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**M&A and uncertainty:  
An empirical study on how volatility  
affects deals volume  
and short-term performance**  
**Martina Sgalippa**

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# **M&A and uncertainty: An empirical study on how volatility affects deals volume and short-term performance**

Martina Sgalippa

## **Abstract**

Does M&A activity changes during periods of high volatility? The main purpose of this paper is to investigate how turbulent market conditions impact on both M&A volume and value creation around deals announcement.

This paper tracks the volume and examines the short-term performance of a sample of European M&A transactions announced by public listed bidders between 1<sup>st</sup> January 2013 and 16<sup>th</sup> July 2018, by discerning between periods of high and neutral uncertainty. The VSTOXX index has been used as a proxy of uncertainty and value creation has been investigated by computing Cumulative Abnormal Returns around the deal announcement. Evidence suggests that, on average, periods of high uncertainty are not only associated with lower M&A activity, but also with lower announcement return. When uncertainty is high, bidding firms earn a statistically significant -0.87% 5-days Cumulative Average Abnormal Returns (CAAR), vis à vis the non-significant +1.39% 5-days CAAR observed in periods of neutral uncertainty. A multi-variable regression model is then ran to determine whether uncertainty can be considered as one of the key drivers of short-term M&A performance, with result showing that a negative and statistically significant relationship between 5-days CARs and uncertainty exists.

## Introduction

Does M&A activity changes during periods of high volatility? The main purpose of this paper is to investigate how turbulent market conditions impact on both M&A volume and value creation around deals announcement.

Existing literature has extensively examined aspects linked to M&A timing and value creation. However, few researchers have focused their attention on understanding how these aspects change in times of higher uncertainty. For this reason, this paper is innovative in proposing a new link between the field of research studying M&A trends and the one studying M&A performance. In order to fill this gap and enrich the current literature, this research will specifically focus on uncertainty as a key factor driving (low) deal volume and (poor) M&A performance around the deal announcement.

The main contribution of this paper is in terms of both up-to-date data collection and analysis focused on a different market environment, notably European Union. The research questions addressed are: “*How does M&A activity volume change in periods of high uncertainty? How does M&A activity performance change in periods of high uncertainty?*” In order to answer these questions, this paper builds upon the contributions of previous studies from Bhagwat, Dam and Harford (2016) and Chiarella and Gatti (2014). The main objective is to determine whether the decision of firms to pursue external growth when the market conditions are uncertain brings value creation to their shareholders, in terms of short-term abnormal returns around the announcement date.

The paper tracks the volume and examines the short-term performance of a sample of European M&A transactions announced by public listed bidders between 1<sup>st</sup> January 2013 and 16<sup>th</sup> July 2018. A sample of 799 European M&A deals has been analyzed throughout an event study approach and the estimation of OLS regression models. Uncertainty has been proxied with market volatility and, given the focus on the European market, it is measured on the basis of the Euro STOXX 50 Volatility Index (VSTOXX). Value creation has been investigated by computing Cumulative Abnormal Returns in the 5-days and 10-days event window around the deal announcement. Evidence suggests that, on average, periods of high uncertainty are not only associated with lower M&A activity, but also with lower announcement returns. When uncertainty is high, bidding firms earn a statistically significant -0.87% 5-days Cumulative Average Abnormal Returns (CAAR), vis à vis the non-significant +1.39% 5-days CAAR observed in periods of neutral uncertainty. A multi-variable regression model has then been ran to determine whether uncertainty can be considered as one of the key drivers of short-term M&A performance, with result showing that a negative and statistically significant relationship between 5-days CARs and uncertainty exists.

### 1. Main Features of the M&A Activity

First of all, M&A is one of the most important events in corporate life. There are several reasons why bidding firms may be willing to pursue M&A transactions. Certainly, synergies seem to be the driving force behind most deals. There is a vast empirical evidence proving the existence of positive synergy gains in M&As (Devos, Kadapakkam and Krishnamurthy, 2009; Houston, James and Ryngaert, 2001; Hoberg and Phillips, 2010). Nonetheless, it is possible to identify some additional reasons driving M&A decisions. In this regard, a crucial contribution comes from Trautwein (1990), which has classified the main theories of merger motives into seven groups – efficiency, monopoly, valuation, empire-building, process, raider and disturbance theory. Moreover, the sale of a company entails a long process (“auction”) that typically spans from three to six months and is characterized by some defined steps, shown below (Rosenbaum, J. and Pearl, J., 2013).



## 2. Relationship between uncertainty and M&A

### 2.1 Impact of Uncertainty on M&A intensity

Moreover, it is well-known that M&A activity is cyclical and occurs in waves. For this reason, several empirical studies have sought to uncover the impact of economic fundamentals on M&A volume. Over the last decades, uncertainty has received extensive attention by researchers and practitioners, being perceived as one of the key factors determining mergers and acquisitions cyclicity. A recent survey by Hogan Lovell, involving a large number of top managers worldwide, shows that c. 90% of the executives interviewed consider economic uncertainty as a key barrier to investment and 62% perceive political uncertainty (particularly in the Eurozone) as one of the key barriers to the implementation of growth strategies.

Generally, when the market is exposed to higher volatility, cost of capital reaches its historically low level, while cash balances are at record highs due to low interest rates and low levels of corporate investments. However, despite these factors create favorable terms for M&A activity, on average, a weak macro environment negatively impacts deal activity, resulting in significantly lower M&A intensity, referred to as both the number and the aggregate value of acquisitions announced. Possible explanations for the reduced number of active buyers during turbulent times are both the lower level of management confidence and risk appetite and the increased shareholders and regulation authorities' scrutiny.

Overall, it is possible to claim that, in tough times, firms are more cautious about investing in external growth and managers show substantial concerns related to transformational investments (i.e. M&A). Even if changes in uncertainty alone do not create M&A waves, they might have a first-order effect on M&A activity.

### 2.2 Impact of Uncertainty on M&A Value Creation

Notably, value creation is one of the most interesting aspects regarding M&A. The effect of an M&A event is so intense that it reaches multiple economic agents, including advisors, creditors, suppliers, customers, employees, communities, governments, and so on (Bruner, 2003).

In light of these considerations, the second aspect on which this paper focuses on is value creation in M&A.

Particularly, if the firm is listed, deal activity directly affects the share price and it is interesting to understand how bidder shareholders' returns change during market turmoil.

Generally, most empirical studies have demonstrated that, when a deal is announced to the market, bidding firms, compared to targets, earn close to zero returns. However, the debate over acquirer's gains at deal announcement is still open, and empirical evidence suggests that large variations in bidder abnormal return around the announcement of M&A transactions are explained by deal-specific characteristics. The five major deal-specific characteristics which may influence M&A performance are (i) the organizational form of the target company (Fuller, Netter and Stegemoller, 2002), (ii) the method of payment (Travlos, 1987), (iii) firm size (Asquith, Bruner and Mullins, 1983; Moeller, Schlingemann and Stulz, 2004) (iv) whether an acquisition is industrially diversifying or not (Morck, Shleifer and Vishny, 1990), (v) whether an acquisition is internationally diversifying or not (Moeller and Schlingemann, 2005).

In addition to the above-mentioned deal-specific determinants, bidder returns might be impacted by some macroeconomic factors. In this context, Chiarella and Gatti (2014) have noticed that the short-term market response to deals initiated in periods of high volatility is usually worse compared to the response observed in periods characterized by lower uncertainty. In fact, through an event study approach, they found that, in periods of high uncertainty, bidders earn substantially lower announcement returns in both the 3- and 5-days interval, with an overall -1.2% CAAR, vis à vis the -0.5% 3-days and -0.6% 5-days CAARs observed during neutral periods. The soundness of this result is proven by the results of their multivariate OLS regressions of short-run abnormal returns which confirms the existence of a link between deal performance and uncertainty at the time of the announcement.

Nonetheless, Chiarella and Gatti (2014) have also proven that, despite the skeptical short-term market reaction to deal announcements, deals initiated in period of high volatility record both higher long-term stock returns and better operating performance (*“Overall, performance results show that while deal announced in periods of high uncertainty realize significantly lower announcement return than do deals announced in neutral times, their long run stock and operating performances are significantly better”*). This finding is consistent with the view that, even if uncertainty seems to de-incentivize acquirers from engaging in M&As, it also creates great opportunities. Under uncertain conditions, there are a number of favorable factors that might encourage bidding firms to engage in high quality M&A transactions. In fact, only the best buyers are able to successfully pursue external growth strategies, resulting in a larger number of value-accretive deals. Buyers can also leverage on their stronger bargaining position towards the sellers during negotiation and it is more easy for buyers to “cherry-pick” targets. Overall, Chiarella and Gatti (2014) provided empirical evidence showing that superior long-term performance in uncertain times can be explained mainly by a more meticulous planning and execution of the M&A deal and by the ability of the acquirer to negotiate from a better bargaining position.

### **3. Empirical Analysis**

#### **3.1 Research Hypotheses and Methodology**

As aforementioned, uncertainty about underlying economic fundamentals can affect the level of M&A activity, both in terms of volume and value. In light of these considerations, a first hypothesis is that:

*3.1.1 In periods of high uncertainty, M&A activity is low.*

Also, unpredictable market conditions and volatile economic fundamentals might influence short-term M&A performance. As a result, the second hypothesis is the following:

*3.1.2 Transactions announced during periods of uncertainty are fundamentally different in terms of short-term performance from those undertaken in more quiet periods.*

These two research hypotheses allow to investigate the links between M&A activity and both fundamental economic conditions and M&A short-term performance for key shareholders.

### 3.2 Event Study: Cumulative Abnormal Returns

The share price reaction to the deal announcement is measured by observing stock price abnormal daily returns, which are considered a good indicator of the performance for merging companies.

Abnormal returns are computed using the expression below:

$$AR_{it} = R_{it} - E(R_{it}) \quad (1)$$

where  $AR_{it}$  is the abnormal return for security  $i$  on day  $t$ .

$R_{it}$  is the effective, observed return for security  $i$  on day  $t$ , computed as:

$$R_t = \ln (P_t / P_{t-1}) \quad (2)$$

where  $\ln$  is the natural logarithm,  $P_t$  is closing price at time  $t$  and  $P_{t-1}$  is the closing price of the previous trading day.

$E(R_{it})$  is the expected return for security  $i$  on day  $t$  and represents a benchmark of what investors required on a particular day. In this paper, the expected return has been computed using the market model approach suggested by Brown and Warner (1985), applying the following formula:

$$E(R_{i,t}) = \alpha_i + \beta_i * R_{mt} \quad (3)$$

where  $\alpha$  is the regression intercept for security  $i$ ,  $\beta$  is the slope coefficient for security  $i$ , and  $R_{mt}$  is the market index return (proxied with the EURO STOXX 50, the European stock market index that covers 50 stocks from 11 Eurozone countries). The estimation period used to compute the parameters of the market model, i.e.  $\alpha$  and  $\beta$ , is [-250, -10] day interval. As a robustness test, 200-trading day and 150-trading day estimation periods have also been considered to compute the CARs, and the original findings are not altered by shortening the estimation period. As a further remark, it is worth to highlight that the estimation period does not include any of the days selected within the event period [-2;+2] to avoid any potential contamination effects arising from the deal announcement.

The abnormal returns for a given day and a given firm are then cumulated over the event window so as to arrive at a cumulative abnormal return (CARs):

$$CAR_i = \sum AR_{it} \quad (4)$$

where  $CAR_i$  is the cumulative abnormal return of firm  $i$  in the [-2; +2] event period considered. As a robustness test, a larger event window of 11 days [-5; +5] has been taken into consideration, and the original findings are not altered by enlarging the event period. Particularly, the five days event windows allows to capture potential information leakages in the days immediately before the announcement, and to account for any delays in the stock price reaction in the days immediately after the announcement.

The statistical significance of the resultant CARs is then tested using formal statistical test procedures. Positive, statistically significant CARs represent a favorable response by the market to the announced deal, whilst insignificant or negatively significant CARs will represent the market skepticism towards the transaction.

### 3.3 Regression Models and Description of Variables

#### 3.3.1 Hypothesis 1

Hypothesis 1 investigates the link between merger intensity and uncertainty and has been tested through a simple OLS regression analysis, following the research method presented in this section follows the one implemented by Chiarella and Gatti (2014).

The methodology employed consists in tracking the aggregate merger activity over 99 partially-overlapping 40-business-days windows across the entire sample period. Out of 99 intervals 13 are classified as periods of high uncertainty, based on the level of the VSTOXX index averaged over the previous 40 business days (see “Sample Selection and Description” for further details on the classification of periods of high versus neutral volatility). For each interval, the corresponding number of deals and the aggregate deal value have been identified. At this stage, two simple linear regressions have been conducted on a time-series data sample. The two regressions differ in the specification of the dependent variable. Moreover, for each of the dependent variables two different independent variables have been tested.

$$\text{Model (1.a): } DealCount = \beta_0 + \beta_1 (High)$$

$$\text{Model (2.a): } DealCount = \beta_0 + \beta_1 (Level)$$

$$\text{Model (1.b): } DealValue = \beta_0 + \beta_1 (High)$$

$$\text{Model (2.b): } DealValue = \beta_0 + \beta_1 (Level)$$

On one side, with regard to the dependent variable, the first bundle of regressions is characterized by *DealCount* as the dependent variable, while the second set of regressions employs *DealValue* in €bn. Deal count is computed as the total number of deals announced in each 40-business-days window. Deal value is computed as the aggregate value of transactions announced in the same period. On the other side, with regard to the independent variable, *High* is a dummy variable that takes the value of one if the 40- business-days window is classified as a period of high uncertainty (see “Sample Selection and Description” for further details on the classification of periods of high versus neutral volatility), while *Level* is a continuous variable that measures the average value of the VSTOXX index in the 40-business-days prior to the beginning of the period.

Moreover, Hypothesis 1 has been further tested following the methodology suggested by Bhagwat, Dam and Harford (2016), who have analyzed the relationship between merger activity and uncertainty through a time-series OLS regression where the dependent variable is the percentage change in the number of merger announcements with respect to the prior quarter (*%ΔNumberOfDeals*). The independent variable (*%ΔVolatility*) is the % change of the VSTOXX index and it is constructed to include the information available before the end of the prior quarter. That is, if the dependent variable is the percent change in merger announcements in the second quarter (April – June), the independent variable is the percent change in the value of the VSTOXX index in the second quarter (January – March).

$$\text{Model (3): } \%ΔNumberOfDeals = \beta_0 + \beta_1 (\%ΔVolatility)$$

### 3.3.2 Hypothesis 2

Hypothesis 2 aims at investigating the impact of uncertainty on bidding firm shareholders' short-term returns. For this purpose, an ad-hoc multivariate regression analysis has been performed, following the model previously employed by Chiarella and Gatti (2014).

The methodology employed consists in performing a multivariate regression analysis with 5-days CARs as dependent variable. For each announced deal, deal-specific characteristics have been identified and have been used as independent variables. Model (4) is inclusive of some of the primary deal-specific characteristics that past literature proved to have a certain effect on stock returns around the deal announcement. Model (5) also comprise a variable that captures uncertainty, main focus of this research. The inclusion of this variable is meant to improve the quality of the overall study and to determine whether uncertainty has some kind of explanatory power when it comes to Cumulative Abnormal Returns flowing to bidder's shareholders when an M&A deal is announced.

The following regression equations have been estimated:

$$\text{Model (4): } CARs = \beta_0 + \beta_1(ListedTarget) + \beta_2(MixedPayment) + \beta_3(RelativeSize) + \beta_4(IndustryRelatedness) + \beta_5(CrossBorderDeal)$$

$$\text{Model (5): } CARs = \beta_0 + \beta_1(ListedTarget) + \beta_2(MixedPayment) + \beta_3(RelativeSize) + \beta_4(IndustryRelatedness) + \beta_5(CrossBorderDeal) + \beta_6(High)$$

where

*ListedTarget* is a dummy variable that takes the value of one if, at the moment of the deal announcement, the target company is listed on the stock exchange.

*MixedPayment* is a dummy variable that takes the value of one if the method of payment (i.e. medium of exchange) employed involves both cash and stocks.

*RelativeSize* is the variable used to compare target and bidding firm size. Following Fuller, Netter and Stegemoller (2002), the relative size is defined as the deal value divided by the bidding firm undisturbed market capitalization measured one month (i.e. using 21 trading days as the average trading days per month) prior to the bid announcement. Data on undisturbed market capitalization was downloaded from Bloomberg.

*IndustryRelatedness* is a dummy variable that takes the value of one if the target and the bidding firms do not operate in the same industry, which means that their 3-digit US primary SIC code does not match. Data on the 3-digit US primary SIC code were sourced by Zephyr.

*CrossBorderDeal* is a dummy variable that takes the value of one if the target company and the bidder company are not domiciled in the same country.

*High* is a dummy variable that takes the value of one if the 40- business-days window prior to the deal announcement is classified as a period of high uncertainty (see "Sample Selection and Description" for further details on the classification of periods of high versus neutral volatility).

Once the variables for each deal have been obtained, significance tests were performed in order to define the explanatory power of the parameters and to determine whether the results can be considered statistically significant or not. Basic two-tailed tests of variable irrelevance have been implemented, with the following null and alternative hypotheses:

$$H_0: \beta_i = 0 \quad H_A: \beta_i \neq 0 \quad \text{with } i \in \{ListedTarget, MixedPayment, RelativeSize, \\ IndustryRelatedness, CrossBorderDeal, High\}$$

The individual significance has been tested through the t-statistics, which in this case translate to the t-ratio:  $t\text{-ratio} = \beta_j / \sigma(\beta_j)$ . Standard 1%, 5% and 10% significance levels have been used as robustness tests.

Rejection of the null, i.e.  $\beta_j / \sigma(\beta_j) > \alpha/2$  states that the considered parameter is statistically significantly different from zero, and as such is able to effectively explain the phenomenon of interest. By contrast, a non-rejection of the null hypothesis will imply that the variable of interest is not able to fulfil the expected relationship with the CARs.

### 3.4 Data Collection

#### 3.4.1 Sample Selection and Description

Information on transactions (announcement dates, identity of bidders and targets, payment methods and transactions specific information etc.) was collected from Zephyr (Bureau Van Dijk deal database) and complemented with stock market and accounting data from Bloomberg and Thomson Reuters DataStream.

The starting point of the sample construction entailed the identification of all companies announcing a transaction (acquisition, merger, demerger, JV, minority stake, buy-outs and buy-ins) between 1<sup>st</sup> January 2003 and 16<sup>th</sup> July 2018 in the European Union. At this stage, an initial sample of 965 deal announcements has been obtained.

The 965 observations have been used in Model (1), (2) and (3) in order to track deal volume across the entire sample period. The sample covers 965 transactions. Deal value across all observations in our sample is on average €1.4bn and ranges from as little as €250mn to as much as €62bn. Data analysis indicates how European M&As are unevenly distributed across the years, confirming Hypothesis 1. Specifically, it is possible to identify a slowdown in the number of announced deals in 2003, 2008, 2009, 2012 and 2016.

In order to analyze the announcement returns and apply Model (4) and (5), the sample has been reduced to 799 observations. In fact, for the purpose of the event study, the sample is only made by those companies for which the stock price is available on the date of the announcement and for at least 250 trading days prior to the announcement date, which constitutes the estimation period. In this way, it is possible to estimate the parameters of the market model as described in the section on Methodology (Brown and Warner, 1985) and obtain for each security the expected returns,  $E(R_{it})$ , against which the cumulative abnormal returns have been computed.

Once the identification of the sample is completed, it is necessary to split the 799 observations into two subsamples with deals announced in times of high and neutral uncertainty, respectively. At this stage, the definition of high uncertainty is crucial. The classification method employed is the one suggested by Chiarella and Gatti (2014). First of all, uncertainty has been proxied with volatility and it has been measured through the Euro STOXX 50 Volatility Index, namely VSTOXX index. This index was designed to track the market expectations of future volatility derived from real-time option prices for European stocks. The higher the expectations of near term volatility, the higher the level of the index, signaling increased uncertainty. In this research, a deal has been categorized as occurred in a period of high uncertainty if the level of the VSTOXX index averaged over the 40 business days preceding the announcement date lies more than 0.5 standard deviations above its historical mean.

Following this classification criterion, it is possible to identify several intervals of turmoil over the sample period:

1. The tech bubble in early 2003;
2. The financial crisis between September 2008 and July 2009;
3. The European debt crisis in 2011-2012;
4. The Brexit in 2016.

Out of 799, 54 transactions were announced in uncertain periods according to the proposed classification.

As shown in Figure 1 and 2, mapping deals along these turbulent periods confirms that the proposed classification based on the VSTOXX index seems to reliably track more uncertain periods.

Figure 1. Volatility and Deal Value (€/bn)

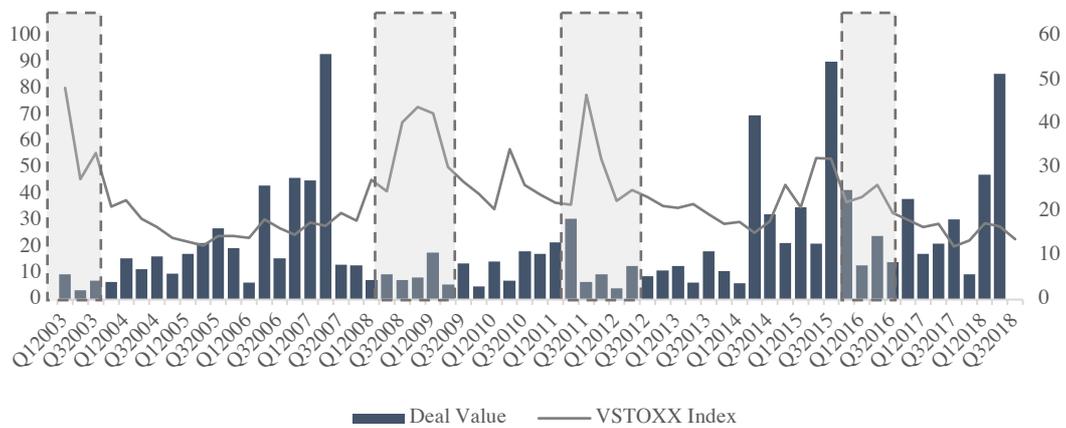
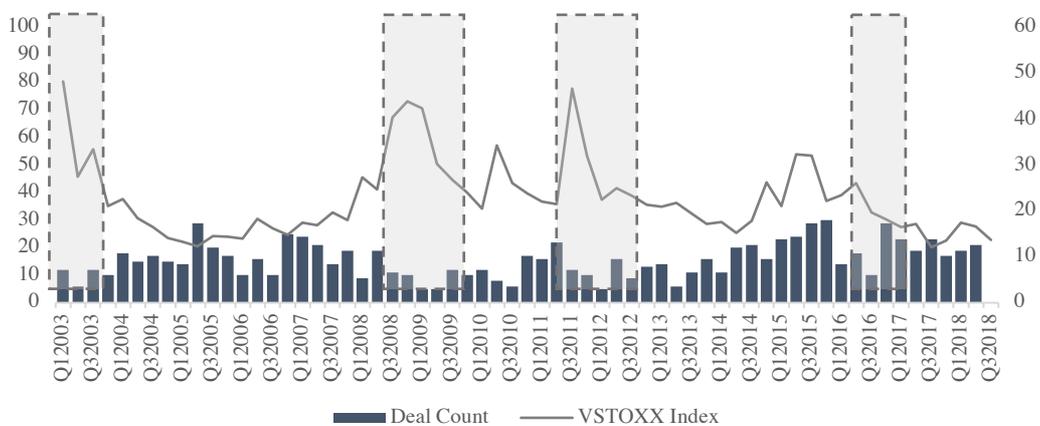


Figure 2. Volatility and Deal Count



### 3.5 Empirical Results

#### 3.5.1 M&A Volume in Periods of High Uncertainty

Table 2 shows the output of the regression analysis for Model (1.a/b) and (2.a/b) performed using the full sample of M&As on a 40-business-days basis with the purpose to assess whether there is a link between uncertainty and M&A intensity.

Table 1. Regression results - Model (1.a), (1.b), (2.a) and (2.b)

	Deal Count		Deal Value	
	<u>1.a</u>	<u>1.b</u>	<u>2.a</u>	<u>2.b</u>
High	-4.48*** (-3.38)		-6.03 (-1.31)	
Level		-0.21*** (-4.03)		-0.43** (-2.31)
N	99	99	99	99
R <sup>2</sup>	0.11	0.14	0.02	0.05

The superscripts \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

In Model (1.a), the coefficient on the deal count variable for periods of high uncertainty is negative and strongly statistically significant, at 1% level. Furthermore, the overall level of uncertainty is associated with fewer deals and lower deal values as well. The coefficients on the average level of the VSTOXX index in the 40 business days prior to the beginning of the period are negative and strongly statistically significant at the 1% level. As expected – except for Model (2.a) – deal count and deal value are negatively correlated with uncertainty, thus confirming Hypothesis 1. In general, when uncertainty is high, firms are more cautious about investing in external growth. The lower appetite for external growth among buyers might be due to the lower level of management confidence and risk appetite among executives, as well as to the increased scrutiny by shareholders and regulation authorities (Chiarella, Della Ragione and Gatti, 2013).

The soundness of the results obtained with the previous models has been tested with Model (3), which follows the methodology suggested by Bhagwat, Dam and Harford (2016). Table 3 present regression results for Model (3).

Table 2. Regression results - Model (3)

<u>%ΔNumberOfDeals</u>	<u>Coef.</u>	<u>Standard Error</u>	<u>t-stat</u>	<u>Number of observations</u>	<u>R<sup>2</sup></u>
%ΔVolatility	-0.50*	(0.30)	-1.69		

The superscripts \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

The coefficient on the indicator variable is negative and significant at the 10% level, thus predicting that the quarterly percentage change in the number of merger announcements is negatively correlated with the percentage change of the VSTOXX index in the quarter before the announcement date.

Summing up, evidence from the sample of 965 deals is consistent with Hypothesis 1, demonstrating that periods of higher uncertainty are usually associated with less intense M&A activity.

### 3.5.2 M&A Short-term Performance in Periods of high Uncertainty

Following Brown and Warner (1985), daily abnormal returns are estimated and then cumulated for a 5-day event window, i.e. [-2;+2], around the announcement date. Table 4 reports summary statistics for the 5-days Cumulative Average Abnormal Returns.

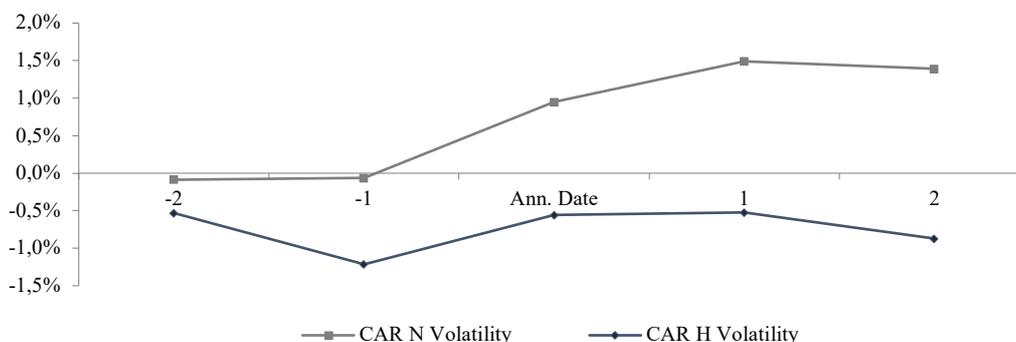
Table 3. Event Study Results: [-2;+2] event window

Uncertainty	5-days CAAR			
	N	Mean	Median	sd
All	799	1.236%	0.486%	0.064
Neutral	745	1.388%	0.518%	0.062
High	54	-0.874%	0.288%	0.088

Overall, announcement returns to the acquirer are slightly positive (1.24%) and statistically significant at the 0.01 level in the 5-days interval.

However, as shown in Figure 3, when taking into consideration uncertainty, a substantial difference in CAARs emerge. In fact, the market seems to react less favorably upon acquisition announcements in periods of high uncertainty. Cumulative Average Abnormal Returns in period of high uncertainty are negative and not statistically significantly different from 0. The average CAR is -0.87% in more turbulent periods vis à vis 1.39% (statistically significant) CAAR in neutral periods.

Figure 3. 5-days CARs – High Versus Neutral Uncertainty



Evidence suggests that, overall, deals undertaken during the four intervals of turmoil which have characterized the European market over the sample period (i.e. the tech bubble in early 2003, the financial crisis between September 2008 and July 2009, the European debt crisis in 2011-2012 and the Brexit in 2016), have generated negative announcement returns.

As shown in Table 5, the difference between the two subsample persists if the event period is extended to 11 days, i.e. [-5;+5] event window.

Table 4. Event Study Results: [-5;+5] event window

	11-days CAAR			
	N	Mean	Median	sd
Uncertainty				
All	799	1.173%	0.693%	0.075
Neutral	745	1.258%	0.726%	0.072
High	54	0.005%	0.510%	0.108

In general, this proves that acquirers in periods of high uncertainty are usually worse performers in both the 5-days and 11-days window around the announcement. Therefore, from the perspective of the bidding firm shareholders, M&A activity in periods of uncertainty is not value-accretive.

In the attempt to detect the factors driving value creation around the announcement of M&A and with the purpose to understand whether uncertainty is one of the key performance drivers, regression models (4) and (5) have been employed. Model (4) regresses the 5-days CARs against these 5 selected deal-specific factors.

Table 5. Regression results - Model (4)

	Coef.	Standard Error	t stat	N	R <sup>2</sup>	Adj. R <sup>2</sup>
Listed Target	-0.002	0.006	-0.272			
Mixed Payment***	-0.021	0.006	-3.421			
Relative Size***	0.003	0.001	3.713			
Industry Relatedness	-0.008	0.005	-1.548			
Cross-Border Deal	-0.010	0.006	-1.643			
				799	0.044	0.038

*The superscripts \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.*

Results based on the 799 observations examined are consistent with previous literature in detecting the relationship between abnormal returns and deal-specific characteristics. Consistent with prior literature, the market looks more favourably at transactions for private targets, non-stock offers, similar size transactions, non-diversifying offers and domestic transactions.

The first important result to be underlined concerns the choice of the method of payment. As it can be read by the table, there is a negative relationship between mixed payment and 5-days CARs. These findings are consistent with the “signalling” hypothesis, which states that the decision to employ stocks as method of payment conveys a negative information to investors, who suspect a potential overvaluation and respond accordingly, bidding down the acquirer stock price.

Also, the firm relative size significantly and substantially affects the degree of underpricing. This finding follows Asquith, Bruner, and Mullins (1983) that found that “on average, a bid for a target firm half the bidding firm’s size produces a cumulative excess return 1.8% greater than a bid for a target one-tenth the bidder’s size”.

The main focus of this paper is to investigate whether, on top of deal-specific characteristics, uncertainty plays a crucial role in determining bidder returns and firms’ M&A appetite. In the attempt to assess whether uncertainty (i.e. volatility), in addition to the aforementioned deal-specific factors, can be considered a key driver of announcement returns, the regression model (5) has been performed.

Table 6. Regression results - Model (5)

	Coef.	Standard Error	t stat	N	R <sup>2</sup>	Adj. R <sup>2</sup>
Listed Target	-0.001	0.006	-0.157			
Mixed Payment***	-0.020	0.006	-3.345			
Relative Size***	0.003	0.001	3.719			
Industry Relatedness	-0.007	0.005	-1.422			
Cross Border Deal*	-0.011	0.006	-1.759			
H**	<b>-0.021</b>	<b>0.009</b>	<b>-2.324</b>			
				799	0.051	0.044

The superscripts \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively.

As expected, the dummy variable identifying the deals undertaken during periods of uncertainty is statistically significant (at 0.05 level) and negatively correlated with 5-days CARs, thus confirming the Hypothesis 2. This result is consistent with the one obtained by Chiarella and Gatti (2014). They have found that the coefficient on the indicator variable for deals in times of high uncertainty is negative at -0.01 and statistically significant at the 10 percent level for announcement return, thus confirming the negative relationship between CARs and uncertainty. This means that the degree of value creation around the announcement of a deal differs substantially depending on whether the announcement occurs in turbulent market conditions or not.

In addition, when the dummy variable for uncertainty is added, the dummy variable tracking cross-border deals becomes significant at the 10% level. The coefficient is negative at -0.01, in line with previous literature findings. Possible explanations for the observed cross-border effect are the cost of geographical diversification, the increase in the level of diversification (which is usually associated with a discount) and country-specific factors (such as the level of shareholder and creditor protection and the accounting standards quality).

To conclude, Model (5) seems to have a higher explanatory power than Model (4). In fact, Model (5) present an increased Adjusted R-Squared with a value of 4.4% compared to the 3.8% of Model (4). Nevertheless, this value is still extremely low due to the large number of variables affecting announcement returns that have not been taken into consideration in this study. Besides this issue, Model (5) proves that uncertainty can be considered a determinant of shareholders returns.

## **Conclusion**

Overall, this study finds that higher uncertainty will decrease both deal activity and bidder returns around the announcement date.

First of all, analysis at the aggregate level shows that, in periods of uncertainty, fewer transactions are announced and their value tends to be smaller. The result obtained shows that, both deal count and deal value are statistically significant at the 1% level and negatively correlated with uncertainty, thus confirming the first hypothesis. Similarly, it has been found that a one standard deviation increase in VSTOXX is associated with a statistically significant drop by 0.50 standard deviations in deal activity in the subsequent quarter. It makes sense that, when markets are under pressure and there is negative momentum, M&A intensity is significantly lower. Indeed, when the market becomes less predictable, acquirers perceive M&A activity as more risky.

Second, moving to the effects of M&A decision on short-term bidder shareholders' returns, the average CARs in the 5-day event window is 1.24%, which is statistically significantly different from 0 at the 0.01 level. When taking into consideration uncertainty, a substantial difference in CAARs emerges. In fact, evidence shows that the market seems to react less favorably upon acquisition announcements in periods of high uncertainty. In fact, the average CAR in more turbulent periods is not statistically significant and equal to -0.87% vis à vis 1.39% (statistically significant) CAAR in neutral periods.

Being the difference between periods of high and neutral uncertainty substantial, it has been shown that uncertainty can be considered as a possible driver of performance when it comes to M&A short-term value creation. Consistent with prior literature, regression analysis indicates that the market looks more favourably at transactions for private targets, non-stock offers, similar size transactions, non-diversifying offers and domestic transactions. More interestingly, uncertainty is found to be a highly relevant factor driving M&A performance. The regression estimates that Cumulative Average Abnormal Returns for deals undertaken in turbulent periods are 2.1% lower than deals undertaken in neutral uncertainty periods. This finding is consistent with Hypothesis 2 and proves the overall market skepticism towards M&A in uncertain market conditions.

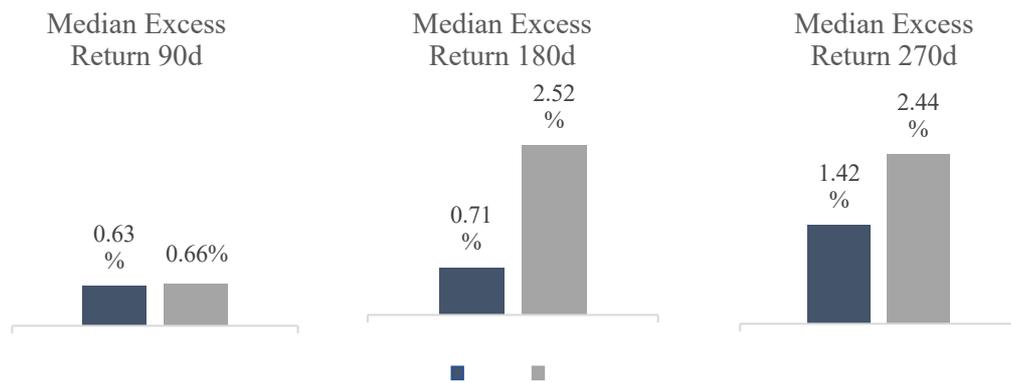
Overall, the general trends in M&A across periods of high and neutral volatility have been confirmed by this paper.

## **Suggestion for Future Research**

The focus of this paper is M&A value creation in the short term. For future studies, a research on long-term gains and performance drivers following M&A transactions announced in periods of high volatility is strongly encouraged.

As a first analysis, Figure 4 suggests that, if we look at median excess returns after 90, 180 and 270 trading days, deals undertaken during highly uncertain periods tend to deliver higher median excess returns. In light of this observation, a long-term performance analysis would help determining whether uncertainty, which seems to de-incentivize acquirers from engaging in M&As, creates opportunities in the long-run.

Figure 4. Long-term median excess returns – High Versus Neutral Uncertainty



Chiarella and Gatti (2014) have found that deals initiated in period of high volatility record both higher long-term stock returns and better operating performance. In fact, under uncertain conditions, only the best buyers are able to successfully pursue external growth strategies. Those best buyers can leverage on their stronger bargaining position towards the sellers during negotiation and can “cherry-pick” targets.

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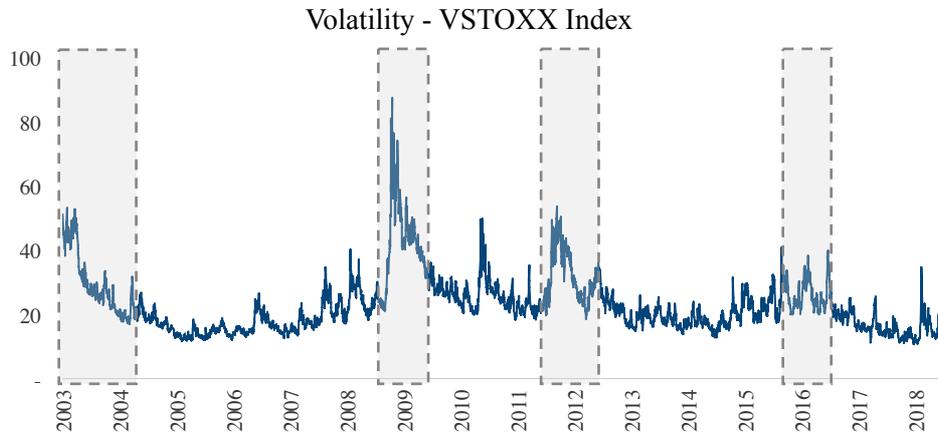
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## Appendix

Figure 1. VSTOXX Indexe in Europe 2003-2018



Source: Bloomberg

Figure 2. Volatility and Deal Value (€/bn)

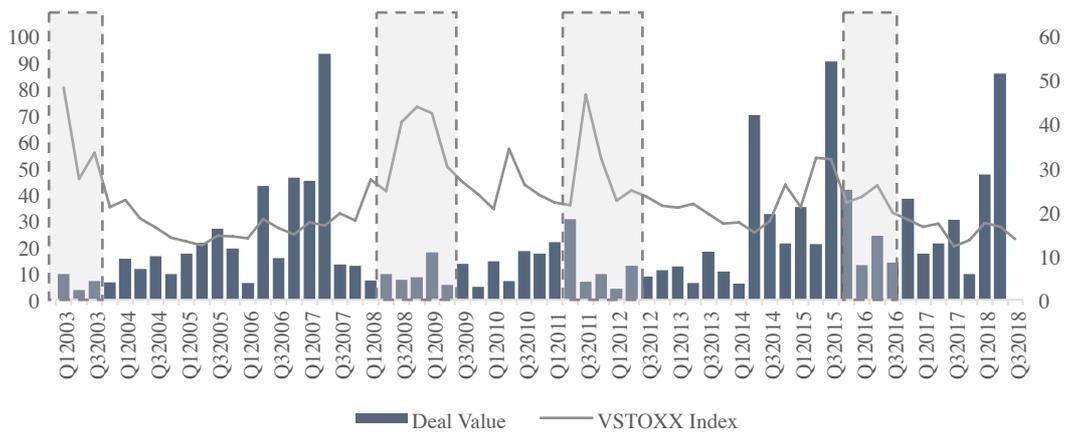


Figure 3. Volatility and Deal Count

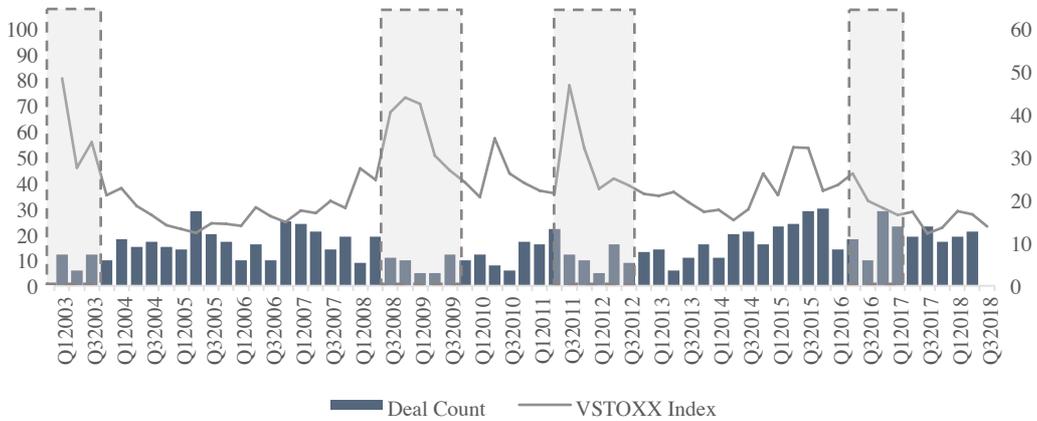


Figure 4. 5-days CARs – High Versus Neutral Uncertainty

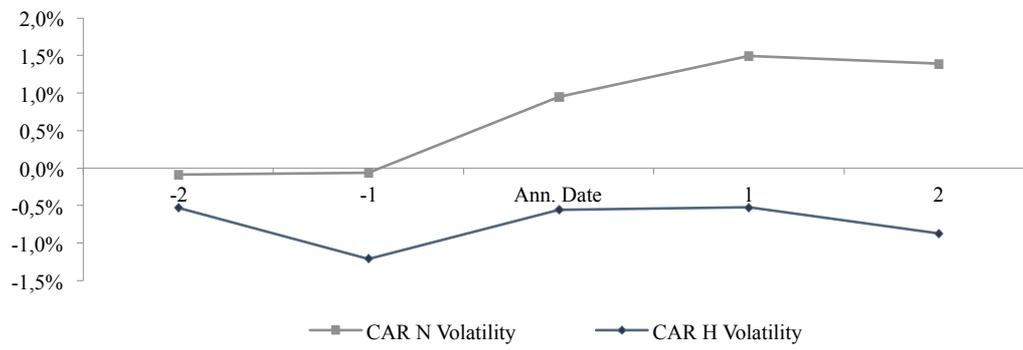


Figure 5. Long-term median excess returns – High Versus Neutral Uncertainty

