ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS
MSc Economics & Business
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The 'New' Attention of Merger & Acquisition Announcements

Master Thesis of T.A.A. van Zanen

Abstract:
This paper analyses in what way the new form of attention, measured by the amount of ticker searches via the well-known search engine Google Trends, is related to the stock performance of target firms during an M&A announcement in the US during the years 2012 to 2016. We determined the abnormal returns of the targets' stock price and its corresponding abnormal attention during the announcement. We found a positive cumulative abnormal return of approximately 30% (event window (-1,1)) and a significant amount of abnormal ticker searches during an M&A announcement. In this paper, we found a significant positive relationship within the abnormal returns and the abnormal attention during the M&A announcement. Therefore, the search behaviour of investors can declare the stock market response due to an M&A announcement. We did not find evidence for insider trading or information leakage the days prior to the M&A announcement.

Author:	T.A.A. van Zanen
Student number:	416637
Thesis supervisor:	Dr. J.J.G. Lemmen
Second Reader:	R.M. Spigt
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1 Introduction

Since the start of the 20th century, mergers and acquisitions have been an important topic in corporate finance. The total number of M&A (Merger and Acquisition) deals in the US has increased from 2,309 in 1985 to 14,963 in 2018, with a corresponding deal value increase from 306 billion to 1,932 billion dollars (IMMA, 2018). This increase in the amount M&A transactions shows the importance of M&As in the present-day field of corporate finance. As the importance of M&A grows over time, its academic importance increases as well. This led to several different opinions for why companies should use M&A as a corporate finance strategy in their governance.

A short introduction into M&As is necessary to understand the purpose of this paper. When a firm (bidding firm) decides to takeover another firm (target firm), the transaction can be done by a complete takeover (acquisition) or by a merger, which means that two companies are combined together. To accomplish this takeover (or merger), the bidding firm has to gain control over the target firm's stocks or assets. The bidding firm must purchase the stocks or assets by providing a specified amount of cash or holdings of equivalent value, such as shares in the newly acquired or merged company (Berk & DeMarzo, 2014). The costs associated with acquiring additional firms prompt questions as to why companies would want to start merging and obtaining other firms. Haleblian, Devers, McNamara, Carpenter & Davison (2009) summarized research investigating why companies venture into the M&A market, showing that the key factors encouraging companies to venture in the M&A markets are: Value Creation, Managerial Self-Interest, Environmental Factors and Firm Characteristics.

The results of the value creation are interesting for the firms' shareholders, as value creation in the firm may cause their personal wealth to rise. Mandelker (1974) researched the wealth of the firms' shareholders and found that the target firms earn an average abnormal return (AR) of approximately 14% in the 7 months preceding the announcement of the takeover. The researchers Asquith, Bruner & Mullin Jr (1983) found that the bidding firm's shareholders see a significant increase in their wealth during the announcement of the upcoming merger (or acquisition) transaction, supporting the idea that managers of bidding firms tend to maximize the value of their shareholders' wealth through the acquisition of additional firms. In a comparable research of Asquith et al. (1983), Jensen and Ruback (1983) found evidence that the target firms' shareholders significantly increase wealth, while bidding firms' shareholders on average do not lose wealth. Jensen & Ruback (1983) reviewed 13 prior empirical studies for the period of 1956-1981, and their results are supported by more recent studies by Jarrel & Poulsen (1989) and Mulherin & Boone (2000), who found similar results. The results showing target firms' shareholders increasing in wealth may be explained by the premium paid by a bidding firm, as in most cases of mergers or acquisitions the bidding firm adds an extra premium on their current stock price as a takeover bid, so they can pursue the target firm's shareholders (and management) to agree with the merger or acquisition. This extra premium is not yet reflected in the stock price of the target firm prior to the bid of the bidding firm. After the announcement of the bid, the stock price of the target firm increases to the initial offer set by the bidding firm (Berk & DeMarzo, 2014). The offer premiums paid is in growing interest of researchers, due to changing methods of bidders, more on this in research of Eckbo (2009), who reviewed all the (relevant) research done on this subject. Due to the scope of this paper, we do not extend our research by analysing the premiums paid in depth. More interesting for our research is the difference within publicly and privately held targets. We focused on publicly held targets, due to the fact that there is more (comparable) information available.

Prior research mainly focused on short-term or long-term abnormal returns related to a merger or an acquisition (announcement). More specific studies tend to explain the causes of these abnormal returns. In this paper, the short-term abnormal returns that are obtained by the target's shareholders of mergers and acquisitions in combination with the search volume of the ticker searches obtained from the acknowledged search engine Google Trends will be compared and tested to determine whether there is a correlation between search volume and the obtained abnormal returns by the target's shareholders. Since the internet is a faster method of gathering information than prior news media such as newspapers or the news on television, the search volumes can be seen as a measure for public attention when used correctly.

The application of this relatively new data source, Google Trends search volume index (SVI), is reducible of previous research affiliated to attention. One of the founding fathers of the research subject attention, academic Kahneman (1973), stated that investors have limited attention, since attention is an affectable (e.g. emotions) cognitive resource. Kahneman's view on the attention led to more studies in this subject, especially how the limited attention affects various pricing models, such as the asset pricing model (e.g. Merton (1987), Hirshleifer & Teoh) and Sims (2003)). More recent studies tried to cover the attention by various proxies and led to indirect measurements of this cognitive resource (e.g. extreme returns (Barber & Odean, 2007), news and headlines (Barber & Odean, 2007), advertising expenses (Grullon, Kanatas, & Weston, 2004) and pricing limits (Seasholes & Wu, 2007)). Da, Engelberg & Gao (2011) were one of the first who applied the data source Google Trends, as a measure of attention. By applying the Google Trends search volume index, Da, Engelberg & Gao were able to proxy the investors' attention by their internet search behaviour, thus a direct measurement of attention. New light is shed on the research subject attention and various academics developed the methodology applied by Da et al. (2011) (e.g. (Siganos, 2013), (Drake, Roulstone, & Thornock, 2012) & (Campos, Cortazar, & Reyes, 2017)). Furthermore, the data made available by Google developed over time as well. In the first years the obtainable data were weekly observations, this changed to a daily frequency, provided that there is an inquiry of maximum 120 days.

In this paper, the obtained attention via the Google search index will be used to test whether the attention can explain the short-term returns of an M&A announcement. One of the most recent studies in the research subject attention was executed by Reyes (2018), who performed a similar research as this paper using the search engine Google Trends. He found a heterogeneous relationship between the post-announcement abnormal returns of the target firms and the abnormal attention of the search volume on the day of the M&A announcement. This result is key for this research and leads to the following main question of this paper:

''To what extent can the Google Search Behaviour of investors (attention) explain the Abnormal Returns of the stocks of target firms during a Merger or Acquisition Announcement?''

By researching this specific topic, new light will be shed on the relationship between 'new' attention (Google Trend Search Volume Index) and short-term abnormal returns during an

M&A announcement. The validity of past research into the short-term abnormal return of target firms will also be tested, in order to determine if these results are still applicable for more recent data. The search volume of the search engine also adds new value to the subject, since older research is based on media attention such as newsletter coverage (Pound & Zeckhauser (2009); Zivney et al. (1996); King (2009)). This data may be less accurate as newspapers are published once per day, potentially leading to a one-day delay. In contrast, the constantly updated search volume of Google Trends opens a new dimension into this particular research field. Furthermore, a potential additional outcome of adding daily search volume index data is the ability to test for the insider trading hypothesis, which was previously researched by Keown & Pinkerton (1981). This will not be the core focus of the paper; therefore more on this is addressed in the literature review.

The results of the paper are in line with previous work done in the short-term abnormal return research field. We found a significant cumulative average abnormal return of approximately 30 percent during an M&A announcement for the target firms. Furthermore, we were able to show a significant increase in ticker searches (attention) during the M&A announcement for various event windows. Finally, we found a positive relationship within the abnormal attention and the abnormal returns of the target firms. This implies that the search behaviour of investors during an M&A announcement could (partially) explain the obtained abnormal returns.

The outline of this paper consists of the following structure: first more scientific evidence of short-term abnormal returns of a M&A announcement will be provided through a literature review. I will then explain how the data is obtained and adjustments are made, so as to be useful for this research. Next, the applied methodology will be highlighted, supported by a short review of the methods. Subsequently results will be shown and explained in detail. The effects of the results will be explained in the conclusion, where the research question will be answered. Finally, the limitations of this research will be discussed and some suggestions for further research will be given and explained.

2 Literature Review

In this section of the paper, multiple researched topics of Mergers and Acquisitions will be discussed. Furthermore, this chapter reviews earlier research done and explains where this research can add additional value to the current vast knowledge. The outline of this chapter is structured as follows; First M&A in General, next The Announcement Effect, subsequently a Review of Earlier Research done by using the search volume index, which is followed by the Determinants of Mergers and Acquisitions. Finally, there will be given a short introduction to the insider trading hypotheses.

2.1 Mergers & Acquisitions in General

As stated in the introduction, the number of mergers and acquisitions has increased extensively since the end of the last century. This also led to increased attention from academic researchers to explain this growth and determine why firms are interested in merging or acquiring other companies (Table 1). Haleblian et al. (2009) reviewed a part of the existing literature of M&As, especially the question ''why do firms acquire?''. The researchers found four antecedents for the obtained acquisition behaviour: Value Creation, Managerial Self-Interest, Environmental Factors and Firm Characteristics. Those factors can be seen as the main drivers for firms to embrace an M&A strategy in their governance.

The antecedent ''Value Creation'' is a much-discussed topic for researchers. In this paper the value creation for shareholders, namely the abnormal return of stocks during the announcement of a merger or acquisition, is the area to be examined. The short-term results of the stock performance are not the purpose of a merger or acquisition, but it is an effect observed by the first researchers of mergers and acquisitions. This effect is in contrast to the Efficient Market Hypothesis (EMH) (Fama, 1970), which implicates that the stock price at a certain moment contains all the information of the firm.

Mandelker (1974) was one of the first researchers who found a different behaviour of stock prices after an M&A announcement. He found a positive return of 14% for the target firms in the 7 months preceding the announcement. These results were supported by the results of Jensen & Ruback (1983), who also provided evidence showing the bidding firms' stockholders did not lose wealth during a merger or acquisition. The target firms seem to show a positive reaction during and after a merger or acquisition announcement, a result supported by papers of Franks & Harris (1989), Kaplan & Weisbach (1992), Smith & Kim (1994) and Muhlerin and Boone (2000) (The researchers also tend to explain what factors could explain the abnormal returns during an M&A announcement, but more on this in section 2.5). These previous results lead to the following hypotheses.

H_1 =Target firms gain positive short-term Abnormal return due to a M&A announcement

A consensus has yet to be reached in academic papers regarding the abnormal returns (ARs) for bidding firms, as pointed out by Bruner (2002). Bruner reviewed 130 merger and acquisition papers, which were published in the years between 1971 and 2000. He showed that researchers found similar results for the short-term AR for target firms, but different results for bidding firms. The main explanation Bruner gives for this difference is the difference in size of bidding firms. Jarrell & Poulsen (1989) provided 3 possible explanations to justify why the results of bidding firms are close to zero; 1. The acquiring firm is bigger than the target, which also means that the impact of the deal does not matter as much for the stock price of the acquiring firm; 2. The competition to 'win' a single target firm, thus they assume there are several bidding firms; 3. A poor investment project of the acquirer, thus the target firm is, according to investors, a bad investment. Jarrel & Poulsen (1989) found evidence for the first two explanations.

Despite the lack of consensus, much of the results of earlier papers are close to zero. Morck, Shleifer and Vishny (1990) found a negative AR of -0.70% at an event window of (-1,1) of 326 M&As, where Franks, Harris & Titman (1991) found a negative AR of -1.45% at an event window of (-5,5) for bidder firms. In comparison Smith & Kim (1994) found ARs of -0.23% and 0.50% for the event windows of respectively (-1,0) and (-5,5). As previously stated, Bruner (2002) collected the most cited work in the topic M&A, though this was research done until 2000.

More recent research does not give a clear conclusion regarding the AR of bidding firms throughout the short term period during the M&A announcement. Goergen & Renneboog (2004) found a significant positive AR of 0.70% in the short term for the bidding firms. One of the latest papers in this subject is the research of Alexandridis, Petmezas & Travlos (2010), who researched the short term ARs in different countries. They found contrasting results within the data sample, but all results remained close to zero. These results support the earlier paper of Bruner (2002), which says the ARs of bidding firms are close to zero, but may deviate to positive or negative values in different research ventures. Therefore the ARs of bidding firms remain a controversial topic in present-day economics.

The AR of bidding firms depends on different aspects during an M&A announcement. First of all, the public status of the target firms. The status of the target firm contains information of how the target firm is valued. For target firms that are not publicly traded, the (potential) shareholders of the bidding firm have to determine whether the bid/offer is correctly determined. By valuating the target firm, the (potential) shareholders judges whether the bidding firm overpays the target (or pays the correct amount/underpays). This determination of value of the target firm is affected in the AR during an M&A announcement. Furthermore, there are plenty other determinants that play a role for the AR of the acquirer, such as: motive of the merger, friendliness, form of payment and managerial motives.

In this paper the search volume will be used to explain the abnormal returns, as target firms have proven over time to outperform the market during a M&A announcement (Table 1). Since prior researchers have yet to find a clear answer regarding the abnormal returns of bidding firms, it would be more interesting to explain the AR of the target firms than for the bidding firms. This does not mean, that the search volume of the bidding firms could not declare the AR. Thus for sake of this research, we do not tend to explain the ARs of the bidding firms.

Table 1: Previous work on the abnormal returns during an M&A announcement summarized.

Author(s) (publication year)	**Region**	**Period**	**Method** (ES= Event Study) (EP= Estimation Period)	**Results**
Mandelker (1974)	US	1941-1962	Two-factor model ES: Multiple periods varying between (-100,40)* & (-40,40)* EP: (t-59,t)*	**Bidding Firms**: No evidence that the acquirer loses wealth from the merger **Target Firms**: CAR (-7,-1)* = 14%.
Asquith, Bruner & Mullin Jr (1983)	US	1963-1979	Scholes-Williams (1977) ES: (-20,20) EP: (-130,-31)	**CER*****: +2.8% over the whole sample, thereby evidence that size does matter in the CER, the succesfullness of the bid does matter in the CER and that the impact after 1969 is bigger than before 1969
Jarrel & Poulsen (1987)	US	1963-1986	Scholes-Williams (1977) ES: (-2,1) , (-20,10) & (-10,20) EP: **	**Bidding Firms:** CAR (-2,1) = 0.70% (5%-level) CAR (-20,10) = 1.29% (5%-level) CAR (-10,20) = 1.96% (5%-level) **Target Firms:** CAR (-20,10) = 28.99% (5%-level)
Franks & Harris (1989)	UK	1955-1985	Market Model ES: (-4,1)* EP: (-62,-2)*	**Bidding Firms:** CAR (-4,1)* = 7.9% (5%-level) **Target Firms:** CAR (-4,1)* = 29.7% (5%-level)
Franks, Harris & Titman (1991)	US	1975-1984	Market model ES: (-5,5) EP: (-240,-40)	**Bidding Firms:** CAR (-5,5) = -1.02% (10%-level) **Target Firms:** CAR (-5,5) = 28.04% (5%-level)
Kaplan & Weisbach (1992)	US	1971-1982	Market model ES: (-5,5) EP: (-300,-61)	**Bidding Firms:** CAR (-5,5) = -1.49% (1%-level) **Target Firms:** CAR (-5,5) = 26.90% (1%-level)
Smith & Kim (1994)	US	1980-1986	Market model ES: (-5,5) EP: (-100,-61)	**Bidding Firms:** CAR (-5,5) = 0.5% **Target Firms:** CAR (-5,5) = 30.19% (5%-level) **Combined:** CAR (-5.5) = 8.88%(5%-level)
Mulherin & Boone (2000)	US	1990-1999	Market Model ES: (-1,1) EP: **	**Bidding Firms:** CAR (-1,1) = -0.37% **Target Firms:** CAR (-1,1) = 20.2% (5%-level) **Combined:** CAR (-1,1) = 3.56% (5%-level)
Georgen & Renneboog (2004)	EU	1993-2000	Market Model ES: (-1,0) & (-2,2) EP: (-9,-1)*	**Bidding Firms:** CAR (-1,0) = 0.70% (1%-level) CAR (-2,2) = 1.18 (1%-level) **Target Firms:** CAR (-1,0) = 9.01% (1%-level) CAR (-2,2) = 12.96 (1%-level)
Alexandridis, Petmezas & Travlos (2010)	Global	1990-2007	Market Model ES: (-2,2) EP: **	**Target firms:** CAR (-2,2) = 17.60 (1%-level)

* The period is denoted in months instead of days

** The Estimation Period (EP) was not directly mentioned in the paper

*** CER = cumulative excess returns

2.2 The Announcement Effect

An important aspect of this paper is the behaviour of investors following an M&A announcement. In the last century, many researchers have shed light on the behaviour of investors at corporate governance announcements, such as Public offerings and Stock Buybacks. Those events give a signal of attention to the outside world. Since such an event has impact on the firm, investors react with their knowledge to the event. Since the EMH states that all the information of a firm is represented in the stock price (Fama, 1970), there should not be any effect of an announcement of a Public Offering. However, multiple academics have determined that this is not the case at the moment of such an announcement. The management of the firm is assumed to know more regarding the value of the firm than possible potential investors. This leads to a stock price that is not a true representation of the real value of the firm (Myers & Majluf, 1984). Since previous literature is mainly based on public offering (IPOs, SEOs) and dividend announcements, it is key to understand what the reaction is, and why the reaction happens. At the moment of a public offering, the firms signal through offering (new) stocks that offering them is the cheapest way to retrieve money. This means that the current stock price, or the offering stock price, is higher than what the management or firm expects it to be. This leads to a negative AR after the announcement of the stock offering (Vermaelen, 1981) (Barclay & Litzenberger, 1988) (Bozos & Nikolopoulos, 2010).

Since most of the previous research of the announcement effect is related to negative or positive signalling, it cannot be fully compared to the announcement effect measured at M&A announcements. It is important to understand why the stock prices of a target firm and an acquiring firm deviate at the moment prior to and preceding the announcement. At the moment of an announcement an acquiring firm offers a price for a target firm, frequently this price is higher than the current price of the target firm on the stock market. At the moment of the announcement the stock price of the target firm rises to the price of the offering. Through the announcement, the acquiring firm's management signals to the outside world that they think the target firm is under-priced, or that the target firm could potentially obtain a higher value. When the acquiring firm overprices the target firm, investors will act negatively towards the valuation of the stock price of the bidding firm. Thus the price change of the stock during the announcement is mainly based by the bid/offer of the bidding firm, which affects the target's stock price but also the bidding's firm stock price.

2.3 Review of Previous Research using the Search Volume Index

For sake of this paper, one search engine will be consulted; Google Trends Search Volume Index (SVI), since there are no similar search engines with an equal database like Google Trend SVI. The use of this type of data has developed over the past decades, as it was not yet available prior to the year 2000. The usage of Search Volume Index data sheds new light on the direct attention research niche of the academic literature. Earlier researchers typically relied on data available out of newspapers or national television, where the attention of a particular company or stock of the company is mentioned in a news article or column. This direct data could only be separated in attention or no attention, with the possible attention including both good news as well as negative press. The rather new SVI has a relative value, which gives the data more explanatory value. In this chapter, the added value of using the SVI-engine for the explanation of the short-term M&A announcement ARs will be reviewed.

One of the first sets of researchers who recommended to use the Google Trend data as a proxy for direct attention measures, were Da et al. (2011). They stated that previous research only observed indirect proxies of attention, such as: extreme returns (Barber & Odean, 2007), news and headlines (Barber & Odean, 2007), advertising expenses (Grullon, Kanatas, & Weston, 2004) and pricing limits (Seasholes & Wu, 2007). Da et al. (2011) found an increase in Google search volume indicates an increase in stock price within the next two weeks, with a possible price reversal within a year. Similar results have been found over time by various researchers in different research fields. This includes Joseph, Wintoki & Zhang (2011) who found that the stock ticker[1] search of an underlying firm has predictive value of the stock returns and trading volume. Similar results, albeit with slightly weaker evidence for the relationship between the

[1] A *Ticker* is a specific code used by investors that represents the stock of an underlying company. The code is most often an abridgement of the company's name.

search volume and the stock returns, was found in the research in Japanese stocks by Takeda & Wakao (2014). In another research area, Ding & Hou (2015) found that the research attention, which is reflected by the abnormal change in search volume, improves the stock liquidity. The results found by these researches imply that the measure of direct attention adds value to the current economic literature.

Researched performed by Reyes (2018) is more relevant for the purposes of this paper. In his research he found a peak of Google searches on the announcement day of the merger or acquisition, but also a short upward trend in the days preceding the announcement. This may indicate that information was released or leaked prior to the announcement, and that an increase in attention is maintained in the days after the announcement. In the article, Reyes (2018) tries to find a relationship between the variation in attention and the stock market's response on a certain announcement of a merger or acquisition. The main finding of the paper is a significant relationship between the abnormal value of attention using the search volume index data and the abnormal returns of the underlying stocks. This result is a fundamental aspect of the research question of this research, thus leading to the following hypothesis:

H_2 = The Abnormal Attention during an M&A announcement is greater than zero

2.4 Insider Trading Hypothesis

One of the best-known theories in the field of M&A is the Efficient Market Hypothesis (EMH), which was brought into the world by Fama (1970). The hypothesis states that the (stock) market is efficient when all the information of a certain company is reflected in its stock price. Fama (1970) distinguishes the market in three different forms: weak, semi-strong, and strong. In a weak form, the price of the stocks depends only on the historical prices of the stock, and that is the method how the market treats the stock prices. In the semi-strong form, the price depends on the historical values of the stock and the publicly available information. The difference between the semi-strong and strong form is the inside information, what means that in the semi-strong form there is information known within the organisation that is not reflected in the stock price. Thus, ideally the market is in a strong form, but this also means that it is not possible to beat the market and obtain abnormal returns. Since we are testing for abnormal returns during an M&A announcement, there is a possibility the market is not in a strong form when we find abnormal returns. This also leads to the possibility that insiders (or outsiders) have heard about a potential merger or acquisition, and anticipated by buying stocks of the target firm prior to the announcement, otherwise known as *Insider Trading*. This problem for merger and acquisition deals has been raised by Keown & Pinkerton (1981) as they found abnormal returns prior to the M&A announcement. Since it is not possible to measure all the information that is freely available to the market, Keown & Pinkerton (1981) were unable to blame these abnormal returns on insider trading. A more recent paper of Agrawal & Nasser (2012), researched the trading volume of stocks at which the underlying firm announcement a merger or acquisition between 1980 and 2006. They did not find proof of insider trading, in terms of a trading volume of the stocks during the days prior to the announcement. Even more contrasting, they found a lower trading volume of the stocks in the days prior to the M&A announcement.

With the ability to use search volume index data, new light can be shed on the topic of insider trading. Since the search volume index data gives a trend of search hits, it would be easier to measure if investors tried to obtain more information about an upcoming M&A announcement. This possibility leads to the following hypothesis:

H_3 = Prior to the M&A announcement, the Abnormal Attention is greater than zero

2.5 Determinants of Mergers and Acquisitions

As there has been plentiful research done on the short-term ARs of M&A announcements, this paper will adopt the most used determinants to control for the adjustment of the AR. By adopting other determinants as seen in other papers, this paper will not declare in depth why such variables are used, as this is out of scope for this research paper.

One of the most important determinants of M&As is the form of payment. Bidding firms tend to pay a target through stocks (and their options, due to earn-out constructions) when they believe their own stock is overvalued. Thus, on average cash-paid M&As show higher ARs ((Travlos, 1987), (Loughran & Vijh, 1997)), that stock-paid M&As. Prior literature showed that this determinant has an impact on the AR of an M&A announcement, so this determinant will be added as a control variable.

Another important determinant of M&As is the Relative Size of the deal, as the deal value implies the total effect of the price offered, and the relative size takes the value of the acquirer in account. This control variable gives the total impact of the announcement. Moeller et al. (2005) provided evidence that smaller targets earn higher ARs during an M&A announcement, and that the deal value partly explains this AR.

Furthermore, the value of a firm can be stated in two terms: the book value and the market value. The main difference between these measures is the value according to the investors, which is represented in the market value of a company. The market value can easily be calculated by the share price at a certain moment multiplied by the shares outstanding. The book value is the value according to the financial statement, which is based on various ledger accounts (e.g. Equity Value) of the firm itself, which is important for tax related businesses and the manner in which the company shows their results to its shareholders.

Tobin's Q[2] is a ratio that is widely used in the economic research, since it describes the relationship between the book and market value in terms of assets and replacement costs of the assets. Servaes (1992) has shown that the Tobin's Q adds value in the M&A research field and is thereafter widely used in the M&A announcement literature (e.g. Alexandridis et al. (2010); Reyes (2018)).

An important aspect for the shareholders of the target and bidding firms is the valuation executed by the acquiring firm. This valuation could be criticized by the shareholders due to over valuation (under valuation) of the acquirers (targets) shareholders, and could lead to over (under) payment according to the shareholders.

[2] Tobin's Q is the total assets market value divided by the replacement costs of the assets.

The friendliness of an offer is another widely used determinant in the M&A short- and long-term return research literature (e.g. Goergen & Renneboog (2004) and Alexandridis et al. (2010)). A bidding firm can make the choice to strike a deal with the target firm's management, thereby providing the target firm with a possibility to negotiate which can be seen as friendly. In contrast, the bidding firm may attempt to aggressively buy all the outstanding stocks in a short period, without the approval of the target's management, thereby trying to claim at least 50% of the shares of a certain target company. The costs of a hostile takeover are higher than the costs of a friendly takeover, as hostile takeovers are often paid in cash and friendly takeovers in stocks. This leads to lower bidder returns for hostile takeovers and relatively higher bidder returns for friendly takeovers (Schnitzer, 1996) and a contrary effect for the target returns.

Another facet of the possible explanation of the abnormal return is the relatedness of the bidding and target firm. A merger or acquisition within the same industry provides information about the underlying motivation of the merger or acquisition (e.g. erase the competition). A merger outside the current industry also offers information of the underlying motivation, as this could be done to speed up the production process, thus possible gaining economies of scales by merging outside the current industry.

Concerning the subject of this paper, the direct attention measured from the search engine Google Trends using search volume index data could partially explain the abnormal returns that are retained during a M&A announcement. Since the search volume index data is given over time, we need to treat this data similarly to the return of the stocks, thus by using abnormal attention (Drake, Roulstone, & Thornock, 2012) (Reyes, 2018). By adding this variable as a determinant of the abnormal returns of an M&A announcement, we are able to examine whether the direct attention can (partially) explain the abnormal returns. This follows in the next hypothesis.

H_4 = The Abnormal Attention has explanatory value in determining the Abnormal Returns of target stocks during a M&A announcement

3 Data Review

This section contains all the information about the data used for this research. Furthermore, it includes information about the different databases used in obtaining the data. This data is transformed into useful data, so we are able to test the hypotheses stated in the previous section. This section is split into three different chapters; the Data Collection Process, Google Trends Data highlighted, and the other data (e.g. the determinants of M&As).

3.1 Data Collection Process

We started by collecting all the Merger and Acquisition Announcements in the period 2012-2016 via the Securities Data Company (SDC) merger database (ThomsonOne). The main criteria for our search were: Companies settled in the US, Target firms had to be listed and at least 50 percent of the target shares have to be obtained in the possible deal. The first criterion is relatively simple, since the research targets the United States. The second criterion is used because we want to calculate the abnormal returns of the stock prices of target firms during a M&A announcement, therefore the target firm has to be listed so that there will be stock prices to measure this abnormal return. And the last criterion is used because we want to pick the deals where the acquiring firm obtains control after the transaction. In this search 698 announcements were found. This data is filtered for the following reasons: Small deals were represented in the sample[3] (deals > 20 million), Missing Tickers, Announcements during weekends when there is no active stock trading, Financial Institutions and utility firms are deleted, Acquirer and Target hold the same Tickers, and Multiple Tickers for one target firm, thereby it was unclear which Ticker to use. By adapting those filters to the previous search, we have obtained a sample of 347 M&A announcement observations.

The next step is obtaining Google Trends data manually via the Google Trends Search Volume Index[4]. This data could only be obtained per one search query. In this research, we used the

[3] We decided to filter the deals bigger than 20 million, since those firms are relatively small and thereby less likely to attract attention of multiple investors.
[4] The Google Trends Search Volume Index is a product of Google and can be obtained through www.google.com/trends/

ticker of the specific company's stock price as the search query in Google Trends Search Engine and a time period of [-80,-10] to obtain enough data points to calculate abnormal attention. This search led to a decrease of the total sample for two reasons: 1) Missing Google Trend data, which happens when there have not been enough searches in the time period as determined by a threshold regulated by Google, and 2) Some of the tickers are normal words in the contemporary language (e.g. WAVE, ROSE, FIRE & TEA). The sample has therefore shortened to a total of 312 M&A announcements.

The last step is obtaining the stock prices of the 312 target firms in the sample. We have obtained those stock prices for all the stock prices from the Bloomberg Database and used the time period of October 2011 to February 2017 in our search query. For several observations there was no Bloomberg code available and for several other observations there were no valid stock prices available (e.g. missing parts of the stock price during the estimation period). Those missing values led to the total sample of 299 observations (For the total sample development see Appendix A). The data is transformed into percentage data by comparing the relative percentage increase or decrease to the previous day (Variable = relative change of the price). Furthermore, we obtained the prices of the S&P 1500 (and S&P500 for robustness purposes, later more on this in Section 4.1) index during the time period of October 2011 to February 2017 and used a similar transformation (relative price change) as applied to the stock prices of the firms in the sample.

Thereafter we were able to gather all the other data (short-term target M&A determinants) needed of the 299[5] observations. The obtained data is summarized in Table 2 (Data over Time) and Table 3 (Data based on Deal Value). In this tables we highlighted the Cumulative Average Abnormal Returns (CAAR), determined by the market model, and the Cumulative Average Abnormal Search Volume Index (CAASVI) of one (relevant) event window (-5,5) (Based on the most used event window of similar studies, see Table 1), because adding more event windows values would make this table to comprehensive (the other event windows are discussed in Chapter 5). Remarkably, the Average Deal Size has increased tremendously over time. Thereby

[5] For research purposes we decided to trim (1%) the cumulative abnormal returns (CARs), to remove the outliers (skewness) of the obtained returns. This leads to a research sample of 293 observations.

we see a decrease in Overpayment, which could be explained by Table 3, where is shown that there is less overpayment in larger deals. Furthermore, Table 3 shows the bigger the deal value, the lower the CAAR (-5,5) and the less deals are entirely paid in cash.

Table 2. The Descriptive Statistics of the sample over time.

	Total		**2012**	**2013**	**2014**	**2015**	**2016**
Observations (#)	299		49	48	58	77	67
	Mean	*Median*	*Mean*	*Mean*	*Mean*	*Mean*	*Mean*
CAAR (-5,5)	34.75%	24.54%	39.60%	24.61%	39.84%	25.09%	45.15%
CAASVI1 (-5,5)	19.54%	0.00%	15.96%	-14.78%	1.09%	28.01%	53.00%
Deal Size (in Millions $)	3751.93	1049.05	1157.14	2237.17	4336.79	6274.32	3329.65
Tobin's Q	4.22	1.42	2.57	3.33	5.21	4.62	4.72
Cash payment	0.52	1.0	0.65	0.52	0.40	0.45	0.60
Mixed payment	0.34	0.0	0.27	0.35	0.38	0.43	0.27
Friendliness	0.94	1.0	0.86	0.98	0.91	0.96	0.96
Relatedness	0.66	1.0	0.51	0.79	0.69	0.64	0.66
Overpayment	0.48	0.0	0.55	0.52	0.55	0.38	0.45

1) The presented Cumulative Average Abnormal Returns (CAAR) & Cumulative Average Abnormal Search Volume Index (CAASVI) are the values for the event window (-5,5), more information about the estimation method can be found in Sections 4.1 & 4.2.

2) The variables Cash, Mixed, Friendliness, Relatedness & overpayment are determined dummy variables, which implies that the value is binominal.

Table 3. The Descriptive Statistics of the sample based on Deal Value.

	Deal Value 20 million - 500 million		**Deal Value 500 million to 2 billion**		**Deal Value 2 billion to max**	
Observations (#)	*95*		*98*		*106*	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
CAAR (-5,5)	43.23%	34.96%	37.59%	25.88%	24.51%	20.64%
CAASVI1 (-5,5)	36.48%	0.00%	-2.14%	0.00%	24.41%	0.00%
Deal Size (in Millions $)	214.72	206.43	1068.10	958.38	9403.35	5122.05
Tobin's Q	1.68	0.66	2.64	0.96	7.95	4.62
Cash payment	0.64	1.00	0.52	1.00	0.41	0.00
Mixed payment	0.21	0.00	0.38	0.00	0.43	0.00
Friendliness	0.80	1.00	1.00	1.00	1.00	1.00
Relatedness	0.58	1.00	0.70	1.00	0.68	1.00
Overpayment	0.75	1.00	0.47	0.00	0.25	0.00

1) The presented Cumulative Average Abnormal Returns (CAAR) & Cumulative Average Abnormal Search Volume Index (CAASVI) are the values for the event window (-5,5), more information about the estimation method can be found in Sections 4.1 & 4.2.

2) The variables Cash, Mixed, Friendliness, Relatedness & overpayment are determined dummy variables, which implies that the value is binominal.

3.2 In Depth: Google Trend Data

As mentioned in the literature review, the use of Google Trend Data is relatively new; therefore it needs some more explanation. Regarding this paper, we used the ticker as a search query in the Google Trend Database. The crucial ground for this choice is that when an ordinary person desires to find information about a firm, it searches with the regular company name or perhaps an abbreviation. On the other hand, an investor, who wants information about the latest stock price of a particular firm, is more likely to use the ticker as a search query. The primary argument for this assumption is, when the investor searches as an ordinary person, the investor will only find company information (e.g. the regular website) and not the stock price. To measure the attention of a specific firm, we want to focus upon the attention of investors who aim to find financial information for the firm.

The obtained raw Google Trend data (Figure 1) is not ready for research purposes yet. Google Trends gives a value between 0 and 100 and is based on historical data of the used search query. The value 100 is given for the maximum number of searches in the selected time period. The given value is defined as follows (Reyes, 2018):

$$Search\,Volume\,Index\,_t^j = \frac{Amount\ of\ Searches\,_t^j}{Total\ Amount\ of\ Searches\ in\ Period\,^j \times Constant^j} \tag{1}$$

Google is able to share the Search Volume Index Data, but not the exact amount of searches; potentially due to privacy concerns. Since we do not have exact data, but relative data, we use the natural logarithm[6] of the Search Volume Index Data as a measure for the robustness of the data and against skewness, a method that is in line with previous papers that used Google Trend Data (e.g. Siganos (2013); Campos, Cortazar & Reyes (2017); Reyes (2018)).

Furthermore, the gathered data contains daily data including weekends. Since the stock market is closed during weekends, we chose to correct the data for these redundant values. In the previous research of Reyes (2018), the value of a weekend day is added to the following

[6] In various observations the Search Volume $Index_t$ is zero, this leads to an insufficient value to use. Therefore we manually transformed this data into ln (1 + SVI).

business day. We will not adopt this method, as this could possibly create a skew in the data- for instance the addition of Sunday values to the data for Mondays may lead to an extraordinary high value. For this research, we decided to drop the weekend values and use a similar method as for the stock prices, considering the weekend announcements are dropped and the impossibility of trading stocks in the weekends. In this way, dropping the data is the most practical protocol in order to avoid losing observations in the sample and without creating data points that are not equal to real values.

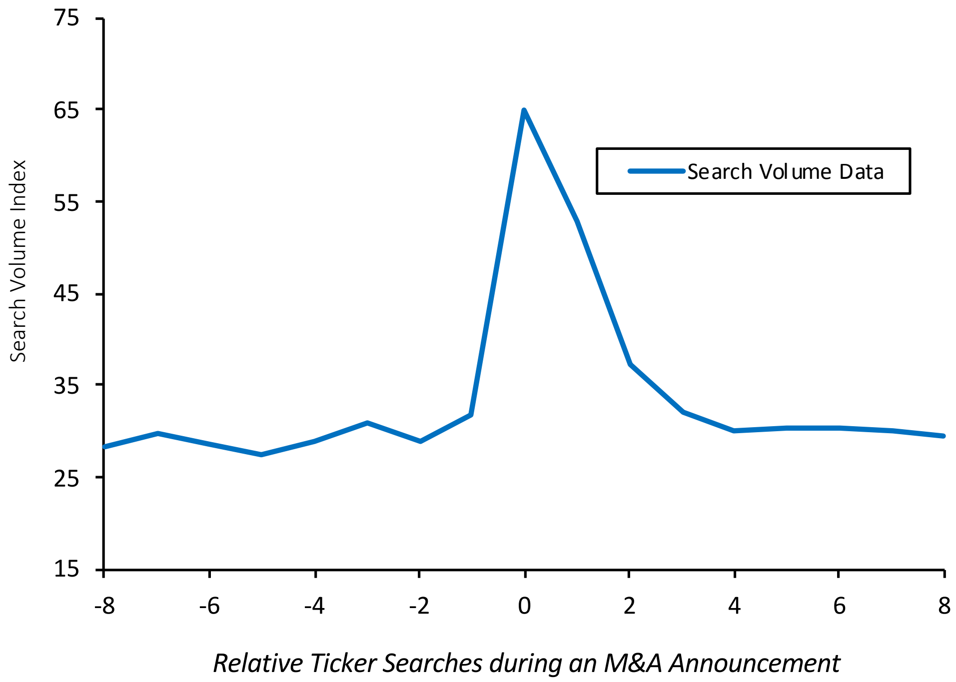

Figure 1. The average Ticker searches obtained via Google Trend Search Volume Index during an M&A announcement in the time period [-8,8], where 0 is the day of the announcement.

3.3 Other Data

As stated in Section 2.4, multiple other determinants are necessary to determine the abnormal returns of the Target firms during an M&A announcement. This data is obtained through the Securities Data Company (ThomsonOne). Most of this data is transformed into workable data (e.g. dummy variable). The obtained variables are described in Table 4 by splitting them into: Determinant, (Applicated) Variable and a sufficient Description of how the determinant is used.

Table 4. The determinants used in this research as explanatory variables for the Abnormal Returns during an M&A announcement.

Determinant	Variable	Description
Form of Payment	Cash Dummy	The variable equals 1, when the form of payment is only cash, otherwise the variable is 0.
	Mixed Dummy	The variable equals 1, when the form of payment is a mix of cash and stocks, otherwise the variable is 0.
Deal Value	Ln (deal size)	The relative value of the size of the Deal by using a natural logarithm.
Firm Value	Market-to-Book ratio	The total market value of the firm divided by the total book value of the firm.
Shareholders Value	Overpayment Dummy	The variable equals 1, when the 52-week high of the target stock multiplied by the shares outstandig is bigger than the Deal Value, otherwise the variable is 0.
Tobin's Q	Tobin's Q	The total assets market value divided by the replacement costs of the assets.
Nature of the Deal	Friendliness	The variable equals 1, when the offer is described as friendly by the Target firm, otherwise the variable is 0.
Relatedness	SIC Dummy	The variable equals 1, when the acquiring firm shares the same first two digits of the SIC-code of the target firm.

Another important part of the data is the market benchmark for determining the abnormal return, as cited in the Capital Asset Pricing Model (CAPM) (Sharpe, 1964). This model will be explained in the next Section: Methodology. In this paper the whole sample of target firms consists of the US-listed companies only. Furthermore, considering that we filtered the announcements during 2012 to 2016 by deal sizes greater than 20 million, what indicates that the target firm sample exists out of varying (in terms of size) US companies. For this reason, we used one of the most accepted US indices, the S&P 1500 (and the S&P 500 as robustness check, more on this in Section 4.1), as the benchmark of the US market.

4 Methodology

In the following chapter, the methodology of the research will be reviewed. After acquiring the data as discussed in the Data section, the methodology section shows how we have applied the data to find the results and how the methods are allied to the hypotheses. The first chapter contains a detailed review of the Capital Asset Pricing Model (CAPM) and how to use it for an Event Study. An important note to the use of the CAPM is the Efficient Market Hypothesis (EMH). According to this theory by Fama (1970), the market is efficient when all the information of a firm is represented in the stock price of the firm. By applying the CAPM it is possible to retain the abnormal returns, thus indicating that a market is not efficient. The next chapter gives more insights in the relatively new term: Abnormal Attention. The last chapter of this section reviews the method for how the determinants of a merger or acquisition announcement could explain the determined abnormal returns.

4.1 Measurement of Abnormal Returns (Event Study)

Performing an event study starts by understanding the CAPM. This is a model developed by Sharpe (1969), which forecasts the return of a certain stock by adjusting the risk of the market. In the model there is a distinction in terms of risk, between systematic risk and unsystematic risk. The systematic risk is, for instance, a possible event that affects the whole stock market (e.g. Inflation). An unsystematic risk is an event that only affects the particular stock (e.g. negative media attention). The formula of CAPM is relatively simple and is stated in the next equation (2).

$$E(R_i) = R_f + \beta_i \times \left(E(R_m) - R_f\right) \tag{2}$$

$E(R_i) = The\ expected\ return\ of\ investment\ i$

$R_f = The\ risk\ free\ rate\ of\ return$

$\beta_i = The\ systematic\ risk\ of\ investment\ i$

$E(R_m) = The\ expected\ return\ of\ the\ market\ benchmark$

An expansion of the CAPM is the market-model (3), which is widely used in performing event studies in the economic literature. In this paper we will pursue the event study as described in the paper of MacKinlay (1997). The introduced method of MacKinlay (1997) is the developed method of the market-model of Brown & Warner (1980). This market-model can be approached to estimate the abnormal returns. This method will be applied to test the first hypothesis, as stated in section 2.1: ''H_1 =Target firms gain positive short-term Abnormal return due to a M&A announcement''. The abnormal return can be estimated by first predicting the normal returns using the market-model. The normal returns are calculated by using an estimation window (control period) of a certain stock and its correlation with the market (Beta/Slope). By applying this beta in the event window to the market returns in the event window, it is possible to estimate the predicted values of the stock (normal returns). The abnormal returns are calculated through the formulas below (4 & 5).

$$R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_{it} \quad (3)$$

$R_{it} = The\ return\ of\ investment\ i\ for\ time\ t$
$\alpha_i = The\ constant\ parameter\ of\ the\ market - model\ (Intercept)$
$\beta_i = The\ slope\ parameter\ of\ the\ market - model$
$R_{mt} = The\ return\ of\ the\ market\ benchmark\ for\ time\ t$
$\varepsilon_{it} = The\ error\ term\ of\ investment\ i\ for\ time\ t$

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i \times R_{mt}) \quad (4)$$

$$AR_t = \frac{1}{i} \sum_{i=1}^{i} AR_{it} \quad (5)$$

An important aspect of an event study is the timeline of the event that is researched. By using the market-model (3), the values of $\hat{\alpha}_i$ & $\hat{\beta}_i$ are estimated through the comparison of the return of stock and the market-benchmark during the estimation period. Peterson (1989) stated that the bigger the estimation period, the more reliable the normal returns are. The estimation period depends on the type of data used in research (e.g. daily stock data). There is no current standard for using an estimation period, but it is key that the estimation period does not overlap the event period. For the sake of this research, we used an estimation period of 101 days (-110,-10), as this gives a reliable view of the normal returns of stock *i* at time *t* in an event window with a maximum of 9 days before and 5 days after the M&A announcement date. Another important time frame is the event period, which for this research begins at the moment that the merger or acquisition is announced. We decided to research several event windows (e.g. (-1,0), (-1,1), (-2,2), (-5,5) & -9,-1)), so the evolution of the abnormal return in the time period can be shown. In the underlying figure, the time frame of this research is illustrated.

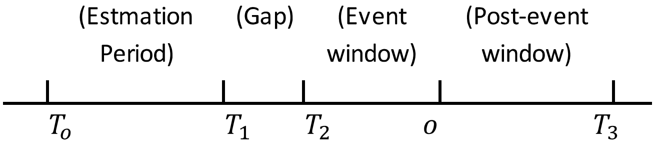

Figure 2. Time frame of event study used for each stock i, where *o* is the day of the M&A announcement.

In time frames with multiple days in the event window, the AR has to be expanded to another term: Cumulative Abnormal Returns (CAR) (6). This term is the sum of the abnormal returns obtained via the market-model in the event window. The smaller the time frame, the less chance that other events could possibly occur and affect the returns. The CAR shows the total returns could have been obtained during the event window, thus it indicates if an investor could have beaten the market. The CAR is an aggregation in time, but not in stocks, therefore we use the Cumulative Average Abnormal Returns (CAAR) (7). This term is the mean of all the CARs of the stocks in the sample and therefore is a reflection of the CARs in the whole research sample.

$$CAR_i = \sum_{t=t_2}^{o} AR_{it} \tag{6}$$

$$CAAR_{(t_2,o)} = \frac{1}{i} \sum_{i=1}^{i} CAR_i \tag{7}$$

To test whether the obtained CARs are statistically significant, we will apply the Standardized Cross-Sectional test statistic of Boehmer, Masumeci & Poulsen (1991) (BMP)[7], since this method is more robust to the induced variance during an event. The regular cross-sectional test does not consider unequal variance of the CARs during an event. By applying this method, the obtained CAR is divided by the squared standard error (variance) of the estimated abnormal returns during the estimation period, also called the least residuals method (8&9). The variables of the Standardized Cross-Sectional test statistics Standardized Abnormal Return (SAR) and Standardized Cumulative Abnormal Return (SCAR) are determined as follows:

$$SAR_{it} = \frac{AR_{it}}{S_{it}} \tag{8}$$

$$SCAR_{it} = \sum_{t=t_2}^{0} SAR_{it} \tag{9}$$

S_{it} is determined by calculating the AR_{it}s in the estimation period, this adjusts the standard error by the forecasting error of the market model (10) (Patell, 1976). The alpha and beta of formula (3), are used for those AR_{it}s of the S_{it}. Furthermore, the deviation of the market index (in this research S&P1500 and as robustness check S&P 500) is added to the standard deviation of the abnormal return.

$$S^2_{AR,it} = S^2_{AR,i} \times \left(1 + \frac{1}{M_i} + \frac{(R_{m,t} - \overline{R_m})^2}{\sum_{t=t_2}^{0}(R_{mt} - \overline{R_m})^2}\right) \tag{10}$$

The z-test of the Standardized Cross-Sectional Test Statistic shows the statistical significance of the obtained CAR during an M&A announcement (11 & 12). Thus, the significance test of the average SCAR (SCAAR), determines whether the average CAR (CAAR) is significant.

$$S^2_{SCAR} = \frac{1}{N(N-1)} \times \sum_{i=1}^{N}(SCAR_i - \overline{SCAR})^2) \tag{11}$$

[7] We decided to split up the formula, to ensure the correct use of the BMP Standardized Cross-Sectional test statistic.

$$Z_{bmp} = \frac{SCAR}{S_{\overline{SCAR}}} \quad (12)$$

In order to strengthen the validity of the performed research we added an alternative way to perform an event study, and therefore an alternative measure of the abnormal return of a stock at the time of an M&A announcement, and an alternative test statistic to determine the statistical significance, as robustness checks. This alternative method, the mean adjusted return model, is determined by the stocks' return at time t minus the average stocks' return during the estimation period (Brown & Warner, 1980) (13). The other steps of the methodology are similar to the market-model (formulas 5 up to 12). Provided that we find equivalent results within the market-model and the adjusted mean model, the results of this paper are more robust.

$$AR_{it} = R_{it} - \frac{1}{(T_1 - T_0)} \sum_{t=T_o}^{T_1} R_{it} \quad (13)$$

The alternative test statistic is the widely accepted Wilcoxon signed rank test of Wilcoxon (1945). Since this test is a non-parametric test, there are fewer assumptions concerning the distribution of the research sample (has to be random and paired data). The determined abnormal returns will be ranked based on their absolute value, which are determined by the asset pricing model. Since the rank is implemented, the test has more statistical power than the regular sign test, because the difference within the hypothesis (CAR>0) has been taken into account.

$$Z_{wilcoxon} = \frac{\{Max\ (W^{+}, W^{-}\} - N(N-1)/4}{\sqrt{(N(N+1)(2N+1)/12}} \quad (14)$$

4.2 Measurement of Abnormal Direct Attention

Few researchers have implemented the Search Volume Index (SVI) as a measure for direct attention in their research of economics or finance. At this moment, there is no general formula to measure the abnormal attention, as it can be used or interpreted in various ways. In this research, we decided to use 2 different methods to measure the abnormal direct attention, for the sake of this paper Abnormal Search Volume Index (ASVI). The main reason we use 2 different techniques is the robustness of the acquired results of the performed tests. Thereby we want to secure and strengthen the validity of the research. The 2 measurement methods are based on prior research and have been modified for this particular research. Those methods will clarify the direct attention the target firms obtain, and therefore determine whether we accept or reject ''H_2 = The Abnormal Attention during an M&A announcement is greater than zero'' and ''H_3 = Prior to the M&A announcement, the abnormal attention is greater than zero'', as stated in sections 2.3 and 2.4.

The first measurement of abnormal direct attention (ASVI) is relatively simple and used in most available papers concerning abnormal attention. Since we transformed the data to Ln (1+ SVI_t), the relative value became considerably smaller and therefore contains fewer outliers. The relative change in value between t and t-1 will be used as the abnormal return of day t (15) (Siganos, 2013) (Campos, Cortazar, & Reyes, 2017) (Reyes, 2018).

$$ASVI1_{it} = Ln\,(1 + SVI_{it}) - Ln\left(1 + SVI_{i,t-1}\right) \qquad (15)$$

The second method determines the relative value of the SVI at day t, which is based on the value of SVI at day t minus the value of SVI at day t-1. This method is somewhat similar to the normal returns, however there is no market to determine the market returns. Therefore we use two different time periods (estimation periods) in our research (t_2-10,t_2) and (t_2-30,t_2) , also for robustness purposes. The abnormal direct attention proxy (ASVI) is calculated by the value of SVI at time t minus the average of the SVI during the 'estimation period' (16) (Drake, Roulstone, & Thornock, 2012) (Campos, Cortazar, & Reyes, 2017).

$$ASVI2_{i0} = Ln\,(1 + SVI_{it}) - \frac{1}{-(-10\ (\text{or} - 30))} \sum_{t=\,t_2-10\,(\text{or}-30)}^{t_2} (\ln 1 + \ SVI_{it}) \tag{16}$$

The two described methods can be directly implemented when the event window is only one day. Similar to section 4.1, cumulative abnormal returns and cumulative average abnormal returns (in this case; cumulative abnormal attention (CASVI)) have to be calculated for event windows bigger than one day (17 & 18).

$$CASVI_i = \sum_{t=\,t_2}^{0} ASVI_{it} \tag{17}$$

$$CAASVI = \frac{1}{N} \sum_{i=1}^{N} CASVI_i \tag{18}$$

To test whether the cumulative average abnormal attention (CAASVI) is statistically relevant, we decided to use a regular Cross-Sectional Test, since the Cross-Sectional Standardized test is barely applicable to the search volume index data due to the alternative method(s) of determining the abnormal attention. Furthermore, as a robustness check, we also applied the Wilcoxon signed Rank test (see section 4.1).

4.3 Cross-sectional Analysis

In order to explain the abnormal returns obtained during an M&A announcement, we have acquired multiple control variables (sections 2.5 and 3.3). Those determinants are widely used within the M&A literature and therefore added as extra robustness of the research performed in this paper. As mentioned in Section 4.2, we calculated the abnormal direct attention with two different estimating methods. These values will be added as main variables in explaining the abnormal returns. The cross-sectional analysis measures the relationship between the dependent variable and the independent variables and therefore helps testing the last hypothesis:''H_4 = The Abnormal Attention has explanatory value in determining the abnormal returns of target stocks during a M&A announcement''. The relationship is represented in a coefficient, which is tested for significance relevance. When this coefficient is significant, it has explanatory value in estimating the dependant variable. In this research, multiple forms of the following regression (19) are used to obtain the possible relationships within the variables. This regression is the most comprehensive form and would be used for multiple event windows.

$$CAR_{it} = \beta_0 + \beta_1 ASVI_{it} + \beta_2 Ln(DV)_i + \beta_3 Tobin's\,Q_i + \beta_4 MtB_i + \beta_5\, Cash_i + \beta_6 Mixed_i + \beta_7 Friendliness_i + \beta_8 Relatedness_i + \beta_9 Overpayment_i + \varepsilon_{it} \quad (19)$$

CAR_i = *Cumulative abnormal return of stock i*

β = *Coefficient that represent the relationship within the dependent and the corresponding independent variable*

$Ln(DV)$ = *Natural logarithm of the deal value*

$Tobin's\,Q$ = *Total market value of the assets divided by the replacement costs of the assets*

MtB = *Market-to-book ratio*

$Cash$ = *Dummy variable of the form of payment, for this matter entirely in cash*

$Mixed$ = *Dummy variable of the form of payment, for this matter mixed payment*

$Friendliness$ = *Dummy variable of the nature of the announcement*

$Relatedness$ = *Dummy variable of the relatedness within the target and bidding firm*

$Overpayment$ = *Dummy variable whether the bidding firm overprices the target firm*

5 Results

This chapter contains all the results, which are obtained by following the methodology described in chapter 4. Those results are key in testing the hypotheses stated in chapter 2. The results will be described in detail and additionally explained how the obtained results are related within the whole research sample and the formed hypotheses. The chapter is structured as follows: Starting with the results of the abnormal returns of the target firms, followed by the results of the abnormal attention of the target firms during the event window(s) and completing the section with the cross-section analyses.

5.1 Abnormal Returns of the Target Firms

This section comprises the results related to the first hypothesis; *H_1 =Target firms gain positive short-term Abnormal return due to a M&A announcement.* Table 5 contains the Cumulative Average Abnormal Returns (CAARs) of the targets due to an M&A announcement spanning 2012-2016. The CAARs are shown in different Event Windows and are broken down by years in the research sample. The different event windows are in line with previous work of the short-term ARs of M&A announcements (See Table 1) and have been adopted to the purpose of our research. The split of number of years shows the development of the CAAR over the years in the sample, and differences could be explained by comparing the results with Table 2.

The results obtained by applying the Market-Model, benchmarked by S&P1500, are in line with previous research. The CAAR of (-5,5) in our sample is 31.68% and is comparable to the results of Franks et al. (1991), Kaplan & Weisbach (1992) and Smith & Kim (1994), who found CAARs of 28.04%, 26.90% and 30.19% respectively. We did not find any evidence why the CAR (-5,5) varied over time by 10%. Furthermore, Muhlerin & Boone (2000) obtained a CAAR (-1,1) of 20.2%, which is slightly smaller than the CAAR (-1,1) of 30.71% obtained in our research. This could be attributed to Mulherin & Boone (2000) not including all the M&A announcements, but only those which were extracted out of an investment survey – resulting in a sample section that excludes relatively smaller M&A deals and therefore the

Table 5. CAARs of Target Firms during 2012 to 2016.
This table contains all the obtained Cumulative Average Abnormal Returns during the various event windows determined by the market model(benchmark S&P 1500). The selection of the five event windows are based on previous research of the Abnormal Returns during an M&A announcement. The employed statistic test is the Standardized Cross-Sectional Test Statistic Boehmer et al. (1991), the z-statistics are in parentheses (,). The development of the CAAR is shown over the years in the research sample. The sample is trimmed by 1% for the CARs on both sides.

	Total	**2012**	**2013**	**2014**	**2015**	**2016**
Observations	293	49	47	57	76	64
Event Window	CAAR	CAAR	CAAR	CAAR	CAAR	CAAR
(0,1)	22.91%***	34.56%***	19.66%***	20.09%***	18.18%***	24.50%***
	(15.12)	(7.88)	(5.72)	(6.98)	(7.13)	(6.78)
(-1,1)	30.71%***	38.06%***	27.89%***	34.92%***	24.30%***	31.01%***
	(19.72)	(10.92)	(7.21)	(10.95)	(8.57)	(8.23)
(-2,2)	31.16%***	39.05%***	28.12%***	35.44%***	24.90%***	30.96%***
	(20.16)	(11.61)	(7.32)	(10.45)	(9.09)	(8.14)
(-5,5)	31.68%***	39.60%***	26.53%***	36.29%***	25.75%***	32.33%***
	(20.12)	(11.85)	(6.68)	(9.65)	(9.65)	(8.50)
(-9,-1)	1.64%**	0.12%	-0.92%	1.91%**	3.99%***	1.65%**
	(2.24)	(0.15)	(-0.51)	(2.00)	(3.19)	(2.35)

*p<10% ,**p<5% & ***p<1%

announcement effect of the smaller M&A deals. According to Moeller et al. (2005), the size of the deal is negatively related to the CAAR, and therefore can account for the differences in CAAR (-1,1), since the deal sizes have been increasing over time.

The CAARs of event windows (0,1), (-1,1), (-2,2) and (-5,5) over the whole sample, and during the separate years, are all statistically significant at a 1%-level. This implies that investing in target firms during an M&A announcement typically leads to significant abnormal returns. Therefore, we cannot reject Hypothesis H_1 for the event windows (0,1), (-1,1), (-2,2) and (-5,5), and conclude that target firms gain positive short-term abnormal returns due to an M&A announcement. Therefore we can reject the Efficient Market Hypothesis and state that not all the information is adopted in the stock price of a target within one working day. A possible cause is stated in section 2.1, when an acquirer wants to take over a target firm, it has to pay a price exceeding the targets market value. In our sample, 48% of the obtained Deal Values exceeds the targets 52-week high stock price times the amount of shares outstanding (Table 3).

The determined total CAAR (-9,-1) during the research period is 1.64% (5%-level). Therefore, we cannot reject the H_1 hypothesis for this event window at a 5%-level. This result indicates that we are able to determine whether investors in 9 to 1 day(s) (9-day period) prior to the announcement are aware of a potential upcoming M&A announcement. Especially in 2014, 2015 and 2016, the results have been outperforming the benchmark by a significant amount. Comparing those results to the other event periods, the relative value of the abnormal returns is remarkably lower.

Since the significance is determined by Standardized cross-sectional test statistic of Boehmer et al. (1991), which is a parametric test statistic, we ensured the validity of our results by applying a non-parametric test statistic, the Wilcoxon signed rank test (see section 4.1). The results are shown in the adjacent table. We applied the non-parametric test statistic to the same results as the parametric test statistic, which are the results determined by the market model, benchmarked by the S&P 1500. The significance level of the event windows (0,1), (-1,1), (-2,2) and (-5,5) remain the same for both the applied test statistics, which ensures the validity of the obtained results during the M&A announcements in our sample. By applying the non-parametric test statistic, our results of the event window (-9,-1) hold less power since we are not able to reject H_1 at a 5%-level, but at a 10%-level. This weakens the evidence for possible insider information leakage or insider trading prior to an M&A announcement.

Table 6. CAARs of Target Firms during 2012 to 2016.
This table contains all the obtained Cumulative Average Abnormal Returns during the various event windows determined by the market model(benchmark S&P 1500). The selection of the five event windows are based on previous research of the Abnormal Returns during an M&A announcement. The employed test statistic is the Wilcoxon signed rank test of Wilcoxon (1945) , the z-statistics are in parentheses (,). The development of the CAAR is shown over the years in the research sample. The sample is trimmed by 1% for the CARs on both sides.

	Total	**2012**	**2013**	**2014**	**2015**	**2016**
Observations	293	49	47	57	76	64
Event Window	CAAR	CAAR	CAAR	CAAR	CAAR	CAAR
(0,1)	22.91%***	34.56%***	19.66%***	20.09%***	18.18%***	24.50%***
	(9.56)	(4.43)	(3.59)	(4.50)	(4.84)	(4.50)
(-1,1)	30.71%***	38.06%***	27.89%***	34.92%***	24.30%***	31.01%***
	(10.16)	(4.46)	(4.07)	(4.80)	(5.33)	(4.72)
(-2,2)	31.16%***	39.05%***	28.12%***	35.44%***	24.90%***	30.96%***
	(10.13)	(4.46)	(4.10)	(4.68)	(5.41)	(4.68)
(-5,5)	31.68%***	39.60%***	26.53%***	36.29%***	25.75%***	32.33%***
	(10.06)	(4.47)	(3.95)	(4.58)	(5.31)	(4.74)
(-9,-1)	1.64%*	0.12%	-0.92%	1.91%	3.99%**	1.65%*
	(1.69)	(0.17)	(-0.36)	(0.84)	(1.93)	(1.39)

*p<10% ,**p<5% & ***p<1%

To ensure the validity of the performed research, we decided to test whether those results show comparable outcomes by applying another research method and another market benchmark (robustness checks). The often-used comparable research method is the adjusted mean model (equation 13). The main difference of this method is that the obtained results are based on prior performance of a stock during the estimation period, thus the normal returns are determined by the mean of the returns of a particular stock during the estimation period. As a result, the determined abnormal returns are not interfered by the market performance. The obtained results by using the adjusted mean model are shown in Table 7. We did find a CAAR of approximately 31% in the event windows (-1,1), (-2,2) and (-5,5), which are almost identical to the results of the market model (Table 5) (benchmarked by the S&P 1500). Remarkably, we did find a noteworthy lower CAAR of 7.95% in the estimation period (0,1), which implies that the abnormal returns during this period are present, but to a lesser extent. The obtained CAARs of the estimation periods (0,1), (-1,1), (-2,2) and (-5,5) are all statistically (measured by the standardized cross-sectional test statistic) significant at an 1%-level. Therefore we cannot reject the hypothesis H_1, and assume that the shareholders of target firms during the various event windows of an M&A announcement obtain a significant abnormal return on their possessed stocks. The obtained results of event window (-9,-1) (CAAR: 0.16%) measured by the adjusted mean model differ significantly from the results obtained by the market model, which implies that the results found are not robust - and furthermore, we have to reject the hypothesis H_1 for this event window. During the days prior to the M&A announcement the shareholders did not gain any wealth in terms of abnormal stock returns. The obtained results for the event window (-9,-1) also denies possible information leakage speculations, since we did not find robust evidence for those speculations.

The last performed robustness check regarding the abnormal returns is the application of another benchmark, S&P 500 instead of S&P1500, in the market model (equations 3&4). The obtained results are shown in Table 8. We did find similar results as the market model benchmarked by the S&P1500 and the mean adjusted model. The results of the event windows (0,1), (-1,1), (-2,2) and (-5,5) differ only by 0.xx of the other benchmarked, which ensures the validity of our obtained results and therefore shows robustness of our performed research. The result found within the event window (-9,-1) was remarkable, as we found a

CAAR 1.68% at a 5%-significance level. As a result of this finding, we could not reject the hypothesis H_1 at a 5%-significance level. By applying two different models and two different benchmarks, we found 3 different results regarding the event window (-9,-1). This implies that the obtained results of this event period are not robust. The other event windows (0,1), (-1,1), (-2,2) and (-5,5) showed for the different measures similar results, and therefore are robust and ensure the validity of our performed research.

Table 7. CAARs of Target Firms during 2012 to 2016.
This table contains all the obtained Cumulative Average Abnormal Returns during the various event windows determined by the adjusted mean model. The selection of the five event windows are based on previous research of the Abnormal Returns during an M&A announcement. The employed statistic test is the Standardized Cross-Sectional Test Statistic Boehmer et al. (1991), the z-statistics are in parentheses (,). The development of the CAAR is shown over the years in the research sample. The sample is trimmed by 1% for the CARs on both sides.

	Total	**2012**	**2013**	**2014**	**2015**	**2016**
Observations	293	49	47	57	76	64
Event Window	CAAR	CAAR	CAAR	CAAR	CAAR	CAAR
(0,1)	7.95%***	14.54%***	8.48%**	10.10%***	6.06%***	6.40%***
	(3.48)	(3.18)	(2.54)	(2.83)	(2.65)	(2.84)
(-1,1)	30.64%***	37.96%***	28.07%***	34.59%***	24.45%***	30.99%***
	(10.05)	(8.77)	(7.07)	(8.47)	(8.99)	(7.25)
(-2,2)	31.09%***	38.64%***	28.27%***	35.22%***	25.10%***	31.01%***
	(10.26)	(8.91)	(7.20)	(7.88)	(9.35)	(7.19)
(-5,5)	31.45%***	39.12%***	27.05%***	35.65%***	25.76%***	32.05%***
	(10.24)	(8.85)	(6.62)	(8.32)	(9.65)	(7.23)
(-9,-1)	0.16%	0.14%	-0.39%	1.34%	3.10%***	0.11%
	(0.85)	(0.18)	(-0.37)	(1.25)	(2.82)	(1.14)

*p<10% ,**p<5% & ***p<1%

Table 8. CAARs of Target Firms during 2012 to 2016.
This table contains all the obtained Cumulative Average Abnormal Returns during the various event windows determined by the market model(benchmark S&P 500). The selection of the five event windows are based on previous research of the Abnormal Returns during an M&A announcement. The employed statistic test is the Standardized Cross-Sectional Test Statistic Boehmer et al. (1991), the z-statistics are in parentheses (,). The development of the CAAR is shown over the years in the research sample. The sample is trimmed by 1% for the CARs on both sides.

	Total	**2012**	**2013**	**2014**	**2015**	**2016**
Observations	293	49	47	57	76	64
Event Window	CAAR	CAAR	CAAR	CAAR	CAAR	CAAR
(0,1)	22.81%***	34.51%***	19.72%***	20.12%***	18.12%***	24.52%***
	(15.09)	(7.87)	(5.75)	(7.01)	(7.09)	(6.79)
(-1,1)	30.65%***	38.04%***	27.89%***	34.93%***	24.30%***	31.00%***
	(19.64)	(10.91)	(7.22)	(10.94)	(8.57)	(8.23)
(-2,2)	31.12%***	39.04%***	28.13%***	35.44%***	24.90%***	30.95%***
	(20.13)	(11.61)	(7.32)	(10.45)	(9.08)	(8.14)
(-5,5)	31.63%***	39.55%***	26.54%***	36.29%***	25.76%***	32.30%***
	(20.01)	(11.84)	(6.68)	(9.64)	(9.65)	(8.48)
(-9,-1)	1.68%**	0.14%	-0.90%	1.91%**	4.01%***	1.64%**
	(2.25)	(0.12)	(-0.49)	(2.01)	(3.20)	(2.31)

*p<10% ,**p<5% & ***p<1%

5.2 Abnormal Attention during an M&A Announcement

This section comprises the results related to the second hypothesis; *H_2 = The Abnormal Attention during an M&A announcement is greater than zero.* In section 4.2, we elaborated two different measurements of the abnormal direct attention, which led to 3 different abnormal attention variables (CASVI1, CASVI2 (10) and CASVI2 (30)). As there is not yet a clear and widely accepted definition of (abnormal) direct attention, and the variable can be interpreted in various ways, we used three different variables. Another argument for why we applied multiple measurements is to ensure validity and add robustness of the performed research. One Google Trend Search Volume Index observation has a value within the range of 0 to 100, therefore the data does not reflect the real amount ticker searches, but a weighted value in which the value 100 reflects the day/period when searches are relatively at the search period highest.

Table 9 contains the Cumulative Average Abnormal Search Volume Index (CAASVI) of the three different attention variables and different event windows. The obtained results are comparable with the limited research done to the relatively new measurement of direct attention. For instance, Siganos (2013) found an CAASVI1 (0,-1) of 1.68 and CAASVI1 (0,-2) of 2.61, both statistically significant at respectively 1% and 5%-level. Our CAASVI1 (0,-1) is 2.45 and statistically significant at a 1%-level. A possible explanation of the observed increase could be the time period of research, as Siganos (2013) employed a research period from 2004 to 2010. In our time range of 2012 to 2016, the Internet search engine Google was more accessible to investors than in the period used in the previous work. We are not able to test whether the total amount of ticker searches have increased over time, since the Google Trends Data is limited to the value of 0 to 100.

Our results for the CAASVI1, as shown in the first row of Table 9, are statistically significant and greater than zero for the event windows (0,-1), (-1,1) and (-2,2). These results indicate that there is a short-term increase in searches due to M&A announcements. The results show a decrease as the event window contains more days in the period, which could be explained by analysing formula 15. The abnormal search volume index of a certain day is determined in part by the returns of the prior day, thus when the peak of searches falls back to the old track of searches, the cumulative abnormal search volume index will diminish. Therefore, the CASVI (-5,5) shows evidence that the peak of attention, as displayed in figure 1, falls within 5 days of the announcement to an insignificant level of the amount of ticker searches.

Table 9. Cumulative Abnormal Attention during 2012 to 2016.
This table contains all the obtained Cumulative Average Abnormal Search Volume Index (CAASVI) for the three different variables during 2012 to 2016. The variables are conducted and determined from the Google Trend Database. We used the same event windows as the event windows used in the Cumulative Abnormal Returns of the targets research, thus we are able to compare the variables in the cross-sectional analyses. The employed test statistic is the Regular Cross-sectional test, where the test statistics are in parentheses (,). The total sample is trimmed by 1% for the CARs on both sides, therefore we neglect the same outliers as in Section 5.1.

	Total	Total	Total
Observations	293	293	293
Event Window	CAASVI1	CAASVI2(10)	CAASVI2(30)
(0,1)	2.45***	2.11***	2.51***
	(14.99)	(13.37)	(17.14)
(-1,1)	2.48***	2.01***	2.62***
	(14.84)	(10.52)	(15.08)
(-2,2)	1.53***	2.11***	3.11***
	(9.14)	(7.68)	(12.77)
(-5,5)	0.14	1.22***	3.43***
	(1.06)	(2.83)	(9.64)
(-9-1)	0.19	-1.92***	-0.11
	(1.33)	(-6.12)	(-0.42)

*p<10% ,**p<5% & ***p<1%

Our results show statistically significant results for all the event windows used in our research for the CAASVI2 (10 day and 30 day period) method, except for the (-9,-1) window of the CAASVI2 (30). This indicates that for both the estimation window of (-20,-10) and (-40,-10), the CAASVI in the different event windows are significant divergent. This result is reducible from Figure 1, where the search volume index is shown in the (-8,8) period but is not yet transformed into the used logarithmic values. By reviewing the different measurements of the CAASVIs, there is one considerable difference in outcomes: the time period (-5,5), where the first measurement of abnormal attention is 0.14 (not significant) and for the other measurements respectively 1.22 (1%-level significant) and 3.43 (1%-level significant). This outcome can be clarified by the formulas of the variables (13 & 14). As stated in the previous paragraph, the first method will show a smaller value when the increase and decrease of the peak ticker searches falls within the event window, therefore the total value of the increases will be reduced by the same level of decreases (thus, when the ticker searches turn back to the old level). The second measurement method compares the ticker searches during an event window to the searches in a prior period (10 or 30 days). In order to make the comparison with the market-model, we could call them the normal ticker searches. This would imply that the CAASVI2 shows differences within the ticker searches of the event window and the normal ticker searches, therefore conveying the total increase of the peak in ticker searches.

The results displayed in Table 9 show a statistically significant (1%-level) abnormal amount of ticker searches during an M&A announcement for the event windows (0,1), (-1,1) and (-2,2), therefore we cannot reject the second hypothesis H_2 = *The Abnormal Attention during an M&A announcement is greater than zero*. Furthermore, if we observe the total impact of the peak during the announcement captured by the CAASVI2 method, the (-5,5) period is also statistically significant at a 1%-level. This indicates that there has been a significant increase of total ticker searches during the M&A announcement compared to the estimation period. This implies that we cannot reject the second hypothesis of this research. Thus, during an M&A announcement is the abnormal attention (amount of ticker searches) of the target firm greater than zero.

In the last row of Table 9, the results of the event window (-10,-2) are displayed. For the first measurement CAASVI1, we did not find any significant results. Therefore, we can state that there is no starting or ending peak during this event window. For the second measurement we found negative values of -1.92 (1%-level significant) and -0.11 (not significant). This implies that there have been, in total, less searches in the days prior to the M&A announcement than observed during the estimation (normal) period. Therefore we must reject H_3 = *Prior to the M&A announcement, the Abnormal Attention is greater than zero*. This indicates that we have not found any evidence for abnormal attention of target firms prior the M&A announcement, which could be attributed to inside information. More interesting is that we have found a negative value, which implies that the (-20,-10) contains a higher amount of ticker searches than the days (-9,-1) prior to the announcement. All the results of the event window (-9,-1) are in line with the results found for the CAARs in the same event window, in which no strong significant results were found.

5.3 *Explaining the Abnormal Return*

This section comprises the results related to the third hypothesis; *H_4 = The Abnormal Attention has explanatory value in determining the Abnormal Returns of target stocks during a M&A announcement.* We will review the cross-sectional results of the dependent variable CAR and the previous explained determinants (Section 2.5). An OLS-regression is executed to determine whether there is a relationship within the determinants and the CAR, following the methodology briefly explained in section 4.3. For the fifteen executed OLS-regressions, we only displayed the most comprehensive form, considering the scope of this research, as our goal is to test whether the abnormal attention could explain the obtained CAR of a target firm.

Table 10 shows the results of the cross-sectional analysis executed for the five different event windows by adapting as main explanatory variable the CASVI1. There was no (multi)collinearity found in the tested variables (see Appendix B1). As stated in the previous section, an on-going peak in searches determines the value of CASVI1. When the peak falls back to its old level, the value decreases with the peak. For the event windows (0,1), (-1,1), (-2,2) and (-5,5), which are the event windows that contains the M&A announcement day, we found positive coefficients which are significant at a 1% level, except event window (0,1), where the result is significant at a 5% level. This implies that the amount of ticker searches could partly explain the increase of CAR in the same event window. For instance, an increase of 1 in the CASVI1 (-2,2), causes an increase of 0.02383 of the CAR (-2,2). Therefore, the 'direct' attention, measured by the CASVI1, (partially) explains the value of the CAR.

The observed results of event window (-9,-1) are not statistically significant, therefore no relationship was shown for the CAR (-9,-1) and the CASVI1 (-9,-1). Since we observed a CAAR of 1.64%, there was a small value to clarify by the 9 independent variables. However, we found a positive relationship within the Ln(DealSize) and the CAR (-9,-1) and the form of payment (mixed) and the CAR (-9,-1). This perceived result is not in line with previous research of Moeller et al. (2005), and therefore weakens the result of that event window. A possible explanation could be the power of the regression, as the observed adjusted R^2 has a value of 0.0442, which is relatively low in comparison to the other executed regression.

Table 10. Cross-sectional results of various event windows where the CAR is determined (CASVI1).

This table contains the OLS for the following regression: CAR_{it}=β0 (constant)$_i$+ β1 ASVI1$_{it}$ + β2 Ln(DV)$_i$ + β3 Tobin's Q$_i$ + β4 MtB$_i$+ β5 Cash$_i$+ β6 Mixed$_i$+ β7 Friendliness$_i$+ β8 Relatedness$_i$+ β9 Overpayment$_i$ + ε_{it} . The variables in the regression are described in Section 2.5. The estimation of the CAR is described in Section 4.1. The estimation of the CASVI is briefly described in Section 4.2. The t-values are displayed between the parenthese (,) and are determined by applying the robust standard errors. The sample is trimmed by 1% of the CAR on both sides.

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI1	0.00962	0.01427**	0.02383***	0.02677***	0.00373*
	(1.52)	(2.14)	(3.59)	(3.62)	(1.71)
Ln (DealSize)	-0.01184	-0.04753***	-0.04648***	-0.04628***	0.08644**
	(-1.02)	(-4.04)	(-4.02)	(-3.74)	(2.02)
Tobin's Q	0.00197	0.00095	0.001639	0.00206	0.00063
	(1.35)	(0.63)	(0.99)	(1.24)	(0.71)
Market-to-Book ratio	-0.00388	0.00143	0.001957	0.00170	-0.00269
	(-0.72)	(0.21)	(0.32)	(0.27)	(-1.22)
CashDummy	0.18685***	0.22698***	0.21783***	0.22363***	-0.02197
	(5.69)	(6.57)	(5.77)	(6.10)	(-1.22)
MixedDummy	0.11703**	0.11710***	0.10649***	0.11695**	-0.03602*
	(3.33)	(3.26)	(2.80)	(3.10)	(-1.85)
FriendlinessDummy	-0.13159	-0.02548	-0.02645	-0.0460	0.03840
	(-1.50)	(-0.30)	(-0.30)	(-0.49)	(1.29)
RelatednessDummy	-0.00793	-0.01699	-0.02629	-0.00435	0.00059
	(-0.23)	(-0.48)	(-0.75)	(-0.12)	(0.06)
OverpaymentDummy	0.00880	-0.03462	-0.04199	-0.02999	0.00138
	(0.23)	(-0.95)	(-1.22)	(-0.84)	(0.12)
Constant	0.28069***	0.47783***	0.48810***	0.51436***	-0.05157
	(2.68)	(5.15)	(4.91)	(4.85)	(-1.41)
Observations	293	293	293	293	293
Adj. R-squared	0.0812	0.1686	0.1921	0.1729	0.0442

*p<10% ,**p<5% & ***p<1%

Tables 11 and 12 contain the cross-sectional results of the CAR of various event windows, and as the main control variable the CASVI2, which is the second measurement of the abnormal attention. A OLS-regression is performed to determine whether there is a relationship between the dependent variable and the independent variables. There was no (multi)collinearity found in the tested variables for two different core independent variables (see Appendix B2 and B3)The tables are split in five event windows, which are similar event windows to the determined CARs (Section 5.1). For the relationship of an event window we used the CASVI2 determined by a similar event window; hence we use the abnormal attention of the same period and make logical assumptions.

Campos et al. (2017) used the direct attention variable to predict the VIX by adopting the CASVI2(10) in their forecast models. They found that models where the CASVI2(10) was adopted predicted the VIX-return more accurately. This was mainly due to the relationship of the CASVI with the stock market. This result is not directly comparable to our results, but indicates that the CASVI2(10) plays a role in terms of stock market returns. For the CASVI2(10), we found a positive significant relationship (at least 5%-level) within the abnormal attention and the abnormal returns of a certain target firm. For the event window (-1,1), an increase of 1 in the CASVI2(10), leads to an increase of the CAR by 0.01355 (1%-significance level). Therefore, we can state that increased attention from an M&A announcement, due to ticker searches, leads to an increase in the abnormal returns during the announcement.

The second measurement of the CASVI2, where we adopted a relatively larger estimation period of 40 days to 10 days prior to the M&A announcement, led to a similar positive relationship. However, the results of using this variable led to less significant results. The event windows (0,1) and (-5,5) have positive significance for at least a 5%-level. An increase of the CASVI2 (30) by 1 in the event window (-5,5) leads to an increase in CAR of 0.00769 (1%-level). The event windows (-1,1) and (-2,2) are less significant respectively, with no significant relationship at a 10%-level. Therefore, the second measurement of the CASVI2 has less power than the first measurement of the CASVI2.

Table 11. Cross-sectional results of various event windows where the CAR is determined (CASVI2 (10)).

This table contains the OLS for the following regression: CAR_{it}=β0 (constant)$_i$+ β1 ASVI2(10)$_{it}$ + β2 Ln(DV)$_i$ + β3 Tobin's Q_i + β4 MtB_i+ β5 $Cash_i$+ β6 $Mixed_i$+ β7 $Friendliness_i$+ β8 $Relatedness_i$+ β9 $Overpayment_i$ + $ε_{it}$. The variables in the regression are described in Section 2.5. The estimation of the CAR is described in Section 4.1. The estimation of the CASVI is briefly described in Section 4.2. The t-values are displayed between the parenthese (,) and are determined by applying the robust standard errors. The sample is trimmed by 1% of the CAR on both sides.

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI2 (10)	0.012226**	0.01355***	0.01133***	0.00723***	0.00027
	(1.97)	(2.59)	(3.15)	(3.49)	(0.26)
Ln (DealSize)	-0.01178	-0.04802***	-0.04642***	-0.04336***	0.00884**
	(-1.02)	(-4.07)	(-3.87)	(-3.53)	(2.05)
Tobin's Q	0.00198	0.00132	0.00148	0.00275*	0.00064
	(1.36)	(0.84)	(0.87)	(1.66)	(0.71)
Market-to-Book ratio	-0.00472	0.00042	0.00067	0.00096	-0.00292
	(-0.88)	(0.06)	(0.10)	(0.15)	(-1.31)
CashDummy	0.19375***	0.24327***	0.23773***	0.24159***	-0.02393
	(5.94)	(6.99)	(6.19)	(6.19)	(-1.29)
MixedDummy	0.12076***	0.1841***	0.11925***	0.11638***	-0.03769**
	(3.53)	(3.62)	(3.13)	(3.02)	(-1.89)
FriendlinessDummy	-0.13105	-0.02467	-0.01598	-0.03261	0.03855
	(-1.52)	(-0.30)	(-0.19)	(-0.36)	(1.32)
RelatednessDummy	-0.00859	-0.01823	-0.02445	-0.01469	0.00112
	(-0.28)	(-0.50)	(-0.69)	(-0.41)	(0.11)
OverpaymentDummy	0.00615	-0.03368	-0.04029	-0.02950	0.00103
	(0.16)	(-0.95)	(-1.13)	(-0.81)	(0.09)
Constant	0.27790***	0.47868***	0.47926***	0.47442***	-0.04966
	(2.70)	(5.15)	(4.81)	(4.47)	(-1.35)
Observations	293	293	293	293	293
Adj. R-squared	0.0865	0.1722	0.1695	0.1598	0.0351

*p<10% ,**p<5% & ***p<1%

Table 12. Cross-sectional results of various event windows where the CAR is determined (CASVI2 (30)).

This table contains the OLS for the following regression: CAR_{it}=β0 (constant)$_i$+ β1 ASVI2(30)$_{it}$ + β2 Ln(DV)$_i$ + β3 Tobin's Q_i + β4 MtB_i+ β5 $Cash_i$+ β6 $Mixed_i$+ β7 $Friendliness_i$+ β8 $Relatedness_i$+ β9 $Overpayment_i$ + $ε_{it}$. The variables in the regression are described in Section 2.5. The estimation of the CAR is described in Section 4.1. The estimation of the CASVI is briefly described in Section 4.2. The t-values are displayed between the parenthese (,) and are determined by applying the robust standard errors. The sample is trimmed by 1% of the CAR on both sides.

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVD2 (30)	0.01279*	0.00530	0.00558	0.00769***	0.00025
	(1.80)	(0.91)	(1.26)	(2.61)	(0.18)
Ln (DealSize)	-0.01157	-0.04951***	-0.04725***	-0.04294***	0.00880**
	(-1.00)	(-4.08)	(-3.81)	(-3.45)	(2.03)
Tobin's Q	0.00197	0.00111	0.00116	0.00242	0.00064
	(1.33)	(0.68)	(0.67)	(1.36)	(0.70)
Market-to-Book ratio	-0.00454	0.00196	0.00201	0.00365	-0.00290
	(-0.82)	(0.27)	(0.28)	(0.56)	(-1.31)
CashDummy	0.19052***	0.24287***	0.23503***	0.24962***	-0.02351
	(5.85)	(6.81)	(6.07)	(6.17)	(-1.31)
MixedDummy	0.11851***	0.12779***	0.11617***	0.11693***	-0.03794*
	(3.44)	(3.57)	(3.00)	(3.00)	(-1.89)
FriendlinessDummy	-0.13430	-0.02537	-0.02051	-0.04594	0.03788
	(-1.57)	(-0.29)	(-0.23)	(-0.51)	(1.31)
RelatednessDummy	-0.00929	-0.01141	-0.01861	-0.00629	0.00121
	(-0.30)	(-0.32)	(-0.53)	(-0.18)	(0.12)
OverpaymentDummy	0.00679	-0.02785	-0.03573	-0.02336	0.00113
	(0.18)	(-0.75)	(-0.95)	(-0.64)	(0.10)
Constant	0.27514***	0.49168***	0.48887***	0.44587***	-0.04906
	(2.67)	(5.12)	(4.81)	(4.08)	(-1.35)
Observations	293	293	293	293	293
Adj. R-squared	0.0855	0.1522	0.1428	0.1524	0.0350

*p<10% ,**p<5% & ***p<1%

The Ln(DealSize), CashDummy and MixedDummy are statistically significant for at least a significance level of 5% (excluding the Ln(DealSize) of CAR (0,1)) for all the OLS-regressions we performed (except for the event window (-9,-1)). This implies that for our executed OLS-regressions, the Deal size and form of payment are related to the value of the CAR. The deal value of an M&A affects the CAR negatively, which is in line with previous research (e.g. Moeller et al. (2005)). Our results for the relationship between the form of payment and the CAR espouses older theories (e.g. (Travlos, 1987);(Loughran & Vijh, 1997), which have proven that cash payments (and mixed payments, because it is a mix between cash and stocks) are positively related to the CAR.

To strengthen the results, we performed an additional robustness check, by adding an interaction term to the regression. We added the interaction term ''The attention variable x ln (dealsize)'', to check whether a combination of these variables led to a higher observed cumulative abnormal return (see Appendix C). We found contrasting results, comparing to the prior OLS regressions, since the CASVI1 had less impact to the CAR. Due to the fact, that we found a VIF-value of over 20 for the 3 different abnormal attention variables (see Appendix D), which implies that the predictors in the regression are highly correlated (multicollinearity), we did not further elaborated this specific interaction term. The addition of the interaction term did not strengthen our results.

The observed results of the variables Tobin's Q, Market-to-Book ratio, Friendliness, Relatedness and Overpayment are insignificant at a significance level of 10%-level (excluding the friendliness variable for event window (0,1)). This implies that we were not able to assume whether there is a relationship within those variables and the CAR. The results of the Tobin's Q, Friendliness, Market-to-Book ratio and Relatedness are in line with the previous research of Drake et al. (2012) and Reyes (2018) and therefore strengthen their, and our, results.

Overall, our goal is to determine whether there is a relationship within the abnormal attention and the abnormal returns of a target firm during an M&A announcement. We applied three different measurements of abnormal attention to gain robustness, since abnormal attention is widely interpretable. The CASVI1 shows whether there is an ongoing peak in ticker searches and the CASVI2 shows the overall surplus of the amount of ticker searchers where the event window is compared to the estimation period. The results displayed in Tables 10, 11, and 12 show similar results of a statistically significant relationship (at least 5%-level) within the abnormal attention and the abnormal return of the target firm during an M&A announcement (event windows: (0,1), (-1,1), (-2,2) and (-5,5)), controlled by various independent variables which are widely used in short-term M&A studies. Therefore, we are unable to reject H_4= *The Abnormal Attention has explanatory value in determining the Abnormal Returns of target stocks during an M&A announcement*, and assume that the CASVI1 & CASVI2 are explanatory variables in terms of determining the CAR of a certain target firm during an M&A announcement. An increase in attention (ticker searches) is related to an increase in abnormal returns of the target firm.

An extra dimension of our paper is the addition of the period of 9 to 1 day(s) prior to the M&A announcement, in order to test whether there is an appearance of insider trading/information leakage during those days. In section 5.1 and 5.2, we did find a relatively small CAAR of 1.64% (10%-level), but no positive significant abnormal attention (only a negative value of -1.91% (1%-level) by the CASVI2(10) measurement) . We executed the OLS-regressions of the (-9,-1) period and did not find a relationship within those variables. Therefore we have to reject H_4= *The Abnormal Attention has explanatory value in determining the Abnormal Returns of target stocks during a M&A announcement* for the event window (-9,-1), and assume there is no relationship within the abnormal returns and abnormal attention the 9 to 1 day(s) prior to M&A announcement. This indicates that no results of insider trading/leakage were found in terms of search behaviour of investors to target firms due to an upcoming merger or acquisition.

6 Conclusion

Previous research has shown that during an M&A announcement, the stock price of a target firm increases, resulting in abnormal returns in comparison to periods where no event occurred. Various works of economic researchers have tried to explain this increase of stock prices of the target firm. One specific variable is the attention of a target firm received from investors due to an M&A announcement, which could possibly explain the increase of the stock price during the M&A announcement period. Prior to the use of Internet, the news - and therefore attention - could only be obtained via newspapers, news journals, and personal contacts to a company. This could be measured through the amount of exposure in specific economic columns/mentions in news journals and whether this information is positive or negative. Since the rise of the Internet, it has become the most popular source of information for people, including investors. One of the best-known search engines, Google, is widely used for gathering information. An interesting database of the Google search engine is the Google Trends Search Volume Index, which opened a new dimension for measuring the 'direct' attention of a target firm due to any sort of event.

In this paper we tried to find the answer to the following question: *To what extent can the Google Search Behaviour of investors (attention) explain the Abnormal Returns of the stocks of target firms during a Merger or Acquisition Announcement?* Thus, whether there is a causal relationship within the abnormal returns of a target firm and the abnormal attention, as measured by the amount of ticker searches during an M&A announcement. We started by determining the abnormal returns and the abnormal attention. Subsequently, we performed a OLS-regression, with the cumulative abnormal return as the dependent variable and the abnormal attention as the explanatory variable. In addition, we adopted multiple control variables that are widely used in previous short-term M&A papers. This regression, the cross-section analysis, shows the relationship within the independent variable (the abnormal return) and the explanatory variables (including the abnormal attention).

First, we tested whether *target firms gain positive short-term Abnormal return due to a M&A announcement* (H_1). The obtained CAAR's of the estimation periods (0,1), (-1,1), (-2,2) and (-5,5) are all statistically significant at an 1%-level (measured by the standardized cross-sectional test statistic), and therefore we cannot reject the hypothesis H_1. As a result, we assume that the shareholders of target firms during the various event windows of an M&A announcement obtain a significant abnormal return on their possessed stocks. This implies that not all the information of a target firm is implemented in its stock price, and therefore not known by the market within one working day. To ensure validity and strengthen the results of our performed methodology, we added two robustness tests. As a first robustness test, we performed the exact same methodology, only changing the benchmark (S&P500 instead of S&P1500). As a second robustness test, we applied the adjusted mean model instead of the market model to the exact same obtained data. The results of these robustness tests showed the same outcome as our first methodology and therefore ensured the validity of our research regarding the abnormal return results.

Thereafter we tested whether *The Abnormal Attention during an M&A announcement is greater than zero* (H_2). We found statistically significant (at a 1%-level) abnormal attention, caused by an increase in total amount of ticker searches during an M&A announcement for the tested event windows (0,1), (-1,1),(-2,2) and (-5,5) (period (-5,5) was only found significant by two of the three measurement methods). We executed three different measures to ensure the validity of this relatively new measurement and strengthen the results. These findings indicate that there has been a significant increase of total ticker searches during the M&A announcement compared to the estimation period. This implies that we cannot reject the second hypothesis of this research. Thus, during an M&A announcement the abnormal attention (amount of ticker searches) of the target firm is greater than zero. This result implies that investors are more likely to gather information of a specific target firm's stock price via Google, since the variable of attention is gathered by the amount of searches to the target firm's ticker (the abbreviation of the target firm's stock).

The second hypothesis is closely related to the third hypothesis, H_3 = *Prior to the M&A announcement, the Abnormal Attention is greater than zero*, since the methodology is similar, though uses a different event window (prior to announcement instead of during). By applying the first measurement of abnormal attention CAASVI1, we did not find any significant results. Therefore, we can state that there is no starting or ending peak in the tested event window (-9,-1). For the other two measurements of abnormal attention CAASVI2 (10) and CAASVI2 (30), we did find respectively negative values of 1.92 (1%-level significance) and -0.11 (no significance). This indicates that there have been fewer searches in the event period (-9,-1) prior to the M&A announcement than during the estimation period (respectively 10 and 30 days). Since we did not find equal (significant) results, we must reject the third hypothesis, and assume that the abnormal attention prior to the M&A announcement is not greater than zero. This implies that we did not find any evidence for possible or potential insider trading or information leakage.

The fourth, and last, hypothesis we tested is whether *the Abnormal Attention has explanatory value in determining the Abnormal Returns of target stocks during a M&A announcement* (H_4). We adopted the variables determined by testing the first three hypotheses and multiple other determinants of short-term M&A announcement stock returns of target firms (the determinants are used is various other papers and are not extensive elaborated in this research) to a OLS-regression. We found statistically significant relationship within the abnormal returns and the abnormal attention. We found similar results for the three different measurements of the abnormal attention. Therefore, we can reject H_4, and state that the amount of attention a target firm receives, as measured by the amount ticker searches, could contribute to the magnitude of the abnormal return a target firm experiences due to an M&A announcement. This indicates that an increase in attention of a target firm during an M&A announcement could enlarge the abnormal return of the target firm. Thus, the search behaviour of investors can represent the stock market response due to an M&A announcement.

However, our results may be limited due to flaws in the data. The obtained Google Trends data is not obtained as absolute values, but rather as a value within the range of 0 to 100 based on the weighted amount of searches within the requested search periods. This indicates that we the obtained values of CASVI are relative for a certain firm and we are not able research to effect of an exact amount of searches. Therefore the CASVI is a relative term for a specific target firm. We tried to reduce the impact of this flaw by adopting the obtained value to the natural logarithm LN, but such an adjustment does not entirely capture this limitation. Furthermore, our obtained adjusted R^2 of the executed OLS-regressions did not reach tremendously higher values than prior research done to short-term abnormal returns during an M&A announcement. To smooth this limitation we did not find a lower adjusted R^2, therefore our results are comparable to previous research. Besides, we only applied one interaction term in our research, by adding other interaction terms we could have possibly reached a higher adjusted R^2. This could be an interesting addition for additional research regarding our research topic, due to the fact that combinations of the explanatory variables comprises additional information or effects to the observed dependent variable.

The purpose of our research into the 'direct' abnormal attention was to open a new dimension in terms of attention research for market events. We endeavoured to persuade other researchers to apply the same methodology for other events such as IPOs, SEOs, Buybacks or the announcement of new financial reports. The attention of people, particularly investors, is an interesting set of information that could have substantial explanatory value in those firm-specific events. This attention variable is not restricted to financial subjects and matters; it could be applied in various other research disciplines (e.g. psychology and medicines).

Furthermore, as there has been a lack of consensus within the short-term abnormal return of acquirers during an M&A announcement, the new form of 'direct' attention could contain explanatory value.

References

Agrawal, A., & Nasser, T. (2012). Insider trading in takeover targets. *Journal of Corporate Finance, 18*(3), 598-625.

Alexandridis, G., Petmezas, D., & Travlos, N. G. (2010). Gains from Mergers and Acquisitions Around the World: New Evidence. *Financial Management, 39*(4), 1671-1695.

Asquith, P., Bruner, R., & Mullins Jr., D. (1983). The gains to bidding firms from merger. *Journal of Financial Economics, 11*(1-4), 121-139.

Barber, B., & Odean, T. (2007). All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *The Review of Financial Studies, 21*(2), 785-818.

Barclay, M., & Litzenberger, R. (1988). Announcement effects of new equity issues and the use of intraday price data. *Journal of Financial Economics, 21*(1), 71-99.

Berk, J., & DeMarzo, P. (2014). Corporate Finance. In J. Berk, & P. DeMarzo, *Corporate Finance* (pp. 930-960). Boston: Pearson Education.

Boehmer, E., Masumeci, J., & Poulsen, A. (1991). Event-study methodology under conditions of event-induced variance. *Journal of Finance, 30*(2), 253-272.

Bozos, K., & Nikolopoulos, K. (2010). Forecasting the value effect of seasoned equity offering announcements. *European Journal of Operational Research, 214*(2), 418-427.

Brown, S., & Warner, J. (1980). Measuring security price performance. *Journal of Financial Economics, 8*(3), 205-258.

Bruner, R. (2002). Does M&A pay? A survey of evidence for the decision-maker. *Journal of Applied Finance, 12*(1), 48-68.

Campos, I., Cortazar, G., & Reyes, T. (2017). Modeling and predicting oil VIX: Internet search volume versus traditional mariables. *Energy Economics, 66*, 194-204.

Da, Z., Engelberg, J., & Gao, P. (2011). In search of attention. *The Journal of Finance, 66*(5), 1461-1499.

Ding, R., & Hou, W. (2015). Retail investor attention and stock liquidity. *Journal of International Financial Markets, Institutions and Money, 36*, 12-26.

Drake, M., Roulstone, D., & Thornock, J. (2012). Investor information demand: Evidence from Google searches around earnings announcements. *Journal of Accounting research, 50*(4), 1001-1040.

Eckbo. (2009). Bidding strategies and takeover premiums: A review. *Journal of Corporate Finance, 1*(15), 149-178.

Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417.

Franks, J., & Harris, R. (1989). Shareholder wealth effects of corporate takeovers: The U.K. experience 1955–1985. *Journal of Financial Economics, 23*(2), 225-249.

Goergen, M., & Renneboog, L. (2004). Shareholder Wealth Effects of European Domestic and Cross-border Takeover Bids. *European Financial Managment, 10*(1), 9-45.

Grullon, G., Kanatas, G., & Weston, J. (2004). Advertising, breadth of ownership, and liquidity. *The Review of Financial Studies, 17*(2), 439-461.

Haleblian, J., Devers, C., McNamara, G., Carpenter, M., & Davison, R. (2009). Taking stock of what we know about mergers and acquisitions: A review and research agenda. *Journal of Management, 35*(3), 469-502.

Harris, R., Franks, J., & Titman, S. (1991). The postmerger share-price performance of acquiring firms. *Journal of Financial Economics, 29*(1), 81-96.

Hirschleifer, D., & Teoh, S. H. (2003). Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics, 36*(1), 337-386.

IMMA. (2018). *IMAA*. Retrieved 10 13, 2019, from IMAA: https://imaa-institute.org/m-and-a-us-united-states/

Jarrell, G., & Poulsen, A. (1989). The Returns to Acquiring Firms in Tender Offers: Evidence from Three Decades. *Financial Management, 18*(3), 12-19.

Jensen, M., & Ruback, R. (1983). The market for corporate control: The scientific evidence. *Journal of Financial Economics, 11*(1-4), 5-50.

Joseph, K., Wintoki, M., & Zhang, Z. (2011). Forecasting abnormal stock returns and trading volume using investor sentiment: Evidence from online search. *International Journal of Forecasting, 27*(4), 1116-1127.

Kahneman, D. (1973). Attention and effort. Englewood Cliffs, NJ: Prentice-Hall.

Kaplan, S., & Weisbach, M. (1992). The Success of Acquisitions: Evidence from Divestitures. *The Journal of Finance, 47*(1), 107-138.

Keown, A., & Pinkerton, J. (1981). Merger announcements and insider trading activity: An empirical investigation. *The Journal of Finance, 4*(36), 855-869.

King, M. (2009). Prebid run-ups ahead of Canadian takeovers: How big is the problem? *Financial Management, 38*(4), 699-726.

Loughran, T., & Vijh, A. (1997). Do Long-Term Shareholders Benefit From Corporate Acquisitions? *The Journal of Finance, 52*(5), 1765-1790.

MacKinlay, A. (1997). Event studies in economics and finance. *Journal of Economic Literature, 35*(1), 13-39.

Mandelker, G. (1974). Risk and return: The case of merging firms. *Journal of Financial Economics, 1*(4), 303-335.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *Journal of Finance, 42*(3), 483-510.

Moeller, S., Schlingemann, F., & Stulz, R. (2005). Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave. *The Journal of Finance, 60*(2), 757-782.

Morck, R., Shleiffer, A., & Vishny, R. (1990). Do Managerial Objectives Drive Bad Acquisitions? *The Journal of Finance, 45*(1), 31-48.

Mulherin, H., & Boone, A. (2000). Comparing acquisitions and divestitures. *Journal of Corporate Finance, 6*(2), 117-139.

Myers, S., & Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*(2), 187-221.

Patell, J. (1976). Corporate forecasts of earnings per share and stock price behavior: Empirical test. *Journal of Accounting Research, 14*(2), 246-276.

Peterson, P. (1989). Event studies: A review of issues and methodology. *Quarterly Journal of Business and Economics, 28*(3), 36-66.

Pound, J., & Zeckenhauser, R. (1990). Clearly heard on the street; The effect of takeover rumours on stock prices. *Journal of Business, 63*(3), 291-308.

Reyes, T. (2018). Limited attention and M&A announcements. *Journal of Empirical Finance, 49*(1), 201-220.

Schnitzer, M. (1996). Hostile versus friendly takeovers. *Economica, 63*(249), 37-55.

Seasholes, M., & Wu, G. (2007). Predictable behavior, profits, and attention. *Journal of Empirical Finance, 14*(5), 590–610.

Servaes, H. (1991). Tobin's Q and the Gains from Takeovers. *The Journal of Finance, 46*(1), 409-419.

Sharpe, W. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance, 19*(3), 425-442.

Siganos, A. (2013). Google attention and target price run ups. *International Review of Financial Analysis, 29*, 219-226.

Sims, C. A. (2003). Implications of rational inattention. *Journal of Monetary Economics, 50*(3), 665-690.

Smith, R., & Kim, J. (1994). The Combined Effects of Free Cash Flow and Financial Slack on Bidder and Target Stock Returns. *The Journal of Business, 67*(2), 281-310.

Takeda, F., & Wakao, T. (2014). Google search intensity and its relationship with returns and trading volume of Japanese stocks. *Pacific-Basin Finance Journal, 27*, 1-18.

Travlos, N. (1987). Corporate Takeover Bids, Methods of Payment, and Bidding Firms' Stock Returns. *The Journal of Finance, 42*(4), 943-963.

Vermaelen, T. (1981). Common stock repurchases and market signalling: An empirical study. *Journal of Financial Economics, 9*(2), 139-183.

Wilcoxon, F. (1945). Individual comparison by ranking methods. *Biometrics Bulletin, 1*(6), 80-83.

Zivney, T., Bertin, W., & Torabzadeh, K. (1996). Overreaction to takeover speculation. *Quarterly Review of Economics and Finance, 36*(1), 89-115.

Appendix A

Table A: The development of the Total Sample during the data gathering proces.

Step	Total Sample	Δ Delta
SDC Search	698	-
Deleted Financial Institutions	406	-292
No weekend days	385	-21
Deal size > 20 million	358	-27
Issues with ticker Data*	327	-31
Missing Google Trend Data	312	-15
Missing Datastream Stock information	299	-13

* The following issues with Tickers were detected.

1) Ticker of the Acquirer is the same ticker as the ticker of the Target
2) There are multiple Tickers of one target
3) Ticker contains an English word or term

Appendix B

Table B1. VIF CASVI1

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI1	1.06	1.05	1.02	1.02	1.02
Ln (DealSize)	1.96	1.97	1.96	1.94	1.68
Tobin's Q	1.22	1.23	1.23	1.23	1.22
Market-to-Book ratio	1.04	1.04	1.04	1.04	1.02
CashDummy	2.43	2.40	2.38	2.41	2.38
MixedDummy	2.42	2.39	2.38	2.40	2.41
FriendlinessDummy	1.37	1.38	1.38	1.36	1.38
RelatednessDummy	1.05	1.05	1.05	1.05	1.04
OverpaymentDummy	1.31	1.32	1.31	1.31	1.09
Mean VIF	1.54	1.54	1.53	1.53	1.47

Table B2. VIF CASVI2 (10)

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI2 (10)	1.05	1.04	1.04	1.05	1.04
Ln (DealSize)	1.96	1.96	1.96	1.95	1.68
Tobin's Q	1.22	1.23	1.23	1.23	1.23
Market-to-Book ratio	1.05	1.04	1.05	1.05	1.02
CashDummy	2.40	2.37	2.38	2.42	2.40
MixedDummy	2.40	2.37	2.37	2.40	2.40
FriendlinessDummy	1.38	1.37	1.37	1.36	1.39
RelatednessDummy	1.05	1.05	1.05	1.05	1.04
OverpaymentDummy	1.31	1.31	1.31	1.31	1.09
Mean VIF	1.53	1.53	1.53	1.53	1.48

Table B3. VIF CASVI2 (30)

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI2 (30)	1.06	1.04	1.05	1.05	1.01
Ln (DealSize)	1.96	1.96	1.96	1.95	1.69
Tobin's Q	1.22	1.24	1.23	1.22	1.23
Market-to-Book ratio	1.05	1.04	1.04	1.04	1.02
CashDummy	2.40	2.38	2.38	2.46	2.36
MixedDummy	2.40	2.37	2.38	2.40	2.40
FriendlinessDummy	1.38	1.38	1.38	1.36	1.39
RelatednessDummy	1.05	1.04	1.04	1.05	1.04
OverpaymentDummy	1.32	1.32	1.33	1.30	1.09
Mean VIF	1.54	1.53	1.53	1.54	1.47

Appendix C

Table C1. Cross-sectional results of various event windows where the CAR is determined (CASVI1).

This table contains the OLS for the following regression: CAR_{it}=β0 (constant)$_i$+ β1 $ASVI1_{it}$ + β2 Ln(DV)$_i$ + β3 Tobin's Q_i + β4 MtB_i+ β5 $Cash_i$+ β6 $Mixed_i$+ β7 $Friendliness_i$+ β8 $Relatedness_i$+ β9 $Overpayment_i$ + ε_{it} . The variables in the regression are described in Section 2.5. The estimation of the CAR is described in Section 4.1. The estimation of the CASVI is briefly described in Section 4.2. The t-values are displayed between the parenthese (,) and are determined by applying the robust standard errors. The sample is trimmed by 1% of the CAR on both sides.

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI1	0.0090338	0.01965	0.03031	0.03125	0.02202**
	(0.41)	(0.96)	(1.18)	(1.13)	(1.96)
CASVI1 x Ln (Dealsize)	0.00009	-0.00082	-0.00104	-0.00072	0.00386**
	(0.03)	(-0.30)	(-0.29)	(-0.18)	(2.36)
Ln (DealSize)	-0.01206	-0.03431***	-0.04454***	-0.04614***	0.00748**
	(-0.98)	(-2.96)	(-3.66)	(-3.75)	(1.82)
Tobin's Q	0.00197	0.00994	0.00162	0.0021	0.00076
	(1.35)	(0.60)	(0.98)	(1.25)	(0.86)
Market-to-Book ratio	-0.00388	0.00111	0.00184	0.00157	-0.00309
	(-0.72)	(0.17)	(0.30)	(0.25)	(-1.42)
CashDummy	0.18683***	0.25265***	0.21804***	0.22328***	-0.02514
	(5.71)	(7.43)	(5.78)	(6.02)	(-1.42)
MixedDummy	0.11700**	0.13363***	0.10720***	0.11615**	-0.03580*
	(3.35)	(3.77)	(2.83)	(3.02)	(-1.82)
FriendlinessDummy	-0.13152	-0.020270	-0.02774	-0.04534	0.04035
	(-1.51)	(-0.25)	(-0.31)	(-0.49)	(1.41)
RelatednessDummy	-0.00706	-0.01206	-0.02624	-0.00513	-0.00228
	(-0.23)	(-0.34)	(-0.75)	(-0.14)	(-0.22)
OverpaymentDummy	0.00877	-0.03025	-0.04078	-0.02996	0.00267
	(0.23)	(-0.85)	(-1.17)	(-0.83)	(0.23)
Constant	0.28219***	0.36851***	0.47618***	0.51404***	-0.04231
	(2.47)	(3.73)	(4.51)	(4.86)	(-1.22)
Observations	293	293	293	293	293
Adj. R-squared	0.0812	0.1686	0.1921	0.1729	0.0442

*p<10% ,**p<5% & ***p<1%

Table C2. Cross-sectional results of various event windows where the CAR is determined (CASVI2 (10)).

This table contains the OLS for the following regression: CAR_{it}=β0 (constant)$_i$+ β1 ASVI2(10)$_{it}$ + β2 Ln(DV)$_i$ + β3 Tobin's Q_i + β4 MtB_i+ β5 $Cash_i$+ β6 $Mixed_i$+ β7 $Friendliness_i$+ β8 $Relatedness_i$+ β9 $Overpayment_i$ + ε_{it} . The variables in the regression are described in Section 2.5. The estimation of the CAR is described in Section 4.1. The estimation of the CASVI is briefly described in Section 4.2. The t-values are displayed between the parenthese (,) and are determined by applying the robust standard errors. The sample is trimmed by 1% of the CAR on both sides.

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI2 (10)	0.03310	0.05581***	0.04176***	0.02168***	-0.01250***
	(1.41)	(2.79)	(2.69)	(2.55)	(-3.28)
CASVI2 (10) x Ln (Dealsize)	-0.00316	-0.00648***	-0.00457**	-0.00219**	0.00192***
	(-1.00)	(-2.42)	(-2.27)	(-1.91)	(3.38)
Ln (DealSize)	-0.00483	-0.03431***	-0.03468***	-0.03960***	0.01163***
	(-0.39)	(-2.96)	(-3.05)	(-3.32)	(2.60)
Tobin's Q	0.00182	0.00094	0.00086	0.00215*	0.00109
	(1.23)	(0.60)	(0.49)	(1.25)	(1.17)
Market-to-Book ratio	-0.00456	0.00111	0.00083	0.00118	-0.00336
	(-0.87)	(0.17)	(0.13)	(0.19)	(-1.53)
CashDummy	0.19705***	0.25265***	0.24676***	0.24749***	-0.02903
	(6.28)	(7.43)	(6.50)	(6.39)	(-1.57)
MixedDummy	0.12263***	0.13363***	0.12220***	0.11663***	-0.03870**
	(3.61)	(3.77)	(3.19)	(3.00)	(-1.93)
FriendlinessDummy	-0.13249	-0.02027	-0.01223	-0.01670	0.03098
	(-1.57)	(-0.25)	(-0.14)	(-0.19)	(1.17)
RelatednessDummy	-0.00628	-0.01206	-0.01830	-0.01080	-0.00380
	(-0.20)	(-0.34)	(-0.52)	(-0.30)	(-0.36)
OverpaymentDummy	0.00740	-0.03025	-0.03695	-0.02939	0.00270
	(0.19)	(-0.85)	(-1.05)	(-0.81)	(0.23)
Constant	0.22731**	0.36851***	0.38508***	0.42736***	-0.05495
	(2.12)	(3.73)	(3.75)	(4.07)	(-1.64)
Observations	293	293	293	293	293
Adj. R-squared	0.0865	0.1722	0.1695	0.1598	0.0351

*p<10% ,**p<5% & ***p<1%

Table C3. Cross-sectional results of various event windows where the CAR is determined (CASVI2 (30)).

This table contains the OLS for the following regression: CAR_{it}=β0 (constant)$_i$+ β1 ASVI2(30)$_{it}$ + β2 Ln(DV)$_i$ + β3 Tobin's Q_i + β4 MtB_i+ β5 $Cash_i$+ β6 $Mixed_i$+ β7 $Friendliness_i$+ β8 $Relatedness_i$+ β9 $Overpayment_i$ + ε_{it} . The variables in the regression are described in Section 2.5. The estimation of the CAR is described in Section 4.1. The estimation of the CASVI is briefly described in Section 4.2. The t-values are displayed between the parenthese (,) and are determined by applying the robust standard errors. The sample is trimmed by 1% of the CAR on both sides.

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVD2 (30)	0.03833	0.03286*	0.02005	0.02531***	0.01019**
	(1.55)	(1.72)	(1.10)	(2.22)	(1.99)
CASVI2 (30) x Ln (Dealsize)	-0.00383	-0.00402*	-0.00203	-0.00253*	-0.00147**
	(-1.18)	(-1.67)	(-0.92)	(1.73)	(2.03)
Ln (DealSize)	-0.00193	-0.03664***	-0.03936***	-0.03211***	0.00970***
	(-0.15)	(-2.79)	(-2.68)	(-2.53)	(2.24)
Tobin's Q	0.00187	0.00929	0.00100	0.00237	0.00050
	(1.25)	(0.58)	(0.57)	(1.33)	(0.55)
Market-to-Book ratio	-0.00427	0.00236	0.00218	0.00386	-0.00261
	(-0.78)	(0.33)	(0.30)	(0.59)	(-1.15)
CashDummy	0.19223***	0.24772***	0.23787***	0.24862***	-0.02123
	(5.98)	(7.13)	(6.33)	(6.21)	(-1.15)
MixedDummy	0.11939***	0.13097***	0.11839***	0.11074***	-0.03615*
	(3.45)	(3.75)	(3.14)	(2.78)	(-1.82)
FriendlinessDummy	-0.13790*	-0.03176	-0.02426	-0.03960	0.03143
	(-1.66)	(-0.37)	(-0.28)	(-0.45)	(1.14)
RelatednessDummy	-0.00700	-0.01583	-0.02235	-0.00727	0.00007
	(-0.23)	(-0.44)	(-0.64)	(-0.21)	(0.01)
OverpaymentDummy	0.00818	-0.02672	-0.03481	-0.02334	0.00130
	(0.22)	(-0.73)	(-0.94)	(-0.64)	(0.11)
Constant	0.20865*	0.40691***	0.43570***	0.36427***	-0.05081
	(1.85)	(3.86)	(3.94)	(3.09)	(-1.41)
Observations	293	293	293	293	293
Adj. R-squared	0.0855	0.1522	0.1428	0.1524	0.0350

*p<10% ,**p<5% & ***p<1%

Appendix D

Table D1. VIF CASVI1

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI1	20.43	16.63	17.74	18.78	22.67
CASVI2 (30) x Ln (Deals	20.23	16.65	17.84	18.85	22.65
Ln (DealSize)	2.85	2.66	2.44	1.95	1.70
Tobin's Q	1.22	1.24	1.23	1.23	1.23
Market-to-Book ratio	1.04	1.04	1.04	1.06	1.03
CashDummy	2.43	2.40	2.38	2.41	2.39
MixedDummy	2.42	2.39	2.39	2.42	2.41
FriendlinessDummy	1.38	1.38	1.38	1.36	1.39
RelatednessDummy	1.05	1.05	1.05	1.07	1.05
OverpaymentDummy	1.32	1.32	1.33	1.31	1.09
Mean VIF	5.44	4.68	4.88	5.04	5.76

Table D2. VIF CASVI2 (10)

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI2 (10)	18.30	17.08	17.90	17.69	18.45
CASVI2 (30) x Ln (Deals	18.29	17.12	17.91	17.48	18.57
Ln (DealSize)	2.66	2.39	2.39	2.00	1.76
Tobin's Q	1.23	1.23	1.24	1.25	1.27
Market-to-Book ratio	1.05	1.05	1.05	1.05	1.02
CashDummy	2.40	2.38	2.39	2.43	2.43
MixedDummy	2.40	2.38	2.37	2.40	2.10
FriendlinessDummy	1.37	1.38	1.38	1.38	1.40
RelatednessDummy	1.05	1.06	1.05	1.05	1.06
OverpaymentDummy	1.32	1.32	1.32	1.31	1.09
Mean VIF	5.01	4.74	1.53	4.81	4.95

Table D3. VIF CASVI2 (30)

	Event Window				
Variables	(0,1)	(-1,1)	(-2,2)	(-5,5)	(-9,-1)
CASVI2 (30)	19.50	18.19	21.47	18.76	18.17
CASVI2 (30) x Ln (Deals	19.36	18.85	21.92	18.68	18.19
Ln (DealSize)	3.06	3.09	2.89	2.38	1.70
Tobin's Q	1.22	1.24	1.24	1.22	1.24
Market-to-Book ratio	1.05	1.04	1.04	1.04	1.02
CashDummy	2.40	2.40	2.38	2.46	2.38
MixedDummy	2.40	2.38	2.38	2.41	2.41
FriendlinessDummy	1.38	1.38	1.38	1.36	1.41
RelatednessDummy	1.06	1.05	1.06	1.05	1.04
OverpaymentDummy	1.32	1.32	1.33	1.30	1.09
Mean VIF	5.28	5.10	5.71	5.07	4.87