

The sixth merger wave and wealth effects of M&A announcements: an analysis of large European bidding companies

Xavier Auguets-Pratsobrerroca

IQS School of Management -Universitat Ramon Llull

Monica Martinez-Blasco

IQS School of Management -Universitat Ramon Llull

Josep García-Blandón

IQS School of Management -Universitat Ramon Llull

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ABSTRACT

This study aims to investigate short-term market reaction, including stock returns, volatility, and trading volumes of bidder firms, around the announcement dates of relevant merger and acquisition (M&A) transactions in the Eurozone during the sixth takeover wave. We emphasize the observed change in the behavior in the reaction of investors while acquiring firms in the transactions before the global financial crisis.

We use the classical Brown and Warner (1985) event studies method, and Corrado's (1989) non-parametric test of ranks to detect abnormal behavior during the days being examined. The results allow us to make inferences about the relevance of the information released during the transaction announcement period. We add to the classical study of returns the use of a more powerful framework that investigates not only the abnormal returns but also their volatility and the abnormal changes in trading volumes around the announcement dates.

Our results indicate that M&A announcements convey relevant information to investors. Furthermore, we show that investors seem to adjust their investment portfolio to this new information. For the constituents of the Eurostoxx 50, there is no change in returns, while

the short-term reaction is positive and highly significant in terms of volatility of returns and trading volume. Our framework, which includes not only returns but also volatility and volume, is particularly useful when M&A news are not probably interpreted equally by all the investors, and therefore we cannot observe a direct response directly in the returns.

This finding contrasts with previous similar studies in the nineties in Europe that did not use the framework of returns, volatilities and volumes by looking only to the returns aspect. In addition, the most compelling results were, on one side, that we found more significant reaction in the sub segment of large transactions, and null reaction on average in the sub segment of smaller transactions, and, on the other side, that we found relevant reaction in the period before crisis and null on average for the period after the crisis.

To our best knowledge, this is the first study to analyse the market reaction to big M&A announcements by European companies during the sixth wave. We also contribute to the existing literature by being the first study to examine the European M&A market using three indicators of market reaction.

KEYWORDS

Mergers and acquisitions, transaction announcement date, event study, firm size, Eurozone, Eurostoxx 50.

JEL Codes: G11, G14.

1. Introduction

Corporate information is released frequently using many sources of communication. The reaction of stock prices to new available information is a well-established line of research in financial economics, which hinges on the efficient market hypothesis (hereafter EMH). EMH assumes that the stock market reflects all known information, and reacts immediately to the new value-relevant information that is disclosed by public companies, including a merger or tender offer announcement. Event studies analysing short-term reactions constitute a prevalent approach to determine marginal informational content of corporate announcements through variations in either the stock price or trading volume.

Several studies have investigated the reactions of stock prices to different corporate events or public information releases, most of them focusing on Anglo-Saxon countries. Earning announcements have been examined by several studies (e.g. Patell, 1976; Aharony and Swary, 1980; Bamber, 1986; Bernard and Thomas, 1989; Francis et al., 2002a; Francis et al., 2002b). Other corporate events also applying event study methodology include dividend announcements (Pettit, 1972; Asquith and Mullins, 1983; Benartzy et al., 1997), stock splits (Grinblatt et al., 1984; McNichols and Dravid, 1990), securities recommendations (Bjerring et al., 1983; Liu et al., 1990; Beneish, 1991), and corporate news (Battacharya et al., 2000; Chan, 2003).

In addition, there exists extensive literature on the announcement of corporate mergers and acquisitions (hereafter M&As). The literature on M&As is replete with studies that evaluate the impact of acquisitions on the participants, both acquiring and targeted firms as well as the combined effect of the resulting company. This is especially true for the US and the UK, since studies regarding European countries are scarce, with a predominant focus on the fifth takeover wave, and generating inconclusive results (Martynova and Renneboog, 2008). European literature is even more scarce regarding big transactions that could involve significant wealth effects on the bidder. To the authors' best knowledge, only Goergen and Renneboog (2004), while analysing the wealth effects of the European takeover bids during the fifth wave, cut off their sample to a minimum of a \$100 million bid. Other authors limiting the amount paid for the target cut off their sample to a much lower amount, (e.g. Faccio et al., 2006). As established in Rosen (2006), M&As

involving a target much smaller than that of the bidder should not have much effect on the bidder's stock price. In this study, we consider deals worthing \$500 million or more, being the first study to analyse big European transactions during the sixth M&A wave.

Previous research studies have stated that the market for corporate control in Europe, despite some similarities with mature financial markets, possesses unique characteristics, distinct from the US and Asia (Moschieri and Campa, 2009). In this paper, we aim to analyse the short-term market reactions of bidder firms around the announcement of M&A transactions in the Eurozone, and as prevalent in the related literature, we specifically focus on several determinants of share price reactions.

We contribute to the existing literature in different ways. First, European M&A research is much less extensive than that in the Anglo-Saxon countries. By studying the European market, we could achieve a better understanding of this phenomenon in an environment characterised by weaker investor protection and less-developed capital markets (La Porta et al., 1997; Martynova and Renneboog, 2011). Some previous studies on the market for corporate control in Europe have shown idiosyncratic characteristics, which differ from the patterns shown in the US and the UK. In Moschieri and Campa (2009), the authors encourage research to not assume the US and the UK's existing theoretical frameworks for M&A, and treat European M&A independently. Moreover, the scarce already existing literature shows disparity in the results, since most results obtained so far are inconclusive. We aim to elucidate these contradictory results obtained by different authors regarding the determinants of price reactions to M&A announcements.

Second, we also contribute to European M&A literature by studying the European takeover bids launched during the sixth takeover wave. Martynova and Renneboog (2008) demonstrated that the characteristics of the takeover within each wave show different patterns from the foregoing and established fifth wave ending in the middle of 2000, as the dot com bubble burst and the M&A activity collapsed. The M&A market for corporate control remained below its maximum from 1999–2000 until 2003, when the activity in the takeover market increased until mid-2007. Although the fifth takeover wave has been deeply analysed, only very few studies analyse the takeover bids for the sixth wave. In fact, all studies that include takeover announcements' wealth effects for recent periods use a time period that belongs to both the fifth and sixth takeover waves (Campa and

Hernando, 2008; Moschien and Campa, 2009). To the best of our knowledge, no studies purely investigate the sixth M&A wave in Europe and its patterns. Furthermore, Alexandridis et al. (2012), while studying the US market, concluded that the US deals were driven by more rational acquisition decisions during the sixth wave. Thus, it appears worthwhile to investigate the European market during the equivalent period.

Third, the paper includes information about not only the returns but also the volatility and volume traded around the announcement date, leading to a more powerful framework for analysis. As explained in Halpern (1983:98), 'a merger or a tender offer provides a bundle of signals, all of which generate information that is reflected in the security prices of the acquisition participants'. The returns' volatility is a significant complement for returns as it measures the total impact of the traded stock. The release of information and price volatility is well established in the literature (e.g. Campbell and Hentschel, 1991). As market returns represent the overall market expectations (Beaver, 1968), the trading volume reflects traders' idiosyncratic preference to hold, sell, or buy the shares of a firm (Kim and Verrecchia, 1991). The necessity to examine trading volumes was also clearly posed, among others, by Kim and Verrecchia (1991), because trading volumes preserved the differences among individual investors' beliefs that would be cancelled out in the averaging process implicit in the determination of the equilibrium price.

The remainder of the paper is structured as follows. Section 2 presents a literature review about the informational content of M&A announcements in Europe and states the hypotheses. In section 3, we describe the sample and method used, and in section 4 we analyse the empirical results of the univariate residuals obtained. Finally, section 5 presents our concluding remarks.

2. Literature overview and hypotheses development

Existing M&A literature is primarily focused on the Anglo-Saxon markets wherein the research is rich and extensive, and the results are dispersed according to different authors, moments in time, frameworks, the time window under study, and specific data segmentations. In contrast, European M&A empirical research is less extensive and more recent. Many empirical studies evaluating the effects of M&A in the European markets

have focused on the fifth takeover wave (Campa and Hernando, 2004; Goergen and Renneboog, 2004; Campa and Hernando, 2006; Faccio and Masulis, 2005; Martynova and Renneboog, 2006; Martynova and Renneboog, 2009; Martynova and Renneboog, 2011), and only two have partially studied the sixth wave (Campa and Hernando, 2008; Moschien and Campa, 2009).

One of the first studies about the short-term wealth effects of large European takeover bids during the fifth wave is Goergen and Renneboog (2004). The authors study 228 M&A announcements during a seven-year period, which purely belongs to the fifth merger wave, 1993–2000, finding that bidders react positively with a statistically significant announcement effect of 0.7%. The authors consider hostile and friendly takeovers, domestic and cross-border deals, means of payment, relative size of the target out of the bidder's size, and bidders' diversification or concentration strategy. They also control for countries' institutional differences and investigate the reasons for the M&As. Following the authors' results, the status of a takeover bid has a large impact on the short-term announcement reaction, since the hostile acquisitions' reaction on returns are greater than those of friendly ones. Hostile bids result in a negative abnormal return for the bidders, as well as bids for diversification strategies or in cash offer. In addition, they do not find any significant result in their domestic sample, but cross-border mergers show a significant abnormal return of 3.09% to the acquirer. The authors also find a lack of response on its relative size analysis and that the predominant reason for the merger is the synergies.

Almost for the same period, 1993–2001, Martynova and Renneboog (2006) analysed the merger activity in 28 continental European countries, in addition to the UK and Ireland, for a total sample of 2,419 announcements. The authors report a positive short-term wealth effect of a 0.5% significant return for the bidders. As in Goergen and Renneboog (2004), the authors also consider several determinants of share price reactions as follows: the status of the M&A announcement, private or listed target, domestic or cross-border bid, diversification or industry-focused strategy, means of payment, countries' legal origin, and the stage of the takeover wave. The authors confirmed most of the results obtained by Goergen and Renneboog (2004), and also when considering the takeover stage occurrence, that takeovers' announcements occurring at a later stage of the takeover wave return lower gains to the stakeholders than those occurring at the beginning. In

addition, for European corporate takeovers, the authors delve deeper into the bidder's choice of financing in Martynova and Renneboog (2009). The paper findings indicate that preferences for sources of financing depend on the firm's and the takeover characteristics, and are influenced by the bidder's preference for the means of payment. The results are consistent with those obtained some years earlier by Faccio and Masulis (2005), who while studying M&A payment choices of European bidders for publicly and privately held companies during 1997–2000, found that deal and target characteristics affect the method of payment. On the other hand, the results obtained in Faccio et al. (2006) only partially support those obtained by Goergen and Renneboog (2004), Martynova and Renneboog (2006), and Martynova and Renneboog (2011). The authors, splitting a sample of 4,429 M&A announcements between listed and not-listed targets do not find any evidence of reaction while announcing the acquisition of a listed target, a hostile or friendly deal, or for both concentration or diversification strategies. Reactions to the announcement of an unlisted target are positive, both for domestic or cross-border deals, and considering any means of payment.

The European market for corporate control during the fifth wave is deeply analysed in Martynova and Renneboog (2011). The authors intensely exploit their 2,419 M&A announcements' database during 1993–2001 to analyse several factors affecting takeover announcement returns. The analysis is based on three main blocks of determinants: 'Takeover characteristics', 'Characteristics of the bidding and target firms', and 'Legal environment and ownership structure'. Regarding the first block of determinants, the authors study the impact on the wealth effect of domestic and cross-border M&A, hostile and friendly deals, the legal status of the target, if bidder and target are related or not in terms of their business, the type of acquisition, the means of payment, deal transparency, and the stage of the takeover announcement. For the 'Characteristics of the bidding and target firms', the authors consider the firm's size, the Q-ratio leverage, cash flow, and the pre-announcement share run-up. Finally, the legal environment is considered by dividing the sample into UK and continental European firms. The list of results is extensive, since most of them are consistent with Goergen and Renneboog (2004) and those previously shown in Martynova and Renneboog (2006). Among the results not documented before, the authors demonstrate that hostile takeovers are anticipated, and that a part of the value created by the merger is incorporated prior to the announcement. In addition, partial

acquisitions and non-transparent deals lead to losses for shareholders. While all the above mentioned factors are applicable for both the UK and continental European countries, the authors also document the existence of differences between both legal regimes, since the shareholders of takeovers involving UK countries are more able to assess the impact of the M&A announcement on the event day.

Analysing the end of the fifth merger wave (1998–2000), Campa and Hernando (2004) also look at the wealth effect of 262 M&A announcements related to listed firms belonging to 13 continental European countries, in addition to the UK and Ireland. Contrary to Goergen and Renneboog (2004), Martynova and Renneboog (2006), and Martynova and Renneboog (2011), the authors do not find a reaction significantly different from zero to the M&A announcements for the bidding firm. Their results contradict those of previous authors by not showing any significance for friendly, domestic, or cross-border takeover bids while the results regarding the relative size effect of the transaction are unclear. The authors delve deeper into analysing the announcements for financial and publicly traded firms for the period 1998–2002 in Campa and Hernando (2006), with similar results for shareholders of the bidding firms as shown in Campa and Hernando (2004). Later, Campa and Hernando (2008) also document the reaction of the M&A announcements of financial publicly traded companies during 1998–2006, but considering industry insiders, industry analysts, and competing firms. The authors document a lack of reaction of the analysts, concluding that analysts covering firms involved in an M&A transaction do not change their recommendation, and therefore, the transactions are fairly priced.

Later on, Moschieri and Campa (2009) focused their attention on transactions that occurred between 2001 and 2007 in the EU15 area. The authors study a wide range of European M&A transactions involving a change in control, with its final sample accounting for 2,122 announcements. As prevalent in the literature, the authors divided the sample into domestic and cross-border deals, which showed an increased importance accorded to cross-border deals during the period. The study also concludes that the UK market for corporate control differs from the rest of the European countries, since the UK shows a higher proportion of cross-border, hostile, cash-only deals while in continental European countries, domestic and private deals are more frequent. Ownership structure

and investor protection are considered by the authors as an explanation for the phenomena.

Finally, Craninckx and Huyghebaert (2011) analyse intra-European deals during the fifth takeover wave to extend the literature regarding the M&A failure in the European market. The authors find a positive and significant abnormal bidding return for the sample of firms willing to acquire privately held companies and a non-significantly different from zero returns if the target firms were listed.

Summarising, the previous literature indicates a wide range of results for almost all the price determinants in M&A transaction announcements. In this paper, we investigate investors' short-term reactions to M&A announcements during the sixth merger wave with the aim to elucidate big European transactions. The research question is as follows: Do market participants of large capitalisation European firms find M&A announcements informative? As mentioned earlier, we examine the effects of M&A announcements on three measures of informativeness: stock returns, price volatility, and trading volumes. Following the event study methodology, when information is transmitted to the financial market, investors react by selling shares or acquiring new ones, depending on the expected wealth effect of the information transmitted. Therefore, we should expect to find abnormal market returns when investors agree to sell (negative) or buy (positive) shares on the announcement day. We would obtain a significant volatility if the announcement conveys value-relevant information to the market, even if the market participants do not agree on the positive or negative evaluation of the information. The examination of volatility is particularly important when the event might involve positive or negative interpretation for market participants. Finally, we should expect to obtain positive abnormal trading volumes when the announcement transmits valuable information to investors. In this paper, we assume that the European stock market is efficient. Bansal and Lundblad (2002:231) conclude that 'the efficient market hypothesis captures, at least in an economic sense, many of the important aspects of observed equity prices in global markets' when studying the US, the UK, French, German, and Japanese stock markets.

Following the Brown and Warner (1985) method, our hypotheses have been postulated in their null forms:

Hypothesis 1 (H01): For investors of Eurostoxx 50 companies, stock returns on the day of the announcement of an M&A transaction will not differ from those on ordinary days.

Hypothesis 2 (H02): For investors of Eurostoxx 50 companies, volatility stock returns on the day of the announcement of an M&A transaction will not differ from those on ordinary days.

Hypothesis 3 (H03): For investors of Eurostoxx 50 companies, the number of shares traded on the day of the announcement of an M&A transaction will not differ from those on ordinary days.

Existing literature on European firms is dispersed in the results. Some authors find positive reactions for bidding firms (Goergen and Renneboog, 2004; Martynova and Renneboog, 2006; Martynova and Renneboog, 2011) while others do not obtain any reaction at all (Campa and Hernando, 2004). Assuming that managers act rationally and for the best interests of the firm, we should expect a positive market reaction to the announcement.

Previous research studies document a great number of determinants influencing the market's reaction to M&A announcements, mostly depending on the attributes of the transaction, the stage of the takeover wave, characteristics of bidder and target firms, as well as their legal origins. We examine the possibility of relevance of some of the most largely studied determinants for the sixth M&A wave, which has somewhat contradictory results among the authors studying the fifth wave for the European corporate market control. This continues to render the results obtained nowadays unclear.

3. Sample Selection and Methodology

In subsections 3.1 and 3.2, we present the sample and dataset used in this research and the method we propose to study the informativeness of M&A announcements.

3.1. Sample selection

We examine abnormal stock returns, volatilities, and trading volumes around M&A announcements between 1 January 2003 and 31 December 2011 of the Eurostoxx 50 stock market index components. The daily adjusted trading data has been obtained from the Bloomberg database, and the information about acquisition announcement dates has been collected from the Thomson Reuters knowledge database.

To include a transaction in the study, its value should be greater than \$500 million, offering a minimum relative size cut-off as proposed in Healy et al. (1992), and similar to Goergen and Renneboog (2004). Transactions must have a disclosed dollar value and a clear announcement date in order to be considered in the study.

In total, 45 different companies announcing relevant transactions have been studied, leading us, once cleaned events with confounding effects, to a final sample size of 125 events.

Table 1 shows the events distribution among the years, and classified by price change determinants. As depicted, our sample is mostly constituted by friendly cross-border M&A announcements, paid in cash, which is the primary strategy focusing on obtaining a majority stake.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Deal attitude										
Hostile	0	0	1	0	0	0	0	0	0	1
Friendly	8	15	13	18	24	11	9	2	6	106
Friendly to Hostile	0	0	0	1	0	0	0	1	0	2
Not Available	3	2	3	2	2	1	2	1	0	16
Geographical scope										
Domestic deals	5	5	3	5	4	3	4	3	3	35
Cross-border deals	6	11	13	16	21	9	6	1	3	86
Not Available	0	1	1	0	1	0	1	0	0	4
Payment method										

Cash	8	12	12	14	21	9	9	3	5	93
Equity	0	1	2	2	2	1	0	0	0	8
Combinations	0	1	0	1	0	1	0	0	1	4
Assets	0	0	0	1	0	0	0	0	0	1
Unknown	0	0	0	1	1	0	0	0	0	2
Not Available	3	3	3	2	2	1	2	1	0	17
Strategy										
Focus-same industry	7	13	13	20	22	11	11	3	6	106
Diversification	4	4	4	1	3	1	0	1	0	18
Not available	0	0	0	0	1	0	0	0	0	1
Type of acquisition										
Minority stake	3	2	1	5	7	3	7	1	1	30
Majority Stake	4	9	8	9	12	7	1	0	2	52
Full bid	1	4	5	5	5	1	1	2	3	27
Not Available	3	2	3	2	2	1	2	1	0	16
Size										
Small	4	2	4	7	9	6	8	0	2	42
Big	1	7	7	7	10	3	1	4	3	43
Other	6	8	6	7	7	3	2	0	1	40

Table 1. Events distribution

Table 2 provides the descriptive statistics of the sample mergers and the sizes of the transaction values for each year of the sample.

Year	Number of Transactions	Number of Bidders	Minimum Transaction Size (1)	Average Transaction Size (1)	Maximum Transaction Size (1)
2003	11	10	589	1,159	1,990
2004	17	15	512	5,993	61,000
2005	17	17	501	5,099	30,720
2006	21	21	517	4,356	32,030
2007	26	23	500	3,951	24,260
2008	12	12	549	6,154	46,800
2009	11	11	508	2,271	15,540

2010	4	4	2,770	8,573	15,784
2011	6	6	625	5,314	23,790

(1) Amounts in US million dollars

Table 2. This Table describes the 2003 to 2011 sample of 125 cross-border and domestic acquisitions obtained from the Thomson Reuters database. The transaction does not need to be completed but an official announcement has to exist and simple rumors of transactions are not included. All the transactions have a disclosed dollar value and this has to be in excess of 500 Million US dollars in order to be considered in the study

3.2. Methodology

We follow the Brown and Warner (1985) event study methodology to assess the informational content around acquisition date announcements. Abnormal price changes (Beaver, 1968) and trading volumes (Kim and Verrecchia, 1991) are investors' responses to the disclosure of information; thus, we expect abnormal prices and trading volumes whenever the transaction translates new information to the financial markets.

We test the aggregate market's average reaction to information released by testing changes in prices through two different measures: abnormal returns (ARs) and absolute value abnormal returns (AARs). Additionally, we examine the activity of individual investors around M&A announcements by analysing the change in trading volumes. These three indicators of the market reaction to the release of information have been tested by a t-test when the data is normally distributed, and otherwise by a non-parametric test (Corrado, 1989; Corrado and Zivney, 1992).

We compute ARs as the difference between the actual and normal returns, while the latter are defined as the expected returns without conditioning on the event. Expected returns are obtained from the market model. For each company, a large number of events can be studied. Unless all companies experience similar positive or negative reactions to acquisition announcements, positive and negative ARs cancel each other out, implying that unusual changes in prices cannot be detected. To avoid the compensation, we also examine stock price volatility around the acquisition dates, measured as the absolute value of abnormal returns. Then, we proceed similarly as with ARs. The only difference arises in how ARs are computed: when they are computed in absolute values, they cannot be directly used to perform a parametric test, because the null hypothesis, that a sum of

absolute values is zero, will be rejected. Therefore, we correct the absolute returns by the mean value of the pre-event period. Finally, we define abnormal volume (AV) as the number of shares traded on a given day divided by the average shares traded over the pre- and post-event estimation periods.

Given the nature of the event, it is meaningful to address the behaviour of prices and trading volumes not only on the announcement day but also some days before and after the event. If there is insider trading, we should observe a market reaction before the announcement date, while there could also be a delayed market reaction to the information released. To capture these possible effects, we do not limit our research to the day of the event but also examine an 11-day event window [-5, +5]. According to Haleblan et al. (2009), it is very common to examine firms' behaviour around M&A announcements by analysing ARs over a short window period of one to five days.

Lastly, cumulative average abnormal return (CAAR), cumulative average absolute value abnormal return (CAAAR), and cumulative average abnormal volume (CAAV) have all been obtained by adding AAR, AAAR, or AAV across different time intervals within the event window.

Appendix 1 describes the computations in detail.

4. Results

Results are presented in six tables (Tables 3 to 8) following the same structure. The tables show the results for AAR (panel 1), AAAR (panel 2), and AAV (panel 3) for the total sample (Table 3) and subsamples (Tables 4 to 8). The significance levels according to the t-test or Corrado test are reported for each day within the event window. Accumulated results, CAARs, CAAARs, and CAAVs, are also reported for five different periods at the bottom of each table. Thus, the accumulated results are presented considering the day of the event as well as the previous five days [-5, 0], one day before [-1, 0], one day after [0, 1], five days after [0, +5], and for the entire window period. The first period analyses whether there is a leakage of information prior to the merger announcement, and the [0, +5] period determines the existence of a delayed reaction. Periods [-1, 0] and [0, 1] reflect

a very short-term anticipated or delayed reaction to the announcement. Finally, the cumulative period [-5, 5] reflects the cumulative effect for the entire period.

Subsection 4.1 presents the results for the entire sample while subsection 4.2 analyses the results using as subsamples some determinants of the price reaction to M&A announcements.

4.1. Results using the entire sample of events

Table 3 summarises the results of the entire sample analysis. For the announcement of an M&A transaction, our results do not show any evidence of a return reaction on the event day. Therefore, H1 cannot be rejected, and the conclusion, just following the price reaction on returns, should be that the market is not reacting to the announcements. This finding is consistent with Campa and Hernando (2004) wherein the ARs for bidding firms received insignificant excess returns. In addition, in Faccio et al. (2006), the authors do not find any reaction while bidding for a listed target. However, our results are contrary to those of Goergen and Renneboog (2004) and Martynova and Renneboog (2006, 2011) where excess returns were found significant and positive.

Nevertheless, panels 2 and 3 depict an observation that is not shown in panel 1, that is, a significant (at 1% level) market reaction in terms of volatility of returns and volume traded. Thus, we can reject our null hypotheses H2 and H3, and therefore conclude that there is a stockholder reaction to the announcement. The results obtained suggest that investors do not achieve a consensus in buying or selling their stocks on the announcement day, thereby increasing the market volatility and the number of shares traded.

During the following days, we can observe a slightly selling market reaction on day $t+1$, with a decrease in volatility and the number of shares traded. Our results may suggest that investors require some time for decision making, once the M&A announcement is made, and when they decide, it mostly pertains to selling their stocks. High volatility and higher than average abnormal volume traded is steadily maintained during $t+2$, and decreases to a much slightly reaction on $t+3$.

For the multi-day tests, we only report the negative significant results for CAAR for the entire period, [-5, 5], while there is a marginally negative reaction for five days after the announcement, [0, 5]. Results for CAAAR and CAAV are significant, with almost all of them being at the 1% level, for all cumulative periods. Especially relevant is that the two sub-periods that could indicate potential anticipation of the markets to the acquisition announcement information, [-5, 0] and [-1, 0] are also significant for volatilities and volumes.

In conclusion, our results support the necessity to analyse volatility and traded volumes along with returns as our conclusions would differ substantially by not adding these two additional indicators. Just following the returns, our results would suggest that investors do not react to the announcement when they actually do.

	N=125		N=125			N=123			
	Panel 1		Panel 2			Panel 3			
Event Day	AAR	t-test	AAAR	t-test		AAV	Corrado		
-5	-0.0008	-0.6244	0.0016	2.2353	**	-0.0183	-1.1353		
-4	-0.0007	-0.5497	-0.0004	-0.5617		-0.0039	-1.1474		
-3	-0.0005	-0.4197	0.0009	1.2643		0.1111	1.2798		
-2	-0.0003	-0.2605	0.0003	0.4850		0.0524	0.6846		
-1	-0.0012	-0.9618	0.0009	1.2588		0.0871	1.1912		
0	-0.0003	-0.2727	0.0033	4.4340	***	0.3907	4.3735	***	
1	-0.0021	-1.7804	*	0.0021	2.7794	***	0.3428	2.6181	***
2	-0.0014	-1.1780		0.0022	2.9124	***	0.3143	2.7118	***
3	-0.0002	-0.1778		0.0013	1.7188	*	0.1871	1.8500	*
4	0.0007	0.5793		0.0008	1.1024		0.1900	1.1035	
5	-0.0018	-1.5368		0.0009	1.1882		0.0774	0.2262	
	CAAR	t-test	CAAAR	t-test		CAAV	Corrado		
[-5,0]	-0.0037	-1.2610	0.0068	3.7215	***	0.6192	2.1419	**	
[-1,0]	-0.0015	-0.8729	0.0043	4.0254	***	0.4778	3.9349	***	
[0,1]	-0.0025	-1.4517	0.0054	5.1006	***	0.7336	4.9438	***	
[0,5]	-0.0053	-1.7825	*	0.0106	5.7706	***	1.5024	5.2595	***
[-5,5]	-0.0086	-2.1656	**	0.0140	5.6735	***	1.7309	4.1476	***

Table 3. This table summarises daily average abnormal returns, absolute value abnormal returns, and abnormal trading volumes around M&A announcements for the whole sample. Superscript ***, ** and * indicate significance at 1, 5 and 10% levels, respectively

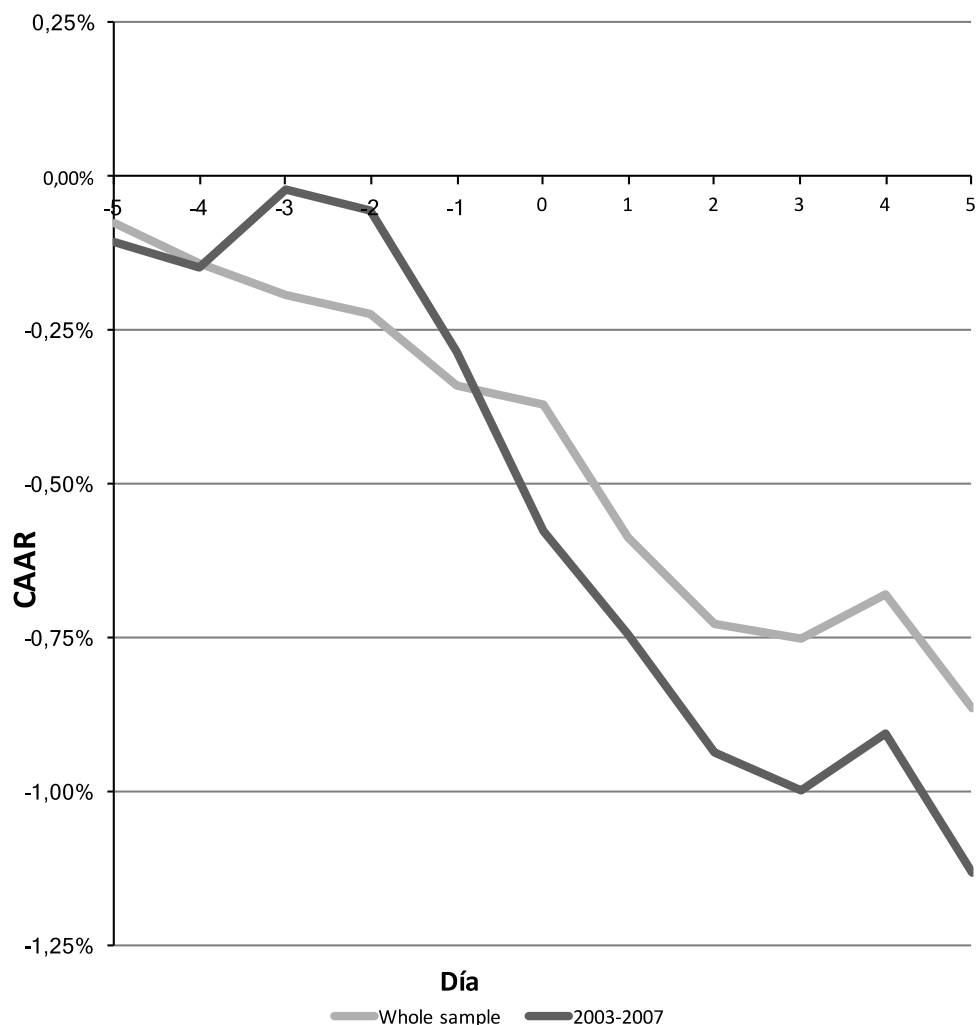
Table 4 depicts the results from the events from 2003 to July 2007, just before the beginning of the financial crisis. The returns are negative and significant (-0.29%),

accompanied with a significant increase in volatility and the number of shares traded (both significant at the 1% level). This result allows us to reject our three null hypotheses while considering only the events before the financial crisis. Shareholders react on not only on the event day but also on almost all accumulative periods once the M&A is announced. The shareholders' first reaction is selling their stocks, in a scenario with high volatility and an increase in the number of trades and volumes of shares traded. M&A announcements have been particularly relevant for transactions announced before the global financial crisis and they have lost most of the relevance after the crisis.

	N=92		N=92		N=91	
	Panel 1		Panel 2		Panel 3	
Event Day	AAR	t-test	AAAR	Corrado	AAV	Corrado
-5	-0.0011	-0.8929	0.0007	0.7328	-0.0426	-0.8415
-4	-0.0004	-0.3398	-0.0009	-0.7180	-0.0559	-1.6234
-3	0.0013	1.0586	0.0012	0.7433	0.1740	1.6181
-2	-0.0004	-0.2955	0.0017	2.5405 **	0.1170	1.4239
-1	-0.0023	-1.8949 *	0.0012	-0.0612	0.0968	0.5441
0	-0.0029	-2.4143 **	0.0033	2.9861 ***	0.4543	3.4294 ***
1	-0.0017	-1.4171	0.0030	3.3408 ***	0.3570	1.4934
2	-0.0019	-1.5966	0.0026	3.3810 ***	0.3319	2.2601 **
3	-0.0006	-0.5159	0.0010	2.0463 **	0.2011	1.7917 *
4	0.0010	0.7922	0.0008	1.4086	0.2032	0.9074
5	-0.0023	-1.9045 *	-0.0001	0.2217	0.0781	0.0151
	CAAR	t-test	CAAR	Corrado	CAAV	Corrado
[-5,0]	-0.0057	-1.9509 *	0.0072	2.5407 **	0.7436	1.8577 *
[-1,0]	-0.0052	-3.0470 ***	0.0045	2.0682 **	0.5511	2.8097 ***
[0,1]	-0.0046	-2.7092 ***	0.0063	4.4738 ***	0.8113	3.4809 ***
[0,5]	-0.0085	-2.8806 ***	0.0106	0.6656	1.6257	4.0405 ***
[-5,5]	-0.0113	-2.8404 ***	0.0145	5.0117 ***	1.9149	3.3222 ***

Table 4. This table summarises daily average abnormal returns, absolute value abnormal returns, and abnormal trading volumes around M&A announcements for transactions starting at 2003 and ending July 2007. Superscript ***, ** and * indicate significance at 1, 5 and 10% levels, respectively

Graph 1 illustrates the differences in the return reaction between the entire sample and the events belonging to the first half of the wave.



Graph 1. CAARs for the Whole Sample and events belonging to years 2003- July 2007

4.2. Determinants of price reaction

As explained earlier, our sample mostly comprises friendly (n=106), cross-border (n=86), focus strategy (n=106), and paid cash (n=93) M&A announcements. Results from each of the later's price determinants (not reported) provide the same conclusion we achieve for the entire sample: no reaction can be seen on the event day when just looking at returns (none of them are significant at any level of significance), but the volatility and volume traded are, in all cases, greater than the average and significant at different levels, depending on the subsample. Therefore, our results show that on the event day, investors of bidding firms involved in a friendly transaction or in a cross-border deal, as well as investments in the same industry sector or those paying cash, trade abnormally by reacting to the new information. Furthermore, when we examine the returns and volatility, we can conclude that investors do not have a clear direction regarding the trading (buying or

selling the stock). Accordingly, we observe abnormal volatility and trading volume but a not significant average ARs for the stocks on the event day.

Once again, our results are consistent with the findings of Campa and Hernando (2004) and Faccio et al. (2006), who do not document any significant reaction for friendly, cross-border, concentration strategy, or paid-cash deals. Our results also do not show any return reaction to domestic transaction announcements (not reported), which is also consistent with Goergen and Renneboog (2004), Campa and Hernando (2004), and Faccio et al. (2006) for the listed targets.

Following the previous literature, other determinants of price reaction are the relative size of the transaction and the type of acquisition, full bid or minority stake.

Thus, Tables 5 and 6 show the results of the analysis of the transactions whose announced values relative to the market capitalisation of the acquiring company are at the top or bottom quartile, respectively, since the top quartile represents the highest 25% and the lower quartile the lowest 25% of the transactions, in terms of relative transaction size of the target versus the acquiring company for every transaction.

	N=43		N=43		N=42	
	Panel 1		Panel 2		Panel 3	
Event Day	AAR	t-test	AAAR	Corrado	AAV	Corrado
-5	-0.0019	-0.9103	0.0014	1.3890	-0.0367	-0.3563
-4	0.0001	0.0469	-0.0005	-0.5522	-0.0319	-0.1077
-3	-0.0008	-0.3949	0.0012	1.5177	0.1020	1.2816
-2	0.0033	1.6022	0.0022	2.0598 **	0.1522	1.6507 *
-1	-0.0044	-2.1601 **	0.0039	1.4602	0.3072	2.1967 **
0	-0.0028	-1.3553	0.0108	5.7966 ***	0.9703	5.1008 ***
1	-0.0021	-1.0136	0.0046	3.0558 ***	0.8750	4.5036 ***
2	-0.0024	-1.1616	0.0039	3.2184 ***	0.6862	2.4069 **
3	-0.0006	-0.3023	0.0033	2.1309 **	0.3731	1.6661 *
4	0.0022	1.0572	0.0029	2.3579 **	0.5168	2.3223 **
5	-0.0054	-2.6355 ***	0.0030	2.0700 **	0.1102	1.8071 *
	CAAR	t-test	CAAR	Corrado	CAAV	Corrado
[-5,0]	-0.0065	-1.2948	0.0191	4.7647 ***	1.4632	3.9869 ***
[-1,0]	-0.0072	-2.4858 **	0.0146	5.1313 ***	1.2775	5.1601 ***
[0,1]	-0.0048	-1.6751 *	0.0153	6.2596 ***	1.8453	6.7913 ***
[0,5]	-0.0110	-2.2091 **	0.0285	1.8077 *	3.5316	7.2695 ***

[-5,5]	-0.0147	-2.1791 **	0.0367	7.3883 ***	4.0245	6.7755 ***
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Table 5. This table summarises daily average abnormal returns, absolute value abnormal returns, and abnormal trading volumes around M&A announcements for the biggest transactions. Superscript ***, ** and * indicate significance at 1, 5 and 10% levels, respectively

	N=42		N=42		N=41	
	Panel 1		Panel 2		Panel 3	
Event Day	AAR	t-test	AAAR	Corrado	AAV	t-test
-5	0.0039	1.6032	0.0022	1.3966	0.0311	0.3532
-4	-0.0012	-0.4956	-0.0016	0.1995	0.0375	0.4262
-3	0.0003	0.1430	0.0014	-0.7509	0.1077	1.2233
-2	-0.0001	-0.0230	-0.0029	-2.2309 **	-0.1266	-1.4388
-1	-0.0006	-0.2537	-0.0009	-0.5369	-0.1425	-1.6188
0	0.0013	0.5408	-0.0011	-0.3482	0.0114	0.1291
1	-0.0023	-0.9464	-0.0011	0.9649	-0.0008	-0.0086
2	-0.0042	-1.7599 *	0.0010	1.9733 **	0.0503	0.5709
3	-0.0015	-0.6438	0.0000	0.0979	0.0436	0.4958
4	0.0008	0.3192	-0.0012	-0.4716	-0.0572	-0.6503
5	0.0020	0.8361	0.0011	0.2394	0.1259	1.4299
	CAAR	t-test	CAAR	Corrado	CAAV	t-test
[-5,0]	0.0036	0.6184	-0.0029	-0.9270	-0.0815	-0.3780
[-1,0]	0.0007	0.2030	-0.0019	-0.6259	-0.1311	-1.0534
[0,1]	-0.0010	-0.2868	-0.0021	0.4360	0.0106	0.0852
[0,5]	-0.0040	-0.6752	-0.0012	-0.0948	0.1731	0.8029
[-5,5]	-0.0016	-0.2050	-0.0030	0.1608	0.0803	0.2750

Table 6. This table summarises daily average abnormal returns, absolute value abnormal returns, and abnormal trading volumes around M&A announcements for small transactions. Superscript ***, ** and * indicate significance at 1, 5 and 10% levels, respectively

Table 5 presents the results of the events representing transactions announced in the Eurozone during 2003–2011 with sizes relative to the market capitalisation of the acquiring company in the top quartile. The data are organised as in Tables 3 and 4. Considering returns reaction first, panel 1, on a daywise basis, we do not observe any reaction on the event day, and thus, we cannot reject H01. Consequently, our results are similar to those obtained by Goergen and Renneboog (2004). Nonetheless, the lack of reaction on the event day could be because the market has reacted in advance, as our results show a negative and significant (at the 5% level) reaction on t-1. This price reaction is also supported by a highest than average reaction in the number of shares traded on t-1 and t-2 (panel 3), and also an increase in volatility on t-2 (panel 2).

Considering these observations together, this may suggest a leakage of information regarding these transactions. In addition, on the event day, the results show a significant increase, at a 1% level, in volatility and the number of shares traded, making us reject, for such transactions, hypotheses H02 and H03.

Following the event day, high levels of price volatility and shares traded are reported on the post-event window, thus suggesting that investors seem to adjust their investment portfolio, before, during, and after a big M&A transaction announcement but without agreeing in a day bases in buying or selling their stocks. However, a multi-day test for ARs shows a negative significance on all accumulated post-event periods, thus suggesting that the short-term reaction of investors of bidding firms involved in a big transaction is mostly to sell their stocks.

We can, therefore, conclude that market participants seem to act along the event window resulting in statistically significant cumulative returns, returns volatilities, and trading volumes.

Otherwise, investors' reactions to the announcement of small transactions are almost insignificant. As depicted in Table 6, our results show a return's marginally negative reaction on $t+2$, panel 1, accompanied with an increase in volatility, significant at the 5% level. These results clearly suggest that smaller transactions in terms of relative size to the acquiring company, are not relevant to investors. The investors possibly understand that these transactions are not relevant enough on average to make them consider to buy or sell the stock due to the announcement.

Therefore, we can conclude that size matters, since in general, the larger the acquisition size with respect to the acquiring company, the more relevant is the transaction for investors, the more negative the market reaction is to the new acquisition, and the more significant is the abnormality of the behaviour of stock prices around the announcement date.

In our opinion, this could explain why some other studies in Europe such as Campa and Hernando (2004) found no significance in the bidders' reaction when considering all-size transactions of large and non-large companies in Europe, as in this case: 1) many low relative size transactions were included in the studied universe of transactions; and 2) the extended framework including volatility of returns and trading volumes is not used.

	N=27			N=27			N=27		
	Panel 1			Panel 2			Panel 3		
Event Day	AAR	Corrado		AAAR	Corrado		AAV	Corrado	
-5	0.0010	0.6527		0.0039	1.9314	*	0.0020	0.1183	
-4	0.0003	0.2057		-0.0002	0.4507		0.0170	0.2317	
-3	0.0027	0.6448		0.0013	0.2052		0.0161	0.1863	
-2	0.0015	-0.0158		0.0032	1.5773		0.1692	1.1518	
-1	-0.0090	-2.9352	***	0.0036	0.3259		0.2300	1.2295	
0	-0.0082	-1.9819	**	0.0107	3.6254	***	1.2494	4.2459	***
1	-0.0002	-1.6536	*	0.0063	2.7039	***	1.1204	3.6141	***
2	-0.0034	-2.0333	**	0.0068	3.9553	***	0.9448	3.0050	***
3	-0.0017	-0.5855		0.0025	1.2675		0.5444	1.9358	*
4	0.0011	0.6329		0.0036	2.2090	**	0.6345	2.1367	**
5	-0.0030	-2.1322	**	0.0044	1.5773		0.2731	2.1173	**
	CAAR	Corrado		CAAAR	Corrado		CAAV	Corrado	
[-5,0]	-0.0117	-1.4002		0.0224	3.3133	***	1.6837	2.9244	***
[-1,0]	-0.0172	-3.4769	***	0.0142	2.7940	***	1.4795	3.8717	***
[0,1]	-0.0084	-2.5706	**	0.0170	4.4755	***	2.3698	5.5578	***
[0,5]	-0.0155	-0.6121		0.0343	1.5458		4.7666	6.9626	***
[-5,5]	-0.0190	-2.7743	***	0.0460	5.9786	***	5.2010	6.0219	***

Table 7. This table summarises daily average abnormal returns, absolute value abnormal returns, and abnormal trading volumes around M&A announcements for full bid transactions. Superscript ***, ** and * indicate significance at 1, 5 and 10% levels, respectively

Finally, we analyse the market reaction by type of acquisition. Table 7 reports the results regarding the 27 announcements making public a full bid. As can be seen, for the event day and following our results, we reject the null hypothesis H01 at the 5% level, and both H02 and H03 at the 1% level for this subsample. These results are quite similar to those obtained for events belonging to the first half of the wave; negative ARs, jointly with an increase in volatility and the number of shares traded. On a daywise basis, the reaction lasts for the following two days in returns and returns volatility, and for the entire window period for the shares traded. The multi-day CAARs [-1, 0], [0, 1], and [-5, 5] are also negative and statistically significant accompanied with CAAARs and CAAVs being positive and significant during almost all cumulative periods.

	N=30		N=30		N=29	
	Panel 1		Panel 2		Panel 3	
Event Day	AAR	t-test	AAAR	Corrado	AAV	Corrado
-5	-0.0008	-0.2698	0.0006	0.7427	0.1203	-0.2480

-4	-0.0004	-0.1537	-0.0002	1.1041	0.1694	-0.6647	
-3	0.0004	0.1261	0.0009	-1.1836	0.2446	1.3551	
-2	0.0008	0.2813	-0.0019	-1.0326	-0.0772	-0.1845	
-1	-0.0001	-0.0276	0.0005	-0.7387	0.0594	1.4265	
0	0.0034	1.1612	-0.0009	-0.2542	0.1893	2.3312	**
1	0.0003	0.0962	-0.0009	0.4329	0.1548	0.9880	
2	0.0019	0.6335	0.0021	3.2171	0.1977	2.0832	**
3	-0.0048	-1.6532	0.0020	1.6761	0.0680	1.5059	*
4	-0.0026	-0.8802	-0.0006	0.2184	0.0845	0.6091	
5	-0.0016	-0.5357	-0.0028	-1.6641	0.0575	-0.5972	*
	CAAR	t-test	CAAAR	Corrado	CAAV	Corrado	
[-5,0]	0.0033	0.4562	-0.0011	-0.5562	0.7057	1.6394	
[-1,0]	0.0033	0.8016	-0.0004	-0.7021	0.2487	2.6571	***
[0,1]	0.0037	0.8891	-0.0018	0.1264	0.3441	2.3471	**
[0,5]	-0.0034	-0.4810	-0.0012	-0.5902	0.7518	2.8252	***
[-5,5]	-0.0036	-0.3684	-0.0013	0.7592	1.2683	2.5944	***

Table 8. This table summarises daily average abnormal returns, absolute value abnormal returns, and abnormal trading volumes around M&A announcements for transactions announcing the acquisition of a minority stake. Superscript ***, ** and * indicate significance at 1, 5 and 10% levels, respectively

In Table 8, we show the results for the events announcing a bid over a minority stake. For the event day, we can only reject H_0 , as our results do not support a significant reaction of stock prices to an M&A announcement, making public the acquisition of a minority stake. Therefore, the two null hypotheses concerning price changes cannot be rejected. The volume traded is significant, not only on the event day, but also for all cumulative periods, thus indicating that the announcements make investors change their portfolio investment. The results also indicate a market reaction on $t+2$, as AAAR is positive and significant at the 1% level, which is also accompanied with an increase in the number of shares traded also on $t+2$. This may indicate investors' late reaction to the announcement.

5. Concluding Remarks

In this paper, we have analysed the market reaction to big M&A announcements made by European companies during the sixth wave. To our best knowledge, this is the first study to not only analyse the European M&A market for big transactions during the sixth wave, but also the first one to use three indicators of the market reaction. Our results indicate

that the use of returns volatility and trading volume in addition to returns is crucial to understand investors' reactions to the announcements. Thereby, the use of returns alone, when not significant, may lead us to conclude that investors are not reacting to announcements. This is our conclusion on analysing the entire sample, when empirical evidence shows that the market is reacting to the announcement with an increase in volatility and the number of shares traded. The framework is particularly useful when M&A information is not probably interpreted equally by all the investors, and therefore we cannot observe a direct response in the returns. Thus, we would like to emphasise the importance of including abnormal changes in the volatility of returns and trading volumes, jointly with returns in future analyses to obtain more accurate and definitive conclusions about the market reaction to specific events such as M&A transactions.

The analysis of the sixth takeover wave has allowed us to divide the announcements before the global financial crisis. Our results are clear about investors' reaction to an M&A announcement during the first half of the wave: selling their stocks with an important increase in the number of shares traded. Moreover, we also concluded that 'size matters' in terms of M&A events. The Eurozone equity markets reacted more on average in the short term around the acquisition announcement dates, and the greater is the relative size of the transaction with respect to the market capitalisation of the acquiring company. Both the size and type of acquisition help the investors consider to take action or not regarding their investment portfolio. Full bids make the investors react similarly to event announcements during 2003 to July 2007, this is, selling their stocks.

The limitations of this study are based on the characteristics of the European takeover market. The preference for friendly agreements prevents us from analysing the effect of hostile takeovers. In addition, the preference for cash payments has prevented us from analysing the effect of an M&A announcement offering equity as a payment method. Lastly, most transactions have been observed to occur in the same industry, leaving just 18 events for diversification strategies.

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APPENDIX 1: Abnormal return and volume calculations

Abnormal return

The return of security i over period t is defined as:

$$R_{it} = E(R_{it} | X_t)_{it} + AR_{it} \quad [1]$$

where, R_{it} , $E(R_{it}|X_t)_{it}$ and AR_{it} are the actual, normal, and abnormal returns, respectively, and X_t is the conditioning information set for the normal return model.

We compute expected or normal returns by using the market model, thus we assume that normal return is given by a linear relationship between the stock and the market return.

$$E(R_{it}|X_t)_{it} = a_i + b_i R_{mt} \quad [2]$$

Where:

$$R_{mt} = \ln \left(\frac{\text{Eurostoxx 50 Stock Market Index}_t}{\text{Eurostoxx 50 Stock Market Index}_{t-1}} \right) \quad [3]$$

We estimate the security normal returns through a pre-event period of 151 days starting on day -170 to day -20 been day 0 the M&A announcement date.

Average abnormal returns (AARs) has been obtain averaging abnormal returns of each event. Thus, AARs is calculated as:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it} \quad [4]$$

The t-statistic for AAR any day in the event period is given by:

$$t - statistic = \frac{AAR_t}{S_p} \quad [5]$$

Where S_p is the standard deviation of the abnormal return over the pre-event period.

Cumulative average abnormal return (CAAR) has been calculated by adding the average daily abnormal return for different time intervals (a, b), within the event window [-5, +5]:

$$CAAR = \sum_{t=a}^b AAR_t \quad [6]$$

Absolute Abnormal Return

Absolute abnormal returns has been obtain applying the absolute value of each abnormal return. Then, we proceed averaging them, thus AAAR is given by:

$$AAAR_t = \frac{1}{N} \sum_{i=1}^N |AR_{it}| - \overline{AAAR_t} \quad [7]$$

Where $\overline{AAAR_{it}}$ is the AAAR mean over the pre-event period.

And its corresponding equation for t-statistic at any day is given by:

$$t - statistic = \frac{AAAR_t}{S_p} \quad [8]$$

Cumulative average absolute abnormal return (CAAAR) is obtained by adding average daily absolute abnormal returns across different time intervals (a, b), within the event window [-5, +5]:

Abnormal Volume

Following Menendez (2005), we define abnormal trading volumes for stock i on day t as:

$$AV_{it} = \frac{V_{it}}{\frac{1}{N} \sum_{i=1}^N V_{it}} \quad [9]$$

Where V_{it} is the traded volume in euros of stock i on day t .

Once abnormal daily volumes have been computed for each firm, the average abnormal trading volume (AAV) on day t is calculated as:

$$AAV_t = \frac{1}{N} \sum_{i=1}^N AV_{it} - 1 \quad [10]$$

The cumulative average abnormal volume (CAAV) is obtained by adding average daily abnormal volumes across different time intervals (a, b), within the event window $[-5, +5]$.

Its corresponding equation for t-statistic at any day is given by:

$$t - statistic = \frac{AAV_t}{Sp} \quad [11]$$

Rank test

We transform each firm's AR in ranks (K_i) over the combined period, including the estimation and the event window (T_i).

$$K_{it} = rank(AR_{it}) \quad [12]$$

$$AR_{it} > AR_{is} \supset K_{it} > K_{is} \quad [13]$$

The test compares the ranks in the event period for each firm, with the expected average rank under the null hypothesis of no ARs. The test statistic for the null hypothesis is:

$$R = \frac{\frac{1}{N} \sum_{i=1}^N (K_{it} - \bar{K}_i)}{S(\bar{K})} \quad [14]$$

where:

$$S(\bar{K}) = \sqrt{\frac{1}{T} \sum_{t=1}^T \frac{1}{N^2} \sum_{i=1}^N (K_{it} - \bar{K}_i)^2} \quad [15]$$