period (N = 183)***					
AR	0.0135	0.183	-0.399	0.113	0.324	-0.331	AR	0.141	-0.0835	0.353	-0.0876	-0.110	0.232
	(0.02)	*(0.40)*	*(-0.63)*	*(0.22)*	*(0.56)*	*(-0.52)*		*(0.34)*	*(-0.15)*	*(0.61)*	*(-0.21)*	*(-0.24)*	*(0.38)*
Mkt return	0.663***	0.269***	0.578***	0.533***	0.704***	0.560***	Mkt return	0.895***	0.683***	0.790***	0.810***	0.888***	0.827***
	(5.16)	*(2.91)*	*(3.81)*	*(5.42)*	*(5.18)*	*(4.14)*		*(8.24)*	*(3.47)*	*(5.79)*	*(7.96)*	*(8.39)*	*(5.72)*
SMB	0.329	0.535**	0.413	0.392*	0.771***	0.171	SMB	0.539**	1.088***	0.630	0.465**	0.966***	0.230
	(1.15)	*(2.48)*	*(0.94)*	*(1.74)*	*(3.35)*	*(0.48)*		*(2.24)*	*(3.11)*	*(1.46)*	*(2.55)*	*(4.51)*	*(0.62)*
HML	-0.412**	0.325*	0.110	-0.204	-0.0643	-0.274	HML	-0.358*	0.448**	0.0292	-0.00997	-0.0590	-0.144
	(-2.00)	*(1.89)*	*(0.53)*	*(-1.25)*	*(-0.37)*	*(-1.05)*		*(-1.94)*	*(2.31)*	*(0.13)*	*(-0.06)*	*(-0.33)*	*(-0.51)*
R^2	0.193	0.114	0.135	0.171	0.230	0.117	R^2	0.440	0.335	0.249	0.398	0.441	0.217
	Panel C: 24 month holding period (N = 186)							***Panel D: 36 month holding period (N = 186)***					
AR	0.199	0.793*	0.578	0.0463	-0.142	1.020	AR	0.311	0.827*	0.808	0.0369	0.0136	1.130*
	(0.55)	*(1.77)*	*(1.02)*	*(0.14)*	*(-0.36)*	*(1.43)*		*(0.91)*	*(1.90)*	*(1.54)*	*(0.11)*	*(0.03)*	*(1.77)*
Mkt return	0.930***	0.447***	0.830***	0.881***	0.876***	0.932***	Mkt return	0.951***	0.515***	0.867***	0.897***	0.863***	0.925***
	(12.33)	*(4.46)*	*(7.32)*	*(12.85)*	*(13.28)*	*(6.29)*		*(13.38)*	*(5.50)*	*(7.89)*	*(14.30)*	*(12.99)*	*(7.03)*
SMB	0.460**	0.966***	0.323	0.526***	0.800***	0.378	SMB	0.410**	0.859***	0.290	0.465***	0.669***	0.433
	(2.14)	*(3.96)*	*(0.77)*	*(3.54)*	*(5.08)*	*(0.96)*		*(2.01)*	*(3.73)*	*(0.73)*	*(3.15)*	*(4.30)*	*(1.33)*
HML	-0.407***	0.512**	-0.0221	-0.235*	-0.196	-0.0449	HML	-0.451***	0.532***	-0.00209	-0.293**	-0.145	-0.148
	(-2.92)	*(2.51)*	*(-0.10)*	*(-1.95)*	*(-1.26)*	*(-0.18)*		*(-3.40)*	*(2.68)*	*(-0.01)*	*(-2.56)*	*(-0.92)*	*(-0.68)*
R^2	0.510	0.267	0.252	0.527	0.475	0.195	R^2	0.556	0.295	0.302	0.545	0.463	0.231

Panel A, B, C and D shows the coefficients of the following time-series regression for sub-samples of spin-off parent stocks over the holding periods XD-6, XD-12, XD-24 and XD-36:

$$R_P - R_F = \alpha + \beta_1 (R_M - R_F)_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

where $(R_P\text{-}R_F)_t$ is the average monthly return on the portfolio of parent stocks less the contemporaneous return on a risk-free bond in calendar month t; $(R_M\text{-}R_F)_t$ is a market premium across European stock markets; SMB_t is the difference between the value weighted average return on the small-cap portfolios and large-cap portfolios; and HML_t is the difference between the value-weighted average return on the high book-to-market portfolios and low book-to-market portfolios. The data was collected from Kenneth R. French's website. Industrial focus increasing spin-offs are defined as spin-offs of subsidiaries that have a two digit SIC-code that is different from the parent company. The relative size is equal to the ratio of the market value of the spun-off subsidiary equity to the sum of the market values of the equity of the parent and the subsidiary on the day of the spin-off, the relative size is defined as large (small) if the ratio is above (below) the median for all spin-off announcements. High (low) level of information asymmetry is defined as being above (below) the medium asymmetry value.Asterisks indicate significance at the 10% (*), 5%(**) and 1% (***) level. T-statistics are reported in parentheses.

Table 12: Subsidiary firms excluding firms taken over within three years

	Coefficients Estimates				
N = 177	**AR**	**Mkt Return**	**SMB**	**HML**	**R^2**
Not taken over subsidiaries (months relative to initial listing date [ID])					
6	1.341	0.459	0.0801	-0.700**	0.070
	(1.44)	*(1.57)*	*(0.15)*	*(-2.28)*	
12	1.466**	0.685***	0.398	-0.668**	0.211
	(2.15)	*(3.38)*	*(1.00)*	*(-2.17)*	
24	0.714	0.808***	0.671**	-0.562**	0.392
	(1.46)	*(7.65)*	*(2.44)*	*(-2.37)*	
36	0.857*	0.846***	0.737***	-0.498**	0.462
	(1.93)	*(9.50)*	*(2.99)*	*(-2.27)*	

The table shows the coefficients of the following time-series regression for spin-off subsidiary stocks excluding subsidiary firms that were taken over within 3 years after listing, over the holding periods ID-6, ID-12, ID-24 and ID-36:

$$R_P - R_F = \alpha + \beta_1(R_M - R_F)_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

where $(R_P\text{-}R_F)_t$ is the average monthly return on the portfolio of subsidiary stocks less the contemporaneous return on a risk-free bond in calendar month t; $(R_M\text{-}R_F)_t$ is a market premium across European stock markets; SMB_t is the difference between the value weighted average return on the small-cap portfolios and large-cap portfolios; and HML_t is the difference between the value-weighted average return on the high book-to-market portfolios and low book-to-market portfolios. The data was collected from Kenneth R. French's website. Asterisks indicate significance at the 10% (*), 5%(**) and 1% (***) level. T-statistics are reported in parentheses.

6. Discussion and concluding remarks

In the following section, we will revisit our hypotheses outlined in the methodology section one by one and provide the answers that our study of parent and subsidiary firms yielded.

Hypothesis 1: Parent company experiences significant positive abnormal returns around the announcement of a spin-off.

In our study we measured three different event windows, namely (-1; +1), (0; +1) and (0) for the announcement date and found cumulative average abnormal returns of 1.89%, 1.61% and 1.66% respectively. The abnormal returns are all significant at the 1% level which confirms our hypothesis that parent firms experience significant abnormal returns at the announcement of a spin-off deal.

Hypothesis 2: Long-run abnormal returns of a spin-off parent and/or subsidiary are not statistically different from zero.

For subsidiaries we found positive abnormal returns for an equally weighted portfolio of subsidiary stock with holding periods of 12-, 24- and 36-months. For the 6-month holding period of the subsidiary portfolio the returns were positive but not significant at conventional levels. However, these results point to a rejection of our hypothesis and that subsidiary stock actually experience abnormal returns in the long-term following a spin-off.

The study of the portfolio of parent stocks returns did not yield conclusive results regarding excess returns. For the holding period of 36-months we found abnormal returns of 0.54% on a significance level of 10% but for the shorter periods the abnormal return was lower or negative and not significant. This suggests that parent firms involved in spin-off may yield abnormal returns in the long-run following the completion of the spin-off. However, since our test's statistical power is getting weaker over longer holding periods we deem these results not conclusive enough to reject the hypothesis that abnormal returns for parent firms are not statistically different from zero.

Hypothesis 3a: Industrial focus proxy is significantly and positively related to CARs around the announcement date.

The tests of the total sample of parent firms around the announcement date as well as the mean comparison t-test of the sample split by the industrial focus proxy yielded no statistically significant relation between industry focus and cumulative average abnormal returns. In fact, the results pointed to a reverse relationship, that the non-focus increasing firms in a spin-off have higher means of cumulative abnormal returns around the announcement. However, the difference between our two subsamples was not statistically different from zero.

Hypothesis 3b: Industrial focus proxy has positive, but insignificant relationship with abnormal returns in the long run.

The test of the parent firms split by industrial focus proxy yields positive abnormal returns for each of the holding periods after spin-off completion which are not significant suggesting that our hypothesis is accepted. However, for the 24- and 36-month holding periods the portfolio of non-focus increasing firms yields positive abnormal returns of 0.79% and 0.83% respectively, significant at the 10% level. Again, this point to the reverse relationship that increase in industrial focus through spin-offs is not related to abnormal returns for parent firms. However, as for the announcement sample the results are

inconclusive and though our hypothesis is not rejected further research needs to be conducted beyond the scope of this study.

Hypothesis 4a: Larger spin-offs are significantly and positively related to CARs around the announcement date.

The studies of the total sample of parent firms and the mean comparison t-test of sub-samples split by size did yield a positive relationship between larger spin-offs and abnormal returns at the announcement date. However, the results were insignificant at conventional levels and we cannot accept our hypothesis based on our sample of European parent firms.

Hypothesis 4b: Relative size is not related to abnormal returns in the long run.

The abnormal returns for parents of larger spin offs is negative for the 6-month holding period and positive for the remaining holding periods and none of the observations are significant at conventional levels. Hence, our study suggests that our hypothesis can be accepted and that relative size of spin-offs are not related to CARs for parent firms in the long run.

Hypothesis 5a: High information asymmetry is predicted to be positively associated with the spin-off excess returns around the announcement date.

Through the study of the total sample and the mean comparison t-test we find the inverse relationship to be significant at the 5% level. This suggests that parent firms high information asymmetry prior to the spin-off announcement yields lower abnormal returns at the announcement of the spin-off. These results are in line with some from previous research, however, the result is puzzling and suggests that this theory has other explanation that need to be research to give a conclusive answer. Based on our results we reject our hypothesis that higher information asymmetry is positively correlated with abnormal returns around the spin-off announcement.

Hypothesis 5b: Information asymmetry is predicted to be unrelated to abnormal returns in the long run.

The portfolio split by high and low information asymmetry yields no significant correlation between the information asymmetry proxy and abnormal returns for the 6-, 12- and 24-month holding periods. However, for the 36-month holding period the portfolio of parent stocks with low information asymmetry is significantly and positively correlated with abnormal returns once again pointing to the inverse relationship to what was previously

anticipated. We cannot provide a conclusive answer through this study and leave this as a suggestion for future research.

Hypothesis 6: Spun-off subsidiaries that were taken over within 3 years after the share distribution, experience higher abnormal returns than non-taken over firms.

When comparing our portfolio including all subsidiaries to a portfolio in which the firms that were involved in acquisitions we find similar abnormal returns for both portfolios. For the portfolio excluding taken over firms the abnormal returns are positive over all periods but only significant on conventional levels for the 12- and 36-month period. While, for the total portfolio returns are slightly lower for the corresponding periods but also significant. The study yields inconclusive results and we cannot reject or accept our hypothesis. Previous studies confirms this hypothesis, however, based on our results further research needs to be conducted outside of the scope of this study.

As expected, we found significant abnormal returns around the announcement date, however, widely accepted control variable proved insignificant or presented inconclusive evidence. The significance of long-run abnormal returns for subsidiaries and in some case parent companies undermines the efficient market hypothesis.

The results of our study implies that there is an opportunity for investors to purchase parent stocks after spin-off announcement and hence receive stocks in the spin-off subsidiary that provides excess returns in the long run. Furthermore, the results indicate at important considerations in corporate decisions regarding divestment options. Our study suggests that spin-off subsidiaries provide excess returns in the long-run, hence the option to divest a corporate division through a spin-off might be a superior strategy compared to carve-outs and sell-offs.

This study does not control for further factors that might affect performance of subsidiaries after the listing that could explain the excess returns, we therefore suggest to continue research and to compare our results to more benchmarks. Moreover, in the literature review we mention the possibility of management making an effort to time the market, which could also have implications for the long-run returns of spin-offs. Lastly, we find conflicting results for our test of takeover premiums among spin-off subsidiaries. Previous research in this area is limited for the European market, hence we conclude that further investigation needs to be conducted regarding takeovers in spun-off subsidiaries.

7. References

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