**Aalto University
School of Business**

The impact of acquisition activity on IPO long-run performance: Evidence from Europe.

Bachelor's Thesis

Finance

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Abstract

The role of acquisitions in the initial public offerings' (IPOs') performance has been studied widely in the U.S. but rather little within European markets. This thesis researches 5,052 European IPOs from 1990 to 2009 to find out whether the acquisition activity influences the long-run performance of newly public firms. Using calendar and event-time approaches, I concluded that the post-IPO acquirers experience significantly poorer performance in the years 2-6 after the issue compared to the non-acquirers group. The non-acquirers earn a Fama-French three-factor monthly alpha of 0.81% while acquirers earn only a monthly alpha of 0.19% during the period. The mean differences in cumulative returns for these groups supports this finding as they are significant for the years 4-6 after the IPO. The results confirm that the management of the IPO firms are exposed hubris and overconfidence when making acquisition decisions shortly after going public as well as investors are exposed to over optimism about these acquisitions. The results indicate as well that acquisitions play an important role in the well-documented IPO long-run underperformance also in Europe.

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Table of Contents

List of tables and figures

1. Introduction and literature review

1.1 Long-run underperformance of initial public offerings

Initial public offering (IPO) long-run underperformance has been studied actively by many authors from the early 1990s. The question is often addressed as "IPO performance puzzle", and since Ritter (1991) as well as Loughran and Ritter (1995) found evidence on the IPO underperformance, literature has tried to find explanations for the performance puzzle from many different angles. Ritter (1991) as well as Loughran and Ritter (1995) argued that issuers took advantage of "windows of opportunity" especially in the high IPO volume periods, by successfully timing their issues in periods when the IPO market was hot and their stock substantially overvalued.

Prior studies raise also the significance of underwriters and venture capital backing in the IPO performance. The underwriter quality and IPO long-run underperformance were studied by Carter et al. (1998) and Dong et al. (2011) who both agreed that higher underwriter quality anticipates better long-run performance especially among IPOs with high uncertainty. Dong et al. (2011) emphasize the important marketing and certification/screening role of the underwriter to explain relation between the underwriter reputation and the long-run performance of the IPO. Brav and Gompers (1997) replicated the Loughran and Ritter (1995) results and discovered that venture-backed IPOs outperform non-venture-backed IPOs in the long-run. As a possible reason for this the authors suggest that individual investors have incomplete information or influenced by fads as non-venture-backed IPOs are more likely to be held by them. While the "windows of opportunity" hypothesis and venture-backing provide considerable insights into understanding of IPO underperformance, previous literature has also considered acquisitions as an important factor to explain the IPO performance puzzle.

1.2 Acquisitions as a driver for the IPO underperformance

Post-acquisition performance of acquirer firms has been studied by e.g. Loughran and Vijh (1997) and Rau and Vermaelen (1998) who both concluded that many acquirers tend to underperform in the long-run. On the other hand, Brau and Fawcett (2006) studied motives for IPOs and surveyed 336 CFOs to interpret that the primary reason for going public is to create public shares for use in future acquisitions. Considering these two findings together, several researchers have studied the role of acquisition activity also in the IPO long-run underperformance. First of all, Brau et al. (2012) studied 3,547 IPOs from 1985 to 2003 and compared long-run returns of firms who did not make an acquisition during the first year after an IPO to those who made one or more acquisitions during the year. The results were

remarkable: the acquirer firms produced significantly poorer long-run returns than the non-acquirers (Brau et al., 2012). To the best of my knowledge, this was the first study to consider the post-IPO acquisition activity as an explanatory factor for the IPO long-run underperformance.

While Brau et al. (2012) considered all acquirers as a single group, other researches have also studied the frequency of acquisitions as a driver for post-acquisition and post-IPO performance. The frequent acquirers' performance (not particularly IPO firms') has been researched by many authors (e.g. Ismail, 2008 as well as Billett and Qian, 2008), who all stated that infrequent acquirers outperform frequent acquirers significantly. In addition, among others Celikyurt et al. (2010) inferred that a typical IPO firm makes four acquisitions within a five-year period with expenditures substantially greater than their capital and research and development expenses. When the acquisition frequency as a driver for poorer performance and the Celikyurt et al. (2010) findings are linked together, we could have another factor to explain the IPO long-run underperformance: the high frequency of post-IPO acquisitions.

At this point I have covered the existing literature on the the IPO long-run underperformance, the acquisition motive in going public and acquisition frequency as a driver for the post-IPO performance. Most comprehensively these issues covered Amor and Kooli (2016) in a recently published paper named "Do acquisitions affect IPO long-run performance? Evidence from single vs. multiple acquirers." In the next chapter I discuss more about the details of this paper as it functions as the frame of reference for this Bachelor's Thesis.

Amor and Kooli (2016) accumulated a sample of 5,055 U.S. IPOs and tested whether non-acquirers outperform acquirers and single acquirers outperform frequent acquirers in the long-run. They used the same one year post-IPO acquisition window as Brau et al. (2012) and studied the firms' performance during years 1-5 after the issue. They came to a conclusion that the frequent acquirers perform significantly worse than the single acquirers and noted (p. 3): "These findings suggest that the reported underperformance of IPO firms that make acquisitions in the first year comes mostly from firms that make more than one acquisition." The findings were remarkable as to my best knowledge, no study had before raised the frequent (i.e. more than one) acquisitions as a main driver for the long-run IPO underperformance. The data and empirical methods used in this "reference paper" are covered in the following sections. As this thesis is focusing on the European markets, in the next chapter I cover the existing literature on European IPOs and acquisitions and their main differences compared to the U.S. markets.

1.3 European point of view

To some extent, existing literature has recorded differences between European and U.S. IPO markets. Jay R. Ritter discussed the subject in a paper published in 2003 and made two major findings. The first was that European gross spreads are lower and less clustered than in U.S, which was, to my best knowledge, firstly found by S. Torstila in 2001. Besides this, in some European countries unlike in the U.S. it is typical to have when-issued trading prior to the final offering. Ritter (2003) notes that (p. 7) "All of these studies have found that the final offer price is adjusted in the direction implied by the when-issued market price, but the adjustment is fairly modest, especially for upward revisions." Basically this could mean that within these European IPOs, the final offer price could be closer to the intrinsic value and thus the first trading day increase in the stock price would not be so significant as in the U.S. markets. The lower gross spreads Torstila (2001) and Ritter (2003) found could have same kind of effect in the short-term returns of the IPO. However, as this thesis focuses on the long-term returns of the European issuers starting from two years after the issue announcement date, these findings should not substantially impact the results.

The motives for IPOs have been researched also in Europe. Bancel and Mittoo (2009) surveyed CFOs from 12 European countries and argued that in Europe there is no single theory that can explain the decision to go public as firms chase several benefits by the IPO. The motives for going public vary significantly along the firm and country characteristics, except that the enhanced visibility and prestige, funding for growth and financial flexibility are common within all European firms and countries (Bancel and Mittoo, 2009). They also found moderate support for the theory which emphasizes future mergers and acquisitions (M&As) as a major benefit in going public. Overall, the findings are more or less similar compared to the U.S. studies of IPO motives, so my hypotheses and methods will be quite similar to the Amor and Kooli (2016) paper. Next, I discuss about the hypotheses the existing literature have stated to explain the value destruction in acquisitions.

1.4 Hypotheses explaining value-destroying acquisitions

One of the first to address an explanation for the poor post-acquisition performance was Richard Roll (1986), who rationalized it with the classic "hubris hypothesis". The hypothesis basically stated that the management of bidding firms are infected by hubris and pay simply too much for their targets as they believe unrealistically that they can manage the target firms' assets more efficiently than the firms' current management (Roll, 1986). Besides this, Titman et al. (2004) argued that when firm increases its investment expenditures (i.e. makes frequent

acquisitions), investors tend to underreact to the empire building implications, which results as a poor performance in the long-run. Over 20 years after Roll (1986) introduced the hubris hypothesis, Malmendier and Tate (2008) studied the CEO overconfidence in M&As and discovered that the market reaction for merger announcement was significantly more negative for overconfident than non-overconfident CEOs. Finally, they note (p. 23) as a continuum to the Roll (1986) research that: "However, overconfident CEOs are unambiguously more likely to make lower-quality acquisitions when their firm has abundant internal resources." In the IPO coverage, newly public firms often have "abundant internal resources" accumulated by the issue, which means these hypotheses are very applicable for this thesis.

An alternative angle to acquisitions is the so called "learning hypothesis" (Aktas et al., 2011), which states that CEOs change their bidding behavior based on the investor reactions to the previous deals they have made. This was later confirmed by Aktas et al. (2013) as they note that multiple acquirers become more skillful by learning and secure larger benefits in following deals. This "learning hypothesis" is not completely in line with the hubris and overconfidence hypotheses discussed earlier as they both addressed acquisitions mainly as a value-destroying deals in the long-run. However, Aktas et. al (2011) noted that (p. 2) "The experience of the CEO in deal making affects the learning process, and both rational and hubristic CEOs learn on average from market signals." In the light of this information, one could argue that the first acquisition a hubristic or overconfident CEO makes is the most value-destroying one as the management is not yet started its learning process. This also contradicts with Amor and Kooli (2016) who basically stated that the second acquisition was the most value-destroying one for the newly public acquirers.

1.5 Scope and hypotheses of this thesis

In this thesis, I ask if the acquisitions made after an IPO affect the issuer firms' long-run performance in European countries. I will replicate the Amor and Kooli (2016) paper (as much is it reasonable for a Bachelor's Thesis) on U.S. IPOs to find out whether the same effects apply also in the European markets. To be specific, I have two research questions: First is whether European post-IPO acquirers perform more poorly in the long-run than those firms who don't acquire at all during the first two years after the issue. Secondly, I ask whether European infrequent post-IPO acquirers outperform frequent acquirers in the long-run. The questions are important to European company managements as well as investors who both benefit from the information if acquisitions truly affect the IPO long-run performance. The management of a newly public firm can use the information when they make the decisions to acquire. Investors

benefit from the information when they are contemplating to invest to an issuer firm with potentially high acquisition intentions. For academicians this study could strengthen the hypothesis of acquisitions' significance in the long studied IPO puzzle.

My main contribution to the existing literature is the fact that post-IPO behavior is not considerably studied in Europe. To my best knowledge, there is no studies in European markets which consider acquisition activity after the issue as a driver for the IPO long-run underperformance. As the results in U.S. have been significant (Brau et al., 2012 and Amor and Kooli, 2016) it is valuable to find out whether the same effects apply also in Europe considering its slightly different acquisition behavior compared to U.S. (Torstila, 2001 and Ritter, 2003). Based on the literature discussed earlier, I expect, similar to Amor and Kooli (2016), that new issuers in Europe are subject to hubris and overconfidence when they decide to implement the several acquisitions. While I assume the issuers to be overconfident, I hypothesize the IPO investors to be overoptimistic about the decisions to acquire within the two years following the IPO. Thus, the more acquisitions an IPO firm makes, the less performance they earn in the long-run. To estimate the long-run performance I use calendar time (following Amor and Kooli, 2016) and event-time approaches, which are discussed thoroughly in Section 3.

Accumulating a sample of 5052 European IPOs from 1990 to 2009 I find out that the issuers who did not make acquisitions during the first two years after the IPO outperformed significantly in the long-run those firms that acquired during the same period. The calendar-time approach showed significant monthly Fama-French (1993) three-factor model abnormal returns within the period, which did not appear in the acquirers group. The results in the event-time approach support this finding as the mean differences in returns are significant between the non-acquirers and acquirers for the years 4, 5 and 6 following the issue. However, the infrequent and frequent acquirers' performance comparison did not yield any significant results on either method. These findings indicate that the acquisitions of newly public firms are an explanatory factor for the IPO long-run underperformance in Europe.

The thesis is structured as follows. In section 2, I discuss about the data and method of the study, Section 3 presents the methods for calculating the performance and shows the empirical results, while Section 4 concludes the paper.

2. Data and method

2.1 Data description

I gathered all IPOs made by European firms from 1.1.1990 to 31.12.2009 using Thomson SDC New Issues database. I identified a firm to be European based on its nation information in the database including also e.g. Turkey and Russia. The start of my 20-year period for IPOs was chosen as 1990 was the first year in Europe to get sufficient amount of IPOs for my empirical analysis. The total amount of IPOs within this period in Europe in the database was 10,299.

After acquiring the IPO data, I gathered all acquisitions made by these IPO firms during 1.1.1990-31.12.2011 as the time window for acquisitions was 2 years after IPO announcement date. To gather the acquisition data, I used the Thomson SDC database and utilized SEDOL-codes to identify the IPO firms. After removing all firms not having a SEDOL and removing duplicate SEDOL codes, my IPO sample size decreased to 7,614. The decision to use the SEDOL-codes was based on the fact that it was the most widely used identifier in Europe (in the databases I used) and the sample size remained large enough for the analysis. The acquisition sample comprised a total of 60,294 transactions made by these 7,614 firms during 1.1.1990-31.12.2011. I removed all acquisitions with less than 50% of acquired shares as these minority-share acquisitions may not have as much impact on the firms' operations (unfortunately 16,170 of the acquisitions did not have this information in the database). Differently than Amor and Kooli (2016) the post-IPO acquisition period I studied was 2 years to get larger and even-sized groups and subgroups of firms for the empirical analysis.

To acquire the IPO firms' stock prices, I used Datastream's Total Return Index. I chose the time period for estimating the issuers' long-run performance to be four years similar to Amor and Kooli (2016). However, as my acquisition window was two years, my period for the returns was months 25-72 after the IPO (Amor and Kooli used months 13-60 as their acquisition-window was one year). I acquired monthly prices from January 1992 to December 2015 for all the 7,614 firms once again using their SEDOL-codes. After removing all firms not having return data for months 25-72 after the IPO or having zero returns within these months my final number of firms in the analysis was 5,052. The drop of 2,562 in the sample size at this point was quite large but anticipated as identification of firms between the databases is always complicated. Besides this, the Total Return Index data in Datastream proved to be somewhat incomplete for particular European submarkets. However, I concluded that the sample of 5,052 firms was large enough for my empirical analysis and that it would have been highly time consuming to manually search the missing data in order to increase the sample. In addition, I gathered

monthly STOXX Europe 600 Index from the Datastream as an estimate for market return as well as monthly Fama & French (1993) European three factors and T-bill rates from Kenneth R. French Data Library for the same period.

2.2 Sample distribution

First, I formed two groups from the final sample of 5,052 IPO firms based on their acquisition amounts during the first two years following the issue announcement date. The other of these groups are all the issuer firms who did not make an acquisition in the first two years following the IPO, which I name "non-acquirers". Of the 5,052 firms, 2,766 (54.75%) applied to this criterion. The remaining firms, which made at least one acquisition during the first two years after the IPO, I specify as "acquirers". In my sample, there were a total of 2,286 (45.25%) firms who acquired during the first two post-IPO years.

Secondly, I wanted to study the acquisition behavior within the group of "acquirers" so I formed two subgroups based on how many acquisitions they made during the two years. The other group was all the acquirers who made one or two acquisitions during the two years, which I call "infrequent acquirers". Of the 2,286 acquirers, 1,415 (28.01% of the total sample and 61.90% of the acquirers) applied to this criterion. The other subgroup, all the firms who made three or more acquisitions during the first two years after the IPO, I specify as "frequent acquirers". The total number of infrequent acquirers in my sample was 871 (17.24% of the total sample and 38.10% of the acquirers).

The groups were very similar to the Amor and Kooli (2016) study as they formed also two groups and two subgroups based on the acquisition activity. Basically the only differences were my acquisition window period and the definition of infrequent and frequent acquirers as Amor and Kooli (2016) designated infrequent acquirers as firms with one acquisition and frequent acquirers as firms with two or more acquisitions during the acquisition window. I concluded that these groups together with the longer acquisition window would suit the European IPO and acquisition markets better as I got nearly equally sized firm samples for my analysis. The terms "non-acquirers", "acquirers", "infrequent acquirers" and "frequent acquirers" defined above are used throughout this thesis. The acquisitions the IPO firms' made during the first two years following the IPO are named as "post-IPO acquisitions" in this paper.

2.3 Sample tables

Table 1 presents the annual distribution of the whole sample of the thesis and the three distinct groups; non-acquirers, infrequent acquirers and frequent acquirers (I decided to drop

the acquirers group out from the tables 1, 2 and 3 as it can be integrated from its two subgroups). First of all, the number of IPOs varies considerably over time. The table shows that the largest increase in IPO numbers in Europe was in 1994 as the year's 286 IPOs was over four times more than in any of the years 1990-1993 IPO volumes. The table shows clearly that the years 1990-1993 European IPO market was to some extent undeveloped. However, when the IPO levels increased suddenly in 1994 they haven't grown substantially since on a yearly basis. In this sample, the highest levels of IPOs were identified during the peak of the Dot-com bubble in 1999-2000 (a total of 969 IPOs during the two years) and in the end of the economic boom in 2007 (547 IPOs). My sample period ends in the year 2009, but the IPO in Europe volumes have dropped substantially since as the 2008 financial crisis and the Eurozone crisis burst (Ritter et al., 2012).

Besides the IPO volumes, the European acquisition activity in the two years following the IPO varies over time. The mean number of acquisitions made during the two years after the IPO varies from 0.774 (2001) to 2.352 (1999). The number acquirers (both infrequent and frequent) follow a growing trend from the year 1990 (10 acquirers) to 2000 (254 acquirers). The share of acquirers of the year's IPO firms varies from 34.13% in year 2009 to 57.32% in year 1999. The yearly average share of firms who became acquirers in the first two years following the IPO is 43.83%. As with IPOs, the highest post-IPO acquisition levels (amount of post-IPO acquisitions) are observed during the Dot-com bubble in 1997-2000 and during the economic boom in 2005-2009. Based on this sample it can be stated that the prevailing economic conditions affect both, firms' IPO and acquisition activity also in Europe.

Table 2 shows the distribution of the nations where the IPO firms are from. The countries and other independent regions are based on the firms' nation information provided by Thomson SDC database. First of all, it can be seen that unsurprisingly, a large amount of 1,797 (35.57%) IPOs in the sample were made in United Kingdom. After UK, the next largest IPO amounts were in France, 601 (11.90%), and in Germany, 591 (11.70%) IPOs during the period. The 15 countries or regions[1] having less than 10 IPO firms in the sample, are combined as "Other". There is a high variability in the post-IPO acquisition activity within the European countries. In Turkey, only 18,07% of IPO firms became acquirers in the first two years, the mean number of acquisitions in this period being 0.34. The highest post-IPO acquisition activity was distinctly in Russia with an average of 4.42 acquisitions during the first two post-IPO years. The Russian acquisitions were studied by Bertrand and Betschinger (2012) concluding that

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[1]The countries and regions having 1 to 10 IPO firms in the sample were Faroe Islands (1 IPO), Greenland (1), Slovak Rep (1), Slovenia (1), Iceland (2), Malta (2), Gibraltar (3), Latvia (4), Ukraine (4), Croatia (5), Romania (7), Czech Republic (8), Estonia (8), and Lithuania (9)

The impact of acquisition activity on IPO long-run performance: Evidence from Europe.

Russian M&A market has grown rapidly during the 21st century and on 2010, the country was responsible for 14% of the total emerging market M&A deals. The highest shares of acquirers of total IPO firms were in Russia (69.09%), Spain (63.64%) and Netherlands (61.83%).

Table 1
Distribution by IPO year

IPO year	Number of IPOs	% of total IPOs	Number of non-acquirers	% of the year's IPO firms	Number of infrequent acquirers	% of the year's IPO firms	Number of frequent acquirers	% of the year's IPO firms	Mean number of acquisitions during the first two years after IPO
1990	19	0.38 %	9	47.37 %	7	36.84 %	3	15.79 %	1.105
1991	63	1.25 %	40	63.49 %	11	17.46 %	12	19.05 %	1.587
1992	52	1.03 %	32	61.54 %	13	25.00 %	7	13.46 %	0.942
1993	61	1.21 %	39	63.93 %	15	24.59 %	7	11.48 %	1.033
1994	280	5.54 %	146	52.14 %	95	33.93 %	39	13.93 %	1.243
1995	200	3.96 %	115	57.50 %	50	25.00 %	35	17.50 %	1.195
1996	255	5.05 %	118	46.27 %	96	37.65 %	41	16.08 %	1.286
1997	310	6.14 %	170	54.84 %	85	27.42 %	55	17.74 %	1.319
1998	347	6.87 %	154	44.38 %	98	28.24 %	95	27.38 %	1.965
1999	403	7.98 %	172	42.68 %	112	27.79 %	119	29.53 %	2.352
2000	566	11.20 %	312	55.12 %	135	23.85 %	119	21.02 %	1.534
2001	261	5.17 %	165	63.22 %	75	28.74 %	21	8.05 %	0.774
2002	127	2.51 %	74	58.27 %	36	28.35 %	17	13.39 %	0.858
2003	115	2.28 %	70	60.87 %	29	25.22 %	16	13.91 %	0.965
2004	269	5.32 %	162	60.22 %	72	26.77 %	35	13.01 %	0.937
2005	277	5.48 %	152	54.87 %	74	26.71 %	51	18.41 %	1.271
2006	472	9.34 %	247	52.33 %	135	28.60 %	90	19.07 %	1.441
2007	547	10.83 %	320	58.50 %	172	31.44 %	55	10.05 %	0.921
2008	220	4.35 %	132	60.00 %	59	26.82 %	29	13.18 %	1.386
2009	208	4.12 %	137	65.87 %	46	22.12 %	25	12.02 %	0.995
Total	**5,052**	**100.00 %**	**2,766**	**54.75 %**	**1,415**	**28.01 %**	**871**	**17.24 %**	**1.341**

Table 2
Country distribution

Country or region	Number of IPOs	% of IPOs	Number of non-acquirers	% of the year's IPO firms	Number of infrequent acquirers	% of the year's IPO firms	Number of frequent acquirers	% of the year's IPO firms	Mean number of acquisitions during the first two years after IPO
Austria	77	1.52 %	34	44.16 %	22	28.57 %	21	27.27 %	1.701
Belgium	88	1.74 %	50	56.82 %	22	25.00 %	16	18.18 %	1.443
Bulgaria	15	0.30 %	10	66.67 %	4	26.67 %	1	6.67 %	0.533
Cyprus	13	0.26 %	5	38.46 %	4	30.77 %	4	30.77 %	1.923
Denmark	134	2.65 %	86	64.18 %	34	25.37 %	14	10.45 %	0.836
Finland	83	1.64 %	33	39.76 %	29	34.94 %	21	25.30 %	1.855
France	601	11.90 %	334	55.57 %	153	25.46 %	114	18.97 %	1.501
Germany	591	11.70 %	314	53.13 %	161	27.24 %	116	19.63 %	1.438
Greece	132	2.61 %	94	71.21 %	22	16.67 %	16	12.12 %	0.697
Guernsey	55	1.09 %	36	65.45 %	17	30.91 %	2	3.64 %	0.527
Hungary	16	0.32 %	9	56.25 %	5	31.25 %	2	12.50 %	1.313
Ireland-Rep	58	1.15 %	27	46.55 %	15	25.86 %	16	27.59 %	1.793
Isle of Man	36	0.71 %	26	72.22 %	7	19.44 %	3	8.33 %	0.528
Italy	226	4.47 %	125	55.31 %	70	30.97 %	31	13.72 %	1.221
Jersey	25	0.49 %	16	64.00 %	8	32.00 %	1	4.00 %	0.480
Luxembourg	11	0.22 %	7	63.64 %	1	9.09 %	3	27.27 %	2.091
Netherlands	131	2.59 %	50	38.17 %	28	21.37 %	53	40.46 %	2.878
Norway	135	2.67 %	73	54.07 %	37	27.41 %	25	18.52 %	1.289
Poland	158	3.13 %	98	62.03 %	50	31.65 %	10	6.33 %	0.671
Portugal	40	0.79 %	22	55.00 %	8	20.00 %	10	25.00 %	1.275
Russian Fed	55	1.09 %	17	30.91 %	16	29.09 %	22	40.00 %	4.418
Spain	99	1.96 %	36	36.36 %	39	39.39 %	24	24.24 %	2.121
Sweden	195	3.86 %	105	53.85 %	51	26.15 %	39	20.00 %	1.549
Switzerland	142	2.81 %	77	54.23 %	37	26.06 %	28	19.72 %	1.387
Turkey	83	1.64 %	68	81.93 %	12	14.46 %	3	3.61 %	0.337
United	1797	35.57 %	978	54.42 %	546	30.38 %	273	15.19 %	1.205
Other	56	1.11 %	36	64.29 %	17	30.36 %	3	5.36 %	0.696
Total	**5,052**	**100.00 %**	**2,766**	**54.75 %**	**1,415**	**28.01 %**	**871**	**17.24 %**	**1.341**

Table 3 presents the industry distribution of the sample firms based on the SIC codes in Thomson SDC database. Most of the European IPO firms in the sample, a total of 76,52%, are in Manufacturing (1,530 firms), Finance, insurance and real estate (1,221 firms) and Services industries (1,122 firms). Excluding "Other" industry (only 5 firms), the mean number of acquisitions in the first two post-IPO years vary between industries from 0.986 in the Finance, insurance and real estate industry to 1.845 in the Transportation, communication and sanitary services industry. The largest share of acquirers of total IPO firms is in Services (54.81%), Construction (54.10%) and Transportation, communication and sanitary services industries (52.93%). The distribution of frequent acquirers is quite similar as can be seen in the table. The industry distribution of acquisition activity in this thesis' sample is in line with the findings by e.g. C. Ciborra (1991), which state that high-tech industries prefer strategic alliances over M&As as in those environments learning and flexibility are important. On the other hand, for low-tech industries M&As tend to be the dominant as learning and flexibility are not so crucial in their operative environment (Ciborra, 1991).

Table 3
Industry distribution

Industry	2-Digit SIC	Number of IPOs	% of total IPOs	Number of non-acquirers	% of the year's IPO firms	Number of infrequent acquirers	% of the year's IPO firms	Number of frequent acquirers	% of the year's IPO firms	Mean number of acquisitions during the first two years after IPO
Agriculture	01-09	20	0.40 %	14	70.00 %	2	10.00 %	4	20.00 %	1.300
Natural resource	10-14	235	4.65 %	132	56.17 %	68	28.94 %	35	14.89 %	1.289
Construction	15-17	122	2.41 %	56	45.90 %	43	35.25 %	23	18.85 %	1.525
Manufacturing	20-39	1530	30.29 %	856	55.95 %	436	28.50 %	238	15.56 %	1.214
Transportation, and sanitary services	40-49	427	8.45 %	201	47.07 %	130	30.44 %	96	22.48 %	1.845
Wholesale and retail trade	50-59	370	7.32 %	203	54.86 %	108	29.19 %	59	15.95 %	1.292
Finance, insurance and real estate	60-67	1221	24.17 %	793	64.95 %	280	22.93 %	148	12.12 %	0.986
Services	70-89	1122	22.21 %	507	45.19 %	347	30.93 %	268	23.89 %	1.722
Other	90-99	5	0.10 %	4	80.00 %	1	20.00 %	0	0.00 %	0.400
Total		**5,052**	**100.00 %**	**2,766**	**54.75 %**	**1,415**	**28.01 %**	**871**	**17.24 %**	**1.341**

To estimate the long-run performance of IPO firms I used two different methods. As a calendar-time approach, I used alphas from the Fama-French (1993) three-factor model, which is based on the Amor and Kooli (2016) research. As an event-time approach I applied cumulative average returns and cumulative average abnormal returns with the Sharpe and Lintner (1964 and 1965) Capital Asset Pricing Model. As an event-time approach, Amor and Kooli (2016) calculated cumulative average abnormal returns and buy and hold returns based on three benchmarks: the value-weighted CRSP index; a sample of firms matched by industry, size and book-to-market ratio and a sample of firms matched using PSM. I decided to exclude this method from my thesis and use the non-adjusted and CAPM risk-adjusted returns for the

event-time approach instead, because finding all the sample firms would have been too time consuming in the scope of this thesis. Both, calendar-time and event-time approaches are discussed thoroughly in the next section.

3. Empirical testing and results

In this section, I present thoroughly both methods I used to determine the IPO firms' long run performance and compare these results with the two groups and two subgroups defined earlier. With both approaches, I discuss first the results between the non-acquirers and acquirers and then between infrequent and frequent acquirers. I consider the first two years after the IPO as the acquisition window, so my period for return calculations for each firm include years 2 to 6 after the IPO. In many occasions, the firm faced delisting, bankruptcy or just problem with the data availability during these years. As these were not sorted out in Datastream (instead they appear as zeros in returns), I assumed that they will not significantly affect my results when comparing the different groups. I recognize that the abnormal returns may be slightly biased due to this assumption but the comparison between the firm groups is still solid.

All the firms' monthly returns in this thesis are calculated with the following formula:

$$(1) \quad R_{i,t} = \frac{TRI_{i,t}}{TRI_{i,t-1}} - 1$$

where $R_{i,t}$ is the return of stock i during period t, $TRI_{i,t}$ is the Total Return Index (from Datastream) of firm i during period t and $TRI_{i,t-1}$ is the Total Return Index of the same firm one period before period t.

3.1 Calendar-time approach

I applied the Fama-French (1993) three-factor model to evaluate the European IPO firms' long-run performance. First, I calculated the monthly returns for each IPO firm between months 25-72 as the months 1-24 acted as my acquisition window. I formed four portfolios of the total sample: non-acquirers, acquirers, infrequent acquirers and frequent acquirers (defined earlier) and calculated their equally weighted average returns (Amor and Kooli used value weighted average returns but again due to time limitations equally weighted portfolios was more reasonable choice for this purpose). I used Fama-French (1993) European monthly three-factors from the Kenneth R. French Data Library as my estimates for the model. For Europe, there were no country or firm specific factors available, so I decided that the European factors are

sufficient for this study because the European countries[1] included in calculating these factors represent 90.36% of my IPO sample. With the equally weighted portfolio average returns, and the European Fama and French (1993) factors, I estimated the following regression:

$$(2) \qquad R_{pt} - R_{ft} = \alpha_p + \beta_1\left(R_{mt} - R_{ft}\right) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t$$

where R_{pt} is the monthly return of an equally weighted calendar-time portfolio of IPO firms, R_{ft} is the one month T-bill rate, R_{mt} is the return on an European value-weight portfolio, SMB_t is the equal-weight average of the returns on European three small stock portfolios minus the average of the returns on the region's three big stock portfolios, and HML_t is the equal-weight average of the returns for European two high book-to-market portfolios minus the average returns of the region's two low book-to-market portfolios.

First, as shown in Panel A of Table 4, the whole IPO sample's mean monthly calendar-time abnormal returns for the period were 0.53%, which is not in line with the IPO long-run underperformance discussed earlier. However, this result is statistically significant only at the 10% level. The abnormal returns may also be slightly biased due to the survivorship bias, which was discussed in the beginning of this section. The Panels B and C show the comparison between non-acquirers and acquirers; the non-acquirers yield positive monthly abnormal returns of 0.81% (significant at the 1% level), while the acquirers have non-significant monthly abnormal returns of 0.19%. This is in line with the hypothesis that post-IPO acquisitions affect negatively on IPO long-run performance.

The results in Panels D and E show the abnormal returns of infrequent and frequent acquirers. Infrequent acquirers have a mean monthly abnormal returns of 0.16% and frequent acquirers 0.18%, both of them insignificant. With these subgroups, I cannot interpret that the number of acquisitions during the first two years after the IPO would affect the firms' long-run performance in European countries. This result contradicts with the Amor and Kooli (2016)'s statement that most of the post-IPO acquirers' underperformance would come from the frequent acquirers. The finding may also result from the differences between European and U.S. IPO and acquisition cultures.

As shown in the table, none of the five groups' HML factors are significant, which may result from the original factors. The Adjusted R-squared values are as well rather small, which

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[1]The European countries included in calculating the Fama-French three-factors were Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Greece, Ireland, Italy, Netherlands, Norway, Portugal and Sweden.

may be caused by the same reason. Even though the countries, which are included in the factor calculations, represent 90.36% of my IPO sample, the factors may still be somewhat biased for these firms. Therefore, further analysis with more accurate Fama-French factors would be necessary for the following studies.

Overall, according to the calendar approach with Fama and French (1993) three factor model, the best performing IPO firms in Europe do not acquire in the first two years after the issue. However, whether a firm does 1 to 2 or 3 or more acquisitions during this period, does not affect its long-run performance.

Table 4
Calendar-time approach: Fama-French three-factor model reression results

	Factors				Model characteristics	
	Alpha	RMRF	SMB	HML	Adjusted R-squared	F-stat
Panel A: Equal weighted calendar-time portfolio (all sample)						
Estimate	0.0053	0.2631	0.9002	0.0667	18.25 %	22.14**
t-Statistics	1.910*	4.589***	7.326***	0.589		
Panel B: Equal weighted calendar-time portfolio (non-acquirers)						
Estimate	0.0081	0.2497	0.8853	0.0302	16.73 %	20.02**
t-Statistics	2.826***	4.265***	7.056***	0.261		
Panel C: Equal weighted calendar-time portfolio (acquirers)						
Estimate	0.0019	0.2671	0.9071	0.1190	16.68 %	19.95**
t-Statistics	0.625	4.344***	6.882***	0.979		
Panel D: Equal weighted calendar-time portfolio (infrequent acquirers)						
Estimate	0.0016	0.2567	0.8827	0.1414	15.90 %	18.90**
t-Statistics	0.532	4.167***	6.683***	1.161		
Panel E: Equal weighted calendar-time portfolio (frequent acquirers)						
Estimate	0.0018	0.2735	0.9132	0.1165	13.34 %	15.57**
t-Statistics	0.522	3.889***	6.058***	0.838		

This table shows the results from Fama-French (1993) three-factor model regression. Monthly returns on the five portfolios are calculated from month 25 to 72 after the IPO. The dependent variable is the difference between monthly return on equally weighted calendar-time portfolio and the monthly return on the 3-month T-bill. The independent variables are (1) *RMRF* is the difference of European value-weight market portfolio and the monthly return on the 3-month T-bill; (2) *SMB* is the difference of equal-weight average of the returns on European three small stock portfolios on the average of the returns on the region's three big stock portfolios, and (3) *HML* is the difference of equal-weight average of the returns for European two high book-to-market portfolios and the average returns of the region's two low book-to-market portfolios. *Alpha* is the intercept term and represents the mean monthly excess returns on the calendar time portfolio. Panel A presents the estimates for all IPOs. Panel B and C reports the regression results for the non-acquirers and acquirers, respectively. Panel D and E show estimates for the infrequent and frequent acquirers, respectively. The results for t-statistic, adjusted R-squared and F-stat are documented for each model.

* Statistical significance at the 10% level.
** Statistical significance at the 5% level.
*** Statistical significance at the 1% level.

3.2 Event-time approach

As in the calendar-time approach, within this approach I focus on the IPO performance for months 25-72 after the issue announcement. In the event-time approach, I calculated non-adjusted cumulative average returns (CAR) and CAPM risk-adjusted cumulative average abnormal returns (CAAR) for all the firms in the sample. Both of these cumulative returns are

calculated for four periods, for years 3 (months 25-36), 4 (25-48), 5 (25-60) and 6 (25-72) after the IPO. The CAR from month q to month s is defined as:

$$(3) \qquad CAR_{q,s} = \sum_{t=q}^{s} AvR_t$$

where

$$(4) \qquad AvR_t = \frac{1}{n} \sum_{t=q}^{s} R_{i,t}$$

AvR_t is the average return (non-risk-adjusted) for the portfolio for the month t and $R_{i,t}$ is the monthly return of the stock i (defined in the beginning of this chapter).

The cumulative average abnormal returns (CAAR) from month q to month s are calculated according to the following formulas:

$$(5) \qquad CAAR_{q,s} = \sum_{t=q}^{s} AvAR_t$$

where

$$(6) \qquad AvAR_t = \frac{1}{n} \sum_{t=q}^{s} AR_{i,t}$$

and the $AR_{i,t}$ is calculated for each month with the original CAPM formula:

$$(7) \qquad R_{i,t} - R_{f,t} = AR_{i,t} + \beta_i \left(R_{m,t} - R_{f,t} \right)$$
$$=> AR_{i,t} = R_{i,t} - R_{f,t} - \beta_i \left(R_{m,t} - R_{f,t} \right)$$

$AvAR_t$ is the average abnormal return of the portfolio for the month t and $AR_{i,t}$ is the monthly abnormal return for firm i during month t. $R_{i,t}$ in the CAPM formula has the same definition as earlier, $R_{f,t}$ is the is the one month T-bill rate (as in the calendar-time approach) and $R_{m,t}$ is the return for STOXX Europe 600 Index for the month t. β_i is calculated for each individual firm against the STOXX Europe 600 Index and is defined as:

$$(8) \quad \beta_i = \frac{Cov(R_i, R_m)}{Var(R_m)}$$

where R_i is the returns for the firm i for months 25 to 72 after the IPO and R_m is the returns for STOXX Europe 600 Index for the same months.

Table 5 and 6 show the results for both CAR and CAAR calculations. The Table 5 focuses on the differences between non-acquirers and acquirers and the Table 6 on the differences between frequent and infrequent acquirers. In Panel A of the Table 5 are the variances and means CAR and CAAR values for the whole IPO sample. The average returns for the sample grow quite steadily after the third post-IPO year (third year return is -0.01%). Yearly average return for the whole sample for years 2-6 after the IPO is 5.85%.

Panels B and C of the Table 5 present the performance comparison between the non-acquirers and acquirers. The means of CAR and CAAR returns show that already in the third year after the issue (right after the acquisition window is closed), these groups' cumulative returns start to differentiate from each other as non-acquirers yield positive and acquirers negative returns. The Panel D presents the mean difference of these groups and its t-statistic. The non-acquirers seem to outperform acquirers in every of the four research periods as the CAR mean difference grows from 0.1299 to 0.2564 in the four-year period. The CAAR mean difference acts similar way as it grows from 0.1298 to 0.2410. The cumulative average returns of non-acquirers in the year 6 are over three times larger than the acquirers' returns. The difference in CAR means between non-acquirers and acquirers in years 2-4, 2-5 and 2-6 are statistically significant at the 1% level. The difference in CAAR means between these groups in years 2-4 is significant at the 5% level and in years 2-5 and 2-6 is significant at the 1% level. Based on this information, it seems that the non-acquirers outperform acquirers during years 2-4, 2-5 and 2-6 after the IPO. This is in line with the results of the calendar-time approach presented earlier and with the original hypothesis that the post-IPO acquisitions could explicate the long-run IPO underperformance.

The impact of acquisition activity on IPO long-run performance: Evidence from Europe.

Table 5

Event-time approach, non-acquirers vs. acquirers: Non-adjusted cumulative average returns (CAR) and CAPM risk-adjusted cumulative average abnormal returns (CAAR) excluding the first two years

	Years 2-3		Years 2-4		Years 2-5		Years 2-6	
	$CAR_{2,3}$	$CAAR_{2,3}$	$CAR_{2,4}$	$CAAR_{2,4}$	$CAR_{2,5}$	$CAAR_{2,5}$	$CAR_{2,6}$	$CAAR_{2,6}$
Panel A: all sample								
N	5,052	5,052	5,052	5,052	5,052	5,052	5,052	5,052
Variance	0.474	0.494	1.059	1.132	1.610	1.688	2.049	2.128
Mean (%)	-0.01 %	-2.13 %	6.82 %	2.93 %	14.16 %	8.11 %	25.53 %	16.29 %
Panel B: non-acquirers								
N	2,766	2,766	2,766	2,766	2,766	2,766	2,766	2,766
Variance	0.512	0.545	1.110	1.160	1.790	1.839	2.404	2.444
Mean (%)	5.87 %	3.75 %	14.81 %	10.81 %	24.94 %	18.70 %	37.13 %	27.19 %
Panel C: acquirers								
N	2,286	2,286	2,286	2,286	2,286	2,286	2,286	2,286
Variance	0.419	0.423	0.980	1.081	1.362	1.477	1.584	1.714
Mean (%)	-7.12 %	-9.23 %	-2.84 %	-6.60 %	1.11 %	-4.71 %	11.49 %	3.09 %
Panel D: Mean difference tests non-acquirers vs. acquirers								
Mean difference	0.1299	0.1298	0.1765	0.1741	0.2383	0.2341	0.2564	0.2410
t-statistics	1.560	1.524	2.657***	2.482**	3.922***	3.704***	3.957***	3.488***

This table shows the non-adjusted cumulative average abnormal returns (CAR) and the CAPM risk-adjusted cumulative average abnormal returns (CAAR) from 2 to 6 years after the IPO (excluding the first two years after the issue). For example, $CAR_{2,5}$ is the cumulative average return from month 25 to 60 following the IPO. Panel A presents CAR and CAAR for all IPO firms. Panel B reports CAR and CAAR for non-acquirers and acquirers (defined earlier). The sample size, variance and the means of returns are presented for all groups. T-statistic for difference in means test are given in Panel D.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

The Table 6 presents the performance comparison between mean returns of infrequent and frequent acquirers. As seen in the Panel A and Panel B of the table, the cumulative average returns and the cumulative average abnormal returns of both of these subgroups sunk in the third year after the IPO. However, there is a notable difference between the subgroups, as infrequent acquirers have a negative third year return of -3.70% and the frequent acquirers a return of -13.70% in the same year. The CAPM cumulative abnormal returns of these two subgroups are even lower throughout the studied period. After the third year drop, the returns start to grow quite steadily towards the sixth post-IPO year, whereupon infrequent acquirers have a CAR of 15.80% and frequent acquirers a CAR of 4.49%. The mean difference in CAR and CAAR of the two subgroups remain between 0.0986 and 0.1367 for the four-year period. Even though there are clearly differences in the subgroups' long-run performance, none of the CAR or CAAR mean differences are statistically significant. This is not in line with the hypothesis that frequent acquisitions during the first two years after the IPO would affect the issuers' long-run performance. On the other hand, it is in line with my calendar-time approach presented earlier, which didn't find any statistically significant results in the performance of these two subgroups.

The impact of acquisition activity on IPO long-run performance: Evidence from Europe.

Table 6
Event-time approach, infrequent acquirers vs. frequent acquirers: Non-adjusted cumulative average returns (CAR) and CAPM risk-adjusted cumulative average abnormal returns (CAAR) excluding the first two years

	Years 2-3		Years 2-4		Years 2-5		Years 2-6	
	$CAR_{2,3}$	$CAAR_{2,3}$	$CAR_{2,4}$	$CAAR_{2,4}$	$CAR_{2,5}$	$CAAR_{2,5}$	$CAR_{2,6}$	$CAAR_{2,6}$
Panel A: infrequent acquirers								
N	1,415	1,415	1,415	1,415	1,415	1,415	1,415	1,415
Variance	0.428	0.425	0.848	0.899	1.381	1.426	1.639	1.729
Mean (%)	-3.07 %	-5.47 %	1.94 %	-2.37 %	6.32 %	0.27 %	15.80 %	7.22 %
Panel B: frequent acquirers								
N	871	871	871	871	871	871	871	871
Variance	0.396	0.413	1.185	1.371	1.320	1.550	1.489	1.685
Mean (%)	-13.70 %	-15.34 %	-10.62 %	-13.48 %	-7.35 %	-12.80 %	4.49 %	-3.61 %
Panel C: Mean difference tests infrequent acquirers vs. frequent acquirers								
Mean difference	0.1063	0.0986	0.1257	0.1111	0.1367	0.1307	0.1131	0.1082
t-statistics	0.228	-0.049	0.580	0.235	0.735	0.582	0.245	0.147

This table shows the non-adjusted cumulative average abnormal returns (CAR) and the CAPM risk-adjusted cumulative average abnormal returns (CAAR) from 2 to 6 years after the IPO (excluding the first two years after the issue) for infrequent and frequent acquirers (defined earlier). Panel A and B reports CAR and CAAR for infrequent and frequent acquirers, respectively. The sample size, variance and the means of returns are presented for both subgroups. T-statistic for difference in means test are given in Panel C.

In Figure 1 is presented the non-adjusted cumulative average returns (CAR) on the whole sample, non-acquirers, acquirers, infrequent acquirers and frequent acquirers. The figure shows clearly that only group of issuers, of which CAR grows steadily in years 2 to 6 after the IPO, is the non-acquirers. The acquirers' CAR begins to grow steadily after the month 59, so they are clearly underperforming the years 2-5 after the IPO. As for the subgroups, it is also distinct that infrequent acquirers produce better cumulative returns than the frequent acquirers, especially in the months 25 to 45 after the IPO, even though these differences were not significant in any year.

Figure 1: Cumulative average returns (CAR) by IPO groups
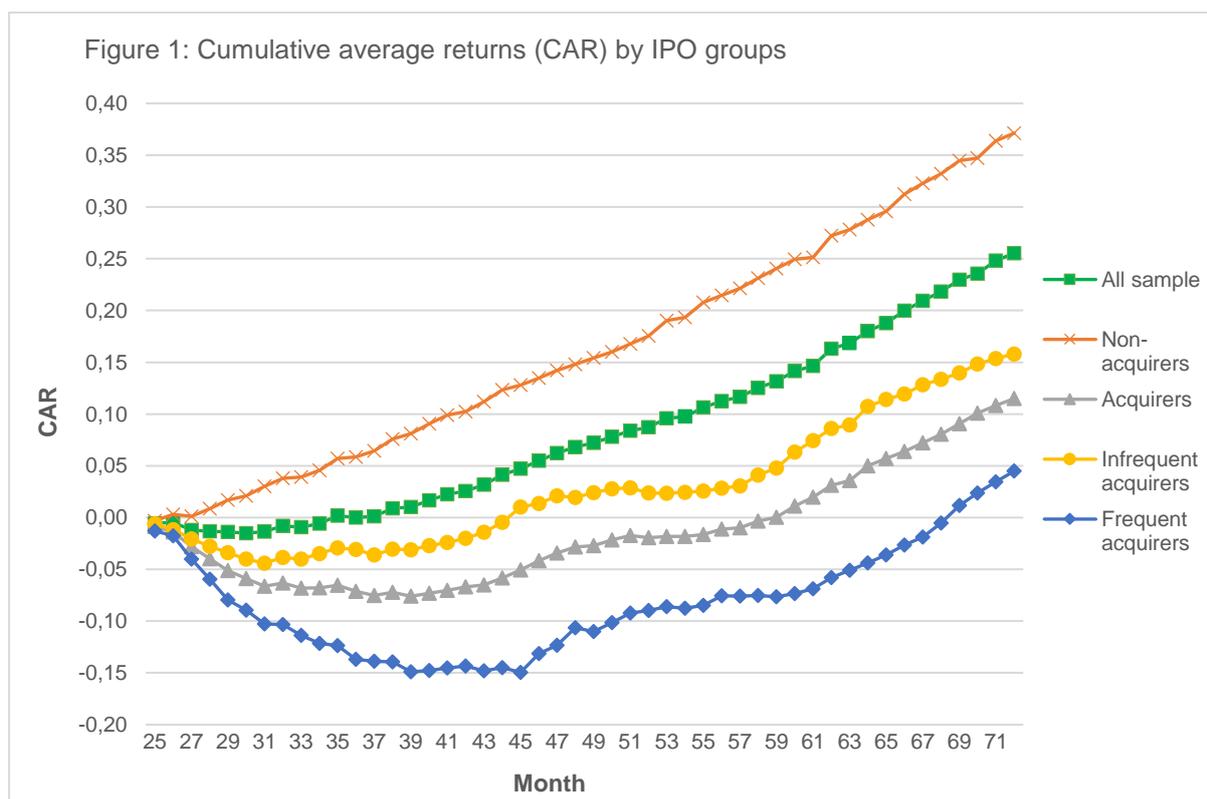
The reference study (Amor and Kooli, 2016) used several robustness checks to confirm the results. Worthwhile robustness check would have been e.g. to control the IPO and acquisition waves in the regression to find out that would acquisitions affect the IPO long-run performance also outside the "hot periods" such as the Dot-com bubble in 1997-2001. In the scope of this thesis due to time limitations, I decided to cut out the robustness checks of my analysis. However, for extra analysis it would be relevant to check whether the findings of this thesis are still significant after applying the robustness checks.

4. Conclusion

The previous literature does not consider acquisitions as a driver for the IPO long-run underperformance in Europe as it is studied quite extensively in the U.S. In this thesis, I compared the long-run performance of post-IPO non-acquirers and acquirers and likewise the performance of infrequent acquirers and frequent acquirers. I used a sample of 5,052 European IPOs in between 1990 and 2009 and included all the acquisitions the issuer completed during the first two years after the IPO. I examined the post-IPO performance for the years 2-6 after the issue.

Both of the approaches I used produced similar results. The calendar-time approach using the Fama-French (1993) three-factor model results a monthly alpha of 0.81% (t-stat = 2.826), which is significant at the 1% level for the non-acquirers, compared to a monthly alpha of 0.19% (t-stat = 0.625) for the acquirers. Results of the event-time approach using cumulative average returns (CAR) and cumulative average abnormal returns (CAAR) supports this finding. Within years 2-6 after the issue, non-acquirers face a CAR of 37.13% (CAAR = 27.19%) while acquirers' CAR in the same period was 11.49% (CAAR = 3.09%). The mean differences between these two groups are statistically significant at the 1% level for both CAR and CAAR within this period. Based on these findings, the European newly public acquirers appear to experience significantly worse performance in the six years after the IPO than the non-acquirers. This finding of European issuers is in line with the U.S. studies made by Brau et al. (2012) and Amor and Kooli (2016) both concluding that the acquisitions affect negatively on the IPO long-run performance. However, there were no significant findings considering the difference between the performance of infrequent and frequent acquirers. Therefore, inconsistent with Amor and Kooli (2016), it seems that for Europe the reported underperformance of IPO firms that make acquisitions does not mostly come from firms that make frequent acquisitions.

I explain the findings with Roll (1986)'s hubris hypothesis together with Malmendier and Tate (2008)'s findings about CEO overconfidence. The hubris hypothesis argues that the management of bidding firms pay too much for their targets as they are infected by hubris, thinking that they can manage the firm more efficiently than its current management. Malmendier and Tate (2008) supports this hypothesis as they note that the overconfident CEOs make the lower-quality acquisitions more likely when the company has abundant internal resources, which is generally the case for newly public firms. My results show also that investors are likely to be overoptimistic about the acquisitions of newly public firms as the underperformance is recorded not until years after the acquisition events. I rationalize this with the finding of Titman et al. (2004), who argued that investors often underreact to the empire building implications, when a firm's investment expenditures increase, which results as a long-run underperformance.

To develop the study further, I would recommend using different methods in calculating abnormal returns e.g. using benchmark firms or calculating Fama-French (1993) factors for each firm separately. I hope to see additional researches in the acquisition and IPO behavior in Europe, which could better explain the slightly different results compared to the U.S. markets. It would also be intriguing to see more studies about the country specific features within Europe considering IPOs and M&As, which are not considerably discussed in the existing literature. Overall, the results indicate new empirical evidence on the importance of acquisition decision of newly public firms and offer a new driver for the well-documented IPO long-run underperformance within the European markets.

The impact of acquisition activity on IPO long-run performance: Evidence from Europe.

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