

ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Master Thesis Financial Economics

# **Shareholder Wealth Effects of Takeovers Throughout the Sixth and Seventh M&A Wave**

## ABSTRACT

This paper examines the shareholder effects of takeovers around the announcement date for the period 2003 – 2017 including the sixth and seventh merger wave. Cumulative abnormal returns are calculated using a traditional event study, where the event day is the announcement day. I find announcement returns different from zero for the acquirer (-0.95%), target (23.86%) and combined net wealth effects (2.34%). Takeovers financed with equity generate significant lower abnormal returns compared to takeovers financed with cash for both acquirer and target. Abnormal returns have the lowest magnitude for the whole sample in the top of a merger wave relative to bottom- and mid-cycle. Zoomed in, the sixth merger wave behaves contradictory to the seventh merger wave and experiences the maximum abnormal returns top-cycle. An explanation might be the extraordinary circumstances of the financial crisis.

**Keywords:** *mergers & acquisitions, takeovers, sixth merger wave, seventh merger wave, cumulative abnormal returns, event study, acquirer, bidder, target, combined net wealth effects, payment method, cash, equity*

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## I. Introduction

Mergers and acquisition (M&A) waves are a well-known phenomenon in the financial world. Takeover intensity fluctuates throughout time and therefore seems to appear in M&A waves. Up to now, six waves have been studied in the academic literature and according to the data, common belief is that we are on the top of the next wave right now. There are a few characteristics that determine a M&A wave which can be explained by economic and regulatory developments. Takeover activity is often disrupted by a collapse of the stock market followed by an economic crisis. Subsequently takeover activity will often strengthen in the period of economic recovery. This occurs in combination with credit expansion and an increasing stock market. Regulatory developments, such as anti-trust legislation and deregulation of the markets, also have an increasing impact on takeover activity. Lastly, waves are pushed by industrial and technological shocks as well.

The following questions rise regarding M&A waves. Firstly, do takeovers create value and if so, do these value creations differ throughout time? In this paper I investigate the wealth effects of takeovers and how they differ throughout a M&A wave. The present thesis analyses these effects during the period of 2003 to 2017, which coincides with the last two merger waves (sixth and seventh merger wave). The sixth wave ranges from 2003 until the financial crisis in 2008, while we are still experiencing the seventh wave which started in 2014 (Cordeiro, 2014). To study these effects, the following research question is formulated: *“Do wealth effects of takeovers differ throughout the sixth and seventh merger wave?”*

In this study, the shareholders' wealth effects of the sixth and seventh wave are analysed and implications are based on the differences in wealth effects of the time periods within a wave, classified as bottom, mid and top cycle periods. In other words, in what way does the time period within a wave impact the wealth effects of takeovers, since there is a belief that the timing of the deal can have a significant impact on the takeover announcement returns (Martynova & Renneboog, 2011). A similar study hasn't been done for the sixth and (part of the) seventh M&A wave yet. These results can be of great importance for investors, since M&A can create substantial value (Goergen & Renneboog, 2004) yet can also destroy it (Moeller, Schlingemann, & Stulz, 2005).

Literature, such as Holmstrom & Kaplan (2001) and Shleifer & Vishny (2003), provided two theories on merger waves, the neoclassical and the behavioural theory. The neoclassical theory suggests that merger waves are driven by regulation, industrial shocks and technological shocks (Holmstrom & Kaplan, 2001). On the contrary, the behavioural theory suggests that merger waves occur after a period of abnormal high stock returns (Shleifer & Vishny, 2003). The behavioural theory explains the occurrence of merger waves by the fact that managers realize that their stock is overvalued and use this overvalued stock as payment for takeovers. Therefore, this theory implies that the announcement returns for acquiring shareholders are lower during a merger wave since investors realize that the announcement of a takeover indicates an overvalued stock. The neoclassical theory does not offer any predictions on acquiring returns specifically, but argues that returns are higher prior to a merger wave (Johansson & Hember, 2012). Lastly, a third and more psychological theory was introduced on why merger waves would occur. The phenomenon called managerial hubris suggests that overestimation of takeovers by overconfident managers results in unprofitable takeovers (Roll, 1986). Interestingly, these theories do not make predictions on the acquiring and target returns combined, which can be seen as wealth creation or destruction.

According to the theories described above, market timing is of great importance to the wealth effects of mergers and acquisitions. One of the first studies conducted on this subject found that market timing is negatively correlated to performance, specifically in time of a booming market M&A performed worse than in time of bust market (Kusewitt, 1985). These results are supported by McNamara, Haleblian, & Dykes (2008), who found that acquirers late in the wave had lower returns than acquirers early in the wave. The bandwagon effect was given as explanation, a fallacy whereby behaviour of managers is followed. An increase in consumption of a certain good, merger or acquisition in this case, results in an increase in individual preference in that specific good. However, these research studies are limited in its scope, as only implications on the returns of the acquirer are analyzed. For the present study, net wealth creation is measured, thus the change in wealth of the acquiring plus the change in wealth of the target. Therefore, the following hypotheses are tested:

*Hypothesis I: On average, wealth effects around the announcement date do not differ from zero.*

- *I.1 Abnormal returns acquirer do not differ from zero*
- *I.2 Abnormal returns target do not differ from zero*
- *I.3 Combined abnormal returns do not differ from zero*

*Hypothesis II: On average, combined net wealth effects in the top of the M&A cycle have the lowest magnitude in comparison to the bottom- and mid M&A cycle.*

Section *II* gives an overview of the completed merger waves and the literature. Section *III* presents the methodology whereas section *IV* describes the data. Subsequently, section *V* reports the results and conclusions are given in section *VI*. Finally some recommendations for further research are made in section *VII*.

## **II. Literature**

### **II.1 History of merger waves**

In this section an overview is given of the completed merger waves. Additionally, an answer will be provided on why merger waves occur and how takeovers performed in the past in terms of shareholder wealth effects. Mergers and acquisitions activity has been showing a clustering pattern in the past century. This clustering pattern presents itself in the form of a wave, also called merger waves. Until now, six waves are completed and according to Cretin, Dieudonné, & Bouacha (2015), we are currently in the middle of the seventh wave. Each wave usually starts with economic, political and/or regulatory changes and ends with a crash of the stock market, recession or financial crisis. The first two waves were clearly visible in the US, whereas the later waves appeared globally as well. Consequently, each wave has different characteristics and will be shortly illustrated.

The first wave, also known as the great merger wave which started in the late 1890s, was mainly characterized by its horizontal mergers. Consequently, large multinational corporations formed, which gained significant market power. This phenomenon is also described as merging to form monopolies (Stigler, 1950). Around 1904 the wave ended by a collapse of the capital market.

M&A activity during WWI stayed at a quiet level, but from the late 1910s to the 1920s, the second wave took shape. The second wave is characterized by the consolidation of small firms who were left out of the synergies in the first wave, stimulated by the antitrust legislation. These companies

wanted to achieve economies of scale and fight the dominant firms in the industry. Therefore, this period is more defined as the merger wave determined by oligopolies rather than by monopolies as in the first wave (Stigler, 1950). The stock market crash in 1929, known as the Great Depression, ended the second wave.

After the Great Depression and WWII, the third wave emerged. The wave began in the late 1950s and lasted for almost two decades. This wave is defined by unrelated mergers trying to diversify their operations and thereby reducing the earnings volatility. As a result, firms transformed into large conglomerates trying to enter new markets other than their primary business. The oil crisis in 1973 ended the third wave which resulted in a recession.

The fourth wave started in the late 1980s. The large conglomerates created in the previous wave became inefficient because of the large complex structures within these firms. Therefore, this wave is characterized by the hostile bids on these large conglomerates. The stock market crash in October 1987 ended the fourth wave.

The fifth wave started in 1993. For the first time, the European M&A market was as big as the US market. In addition, an Asian M&A market emerged as well. Market globalization is distinctive for this period and the fifth wave is therefore known for its global features. The increase in cross-border takeovers was substantial, since companies wanted to survive in the growing international market. Furthermore, deregulation became a dominant factor in takeovers and the 1990s therefore is also known as ‘the decade of deregulation’ (Andrade, Mitchell, & Stafford, 2001). The dotcom bubble in 2000 made an abrupt end to this period.

The last completed merger wave began in 2003 and continues the international aspect of mergers. Further, this wave is characterized by its financial structure. More specifically, almost half of the mergers consisted of leveraged buyouts (LBO). In 2008, the financial crisis ended this wave.

Currently, we are in the middle of the seventh wave, which started in 2014 when optimism was returning to the market (Cordeiro, 2014). In 2016, total M&A deal value was 1200 billion, which has not been that high since 2007, that was before the collapse of the market and the financial crisis. At this moment, the risk aversion towards volatility is slowly fending away. The rise of the M&A market in the coming future is predicted (Caiazza, 2018). Characteristics of this wave are still built on globalization and cross-border mergers.

In conclusion, waves have common factors while simultaneously vary on different aspects like their nature and duration. In general, a wave consists of the following structure: it starts with economic recovery, booming capital markets, regulatory changes, industrial and technological innovation and urgency of companies to adjust to the changing environment. Ultimately, it will end with a collapse of the financial market, crisis and/or recession.

## **II.2 Advantages of takeovers**

There are multiple motives why a firm wants to take over another firm, but they all have the same core purpose to maximize the firm's expected present value. Consequently, a takeover can be seen as an investment decision. An investment decision is a decision to realize wealth gains, therefore the realization of wealth gains is only possible if the risk of the merged firm is reduced and/or the combined future earnings are greater than the sum of the two the earnings separately. An increase in the expected present value of the merged firm is a result from synergies. The synergies created by M&A can be divided into three subcategories (Cording, Christmann, & Bourgeois, 2002).

### *1. Operating Synergies*

A merged firm can operate on a larger scale and therefore has less average production, marketing and administrative costs. The economic benefit that is realized when operating on a larger scale is also known as economies of scale and will therefore increase the efficiency of the merged firm.

### *2. Financial Synergies*

As mentioned earlier, one way to increase expected present value is to reduce the risk of the merged firm. This will be accomplished by diversifying the operations of the firm. By doing so, the cost of capital and thereby the bankruptcy risk is reduced.

### *3. Collusive Synergies*

Collusive synergies are also known as market power in the M&A literature and are a result of horizontal mergers. After a takeover, the merged firm is able to sell its products or services for a higher price or pay less to its suppliers (Chatterjee, 1986).

## **II.3 Why do merger waves occur?**

In section *II.1* and *II.2*, the characteristics of the seven waves and the advantages of takeovers are described. Subsequently, in this section, I describe the factors that possibly trigger a merger wave.

These factors can be divided into groups based on the neoclassical and behavioural theory. As explained in the introduction, the neoclassical theory argues that a M&A wave is a result of an environmental change such as regulation and industrial or technological shock, where the behavioural theory suggests a M&A wave is driven by the development of the capital market and the associated abnormal high stock returns. Lastly, there is a third group based on the managerial decisions, where managerial hubris and herding behaviour plays a role.

#### *Neoclassical theory - Business shocks*

Industrial and technological changes, also called economic disturbances, can trigger a M&A wave. Gort (1969) argues that economic disturbances create discrepancies in valuation, which is needed for mergers. It can occur in two ways. Firstly, individual assumptions regarding valuation of companies can change causing the value prediction of non-owners greater than owners, which result in mergers. Secondly, economic disturbances generate an uncertain future. This results in an increasing volatility leading to a boost in valuation discrepancies, which in the end produces a surge in M&A activity.

This view of misvaluation is supported by Shleifer & Vishny (2003), who argues that managers can understand market inefficiencies and exploit them partly through takeovers. In other words, merger waves are caused by the misvaluation, or relative valuation, of firms.

Mitchell & Mulherin (1996) found that industry shocks, such as deregulation, energy dependence, foreign competition and financing innovations have a significant impact on takeover activity. These industry shocks can create excess capacity and thereby forcing companies to merge. Mitchell & Mulherin (1996) state that takeovers appear in a wave and cluster within an industry. Furthermore, Andrade, Mitchell, & Stafford (2001) supplement this relation between industry shocks and M&A activity. They suggest that not only industry-wide factors, as illustrated in the former study, but firm-specific factors can have an impact as well. Especially in the 1990s (fifth takeover wave), mergers were driven by industry expansion. Firms with high growth options, profitability and capacity limitations had the most takeover intensity.

In periods of industry expansion, the sellers are most probably the less productive firms, where the buyers are more likely to be efficient and want to expand to industries that are experiencing an increase in demand (Maksimovic & Phillips, 2001). In addition, Lambrecht (2004) demonstrates



that the benefit of merging is an increasing function of the output price. In other words, merger activity is high when prices are high (boom market) and merger activity is low when prices are low (bust market). Therefore, one can conclude that the movement of merger waves is procyclical with the market. Furthermore, Maksimovic & Phillips (2001) showed that the success of merger depends on the financial constraints of a company. More specifically, a financially unconstrained firm has a higher probability of participating in M&A. Harford (2005) underlines this by mentioning the importance of enough capital liquidity in order to generate a merger wave. This is possible when companies have large amounts of cash available or access to external financing is relative easy, which is the case in a booming capital market. In other words, merger waves coincides with a growing capital market.

#### *Behavioural Theory – Market timing*

As briefly mentioned in the introduction, Shleifer & Vishny (2003) argue that managers use overvalued stock capital as payment for mergers. Consequently, clustering of takeovers is likely to happen in times of a bull market and is therefore pro-cyclical with the stock market. There are two explanations why target managers would accept a takeover bid consistent of overvalued stock. Firstly, managers are maximizing their own welfare. Most managers only stay with firms for a short period of time. Thus, these managers are more likely to accept overvalued stock offers, as this inflates short-term benefits. Additionally, due to their short stay at the firm, these managers are not worried as much with the potential long-term damage. Secondly, there is a lot of uncertainty in times of a bull market, which results in misvaluation and thus uncertainty in the benefits of takeovers. Managers overvalue the potential growth opportunities and synergy effects caused by mergers (Rhodes-Kropf & Viswanathan, 2004). Ang & Cheng (2006) provide direct evidence that stock overvaluation is a significant motive for stock takeovers. They use two approaches for misvaluation; the residual income model (RIM) and the market-to-book ratio method, where the RIM presents the difference between the market value and the fair value. The fair value consists of the sum of book value of equity and the residual income. They found that stock overvaluation increases the probability to become an acquirer in a merger and will increase the probability of succession of the merger as well. These results are in line with the findings of Dong, Hirshleifer, Richardson, & Teoh (2006) who in addition state that stock takeovers are more overvalued than cash takeovers, implicating the market-driven acquisition theory.

Concluding, there are two theories on what drives merger waves, the neoclassical and the behavioural theory. Most of the empirical research give explanations on only one of the theories, where Harford (2005) tries to differentiate between them. More specifically, he included explanatory variables for environment shocks and market-timing. He found that environment shocks have significant explaining power, whereas market-timing only marginally improves the model. Furthermore, he argues that capital liquidity is a necessary factor in order for merger waves to occur.

#### *Managerial hubris and herding behaviour*

Roll (1986) introduced another, more psychological explanation for merger waves. He investigated the role of managerial hubris in takeovers. Managerial hubris presents the overconfidence of managers who overestimate the expected generated value of the merger. The hypothesis of managerial hubris is also tested by Malmendier, Tate, & Geoffrey (2005) in corporate investments. A manager with significant exposure to firm-specific risk is classified as overconfident manager. They are more likely to participate in less profitable takeovers, especially when cash flow is high. Specifically, there is a strong relationship between overconfidence and the sensitivity of cash flow. That is, when cash flow increases, more inefficient investments are made. Managerial hubris is connected with another psychological factor in explaining merger waves, called herding behaviour. Herding behaviour suggests that managers copy the actions of other managers while ignoring important information (Scharfstein & Stein, 1990). This can explain the clustering of takeovers. Especially, a merger wave starts with efficient takeovers, followed by copy behaviour of managers. These takeovers decisions are based on the actions of others instead of economic principles. This reasoning is in line with the findings of Harford (2005) who addresses lower abnormal returns in the later stage of a merger wave than at the beginning.

#### **II.4 M&A Performance**

The main aim of this study is to analyse whether there is value creation by mergers and how the value created differ throughout a merger wave. Different perspectives exist on how to measure the value created by a merger. It can be measured from the acquirer's perspective, the target's perspective or the combined value created. Subsequently, value is measured through shareholder returns using a traditional event study. The methodology section provides a more thorough explanation on this method. This is the most used method in finance literature to measure the value

of mergers and has two main advantages. Firstly, shareholder returns are easy to observe. Secondly, it is the best proxy for the discounted value of the transaction (Campa & Hernando, 2004). Since there has been substantial empirical literature on the performance of mergers, I will give a brief summary of the results organized by acquirers, targets and combined performance. Some of the papers referred to include not the most recent literature, since more recent literature is limited to find. However, results still have sufficient relevance and are able to reflect the current situation.

### *Target performance*

Empirical evidence on target performance is unanimous. Bruner (2001) summarized 21 studies on target performance and comes to the consistent conclusion of significant positive returns for target shareholders. Furthermore, Martynova & Renneboog (2008) conducted a summary on M&A literature as well and came to the same conclusion regarding target shareholder performance. However, they reported significant differences in post performance produced by factors such as hostile vs. friendly bids, means of payment (cash vs. stock) and bid type (merger vs. tender). For instance, the difference between hostile and friendly bids is a result of the target price which incorporate the hostile attitude since the high probability of revision of the bid. This is in line with the results of Jensen & Ruback (1983), which reported abnormal returns of 30% for tender (hostile) offers and abnormal returns of 20% for mergers. Nonetheless, despite the differences created by various factors, targets will almost always experience positive abnormal returns around the announcement date.

### *Acquirer performance*

On the contrary, acquirer performance is not as evident as target performance. Again I refer to the comprehensive survey of Bruner (2001), who summarised a list of 41 studies on acquirer performance, were 13 studies report value destruction, 14 studies show value conservation and 17 studies indicate value creation. In other words, the results are roughly evenly distributed, representing a mean abnormal return of zero. Therefore, there is no real evidence for significant negative or positive abnormal returns for acquirers. As a result, M&A for buyers provide investors their required return on average.

One important aspect to bear in mind for the implications on these results is the size aspect. In general, acquirers are significantly larger than targets. Hence, dividing the value created by the takeover equally among the acquirer and the target results in a larger percentage benefit for the target. This is in agreement with Asquith, Bruner, & Mullins Jr. (1983), reporting significant excess returns for the bidding firm of 2.8%. They also show a positive relationship between abnormal returns and the relative size of the target firm's equity. More specifically, they demonstrate that a bid on a target half the size of the bidder results in a 1.8% higher abnormal return than a bid on a target one tenth of the size of the bidder.

### *Combined performance*

Incorporating the performance of the target and the acquirer, the following question needs to be answered: *"is there an economic benefit created by M&A?"* As mentioned before, the firm size effect plays an important role. A positive abnormal target return can easily be set off by a slight negative acquirer return, considering the size. In this study, a market value weighted portfolio of the acquirer and the target is created in order to measure the economic value created or destroyed. I will elaborate on this in the methodology section. Bruner (2001) produced an overview of 20 studies researching combined gains of targets and acquirers in M&A. Almost all of them report positive gains where 11 out of 20 studies show significant positive gains, indicating that M&A does pay.

### *Performance throughout the M&A cycle*

The target-, acquirer- and combined M&A performance are briefly summarized. However, this is a general overview of the behaviour of target and acquirer abnormal returns. The main focus of this study is the behaviour of the abnormal returns throughout merger waves. Specifically, I will zoom in on a merger wave and compare the returns for different time periods within a wave (bottom, mid and top cycle). Figure 1 presents the bidder cumulative average abnormal return (CAAR) and the number of mergers announced (Rosen, 2006):

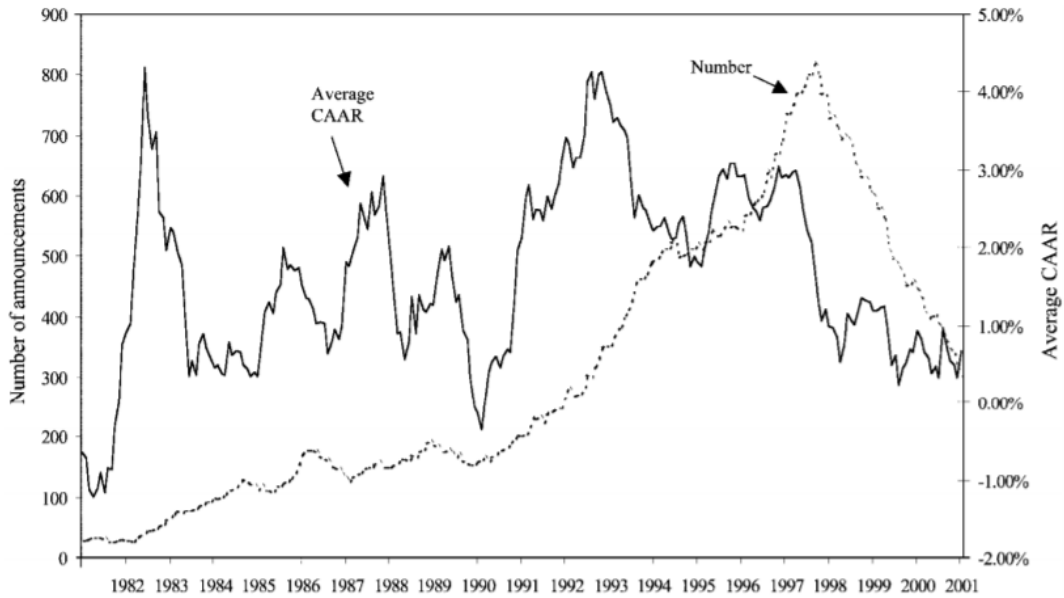


Figure 1. Trailing 12-month average bidder CAAR and trailing 12-month number of mergers announced 1982-2001

The fifth merger wave, spanning from 1993-2000, is clearly presented in Figure 1 by the number of merger announcements. During the fifth wave, an explicit negative relationship between CAAR and number of announcements is observable, indicating a lower abnormal return for the acquirer in the top of the M&A wave in comparison to the bottom- and mid cycle. This is in line with Harford (2005) and Bhagat, Dong, Hirshleifer, & Noah (2005), who both report lower combined abnormal returns in the later stage of a merger wave. The following table shows the five day stock-return of takeovers divided in subperiods (Bhagat, Dong, Hirshleifer, & Noah, 2005).

Table 1. Stock returns of various subperiods of the fourth and fifth merger wave

	1981-1984	1985-1988	1989-1992	1993-1996	1997-2000	2000-2001
Combined abnormal returns - CAAR (%)	8.12	5.19	3.59	5.05	4.61	3.57

These results are in conjunction with the previous figure. Both the fourth wave (1981-1987) and the fifth wave (1993-2000) shows declining combined abnormal returns. Furthermore, McNamara, Haleblan, & Dykes (2008) investigate the potential benefits of early mover advantages and compare performance in different stages of a merger wave. Again, they find that M&A performance is higher in the beginning of the wave (early movers) and lower for mergers taking

part at the top of the wave. Figure 2 demonstrates the early mover effect (McNamara, Haleblian, & Dykes, 2008).

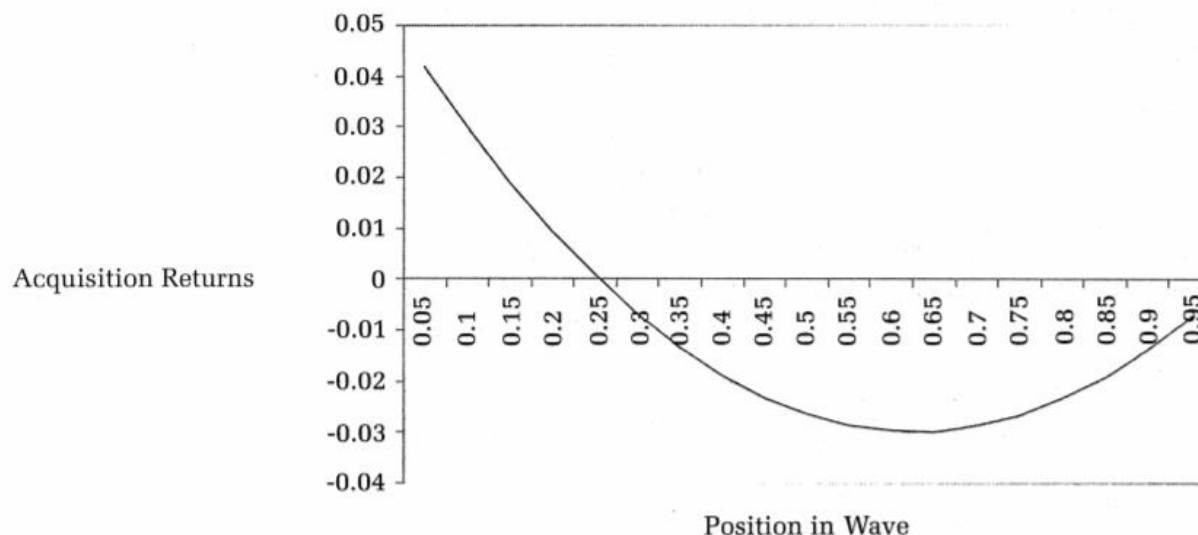


Figure 2. Acquirer returns captured in wave position

Only acquirers in the early fase of a merger wave will generate positive abnormal returns. In conclusion it is clear to say that the literature is consistent on declining CAARs throughout merger waves.

## II.5 Definition Wealth Creation

In this study, the wealth creation of a takeover is examined. The wealth of a company at time  $t$  can be seen as the market value of that company at time  $t$ , where the market value is the expected present value seen by the market. In this way, when a company announces a takeover, the change in the market value reflects what the market thinks the firm will increase or lose by this takeover. Therefore, the net wealth gains in this study is defined as follows (Zhang, 1995):

$$Net\ Wealth\ Gains_i = \Delta V_{tar} + \Delta V_{acq} \quad (1)$$

Where  $\Delta V_{tar}$  is the change in target shareholders' value and  $\Delta V_{acq}$  is the change in acquirer shareholders' value. This formula reflects a general overview of what is conducted during the study. A more specific calculation of the net wealth gains is presented in the methodology.

## **Summary Literature**

In short, mergers have the tendency to cluster and therefore occur in waves. Each wave has its own characteristics. However, it always starts with an economic recovery, industrial shock or technological shock and results in a collapse of the financial market or recession. Multiple motives, like operating-, financial- and collusive synergies, can induce mergers. Consequently, the question why does it occur in waves, arises. In general, there are two theories, the neoclassical and the behavioural theory. The neoclassical theory argues that the clustering of mergers is a result of environmental changes such as regulation or industrial shocks, whereas the behavioural theory suggests that waves are driven by the capital market. The performance of mergers can be measured through the net shareholder wealth created by the acquirer and target firm combined. Literature is unanimous on positive abnormal returns for targets whereas the returns for acquirers can differ. On average, mergers do create value. Finally, mergers in the beginning of a wave tend to create higher value than mergers in the top of a wave. In this study I will analyse whether these findings still hold for the sixth and seventh merger wave.

## **III. Methodology**

### **III.1 M&A index**

In this section a M&A index is constructed in order to break down the sixth and seventh merger wave in bottom-, mid- and top-cycle periods. Furthermore, the methodology of the event study and the multivariate regression is described. In order to analyse the behaviour of shareholder wealth throughout a merger wave, different periods within a wave should be defined. I will classify three different zones; bottom-, mid- and top-cycle. Based on the methodology of Cretin, Dieudonné & Bouacha (2015), these zones are determined by a M&A index where the M&A activity by value over 12 rolling months is used. To create this index, I take all the mergers from 1 January 2002 to 31 December 2017 with a deal value upward of 1 million dollars. Furthermore the acquirer and target should both be listed US companies and therefore only consists of domestic deals. Transaction values of every month are summed up in order to calculate the 12-month rolling M&A value. Therefore data from 2002 is used instead of 2003, since the first year is needed for the 12-month rolling calculation only. Subsequently, outliers in the 12-month rolling data from 2003 to 2017 are deleted using the interquartile range. In Figures 3 and 4, the standard deviation is compared to the average. The data is split in the sixth merger wave until the start of the seventh period (2003-2013) and the start of the seventh merger wave until the end of 2017. From 2014

onwards, optimism is returning to the market and will therefore be used as start for the seventh merger wave (Cordeiro, 2014). Reasoning for the split in data are the more sizeable deals in the seventh merger wave, therefore comparison in standard deviations will be too complicated. Bottom-, mid- and top cycle are defined as follows:

- Bottom-cycle:  $< -0.5$  standard deviation from the average
- Mid-cycle: between  $-0.5$  and  $0.5$  standard deviation from the average
- Top-cycle:  $> 0.5$  standard deviation from the average

The classification of bottom-, mid- and top-cycle leads to partition of the merger waves as can be seen in Table 2.

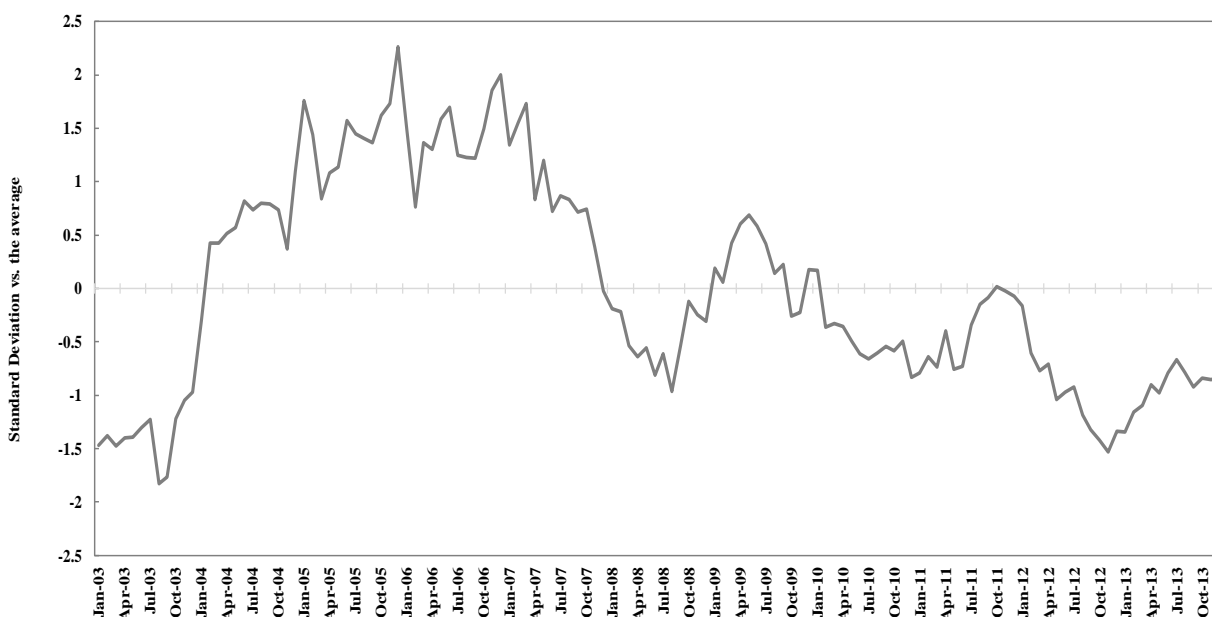


Figure 3. Standard deviation versus the average of the 12-month rolling M&A activity value 2003 - 2013



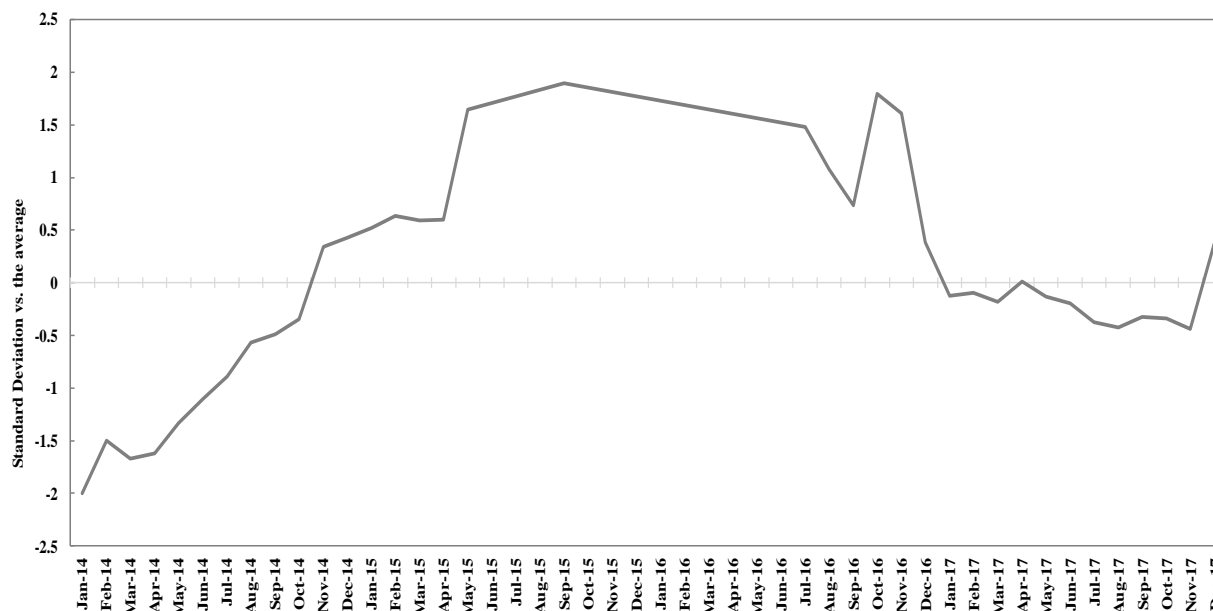


Figure 4. Standard deviation versus the average of the 12-month rolling M&A activity value 2014 – 2017

Table 2. Sixth and seventh merger wave classified as bottom-, mid- and top-cycle periods

Period	Where in the Cycle	
Jan 2003 - Dec 2003	Bottom	
Jan 2004 - Mar 2004	Mid	
Apr 2004 - Oct 2007	Top	6th merger wave
Nov 2007 - Feb 2008	Mid	
Mar 2008 - Aug 2008	Bottom	
Sep 2008 - Dec 2013		Period between waves
Jan 2014 - Aug 2014	Bottom	
Sep 2014 - Dec 2014	Mid	
Jan 2015 - Nov 2016	Top	7th merger wave
Dec 2016 - Dec 2017	Mid	

### III.2 Event Study

This research conducts a traditional event study where the announcement day of the takeover is the event day. To allow for slow information adaption of the market or leakage of information, three event windows are examined: a three-day event window from  $t-1$  to  $t+1$ , a seven-day event window from  $t-3$  to  $t+3$  and an 11-day event window from  $t-5$  to  $t+5$ , where  $t=0$  is the

announcement day. The study is conducted using an event study tool based on the paper of MacKinlay (1997).<sup>1</sup>

Market model parameters are estimated over day -300 to day -60. Using the market model, the daily expected return is calculated as follows:

$$E(R_{it}) = \alpha_i + \beta_i(r_m - r_f) \quad (2)$$

Where  $E(R_{ij})$  is the expected return on security  $i$ ,  $\alpha$  is the intercept,  $\beta$  is the slope coefficient (sensitivity) and  $r_m - r_f$  is the return on market index, which in this study is the NYSE. Another method for calculating the expected return is by the Fama-French three factor model. In this model two factors are added to estimate the expected return and will therefore have more explanatory power.

$$E(R_{it}) = \alpha_i + \beta_1(r_m - r_f) + \beta_2SMB + \beta_3HML \quad (3)$$

Where SMB (small minus big) captures excess returns of small-cap company stocks over large-cap company stocks and HML (high minus low) captures excess returns of stocks with high market-to-book ratio over stocks with low market-to-book ratio. Unfortunately, the Fama-French is not incorporated in the event study tool supplied by the university. Adding this model manually will be too time-consuming hence the market model is used.

Then, the abnormal return in the event window is calculated as the difference between the actual return and the expected return:

$$AR_{it} = R_{it} - E(R_{it}) \quad (4)$$

Where  $AR_{it}$  is the daily abnormal return of security  $i$ ,  $R_{it}$  is the actual return of security  $i$  and  $E(R_{it})$  is the expected return of security  $i$ .

For every day in the event window, the average abnormal return (AAR) across  $n$  firms is calculated as follows:

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

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<sup>1</sup> Credits for the tool to Arco van Oord

Subsequently, CAAR per specific event period is calculated:

$$CAAR_{T_1 T_2} = \sum_{t=T_1}^{T_2} AAR_t \quad (6)$$

Which can be tested for significance with the following t-statistic, assuming normality and independent returns:

$$t - statistic = \frac{CAAR_{T_1 T_2}}{\sqrt{T} * S(AAR)} \quad (7)$$

Where S(AAR) is the estimated standard deviation of the average abnormal return during the estimation period.

Lastly, the combined net wealth change needs to be calculated to answer the stated research question and hypotheses. Therefore, the gain<sup>2</sup> of the acquirer and target are combined as pair and calculated as follows:

$$\Delta W_t = \frac{CAAR_{bi} * MV_{bi} + CAAR_{si} * MV_{si}}{MV_{bi} + MV_{si}} \quad (8)$$

Where  $MV_{bi}$  and  $MV_{si}$  are the market capitalization of buyer and seller at the last month before the announcement date, respectively (Cybo-Ottone & Murgia, 2000).

### III.3 Cross-sectional analysis

To investigate what factors explain the differences in CAR, a cross sectional study is set up.

$$CAR = a + b_1 \ln(SIZE) + b_2 D_{T_1} + b_3 D_{T_2} + b_4 D_F + b_5 D_{P_1} + b_6 D_{P_2} + b_7 D_D \quad (9)$$

Based on the methodology of Datta & Pinches (1992), the following variables are added to the multivariate regression, beginning with the log of the relative size,  $\ln(SIZE)$ . Size is calculated by dividing the market capitalization of the target by market capitalization of the acquirer. Subsequently several dummy variables are added, where  $D_{T_1}$  is a dummy variable that equals one if the merger period is classified as mid cycle<sup>3</sup> and zero otherwise. Dummy variable  $D_{T_2}$  equals one if the merger period is classified as top cycle and zero otherwise. The bottom cycle period is left out of the regression in order to compare to this period. These time-varying dummy variables

<sup>2</sup> The net wealth gain is value weighted to account for the size between to the firms.

<sup>3</sup> Merger waves are divided in bottom-, mid- and top cycle periods according to the M&A cycle index created by Cretin, Dieudonné, & Bouacha (2015)

produce results and implications for the main focus of this study, specifically the effectiveness of the time periods within a wave. Dummy variable  $D_F$  presents the attitude of the deal, equals one if friendly and zero otherwise. Dummy variable  $D_{P1}$  equals one when paid with cash and zero otherwise.  $D_{P2}$  equals one if paid with stock and zero otherwise. Lastly, dummy variable  $D_D$  equals one if it is a diversifying merger and zero when the merger is focused in the same industry.

## **IV. Data**

### *Sample Selection*

This section provides data selection and descriptive statistics. Abnormal stock returns are examined in the period from 2003 to 2017, covering the sixth wave and (part of) the seventh wave, which we are currently experiencing, within the US market. Both the acquirer and the target should be a public company and therefore listed on the US stock market. Moreover, the present thesis only selects domestic M&A activities. Additional information, such as means of payment (stock, cash or mixed) and the status of the bid (friendly or hostile) are also reported. Diversifying mergers are defined when two firms with two different 2-digit SIC codes merge. More specifically, when the first two digits of the SIC code (4-digits) differ (De Long, 2001). Furthermore, the announcement dates are extracted from the Thomson One Securities Data Corporation (SDC) database and the daily stock prices are collected from DataStream.

In this study, there is focus on large acquisitions (transaction value greater than \$100 million). It is less likely that the acquirers get involved in another substantial takeover within a short time period which results in less likelihood of confounding events (Healy, Palepu, & Ruback, 1992).

Table 3 provides the sample selection whereas Table 4 describes the distribution of the takeovers divided by several categories per year. First of all, we are able to identify the sixth and seventh merger wave in the total number of M&As. Specifically, the sixth merger wave (2003 – 2008) has an increasing trendline in number of M&As per year with the collapse in 2008 leading to less than half of the takeovers compared to 2007. Subsequently, optimism is returning to the market in 2014 indicating the start of the seventh merger wave (2014 - ...). As can be seen from the M&A index created in section *III.1*, the years 2015 and 2016 are top-cycle whereas 2017 is down to mid-cycle again.

Next, what stands out is the severe low frequency of 1.7% hostile deals on average. An explanation might be that hostile takeovers occur more frequently on mergers with a relative low transaction value. Smaller companies can be targeted more easily by larger firms. The transaction value used in this study is at least 100 million and might therefore be a reason for almost only friendly takeovers.

Moreover, around 15% consists of diversifying mergers in contrast to 85% non-diversifying mergers. Also, the financial and manufacturing industry are the two substantial sectors and consist together for 70% of the sample. Lastly, almost twice as many takeovers are financed with cash rather than with stock. A reason might be the preference of stock only in times of a bull market, when stock is overvalued.

*Table 3. Sample selection*

	<i>Observations</i>
Raw Sample	1705
Missing stock prices	200
Missing market values	36
Extreme outlier	1
<b>Reduced Sample</b>	<b>1468</b>

Table 4. Descriptive statistics of M&A deals in 2003 – 2017. This Table presents the number of M&A deals as percentage per year split up in different categories: (I) Attitude; (II) Diversification; (III) Industry group of the acquirer and (IV) Payment method.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2003 - 2017	
																%	Num
<b>Total number of M&amp;As</b>	<b>100</b>	<b>116</b>	<b>112</b>	<b>127</b>	<b>144</b>	<b>72</b>	<b>68</b>	<b>93</b>	<b>58</b>	<b>78</b>	<b>88</b>	<b>99</b>	<b>117</b>	<b>103</b>	<b>93</b>		<b>1468</b>
% of all M&As in 2003-2017	6.8	7.9	7.6	8.7	9.8	4.9	4.6	6.3	4.0	5.3	6.0	6.7	8.0	7.0	6.3	100.0	
<i>% of M&amp;A deals by category:</i>																	
Friendly M&A	98.0	98.3	96.4	96.1	98.6	91.7	100.0	98.9	93.1	93.6	97.7	99.0	98.3	98.1	98.9	97.1	<b>1429</b>
Hostile M&A	2.0	1.7	2.7	1.6	0.0	5.6	0.0	1.1	6.9	0.0	0.0	1.0	1.7	0.0	1.1	1.7	<b>22</b>
Neutral M&A	0.0	0.0	0.9	2.4	1.4	2.8	0.0	0.0	0.0	6.4	2.3	0.0	0.0	1.9	0.0	1.2	<b>17</b>
Non-diversifying merger	90.0	84.5	88.4	88.2	82.6	83.3	77.9	90.3	82.8	83.3	86.4	87.9	86.3	84.5	88.2	85.6	<b>1261</b>
Diversifying merger	10.0	15.5	11.6	11.8	17.4	16.7	22.1	9.7	17.2	16.7	13.6	12.1	13.7	15.5	11.8	14.4	<b>207</b>
Financial	39.0	36.2	24.1	29.9	34.7	19.4	16.2	19.4	29.3	23.1	33.0	29.3	26.5	33.0	40.9	28.9	<b>435</b>
Manufacturing	39.0	38.8	50.0	41.7	38.9	52.8	52.9	47.3	29.3	43.6	34.1	34.3	42.7	42.7	33.3	41.4	<b>607</b>
Natural resources	4.0	5.2	5.4	7.1	3.5	6.9	5.9	8.6	10.3	3.9	5.7	4.0	6.8	4.9	4.3	5.8	<b>82</b>
Services	17.0	16.4	15.2	17.3	16.0	13.9	22.1	20.4	24.1	23.1	21.6	27.3	18.8	16.5	19.4	19.3	<b>277</b>
Trade	1.0	3.5	5.4	3.9	6.9	6.9	2.9	4.3	6.9	6.4	5.7	5.1	5.1	2.9	2.2	4.6	<b>67</b>
All-Cash	32.0	31.0	32.1	44.9	45.1	45.8	30.9	53.8	36.2	51.3	40.9	32.3	31.6	39.8	31.2	38.6	<b>566</b>
All-Equity	28.0	29.3	19.6	17.3	16.7	20.8	23.5	17.2	22.4	10.3	19.3	27.3	19.7	26.2	37.6	22.4	<b>327</b>
Cash/Equity Mix	37.0	37.9	47.3	34.7	35.4	27.8	42.7	26.9	37.9	33.3	33.0	40.4	47.9	31.1	25.8	35.9	<b>532</b>
Undisclosed terms	3.0	1.7	0.9	3.2	2.8	5.6	2.9	2.2	3.5	5.1	6.8	0.0	0.9	2.9	5.4	3.1	<b>43</b>

## **V. Results**

### **V.1 Abnormal Returns**

In this section, the cumulative average abnormal returns (CAAR) are analysed. The abnormal returns are divided into bidder, target, and combined returns. Moreover, these returns are subdivided into several categories. The following variables are controlled for in the analysis; whole sample, industry scope, industry group of the acquirer, means of payment and subperiods of the sixth and seventh merger wave. Firstly, the results of this study are discussed and subsequently in the conclusions of this section the link with previous literature is made.

#### *Total sample*

Table 5 reports significant negative abnormal bidder returns for all three periods. The 3-day significant abnormal return for bidders yields -0.95%. Furthermore, the negative abnormal returns increase over the time periods, indicating slow information adaption of the market or leakage of information.

Contrary to the bidder announcement returns, are the target announcement returns. Table 5 reports significant positively abnormal returns of 23.86% for the 3-day period and slowly increasing for the larger periods.

Main focus of this thesis is to investigate whether wealth is created or destroyed by takeovers. The combined abnormal returns indicate significant positive abnormal returns of approximately 2.34% over all three periods. In other words, net wealth is created regarding the whole sample.

#### *Industry Scope*

This category divides the sample into industry focus and diversification. The results are roughly the same in comparison to the whole sample, except for two non significant bidder results. This is likely due to the fact that diversification takeovers only consists of 14.6% of the whole sample (see Table 3).

#### *Industry Group Acquirer*

The table displays five industries that belong to the acquirer. Financial, manufacturing and national resources report significant negative abnormal returns for the bidder, whereas services is

insignificant, indicating nonabnormal returns. Specifically, returns do not differ from zero. In contrast to previous bidder results, the trade industry reports significant positive abnormal returns for the bidder. In the first two periods the results are only on the 10% significance level whereas the 11-day period is on the 5% level.

As in the whole sample, the targets produce substantial significant abnormal returns, especially for the manufacturing industry, which goes up to a sizeable 31.10%. All the results are significant at the 1% level.

As can be seen from the Table, net wealth is created for all the industries, ranging from 1.51% to 4.17%. The abnormal returns are all significant on the 1% level except two periods regarding natural resources, which are on the 5% level.

### *Means of Payment*

Takeovers are financed through different payment methods. This sample is divided into all-cash, all-equity and mixed payments, where sometimes this information is not disclosed. The Table reports insignificant bidder abnormal returns for all-cash payments, indicating returns that do not differ from zero. In contrast, all-equity and mixed payments report significant negative abnormal returns, suggesting a higher return for cash payments than equity payments. In terms of numbers, a merger financed with equity results in negative abnormal returns of 1.79%. Contrarily, there is no effect on the abnormal returns when financed with cash. Interestingly, payments with undisclosed terms report sizeable significant positive abnormal returns. It is hard to draw conclusions from this, since we do not know anything about the payment method.

Again, abnormal returns for the targets are substantial, significant and positive, reporting the most sizeable for cash-payments. Similarly to the bidder returns, cash payments produce a considerable higher abnormal return than other payment methods. Takeovers financed with stock have a significant impact on the average target abnormal returns, reporting around 33%. This is an enormous contrast to the takeover abnormal returns for targets financed with equity, yielding around 14%. A takeover that is financed with both stock and equity results in abnormal returns around 22%, which is logically between abnormal returns regarding stock and equity payments.

Equivalently to the whole sample, net wealth is created for all payment methods, with all returns positive and significant at the 5% level minimum. Takeovers financed with cash produce



more combined abnormal returns than other payments. Specifically, combined abnormal returns increase almost 3% when the deal is financed with cash whereas an equity financed deal only causes a 1.38% increase in the combined abnormal returns.

Table 5. Reports the cumulative average abnormal returns (CAAR) for bidder, target and the combined return, calculated using the net wealth formula described in the methodology. Since the data is not normally distributed, the Wilcoxon rank sum test is used to determine whether the returns are statistically different from zero. Indicators a, b and c are used to determine significance at 1%, 5% and 10% level respectively. CAARs in bold indicate a significant abnormal return. The CAARs are divided in the groups (I) industry scope; (II) Industry Group Acquirer and (III) Means of Payment.

	Period [-1,1]		Period [-3,3]		Period [-5,5]	
	CAARs (%)	(z-stat)	CAARs (%)	(z-stat)	CAARs (%)	(z-stat)
<i>Whole Sample:</i>						
• <b>BIDDER</b>	<b>-0.95</b>	(-6.61 <sup>a</sup> )	<b>-1.10</b>	(-6.07 <sup>a</sup> )	<b>-1.14</b>	(-5.24 <sup>a</sup> )
• <b>TARGET</b>	<b>23.86</b>	(30.60 <sup>a</sup> )	<b>24.33</b>	(30.24 <sup>a</sup> )	<b>24.85</b>	(30.14 <sup>a</sup> )
• <b>COMBINED</b>	<b>2.34</b>	(13.04 <sup>a</sup> )	<b>2.29</b>	(11.17 <sup>a</sup> )	<b>2.34</b>	(10.67 <sup>a</sup> )
<i>Industry Scope:</i>						
• <b>BIDDER</b>						
Industry Focus	<b>-1.01</b>	(-6.53 <sup>a</sup> )	<b>-1.15</b>	(-5.83 <sup>a</sup> )	<b>-1.18</b>	(-4.98 <sup>a</sup> )
Diversification	-0.54	(-1.39)	<b>-0.75</b>	(-1.71 <sup>c</sup> )	-0.93	(-1.61)
• <b>TARGET</b>						
Industry Focus	<b>23.40</b>	(28.51 <sup>a</sup> )	<b>23.91</b>	(28.17 <sup>a</sup> )	<b>24.52</b>	(28.11 <sup>a</sup> )
Diversification	<b>26.63</b>	(11.17 <sup>a</sup> )	<b>26.91</b>	(11.03 <sup>a</sup> )	<b>26.86</b>	(10.89 <sup>a</sup> )
• <b>COMBINED</b>						
Industry Focus	<b>2.35</b>	(12.11 <sup>a</sup> )	<b>2.31</b>	(10.35 <sup>a</sup> )	<b>2.39</b>	(10.08 <sup>a</sup> )
Diversification	<b>2.31</b>	(4.82 <sup>a</sup> )	<b>2.16</b>	(4.25 <sup>a</sup> )	<b>2.03</b>	(3.60 <sup>a</sup> )
<i>Industry Group Acquirer:</i>						
• <b>BIDDER</b>						
Financial	<b>-1.40</b>	(-7.53 <sup>a</sup> )	<b>-1.44</b>	(-6.08 <sup>a</sup> )	<b>-1.58</b>	(-5.67 <sup>a</sup> )
Manufacturing	<b>-1.13</b>	(-3.19 <sup>a</sup> )	<b>-1.25</b>	(-3.24 <sup>a</sup> )	<b>-1.22</b>	(-2.51 <sup>b</sup> )
Natural resources	<b>-3.07</b>	(-3.45 <sup>a</sup> )	<b>-2.85</b>	(-3.27 <sup>a</sup> )	<b>-2.88</b>	(-2.89 <sup>a</sup> )
Services	0.12	(-0.76)	-0.26	(-1.07)	-0.46	(-1.24)
Trade	<b>1.80</b>	(1.69 <sup>c</sup> )	<b>1.23</b>	(1.94 <sup>c</sup> )	<b>1.74</b>	(2.15 <sup>b</sup> )
• <b>TARGET</b>						
Financial	<b>17.24</b>	(16.44 <sup>a</sup> )	<b>17.32</b>	(16.30 <sup>a</sup> )	<b>17.32</b>	(15.92 <sup>a</sup> )
Manufacturing	<b>29.37</b>	(20.31 <sup>a</sup> )	<b>30.12</b>	(20.10 <sup>a</sup> )	<b>31.10</b>	(20.09 <sup>a</sup> )
Natural resources	<b>14.40</b>	(7.03 <sup>a</sup> )	<b>14.51</b>	(6.97 <sup>a</sup> )	<b>14.70</b>	(6.99 <sup>a</sup> )
Services	<b>25.21</b>	(12.37 <sup>a</sup> )	<b>25.61</b>	(11.99 <sup>a</sup> )	<b>26.19</b>	(12.12 <sup>a</sup> )

Trade	<b>22.89</b>	(6.77 <sup>a</sup> )	<b>24.08</b>	(6.86 <sup>a</sup> )	<b>24.00</b>	(6.90 <sup>a</sup> )
<b>• COMBINED</b>						
Financial	<b>1.61</b>	(5.59 <sup>a</sup> )	<b>1.57</b>	(4.45 <sup>a</sup> )	<b>1.51</b>	(3.88 <sup>a</sup> )
Manufacturing	<b>2.25</b>	(8.65 <sup>a</sup> )	<b>2.23</b>	(7.17 <sup>a</sup> )	<b>2.34</b>	(7.23 <sup>a</sup> )
Natural resources	<b>1.77</b>	(2.76 <sup>a</sup> )	<b>2.07</b>	(2.29 <sup>b</sup> )	<b>2.15</b>	(2.25 <sup>b</sup> )
Services	<b>3.52</b>	(6.56 <sup>a</sup> )	<b>3.31</b>	(5.91 <sup>a</sup> )	<b>3.25</b>	(5.38 <sup>a</sup> )
Trade	<b>3.73</b>	(4.05 <sup>a</sup> )	<b>3.61</b>	(4.11 <sup>a</sup> )	<b>4.17</b>	(4.09 <sup>a</sup> )
<i>Means of Payment:</i>						
<b>• BIDDER</b>						
All-Cash	0.22	(-1.14)	0.02	(-0.01)	-0.09	(-0.38)
All-Equity	<b>-1.79</b>	(-5.28 <sup>a</sup> )	<b>-1.79</b>	(-4.55 <sup>a</sup> )	<b>-1.99</b>	(-4.02 <sup>a</sup> )
Cash/Equity Mix	<b>-1.90</b>	(-7.19 <sup>a</sup> )	<b>-2.11</b>	(-6.24 <sup>a</sup> )	<b>-2.05</b>	(-5.38 <sup>a</sup> )
Undisclosed terms	<b>1.84</b>	(2.69 <sup>a</sup> )	<b>1.90</b>	(2.11 <sup>b</sup> )	<b>2.60</b>	(2.49 <sup>b</sup> )
<b>• TARGET</b>						
All-Cash	<b>32.44</b>	(20.18 <sup>a</sup> )	<b>33.17</b>	(20.14 <sup>a</sup> )	<b>34.16</b>	(20.15 <sup>a</sup> )
All-Equity	<b>14.08</b>	(13.28 <sup>a</sup> )	<b>14.00</b>	(12.70 <sup>a</sup> )	<b>14.14</b>	(12.51 <sup>a</sup> )
Cash/Equity Mix	<b>21.33</b>	(18.01 <sup>a</sup> )	<b>22.06</b>	(18.00 <sup>a</sup> )	<b>22.47</b>	(17.97 <sup>a</sup> )
Undisclosed terms	<b>16.47</b>	(3.50 <sup>a</sup> )	<b>14.57</b>	(3.09 <sup>a</sup> )	<b>13.24</b>	(2.79 <sup>a</sup> )
<b>• COMBINED</b>						
All-Cash	<b>2.93</b>	(11.16 <sup>a</sup> )	<b>2.83</b>	(9.30 <sup>a</sup> )	<b>2.77</b>	(8.14 <sup>a</sup> )
All-Equity	<b>1.38</b>	(3.14 <sup>a</sup> )	<b>1.38</b>	(2.46 <sup>b</sup> )	<b>1.39</b>	(2.51 <sup>b</sup> )
Cash/Equity Mix	<b>2.33</b>	(7.24 <sup>a</sup> )	<b>2.31</b>	(6.71 <sup>a</sup> )	<b>2.45</b>	(6.94 <sup>a</sup> )
Undisclosed terms	<b>2.04</b>	(3.07 <sup>a</sup> )	<b>2.01</b>	(2.48 <sup>b</sup> )	<b>2.51</b>	(2.39 <sup>b</sup> )

*Sub periods – sixth merger wave*

Table 6 displays the abnormal returns for the sub periods (bottom-, mid- & top-cycle) within the 6th and 7th merger wave and reports significant negative bidder abnormal returns for the 3-day period. Strikingly, the abnormal returns start at -2.68% and have an increasing tendency towards the top of the cycle reporting abnormal returns of -1.63%, which is in contrast with the literature describing decreasing abnormal returns as the cycle develops. However, from the top onwards there is a decreasing pattern which is in line with the literature, reporting the lowest abnormal returns at the end of a merger wave.

For the target, sizeable significant positive abnormal returns are reported. In contrast to the bidder, the highest returns of 35.12% are experienced in the comedown from the sixth merger wave, which is in contradiction with the literature arguing decreasing returns throughout the wave.

The combined abnormal returns only reports real significance in the top of the cycle with a magnitude around 1.50%. Surprisingly, the combined abnormal returns experience the highest magnitude in the top of the cycle, which again contradicts the literature. An explanation might be the economical time frame of the sixth merger wave. In the run-up of the financial crisis of 2007 – 2008 there was overoptimism in abundance. Extreme and increasing overvaluation could have been a reason for even higher abnormal returns at the top compared to the beginning of the wave. Despite the contrary findings, the combined abnormal returns remain positive and therefore it can be concluded that takeovers in the sixth merger wave created combined net value.

#### *Sub periods – seventh merger wave*

Results only report significant bidder abnormal returns for bottom- and top-cycle. Bottom returns are positive whereas returns in the top of the cycle are negative. Again, the pattern of decreasing abnormal returns throughout the wave as described in the literature is noticeable. The bottom start of the cycle reports bidder positive abnormal returns of 1.38% along with negative abnormal returns of -1.02%. This also corresponds with literature mentioned earlier in this study presenting an equal distribution of positive and negative abnormal returns concerning the bidder.

Target abnormal returns are substantial, positive and significant at the 1% level. The same story of decreasing returns applies here, reporting abnormal returns of around 35% at the start to 25% at the top and 16% near the end of the wave.

Combined abnormal returns for the seventh merger wave are all positive and significant at minimum 5% significance level, reporting a combined abnormal return of 6.40% at the start of the wave and decreasing to 1.45% towards the end of the wave. The pattern holds for the 3-, 5- and 11-day period, indicating the robustness. Lastly, all the returns are positive, confirming the combined net wealth creation by takeovers. Noteworthy is the difference in wealth creation between the sixth and seventh merger wave, which is considerable more in the seventh compared to the sixth merger wave. An explanation might be the growing experience of efficiently participating in M&A.

Table 6. Reports the cumulative average abnormal returns (CAAR) for bidder, target and the combined return, calculated using the net wealth formula described in the methodology. Since the data is not normally distributed, the Wilcoxon rank sum test is used to determine whether the returns are statistically different from zero. Indicators a, b and c are used to determine significance at 1%, 5% and 10% level respectively. CAARs in bold indicate a significant abnormal return. Results are split up in sub periods of the sixth and seventh merger wave.

		Period [-1,1]		Period [-3,3]		Period [-5,5]		Nr. Obs
		CAARs (%)	(z-stat)	CAARs (%)	(z-stat)	CAARs (%)	(z-stat)	
<i>Sub-periods 6th merger wave:</i>								
	<i>Cycle:</i>							
<b>• BIDDER</b>								
Jan 2003 – Dec 2003	<i>Bottom</i>	<b>-2.68</b>	(-4.25 <sup>a</sup> )	<b>-3.40</b>	(-4.01 <sup>a</sup> )	<b>-2.74</b>	(-3.10 <sup>a</sup> )	100
Jan 2004 – Mar 2004	<i>Mid</i>	<b>-1.58</b>	(-1.76 <sup>c</sup> )	-1.43	(-1.59)	-1.50	(-1.03)	32
Apr 2004 – Oct 2007	<i>Top</i>	<b>-1.63</b>	(-6.18 <sup>a</sup> )	<b>-1.80</b>	(-5.77 <sup>a</sup> )	<b>-1.97</b>	(-5.32 <sup>a</sup> )	450
Nov 2007 – Feb 2008	<i>Mid</i>	<b>-2.91</b>	(-1.94 <sup>c</sup> )	<b>-3.33</b>	(-1.96 <sup>c</sup> )	<b>-3.76</b>	(-2.32 <sup>b</sup> )	28
Mar 2008 – Aug 2008	<i>Bottom</i>	<b>-3.34</b>	(-2.40 <sup>b</sup> )	-2.26	(-1.50)	-1.17	(-0.86)	43
<b>• TARGET</b>								
Jan 2003 – Dec 2003	<i>Bottom</i>	<b>20.51</b>	(8.05 <sup>a</sup> )	<b>20.67</b>	(7.77 <sup>a</sup> )	<b>21.54</b>	(7.91 <sup>a</sup> )	
Jan 2004 – Mar 2004	<i>Mid</i>	<b>17.02</b>	(4.39 <sup>a</sup> )	<b>17.48</b>	(4.39 <sup>a</sup> )	<b>16.99</b>	(4.30 <sup>a</sup> )	
Apr 2004 – Oct 2007	<i>Top</i>	<b>20.23</b>	(17.40 <sup>a</sup> )	<b>20.46</b>	(17.26 <sup>a</sup> )	<b>20.60</b>	(16.96 <sup>a</sup> )	
Nov 2007 – Feb 2008	<i>Mid</i>	<b>35.12</b>	(4.28 <sup>a</sup> )	<b>34.29</b>	(4.10 <sup>a</sup> )	<b>33.93</b>	(4.03 <sup>a</sup> )	
Mar 2008 – Aug 2008	<i>Bottom</i>	<b>26.81</b>	(5.30 <sup>a</sup> )	<b>29.03</b>	(5.40 <sup>a</sup> )	<b>30.57</b>	(5.31 <sup>a</sup> )	
<b>• COMBINED</b>								
Jan 2003 – Dec 2003	<i>Bottom</i>	0.27	(0.04)	-0.16	(-0.40)	0.33	(0.12)	
Jan 2004 – Mar 2004	<i>Mid</i>	0.48	(0.00)	0.45	(0.13)	0.31	(0.45)	
Apr 2004 – Oct 2007	<i>Top</i>	<b>1.68</b>	(6.00 <sup>a</sup> )	<b>1.52</b>	(4.83 <sup>a</sup> )	<b>1.39</b>	(4.37 <sup>a</sup> )	
Nov 2007 – Feb 2008	<i>Mid</i>	<b>1.75</b>	(1.80 <sup>c</sup> )	1.41	(1.64)	1.30	(1.12)	
Mar 2008 – Aug 2008	<i>Bottom</i>	1.58	(1.43)	<b>2.61</b>	(1.69 <sup>c</sup> )	<b>3.37</b>	(2.44 <sup>b</sup> )	
<i>Sub-periods 7th merger wave:</i>								
<b>• BIDDER</b>								
Jan 2014 – Aug 2014	<i>Bottom</i>	<b>1.38</b>	(1.85 <sup>c</sup> )	<b>1.79</b>	(2.00 <sup>b</sup> )	1.58	(1.07)	66
Sep 2014 – Dec 2014	<i>Mid</i>	0.90	(0.28)	1.23	(0.87)	0.60	(-0.28)	33
Jan 2015 – Nov 2016	<i>Top</i>	<b>-1.02</b>	(-2.68 <sup>a</sup> )	<b>-1.07</b>	(-1.94 <sup>c</sup> )	-0.86	(-1.32)	213
Dec 2016 – Dec 2017	<i>Mid</i>	-0.55	(-1.01)	-0.80	(-1.60)	<b>-1.24</b>	(-1.69 <sup>c</sup> )	100
<b>• TARGET</b>								
Jan 2014 – Aug 2014	<i>Bottom</i>	<b>36.45</b>	(6.98 <sup>a</sup> )	<b>38.20</b>	(6.86 <sup>a</sup> )	<b>39.08</b>	(6.81 <sup>a</sup> )	
Sep 2014 – Dec 2014	<i>Mid</i>	<b>25.14</b>	(4.94 <sup>a</sup> )	<b>25.77</b>	(4.87 <sup>a</sup> )	<b>26.17</b>	(4.76 <sup>a</sup> )	
Jan 2015 – Nov 2016	<i>Top</i>	<b>25.78</b>	(11.79 <sup>a</sup> )	<b>26.75</b>	(11.94 <sup>a</sup> )	<b>27.32</b>	(11.95 <sup>a</sup> )	
Dec 2016 – Dec 2017	<i>Mid</i>	<b>16.06</b>	(7.51 <sup>a</sup> )	<b>16.01</b>	(7.22 <sup>a</sup> )	<b>16.15</b>	(7.12 <sup>a</sup> )	
<b>• COMBINED</b>								
Jan 2014 – Aug 2014	<i>Bottom</i>	<b>6.40</b>	(5.40 <sup>a</sup> )	<b>7.30</b>	(5.14 <sup>a</sup> )	<b>7.22</b>	(4.83 <sup>a</sup> )	
Sep 2014 – Dec 2014	<i>Mid</i>	<b>4.42</b>	(3.60 <sup>a</sup> )	<b>4.96</b>	(3.67 <sup>a</sup> )	<b>4.51</b>	(3.23 <sup>a</sup> )	
Jan 2015 – Nov 2016	<i>Top</i>	<b>2.71</b>	(5.54 <sup>a</sup> )	<b>2.83</b>	(5.09 <sup>a</sup> )	<b>3.19</b>	(5.38 <sup>a</sup> )	
Dec 2016 – Dec 2017	<i>Mid</i>	<b>1.45</b>	(3.32 <sup>a</sup> )	<b>1.35</b>	(2.37 <sup>b</sup> )	<b>1.32</b>	(1.99 <sup>b</sup> )	

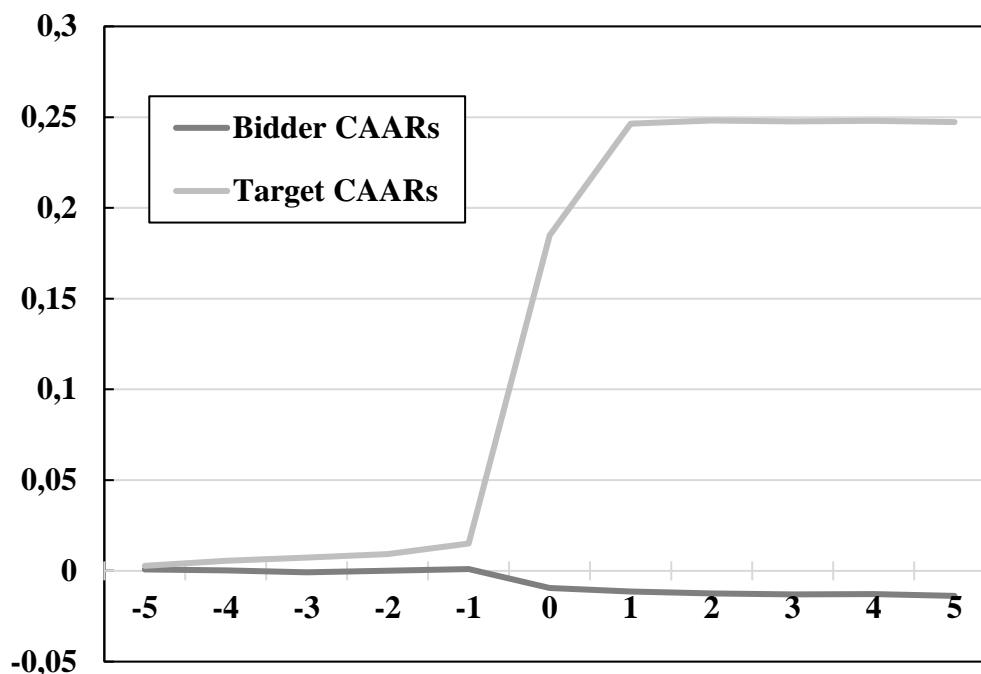


Figure 5. Bidder and target CAARs around the takeover announcement date. This figure shows the cumulative average abnormal returns for both the acquirer and the target firm 5 days before and after the announcement date, denoted as 0.

### Conclusion abnormal returns

Hypothesis *I* states that on average wealth effects around the announcement date do not differ from zero. This hypothesis is split up into partial hypotheses, stating abnormal returns acquirer, abnormal returns target and combined abnormal returns do not differ from zero.

As it can be seen from Table 5, on average, the wealth effects for the acquirer are -0.95%, -1.10%, -1.14% for 3-days, 5-days and 11-days period respectively at the 1% significance level. Therefore we can reject the hypothesis that abnormal returns of the acquirer do not differ from zero, claiming negative wealth effects for the acquirer in the period from 2003 – 2017. As stated by Bruner (2001), there is no real significant evidence of positive or negative bidder abnormal returns. Abnormal returns are evenly distributed presenting a mean abnormal return of zero. A bidder abnormal return of -0.95% is therefore a possible result compared to previous literature.

Contrary, the wealth effects for the targets are substantial and positive. Cumulative average abnormal returns for the three periods respectively are 23.86%, 24.33 and 24.85% at the 1% significance level. Again, this is in line with literature on earlier waves, reporting around 20% - 30% of abnormal returns for targets (Jensen & Ruback, 1983). Additionally, Martynova &

Renneboog (2008) conducted a summary on M&A literature and came to a similar conclusion, specifically a range of target announcement abnormal returns between 20% and 30%. Consequently, the second partial hypothesis stating that abnormal returns of targets do not differ from zero can be rejected.

Moreover, the third and last partial hypothesis states that combined net wealth effects do not differ from zero, that is, takeovers do not generate net wealth effects on average. The results confirm the opposite. The net wealth effects for the three periods respectively are positive and significant at the 1% level; 2.34%, 2.29% and 2.34%. A previous study of Bruner (2001), shows that 11 out of 20 studies report significant combined abnormal returns. Accordingly, the third partial hypothesis and hence main hypothesis *I* can be rejected. Concluding, on average a takeover will generate net wealth effects.

Lastly, the second hypothesis states that wealth effects in the top of the cycle have the lowest magnitude in comparison to the bottom- and mid-cycle periods. For the sixth merger wave, only the top-cycle abnormal returns (1.68%) are significant and surprisingly the highest. This is in contrast with previous literature, reporting declining abnormal returns throughout a merger wave (Bhagat, Dong, Hirshleifer, & Noah, 2005). Therefore we can not confirm hypothesis *II* for the sixth merger wave. Contrary, the seventh merger wave follows the pattern of declining abnormal returns, including the lowest for top-cycle (2.71%) compared to the prior bottom- and mid-cycle period. Therefore hypothesis *II* can be confirmed for the seventh merger wave. On an important note, this is only regarding the univariate analysis. The bottom-, mid- and top-cycle will be analysed using a multivariate linear regression in the next section.

## **V.2 Multivariate Linear Regression**

In this section the differences in the bidder, target and combined CAR are explained by a multivariate linear regression. Specifically, to explain the differences in the wealth created by mergers and acquisitions. The factors that explain these differences are reported in the tables below. Before performing the three multivariate regressions, some tests are conducted to test for multicollinearity and heteroskedasticity. For all three regressions, the model is not subject to multicollinearity as can be seen by the correlation matrices and the variance inflation factor (VIF) (see Appendix). As a rule of thumb, further investigation is needed when VIF is greater than 10,

which is not the case<sup>4</sup>. Furthermore, I want to test for heteroskedasticity, starting with a graphical presentation of the residual values (see Appendix). There is a clear clustering of residual values indicating heteroskedasticity. Subsequently, I perform the heteroskedastic Breusch-Pagan test for all regressions (see Appendix). The null hypothesis of constant variance is rejected for all of the regressions indicating heteroskedasticity. In order to correct for this, I use heteroskedastic-robust (White) standard errors. First, the multivariate regression on the combined CAR is analysed, which is the main focus of this study. Thereafter, the multivariate regressions on the bidder CAR and target CAR are analysed and implications are made.

### Combined CAR

Table 7. Results of the multivariate linear regression where the combined CAR of target and bidder is the dependent variable. Standard errors are calculated using the heteroskedastic-robust method of White (1980). Indicators a, b and c are used to determine significance at 1%, 5% and 10% level respectively. Coefficients in bold indicate significance.

<i>Combined CAR</i>	CAR [-1,1]		CAR [-3,3]		CAR [-5,5]	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Intercept	<b>0.043<sup>a</sup></b>	0.000	<b>0.042<sup>a</sup></b>	0.000	<b>0.059<sup>a</sup></b>	0.000
lnSIZE	<b>0.013<sup>a</sup></b>	0.000	<b>0.013<sup>a</sup></b>	0.000	0.013 <sup>a</sup>	0.000
Friendly Attitude	0.007	0.546	0.009	0.426	-0.007	0.606
Cash Payment	<b>0.022<sup>a</sup></b>	0.000	<b>0.021<sup>a</sup></b>	0.000	<b>0.019<sup>a</sup></b>	0.004
Stock Payment	<b>-0.015<sup>a</sup></b>	0.002	<b>-0.015<sup>a</sup></b>	0.008	<b>-0.016<sup>b</sup></b>	0.011
Diversifying Merger	0.002	0.668	0.001	0.829	-0.001	0.884
Mid-Cycle	-0.008	0.137	-0.008	0.205	-0.010	0.114
Top-Cycle	<b>-0.010<sup>b</sup></b>	0.012	<b>-0.011<sup>b</sup></b>	0.019	<b>-0.012<sup>b</sup></b>	0.021
Nr of observations	1468		1468		1468	
R-squared	0.088		0.074		0.061	
F-value	5.78	0.000	5.66	0.000	5.56	0.000

First of all, the 3-day, 5-day and 11-day period show somewhat similar results for all three periods. Differences between these periods can be explained by leakage or slow adaption of information. For the sake of simplicity I will refer to the 3-day period in this section. Furthermore, the main focus of this study is to investigate whether takeovers generate combined net wealth effects. Consequently, in this section the hypotheses will be rejected or confirmed.

<sup>4</sup> According to the official Stata webbooks.

The log of the relative size is defined as the log of the targets' market cap divided by the market cap of the acquirer and is significant at the 1% level. Therefore a one percent increase in the relative size result in an increase in the CAR of 0.013%. Reasoning behind is that substantial positive target returns have more weight in a relative more sizeable deal. Simultaneously, bidder returns will have less weight in a relative more sizeable deal, which often yields a negative return. Specifically, a large deal puts more weight on the returns of the target (mostly positive) and less weight on the returns of the bidder (mostly negative). Consequently, a large deal creates more net wealth and thus an increase in the combined CAR (Houston & Ryngaert, 1994).

The results for the friendly dummy variable is insignificant. This is highly likely due to the fact that the total sample consists of 97.1% friendly takeovers, hence the difficulty to draw a conclusion.

Takeovers financed with stock result in lower returns. An all equity payment leads to a 1.5% decline in the combined CAR. This is consistent with the literature arguing that an equity payment indicates an overvalued stock of the acquirer. As a result, investors correct for this overvaluation. Furthermore, the acquirer is more likely to finance the deal with stock when it wants to share its risks. Therefore the market will question the quality of the target (Andrade, Mitchell, & Stafford, 2001). Contrarily, cash payments result in an increase of 2.2% in the combined CAR. Both the stock and cash payment dummy variables are significant at the 1% level.

The coefficients of the last two dummy variables (mid- and top-cycle) indicate the performance of these periods in relation to bottom-cycle. Unfortunately the mid-cycle coefficient is insignificant. However, the magnitude indicates 0.8% less abnormal returns for the mid-cycle in relation to the bottom-cycle. Takeovers in the top-cycle experience 1.0% lower abnormal returns relative to the bottom-cycle at the 5% significance level. This is in accordance with the literature, arguing declining abnormal returns for the fourth and fifth merger wave (Bhagat, Dong, Hirshleifer, & Noah, 2005). Therefore hypothesis *II* can be confirmed.

### *Bidder's CAR*

Table 8 reports the factors that determines the bidder's abnormal returns. A takeover financed with cash leads to an increase in the abnormal return of 1.8% contrarily to no effect when it is equity financed. The reasoning behind this, is the adverse signal to the market in case of equity financing.



Specifically, an equity payment indicates an overvalued stock of the bidder, which in turn leads to a downwards adjustment of the bidder stock by the market, therefore generating lower abnormal returns. Furthermore, mid-cycle returns report little negative insignificant magnitude whereas takeovers in the top-cycle produce lower abnormal bidder returns of 1.0%. Therefore lower abnormal returns at the top of a merger wave can be confirmed for the acquiring firms as well.

Table 8. Results of the multivariate linear regression where the bidder CAR is the dependent variable. Standard errors are calculated using the heteroskedastic-robust method of White (1980). Indicators a, b and c are used to determine significance at 1%, 5% and 10% level respectively. Coefficients in bold indicate significance.

<i>Bidder CAR</i>	CAR [-1,1]		CAR [-3,3]		CAR [-5,5]	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Intercept	-0.012	0.250	-0.020	0.143	-0.004	0.786
lnSIZE	-0.000	0.720	-0.000	0.858	-0.002	0.314
Friendly Attitude	-0.000	0.967	0.005	0.686	-0.011	0.463
Cash Payment	<b>0.018<sup>a</sup></b>	0.000	<b>0.018<sup>a</sup></b>	0.001	<b>0.014<sup>b</sup></b>	0.014
Stock Payment	-0.002	0.686	-0.000	0.941	-0.002	0.719
Diversifying Merger	0.002	0.621	0.002	0.752	-0.000	0.977
Mid-Cycle	-0.001	0.867	-0.000	0.940	-0.005	0.442
Top-Cycle	<b>-0.010<sup>b</sup></b>	0.019	<b>-0.009<sup>c</sup></b>	0.061	<b>-0.010<sup>c</sup></b>	0.060
Nr of observations	1468		1468		1468	
R-squared	0.023		0.015		0.013	
F-value	5.78	0.000	3.84	0.000	3.36	0.002

### Target CAR

Table 9 shows the determinants of the multivariate regression in analysing the abnormal returns of the target. We see a negative significant impact of the relative size on the returns. A one percent increase in the relative size (that is market cap target divided by market cap acquirer) results in a 0.070% decrease in the abnormal return of the target. An increase in the relative size implies a more sizeable deal indicating a smaller bidder and/or a larger target in terms of market capitalization. There can be argued that synergistic effects play a more dominant role when a target firm is relative small to the bidder, for example operating synergies. A relative large acquirer is likely to be in possession of a wealthy infrastructure therefore operating on a larger scale and thus creating economies of scale. Logically, such an increase in synergies will be less significant for larger relative sized targets. Therefore takeovers of relative sizeable companies result in a lower abnormal return compared to takeovers of relative small companies.

Furthermore, the table displays the effect of equity payments in takeovers. The results are consistent throughout the study, that is equity payments result in a lower abnormal return compared to a takeover financed with cash. An equity financed merger results in a lower target abnormal return of 4.0%. This can be explained by the negative signal to the market in case of an equity payment by an acquirer. The bidder is more likely to do an equity offer when the quality of the target is uncertain in order to reduce the risk in taking over the firm. Risks in this case might be not realizing the expected synergies. Subsequently, the market will pick up on this and evaluate this equity offer as an uncertain estimation of the target. As a result, the abnormal returns of the target will decrease.

Surprisingly and contrarily to the combined and bidder abnormal returns are the consistent lower returns for all three periods in mid-cycle compared to top-cycle. The mid-cycle period decreases the abnormal returns with 4.3% whereas takeovers in top-cycle only experience 3.7% lower abnormal returns. This is in contradiction with the literature arguing the lowest returns are witnessed in the top of the cycle. Since the average target abnormal return is around 20% to 30%, this difference in periods may be less significant, however it is still remarkable. An other explanation may be the structure and design of this study. I will elaborate on this in the limitations and recommendations section.

Table 9. Results of the multivariate linear regression where the target CAR is the dependent variable. Standard errors are calculated using the heteroskedastic-robust method of White (1980). Indicators a, b and c are used to determine significance at 1%, 5% and 10% level respectively. Coefficients in bold indicate significance.

	CAR [-1,1]		CAR [-3,3]		CAR [-5,5]	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Intercept	<b>0.086<sup>a</sup></b>	0.002	<b>0.084<sup>a</sup></b>	0.003	<b>0.091<sup>a</sup></b>	0.004
lnSIZE	<b>-0.070<sup>a</sup></b>	0.000	<b>-0.068<sup>a</sup></b>	0.000	<b>-0.071<sup>a</sup></b>	0.000
Friendly Attitude	0.032	0.256	0.044	0.119	0.041	0.187
Cash Payment	0.025	0.481	0.028	0.416	0.033	0.354
Stock Payment	<b>-0.040<sup>a</sup></b>	0.006	<b>-0.046<sup>a</sup></b>	0.002	<b>-0.047<sup>a</sup></b>	0.003
Diversifying Merger	-0.006	0.842	-0.008	0.782	-0.016	0.581
Mid-Cycle	<b>-0.043<sup>b</sup></b>	0.045	<b>-0.048<sup>b</sup></b>	0.030	<b>-0.056<sup>b</sup></b>	0.014
Top-Cycle	<b>-0.037<sup>c</sup></b>	0.087	<b>-0.038<sup>c</sup></b>	0.074	<b>-0.044<sup>b</sup></b>	0.042
Nr of observations	1468		1468		1468	
R-squared	0.121		0.120		0.125	
F-value	14.53	0.000	15.63	0.000	16.15	0.000

## VI. Conclusions

This paper examines the impact of an announcement of a merger or acquisition on shareholder wealth during the sixth and (partial) seventh merger wave (2003 – 2017). The main focus of this study is to answer the question: “*Do wealth effects of takeovers differ throughout the sixth and seventh merger wave?*” Two main hypotheses are tested, whether wealth effects around the announcement date differ from zero and which period within a merger wave (bottom, mid or top) generate the lowest abnormal returns. A traditional event study is used in order to calculate the abnormal returns on and around the announcement date. Regarding the whole sample, I find significant abnormal returns for the acquirer (-0.95%), the target (23.86%) and combined (2.34%), confirming announcement returns different from zero. The key results of this study are reported in table 10. To answer hypothesis II, I zoom in on the sixth and seventh merger wave separately and separate them in bottom-, mid- and top-cycle periods. The univariate analysis provides contradicting results for the sixth merger wave reporting the highest returns in the top of the wave. An explanation might be extreme overoptimism in the run-up to the burst of the bubble in 2008. In regard to the seventh merger wave, returns are declining throughout the wave, which is in agreement with previous literature. Subsequently, in order to explain the differences in CAR, I conducted a multivariate regression analysis. Mid-cycle reports insignificant abnormal returns of -0.8% lower compared to bottom-cycle, whereas top-cycle reports significant abnormal returns of 1.0% lower compared to bottom-cycle. Accordingly, declining abnormal returns throughout a merger wave can be confirmed.

Moreover, some secondary findings are made. Takeovers financed with equity perform significantly worse compared to stock financed takeovers. Univariate analysis reports bidder returns of -1.79% for equity payments. Cash target returns are 32.44% compared to equity target returns of 14.08%. Cash combined returns report 2.93%, whereas equity combined returns only report 1.38%.

To conclude, takeover shareholder wealth effects around the announcement date do create combined net value. Furthermore, the top of a merger wave will generate the lowest combined abnormal returns on average based on the multivariate regression analysis.

Table 10. Key results of the univariate and multivariate analysis.

	Univariate Analysis		Multivariate Analysis	
	Period [-1,1]		CAR [-1,1]	
	CAARs (%)	(z-stat)	Coef.	P-value
<i>Whole Sample:</i>			Mid-Cycle	-0.008    0.137
• <b>BIDDER</b>	<b>-0.95</b>	<i>(-6.61<sup>a</sup>)</i>	Top-Cycle	<b>-0.01<sup>b</sup></b> 0.012
• <b>TARGET</b>	<b>23.86</b>	<i>(30.60<sup>a</sup>)</i>		
• <b>COMBINED</b>	<b>2.34</b>	<i>(13.04<sup>a</sup>)</i>		

## VII. Limitations and recommendations for further research

In this paper a traditional event study is conducted in order to generate abnormal returns. The estimated daily expected returns are estimated using the market model, also known as capital asset pricing model (CAPM). An alternative method for estimating the daily expected returns is using the Fama-French three factor model. This model includes two more factors; small minus big (SMB) and high minus low (HML). Incorporating these factors will take into account small over big companies and growth over value companies. Unfortunately, the tool used in this study does not support the Fama-French model. It would be beyond the scope of this study to add this manually. However, it would be interesting for further research to include this model in estimating expected return, especially since it has more explanatory power (Gaunt, 2004).

The main focus of this study is to examine whether shareholder wealth is created. However, it would be interesting to include additional accounting and financial control variables, such as market-to-book ratio, sales/assets, Q-ratio (total market value firm/total asset value firm) as is done in the study of (Martynova & Renneboog (2011)). Subsequently, discrepancies can be made between high-growth and value companies. Including such variables can generate more value for future research. Moreover, it would be interesting to incorporate a time-varying variable in the multivariate linear regression in order to compare sixth and seventh merger wave returns. For the multivariate analysis, this study only limits in investigating different periods within a cycle, since that is the main focus.

Furthermore, this study is focused on the market of the United States. It would be interesting to investigate if these results hold for continents with different characteristics such as Europe and Asia.

Finally, I compared three periods within a merger wave, namely bottom-, mid- and top-cycle based on M&A activity by value. A merger wave consists of the following pattern: bottom, mid, top, mid, bottom. A suggestion for further research would be to make a distinction between the bottom and mid period before the top and after the top, since they might behave differently.

## Appendix

### Multicollinearity Tests

Table 10. Correlation Matrix. CAR contains the bidder abnormal return created for the 11-day period.

	1	2	3	4	5	6	7	8
1. Bidder CAR	1.000							
2. lnSIZE	-0.064	1.000						
3. Friendly Attitude	-0.018	-0.104	1.000					
4. Cash Payment	0.094	-0.398	0.000	1.000				
5. Stock Payment	-0.051	0.251	0.038	-0.424	1.000			
6. Diversifying Merger	0.001	-0.094	-0.018	0.081	-0.052	1.000		
7. Mid-cycle	-0.008	0.017	0.027	-0.080	0.121	-0.001	1.000	
8. Top-cycle	-0.049	0.041	0.014	0.004	-0.058	-0.006	-0.353	1.000

Table 11. Correlation Matrix. CAR contains the target abnormal return created for the 11-day period.

	1	2	3	4	5	6	7	8
1. Target CAR	1.000							
2. lnSIZE	-0.341	1.000						
3. Friendly Attitude	0.045	-0.104	1.000					
4. Cash Payment	0.186	-0.340	0.000	1.000				
5. Stock Payment	-0.145	0.251	0.038	-0.424	1.000			
6. Diversifying Merger	0.021	-0.094	-0.018	0.081	-0.052	1.000		
7. Mid-cycle	-0.042	0.017	0.027	-0.081	0.121	-0.001	1.000	
8. Top-cycle	-0.048	0.041	0.014	0.004	-0.058	-0.006	-0.353	1.000

Table 12. Correlation Matrix. CAR contains the combined net wealth created for the 11-day period.

	1	2	3	4	5	6	7	8
1. Combined CAR	1.000							
2. lnSIZE	0.190	1.000						
3. Friendly Attitude	-0.044	-0.104	1.000					
4. Cash Payment	0.040	-0.398	0.000	1.000				
5. Stock Payment	-0.059	0.251	0.038	-0.424	1.000			
6. Diversifying Merger	-0.014	-0.094	-0.018	0.081	-0.052	1.000		
7. Mid-cycle	-0.029	0.017	0.027	-0.080	0.121	-0.001	1.000	
8. Top-cycle	-0.039	0.041	0.014	0.004	-0.058	-0.006	-0.353	1.000

Table 13. Variance Inflation Factor (VIF). Command in Stata to check for multicollinearity

	VIF	1/VIF
InSIZE	1.23	0.816
Friendly Attitude	1.02	0.982
Cash Payment	1.38	0.726
Stock Payment	1.25	0.801
Diversifying Merger	1.01	0.988
Mid-cycle	1.16	0.863
Top-cycle	1.15	0.871
Mean VIF	1.17	

### Heteroskedasticity Tests

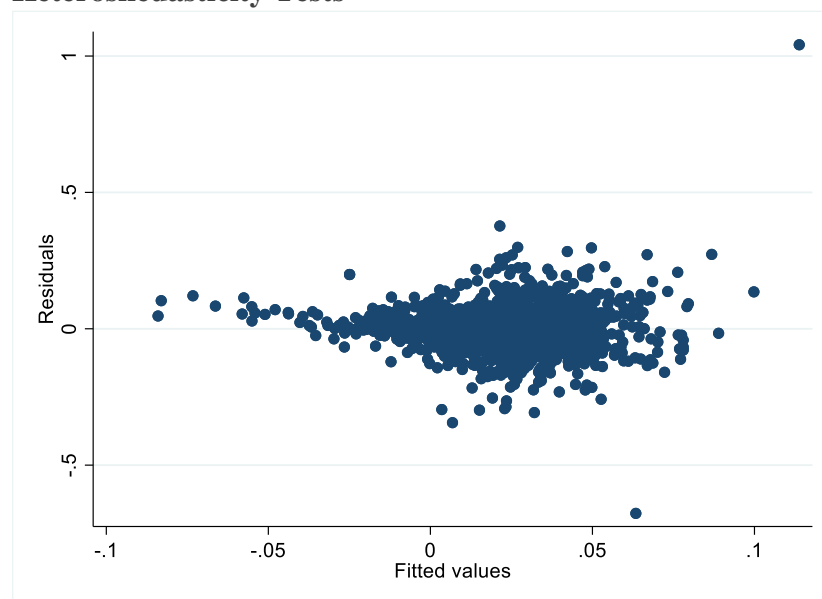


Figure 6. Residual-versus-fitted plot of the 11-day combined abnormal returns

Table 14. Breusch-Pagan test for heteroskedasticity testing the null hypothesis of constant variance

	CAR [-1,1]	CAR [-3,3]	CAR [-5,5]
<b>Bidder CAR</b>			
chi2	26.12	22.19	41.96
prob>chi2	0.000	0.000	0.000
<b>Target CAR</b>			
chi2	2143.41	1977.77	1889.07
prob>chi2	0.000	0.000	0.000
<b>Combined CAR</b>			
chi2	865.88	559.52	428.85
prob>chi2	0.000	0.000	0.000

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