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Value destructive consequences of Mergers & Acquisitions during times of low interest rates

An empirical study of M&A transactions in Europe between 2009 and 2015

Master Thesis

MSc Finance and Strategic Management

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Abstract

The prevailing low interest rate environment in the EU, in combination with booming stock markets, lured one of Germany's highest valued corporations (Bayer AG) to make the largest takeover bid in the history of German companies. This thesis uses such a novel macroeconomic environment in an effort to push forward the research in the field of M&A and its potential on value creation. In detail, this unique macroeconomic environment allows to extract the impact of interest rates on value creation through M&A. The total sample consists of 2,140 transactions, executed by companies headquartered in the EU, from the time periods between 2009-2015 and 2003-2007. The carried out event study indicates that transactions performed during a low interest rate environment yield negative abnormal returns to acquirers' shareholders. In a low interest rate environment the subsequent characteristics significantly impact shareholder value negatively: (i) deal value of more than €500m, (ii) deal value larger than 10% of acquirer's market cap / asset value, and (iii) equity financed acquisitions. In contrast, cash financed acquisitions seem to positively impact the potential of value creation through M&A during low interest rates. Moreover, this thesis confirms that M&A during times of low interest rates destroy significantly more value than during times of normal interest rates. The following characteristics have proven to lead to lower returns in times of low interest rates relative to normal interest rates: (i) synergy seeking acquisitions, (ii) deal value of more than €500m, and (iii) cash financed acquisitions.

Table of contents

List of abbreviations

€ / EUR	Euro
AAR	Average abnormal return(s)
AR	Abnormal return(s)
bn	Billion
CAAR	Cumulative average abnormal return(s)
CAPM	Capital asset pricing model
ECB	European central bank
EMH	Efficient market hypothesis
EU	European union
M&A	Merger(s) & Acquisition(s)
MRO	Main refinancing operation
SIC	Standard industrial classification
US	United States

List of tables

List of figures

1 Introduction

Recent transaction announcements of two major German listed companies[1] give the impression that the low interest rate environment does not only spur economic growth, but also lures companies into performing mergers & acquisitions (M&A). Bayer AG, one of the largest German companies measured by market capitalization made an offer to acquire Monsanto, which would represent the largest ever transaction made by a German corporation. According to Handelsblatt (2016) this is fostered by the low interest rate environment.

Even though such announcements and intentions often times receive great public attention the potential of value creation is questionable. Especially, when considering that these transactions might be triggered by receiving financing in an easier than usual manner. The combination of a booming stock market and a low interest rate environment over such a time period is unique, and therefore interesting to analyse from an academic perspective. Consequently, this study goes perfectly with the generally high interest in the potential of M&A to create or destroy value from a practitioner's as well as scholar's perspective.

This thesis employs the event study methodology and uses a sample of 2,140 transactions to test whether acquisitions in a low interest rate environment destroy shareholder value in comparison to transactions in a normal interest rate environment. In addition, a number of characteristics are tested in order to identify the value drivers of M&A given the specific economic environment. M&A has been analysed from various perspectives over the last decades and the dimension of interest rate regimes adds another factor which should be considered in the analysis. Moreover, the results can serve practitioners to optimize their decision making in evaluating M&A, while maintaining the overall perspective of creating value for the acquirer's shareholders.

This type of study has not been undertaken before and it is expected that papers covering that topic will be published in the near future. Therefore, the results can be considered as a first step to highlight the importance of economic circumstances when analysing M&A.

[1] Bayer made an offer to acquire US based Monsanto and Deutsche Boerse announced the intention to acquire London Stock Exchange and merge the two similarly sized entities

1.1 Research questions

This thesis is aiming to portray whether the corporate action of acquiring another company is value creating to the shareholders of the acquirer. In general, this topic has been studied extensively, however, in this work the focus is set on companies performing acquisitions during times of low interest rates and a booming stock market. Acquisitions from such a time period are compared to a similar time period in terms of overall economic growth with normal and rising interest rates. Thus, the first research question is:

Do shareholders of companies that execute M&A during times of low interest rates and a booming economy lose value in comparison to shareholders of companies that perform such actions during a similar economic environment but considerably higher interest rates?

Aside to this general research question, the objective of this thesis is to determine which underlying factors represent the root cause for such findings. In order to do so, a number of strategic and financial characteristics will be analysed and hence, the second major research question is:

Which deal characteristics govern the alterations between value destruction during times of low interest rates set against considerably higher interest rates?

1.2 Delimitations and scope

In this thesis, value creation and destruction through M&A activity is analysed by considering different economic variables, as well as transaction specific characteristics. It is important to clarify that value creation is only regarded from the shareholders' perspective of the acquirer and hence, any share value changes of the target company are being neglected. Low interest rates, which are mainly dictated by central banks, are taken as a given external independent variable and its general implications on the economy are considered in the formation of hypotheses.

Initially, characteristics which potentially affect the extent of value destruction are identified by combining consequences of the low interest rate environment with strategic and financial theories. By linking such a nouveau macroeconomic circumstance with classical theory, new insights about the impact of M&A for shareholders are identified. To sum up, the hypothesized effects are tested through an empirical study to validate or discard the hypotheses.

The underlying research questions are empirically tested by applying a so called event study methodology. This method allows identifying the determinants of stock market responses to distinct event types. Nevertheless, using the event study methodology imposes certain limitations as value creation is defined as an abnormal return to shareholders. Consequently, the share price and its development serve as a proxy to determine value creation or destruction. As listed firms are affected by a countless number of factors, the effect of individual events is attempted to be isolated by using an appropriate event window. This limits the observed abnormal returns to a short period and any long term effects are not accounted for. Consequently, the right theoretical foundation needs to be laid and it is drawn upon the construct of an efficient market, which helps to justify the usage of such an approach.

Furthermore, it is noteworthy to mention that certain characteristics are emphasized when identifying factors which further explain the negative impact of low interest rates on value creation. This means, not all possible variables are analysed, partly because not all variables can be modelled objectively, and partly because the amount of accessible information is not the same in terms of richness for each observation. Hence, this thesis does not claim to be

exhaustive when speaking of variables affecting value creation in a low interest rate environment.

This thesis is enhancing current research by taking interest rates as an influencing factor for value creation. At the same time, the intention is to use a sample with a large number of observations while keeping it as homogeneous as possible. Therefore, one major geographical region, the European Union (EU), which is heavily dependent on the monetary policy of one institution, is selected. Transactions from companies that are headquartered in countries where the European Central Bank (ECB) is a major influencer of monetary policy are used to test the before mentioned research questions. This trade-off between creating a homogenous sample and creating a large enough sample has been carefully reflected upon.

1.3 Structure

In the following section, a structural outline of the thesis is given in order to facilitate the reading and comprehension of the thesis.

Chapter 2 is dedicated to explaining the economic setting in which the analysed transactions were executed and the low interest rate environment is characterized. In addition, the reference time period characterized by a normal interest rate environment is shortly elaborated upon.

The following chapter 3 is devoted to lay a theoretical fundament and to explain the rationale for each hypothesis. Here, the combination of the macroeconomic environment and a variety of strategic and financial characteristics is identified to discuss the impact on value creation and destruction through M&A activity.

In continuation, chapter 4 serves as a review of past work in the field of value creation through M&A by identifying relevant literature and combining it with the expected results. This gives a suggestion of how the characteristics will affect value creation in the subsequent chapters.

Furthermore, chapter 5 is going into detail about the selected empirical methodology. The event study methodology is critically analysed and employed with prior justified specifications.

Additionally, a discussion illuminates the examined variables and assumptions. The chapter is also giving insights on how the data was generated and why certain adjustments were made.

In chapter 6, the actual results of the empirical study are presented. Each hypothesis is tested and comparisons between transactions during a low and high interest rate environment are made.

Chapter 7 discusses the results of the statistical testing and how the low interest rate environment is distinguishable from a value creation perspective through M&A.

Concluding, chapter 8 summarizes the findings and identifies the most relevant managerial implications in combination with further research topics.

2 Monetary policy and economic environment

2.1 Economic environment in the sample period (2009-2015)

Between 2009 and 2015 quite a unique economic environment can be identified as the stock market was booming while the interest rate level set by central banks was low. Under normal circumstances interest rates are slowly raised or kept at a higher level during times of a booming economy as observed in the reference period 2003-2007.

In detail, the period between 2009 and 2015 can be seen as a post crisis period to the period of 2008-2009, where a bear market was present and the major global economies were in a downturn. Since then, the stock market has developed very positively in the EU, which is the focal region in this thesis. A broad index is considered to get an understanding of how the stock prices developed in the period of interest. As a proxy for the development of the EU's stock markets, the FTSEurofirst 300 is drawn upon, which measures the performance of Europe's largest 300 companies by market capitalization and covers 70% of Europe's total market capitalization. The value of the FTSEurofirst 300 increased by 113% over the sample period and can therefore be described as a booming stock market (see figure 1).

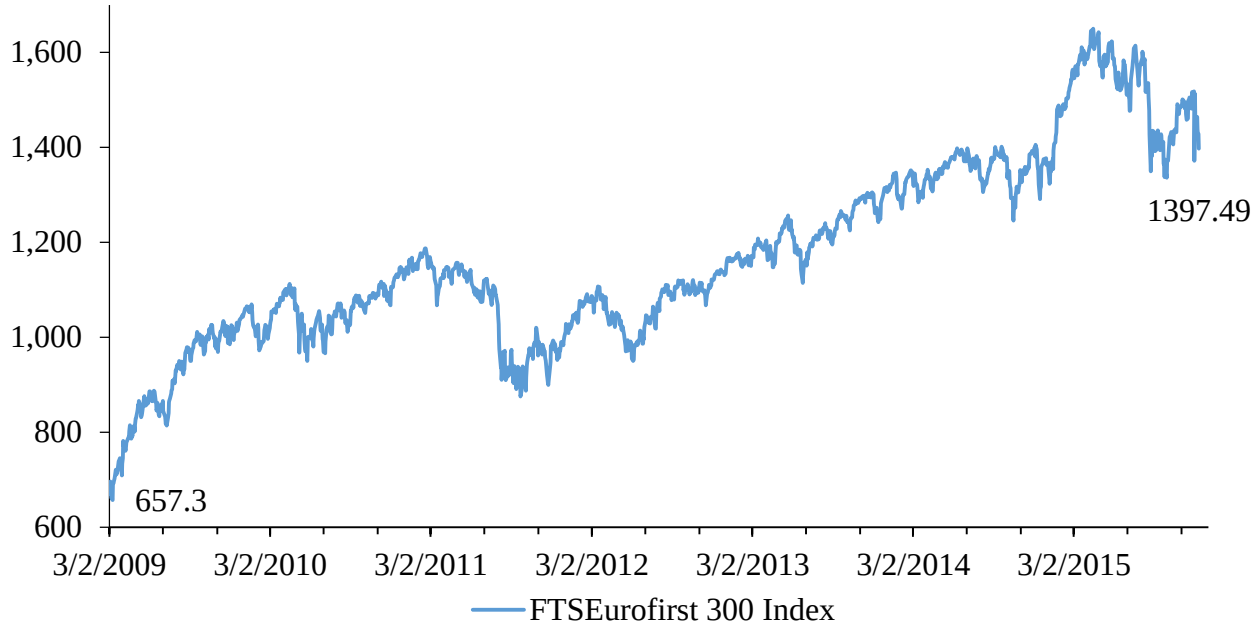

Figure 1: Index price development of FTSEurofirst 300 from Mar 2009 - Dec 2016; Source: Yahoo Finance

The crucial point of this thesis is the assumption that the interest rate level has an effect on value creation through M&A. Therefore, the interest rate environment and the central institution which controls it need to be introduced.

The ECB is the central bank of all countries which have adopted the euro (€). The ECB is responsible for the monetary policy in the euro region and aims at maintaining price stability. One of the key responsibilities and tools of the ECB is to steer interest rates and for the purpose of this thesis the main refinancing operation (MRO) interest rate is briefly explained. The ECB sets a target interest rate for the MRO in its efforts to influence short-term interest rates as part of its monetary policy strategy. The main refinancing rate is the rate for regular open market operations and provides the banking system with the amount of liquidity that the ECB deems to be suitable.

When referencing to the European interest rate, most of the times it is referred to the ECB refinance rate which equals the MRO. The level of this rate is basically the price that financial institutions, like banks, pay to get liquidity from the ECB. This rate heavily influences banks when they set an interest rate to lend money. Therefore, the ECB can influence interest rates,

which apply to different types of loans and interbank transactions by raising or lowering the rates.

The MRO is displayed in figure 2 and the rates, as displayed, are historically low with the MRO declining to a near 0% level by the end of the sample period. Originally, the ECB set such low interest rates to further spur economic growth after the Great Recession of 2008. Even though economies and stock markets recovered, the ECB did not raise the MRO back up. The ECB has even decreased the rate over the observation period to a level of 0.05%.

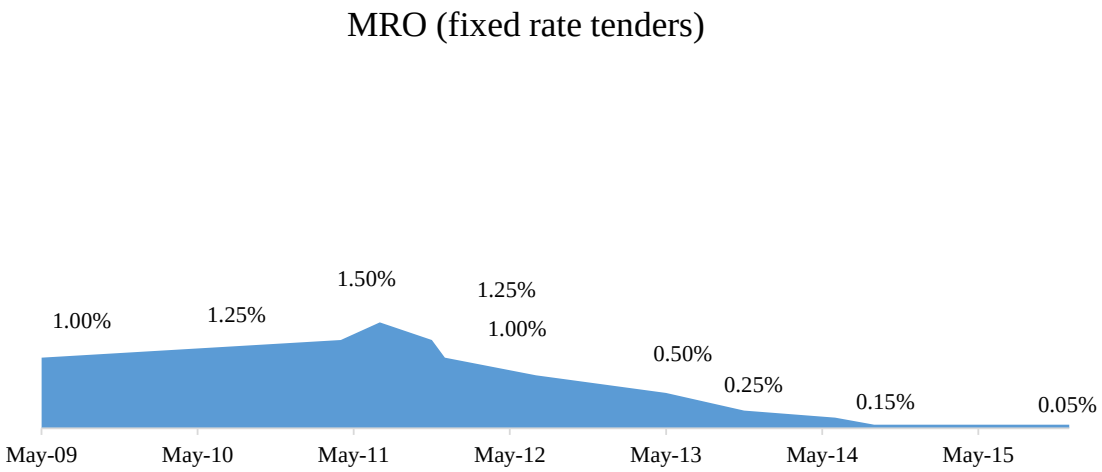

Figure 2: ECB main refinancing operations 2009-2015

2.2 Brief outline of the reference period (2003-2007)

As briefly mentioned in the previous chapter, the period between 2003 and 2007 is also distinct by its positive stock market performance. Here, the reference index for the EU has increased by 96% (see figure 3). As this thesis aims to create a better understanding of how the interest rate environment effects value creation through M&A, it is of crucial importance to choose a reference period which is similar in the overall economic setting. In the reference period of 2003-2007 the market also started to recover from a crisis. In addition, the monetary union was recently introduced and the actual euro as a currency was introduced in 2002. Due to a similar economic context, the two periods allow a comparison and the potential effect of the interest rate environment can be analysed on an isolated basis.

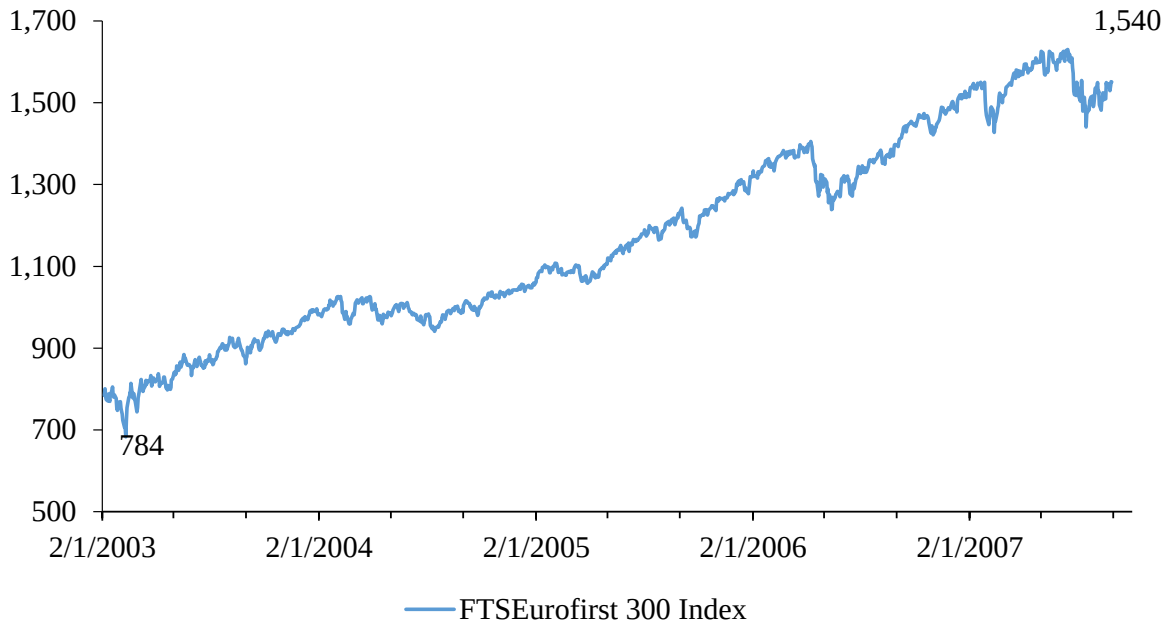

Figure 3: Index price development of FTSEurofirst 300 from Feb 2003 - Sep 200; Source: Yahoo Finance

As mentioned earlier, the leading interest rate indicator for the reference period of 2003-2007 has been in line with previous economic cycles, where central banks slowly raise rates as the stock market recovers and valuations rise. This is shown in figure 4, where the interest rates from March 2003 until April 2007 have been raised by more than 2 percentage points to a final level of 2.75%.

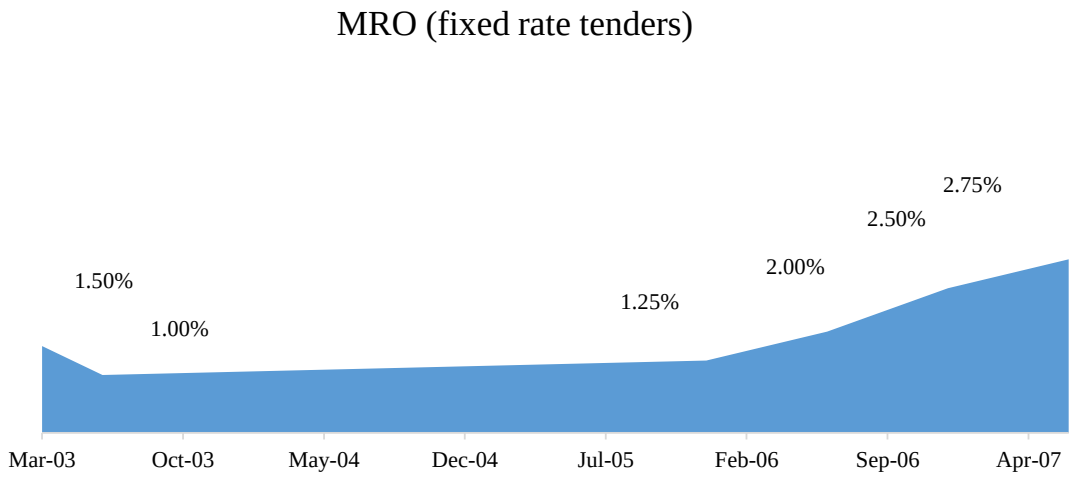

Figure 4: ECB main refinancing operations 2003-2007; Source: European Central Bank

2.3 M&A activity in the time periods

After the financial crisis of 2008-2010, the M&A market came back to live and deals increased significantly, both in terms of value and volume. In Europe, deal value went up continuously with a large spike in the last quarter of 2015. 2015 reached a value of about €950bn, which is high in comparison to 2009, where M&A transactions with a value of roughly €350bn were executed (Figure 5). The development in terms of volume increased over the time period as well, even though the value increase was more drastic.

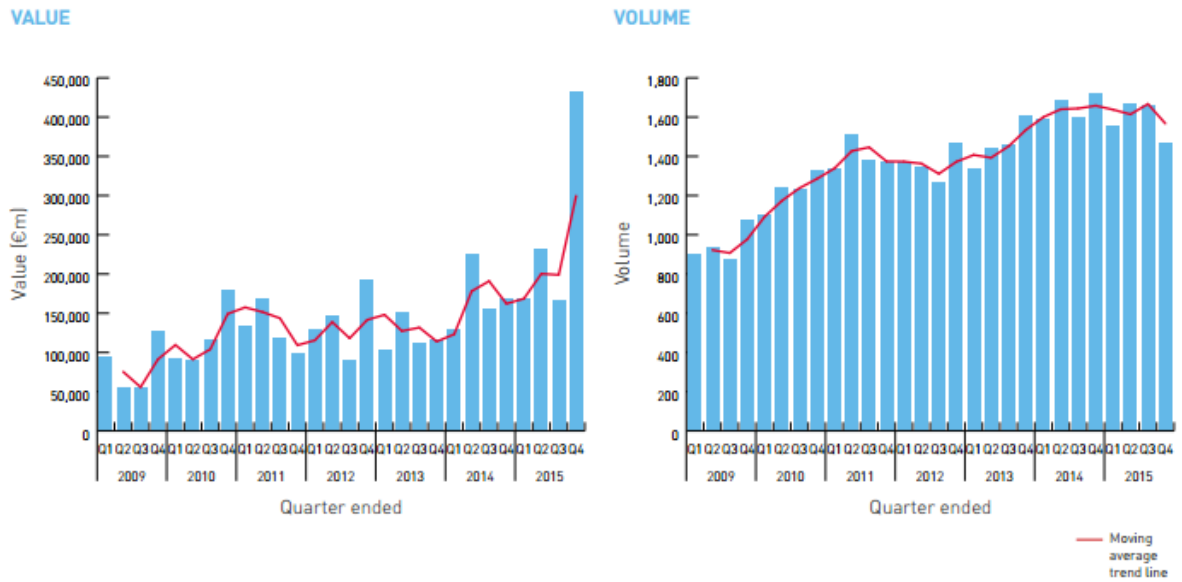

Figure 5: European M&A activity; Source: Mergermarket (2015); Note: Based on announced deals, excluding those that lapsed or were withdrawn

As a brief comparison, the development on a global level between 2003 and 2007 has been similar and both M&A markets have developed in such a way post-recession, which further supports the comparability of the two periods (see figure 6).

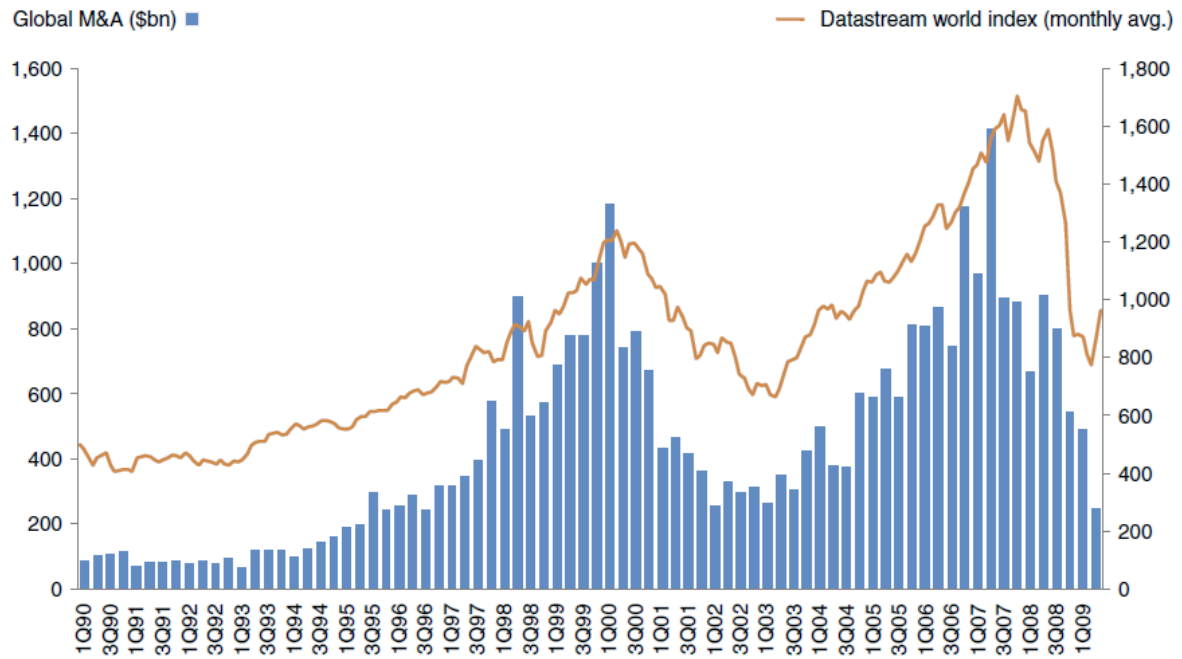

Figure 6: Global M&A Activity 1990-2009; Source: Thomson Reuters; The era of globalized M&A, J.P. Morgan; 2009

3 Theoretical framework

3.1 Rationale for mergers & acquisitions

3.1.1 The ambiguity of mergers & acquisitions

Companies repeatedly rely on M&A in order to execute upon their strategic goals and to rejuvenate their operations. Therefore, the acquiring company is intentionally acquiring or merging with another company. A variety of reasons exist why firms do so, e.g. diversify into new and promising business segments, increase market share, or pre-empt competition and create synergies. However, whether the acquisition is truly for the better of the acquiring company is disputable. Even though acquiring another company takes place intentionally, research has proven that it does not necessarily create value (Bruner, 2002). Acquiring other companies is often times connected to the deployment of a high amount of resources and leads to high public awareness. All stakeholders of the participating companies are in some way affected by M&A. Hence, researching that topic is of high relevance and the potential reasons for value destruction through M&A are important to discuss and identify.

3.1.2 The intricacies of value accretion versus destruction

Along with the intention of acquiring another company or merging with another company, a press release is usually published, representing the announcement date of the acquisition. In order to evaluate the impact of transactions, share prices around the announcement date are analysed. By doing this, it is possible to measure abnormal returns. With the aim of setting a common ground on how the impact of M&A is assessed, the efficient market hypothesis (EMH) has to be introduced briefly (Malkiel & Fama, 1970). In 1970, a paper was published discussing the efficiency of markets and defining three different forms of market efficiency. In the context of this thesis the semi-strong efficient market hypothesis is applied. The semi-strong-form of efficiency infers that all public information is calculated into a stock's current share price. Meaning that neither fundamental nor technical analysis can be used to achieve superior stock returns. The applied measure of value destruction and creation is the difference between the share's return and an appropriate comparable return on the same day. In case of a negative difference, the abnormal return is negative and the transaction is characterized as value destructive and, vice versa, the indication is inverted if the abnormal return is positive.

Despite the question whether an acquisition has a positive or negative impact, it is of clear interest what the drivers behind value creation or destruction are. Therefore, the acquirers and targets are analysed in more detail and certain characteristics are highlighted. Additionally, the mode of transaction is taken into consideration when clustering and comprehending transactions. This serves to understand the intricacies of value accretion versus destruction.

3.2 Deal characteristics

As briefly outlined before, concrete insights about why transactions create value or not can be generated when identifying the determinants which affect the underlying transaction's impact on value accretion and destruction. Numerous scholars have done research in that field and identified various characteristics which may impact transactions. A paper from 2004 has compiled the most common characteristics and in combination with other research it is possible to identify the most important characteristics (Bruner, 2004). The research discloses that factors like synergy realization, the motives of management and the execution of strategies like geographic expansion play a crucial role and affect the impact of transactions. Furthermore,

researchers claim that financial characteristics, like the method of payment (Wansley, Lane, & Yang, 1983) and the liquidity of the target are of high importance when determining whether a transaction creates value or not (Amit, Livnat, & Zarowin, 1989). Other researches are keener to learn about the impact of strategic motives and characteristics. The main characteristics researched are whether a company acquires a company in the same industry or diversifies its business (Healy, Palepu, & Ruback, 1997), or whether the intention is to achieve other strategic goals like the increase of market share (Ghosh, 2004). In total, there are multiple other characteristics impacting M&A transactions and the most important ones are considered in this thesis.

The focus is set on the effect of a low interest rate environment in combination with other prevalent characteristics. A selection of characteristics, which in theory should reinforce, or emasculate the effect of the economic environment on value creation through M&A is analysed. In particular, this is based on the assumption that the relative importance of selected characteristics is different in a low and normal interest rate environment and therefore, infers different value destruction potential. The individual characteristics can be clustered into strategic and financial characteristics. In other words, one set of characteristics elaborates upon why the acquirer engaged in the transaction and the other set considers how the acquirer executed the deal.

All hypotheses emerge from one of the two clusters and are tested accordingly. However, this thesis is not only proving whether there is value destruction during times of low interest rates, but also whether there is a difference to times of normal interest rates. Consequently, each hypothesis is tested to answer two different sub questions.

1) The first test examines whether abnormal returns are negative or positive during the low interest rate environment. Each individual characteristic is tested against all other transactions from the sample, which do not possess the chosen characteristic. Thereby, the hypothesis whether one characteristic leads to lower or higher abnormal returns than the rest of the sample during the low interest rate environment is tested.
2) In the second sub question of each hypothesis the characteristic is tested by comparing abnormal returns of transactions during the low interest rate environment versus

comparable transactions' abnormal returns during the normal interest rate environment. Despite the different interest rate environment, the economic environment is similar as both time periods experience booming stock markets. Here, the hypothesis whether one characteristic leads to lower or higher abnormal returns during a low interest or normal interest rate environment is tested.

In the following, the main financial and strategic characteristics are explained in more detail to set a common foundation before testing them statistically.

3.2.1 Financial characteristics

Federal banks can strongly affect the availability of financing through monetary policy and therefore, they are able to trigger increased spending through lowering interest rates. This is highly interesting as acquisitions often times require significant funding. Consequently, it is expected that the effect of financial characteristics, in combination with low interest rates, on the ability of M&A to create or destroy value can be proven through this work. To answer such question, the methods of financing are analysed.

Financing method: The prominent theory, which explains the underlying rationale for how a financing method can impact M&A, is the pecking order theory. The theory suggests that a company should finance its assets and endeavours firstly by cash, then debt and lastly stocks (Myers & Majluf, 1984). On the contrary, the free cash flow theory suggests that an organization should ideally keep as little cash as possible on their balance sheet, due to the risk of using it for value destructive activities (Jensen, 1986).

3.2.1.1 Pecking order theory

Two classical theories are highly relevant when referring to financing decisions of firms and they can be used to explain how the way of financing affects value creation through M&A. The pecking order of financing suggests that a company should use a certain order for how to finance their projects and endeavours. The principles of the theory are based on asymmetric information between the company's shareholders and the management running the firm. This asymmetry fosters moral hazard and leads to shareholders requiring a higher rate of return to

compensate for the resulting costs (Altunbaş, Kara, & Marqués-Ibáñez, 2010). Based on that theory, equity implies the strongest form of information asymmetry and highest costs. Therefore, it should be used as a financing of last resort. In contrast, internal funds are deemed to be the cheapest financing method and should therefore be used first. Financing through debt is placed between cash and equity financing and dependent on the structure of the debt.

These types of financing do also send different types of signals to the market. In particular, it gives insights about how the company's management is valuing the company it runs (Myers & Majluf, 1984). Companies that raise new equity in order to finance acquisitions send the signal to the market that their stock is overvalued and raise the suspicion that the company's stock price will lower in the future. Echoing this logic, the acquirer can also pay the target's shareholders with equity of the newly formed entity leading to similar implications about the acquisition. In both cases, the acquirer is sharing the risk of an overvalued transaction with either the target's shareholders, or investors on capital markets. It is assumed that the management would choose to pay with a different form if they consider the company to increase in value after the acquisition. Therefore, it is expected that announcements of acquisitions financed by equity cause negative stock market reactions (Travlos, 1987).

In contrast to equity financing, acquisitions by means of internal funding send a positive signal to investors. The reversed argumentation as for equity funding is used and the implication of an acquisition financed by cash is that the stock is undervalued. Respectively, the assurance of the acquirer's management team to have assessed the price of the target carefully is given, leading to a reduced risk of overvaluation and overpayment. In general, it can be argued that the market interprets a cash acquisition as good news and therefore, expectations of positive abnormal returns can be set. Debt is positioned between financing through cash and equity, being similarly interpreted as cash financing in terms of undervaluation of the acquirer's equity only with slightly higher costs. However, it also creates an interest tax shield to the acquiring company. Combining these effects, debt can be seen as the second best option to financing an acquisition (Emery & Switzer, 1999).

The flotation cost argument adds further support to the argument that cash and debt financing lead to higher abnormal returns than equity financing. The rational is founded on the fact that

issuing new shares creates additional costs for external services like investment banks (book building etc.) and is inefficient for small issues as equity financing reacts largely to scale (Bhagat & Frost, 1986). Similarly, debt issuing leads to some costs, even though the cost is lower than for equity issues (Blackwell & Kidwell, 1988).

A comprehensive study about payment choices in European transactions found that 80% of all transactions were financed with cash or debt, while only 14% were financed by equity (Faccio & Masulis, 2005). When looking at booming stock markets in isolation, it is likely that more acquisitions will be financed with equity as company valuations are higher and the use of equity as a means of payment is facilitated (Elliott, Koëter-Kant, & Warr, 2008). However, in this thesis two booming stock market periods will be compared, where the main difference boils down to the interest rates. Therefore, it can be argued that during times of low interest rates fewer transactions will be financed through equity, even though valuations are high. At the same time, it can be derived that the signalling effect of an internally funded acquisition decreases during times of low interest rates as financing in general is easier to be acquired. In comparison, an equity issue is comparably more expensive than during times of high interest rates.

At large, equity financed acquisitions during times of low interest rates are expected to create the lowest abnormal returns and contrarily cash the highest. When comparing the two time periods and isolating the difference in interest rates, the following expectations are set. Equity financed acquisitions are assumed to be more value destructive during times of low interest rates as the alternative financing methods are cheaper and therefore, the signalling effect of a potentially overvalued stock is even higher. Similarly, debt financing is expected to create lower abnormal returns during times of low interest rates due to lower costs of access. In order to make an assumption about the impact of a low interest rate environment on cash financing, the free cash flow theory is drawn upon (Jensen, 1986).

3.2.1.2 Free cash flow theory

According to the theory of free cash flows, organizations which hold a lot of cash on their balance sheet tend to engage in agency motivated activities. Following this rationale, acquisitions financed by cash should lead to lower returns than other financing methods, which

is in direct opposition to the theories elaborated upon earlier. However, the argument which is build up through the free cash flow theory relates to the difference between the low and normal interest rate regime. It is assumed that management will realize lower abnormal returns with cash on their balance sheet during low interest rates in comparison to high interest rates. Cash is therefore seen as undesirable and Jensen (1988) argues that paying out dividends or repurchasing stock creates higher value than using the cash through management. Exemplary, empire building and other forms of maximizing management's own wealth, like unnecessary perquisites are mentioned (Brealey, Myers, Allen, & Mohanty, 2012). During times of low interest rates, there are less investment alternatives and the return investors can achieve on the market are typically lower as well. Additionally, investors are less likely to engage in monitoring to assure high returns (Caldwell, 2008; Svare, 2009). Combining these factors leads to the hypothesis that lower abnormal returns are generated when comparing cash transactions under the low interest rate environment with those (executed) during the normal interest rate environment.

3.2.2 Strategic characteristics

The strategic characteristics, which are investigated in this thesis are agency costs, synergy exploitation, and size. The effect of these characteristics is hypothesized to have moved as a result of the low interest rate environment.

Agency costs and synergy potential: One of the major reasons for acquiring other firms in practice and in literature is the hunt for synergies. Another key reason is an assumed misalignment between the managers and the shareholders of the firm (Berkovitch & Narayanan, 1993; Firth, 1980). On the one hand, firms often times integrate other firms vertically or horizontally with the objective of realizing synergies in terms of overall reduced costs or increased revenue potential. On the other hand, the executive committee may engage in acquisitions which represent a diversification and theoretically harm the shareholders as executives follow their own interests.

Size: The impact of a transaction on the acquirer's inherent business is affected by the size of the transaction. It is arguable that large transactions in general terms and in relative terms have a higher chance of changing the fundamentals of a company. Some research shows that such

riskier transformational transactions do not have the same positive value creation potential as small acquisitions (Fich, Nguyen, & Officer, 2015). This can be connected to a potential overconfidence of management in combination with hubris and agency theory.

3.2.2.1 Synergy exploitation

When talking about synergy exploitation, it can be distinguished between two different types of acquisitions which are expected to create synergies, namely horizontal and vertical integrations. In terms of horizontal integrations, synergies can be realized from cost savings through economies of scale and excess capacity utilization in factors like managerial and financial control. In addition, economies of scope can further lead to cost synergies. Vertical integrations on the other side allow cost savings from the integration of the value chain and therefore increased control over the supply chain and more precise coordination in the control of operations. Countless other synergies like improved access to new markets and decreased costs in administrative functions can be realized. Overall, synergy exploitation is the primary motive in terms of acquisitions in related businesses (Berkovitch & Narayanan, 1993). In general, related acquisitions are expected to outperform unrelated acquisitions and therefore create comparably higher abnormal returns.

In relation to the potential of realizing synergies it is argued that the low interest rate environment has an impact on the possibility of creating value through the exploitation of synergies. In a working paper, Goel and Thakor (2005) suggest that corporate acquisitions, which are undertaken during a bear market, create higher synergies as they are focused on efficiency optimization. They claim that synergies are more easily realizable due to the fact that companies are shifting from a focus on growth and expansion during bull markets to a focus on efficiency optimization, as well as to overthinking their own business strategy and optimization (Rhodes & Stelter, 2009). Therefore, revising this statement can lead to the hypothesis that related acquisitions of vertical and horizontal nature will not set their focus on the intrinsic value of combining two companies' assets. Contrarily, it is argued that companies emphasize on executing a potentially risky strategy as barriers to do so are less present during times of low interest rates. Therefore, synergy potential might be overestimated as the general outlook of a booming market leads to overconfidence. Coupling this with easy access to capital and bad alternatives to invest, companies might engage in related acquisitions, which do not

fulfil what they are deemed to do. The underlying anticipation is that synergy motivated acquisitions during times of low interest rates and a booming stock market lead to lower abnormal returns in comparison to those at times of normal interest rates and a booming stock market.

3.2.2.2 Agency problems

A common theory to analyse problems in the field of business administration and economics is the agency theory (Jensen & Meckling, 1976). This prominent theory can be linked to the management of a company who represents the agent and potentially his own self-interested agenda. The actual shareholders of a company can be seen as the principal who has a hard time enforcing his own interests. This friction can lead to a variety of agency problems like overinvestment, entrenchment, excess expenditure and empire building (Chen, Lu, & Sougiannis, 2008).

These drivers can lead to acquisitions that are not in line with shareholders' interests and do not necessarily create shareholder value, but rather destroy it. The underlying information asymmetry which allows such behaviour rests in the fact that internal managers possess more information and can misuse that to promote their own interests. Hence, acquisitions which are traceable to the agency motive are expected to lead to negative total gains (Berkovitch & Narayanan, 1993).

In order to identify agency motivated acquisitions, the degree of relatedness of the acquirer's and the target's business is measured. As soon as the company is diversifying it is interpreted as an acquisition afflicted with the agency problem. The managers effectively diversify the companies' risks, and thereby their own risks while following a self-interested agenda. In contrast, this risk reduction is no advantage to the companies' shareholders as they prefer diversifying their own portfolios themselves. This behaviour can be considered as managers' perquisites and clearly an agency problem (Amihud & Lev, 1981). In modern portfolio theory, diversification is achieved by each investors' own investment decision and not by a portfolio company's diversification strategy (Markowitz, 1952).

In order to connect the agency problem and unrelated acquisitions to the economic environment of low interest rates and differentiate it from a normal interest rate environment, some further assumptions and observations have to be introduced. Taking the same argument as for synergy seeking acquisitions, the opportunity costs for unrelated acquisitions are lower during times of low interest rates and therefore easier to execute. Additionally, during times of crises, shareholders tend to increase the monitoring of management (Caldwell, 2008; Svare, 2009). Here, it is assumed vice versa, that in booming stock markets and little investment alternatives, the shareholders might not be as active in monitoring the management. This in turn, facilitates behaviour which is not in favour of the company's shareholders. Therefore, the hypothesis claims that unrelated acquisitions have a higher potential to destroy value in the low interest rate data set than in the normal interest rate one.

3.2.2.3 Transformative acquisitions

Companies engage in different kinds of acquisitions, related and unrelated, or transformative acquisitions. In this context, a company that acquires another player which is large in general or in relation to its own size is considered to be changing the fundamentals of the acquiring firms' competitive position. For example, a company could acquire a large competitor and therefore transform into one of the largest players in the industry (merger of equals), or it is acquiring a large company which is active in a different field. The latter type of transaction is classified as a large diversifying acquisition, which changes the fundamentals of the business strongly and therefore the intrinsic value of the firm (Fich et al., 2015). Multiple researchers have investigated how size affects acquisitions (Harford, Humphery-Jenner, & Powell, 2012; Seth, 1990).

As a result, large acquisitions tend to have a strong impact on the acquirer's business and therefore multiply the effect of an acquisition. Following the argumentation above, such acquisitions are more easily financed as the cost of getting capital is lower and the alternative investment options are scarce. However, if it is easier to perform such acquisitions due to a lower hurdle, it is argued that the likelihood of value destruction to the acquiring company's shareholders is increased. In addition, transformative acquisitions can be connected to CEO overconfidence and empire building which can equally be connected to agency costs (see chapter 3.2.1.2). As the market is also in an upswing in the observation period, management

hubris is fostered and CEOs may be exaggeratedly optimistic in evaluating synergies and other benefits from an acquisition. A variety of studies identified a correlation between share prices, the tendency to perform M&A and the returns to acquirers' shareholders. The correlation between bull markets and M&A activity is claimed to be positive, while the correlation with returns tends to be negative (Jovanovic & Rousseau, 2001; Moeller, Schlingemann, & Stulz, 2005; Rhodes-Kropf & Viswanathan, 2004). To sum it up, large acquisitions both in relative and absolute terms are expected to perform worse than small transactions. This is claimed to hold for both research questions, meaning large acquisitions perform worse than other transactions in the same low interest rate environment and worse than other similarly large acquisitions in the normal interest rate environment.

3.3 Overview of hypotheses

In total, 13 different hypotheses are tested and an overview is shown in table A before reviewing past literature in the subsequent chapter.

Main research question

H_1	M&A during times of low interest rates lead to lower abnormal returns in comparison to M&A during times of normal interest rates

Sub research questions

	Deal characteristic	Impact on shareholder value	Relative to normal interest rate regime
H_2	M&A financed through cash	Higher returns	Lower returns
H_3	M&A financed through equity	Lower returns	Lower returns
H_4	M&A focused on synergy exploitation	Higher returns	Lower returns
H_5	M&A focused on diversification	Lower returns	Lower returns
H_6	Relative large acquisitions	Lower returns	Lower returns

H_7	Absolute large acquisitions	Lower returns	Lower returns

Table A: Overview of hypotheses

4 Literature review

The hypotheses outlined above represent a large amount of classical characteristics which were tested over the last few decades combined with a focus on a novel economic environment. This section serves as a compilation of prior research in the field which in parts have an overlap with this study. In particular, all characteristics that are studied in this thesis are considered and previous results are shortly demonstrated.

When reading studies and reports about the topic of value creation through M&A, the first striking piece of information readers stumble upon is the fact that there is a large controversy. Scholars seem to not agree whether the intentional action of purchasing another company creates value. This in fact creates the need for digging deeper into the material and identifying potential reasons why some transactions do create value and others do not.

4.1 Shareholder value impact of M&A

A large amount of research, which studies the impact of M&A on abnormal returns to shareholders, proves that M&A is value accretive, but a similarly large number proves the opposite. Conversely, the results change significantly when looking at the shareholders of both, the target and the acquirer individually. This is partly due to the fact that the target is often times much smaller than the acquirer. Hence, even if the target's shareholders receive higher abnormal returns in percentage due to synergy and control premiums, the impact on abnormal returns in absolute terms is negligible (Bruner, 2002). Bruner (2002) published one of the most comprehensive reviews with a scope of 114 studies and comes to the conclusion that M&A is not value destructive – however, a large dispersion around a zero return is observed. Noteworthy to mention, M&A itself does not necessarily create shareholder value but does not destroy it either. Therefore, execution of M&A should not be banned from the list of possible corporate actions simply due to the expectation of a zero return.

A variety of studies prove statistically that shareholders of the target company are the ones truly benefitting from M&A transactions (Beitel, Schiereck, & Wahrenburg, 2004; Campa & Hernando, 2004; Capron & Pistre, 2002; Jensen, 1988; Jensen & Ruback, 1983; Kaplan & Weisbach, 1992; Walker, 2000). A prime example of such a study is one by Campa and Hernando (2004), which analysed the announcements of transactions in the European Union and its abnormal returns to the target firms' shareholders. The study was able to conclude that the cumulative abnormal return to the target firms' shareholder amounts to 9% in a one-month window around the announcement date. In contrast, the acquirers' shareholders' cumulative abnormal returns were zero on average.

Considering literature, which investigates the value effect of M&A to the shareholders of the acquiring firm, most results prove either a negative abnormal return or an abnormal return around zero. However, many of these studies do not lead to significant results. An exemplary study led to a negative abnormal return of 0.7% for the acquiring companies' shareholders (Andrade, Mitchell, & Stafford, 2001). There are numerous other studies which lead to similar results, varying between a slight negative abnormal return and zero (Akdogu, 2003; Berry, 2000; Higson & Elliott, 1998; Holl & Kyriazis, 1997; Kennedy & Limmack, 1996; Limmack, 1991; Sudarsanam & Mahate, 2003; Walker, 2000). Not surprisingly, there are also studies reporting positive returns to the acquiring companies' shareholder; e.g. in high-tech mergers (Kohers & Kohers, 2000) or general M&A (Leeth & Borg, 2000).

4.2 Context specifics affecting value creation through M&A

Due to the fact that the field of M&A is highly relevant from a practical perspective and studies yield differing results, many researchers analysed what factors are relevant when categorizing transactions into value creating and destructing. To do so, subjects such as cross-border versus domestic transactions, the method of payment, industry relatedness of target and acquirer, and others have been analysed in detail. In relation to the factors analysed in this scope a short review of relevant studies is given.

Limited researchers studied the impact of different economic environments in combination with M&A transactions and linked it to the potential of value creation. In this thesis, the contextual background is the main focus and will therefore be incorporated in the event study

and analysed. In particular, interest rates are considered during times of a booming stock market.

Previous studies investigated how crises impact M&A transactions. As an example the stock market crash in 1987 has been studied and whether US acquirers gain abnormal returns in comparison to before the crash. It was found that transactions after the crash realised positive gains with a lower likelihood, which is mainly attributable to the increase of acquisitions based on agency motives (Gondhalekar & Bhagwat, 2003).

Other studies researched how the economic environment in a particular region is affecting M&A activity but without the actual linkage to value creation (Sedláček, Křížová, & Hýblová, 2014). Recently, scholars investigated whether M&A in the banking sector were different due to the economic environment during the crisis and analysed the time between 2007 and 2010. In the study covering Europe, on an aggregate level, it was not possible to identify positive abnormal returns around the announcement day. In contrast, positive abnormal returns were observed after the completion day, which can be explained by acquirers' characteristics (Beltratti & Paladino, 2013). In a comparable global study, it was shown that emerging market acquirers create value when acquiring developed market targets (Rao-Nicholson & Salaber, 2015).

Nevertheless, the exact research topic of this thesis has not been studied, potentially related to the fact that the constantly low interest rate environment is unique and has not existed in combination with a booming stock market before.

4.3 Deal characteristics affecting value creation through M&A

One of the major factors which is supposed to affect the potential of value creation through M&A are agency problems. Various scholars were able to confirm the hypotheses that companies engaging in M&A due to misaligned interests of the management and the shareholders destroy value. Here, scholars have isolated companies, which engage in diversifying actions and measured the abnormal returns around the announcement date (Kaplan & Weisbach, 1992; Morck, Shleifer, & Vishny, 1990; Sicherman & Pettway, 1987). In contrast,

synergies are the primary motive in takeovers with positive total gains, which has equally received a lot of attention from scholars (Berkovitch & Narayanan, 1993).

A company characteristic which is easily measurable and also connected to the potential of value creation is the size of the acquisition. Fich et al. (2015) found that companies which are relatively small in comparison to the acquirer's size lead to a value adding effect of M&A transactions. In detail, their results support the hypothesis that large gain M&A deals are small relative to the acquirer, in comparison to large transformative deals or mergers of equals.

In addition to the strategic motive, transactions are commonly analysed based on the chosen financing method to investigate the relationship between abnormal returns and specific transactions. Here, the results are quite consistent and signal a higher abnormal return for cash and debt financed acquisitions in comparison to stock financed acquisitions (Abhyankar, Ho, & Zhao, 2005; Andrade et al., 2001; Bellamy & Lewin, 1992; Loughran & Vijh, 1997; Moeller, Schlingemann, & Stulz, 2004; Myers & Majluf, 1984; Rau & Vermaelen, 1998).

4.4 Implications of the literature review

As briefly outlined, there is a large variety of different studies that investigate the value creation / destruction of M&A. Nevertheless, the focus of this review was set on literature, which gives an indication of what this thesis' results will be impacted by. At the same time, it is apparent that there is no clear answer under what circumstances M&A creates value to the acquiring firms' shareholder. This field has been interesting to scholars for decades and therefore, the literature and background covered comes from very different time periods. Similarly, the methodology applied in the assorted literature has been relying on the event study methodology which has not changed much since the 1980's.

Concerning the focal point of this thesis, the low interest rate environment and its effects on value creation through M&A, no relevant studies have been identified. However, this is a logical result of the fact that the topic is very recent and the samples need a certain amount of size in order for it to be useful. In addition, the next years will probably yield multiple of such studies with different focuses and this thesis represents a first step at analysing the special economic environment.

5 Methodology

As described briefly in chapter three, the semi-strong-form of market efficiency is hypothesised to be true and is built upon in order to test the research questions empirically. In order to do so, an event study is executed to measure and determine the impact of transactions on securities' prices, and thereby the abnormal returns.

5.1 Event study methodology

The event study methodology serves as the best option to empirically research this thesis' hypotheses given the large number and type of observations. An event study allows to track the changes of a publicly traded asset's price in combination with an event such as stock splits, earnings announcements, regulatory changes, corporate restructurings or in this case mergers or acquisitions (Brown & Warner, 1980; King, Dalton, Daily, & Covin, 2004; MacKinlay, 1997).

The reason for choosing this methodology in such a context is based on a couple of advantages. Namely, a large sample of companies can be evaluated and the potential for value creation is identifiable across time periods from different acquisitions. Value creation from each transaction can be isolated as the market is assumed to be efficient. The method is easy to apply and can be adapted flexibly to the type of event. Naturally, there are other methods which can be used to test the creation of value other than stocks' price development. Methods like a classical cash flow calculation could be considered, however this would clearly restrict the analysis to smaller sample sizes. The availability of trustworthy information about cash flows and accounting methods creates further limitations. Based on this rationale, this thesis is using an event study methodology in order to answer the research questions.

The setup of an event study goes through a variety of steps, which can differ slightly but is fairly standardized. This thesis follows the main steps, which are (1) defining the event, (2) estimating normal returns, (3) cumulating abnormal returns and lastly (4) testing the hypotheses statistically (Bowman, 1983; Wells, 2004).

5.1.1 Defining the event

In order to isolate the effect of an event, the proper event day needs to be defined. This thesis follows the same approach as most researchers with the definition of the announcement day as t_0 (Ebneth & Theuvsen, 2007). Others define the completion day of the acquisition as the event day (Weston & Halpern, 1983). However, as the market is believed to be efficient, this thesis uses the announcement day as a proxy for when the market reacts to an acquisition. A company's share price should reflect information such as an acquisition announcement the moment it is publicly disclosed. Nevertheless, it needs to be accounted for the fact that information can spread prior to the public disclosure and therefore, an event window is defined. That way, some of the insider trading and the spreading of rumours is incorporated into the measurement of value creation. Besides that, the information can also take some time to be fully digested by the market, as acquisition announcements can come as a shock or surprise and the actual consequences are not that obvious. These aforementioned circumstances are taken into account by using an event window around the announcement date when evaluating the effect of value creation (Wells, 2004). The event window is clustered around the announcement day with a specific time difference, e.g. $t_{-15} = t_0 + 15$ to $t_{15} = t_0 + 15$ days (see figure 7). In the example the event window consists of 31 days, the event day plus 15 days before and after the event day. In this thesis, a number of event windows are employed, namely [-15;15], [-10;10], [-5;5], [-3;3], and [-1;1]. By adding these event windows to the analysis, any rumours or trades based on insider information, as well as delayed responses within that time window of the market are covered.

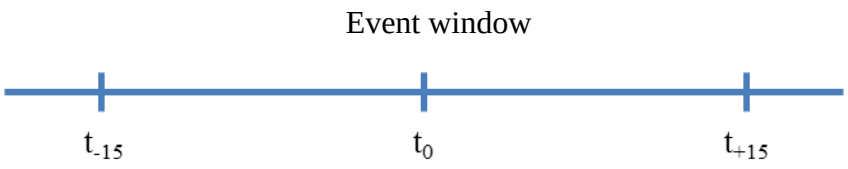

Figure 7: Event window illustration

5.1.2 Estimating normal returns

The second necessary step to perform an event study is to decide how to estimate normal returns. This decision is crucial as an event study is based on the assumption that a stock price reacts differently due to an event in comparison to the status quo (Peterson, 1989). Scholars use various approaches to forecast the benchmark stock returns. The observed stock returns in the event window are compared with the calculated abnormal returns. The return generating models can be clustered into statistical and economic models. The latter includes multi factor models like the Fama-French Model which are more comprehensive but not practical taking the sample size into account (Fama & French, 1993).

Three different statistical models are predominantly used in literature, namely the 'mean adjusted return', the 'market and risk adjusted return' and the model which is applied here – the 'market adjusted return' (Campbell, Lo, & MacKinlay, 1997). The market adjusted return draws upon an index (e.g. S&P 500), depending on the scope of the sample, which is used as the benchmark to calculate abnormal returns. The market and risk adjusted return is based on CAPM and calculates the expected return for each stock individually based on the companies' risk profile (i.e. β). Lastly, the mean adjusted return is estimating the expected return based on the historic return of each stock individually.

The mean adjusted return is the least complicated one and is based on the assumption that the expected return is the average historic return over a certain time period. However, in this thesis the economic environment is expected to have an effect on share prices and therefore it would not add value if this estimation model would be used as it disregards economic cycles. The risk and market adjusted return model assumes to follow a single factor market model (i.e. beta). The use of that method allows to take account for market movements and also for the fact that different assets have different sensitivities to the market's return. In this thesis the market adjusted return model is used, which takes account of market wide movements and does not rely on an uncertain beta. The way of adopting this model is by choosing a relevant index for the underlying transactions' regions or industries.

Choosing the right model is debatable and the prior mentioned models are used interchangeably in some cases (Weston & Halpern, 1983). The rationale for choosing the market adjusted return

model is based on a variety of reasons specific to the topic and based on empirical evidence of its usefulness. Here, the advantages and caveats of the risk and market adjusted return and the market adjusted return are contrasted against each other.

Firstly, the single factor or market and risk adjusted return model is understood to be more sophisticated from a theoretical perspective as it encompasses relevant dimensions which affect the price of a security. However, many scholars criticize it for distorting the actual results and being unreliable when calculating abnormal returns (Banz, 1981; Seyhun, 1988). In contrast, Brown and Warner (1980) have come to the conclusion that the market adjusted return model is robust and leads to viable results when applied in event studies. Additionally, their study indicates that more sophisticated models can actually hinder in getting reliable results.

A point which speaks against the use of the model based on CAPM is the fact that beta is assumed to be stable in theory. However, beta is dependent on economic states and therefore not a stable measure of a company's risk profile (Dotan & Ofer, 1984; Fabozzi & Francis, 1978). In this case, where the economic environment is believed to have an impact on value creation, the assumption of a steady beta skews the results. Another downside, which would have to be dealt with when using the risk and market adjusted model, is the need for data of a longer time period. In order to perform an ordinary least regression to identify the beta of each security, a series of returns of up to 200 days before the announcement day is needed. This would decrease the sample size and therefore limit the generalizability of the results.

Lastly, the model based on CAPM is estimating a stock's return by implying a risk free rate of return which is usually some form of government bond. As this thesis is tackling how interest rates affect value creation, the assumption of a certain interest rate would be hard. Using a fixed interest rate for both time periods would not take account of the interest rate environment's intricacies and choosing two different ones would lead to a lower threshold for reaching positive abnormal returns in the case of low interest rates (period 2009 – 2015). Based on these arguments, the transactions' benchmark returns will be based on respective indexes' returns and hence, the market adjusted return model is chosen.

5.1.3 Calculating abnormal returns based on the market adjusted return model

With the intention of deriving a stock's abnormal returns, the actual returns need to be deducted from the expected returns. As mentioned, this thesis will rely on the market adjusted return model which uses an index as a benchmark for the securities, and therefore expects the stocks to perform like the market. This thesis studies European transactions and will therefore use the FTSEurofirst 300 as the benchmark to calculate abnormal returns. The observed daily returns are calculated using the below formula:

$$(1)\ R_{it} = \ln(\frac{P_{it}}{P_{it-1}})$$

Where $R_{it,}$ stands for the return R of a stock i for day t and $P_{it,}$ is the price P of a stock i on day t. By using the natural logarithm, the average bias is avoided. As a next step, these observed returns need to be subtracted from the benchmark in order to derive the abnormal returns AR_{it} of stock i on day t. This is done by subtracting the daily index return Rm_t from the stocks return R_{it}. The resulting abnormal return can be interpreted as a tangible measure of the unforeseen change in the stock's shareholders' wealth associated with the event.

$$(2)\ AR_{it} = R_{it} - Rm_t$$

The next step is necessary to test the returns statistically and requires the introduction of two measures. Firstly, the abnormal returns for each individual stock need to be cumulated for all days of the event window respectively. In accordance with Wells (2004), this leads to the measure of average abnormal returns (AAR = $\overline{AR}$). This method sums up all abnormal returns AR_{it} across all stocks for a given day and then averages them for firms' daily abnormal returns for each day of the event window.

$$(3)\ \overline{AR_t} = \frac{1}{N}\sum_{t=1}^{N} AR_{it}$$

This arithmetic mean is calculated by averaging the sum of the individual abnormal returns with the sample size N. Each day will yield its own AAR, which can then be cumulated to

achieve a cumulated average abnormal return (CAAR = $\overline{CAR}$) for each day *L* by adding the sum of the previous day(s). CAAR correspond to security holder wealth changes around an event.

$$(4)\ \overline{CAR_t} = \sum_{t=1}^{L} \overline{AR_t}$$

5.1.4 Testing the hypotheses statistically

After having aggregated the returns and prepared the data to be tested statistically, the appropriate tests need to be chosen. In this last step, the measures AAR and CAAR are hypothesized to be different from zero and tested accordingly. Parametric tests are the main statistical tools which are used in this context. This thesis follows this pattern and makes use of a t-test, which assumes the distribution of returns to be normally distributed (Brown & Warner, 1980). In accordance with Serra (2004) and Graham (2008) the following formulas are used in order to test the developed hypotheses.

$$(5)\ t - stat\ \overline{AR}_t = \frac{\overline{AR}_t}{\sigma_{\overline{AR}_t}/\sqrt{n}}$$

$$(6)\ \sigma_{\overline{AR}_t} = \sqrt{\frac{1}{n-1} * \sum_{t=1}^{N} (AR_{it} - \overline{AR}_t)^2}$$

And the significance test for CAAR is based on:

$$(7)\ t - stat\ \overline{CAR}_L = \frac{\overline{CAR}_L}{\sigma_{\overline{CAR}_L}/\sqrt{n}}$$

$$(8)\ \sigma_{\overline{CAR}_L} = \sqrt{L * \ \sigma_{\overline{AR}_t}{}^2}$$

In addition to the general test whether certain transactions are value creating, two other types of hypotheses are tested: (1) compare a certain group of transactions within one time period

against transactions which do not show that characteristic, and (2) compare transactions which possess the same characteristic but were executed in two different time periods. These tests need to be carried out with a different t-test as two means are compared. The before mentioned t-test can be used for testing whether a certain mean is statistically different from zero and therefore value creating, destructing or none of the two. In order to ascertain whether two means are different from each other, another type of t-test is applied. The test is called Welch's t-test and it is an adaption of the student's t-test (Welch, 1947). This method can be defined as a two-sample location test, which is used to analyse whether two populations, in this case subsamples, have non-equal means. The test is endorsed under the condition of unequal variances and unequal sample sizes which fits this work's case (Moser & Stevens, 1992).

$$(9)\ t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{{s_1}^2}{N_1} + \frac{s_2^2}{N_2}}}$$

$\overline{X_1}$ and $\overline{X_2}$ describe each of the subsamples average mean returns, while s_1^2 and s_2^2 describe the subsamples variances and N_1 and N_2 represent the subsamples number of observations. For the calculation of the p-values the Welch–Satterthwaite equation is used to calculate the degrees of freedom (Satterthwaite, 1946):

$$(10)\ d.f. = \frac{(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2})^2}{\frac{(s_1^2/n_1)^2}{(n_1 - 1)} + \frac{(s_2^2/n_2)^2}{(n_2 - 1)}}$$

The actual null hypothesis, which is tested with this operation, is that the two average means of the two groups are equal. The alternative hypotheses, which can therefore be set, are that one of the samples has a higher or lower average return than the other sample. In addition, a p-value calculation is performed in order to test if the null hypotheses are being rejected at a reasonable confidence level.

A number of different event windows are used in order to grasp the impact of potential leakage of information prior to the announcement day and a delayed response to the transactions. The longest event window which is applied in this thesis is one of 15 days prior to the announcement

and 15 days post to the announcement. Furthermore, additional other event windows are used in order to see whether the market reacts to the announcement in less than the 31 day period. In detail, windows of [-10;10], [-5;5], [-3;3], and [-1;1] are used.

In accordance with other event studies, the tests are executed and tested at a significance level of 5%. In addition, it is noted if the significance lays at a 10% level and therefore, a weak support for the rejection of the null hypothesis, or at a confidence level of 1%. Hence, a p-value below 0.05 will lead to the rejection of the null hypothesis and p-values between 0.05 and 0.1 imply some statistical significance. The significance level of 10% will be indicated with one star (*), and the 5% and 1% level respectively with two (**) and three (***) stars. There is some critique around the test statistic as it is a random variable due to the fact that abnormal returns are measured with error. This error is based on two errors (1) forecasts of stocks' expected returns are inaccurate, (2) realized returns are influenced by other factors unrelated to the event.

5.2 Assumptions and limitations of the event study methodology

In general, the event study methodology is applied in many contexts and also considered a proper way of testing the impact of events statistically. However, there are some limitations which are elaborated upon in the following sub chapter.

Market efficiency, as one of the most basic and crucial assumptions of the event study methodology, has to be critically evaluated and discussed. As mentioned earlier, it is believed that information are absorbed by the market and immediately priced into each single security's price. In order for this thesis' tests to yield reliable results, the market has to be able to instantly analyse how a transaction impacts a company's future potential to create abnormal returns. Consequently, if the market efficiency hypothesis does not hold true, the market does not react accordingly to the announcement of transactions. Therefore, the interpretation of statistical results assuming market efficiency might lead to misleading results. Nevertheless, researchers usually apply event windows to account for the fact that markets might not be perfectly efficient. Besides that, the majority of researchers opines that despite the shortcomings, the methodology can be used and the degree of market inefficiency should not affect the results aversely to an extent that the results are useless (Bruner, 2002).

Another limitation, which was briefly mentioned earlier, is the possibility that information leaks to the public or that insider trading takes place before the transaction is publicly announced. This strongly affects the testing of individual days' returns and cannot be prevented. However, this is captured by putting a special emphasis on cumulative returns in the event window around the day 0 event (Wells, 2004).

Another critical assumption, which the event study methodology is based upon, is the fact that the event can be connected to reactions on the stock market without noise. However, a stock's price is affected by other information and changes in the market environment. Exemplary, a company could have been performing very well and just announced positive results or the industry has been disrupted by some major innovation. Both cases would affect the abnormal returns and isolating these effects are close to impossible (Bruner, 2002). This would lead to an abnormal return, positive or negative, which might not be linkable to the actual announcement of the return but rather other events or circumstances.

Close to the before mentioned limitation is the fact that many results of an acquisition are rather long term and not necessarily directly priced into the abnormal returns on the same day. This can be related to the fact that many consequences are not directly observable or that they will only take effect in combination with other events (Abhyankar et al., 2005; Oler, Harrison, & Allen, 2008). Therefore, some scholars argue that longer event windows would disentangle the effects and give a better picture of the actual performance of the company. Other scholars argue that in the long run the assumptions of the methodology are disturbed (Sudarsanam & Mahate, 2003). Using a longer event window would directly contradict with the assumption of efficient markets, as abnormal returns would reflect an excess of other information and events. In conclusion, most scholars do not see long run models as a fix to the before mentioned limitation and rely on short event windows in combination with the event study methodology.

For the purpose of this thesis, the overall assumption is that none of the mentioned limitations are restricting the testing methodology to an extent where the results cannot be seen as representative of the market's reaction to transaction announcements.

5.3 Measuring deal characteristics

As the overall logic and execution of the event study methodology has been explained, the testing of the individual hypotheses has to be explained in more detail. In the theoretical part, the hypotheses were clustered into financial and strategic characteristics and this structure will be followed subsequently.

5.3.1 Financial characteristics

In this thesis, the different modes of financing are distinguished and tested to what extent they affect value creation. In particular, the focus is set on cash and equity transactions suggested by the pecking order theory and Jensen's free cash flow theory. Many acquisitions are financed through multiple methods and the transaction method which was used for the largest part of the transaction is considered to be the mode of transactions. Furthermore, the different acquisition types are clustered into cash, new bank facilities which means debt, and a capital increase which stands for equity.

5.3.2 Strategic characteristics

Agency costs and synergy realization

The major strategic motive to distinguish transactions is the acquisition of related companies or unrelated companies (Gondhalekar & Bhagwat, 2003). As presented before, unrelated acquisitions can be connected to agency costs, as the underlying rationale to do such a transaction is not in the interest of shareholders. Contrarily, acquisitions which target similar companies can be connected to the motive of seeking synergies. This in fact can be linked to the potential of value creation through cost or revenue synergies. Whether such a related transaction is of horizontal or vertical nature is not affecting the assumption that synergies can be realized.

In order to test whether a transaction falls into the synergy seeking or agency cost bucket, the four digit Standard Industrial Classification (SIC) codes of both the acquirer and target are used. The SIC system is used by government agencies to classify industry areas. The first two digits of each company's SIC code indicate the major group and it can be obtained from the

Zephyr database. All transactions are clustered according to the respective SIC codes obtained for the participating companies. Therefore, transactions where the acquirer and the target have the first two digits in common are assumed to be synergy seeking transactions and hence, related transactions. If the acquirer and target do not have these two first digits in common, it is assumed to be an unrelated acquisition, and therefore a transaction bearing agency costs.

Transformative acquisitions

Lastly, it is assumed that large transactions have a different impact on the acquiring company than small acquisitions. The underlying rationale is that large transactions have a higher likelihood to be transformative to the acquirer's business. In order to do so, two different measures were taken as the dataset did not cover all transactions in the same way. In order for a transaction to be considered large, the deal value has to be more than €500m, or the deal value has to be more than 10% of the acquirer's market cap or asset value.

5.4 Data sample

5.4.1 Regional and chronological focus

Region

A lot of event studies are analysing the global M&A market based on the assumption that value creation is independent of individual countries or regions (Cording, Christmann, & Bourgeois Iii, 2002). In many instances though, scholars were able to prove that this does not hold true as markets respond differently to certain events (Park, 2004). In addition, some markets have a different attitude towards M&A, the United States (US) for example is the most active M&A market globally and the corporate action of M&A is commonly used and accepted. Besides those regional biases, which seem to exist, this study puts a special focus on the economic environment and therefore on a factor which is unique to certain regions. The novelty of this thesis is to compare M&A transactions during times of different interest rate regimes. As detailed in chapter 2, the interest rate regime is usually part of the central bank's set of tools and therefore specific to the reach of the central bank. Nevertheless, in some cases, countries that are located around a powerful region are heavily dependent and connected to that region. This is the case with Europe, as the European central bank sets the interest rate for all members

of the monetary union and at the same time members of the European Union are dependent on such by pegged currencies.

Therefore, transactions in the EU are analysed as being dependent on the action of the ECB. This thesis could have equally taken North American transactions as the scope and use the Federal Reserve's interest rate policy as a given. However, as studies about the US market are generally more prominent and this thesis is part of an education at a European business school, the focus is set on Europe.

Timing

Picking the right timing for the two samples of interest is of crucial importance in this thesis. The two sample periods are ought to be as similar as possible with the main difference being a different interest rate regime. The number of possible periods is limited due to data restrictions and the relative newness of the ECB and the monetary union euro. However, two time periods are very similar in terms of stock market development and at the same time different in terms of interest rate development. Those were the two main criteria which shaped the exact periods. As shown in chapter 2 for both time periods separately, figure 8 shows the stock market development of the 300 largest companies in Europe. The normal interest rate period (2003-2007) starts out with coming out of a stock market dip, which is comparable to the low interest rate environment (2009-2015). In addition, both periods roughly double and see a vast increase in market value of the index. Another similar fact is the development of the M&A market, which is also shown in chapter 2. Those criteria lead to similar, fairly large sample sizes which is detailed in chapter 5.4.2. The data collection date was November 17 of 2015 and therefore the end of the low interest rate period for the purpose of this thesis.

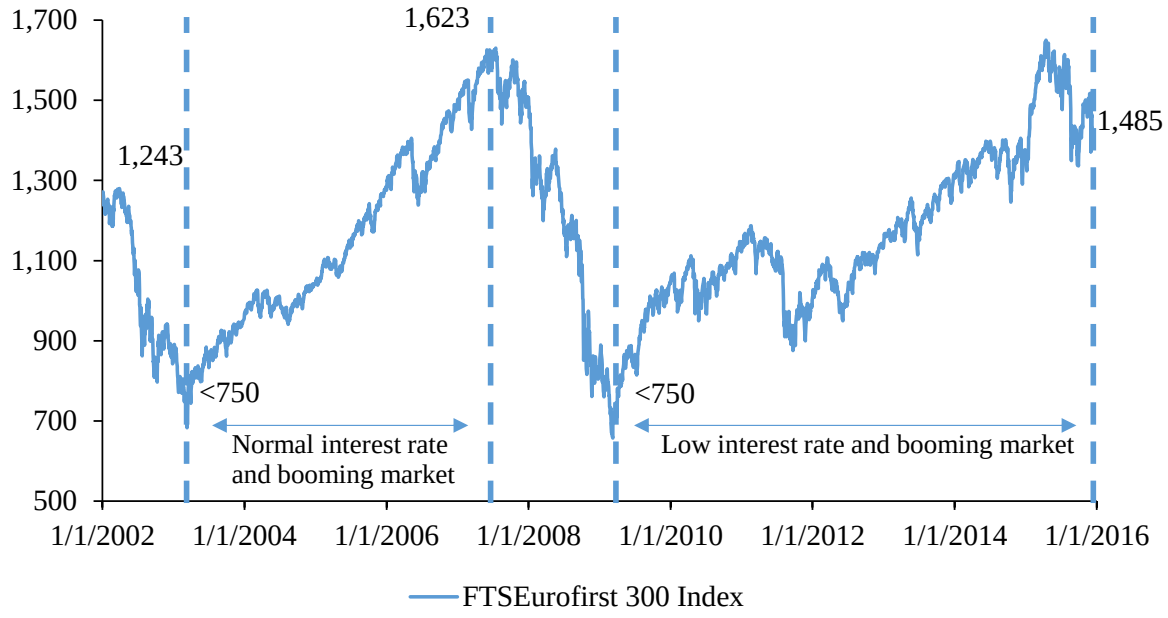

Figure 8: FTSEurofirst development from Jan 2002 - Nov 2015; Source: Yahoo Finance

5.4.2 Data collection

This thesis draws upon two different data sources in order to create a data set which is testable according to the laid out hypotheses and methodology. First, the transactions which will be used to represent the low interest rate and normal interest rate environment were retrieved. Zephry was used to gain access to such data, which is part of a major publisher of business information called Bureau van Dijk. The database contains information on completed, pending, withdrawn, announced, and rumoured deals. The deal records describe both acquiring and target companies along with descriptive information about the deal itself. The data retrieved from Zephyr was enhanced with share prices accessed through Bloomberg in order to calculate abnormal returns and measure value creation.

The following deal filters were applied in order to get data from Zephyr in line with the needed specifications:

i) Deal status is either announced, completed or pending
ii) Acquirer has to be headquartered in the European Union
iii) Acquirer has to be listed on a stock exchange with accessible share prices
iv) Deal value has to be disclosed

v) The final ownership stake of the acquirer has to be more than 50.1%

vi) Deal has to be announced between 30 March 2009 and 17 November 2015 to be part of the low interest rate environment sample and between 01 February 2003 and 30 September 2007 to be part of the normal interest rate environment sample

Stock prices as well as index returns for both time periods were gathered from Bloomberg. The share prices are the daily adjusted closed prices for the individual listed acquirer. Nevertheless, not all deals could be considered as the relevant stock information of some companies was not available due to the fact that the stock has either been taken off the market, the ticker symbol has been changed, or the acquirer was merged with a different firm or acquired by another company.

These selection criteria lead to a final data sample of 921 transactions for the low interest rate environment and 1,219 transactions for the normal interest rate environment. Bloomberg was used to retrieve the companies' share prices on the event day and 15 days prior and post the announcement of an acquisition.

6 Analysis

In the following, the statistical results are being presented with a focus on differentiating the empirical results of the measure AAR and CAAR. The results are presented for the low interest rate environment as a whole and then compared to the reference period with normal interest rates. This structure is applied to each sub hypothesis equally. The sample of each time period is split according to the specified criteria with the aim of understanding which characteristics are the main drivers of value destruction in general. Moreover, the characteristics, which have a stronger effect in a low interest rate environment, relative to the normal interest rate environment, are identified. Concluding the analysis part, an overview of all hypotheses is given for both, the differences between the time periods, as well as within one time period.

6.1 Abnormal returns during different interest rate regimes

The sample of each time period (2003-2007 & 2009-2015) was analysed individually and the results of the two samples, its average abnormal returns and cumulative average abnormal returns, are reported below in table B and C. Prior to dissecting the statistical analysis and the

significance of results, the figures below illustrate the results in line charts showing the overall direction of the impact of M&A on shareholder value.

In figure 9, the AAR of both the low and normal interest rate environment are shown. The results include all transactions from the given time period according to the sample criteria mentioned in chapter 5.4. When considering the whole event window [-15;15], the returns seem to vary around a 0.00% return with a deviation of 0.5% and a large exception on the event day t_0. The event day t_0 shows a large negative return abnormality from a zero return for both time periods. This observation is clearly in line with the suggested theory of a semi-strong market efficiency. The market reacts to the announcement of M&A in accordance with the outlined hypothesis. In the low interest rate environment the negative average abnormal return is considerably lower with -1.10% versus -0.63% in the normal interest rate environment on t_0.

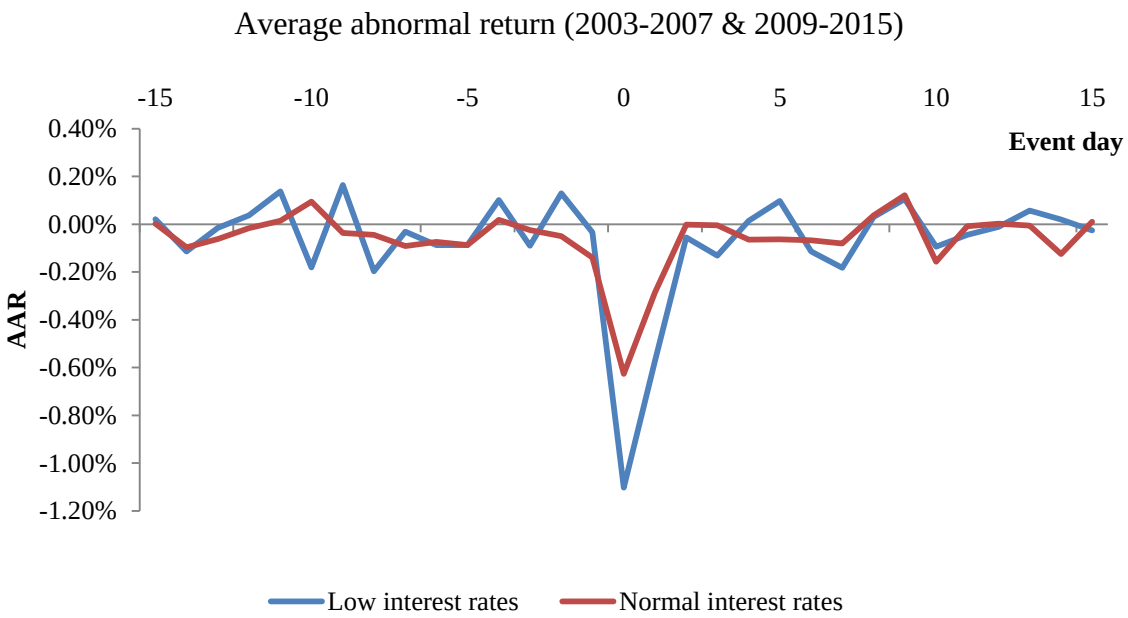

Figure 9: Average abnormal return of the period 2003-2007 (normal interest rates) and 2009-2015 (low interest rates)

The second measure, which is used to identify the impact of M&A in event studies, is the cumulative average abnormal return. Figure 10 shows the development over the event window

for both time periods of that measure. The most immediate observable fact is that the return turns negative around the event day for both time periods. This is in line with the hypothesized value destructive impact. Interestingly, the effect seems larger for the low interest rate environment, which is also in line with the main hypothesis. When comparing the development of the CAAR until the end of the event window t_{15}, the low interest rate environment transactions stay more value destructive than the others. Remarkably to note, the development of the CAAR are quite similar for both time periods. The starting point for the low interest rate environment at t_0 is a -1.35% CAAR and for the normal interest rate envinronment a -1.22% CAAR. Following that, the development is more or less parallel and goes down further until it hits -2.25% for the low interest rate environment and -1.91% for the normal interest rate environment at t_{15}.

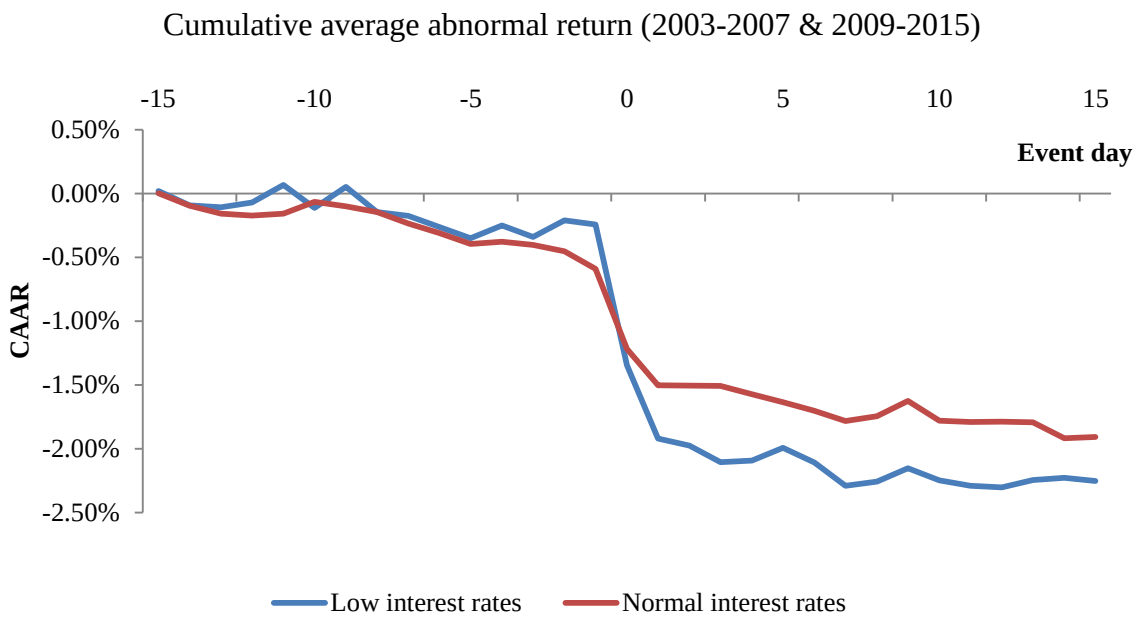

Figure 10: Cumulative average abnormal return of the period 2003-2007 (normal interest rates) and 2009-2015 (low interest rates)

6.2 Statistical results of the overall sample

As suggested in chapter 5, the longest event window which is applied lasts 31 days. Table B shows the overall test of the measures AAR and CAAR for the low interest rate environment. In accordance with the previously mentioned methodology, the AAR and the CAAR were tested with a t-test.

The H_0, which hypothesizes that the average abnormal return of acquirers that execute M&A during a low interest rate environment is equal to zero can be rejected on the event day t_0 and one day post the announcement t_1. The hypothesis is rejected at a significance level of 1% and therefore strong support is found for the hypothesis, which claims that value is destroyed through M&A transactions during times of low interest rates. The average abnormal return equals to -1.10% for t_0 and -0.57% for t_1. This finding also supports the assumption of a semi-strong market efficiency as the market reacts to the announcement of transactions timely. The p value is equal to 0.0000000002 for t_0 and even lower for the subsequent day, which means the likelihood of rejecting the null hypothesis mistakenly is very low (Type I error). When observing the period prior to the M&A announcement, the returns vary around 0 which further supports the efficient market hypothesis. A good example are the days t_{-10}, t_{-9} and t_{-8} where the return switches from negative to positive from one day to another.

A second measure which is used to check the effect of M&A announcements is the cumulative average abnormal return. As seen in the right part of table B, the CAAR values starting from the event day t_0 are significant at a 5% significance level and from day t_1 onwards at a significance level of 1%. It is quite interesting that the significance starts with day t_0 as this is also what theory would suggest. Prior to the announcement of an acquisition the data is not known to the public and therefore the stock market should not show any reactions. Even though such a long event window of in total 31 days is used the negative abnormal returns are significant until day t_{15}. On the event day t_0 the CAAR is at -1.35% and it goes down further to -2.25% until the end of the event window on t_{15} with a final t value of -5.38, which lays far outside the 1% significance level. The large negative abnormal return on t_0 has such a large impact that it lasts until the end of the event window.

Low interest rate environment 2009-2015 (15 day horiozon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.02%	0.24	0.81	0.02%	0.24	0.81
-14	-0.11%	-0.94	0.35	-0.09%	-0.54	0.59
-13	-0.01%	-0.17	0.86	-0.11%	-0.75	0.46
-12	0.04%	0.53	0.59	-0.07%	-0.49	0.62
-11	0.14%	1.25	0.21	0.07%	0.28	0.78
-10	-0.18%	-1.92	0.05 *	-0.11%	-0.49	0.63
-9	0.16%	2.40	0.02 **	0.05%	0.29	0.77
-8	-0.20%	-1.70	0.09 *	-0.15%	-0.44	0.66
-7	-0.03%	-0.39	0.70	-0.18%	-0.73	0.46
-6	-0.09%	-1.12	0.26	-0.26%	-1.07	0.29
-5	-0.09%	-1.18	0.24	-0.35%	-1.44	0.15
-4	0.10%	1.34	0.18	-0.25%	-0.96	0.34
-3	-0.09%	-1.11	0.27	-0.34%	-1.17	0.24
-2	0.13%	1.19	0.23	-0.21%	-0.52	0.61
-1	-0.03%	-0.39	0.70	-0.24%	-0.73	0.47
0	**-1.10%**	**-6.47**	**0.00 *****	**-1.35%**	**-1.97**	**0.05 ** **
1	-0.57%	-5.16	0.00 ***	-1.92%	-4.19	0.00 ***
2	-0.05%	-0.55	0.58	-1.97%	-4.68	0.00 ***
3	-0.13%	-1.58	0.11	-2.11%	-5.84	0.00 ***
4	0.01%	0.18	0.86	-2.09%	-5.81	0.00 ***
5	0.10%	1.31	0.19	-1.99%	-5.80	0.00 ***
6	-0.11%	-1.51	0.13	-2.11%	-5.98	0.00 ***
7	-0.18%	-1.63	0.10	-2.29%	-4.26	0.00 ***
8	0.03%	0.33	0.74	-2.26%	-4.87	0.00 ***
9	0.11%	1.29	0.20	-2.15%	-5.25	0.00 ***
10	-0.09%	-1.20	0.23	-2.25%	-5.66	0.00 ***
11	-0.04%	-0.50	0.62	-2.29%	-4.94	0.00 ***
12	-0.01%	-0.17	0.87	-2.30%	-6.44	0.00 ***
13	0.06%	0.78	0.43	-2.25%	-5.75	0.00 ***
14	0.02%	0.25	0.80	-2.23%	-5.30	0.00 ***
15	-0.03%	-0.35	0.73	-2.25%	-5.38	0.00 ***
n	921					

Table B: Testing output of abnormal returns in the low interest rate environment 2009-2015 with an event window of [-15;15]; sample size n=921

The outcomes of the analysis of the normal interest rate period are displayed in table C. This period stands for the normal interest rate environment and contains all transactions according to the sample selection from 2003-2007. Similar to the low interest rate environment, the announcement day t_0 shows a significantly negative AAR with -0.63% at a confidence level of

1%. Similarly, the days t_{-1} and t_1 show a negative return at a significant level of 5% and 10%. This can be explained through the potential leak or flow of information into the market prior to the public announcement for t_{-1} and a delay in response of the market for t_1.

Furthermore, the CAAR are also negative in the normal interest rate environment and the negativity starts even before the event day. As this is not assumed to be the regular case it has to be considered as a random result. Besides that, the significance is mainly given for a confidence level of 10%, which supports the claim that the results before the event day are rather weak. However, from the event day onwards until the day t_{15}, the CAAR stay negative and are significant at a 1% level. The CAAR is -1.22% at t_0 and ends with a value of -1.91% on day t_{15}.

One of the main similarities between the two samples is a booming stock market, therefore it can be claimed that during both times, acquisitions destroy value for the acquirer's shareholder at a significant level of at least 5% for the normal interest rates and 1% for the low interest rate environment.

However, this thesis is also set to investigate the impact of a low interest rate environment on value destruction through M&A. Therefore, the two periods need to be compared statistically, which is done through a Welch's t-test comparing the means. The H_1 hypothesizes that the mean differences are unlike from 0. This is tested anologously with the measures AAR and CAAR in the event window of [-15;15].

Normal interest rate environment 2003-2007 (15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.00%	0.03	0.97	0.00%	0.03	0.97
-14	-0.10%	-1.66	0.10 *	-0.09%	-1.15	0.25
-13	-0.06%	-1.05	0.29	-0.16%	-1.53	0.13
-12	-0.02%	-0.28	0.78	-0.17%	-1.45	0.15
-11	0.02%	0.25	0.80	-0.16%	-1.18	0.24
-10	0.09%	1.81	0.07 *	-0.06%	-0.50	0.62
-9	-0.04%	-0.62	0.54	-0.10%	-0.65	0.51
-8	-0.04%	-0.64	0.52	-0.14%	-0.74	0.46
-7	-0.09%	-1.36	0.17	-0.23%	-1.18	0.24
-6	-0.07%	-1.25	0.21	-0.31%	-1.64	0.10
-5	-0.09%	-1.53	0.13	-0.40%	-2.11	0.04 **
-4	0.02%	0.29	0.78	-0.38%	-1.72	0.09 *
-3	-0.02%	-0.42	0.67	-0.40%	-1.93	0.05 *
-2	-0.05%	-0.74	0.46	-0.45%	-1.80	0.07 *
-1	-0.14%	-1.97	0.05 **	-0.59%	-2.15	0.03 **
0	**-0.63%**	**-6.01**	**0.00 *****	**-1.22%**	**-2.92**	**0.00 *****
1	-0.29%	-3.68	0.00 ***	-1.50%	-4.69	0.00 ***
2	0.00%	-0.01	0.99	-1.50%	-5.26	0.00 ***
3	0.00%	-0.06	0.95	-1.51%	-5.37	0.00 ***
4	-0.06%	-0.97	0.33	-1.57%	-5.33	0.00 ***
5	-0.06%	-1.14	0.26	-1.64%	-6.46	0.00 ***
6	-0.07%	-1.11	0.27	-1.70%	-6.01	0.00 ***
7	-0.08%	-1.36	0.17	-1.78%	-6.28	0.00 ***
8	0.04%	0.60	0.55	-1.75%	-5.75	0.00 ***
9	0.12%	2.01	0.04 **	-1.62%	-5.41	0.00 ***
10	-0.16%	-2.44	0.01 **	-1.78%	-5.46	0.00 ***
11	-0.01%	-0.16	0.87	-1.79%	-6.45	0.00 ***
12	0.00%	0.04	0.97	-1.79%	-5.65	0.00 ***
13	0.00%	-0.09	0.92	-1.79%	-6.31	0.00 ***
14	-0.13%	-2.16	0.03 **	-1.92%	-6.03	0.00 ***
15	0.01%	0.17	0.87	-1.91%	-5.32	0.00 ***
n	1219					

Table C: Testing output of abnormal returns in the normal interest rate environment 2003-2007 with an event window of [-15;15]; sample size n=1,219

Table D portrays the results of the mean difference analysis of both time periods. As suggested by the hypothesis, the low interest rate environment transactions are expected to destroy more value in comparison to the transactions during times of normal interest rates. This is supported by the AAR measure which is 0.48% lower in the low interest rate environment at a

significance level of 5%. The t value is equal to -2.38 and therefore the H_0, which states that both interest rate environments lead to the same level of average abnormal returns can be rejected. However, when comparing the CAAR no such conclusions can be drawn. This is in support of an efficient market and that the CAAR do not have a large enough difference to lead to significant results. In addition, the fact that such a long event window is used is impacting the results as well (here [-15;15]). Nevertheless, the difference stays negative, meaning that the CAAR during times of low interest rates is lower than during times of normal interest rates.

Mean difference between low and normal interest rate environment						
Event day (t)	d AAR	t-stat	p-value	d CAAR	t-stat	p-value
-15	0.02%	0.17	0.86	0.02%	0.17	0.86
-14	-0.02%	-0.13	0.90	0.00%	0.01	0.99
-13	0.05%	0.47	0.64	0.05%	0.28	0.78
-12	0.05%	0.59	0.56	0.10%	0.56	0.58
-11	0.12%	0.98	0.33	0.23%	0.81	0.42
-10	-0.28%	-2.56	0.01 **	-0.05%	-0.18	0.85
-9	0.20%	2.23	0.03 **	0.15%	0.64	0.52
-8	-0.15%	-1.13	0.26	0.00%	0.00	1.00
-7	0.06%	0.57	0.57	0.06%	0.19	0.85
-6	-0.01%	-0.13	0.89	0.05%	0.15	0.88
-5	0.00%	-0.01	1.00	0.05%	0.15	0.88
-4	0.08%	0.84	0.40	0.13%	0.38	0.71
-3	-0.07%	-0.66	0.51	0.06%	0.18	0.86
-2	0.18%	1.40	0.16	0.24%	0.51	0.61
-1	0.11%	0.95	0.34	0.35%	0.80	0.42
0	**-0.48%**	**-2.38**	**0.02 ****	**-0.13%**	**-0.16**	**0.87**
1	-0.29%	-2.12	0.03 **	-0.42%	-0.74	0.46
2	-0.05%	-0.45	0.65	-0.47%	-0.92	0.36
3	-0.13%	-1.21	0.23	-0.60%	-1.31	0.19
4	0.08%	0.75	0.45	-0.52%	-1.12	0.26
5	0.16%	1.73	0.08 *	-0.36%	-0.84	0.40
6	-0.05%	-0.48	0.63	-0.40%	-0.90	0.37
7	-0.10%	-0.80	0.42	-0.51%	-0.83	0.40
8	-0.01%	-0.06	0.96	-0.51%	-0.92	0.36
9	-0.02%	-0.15	0.88	-0.53%	-1.04	0.30
10	0.06%	0.62	0.53	-0.47%	-0.91	0.37
11	-0.04%	-0.35	0.73	-0.50%	-0.93	0.35
12	-0.01%	-0.15	0.88	-0.52%	-1.08	0.28
13	0.06%	0.69	0.49	-0.45%	-0.94	0.35
14	0.14%	1.50	0.13	-0.31%	-0.59	0.56
15	-0.04%	-0.37	0.71	-0.35%	-0.63	0.53

Table D: Testing output of mean difference of abnormal returns between the low and normal interest rate environment with an event window of [-15;15]

When changing the event window to a smaller window (i.e. [-3;3] and [-1;1]) the mean difference changes to -0.66% for the 3 day period and -0.73% for the 7 day period. Additionally, the mean differences for those two periods of CAAR are significant at a 1% confidence level and the H_0 rejected as displayed in table E.

CAAR - All transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-1.05%	0.00 ***	-1.71%	0.00 ***	-0.66%	0.01 ***
[-3;3]	-1.13%	0.00 ***	-1.86%	0.00 ***	-0.73%	0.01 ***
[-5;5]	-1.33%	0.00 ***	-1.73%	0.00 ***	-0.40%	0.19
[-10;10]	-1.62%	0.00 ***	-2.31%	0.00 ***	-0.69%	0.13
[-15;15]	-1.91%	0.00 ***	-2.25%	0.00 ***	-0.35%	0.53

Table E: Testing output of cumulative average abnormal returns for different event windows comparing low and normal interest rate environment; for further details see table F

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Low interest rates		921	-1.10%		0.051743479
Normal interest rates		1219	-0.63%		0.036374785
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.48%	0.00%	1,570	-2.38	0.02 **	1.96

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Low interest rates		921	-1.73%		0.075446828
Normal interest rates		1219	-1.33%		0.063922641
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.40%	0.00%	1,791	-1.31	0.19	1.96

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Low interest rates		921	-1.86%		0.066455354
Normal interest rates		1219	-1.13%		0.05955207
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.73%	0.00%	1,858	-2.61	0.01 ***	1.96

Table F: Test statistics of main hypothesis for main measures AAR and CAAR

6.3 Statistical results of deal characteristics

Following the same approach as in the theoretical part of this thesis, the hypotheses are tested according to financial and strategic characteristics. Firstly, the AAR are analysed in isolation for each hypothesis and then compared with other transactions within the same time period and the reference time period. In concrete, transactions which possess a certain characteristic (e.g.

financed with cash) are tested against all other transactions in the same time period which do not possess the characteristic. The same process is executed for the other time period and subsequently, transactions which possess that characteristic from both time periods are compared with each other.

The second measure which is tested is the CAAR and the approach is analogous to the AAR with some minor adjustments. First, the transactions which feature a certain characteristic are considered and the CAAR for different event windows in the low interest rate sample are tested. Secondly, the normal interest rate environment and its CAAR of transactions with the selected characteristics are analysed and finally the mean difference between both time periods is tested for significance for the specific subsamples.

6.3.1 Financial characteristics

As suggested in the hypotheses, one of the main factors influencing value creation of M&A is the mode of financing. It is hypothesized that transactions financed with cash create more value, or in this context destroy less value than any other financing mode. All cash and equity transactions were tested against all other transactions within both time periods which is shown in table G, H, I, J, K and L.

Cash transactions

In the low interest rate environment, 71% of the transactions were financed with cash as the major source and 54% in the normal interest rate environment. When looking at the AAR on the event day t_0, cash transactions in the low interest rate environment have an AAR of -0.65% at a significance level of 1%. Non-cash transactions in controrary yield an AAR of -2.27%, with a significant difference of 1.62% in favor of cash transactions at a confidence level of 1%. In comparison, cash transactions in the normal interest rate environment vs non-cash transactions have created an AAR on the event day of -0.42% versus -1.52%. This equals a significant mean difference at the 1% level of 1.10% excess AAR for cash transactions (see table G). The second hypothesis is therefore confirmed and it is valid for both time periods that cash transactions create more value, or in this case destroy less value than transactions financed through other means. Consistent with many other studies, the pecking order theory is applicable

and cash seems to be the least value destructive, especially in comparison to equity which is claimed to be the most value destructive.

AAR - Cash transactions (t = 0)						
Hypothesis / sample	Normal interest rates	p value	Low interest rates	p value	Period return difference	p value
Cash	-0.42%	0.00 ***	-0.65%	0.00 ***	-0.23%	0.19
Other than cash	-1.52%	0.00 ***	-2.27%	0.00 ***		
Mean difference	1.10%	0.00 ***	1.62%	0.00 ***		

Table G: Testing output of average abnormal returns on the event day comparing cash transactions with non-cash transactions; for further details see appendix 10.1, 10.7

In addition to the testing of the AAR on the event day, the CAAR with different event windows are tested. This measure includes the possibility that the stock market is inefficent to some extent and reacts to the announcement with a delay or due to leakage of information prior to the transaction. Table H portrays the CAAR of cash versus non cash transactions in the low interest rate environment for all tested event windows. The results are very forthright as cash transactions consistently create more value than non cash transactions. This further supports the theoretical concept of the pecking order theory and thereby, that cash, as the cheapest form of financing, signals that managers believe their company's shares are undervalued.

CAAR - Cash vs other (low interest rate environment)						
Event window	Return (Cash)	p value	Return (Other)	p value	Return (Difference)	p value
[-1;1]	-1.15%	0.00 ***	-3.16%	0.00 ***	2.01%	0.00 ***
[-3;3]	-1.51%	0.00 ***	-2.85%	0.00 ***	1.34%	0.02 **
[-5;5]	-1.33%	0.00 ***	-2.85%	0.00 ***	1.53%	0.01 **
[-10;10]	-1.59%	0.00 ***	-3.82%	0.00 ***	2.23%	0.03 **
[-15;15]	-1.60%	0.00 ***	-3.60%	0.00 ***	2.00%	0.02 **

Table H: Testing output of cumulative average abnormal returns comparing cash transactions with non-cash transactions; for further details see appendix 10.1, 10.13, 10.14, 10.15

The second part of the hypothesis is whether cash transactions during a low interest rate environment destroy more value than cash transactions during a normal interest rate environment. The direction of the set hypothesis concurs with the observed difference. Cash

transactions during a low interest rate environment create a 0.23% lower AAR on the event day than during the normal interest rate regime. However, the value is not significant as the p value only reaches a value of 0.19 (see table G).

Table I shows the CAAR for the low and normal interest rate environment. The measure CAAR is negative and significantly different from zero at a 5% or 1% significance level across all event windows. Looking at the CAAR also shows that the return in the low interest rate environment is always lower and therefore more value destructive than during normal interest rates. Furthermore, two event windows (i.e. [-3;3] and [-1;1]) are significant with a 5% confidence level. This shows, that the market reacts the most around the event day, which leads to significantly lower abnormal returns during a low interest rate environment. This is in line with the hypothesis and can be explained by the theoretical concept of Jensen's free cash flow theory. Excess cash or an easier access to it as seen in the low interest rate environment leads to acquisitons which are not in the best interest of shareholders. The difference between the two time periods is only significant when considering the CAAR, demonstrating that the market is not completely efficient. The difference in CAAR for the three day event window [-1;1] is equal to -0.52% at a confidence level of 5% and therefore lower for low interest rate cash transactions. The 3 day event window is equally significant with a difference of -0.69%. The other event windows show lower returns for the low interest rate environment but do not qualify as significant differences.

CAAR - Cash transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-0.62%	0.00 ***	-1.15%	0.00 ***	-0.52%	0.02 **
[-3;3]	-0.83%	0.00 ***	-1.51%	0.00 ***	-0.69%	0.03 **
[-5;5]	-1.07%	0.00 ***	-1.33%	0.00 ***	-0.26%	0.47
[-10;10]	-1.07%	0.01 **	-1.59%	0.00 ***	-0.52%	0.30
[-15;15]	-1.41%	0.00 ***	-1.60%	0.00 ***	-0.19%	0.78

Table I: Testing output of cumulative average abnormal returns of cash transactions for different event windows; for further details see appendix 10.7, 10.13, 10.16, 10.17

Equity transactions

Another major source for financing transactions is equity and respective hypotheses have been constructed in connection to the pecking order theory. This thesis claims that equity transactions destroy more value than transcations financed through other means. The first observation that can be made in table J is that in the low interest rate environment equity transactions destroy 1.17% more value at a confidence level of 5% than non-equity transactions. This is in line with the hypothesis and the same obversation can be made for the normal interest rate environment. In the normal interest rate environment the difference between equity and non-equity financed transactions is -0.93% at a significance level of 1%. As indicated by the pecking order theory, equity transactions are perceived with negativity by the market. Especially during times of a booming stock market, where the conclusion could arise that the management believes its company is overvalued and therefore decides to execute the transaction financed with equity. This leads to a negative market reaction and therefore a significantly lower AAR than transactions performed with other means than equity.

AAR - Equity transactions (t = 0)						
Hypothesis / sample	Normal interest rates	p value	Low interest rates	p value	Period return difference	p value
Equity	-1.41%	0.00 ***	-1.99%	0.00 ***	-0.59%	0.36
Other than equity	-0.48%	0.00 ***	-0.82%	0.00 ***		
Mean difference	-0.93%	0.01 ***	-1.17%	0.04 **		

Table J: Testing output of average abnormal returns on the event day comparing equity transactions with non-equity transactions; for further details see appendix 10.2, 10.8

The CAAR of cash transactions in the low interest rate environment versus non-cash transactions yield a similar result as the AAR on the event day. Despite the fact that CAAR of equity transactions destroy more value in comparison to non-equity transactions across all event windows, only the [-1;1] day event window leads to a significantly lower return of 1.31% at a 5% confidence level (see table K).

CAAR - Equity vs other (low interest rate environment)						
Event window	Return (Equity)	p value	Return (Other)	p value	Return (Difference)	p value
[-1;1]	-2.65%	0.00 ***	-1.34%	0.00 ***	-1.31%	0.03 **
[-3;3]	-2.23%	0.00 ***	-1.65%	0.00 ***	-0.58%	0.32
[-5;5]	-2.19%	0.00 ***	-1.51%	0.00 ***	-0.68%	0.30
[-10;10]	-3.34%	0.00 ***	-1.89%	0.00 ***	-1.45%	0.21
[-15;15]	-2.89%	0.00 ***	-1.95%	0.00 ***	-0.94%	0.29

Table K: Testing output of cumulative average abnormal returns comparing equity transactions with non-equity transactions; for further details see appendix 10.2, 10.18, 10.19, 10.20

The second research question aims to investigate the impact of the low interest rate environment on transactions in combination with the previously selected underlying transaction characteristics. In this case the mean difference of the AAR between the time periods is as anticipated. Equity transactions during low interest rates destroy more value than in the comparable period with normal interest rates. However, the difference is not significant and the H_0 can therefore not be rejected for equity financed acquisitions.

In terms of CAAR, table L shows the time periods individually and that all equity transactions lead to a significant negative CAAR. The return differences between the periods lead to a comparably lower result for the low interest rate environment, except for the [-15;15] window. However, none of the results are significant and the H_0, that equity transactions lead to a lower CAAR in the low interest rate regime compared with the normal interest rate regime, cannot be rejected. This means that companies that perform M&A through means of equity are not impacted by the interest rate environment at a significant level. Companies that consider equity transactions do so for reasons which are not impacted by the low interest rate environment. As mentioned in the theoretical part, this could be based on the fact that they believe their stock is overvalued and this cirucmstance does not change with a change in interest rates. Furthermore, they might not have the necessary cash in the first place or do not get access to other funding methods. Therefore, they must rely on equity which is closely linked to the valuation of companies on the stock market or rather booming markets and not the interest rate regime which is in place.

CAAR - Equity transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-1.98%	0.00 ***	-2.65%	0.00 ***	-0.67%	0.36
[-3;3]	-1.92%	0.00 ***	-2.23%	0.00 ***	-0.31%	0.64
[-5;5]	-2.11%	0.00 ***	-2.19%	0.00 ***	-0.08%	0.92
[-10;10]	-3.27%	0.00 ***	-3.34%	0.00 ***	-0.07%	0.96
[-15;15]	-3.19%	0.00 ***	-2.89%	0.00 ***	0.31%	0.82

Table L: Testing output of cumulative average abnormal returns of equity transactions for different event windows; for further details see appendix 10.8, 10.20, 10.21, 10.22

6.3.2 Strategic characteristics

Related vs unrelated acquisitions

Two of the typical strategic rationales for acquiring another company are the goals of diversifying or focusing on its inherent business. As suggested by previous studies and the theoretical background of agency theory, related acquisitons are expected to create more value than unrelated acquisitions. In line with the main hypothesis of value destruction, both transaction types destroy value in both economic environments at a confidence level of 1%. Surprisingly, the AAR on the event day is lower for related transactions in both time periods as well. Nevertheless, the difference is small and not significant and can therefore be neglected in the analysis.

AAR - Synergy / Agency transactions (t = 0)						
Hypothesis / sample	Normal interest rates	p value	Low interest rates	p value	Period return difference	p value
Related	-0.85%	0.00 ***	-1.29%	0.00 ***	-0.43%	0.15
Unrelated	-0.66%	0.00 ***	-0.89%	0.00 ***	-0.23%	0.41
Mean difference	0.19%	0.36	0.40%	0.24		

Table M: Testing output of average abnormal returns on the event day comparing related transactions with unrelated transactions; for further details see appendix 10.3, 10.9, 10.10

The comparison of CAAR of agency and synergy motivated acquisitions in the low interest rate environment shows a similar picture. One day around the event day shows a significantly lower value for non-agency motivated acquisitions. However, that result is questionable as the return difference switches from positive to negative when increasing to a 5 day event window.

This is an indication that the effect of agency acquisitions in combination with a low interest rate environment is not unambiguous.

CAAR - Agency vs synergy (low interest rate environment)						
Event window	Return (Agency motivated)	p value	Return (Other)	p value	Return (Difference)	p value
[-1;1]	-1.07%	0.00 ***	-2.27%	0.00 ***	1.20%	0.00 ***
[-3;3]	-1.48%	0.00 ***	-2.19%	0.00 ***	0.71%	0.11
[-5;5]	-1.75%	0.00 ***	-1.71%	0.00 ***	-0.03%	0.95
[-10;10]	-2.07%	0.00 ***	-2.52%	0.00 ***	0.45%	0.52
[-15;15]	-1.82%	0.01 **	-2.63%	0.00 ***	0.81%	0.34

Table N: Testing output of cumulative average abnormal returns comparing related transactions with unrelated transactions; for further details see appendix 10.3, 10.23, 10.24, 10.25

When comparing both time periods, related acquisitions have a lower AAR in the low interest rate environment than in the normal interest rate environment. The significance test leads to a p value of 0.15, which does not allow to reject the null hypothesis. Similarly, comparing unrelated acquisitions in both time periods, the low interest rate environment leads to -0.23% AAR in comparison to the normal interest rate regime. However, the result is not statistically significant and the null hypothesis can therefore not be rejected.

The measure CAAR leads, as hypothesized, to a significant difference in value creation between the low and high interest rate environment (table O). Related acquisitions destroy more value in a low interest rate environment. This is in line with the claim that the potential of value creation through synergy realization in related acquisitions is overestimated and the monitoring through shareholders decreased. Related acquisitions lead to a lower CAAR in the normal interest rate environment by 1.21% at a significance level of 10% in a [-10;10] event window. When shortening the event window to [-3;3] or [-1;1] the confidence level increases to 1% and leads to a CAAR difference of -1.13% and -1.04% respectively.

CAAR - Synergy transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-1.14%	0.00 ***	-2.27%	0.00 ***	-1.13%	0.00 ***
[-3;3]	-1.15%	0.00 ***	-2.19%	0.00 ***	-1.04%	0.01 ***
[-5;5]	-1.39%	0.00 ***	-1.71%	0.00 ***	-0.33%	0.40
[-10;10]	-1.32%	0.00 ***	-2.52%	0.00 ***	-1.21%	0.07 *
[-15;15]	-2.01%	0.00 ***	-2.63%	0.00 ***	-0.62%	0.36

Table O: Testing output of cumulative average abnormal returns of related transactions for different event windows; for further details see appendix 10.9, 10.10, 10.24, 10.28, 10.29

Table P shows the same test of CAAR for unrelated transactions in isolation. The time periods analyzed individually yield a significantly negative CAAR for all event windows. The return differences between the time periods do not yield any clear results in this case. This could be an indication that unrelated transactions are perceived differently in a low interest rate environment than in a normal interest rate environment. The results for different event windows vary between positive and negative depending on the event window, while none of the results are significant.

CAAR - Agency transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-1.19%	0.00 ***	-1.07%	0.00 ***	0.13%	0.68
[-3;3]	-1.34%	0.00 ***	-1.48%	0.00 ***	-0.13%	0.75
[-5;5]	-1.53%	0.00 ***	-1.75%	0.00 ***	-0.22%	0.66
[-10;10]	-2.19%	0.00 ***	-2.07%	0.00 ***	0.12%	0.86
[-15;15]	-2.06%	0.00 ***	-1.82%	0.01 **	0.24%	0.79

Table P: Testing output of cumulative average abnormal returns of unrelated transactions for different event windows; for further details see appendix 10.10, 10.23, 10.26, 10.27

Transformative acquisitions

In this thesis, a proxy for transformative acquisitions, which change the fundamentals of a firm, is size in absolute terms and relative terms. Transactions which are valued higher than €500m are considered as large transactions and are hypothesized to create less value than smaller transactions. The test covering relative size, splits the transcations into one group where the

deal value is more than 10% of the acquirer's asset value or market cap and one group for all other transactions.

Absolute size

Table Q shows that the hypothesis covering value destructiveness of large transactions is not confirmed by testing average abnormal returns in a low interest rate environment on the event day t_0. The mean difference is not statistically significant and in fact, transactions that are smaller than €500m seem to destroy more value on the event day itself. However, on t_1 the market punishes absolute large transactions with a significantly lower AAR by 1.05% at a confidence level of 10% (see appendix 10.32).

AAR - Absolute large transactions (t = 0)						
Hypothesis / sample	Normal interest rates	p value	Low interest rates	p value	Period return difference	p value
>EUR500m	-0.47%	0.10 *	-0.62%	0.20	-0.16%	0.78
<EUR500m	-0.64%	0.00 ***	-1.09%	0.00 ***		
Mean difference	0.17%	0.57	0.46%	0.37		

Table Q: Testing output of average abnormal returns on the event day comparing transactions valued higher than €500m with transactions valued lower than €500m; for further details see appendix 10.4, 10.11

The CAAR shows a similar picture of how large transactions perform in comparison to small transactions within the period of low interest rates. The CAAR for a short event window of [-3;3] shows that large transactions destroy significantly more value with -3.31% vs -1.77% at a confidence level of roughly 5% (see table R). This is in line with the hypothesis that large and risky transactions, which might only be executed due to favourable financing or overconfidence of the management, lead to value destruction. The likelihood that the rationale for executing a large transaction is based on subjective and irrational reasons could be elevated due to the effects of the low interest rate environment. The difference to the result for AAR gives an indication that large transactions are more complex and harder to react to from the market perspective. This could lead to the conclusion that the market is not efficient as it shows a delayed response to the announcement of M&A.

CAAR - >EUR500m vs other (low interest rate environment)						
Event window	Return (>500m)	p value	Return (Other)	p value	Return (Difference)	p value
[-1;1]	-3.07%	0.00 ***	-1.63%	0.00 ***	-1.44%	0.17
[-3;3]	-3.31%	0.00 ***	-1.77%	0.00 ***	-1.54%	0.05 *
[-5;5]	-2.40%	0.01 ***	-1.69%	0.00 ***	-0.71%	0.44
[-10;10]	-3.03%	0.00 ***	-2.27%	0.00 ***	-0.76%	0.45
[-15;15]	-2.37%	0.03 **	-2.25%	0.00 ***	-0.13%	0.92

Table R: Testing output of cumulative average abnormal returns comparing transactions valued higher than €500m with transactions valued lower than €500m; for further details see appendix 10.04, 10.30, 10.31, 10.32

When comparing AAR on t_0 of large transactions from both time periods the direction of the difference is as hypothesized, while the difference is not significant either. The CAAR gives a better picture of the difference between the two interest rate regimes. Here, all event windows, except the longest one (i.e. [-15;15]), show that large transactions in a low interest rate environment destroy more value than during a normal interest rate environment. Nevertheless, only the [-3;3] event window leads to a significant result at a confidence level of 10%. Therefore, weak support is given for the hypothesis when considering the CAAR.

CAAR - Absolute large transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-1.21%	0.02 **	-2.84%	0.00 ***	-1.63%	0.13
[-3;3]	-1.34%	0.06 *	-3.06%	0.00 ***	-1.72%	0.08 *
[-5;5]	-1.62%	0.00 ***	-2.22%	0.01 ***	-0.60%	0.52
[-10;10]	-2.06%	0.43	-2.80%	0.00 ***	-0.74%	0.48
[-15;15]	-2.52%	0.01 **	-2.19%	0.03 **	0.33%	0.82

Table S: Testing output of cumulative average abnormal returns of absolute large transactions for different event windows; for further details see appendix 10.11, 10.30, 10.33, 10.34

Relative size

In addition to absolute size, relative size is also tested as it should give a better indication of whether a transaction is of high importance and impact to the acquirer. In accordance with the hypothesised effect of relative large transactions, such transactions are worse from a value creating perspective than relatively small transactions. Transactions, which represent 10% or

more of the acquirer's asset or market value create lower AAR in both time periods than other transactions. Table T shows the results of the AAR at t_0 and in both time periods, relatively large transactions destroy about 1% more value than transactions that are worth less than 10% of the acquirer's assets or market cap. Nevertheless, such difference is only significant in the normal interest rate environment (1% confidence level). Large transactions in the low interest rate environment yield also lower results than during normal interest rates, but the H_0 cannot be rejected at a statistically significant level.

AAR - Relative large transactions (t = 0)						
Hypothesis / sample	Normal interest rates	p value	Low interest rates	p value	Period return difference	p value
>10% of value	-1.45%	0.00 ***	-2.08%	0.00 ***	-0.63%	0.41
<10% of value	-0.47%	0.00 ***	-0.94%	0.00 ***		
Mean difference	-0.99%	0.00 ***	-1.14%	0.11		

Table T: Testing output of average abnormal returns on the event day comparing transactions valued >10% of the acquirer's market cap / asset value with transactions valued < 10% of the acquirer's market cap / asset value; for further details see appendix 10.5, 1

In the low interest rate environment, the CAAR show a similar picture, especially in terms of the tested differences, which is shown in table U. Comparing the [-5;5] and [-1;1] event window, large transactions create a lower return by about 2% at a confidence level of 1% for all three event windows. This is a strong confirmation for a potential mistrust of the market when companies acquire companies, which change the acquirer's fundamental business and positioning in the market. In combination with the low interest rate environment, such acquisitions are seen even more critical as acquirers can perform such actions easier. This is rooted in the fact that a booming stock market leads managers to execute risky transactions which they can perform easier due to less monitoring.

CAAR - >10% vs other (low interest rate environment)						
Event window	Return (Large)	p value	Return (Other)	p value	Return (Difference)	p value
[-1;1]	-3.62%	0.00 ***	-1.40%	0.00 ***	-2.22%	0.00 ***
[-3;3]	-3.49%	0.00 ***	-1.59%	0.00 ***	-1.90%	0.00 ***
[-5;5]	-3.44%	0.00 ***	-1.45%	0.00 ***	-1.99%	0.00 ***
[-10;10]	-2.99%	0.00 ***	-2.20%	0.00 ***	-0.79%	0.43
[-15;15]	-2.88%	0.00 ***	-2.15%	0.00 ***	-0.73%	0.49

Table U: Testing output of cumulative average abnormal returns comparing transactions valued >10% of the acquirer's market cap / asset value with transactions valued < 10% of the acquirer's market cap / asset value; for further details see appendix 10.5, 10.35,

Comparing relative large transactions between times of different interest rate environments seems not be that fruitful. Even though the returns for low interest rates are lower and destroy more value, the differences are not significant when testing for statistical significance (see table V).

CAAR - Relative large transactions (low vs normal interest rates)						
Event window	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
[-1;1]	-2.41%	0.00 ***	-3.62%	0.00 ***	-1.21%	0.15
[-3;3]	-2.91%	0.00 ***	-3.49%	0.00 ***	-0.58%	0.46
[-5;5]	-3.30%	0.00 ***	-3.44%	0.00 ***	-0.14%	0.85
[-10;10]	-2.98%	0.03 **	-2.99%	0.00 ***	-0.01%	0.99
[-15;15]	-3.04%	0.00 ***	-2.88%	0.00 ***	0.16%	0.90

Table V: Testing output of cumulative average abnormal returns of relative large transactions for different event windows; for further details see appendix 10.12, 10.35, 10.38, 10.39

7 Results

The empirical study has extensively covered the impact of interest rate regimes on the potential of value creation through M&A. The focus was set on different interest rate environments and the results lead to the conclusion that the economic environment and the interest rate regime do have an impact on value creation through M&A. Confirming and further amplifying other research, the results show that acquisitions during booming markets are value destructive (Rhodes-Kropf & Viswanathan, 2004). Both analyzed time periods, the low and normal interest

rate environment, in combination with a booming stock market lead to negative abnormal returns to the acquiring companies' shareholders. This is in line with the overarching hypothesis that companies engaging in M&A during times of booming stock markets are doing so based on biased rationales, such as overconfidence and overestimation of synergies.

The risk of judging M&A and dismissing it to be bad in general is high and therefore differences between M&A transactions were identified and tested. A number of strategic and financial characteristics give an indication of what kind of transactions seem to be at risk of being more value destructive than others. Clearly, the results are dependent on the markets' perception in the short run and the way the testing is constructed in this thesis. The selected methodology relies on market efficiency and therefore, the ability of the market to assess transactions in a short time period.

7.1 Discussion of results

The results of this study lead to significant results filling a gap in academic literature. Firstly, the study allows to understand what characteristics drive value destruction to a higher extent than others within the low interest rate environment. Transactions that possess certain characteristics were tested against the rest of the sample in the low interest rate environment as shown in table W. The results indicate that significantly worse performing transactions in the low interest rate environment are: equity financed, transactions of size larger than €500m and transactions which are relatively large to the size of the acquirer (>10% of market cap / asset value). In contrast, one characteristic which leads to significantly better performing acquisitions in terms of abnormal returns are cash financed acquisitions during times of low interest rates.

Difference to rest of sample	AAR (t = 0)		CAAR			
Hypothesis	Return difference	p value	Return differnce [-3;3]	p value	Return difference [-5;5]	p value
Cash	1.62%	0.00 ***	1.34%	0.02 **	1.53%	0.01 **
Equity	-1.21%	0.03 **	-0.58%	0.32	-0.68%	0.30
Agency	0.40%	0.24	0.71%	0.11	-0.03%	0.95
Absolute size	0.45%	0.41	-1.54%	0.05 *	-0.71%	0.44
Relative size	-1.14%	0.11	-1.90%	0.00 ***	-1.99%	0.00 ***

Table W: Testing output of abnormal returns for all hypotheses in the low interest rate environment

The second part and the focus of this thesis is the contrasting analysis between the low and normal interest rate environment. This part compares transactions common in a certain characteristic but different due to having been exectued in dissimilar interest rate environments. Table X shows that the difference in AAR on the event day t_0 is only significant when testing all transactions combined.

Average abnormal return - overview						
Hypothesis	Return (normal interest rate)	p value	Return (low interest rate)	p value	Return (difference)	p value
General	-0.63%	0.00 ***	-1.10%	0.00 ***	-0.48%	0.02 **
Cash	-0.42%	0.00 ***	-0.65%	0.00 ***	-0.23%	0.19
Equity	-1.41%	0.00 ***	-1.99%	0.00 ***	-0.59%	0.36
Synergy	-0.85%	0.00 ***	-1.29%	0.00 ***	-0.43%	0.15
Agency	-0.66%	0.00 ***	-0.89%	0.00 ***	-0.23%	0.41
Absolute size	-0.47%	0.10 *	-0.62%	0.20	-0.16%	0.78
Relative size	-1.45%	0.00 ***	-2.08%	0.00 ***	-0.63%	0.41

Table X: Testing output of average abnormal returns for all hypotheses comparing the two time periods

Considering the possibility that not all information is absorped by the market on the event day t_0 and the efficient market hypothesis is violated, the CAAR measure gives a better picture of the difference between the two time periods. Table Y shows that transactions that are financed with cash are related and larger than €500m lead to significantly worse transactions from a shareholder value perspective during times of low interest rates than during times of normal interest rates.

Period differences	AAR		CAAR			
Hypothesis	Return difference	p value	Return differnce [-3;3]	p value	Return difference [-5;5]	p value
General	-0.48%	0.02 **	-0.73%	0.01 ***	-0.40%	0.19
Cash	-0.23%	0.19	-0.69%	0.03 **	-0.26%	0.47
Equity	-0.59%	0.36	-0.31%	0.64	-0.08%	0.92
Synergy	-0.43%	0.15	-1.04%	0.01 ***	-0.33%	0.40
Agency	-0.23%	0.41	-0.13%	0.75	-0.22%	0.66
Absolute size	-0.16%	0.78	-1.72%	0.08 *	-0.60%	0.52
Relative size	-0.63%	0.41	-0.58%	0.46	-0.14%	0.85

Table Y: Testing output of cumulative average abnormal returns for event windows [-3:3] and [-5;5] as well as average abnormal returns for all hypotheses' mean differences between the low and normal interest rate environment

In the following, the before mentioned signficant results of the testing against the rest of the sample in the low interest time period and similar transactions in the other time period are discussed in more detail.

7.2 Testing of transactions in the low interest rate environment

Overall, the 921 analyzed transactions in the low interest rate environment significantly destroy shareholder value. This outcome is in line with the main hypothesis of this thesis and it can be argued that the facilitation of financing through loose monetary policy seduces companies to execute questionable M&A transactions from the acquirers' shareholder value perspective. The AAR on the event day t_0 is equivalent to -1.10% and significantly different from zero with a confidence level of 1%. The CAAR measure supports the claim and all event windows [-15;15], [-10;10], [-5;5], [-3;3] and [-1;1], prove to be significantly value destructive to the shareholders of the acquiring company. In order to understand the fine nuances of value destruction the significant characteristics are discussed in the following.

Financial characteristics

When considering all transactions in the low interest rate environment, the only characteristic which significantly outperforms other characteristics in terms of value creation is financing through cash. This is completely in line with suggestions of the pecking order theory, as cash is assumed to be the cheapest form of financing and is expected to create the lowest hurdle to

creating value from a shareholder perspective. The AAR of cash transactions on t_0 leads to a return which is 1.62% higher than the AAR of non-cash transactions, mainly comprising of equity transactions (85% out of non-cash transactions). The total amount of cash transactions was also high in that period (71% out of all transactions), which is likely to be linked to the low interest rate environment and the bad investment alternatives. The positive difference of AAR_{cash} in comparison to other transactions is significant at a confidence level of 1%, which allows a high assurance in rejecting the null hypothesis. In addition, the CAAR with a [-3;3] and [-5;5] event window lead to similar significant results and further supports the claims.

In contrast, equity financing is one of the characteristics which leads to significantly worse performing M&A. This can equally be explained by drawing upon pecking order theory and stands in direct contrast to cash financed acquisitions. Moreover, equity financed acquisitions are connected to the fact that stock markets expect the inherent managers to think their stock is overvalued when choosing equity financing. This has also been verified by multiple other studies and the sample between 2009 and 2015, during the low interest rate environment allows the same conclusion. The actual AAR difference on the event day t_0 is 1.21% lower for equity transactions than other transactions at a confidence level of 5% (see table W).

Strategic characteristics

The strategic characteristic which proves to have a negative influence on the potential of value creation through M&A is related to deals changing the fundamentals of the acquirer's business. The applied proxy relies on sizable transactions in relative and absolute terms. Interestingly, only the CAAR lead to meaningful significant results in terms of large transactions. This is an observation which can be made for some of the other characteristics, nevertheless it is best observed in this case. The event day t_0 does not seem to be different enough from other days which leads to the conclusion that the market might react late due to the inability to absorb the new information. Such a claim is further supported by the fact that the AAR of transactions larger than €500m is lower on t_1 in comparison to t_0 in both time periods (see appendix 10.30, 10.30). This could be related to the fact that the transactions are complicated, which is inherently linked to size, or were unexpected and supposed to change the acquirers' business significantly. A possible interpretation is that markets need time to digest such information, which is one day in this case. In addition, information coud leak prior to the announcement

which leads to a stock market reaction before the actual event day t_0. Another factor which is influential and increases the importance of considering the event window is the actual timing of an announcement. The exact timing of an announcement can lead to a reaction which takes place after t_0. In this case the information might be publicly disclosed after the stock exchange has closed, not all traders can access the market and trades based on the new information cannot be executed in time. Additionally, some stocks can be put on a trading halt and therefore no trades can be executed leading to a delay in the response as well. Naturally, the reaction of the market is observed shortly after (i.e. at t_1), or in case of a trading halt when trading is possible again.

7.3 Differences between low and normal interest rate environment

The testing of differences between the low and normal interest rate environment has proven to be rewarding. The main hypothesis was confirmed at a confidence level of 5% for the AAR and 1% for the CAAR with an event window of [-3;3]. This is in line with the overall claim that the interest rate environment proves to have an effect on value creation through M&A. In the case of low interest rates, it is shown to be value destructive from a shareholder perspective. Therefore, companies that perform M&A during times of low interest rates seem to base their decision on subjective matters and are influenced by external factors which facilitate easy access to capital. This in turn leads to punishment by capital markets with a negative stock market reaction. Interestingly, the reference period which is also characterized by a booming stock market leads similarly to negative abnormal returns to shareholders. Nonetheless, the low interest rate destroys significantly more value and a couple of characteristics were ascertained to be driving the difference.

Financial characteristics

One of the characteristics which shape the response of capital markets is the way of financing that companies choose. As suggested by the fact that financing is acquired more easily during times of low interest rates and holding cash on the balance sheet yields lower returns, companies perform M&A with lower reluctance. Usually interest rates are raised during times of booming stock markets in order to not overheat the market and associated investments. In this case, interest rates were kept low and were even lowered over the observation period. This

is hypothesized to have a negative impact on cash transactions. Jensen's free cash flow theory serves as a theoretical background for such hypothesis. Here, the CAAR with a [-3;3] event window show significantly more negative results for cash transactions at a confidence level of 5% set side by side to cash financed transactions during times of normal interest rates (see table Y).

Strategic characteristics

Another factor which signficantly affects value creation is whether a transaction is involving companies in the same business or not. Related acquisitions create most of its benefits through an improved market position and the potential of exploiting syerngies. As a result of lower interest rates this potential could be deceiving with managers overestimating the potential synergies. This is in line with the fact that more value is destroyed through related acquisitions during times of low interest rates. In particular, an event window of [-3;3] leads to a negative effect of -1.04% at a confidence level of 1%.

Lastly, acquisitions that are larger than €500m also destroy significantly more value than similarly large acquisitions during times of normal interest rates (confidence level of 10%, see table Y). This fact can be explained by taking into account that receiving financing for acquisitions in general is easier. Therefore, companies perform acquisitions which would otherwise not be feasible from a financial perspective. This likelihood is higher for large acquisitions as those usually lead to a higher risk for acquirers and require more funding. During a normal interest rate environment, these acquisitions might still not be undertaken as the increased cost of financing would hinder companies. However, when companies receive financing more easily and the stock market develops positively, they might take on that risk of performing highly valued acquisitions. This decreased barrier is taken into account when the stock market assesses transactions and therefore, lower abnormal returns are realized with a higher likelihood. This finding is significant at a confidence level of 10% when regarding a [-3;3] day event window and the CAAR is equivalent to a return difference of -1.72% in comparison to the normal interest rate environment.

7.4 Overview of supported hypotheses

Table Y gives an overview of all hypotheses and indicates the supported ones. For the supported hypotheses, the null hypothesis needs to be rejected, which is the case in 8 out of the total 13 claims including the main hypothesis.

First research question

H_1	**M&A during times of low interest rates lead to lower abnormal returns in comparison to M&A during times of normal interest rates** ✓	

Second research question

	Transaction characteristic	Impact on shareholder value	Relative to normal interest rate regime
H_2	M&A financed through cash	**Higher returns** ✓	**Lower returns** ✓
H_3	M&A financed through equity	**Lower returns** ✓	Lower returns
H_4	M&A focused on synergy exploitation	Higher returns	**Lower returns** ✓
H_5	M&A focused on diversification	Lower returns	Lower returns
H_6	Relative large acquisitions	**Lower returns** ✓	Lower returns
H_7	Absolute large acquisitions	**Lower returns** ✓	**Lower returns** ✓

*Table Y: Overview of accepted hypotheses; **Note**: Supported hypotheses are highlighted bold and marked with a tick*

8 Conclusion

The topic M&A is highly relevant in many contexts and widely researched in respect to value creation and destruction. This thesis is able to further illuminate and detail the effect of M&A on the acquirers' shareholders' wealth. The findings of other researchers are partly in line with this thesis' results as many studies show that M&A can be value destructive depending on the transactions' and companies' characteristics. The fact that many M&A transactions are value destructive seems to be counterintuitive and the need to further explore under what circumstances value destruction occurs is self explanatory.

A previously neglected topic is the effect of the interest rate environment as a decisive factor on whether M&A creates or destroys value. Hence, this thesis takes the recent novel macroeconomic environment and researches the effect of low interest rates in combination with other characteristics. The period of 2010-2015 serves as the perfect sample for such an endeavour as the interest rates have been lowered over a long period of time despite the fact of a booming stock market. This allows to draw a comparison with the period between 2003-2007 where stock market valuations were rising as well but with higher and rising interest rates. The attempt to isolate the effect of interest rates and identify differences between the two periods leads to a number of conclusions which can benefit practicioners in their decision making concerning M&A and allow scholars to further research the topic.

The first research question and main hypothesis of this thesis answers whether acquisitions during times of low interest rates destroy more value than M&A during times of normal interest rates. This claim is supported by a statistical significance which allows to reject the H_0 at a confidence level of 5% for the measure AAR. The low interest rate sample of 921 transactions leads to an AAR on the event day t_0 which is 0.48% lower than the AAR of the 1,219 transactions in the normal interest rate environment. This also confirms that the market is efficient and information is absorped quickly by the market. In addition, the measure CAAR shows a significantly negative difference for an event window of [-3;3] and further gives evidence that transactions in a low interest rate regime destroy significantly more value than during normal interest rates. A number of theoretical considerations are used to find out which characteristics drive such a difference in value creation.

Examining the low interest rate in separation implies that the effect of transactions is governed by the pecking order theory and the agency theory. The results indicate that equity transactions lead to significantly worse performing deals in accordance with the pecking order theory. In contrast, cash financed acquisitions lead to higher returns in comparison to other transactions performed in the low interest rate environment. Agency theory in combination with CEO overconfidence turns large transactions into value destructive corporate actions.

The second research question gives a better picture about the difference between the low and normal interest rate regime. The two sample periods are distinguished based on company and transaction characteristics. Due to the fact that low interest rates cheapen the sourcing of money, the Jensen's free cash flow theory is followed and proves that cash transactions destroy significantly more value during times of low interest rates. Furthermore, it is shown that related transactions lead to lower returns during times of low interest rates. It can be assumed that synergies are overestimated and the simplified execution of transactions leads to worse performing M&A. Lastly, the easened way of acquiring financing leads to more large scale transactions which often times bear higher risks. These large transactions tend to be negatively regarded by the market and therefore lead to lower returns during times of normal interest rates in comparison to times of normal interest rates.

However, the conclusions should still not hinder companies to consider and perform M&A. In contrast, it should raise the awareness for ensuring that the underlying decision making process of M&A is grounded on subjective rationales. Managers are therefore asked to question whether transactions which possess one of the above mentioned characteristics would be reasonable during a different economic context. In addition, market responses do not perfectly display the potential of M&A transactions but should be regarded as an indicator in the analysis. Long term consequences in combination with internal knowledge could prove that certain transactions are beneficial even though the market initially responds negatively.

In terms of scholarly attention this thesis is expected to be further extended by using other characteristics, different regions and potentially other time periods. Furthermore, the interest rate environment is closely connected to the overall macroeconomic environment and the inter relatedness could be considered more thoroughly while evaluating the impact of M&A

transactions. Concluding, the results prove to have a high significance and therefore give relevant clues about the effect of M&A. Further studies regarding interest rates in the field of M&A are probable to lead to further insightful conclusions and additioanl implications.

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10 Appendices

10.1 Test of cash transactions vs other transactions in the low interest rate environment

AAR (t=0) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Cash		654	-0.65%		0.031581033
Other than cash		261	-2.27%		0.082271455
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
1.62%	0.00%	291	3.10	0.00 ***	1.97

CAAR (+/-5) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Cash		654	-1.33%		0.06980345
Other than cash		261	-2.85%		0.088866192
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
1.53%	0.00%	394	2.49	0.01 **	1.97

CAAR (+/-3) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Cash		654	-1.51%		0.059828896
Other than cash		261	-2.85%		0.08136897
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
1.34%	0.00%	377	2.41	0.02 **	1.97

10.2 Test of equity transactions vs other transactions in the low interest rate environment

AAR (t=0) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Equity		223	-1.99%		0.082883334
Other than equity		698	-0.82%		0.036228811
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-1.17%	0.00%	250	-2.05	0.04 **	1.97

CAAR (+/-5) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Equity		223	-2.19%		0.091858097
Other than equity		698	-1.58%		0.069468466
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.61%	0.00%	307	-0.91	0.36	1.97

CAAR (+/-3) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Equity		223	-2.23%		0.079524359
Other than equity		698	-1.74%		0.061762255
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.49%	0.00%	312	-0.85	0.40	1.97

10.3 Test of agency motivated transactions vs synergy motivated transactions in the low interest rate environment

AAR (t=0) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Agency motivated		428	-0.89%		0.047479192
Synergy motivated		493	-1.29%		0.055160827
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
0.40%	0.00%	919	1.17	0.24	1.96

CAAR (+/-5) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Agency motivated		428	-1.75%		0.085957415
Synergy motivated		493	-1.71%		0.06500739
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.03%	0.00%	788	-0.06	0.95	1.96

CAAR (+/-3) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Agency motivated		428	-1.48%		0.067475974
Synergy motivated		493	-2.19%		0.065560256
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
0.71%	0.00%	893	1.61	0.11	1.96

10.4 Test of transactions >€500m vs other transactions in the low interest rate environment

AAR (t=0) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
>500m		49	-0.67%		0.036271692
other		872	-1.13%		0.052482524
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
0.45%	0.00%	60	0.83	0.41	2.00

CAAR (+/-5) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
>500m		49	-2.40%		0.061216327
other		872	-1.69%		0.076157919
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.71%	0.00%	57	-0.77	0.44	2.00

CAAR (+/-3) Comparison with other transactions (low interest rates) - Welch's t-test						
Sub sample		Sample size	Mean			Variance
>500m		49	-3.31%			0.051560753
other		872	-1.77%			0.067217849
Difference	Hypothesized difference	Degrees of freedom	t value	p value		t critical value (5%)
-1.54%	0.00%	58	-2.00	0.05	*	2.00

10.5 Test of relatively large transactions (>10% of acquirer's asset value / market cap) vs other transactions in the low interest rate environment

AAR (t=0) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Large		129	-2.08%		0.07789267
Small		792	-0.94%		0.04597757
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-1.14%	0.00%	143	-1.62	0.11	1.98

CAAR (+/-5) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Large		129	-3.44%		0.069066452
Small		792	-1.45%		0.076467563
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-1.99%	0.00%	183	-2.98	0.00 ***	1.97

CAAR (+/-3) Comparison with other transactions (low interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Large		129	-3.49%		0.066843708
Small		792	-1.59%		0.066434186
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-1.90%	0.00%	172	-2.99	0.00 ***	1.97

10.6 Test of low interest rate M&A transactions vs normal interest rate M&A transactions

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test

Sub sample	Sample size	Mean	Variance
Low interest rates	921	-1.10%	0.051743479
Normal interest rates	1219	-0.63%	0.036374785

Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.48%	0.00%	1,570	-2.38	0.02 **	1.96

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test

Sub sample	Sample size	Mean	Variance
Low interest rates	921	-1.73%	0.075446828
Normal interest rates	1219	-1.33%	0.063922641

Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.40%	0.00%	1,791	-1.31	0.19	1.96

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test

Sub sample	Sample size	Mean	Variance
Low interest rates	921	-1.86%	0.066455354
Normal interest rates	1219	-1.13%	0.05955207

Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.73%	0.00%	1,858	-2.61	0.01 ***	1.96

10.7 Test of cash transactions in the low interest rate environment vs normal interest rate environment

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Cash transactions (low interest rates)		654	-0.65%		0.031581033
Cash transactions (normal interest rates)		666	-0.42%		0.030957846
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.23%	0.00%	1,316	-1.31	0.19	1.96

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Cash transactions (low interest rates)		654	-1.33%		0.06980345
Cash transactions (normal interest rates)		666	-1.07%		0.060419176
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.26%	0.00%	1,285	-0.72	0.47	1.96

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Cash transactions (low interest rates)		654	-1.51%		0.059828896
Cash transactions (normal interest rates)		666	-0.83%		0.055588049
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.69%	0.00%	1,307	-2.16	0.03 **	1.96

10.8 Test of equity transactions in the low interest rate environment vs normal interest rate environment

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Equity transactions (low interest rates)		223	-1.99%		0.082883334
Equity transactions (normal interest rates)		197	-1.41%		0.046157912
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.59%	0.00%	356	-0.91	0.36	1.97

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Equity transactions (low interest rates)		223	-2.19%		0.091858097
Equity transactions (normal interest rates)		197	-2.11%		0.073236841
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.08%	0.00%	414	-0.10	0.92	1.97

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Equity transactions (low interest rates)		223	-2.23%		0.079524359
Equity transactions (normal interest rates)		197	-1.92%		0.055051438
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.31%	0.00%	396	-0.47	0.64	1.97

10.9 Test of synergy motivated transactions in the low interest rate environment vs normal interest rate environment

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test

Sub sample	Sample size	Mean	Variance
Synergy transactions (low interest rates)	428	-1.29%	0.055160827
Synergy transactions (normal interest rates)	642	-0.85%	0.033615661

Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.43%	0.00%	639	-1.46	0.15	1.96

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test

Sub sample	Sample size	Mean	Variance
Synergy transactions (low interest rates)	428	-1.71%	0.06500739
Synergy transactions (normal interest rates)	642	-1.39%	0.059638952

Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.33%	0.00%	860	-0.84	0.40	1.96

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test

Sub sample	Sample size	Mean	Variance
Synergy transactions (low interest rates)	428	-2.19%	0.065560256
Synergy transactions (normal interest rates)	642	-1.15%	0.058030266

Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-1.04%	0.00%	837	-2.65	0.01 ***	1.96

10.10 Test of agency motivated transactions in the low interest rate environment vs normal interest rate environment

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Agency transactions (low interest rates)		428	-0.89%		0.047479192
Agency transactions (normal interest rates)		577	-0.66%		0.039225931
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.23%	0.00%	814	-0.82	0.41	1.96

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Agency transactions (low interest rates)		428	-1.75%		0.085957415
Agency transactions (normal interest rates)		577	-1.53%		0.068277034
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.22%	0.00%	792	-0.44	0.66	1.96

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Agency transactions (low interest rates)		428	-1.48%		0.067475974
Agency transactions (normal interest rates)		577	-1.34%		0.06118939
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.13%	0.00%	868	-0.32	0.75	1.96

10.11 Test of transactions >€500m in the low interest rate environment vs normal interest rate environment

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Transactions >EUR500m (low interest rates)		49	-0.67%		0.036271692
Transactions >EUR500m (normal interest rates)		69	-0.47%		0.023013484
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.21%	0.00%	75	-0.35	0.72	1.99

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Transactions >EUR500m (low interest rates)		49	-2.40%		0.061216327
Transactions >EUR500m (normal interest rates)		69	-1.62%		0.036276169
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.78%	0.00%	72	-0.79	0.43	1.99

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Transactions >EUR500m (low interest rates)		49	-3.31%		0.051560753
Transactions >EUR500m (normal interest rates)		69	-1.34%		0.058631369
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-1.97%	0.00%	111	-1.93	0.06 *	1.98

10.12 Test of relatively large transactions (>10% of the acquirer's asset value / market cap) in the low interest rate environment vs normal interest rate environment

AAR (t=0) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Relative large transactions (low interest rates)		129	-2.08%		0.07789267
Relative large transactions (normal interest rates)		196	-1.45%		0.045417714
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.63%	0.00%	186	-0.83	0.41	1.97

CAAR (+/-5) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Relative large transactions (low interest rates)		129	-3.44%		0.069066452
Relative large transactions (normal interest rates)		196	-3.30%		0.064056002
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.14%	0.00%	259	-0.18	0.85	1.97

CAAR (+/-3) Comparison of two independent samples (low vs normal interest rates) - Welch's t-test					
Sub sample		Sample size	Mean		Variance
Relative large transactions (low interest rates)		129	-3.49%		0.066843708
Relative large transactions (normal interest rates)		196	-2.91%		0.072356721
Difference	Hypothesized difference	Degrees of freedom	t value	p value	t critical value (5%)
-0.58%	0.00%	289	-0.75	0.46	1.97

10.13 AAR and CAAR t-test of cash transactions in the low interest rate environment

Cash transactions (low interest rates - 15 day horiozon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.05%	0.60	0.55	0.05%	0.60	0.55
-14	-0.19%	-1.26	0.21	-0.14%	-0.66	0.51
-13	0.11%	1.09	0.28	-0.03%	-0.16	0.87
-12	0.06%	0.76	0.45	0.03%	0.19	0.85
-11	0.04%	0.61	0.54	0.07%	0.44	0.66
-10	0.02%	0.21	0.84	0.09%	0.44	0.66
-9	0.04%	0.57	0.57	0.13%	0.69	0.49
-8	-0.07%	-0.85	0.39	0.06%	0.29	0.77
-7	0.01%	0.15	0.88	0.08%	0.33	0.74
-6	-0.11%	-1.36	0.17	-0.03%	-0.12	0.90
-5	-0.07%	-0.94	0.35	-0.10%	-0.40	0.69
-4	0.14%	1.73	0.08 *	0.04%	0.13	0.89
-3	-0.09%	-1.24	0.22	-0.06%	-0.21	0.83
-2	0.00%	-0.03	0.97	-0.06%	-0.21	0.84
-1	-0.11%	-1.35	0.18	-0.17%	-0.54	0.59
0	**-0.65%**	**-5.24**	**0.00 *** **	**-0.82%**	**-1.65**	**0.10 ***
1	-0.39%	-3.87	0.00 ***	-1.20%	-2.92	0.00 ***
2	-0.15%	-1.51	0.13	-1.36%	-3.20	0.00 ***
3	-0.12%	-1.35	0.18	-1.48%	-3.83	0.00 ***
4	0.00%	-0.04	0.97	-1.48%	-3.73	0.00 ***
5	0.12%	1.47	0.14	-1.36%	-3.60	0.00 ***
6	-0.14%	-1.74	0.08 *	-1.49%	-4.04	0.00 ***
7	0.02%	0.25	0.80	-1.47%	-3.80	0.00 ***
8	-0.03%	-0.33	0.74	-1.50%	-3.73	0.00 ***
9	0.03%	0.40	0.69	-1.47%	-4.39	0.00 ***
10	-0.04%	-0.62	0.54	-1.52%	-4.20	0.00 ***
11	-0.12%	-1.25	0.21	-1.64%	-3.23	0.00 ***
12	0.04%	0.62	0.54	-1.60%	-4.31	0.00 ***
13	0.06%	0.85	0.40	-1.53%	-3.90	0.00 ***
14	0.01%	0.17	0.87	-1.52%	-3.07	0.00 ***
15	-0.08%	-0.84	0.40	-1.60%	-3.05	0.00 ***
N	654					

10.14 AAR and CAAR t-test of non-cash transactions in the low interest rate environment

Non-cash transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.06%	-0.24	0.81	-0.06%	-0.24	0.81
-14	0.07%	0.35	0.73	0.02%	0.06	0.95
-13	-0.34%	-2.33	0.02 **	-0.32%	-1.27	0.20
-12	0.00%	-0.02	0.98	-0.33%	-0.97	0.33
-11	0.38%	1.10	0.27	0.05%	0.07	0.95
-10	-0.68%	-2.66	0.01 ***	-0.63%	-1.01	0.32
-9	0.49%	3.05	0.00 ***	-0.14%	-0.33	0.74
-8	-0.27%	-1.07	0.29	-0.41%	-0.57	0.57
-7	-0.14%	-0.68	0.50	-0.55%	-0.88	0.38
-6	-0.05%	-0.26	0.79	-0.60%	-0.97	0.33
-5	-0.12%	-0.68	0.49	-0.72%	-1.23	0.22
-4	0.01%	0.04	0.97	-0.71%	-1.19	0.23
-3	-0.07%	-0.32	0.75	-0.78%	-1.04	0.30
-2	0.33%	1.09	0.28	-0.45%	-0.39	0.69
-1	0.17%	0.77	0.44	-0.28%	-0.32	0.75
0	**-2.27%**	**-4.46**	**0.00 *****	**-2.55%**	**-1.25**	**0.21**
1	-1.06%	-3.54	0.00 ***	-3.61%	-2.92	0.00 ***
2	0.20%	0.83	0.41	-3.40%	-3.27	0.00 ***
3	-0.16%	-0.84	0.40	-3.56%	-4.30	0.00 ***
4	0.07%	0.39	0.70	-3.50%	-4.43	0.00 ***
5	0.04%	0.24	0.81	-3.46%	-4.55	0.00 ***
6	-0.05%	-0.27	0.78	-3.50%	-4.22	0.00 ***
7	-0.50%	-1.86	0.06 *	-4.01%	-3.11	0.00 ***
8	0.15%	0.56	0.58	-3.86%	-3.00	0.00 ***
9	0.31%	1.32	0.19	-3.55%	-3.02	0.00 ***
10	-0.22%	-1.05	0.29	-3.77%	-3.52	0.00 ***
11	0.14%	0.72	0.47	-3.62%	-3.52	0.00 ***
12	-0.16%	-0.99	0.32	-3.78%	-4.44	0.00 ***
13	0.06%	0.31	0.76	-3.73%	-3.87	0.00 ***
14	0.03%	0.22	0.82	-3.70%	-4.56	0.00 ***
15	0.09%	0.78	0.44	-3.60%	-5.33	0.00 ***
N	261					

10.15 AAR and CAAR Welch's t-test of cash vs non-cash transactions in the low interest rate environment

Cash vs non-cash transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.11%	0.42	0.67	0.11%	0.42	0.67
-14	-0.26%	-1.01	0.31	-0.16%	-0.43	0.67
-13	0.45%	2.54	0.01 **	0.29%	0.96	0.34
-12	0.06%	0.33	0.74	0.35%	0.97	0.33
-11	-0.33%	-0.95	0.34	0.02%	0.03	0.98
-10	0.70%	2.60	0.01 ***	0.72%	1.09	0.28
-9	-0.45%	-2.56	0.01 **	0.27%	0.58	0.56
-8	0.20%	0.77	0.44	0.47%	0.64	0.53
-7	0.15%	0.69	0.49	0.63%	0.94	0.35
-6	-0.05%	-0.26	0.79	0.57%	0.86	0.39
-5	0.05%	0.26	0.80	0.62%	0.97	0.33
-4	0.13%	0.69	0.49	0.75%	1.14	0.26
-3	-0.03%	-0.12	0.90	0.72%	0.90	0.37
-2	-0.33%	-1.06	0.29	0.39%	0.33	0.74
-1	-0.28%	-1.19	0.24	0.10%	0.11	0.91
0	**1.62%**	**3.10**	**0.00 *** **	**1.73%**	**0.82**	**0.41**
1	0.67%	2.13	0.03 **	2.40%	1.84	0.07 *
2	-0.35%	-1.34	0.18	2.05%	1.82	0.07 *
3	0.04%	0.20	0.85	2.09%	2.28	0.02 **
4	-0.07%	-0.36	0.72	2.02%	2.28	0.02 **
5	0.08%	0.44	0.66	2.10%	2.47	0.01 **
6	-0.09%	-0.46	0.65	2.01%	2.21	0.03 **
7	0.52%	1.86	0.06 *	2.53%	1.88	0.06 *
8	-0.17%	-0.63	0.53	2.36%	1.75	0.08 *
9	-0.28%	-1.16	0.25	2.07%	1.70	0.09 *
10	0.18%	0.80	0.42	2.25%	1.99	0.05 **
11	-0.27%	-1.20	0.23	1.99%	1.73	0.08 *
12	0.20%	1.15	0.25	2.19%	2.35	0.02 **
13	0.01%	0.03	0.97	2.19%	2.11	0.04 **
14	-0.02%	-0.10	0.92	2.18%	2.29	0.02 **
15	-0.17%	-1.13	0.26	2.00%	2.34	0.02 **

10.16 AAR and CAAR t-test of cash transactions in the normal interest rate environment

Cash transactions (normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.06%	0.70	0.49	0.06%	0.70	0.49
-14	-0.01%	-0.12	0.90	0.05%	0.44	0.66
-13	-0.11%	-1.35	0.18	-0.06%	-0.44	0.66
-12	0.04%	0.57	0.57	-0.02%	-0.12	0.90
-11	-0.07%	-0.87	0.39	-0.09%	-0.49	0.62
-10	0.13%	1.91	0.06 *	0.04%	0.22	0.82
-9	0.00%	0.02	0.99	0.04%	0.21	0.84
-8	0.00%	0.05	0.96	0.04%	0.18	0.86
-7	-0.08%	-0.95	0.34	-0.04%	-0.15	0.88
-6	0.02%	0.21	0.83	-0.02%	-0.08	0.93
-5	-0.07%	-1.01	0.31	-0.09%	-0.39	0.70
-4	0.02%	0.24	0.81	-0.07%	-0.24	0.81
-3	-0.04%	-0.53	0.60	-0.11%	-0.41	0.68
-2	-0.09%	-0.99	0.32	-0.20%	-0.60	0.55
-1	-0.02%	-0.26	0.80	-0.22%	-0.64	0.52
0	**-0.42%**	**-3.51**	**0.00 *** **	**-0.64%**	**-1.34**	**0.18**
1	-0.18%	-2.06	0.04 **	-0.82%	-2.32	0.02 **
2	0.04%	0.42	0.67	-0.78%	-2.06	0.04 **
3	-0.11%	-1.41	0.16	-0.90%	-2.53	0.01 **
4	-0.06%	-0.71	0.48	-0.96%	-2.64	0.01 ***
5	-0.13%	-1.86	0.06 *	-1.09%	-3.36	0.00 ***
6	0.01%	0.16	0.88	-1.08%	-2.93	0.00 ***
7	-0.08%	-1.05	0.30	-1.16%	-3.11	0.00 ***
8	-0.05%	-0.55	0.59	-1.20%	-2.98	0.00 ***
9	0.15%	2.07	0.04 **	-1.05%	-2.84	0.00 ***
10	-0.11%	-1.39	0.16	-1.16%	-2.79	0.01 ***
11	-0.06%	-0.78	0.43	-1.22%	-3.22	0.00 ***
12	-0.04%	-0.49	0.62	-1.26%	-2.84	0.00 ***
13	-0.05%	-0.74	0.46	-1.31%	-3.74	0.00 ***
14	-0.08%	-1.03	0.31	-1.39%	-3.21	0.00 ***
15	-0.01%	-0.18	0.86	-1.41%	-3.13	0.00 ***
N	666					

10.17 AAR and CAAR Welch's t-test of cash transactions in the low interest rate vs normal interest rate environment

Cash transactions (low vs normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.01%	-0.08	0.94	-0.01%	-0.08	0.94
-14	-0.18%	-1.06	0.29	-0.19%	-0.79	0.43
-13	0.22%	1.70	0.09 *	0.03%	0.15	0.88
-12	0.01%	0.12	0.90	0.05%	0.22	0.83
-11	0.12%	1.05	0.29	0.16%	0.66	0.51
-10	-0.11%	-1.03	0.30	0.05%	0.20	0.84
-9	0.04%	0.40	0.69	0.09%	0.35	0.73
-8	-0.07%	-0.62	0.53	0.02%	0.07	0.94
-7	0.09%	0.80	0.43	0.11%	0.33	0.74
-6	-0.12%	-1.12	0.26	-0.01%	-0.03	0.98
-5	0.00%	0.02	0.99	-0.01%	-0.02	0.98
-4	0.12%	1.00	0.32	0.11%	0.27	0.79
-3	-0.05%	-0.51	0.61	0.06%	0.14	0.89
-2	0.09%	0.73	0.47	0.14%	0.32	0.75
-1	-0.09%	-0.71	0.48	0.05%	0.11	0.91
0	**-0.23%**	**-1.31**	**0.19**	**-0.17%**	**-0.25**	**0.80**
1	-0.21%	-1.59	0.11	-0.38%	-0.70	0.48
2	-0.19%	-1.40	0.16	-0.57%	-1.00	0.32
3	0.00%	-0.04	0.97	-0.58%	-1.10	0.27
4	0.05%	0.45	0.65	-0.52%	-0.97	0.33
5	0.25%	2.32	0.02 **	-0.27%	-0.54	0.59
6	-0.15%	-1.34	0.18	-0.42%	-0.81	0.42
7	0.10%	0.91	0.36	-0.32%	-0.59	0.55
8	0.02%	0.16	0.88	-0.30%	-0.52	0.60
9	-0.13%	-1.26	0.21	-0.43%	-0.85	0.39
10	0.07%	0.65	0.52	-0.35%	-0.64	0.52
11	-0.06%	-0.53	0.60	-0.42%	-0.66	0.51
12	0.08%	0.77	0.44	-0.34%	-0.58	0.56
13	0.11%	1.13	0.26	-0.22%	-0.43	0.67
14	0.10%	0.80	0.42	-0.13%	-0.20	0.84
15	-0.06%	-0.52	0.60	-0.19%	-0.28	0.78

10.18 AAR and CAAR t-test of equity transactions in the low interest rate environment

Equity transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.02%	0.08	0.94	0.02%	0.08	0.94
-14	0.08%	0.32	0.75	0.10%	0.29	0.77
-13	-0.34%	-2.07	0.04 **	-0.24%	-0.83	0.40
-12	0.02%	0.13	0.90	-0.21%	-0.58	0.56
-11	0.40%	1.00	0.32	0.19%	0.21	0.83
-10	-0.74%	-2.51	0.01 **	-0.55%	-0.77	0.45
-9	0.50%	2.68	0.01 ***	-0.06%	-0.12	0.90
-8	-0.31%	-1.07	0.29	-0.37%	-0.45	0.65
-7	-0.17%	-0.71	0.48	-0.53%	-0.75	0.46
-6	-0.06%	-0.28	0.78	-0.60%	-0.86	0.39
-5	-0.14%	-0.68	0.50	-0.73%	-1.09	0.28
-4	0.00%	-0.01	0.99	-0.73%	-1.07	0.29
-3	-0.03%	-0.11	0.92	-0.76%	-0.88	0.38
-2	0.37%	1.06	0.29	-0.38%	-0.29	0.77
-1	0.32%	1.28	0.20	-0.06%	-0.06	0.95
0	**-1.99%**	**-3.59**	**0.00 *****	**-2.05%**	**-0.93**	**0.36**
1	-0.98%	-2.91	0.00 ***	-3.03%	-2.19	0.03 **
2	0.16%	0.59	0.56	-2.87%	-2.47	0.01 **
3	-0.09%	-0.46	0.64	-2.97%	-3.38	0.00 ***
4	0.08%	0.41	0.68	-2.88%	-3.21	0.00 ***
5	0.10%	0.53	0.60	-2.79%	-3.28	0.00 ***
6	0.00%	0.02	0.98	-2.78%	-3.10	0.00 ***
7	-0.49%	-1.58	0.11	-3.27%	-2.22	0.03 **
8	0.07%	0.23	0.82	-3.20%	-2.16	0.03 **
9	0.33%	1.22	0.22	-2.87%	-2.13	0.03 **
10	-0.28%	-1.17	0.24	-3.15%	-2.57	0.01 **
11	0.13%	0.58	0.56	-3.02%	-2.57	0.01 **
12	-0.14%	-0.79	0.43	-3.16%	-3.29	0.00 ***
13	0.09%	0.43	0.67	-3.08%	-2.85	0.00 ***
14	0.15%	0.92	0.36	-2.93%	-3.24	0.00 ***
15	0.04%	0.29	0.78	-2.89%	-3.82	0.00 ***
N	223					

10.19 AAR and CAAR t-test of non-equity transactions in the low interest rate environment

Non-equity transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.02%	0.26	0.79	0.02%	0.26	0.79
-14	-0.17%	-1.26	0.21	-0.15%	-0.78	0.43
-13	0.08%	0.92	0.36	-0.06%	-0.40	0.69
-12	0.04%	0.58	0.56	-0.02%	-0.16	0.87
-11	0.05%	0.77	0.44	0.03%	0.19	0.85
-10	0.00%	-0.02	0.98	0.03%	0.15	0.88
-9	0.06%	0.87	0.39	0.08%	0.49	0.63
-8	-0.15%	-1.32	0.19	-0.07%	-0.21	0.83
-7	0.01%	0.17	0.86	-0.06%	-0.28	0.78
-6	-0.09%	-1.27	0.20	-0.15%	-0.66	0.51
-5	-0.07%	-0.98	0.33	-0.22%	-0.95	0.34
-4	0.13%	1.75	0.08 *	-0.09%	-0.36	0.72
-3	-0.10%	-1.49	0.14	-0.19%	-0.77	0.44
-2	0.05%	0.58	0.56	-0.15%	-0.47	0.64
-1	-0.14%	-1.84	0.07 *	-0.29%	-0.97	0.33
0	**-0.78%**	**-5.96**	**0.00 *** **	**-1.06%**	**-2.04**	**0.04 ** **
1	-0.42%	-4.46	0.00 ***	-1.49%	-3.80	0.00 ***
2	-0.12%	-1.27	0.21	-1.61%	-4.07	0.00 ***
3	-0.14%	-1.62	0.11	-1.74%	-4.75	0.00 ***
4	-0.01%	-0.09	0.93	-1.75%	-4.86	0.00 ***
5	0.09%	1.24	0.22	-1.65%	-4.79	0.00 ***
6	-0.14%	-1.93	0.05 *	-1.80%	-5.16	0.00 ***
7	-0.08%	-0.77	0.44	-1.88%	-3.73	0.00 ***
8	0.02%	0.23	0.81	-1.86%	-5.02	0.00 ***
9	0.03%	0.53	0.59	-1.83%	-5.85	0.00 ***
10	-0.03%	-0.49	0.62	-1.86%	-5.62	0.00 ***
11	-0.10%	-1.08	0.28	-1.96%	-4.25	0.00 ***
12	0.03%	0.46	0.65	-1.93%	-5.67	0.00 ***
13	0.05%	0.67	0.50	-1.88%	-5.16	0.00 ***
14	-0.02%	-0.27	0.79	-1.90%	-4.23	0.00 ***
15	-0.04%	-0.52	0.60	-1.95%	-4.12	0.00 ***
N	734					

10.20 AAR and CAAR Welch's t-test of equity vs non-equity transactions in the low interest rate environment

Equity vs non-equity transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.00%	0.00	1.00	0.00%	0.00	1.00
-14	0.25%	0.88	0.38	0.25%	0.63	0.53
-13	-0.42%	-2.25	0.02 **	-0.17%	-0.53	0.60
-12	-0.02%	-0.09	0.93	-0.19%	-0.49	0.63
-11	0.35%	0.86	0.39	0.16%	0.17	0.86
-10	-0.74%	-2.42	0.02 **	-0.58%	-0.78	0.44
-9	0.44%	2.24	0.03 **	-0.14%	-0.28	0.78
-8	-0.15%	-0.49	0.63	-0.30%	-0.34	0.74
-7	-0.18%	-0.73	0.47	-0.48%	-0.64	0.52
-6	0.03%	0.13	0.90	-0.45%	-0.61	0.54
-5	-0.07%	-0.32	0.75	-0.52%	-0.72	0.47
-4	-0.13%	-0.61	0.54	-0.64%	-0.88	0.38
-3	0.08%	0.32	0.75	-0.57%	-0.63	0.53
-2	0.33%	0.90	0.37	-0.24%	-0.18	0.86
-1	0.46%	1.76	0.08 *	0.23%	0.22	0.83
0	**-1.21%**	**-2.13**	**0.03 ** **	**-0.99%**	**-0.43**	**0.66**
1	-0.56%	-1.59	0.11	-1.55%	-1.07	0.28
2	0.28%	0.96	0.34	-1.27%	-1.03	0.30
3	0.04%	0.20	0.84	-1.22%	-1.29	0.20
4	0.09%	0.41	0.68	-1.13%	-1.17	0.24
5	0.00%	0.02	0.98	-1.13%	-1.23	0.22
6	0.15%	0.72	0.47	-0.98%	-1.02	0.31
7	-0.40%	-1.25	0.21	-1.39%	-0.89	0.37
8	0.05%	0.16	0.87	-1.33%	-0.87	0.38
9	0.29%	1.07	0.29	-1.04%	-0.75	0.45
10	-0.25%	-1.00	0.32	-1.29%	-1.02	0.31
11	0.23%	0.93	0.35	-1.06%	-0.84	0.40
12	-0.17%	-0.90	0.37	-1.24%	-1.21	0.23
13	0.04%	0.19	0.85	-1.20%	-1.05	0.29
14	0.17%	0.95	0.34	-1.02%	-1.01	0.31
15	0.08%	0.52	0.60	-0.94%	-1.05	0.29

10.21 AAR and CAAR t-test of equity transactions in the normal interest rate environment

Equity transactions (normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.24%	-1.45	0.15	-0.24%	-1.45	0.15
-14	-0.13%	-0.89	0.37	-0.37%	-1.80	0.07 *
-13	-0.07%	-0.48	0.63	-0.44%	-1.83	0.07 *
-12	-0.21%	-1.20	0.23	-0.64%	-1.89	0.06 *
-11	0.27%	1.81	0.07 *	-0.37%	-1.12	0.26
-10	0.12%	0.86	0.39	-0.25%	-0.72	0.47
-9	-0.28%	-1.54	0.12	-0.54%	-1.10	0.27
-8	-0.08%	-0.36	0.72	-0.62%	-0.96	0.34
-7	-0.27%	-1.30	0.19	-0.89%	-1.41	0.16
-6	-0.27%	-1.62	0.11	-1.16%	-2.21	0.03 **
-5	-0.18%	-1.21	0.23	-1.35%	-2.67	0.01 ***
-4	0.02%	0.14	0.89	-1.32%	-2.45	0.02 **
-3	0.03%	0.18	0.86	-1.30%	-2.22	0.03 **
-2	-0.03%	-0.15	0.88	-1.32%	-1.97	0.05 *
-1	-0.21%	-1.30	0.19	-1.53%	-2.44	0.02 **
0	**-1.41%**	**-4.27**	**0.00 *** **	**-2.94%**	**-2.23**	**0.03 ** **
1	-0.37%	-1.45	0.15	-3.31%	-3.17	0.00 ***
2	-0.08%	-0.49	0.63	-3.39%	-4.74	0.00 ***
3	0.15%	0.98	0.33	-3.24%	-5.02	0.00 ***
4	-0.03%	-0.13	0.90	-3.27%	-3.61	0.00 ***
5	-0.01%	-0.05	0.96	-3.28%	-4.54	0.00 ***
6	-0.35%	-2.17	0.03 **	-3.62%	-4.81	0.00 ***
7	-0.07%	-0.42	0.68	-3.69%	-4.75	0.00 ***
8	0.20%	1.23	0.22	-3.49%	-4.42	0.00 ***
9	0.19%	1.03	0.30	-3.30%	-3.53	0.00 ***
10	-0.34%	-1.86	0.06 *	-3.64%	-3.89	0.00 ***
11	0.13%	1.08	0.28	-3.51%	-5.57	0.00 ***
12	0.16%	1.20	0.23	-3.35%	-4.64	0.00 ***
13	0.06%	0.37	0.71	-3.29%	-3.78	0.00 ***
14	-0.07%	-0.50	0.62	-3.36%	-4.41	0.00 ***
15	0.17%	0.86	0.39	-3.19%	-2.96	0.00 ***
N	197					

10.22 AAR and CAAR Welch's t-test of equity transactions in the low interest rate vs normal interest rate environment

Equity transactions (low vs normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.26%	0.83	0.41	0.26%	0.83	0.41
-14	0.21%	0.73	0.46	0.47%	1.17	0.24
-13	-0.27%	-1.26	0.21	0.20%	0.55	0.58
-12	0.23%	0.91	0.36	0.43%	0.86	0.39
-11	0.13%	0.31	0.76	0.56%	0.59	0.56
-10	-0.86%	-2.63	0.01 ***	-0.30%	-0.38	0.71
-9	0.78%	2.99	0.00 ***	0.48%	0.69	0.49
-8	-0.22%	-0.61	0.54	0.25%	0.24	0.81
-7	0.11%	0.33	0.74	0.36%	0.38	0.71
-6	0.21%	0.76	0.45	0.57%	0.65	0.52
-5	0.05%	0.18	0.85	0.61%	0.73	0.47
-4	-0.02%	-0.09	0.93	0.59%	0.68	0.50
-3	-0.05%	-0.19	0.85	0.54%	0.52	0.61
-2	0.40%	1.01	0.31	0.94%	0.63	0.53
-1	0.53%	1.78	0.08 *	1.47%	1.27	0.21
0	**-0.59%**	**-0.91**	**0.36**	**0.88%**	**0.34**	**0.73**
1	-0.61%	-1.46	0.15	0.27%	0.16	0.88
2	0.24%	0.76	0.45	0.52%	0.38	0.71
3	-0.24%	-0.96	0.34	0.28%	0.25	0.80
4	0.11%	0.38	0.70	0.39%	0.30	0.76
5	0.10%	0.43	0.67	0.49%	0.44	0.66
6	0.35%	1.41	0.16	0.84%	0.72	0.47
7	-0.42%	-1.20	0.23	0.43%	0.26	0.80
8	-0.13%	-0.38	0.71	0.30%	0.18	0.86
9	0.13%	0.41	0.68	0.43%	0.26	0.79
10	0.06%	0.20	0.84	0.49%	0.32	0.75
11	0.00%	0.00	1.00	0.49%	0.37	0.71
12	-0.31%	-1.35	0.18	0.18%	0.15	0.88
13	0.03%	0.10	0.92	0.21%	0.15	0.88
14	0.22%	1.03	0.30	0.43%	0.37	0.71
15	-0.13%	-0.54	0.59	0.31%	0.23	0.82

10.23 AAR and CAAR t-test of agency motivated transactions in the low interest rate environment

Agency transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.02%	-0.15	0.88	-0.02%	-0.15	0.88
-14	-0.17%	-0.77	0.44	-0.19%	-0.61	0.54
-13	0.11%	0.79	0.43	-0.08%	-0.36	0.72
-12	0.12%	1.20	0.23	0.04%	0.19	0.85
-11	0.19%	1.75	0.08 *	0.22%	0.94	0.35
-10	-0.10%	-0.81	0.42	0.12%	0.38	0.70
-9	0.18%	1.82	0.07 *	0.30%	1.16	0.25
-8	-0.22%	-1.07	0.28	0.07%	0.12	0.90
-7	0.15%	1.27	0.21	0.22%	0.63	0.53
-6	-0.11%	-0.96	0.34	0.11%	0.31	0.75
-5	-0.22%	-1.87	0.06 *	-0.11%	-0.27	0.78
-4	-0.01%	-0.10	0.92	-0.12%	-0.27	0.79
-3	-0.13%	-1.03	0.30	-0.25%	-0.54	0.59
-2	0.27%	2.12	0.03 **	0.02%	0.03	0.97
-1	0.11%	0.95	0.34	0.12%	0.28	0.78
0	**-0.89%**	**-3.88**	**0.00 *** **	**-0.77%**	**-0.84**	**0.40**
1	-0.28%	-1.97	0.05 **	-1.05%	-1.78	0.08 *
2	-0.33%	-2.23	0.03 **	-1.38%	-2.21	0.03 **
3	-0.22%	-1.76	0.08 *	-1.60%	-2.97	0.00 ***
4	-0.08%	-0.60	0.55	-1.68%	-2.86	0.00 ***
5	0.04%	0.34	0.73	-1.63%	-2.85	0.00 ***
6	-0.07%	-0.71	0.48	-1.71%	-3.60	0.00 ***
7	-0.38%	-1.90	0.06 *	-2.08%	-2.17	0.03 **
8	0.16%	1.23	0.22	-1.92%	-2.98	0.00 ***
9	0.08%	0.89	0.38	-1.84%	-4.18	0.00 ***
10	0.00%	-0.04	0.97	-1.85%	-3.50	0.00 ***
11	-0.01%	-0.09	0.93	-1.86%	-2.29	0.02 **
12	-0.02%	-0.21	0.84	-1.88%	-3.74	0.00 ***
13	-0.05%	-0.52	0.60	-1.94%	-3.43	0.00 ***
14	0.15%	1.24	0.21	-1.79%	-2.70	0.01 ***
15	-0.03%	-0.25	0.80	-1.82%	-2.55	0.01 **
N	428					

10.24 AAR and CAAR t-test of synergy motivated transactions in the low interest rate environment

Synergy transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.06%	0.47	0.64	0.06%	0.47	0.64
-14	-0.07%	-0.53	0.60	-0.01%	-0.05	0.96
-13	-0.12%	-1.17	0.24	-0.13%	-0.73	0.47
-12	-0.03%	-0.35	0.73	-0.16%	-0.82	0.41
-11	0.10%	0.52	0.60	-0.07%	-0.16	0.87
-10	-0.25%	-1.82	0.07 *	-0.31%	-0.94	0.35
-9	0.16%	1.60	0.11	-0.16%	-0.62	0.54
-8	-0.18%	-1.44	0.15	-0.33%	-0.97	0.33
-7	-0.19%	-1.75	0.08 *	-0.52%	-1.61	0.11
-6	-0.07%	-0.64	0.52	-0.59%	-1.75	0.08 *
-5	0.03%	0.32	0.75	-0.56%	-1.85	0.06 *
-4	0.20%	2.39	0.02 **	-0.36%	-1.25	0.21
-3	-0.05%	-0.51	0.61	-0.41%	-1.17	0.24
-2	0.01%	0.04	0.97	-0.41%	-0.64	0.52
-1	-0.15%	-1.19	0.23	-0.56%	-1.12	0.26
0	**-1.29%**	**-5.18**	**0.00 *** **	**-1.85%**	**-1.86**	**0.06 ***
1	-0.83%	-5.00	0.00 ***	-2.67%	-3.92	0.00 ***
2	0.18%	1.37	0.17	-2.49%	-4.39	0.00 ***
3	-0.06%	-0.50	0.62	-2.55%	-5.24	0.00 ***
4	0.10%	0.97	0.33	-2.45%	-5.58	0.00 ***
5	0.15%	1.66	0.10 *	-2.31%	-5.70	0.00 ***
6	-0.15%	-1.37	0.17	-2.46%	-4.77	0.00 ***
7	-0.01%	-0.10	0.92	-2.47%	-4.42	0.00 ***
8	-0.08%	-0.62	0.54	-2.55%	-3.86	0.00 ***
9	0.13%	0.98	0.33	-2.42%	-3.65	0.00 ***
10	-0.17%	-1.50	0.14	-2.59%	-4.44	0.00 ***
11	-0.07%	-0.74	0.46	-2.66%	-5.30	0.00 ***
12	0.00%	-0.04	0.96	-2.67%	-5.28	0.00 ***
13	0.15%	1.53	0.13	-2.51%	-4.65	0.00 ***
14	-0.09%	-0.97	0.33	-2.61%	-4.89	0.00 ***
15	-0.02%	-0.24	0.81	-2.63%	-5.47	0.00 ***
N	493					

10.25 AAR and CAAR Welch's t-test of agency vs synergy motivated transactions in the low interest rate environment

Agency vs synergy transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.08%	-0.42	0.67	-0.08%	-0.42	0.67
-14	-0.10%	-0.41	0.68	-0.18%	-0.51	0.61
-13	0.23%	1.34	0.18	0.05%	0.16	0.88
-12	0.16%	1.10	0.27	0.20%	0.71	0.48
-11	0.09%	0.42	0.67	0.29%	0.61	0.54
-10	0.14%	0.77	0.44	0.44%	0.95	0.34
-9	0.02%	0.14	0.89	0.45%	1.26	0.21
-8	-0.05%	-0.20	0.84	0.41%	0.60	0.55
-7	0.34%	2.11	0.03 **	0.75%	1.55	0.12
-6	-0.04%	-0.26	0.79	0.70%	1.42	0.15
-5	-0.25%	-1.68	0.09 *	0.45%	0.91	0.36
-4	-0.21%	-1.37	0.17	0.24%	0.45	0.65
-3	-0.08%	-0.52	0.60	0.16%	0.27	0.79
-2	0.26%	1.24	0.21	0.42%	0.53	0.60
-1	0.26%	1.52	0.13	0.68%	1.03	0.30
0	**0.40%**	**1.17**	**0.24**	**1.08%**	**0.80**	**0.43**
1	0.55%	2.49	0.01 **	1.62%	1.80	0.07 *
2	-0.51%	-2.57	0.01 **	1.11%	1.31	0.19
3	-0.16%	-0.97	0.33	0.95%	1.31	0.19
4	-0.17%	-1.06	0.29	0.78%	1.06	0.29
5	-0.10%	-0.68	0.50	0.67%	0.96	0.34
6	0.08%	0.52	0.60	0.75%	1.07	0.28
7	-0.37%	-1.59	0.11	0.38%	0.34	0.73
8	0.25%	1.30	0.19	0.63%	0.68	0.50
9	-0.05%	-0.32	0.75	0.58%	0.72	0.47
10	0.17%	1.08	0.28	0.74%	0.95	0.34
11	0.06%	0.32	0.75	0.80%	0.84	0.40
12	-0.02%	-0.11	0.91	0.79%	1.10	0.27
13	-0.21%	-1.44	0.15	0.58%	0.74	0.46
14	0.25%	1.58	0.11	0.82%	0.97	0.33
15	-0.01%	-0.07	0.94	0.81%	0.95	0.34

10.26 AAR and CAAR t-test of agency motivated transactions in the normal interest rate environment

Agency transactions (normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.08%	0.74	0.46	0.08%	0.74	0.46
-14	-0.16%	-1.65	0.10 *	-0.08%	-0.58	0.56
-13	-0.07%	-0.82	0.41	-0.15%	-0.99	0.32
-12	-0.06%	-0.66	0.51	-0.21%	-1.20	0.23
-11	0.18%	1.95	0.05 *	-0.03%	-0.14	0.88
-10	0.15%	1.78	0.07 *	0.12%	0.58	0.56
-9	-0.03%	-0.33	0.74	0.09%	0.43	0.67
-8	-0.06%	-0.64	0.52	0.03%	0.10	0.92
-7	-0.11%	-1.00	0.32	-0.08%	-0.25	0.81
-6	-0.23%	-2.42	0.02 **	-0.31%	-1.03	0.30
-5	-0.08%	-0.87	0.38	-0.38%	-1.32	0.19
-4	0.14%	1.43	0.15	-0.24%	-0.74	0.46
-3	0.05%	0.57	0.57	-0.19%	-0.59	0.55
-2	-0.15%	-1.31	0.19	-0.34%	-0.82	0.41
-1	-0.17%	-1.61	0.11	-0.51%	-1.23	0.22
0	**-0.66%**	**-4.03**	**0.00 *** **	**-1.17%**	**-1.79**	**0.07 ***
1	-0.36%	-3.45	0.00 ***	-1.53%	-3.54	0.00 ***
2	0.01%	0.09	0.93	-1.52%	-3.59	0.00 ***
3	-0.06%	-0.66	0.51	-1.59%	-3.78	0.00 ***
4	-0.02%	-0.22	0.82	-1.61%	-3.71	0.00 ***
5	-0.22%	-2.58	0.01 **	-1.83%	-4.66	0.00 ***
6	-0.14%	-1.48	0.14	-1.98%	-4.32	0.00 ***
7	-0.14%	-1.45	0.15	-2.12%	-4.53	0.00 ***
8	0.07%	0.73	0.46	-2.04%	-4.19	0.00 ***
9	0.09%	0.93	0.35	-1.96%	-4.21	0.00 ***
10	-0.27%	-2.49	0.01 **	-2.22%	-4.06	0.00 ***
11	-0.01%	-0.14	0.89	-2.24%	-4.98	0.00 ***
12	0.05%	0.55	0.58	-2.18%	-4.19	0.00 ***
13	0.12%	1.67	0.10 *	-2.06%	-5.14	0.00 ***
14	-0.10%	-1.07	0.29	-2.15%	-4.39	0.00 ***
15	0.09%	0.91	0.37	-2.06%	-3.58	0.00 ***
N	577					

10.27 AAR and CAAR Welch's t-test of agency motivated transactions in the low interest rate vs normal interest rate environment

Agency transactions (low vs normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.10%	-0.58	0.56	-0.10%	-0.58	0.56
-14	-0.01%	-0.04	0.97	-0.11%	-0.32	0.75
-13	0.18%	1.12	0.26	0.07%	0.25	0.80
-12	0.18%	1.34	0.18	0.25%	0.93	0.35
-11	0.00%	0.03	0.98	0.26%	0.80	0.42
-10	-0.25%	-1.66	0.10 *	0.00%	0.00	1.00
-9	0.20%	1.60	0.11	0.20%	0.61	0.54
-8	-0.16%	-0.69	0.49	0.04%	0.07	0.95
-7	0.26%	1.61	0.11	0.30%	0.63	0.53
-6	0.12%	0.79	0.43	0.42%	0.90	0.37
-5	-0.15%	-0.99	0.32	0.27%	0.56	0.57
-4	-0.15%	-0.93	0.36	0.12%	0.22	0.82
-3	-0.19%	-1.17	0.24	-0.06%	-0.11	0.91
-2	0.42%	2.46	0.01 **	0.35%	0.56	0.58
-1	0.28%	1.80	0.07 *	0.63%	1.06	0.29
0	**-0.23%**	**-0.82**	**0.41**	**0.40%**	**0.36**	**0.72**
1	0.08%	0.45	0.65	0.48%	0.66	0.51
2	-0.34%	-1.89	0.06 *	0.14%	0.19	0.85
3	-0.15%	-0.98	0.33	-0.01%	-0.01	0.99
4	-0.06%	-0.35	0.73	-0.07%	-0.09	0.93
5	0.26%	1.74	0.08 *	0.20%	0.28	0.78
6	0.07%	0.52	0.60	0.27%	0.41	0.68
7	-0.24%	-1.07	0.29	0.03%	0.03	0.98
8	0.09%	0.54	0.59	0.12%	0.15	0.88
9	-0.01%	-0.07	0.95	0.11%	0.18	0.86
10	0.26%	1.77	0.08 *	0.38%	0.50	0.62
11	0.00%	-0.01	0.99	0.38%	0.40	0.69
12	-0.07%	-0.54	0.59	0.30%	0.42	0.68
13	-0.18%	-1.39	0.16	0.12%	0.18	0.86
14	0.25%	1.63	0.10	0.37%	0.45	0.65
15	-0.13%	-0.76	0.45	0.24%	0.27	0.79

10.28 AAR and CAAR t-test of synergy motivated transactions in the normal interest rate environment

Synergy transactions (normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.14%	-2.10	0.04 **	-0.14%	-2.10	0.04 **
-14	0.03%	0.42	0.67	-0.12%	-1.21	0.23
-13	-0.13%	-1.69	0.09 *	-0.25%	-1.82	0.07 *
-12	0.01%	0.12	0.90	-0.24%	-1.46	0.14
-11	-0.15%	-1.99	0.05 **	-0.39%	-2.28	0.02 **
-10	0.11%	1.69	0.09 *	-0.28%	-1.80	0.07 *
-9	-0.13%	-1.58	0.11	-0.41%	-1.90	0.06 *
-8	0.06%	0.58	0.56	-0.36%	-1.33	0.19
-7	-0.15%	-1.83	0.07 *	-0.51%	-2.09	0.04 **
-6	0.05%	0.69	0.49	-0.45%	-1.91	0.06 *
-5	-0.16%	-2.10	0.04 **	-0.61%	-2.48	0.01 **
-4	-0.06%	-0.75	0.45	-0.67%	-2.30	0.02 **
-3	-0.12%	-1.63	0.10	-0.79%	-3.00	0.00 ***
-2	0.03%	0.33	0.74	-0.77%	-2.58	0.01 ***
-1	-0.11%	-1.15	0.25	-0.88%	-2.41	0.02 **
0	**-0.85%**	**-6.43**	**0.00 *****	**-1.73%**	**-3.26**	**0.00 *****
1	-0.18%	-1.56	0.12	-1.91%	-4.07	0.00 ***
2	0.03%	0.00	1.00	-1.87%	-4.86	0.00 ***
3	0.05%	0.00	1.00	-1.82%	-4.83	0.00 ***
4	-0.08%	0.00	1.00	-1.90%	-4.71	0.00 ***
5	0.06%	0.00	1.00	-1.84%	-5.66	0.00 ***
6	0.01%	0.00	1.00	-1.83%	-5.30	0.00 ***
7	-0.04%	0.00	1.00	-1.87%	-5.54	0.00 ***
8	0.00%	0.00	1.00	-1.87%	-5.01	0.00 ***
9	0.26%	0.00	1.00	-1.61%	-4.16	0.00 ***
10	-0.10%	0.00	1.00	-1.71%	-4.56	0.00 ***
11	0.00%	0.00	1.00	-1.72%	-5.07	0.00 ***
12	-0.01%	0.00	1.00	-1.72%	-4.58	0.00 ***
13	-0.16%	0.00	1.00	-1.88%	-4.70	0.00 ***
14	-0.11%	0.00	1.00	-1.99%	-4.84	0.00 ***
15	-0.02%	0.00	1.00	-2.01%	-4.56	0.00 ***
N	642					

10.29 AAR and CAAR Welch's t-test of synergy motivated transactions in the low interest rate vs normal interest rate environment

Synergy transactions (low vs normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.20%	1.36	0.17	0.20%	1.36	0.17
-14	-0.09%	-0.63	0.53	0.11%	0.51	0.61
-13	0.01%	0.10	0.92	0.12%	0.51	0.61
-12	-0.04%	-0.33	0.74	0.08%	0.28	0.78
-11	0.25%	1.17	0.24	0.33%	0.68	0.49
-10	-0.36%	-2.23	0.03 **	-0.03%	-0.08	0.94
-9	0.29%	2.15	0.03 **	0.26%	0.73	0.47
-8	-0.23%	-1.43	0.15	0.02%	0.05	0.96
-7	-0.04%	-0.29	0.77	-0.02%	-0.04	0.97
-6	-0.12%	-0.87	0.38	-0.14%	-0.32	0.75
-5	0.19%	1.51	0.13	0.05%	0.12	0.91
-4	0.26%	2.14	0.03 **	0.31%	0.73	0.47
-3	0.07%	0.55	0.59	0.38%	0.83	0.41
-2	-0.02%	-0.10	0.92	0.36%	0.49	0.63
-1	-0.05%	-0.27	0.78	0.32%	0.49	0.63
0	**-0.43%**	**-1.46**	**0.15**	**-0.12%**	**-0.10**	**0.92**
1	-0.65%	-3.08	0.00 ***	-0.77%	-0.88	0.38
2	0.15%	0.89	0.37	-0.62%	-0.86	0.39
3	-0.11%	-0.74	0.46	-0.73%	-1.13	0.26
4	0.17%	1.26	0.21	-0.55%	-0.89	0.37
5	0.09%	0.73	0.47	-0.47%	-0.86	0.39
6	-0.16%	-1.12	0.26	-0.62%	-0.95	0.34
7	0.03%	0.19	0.85	-0.59%	-0.86	0.39
8	-0.08%	-0.50	0.61	-0.68%	-0.84	0.40
9	-0.13%	-0.81	0.42	-0.81%	-1.00	0.32
10	-0.07%	-0.51	0.61	-0.88%	-1.21	0.23
11	-0.07%	-0.56	0.58	-0.95%	-1.49	0.14
12	0.00%	0.02	0.98	-0.95%	-1.43	0.15
13	0.31%	2.40	0.02 **	-0.63%	-0.90	0.37
14	0.02%	0.12	0.90	-0.62%	-0.87	0.38
15	0.00%	0.00	1.00	-0.62%	-0.91	0.36

10.30 AAR and CAAR t-test of >€500m transactions in the low interest rate environment

>EUR500m transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.05%	-0.15	0.88	-0.05%	-0.15	0.88
-14	-0.29%	-1.14	0.26	-0.34%	-0.95	0.35
-13	0.31%	1.45	0.15	-0.03%	-0.08	0.93
-12	0.42%	1.92	0.06 *	0.39%	0.89	0.38
-11	-0.05%	-0.22	0.82	0.33%	0.61	0.54
-10	-0.26%	-0.92	0.36	0.08%	0.11	0.91
-9	0.06%	0.26	0.80	0.13%	0.23	0.82
-8	-0.19%	-0.86	0.40	-0.05%	-0.09	0.93
-7	-0.02%	-0.08	0.94	-0.07%	-0.10	0.92
-6	0.22%	0.82	0.41	0.15%	0.18	0.86
-5	-0.01%	-0.04	0.97	0.14%	0.19	0.85
-4	0.69%	3.09	0.00 ***	0.83%	1.07	0.29
-3	0.36%	1.77	0.08 *	1.19%	1.63	0.11
-2	-0.16%	-0.62	0.54	1.03%	1.11	0.27
-1	-0.83%	-2.61	0.01 **	0.21%	0.17	0.87
0	**-0.67%**	**-1.30**	**0.20**	**-0.47%**	**-0.23**	**0.82**
1	-1.57%	-2.71	0.01 ***	-2.04%	-0.85	0.40
2	-0.30%	-1.00	0.32	-2.33%	-1.84	0.07 *
3	-0.15%	-0.54	0.59	-2.49%	-2.05	0.05 **
4	-0.16%	-0.44	0.66	-2.65%	-1.61	0.11
5	0.40%	1.51	0.14	-2.25%	-1.86	0.07 *
6	-0.03%	-0.20	0.85	-2.28%	-2.76	0.01 ***
7	-0.30%	-1.25	0.22	-2.58%	-2.27	0.03 **
8	0.02%	0.09	0.93	-2.56%	-2.27	0.03 **
9	0.03%	0.12	0.90	-2.53%	-1.90	0.06 *
10	-0.17%	-0.85	0.40	-2.70%	-2.66	0.01 **
11	0.02%	0.13	0.90	-2.68%	-3.03	0.00 ***
12	0.16%	0.76	0.45	-2.52%	-2.26	0.03 **
13	-0.26%	-1.49	0.14	-2.77%	-2.98	0.00 ***
14	0.14%	0.64	0.53	-2.63%	-2.20	0.03 **
15	0.26%	1.35	0.18	-2.37%	-2.18	0.03 **
N	49					

10.31 AAR and CAAR t-test of <€500m transactions in the low interest rate environment

<EUR500m transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.03%	0.27	0.78	0.03%	0.27	0.78
-14	-0.10%	-0.81	0.42	-0.08%	-0.44	0.66
-13	-0.03%	-0.38	0.71	-0.11%	-0.74	0.46
-12	0.02%	0.22	0.82	-0.10%	-0.65	0.52
-11	0.15%	1.28	0.20	0.05%	0.21	0.84
-10	-0.18%	-1.80	0.07 *	-0.12%	-0.51	0.61
-9	0.17%	2.39	0.02 **	0.05%	0.25	0.80
-8	-0.20%	-1.62	0.11	-0.15%	-0.43	0.66
-7	-0.03%	-0.38	0.71	-0.18%	-0.73	0.47
-6	-0.10%	-1.29	0.20	-0.29%	-1.12	0.26
-5	-0.09%	-1.19	0.23	-0.38%	-1.48	0.14
-4	0.07%	0.87	0.39	-0.31%	-1.14	0.25
-3	-0.11%	-1.37	0.17	-0.42%	-1.41	0.16
-2	0.15%	1.28	0.20	-0.28%	-0.66	0.51
-1	0.01%	0.12	0.90	-0.27%	-0.78	0.44
0	**-1.13%**	**-6.34**	**0.00 *** **	**-1.40%**	**-1.96**	**0.05 ***
1	-0.52%	-4.60	0.00 ***	-1.91%	-4.12	0.00 ***
2	-0.04%	-0.39	0.69	-1.95%	-4.44	0.00 ***
3	-0.13%	-1.51	0.13	-2.08%	-5.56	0.00 ***
4	0.02%	0.29	0.77	-2.06%	-5.59	0.00 ***
5	0.08%	1.04	0.30	-1.98%	-5.55	0.00 ***
6	-0.12%	-1.50	0.13	-2.10%	-5.67	0.00 ***
7	-0.18%	-1.50	0.13	-2.27%	-4.03	0.00 ***
8	0.03%	0.32	0.75	-2.24%	-4.61	0.00 ***
9	0.11%	1.29	0.20	-2.13%	-4.99	0.00 ***
10	-0.09%	-1.10	0.27	-2.22%	-5.34	0.00 ***
11	-0.05%	-0.52	0.60	-2.27%	-4.65	0.00 ***
12	-0.02%	-0.30	0.76	-2.29%	-6.15	0.00 ***
13	0.07%	0.98	0.33	-2.22%	-5.42	0.00 ***
14	0.01%	0.16	0.87	-2.20%	-5.02	0.00 ***
15	-0.04%	-0.54	0.59	-2.25%	-5.13	0.00 ***
N	872					

10.32 AAR and CAAR Welch's t-test of >€500m vs other transactions in the low interest rate environment

>EUR500m vs <EUR500m transactions (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.08%	-0.21	0.83	-0.08%	-0.21	0.83
-14	-0.19%	-0.65	0.52	-0.27%	-0.65	0.52
-13	0.35%	1.48	0.14	0.08%	0.20	0.84
-12	0.40%	1.75	0.09 *	0.48%	1.05	0.30
-11	-0.20%	-0.75	0.45	0.28%	0.46	0.64
-10	-0.08%	-0.27	0.79	0.20%	0.28	0.78
-9	-0.11%	-0.49	0.63	0.09%	0.14	0.89
-8	0.01%	0.04	0.97	0.10%	0.14	0.89
-7	0.01%	0.05	0.96	0.11%	0.14	0.89
-6	0.33%	1.16	0.25	0.43%	0.49	0.62
-5	0.08%	0.35	0.73	0.52%	0.66	0.51
-4	0.62%	2.63	0.01 **	1.14%	1.39	0.17
-3	0.47%	2.16	0.03 **	1.61%	2.04	0.05 **
-2	-0.30%	-1.10	0.28	1.31%	1.28	0.20
-1	-0.84%	-2.55	0.01 **	0.48%	0.37	0.71
0	**0.45%**	**0.83**	**0.41**	**0.93%**	**0.42**	**0.67**
1	-1.05%	-1.78	0.08 *	-0.12%	-0.05	0.96
2	-0.26%	-0.81	0.42	-0.38%	-0.28	0.78
3	-0.02%	-0.07	0.94	-0.40%	-0.32	0.75
4	-0.19%	-0.50	0.62	-0.59%	-0.35	0.73
5	0.32%	1.15	0.25	-0.27%	-0.22	0.83
6	0.08%	0.43	0.67	-0.19%	-0.21	0.84
7	-0.12%	-0.46	0.65	-0.31%	-0.24	0.81
8	-0.01%	-0.04	0.97	-0.32%	-0.26	0.80
9	-0.08%	-0.28	0.78	-0.40%	-0.29	0.78
10	-0.08%	-0.37	0.71	-0.48%	-0.44	0.66
11	0.07%	0.36	0.72	-0.41%	-0.40	0.69
12	0.18%	0.82	0.42	-0.23%	-0.19	0.85
13	-0.33%	-1.76	0.08 *	-0.56%	-0.55	0.58
14	0.13%	0.54	0.59	-0.43%	-0.34	0.74
15	0.31%	1.46	0.15	-0.13%	-0.11	0.92

10.33 AAR and CAAR t-test of >€500m in the normal interest rate environment

>EUR500m transactions (normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.12%	0.35	0.72	0.12%	0.35	0.72
-14	-0.29%	-2.35	0.02 **	-0.18%	-0.99	0.32
-13	0.19%	0.96	0.34	0.01%	0.03	0.98
-12	0.04%	0.33	0.75	0.05%	0.20	0.84
-11	-0.22%	-1.90	0.06 *	-0.17%	-0.66	0.51
-10	0.08%	0.67	0.51	-0.09%	-0.29	0.77
-9	0.21%	0.92	0.36	0.12%	0.20	0.84
-8	-0.23%	-1.52	0.13	-0.10%	-0.25	0.81
-7	0.13%	0.87	0.39	0.03%	0.06	0.95
-6	0.04%	0.30	0.77	0.07%	0.15	0.88
-5	0.03%	0.16	0.88	0.10%	0.16	0.87
-4	-0.10%	-0.68	0.50	0.00%	0.00	1.00
-3	0.12%	0.80	0.42	0.12%	0.22	0.82
-2	0.12%	0.53	0.59	0.24%	0.29	0.77
-1	-0.26%	-0.67	0.50	-0.01%	-0.01	0.99
0	**-0.47%**	**-1.68**	**0.10 ***	**-0.48%**	**-0.43**	**0.67**
1	-0.49%	-1.68	0.10 *	-0.97%	-0.81	0.42
2	-0.27%	-1.17	0.24	-1.24%	-1.26	0.21
3	-0.10%	-0.39	0.70	-1.34%	-1.15	0.25
4	-0.18%	-1.00	0.32	-1.52%	-1.92	0.06 *
5	-0.03%	-0.24	0.81	-1.55%	-2.57	0.01 **
6	-0.17%	-1.04	0.30	-1.72%	-2.28	0.03 **
7	-0.04%	-0.22	0.83	-1.75%	-2.14	0.04 **
8	-0.08%	-0.37	0.71	-1.83%	-1.80	0.08 *
9	-0.36%	-2.25	0.03 **	-2.19%	-2.74	0.01 ***
10	-0.04%	-0.29	0.77	-2.23%	-3.18	0.00 ***
11	0.16%	1.20	0.24	-2.06%	-2.89	0.01 ***
12	-0.14%	-0.85	0.40	-2.20%	-2.56	0.01 **
13	0.02%	0.12	0.90	-2.19%	-3.09	0.00 ***
14	-0.23%	-1.51	0.14	-2.42%	-2.87	0.01 ***
15	-0.10%	-0.56	0.58	-2.52%	-2.51	0.01 **
N	69					

10.34 AAR and CAAR Welch's t-test of >€500m in the low interest rate vs normal interest rate environment

>EUR500m transactions (low vs normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.17%	-0.35	0.73	-0.17%	-0.35	0.73
-14	0.00%	0.00	1.00	-0.17%	-0.42	0.68
-13	0.13%	0.44	0.66	-0.04%	-0.08	0.93
-12	0.38%	1.52	0.13	0.34%	0.68	0.50
-11	0.16%	0.61	0.54	0.50%	0.83	0.41
-10	-0.34%	-1.11	0.27	0.16%	0.22	0.83
-9	-0.15%	-0.48	0.63	0.01%	0.01	0.99
-8	0.04%	0.15	0.88	0.05%	0.07	0.95
-7	-0.15%	-0.53	0.60	-0.10%	-0.12	0.91
-6	0.18%	0.57	0.57	0.08%	0.08	0.94
-5	-0.04%	-0.13	0.89	0.04%	0.04	0.97
-4	0.79%	2.95	0.00 ***	0.83%	0.89	0.38
-3	0.24%	0.93	0.35	1.07%	1.16	0.25
-2	-0.27%	-0.82	0.41	0.79%	0.63	0.53
-1	-0.57%	-1.15	0.25	0.22%	0.11	0.91
0	**-0.21%**	**-0.35**	**0.72**	**0.01%**	**0.01**	**1.00**
1	-1.08%	-1.67	0.10 *	-1.07%	-0.40	0.69
2	-0.03%	-0.07	0.95	-1.10%	-0.68	0.50
3	-0.05%	-0.12	0.90	-1.14%	-0.68	0.50
4	0.01%	0.03	0.97	-1.13%	-0.62	0.54
5	0.43%	1.46	0.15	-0.70%	-0.52	0.61
6	0.13%	0.55	0.58	-0.57%	-0.51	0.61
7	-0.26%	-0.89	0.38	-0.83%	-0.59	0.56
8	0.10%	0.31	0.76	-0.73%	-0.48	0.63
9	0.39%	1.26	0.21	-0.34%	-0.22	0.83
10	-0.13%	-0.53	0.60	-0.47%	-0.38	0.71
11	-0.14%	-0.65	0.51	-0.61%	-0.54	0.59
12	0.30%	1.12	0.27	-0.31%	-0.22	0.82
13	-0.27%	-1.26	0.21	-0.59%	-0.50	0.62
14	0.37%	1.39	0.17	-0.22%	-0.15	0.88
15	0.37%	1.37	0.17	0.15%	0.10	0.92

10.35 AAR and CAAR t-test of transactions >10% of acquirer's asset value / market cap in the low interest rate environment

>10% of acquirer's value (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.21%	0.61	0.54	0.21%	0.61	0.54
-14	-0.04%	-0.19	0.85	0.18%	0.63	0.53
-13	-0.05%	-0.32	0.75	0.12%	0.42	0.68
-12	-0.01%	-0.04	0.97	0.11%	0.26	0.80
-11	0.18%	1.25	0.21	0.29%	0.91	0.37
-10	-0.49%	-1.60	0.11	-0.20%	-0.26	0.79
-9	0.36%	1.51	0.13	0.16%	0.26	0.80
-8	0.15%	0.69	0.49	0.32%	0.50	0.62
-7	-0.10%	-0.41	0.68	0.22%	0.31	0.76
-6	0.19%	0.72	0.48	0.41%	0.49	0.62
-5	-0.16%	-0.83	0.41	0.24%	0.37	0.71
-4	0.01%	0.07	0.94	0.25%	0.42	0.68
-3	0.20%	0.75	0.46	0.45%	0.47	0.64
-2	0.06%	0.34	0.74	0.51%	0.77	0.44
-1	-0.31%	-1.58	0.12	0.20%	0.26	0.79
0	**-2.08%**	**-3.04**	**0.00 *** **	**-1.89%**	**-0.69**	**0.49**
1	-1.22%	-3.29	0.00 ***	-3.11%	-2.03	0.04 **
2	-0.01%	-0.03	0.97	-3.12%	-2.83	0.01 ***
3	-0.12%	-0.53	0.59	-3.24%	-3.34	0.00 ***
4	0.03%	0.12	0.90	-3.21%	-3.36	0.00 ***
5	0.18%	0.97	0.33	-3.03%	-3.61	0.00 ***
6	0.03%	0.19	0.85	-3.00%	-3.58	0.00 ***
7	-0.13%	-0.66	0.51	-3.13%	-3.31	0.00 ***
8	0.18%	0.81	0.42	-2.95%	-2.71	0.01 ***
9	0.27%	1.26	0.21	-2.67%	-2.45	0.02 **
10	-0.03%	-0.13	0.90	-2.70%	-2.64	0.01 ***
11	-0.20%	-0.62	0.54	-2.90%	-1.76	0.08 *
12	0.23%	1.52	0.13	-2.67%	-3.34	0.00 ***
13	-0.27%	-1.37	0.17	-2.94%	-2.74	0.01 ***
14	0.01%	0.04	0.97	-2.93%	-3.14	0.00 ***
15	0.05%	0.32	0.75	-2.88%	-3.07	0.00 ***
N	129					

10.36 AAR and CAAR t-test of transactions <10% of acquirer's asset value / market cap in the low interest rate environment

<10% of acquirer's value (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	-0.01%	-0.12	0.91	-0.01%	-0.12	0.91
-14	-0.13%	-0.92	0.36	-0.14%	-0.70	0.48
-13	-0.01%	-0.09	0.93	-0.14%	-0.90	0.37
-12	0.05%	0.61	0.54	-0.10%	-0.67	0.50
-11	0.13%	1.04	0.30	0.03%	0.11	0.91
-10	-0.13%	-1.34	0.18	-0.10%	-0.42	0.68
-9	0.13%	1.91	0.06 *	0.03%	0.18	0.85
-8	-0.25%	-1.95	0.05 *	-0.22%	-0.60	0.55
-7	-0.02%	-0.24	0.81	-0.24%	-0.94	0.35
-6	-0.13%	-1.65	0.10 *	-0.37%	-1.47	0.14
-5	-0.07%	-0.94	0.35	-0.45%	-1.70	0.09 *
-4	0.12%	1.40	0.16	-0.33%	-1.16	0.25
-3	-0.14%	-1.65	0.10 *	-0.47%	-1.57	0.12
-2	0.14%	1.14	0.25	-0.33%	-0.71	0.48
-1	0.01%	0.12	0.90	-0.32%	-0.86	0.39
0	**-0.94%**	**-5.77**	**0.00 *** **	**-1.26%**	**-1.93**	**0.05 ***
1	-0.47%	-4.11	0.00 ***	-1.73%	-3.67	0.00 ***
2	-0.06%	-0.58	0.56	-1.79%	-3.91	0.00 ***
3	-0.13%	-1.49	0.14	-1.92%	-4.94	0.00 ***
4	0.01%	0.14	0.89	-1.91%	-4.91	0.00 ***
5	0.09%	1.04	0.30	-1.82%	-4.86	0.00 ***
6	-0.14%	-1.67	0.10 *	-1.96%	-5.07	0.00 ***
7	-0.19%	-1.51	0.13	-2.15%	-3.55	0.00 ***
8	0.01%	0.06	0.95	-2.15%	-4.21	0.00 ***
9	0.08%	0.89	0.38	-2.07%	-4.67	0.00 ***
10	-0.10%	-1.24	0.22	-2.17%	-5.04	0.00 ***
11	-0.02%	-0.22	0.82	-2.19%	-4.68	0.00 ***
12	-0.05%	-0.68	0.50	-2.24%	-5.69	0.00 ***
13	0.11%	1.42	0.16	-2.13%	-5.09	0.00 ***
14	0.02%	0.25	0.80	-2.11%	-4.55	0.00 ***
15	-0.04%	-0.47	0.64	-2.15%	-4.65	0.00 ***
N	792					

10.37 AAR and CAAR Welch's t-test of transactions > 10% vs <10% of acquirer's asset value / market cap in the low interest rate environment

>10% vs <10% of acquirer's value (low interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.22%	0.62	0.53	0.22%	0.62	0.53
-14	0.09%	0.37	0.71	0.31%	0.92	0.36
-13	-0.05%	-0.24	0.81	0.27%	0.80	0.43
-12	-0.05%	-0.24	0.81	0.21%	0.46	0.64
-11	0.05%	0.26	0.80	0.26%	0.61	0.54
-10	-0.36%	-1.12	0.27	-0.10%	-0.12	0.90
-9	0.23%	0.91	0.36	0.13%	0.20	0.84
-8	0.41%	1.58	0.12	0.54%	0.73	0.46
-7	-0.08%	-0.31	0.76	0.46%	0.61	0.54
-6	0.32%	1.17	0.24	0.78%	0.90	0.37
-5	-0.09%	-0.42	0.67	0.69%	0.97	0.33
-4	-0.10%	-0.54	0.59	0.58%	0.88	0.38
-3	0.33%	1.20	0.23	0.92%	0.92	0.36
-2	-0.08%	-0.37	0.71	0.84%	1.04	0.30
-1	-0.32%	-1.48	0.14	0.51%	0.61	0.55
0	**-1.14%**	**-1.62**	**0.11**	**-0.63%**	**-0.22**	**0.82**
1	-0.75%	-1.94	0.05 *	-1.38%	-0.86	0.39
2	0.05%	0.19	0.85	-1.33%	-1.12	0.27
3	0.01%	0.06	0.95	-1.31%	-1.26	0.21
4	0.01%	0.06	0.95	-1.30%	-1.26	0.21
5	0.09%	0.46	0.64	-1.21%	-1.31	0.19
6	0.17%	0.87	0.39	-1.04%	-1.12	0.26
7	0.06%	0.26	0.80	-0.98%	-0.87	0.39
8	0.17%	0.70	0.48	-0.80%	-0.67	0.50
9	0.20%	0.83	0.41	-0.61%	-0.52	0.61
10	0.08%	0.36	0.72	-0.53%	-0.48	0.63
11	-0.18%	-0.54	0.59	-0.71%	-0.41	0.68
12	0.28%	1.67	0.10 *	-0.42%	-0.48	0.63
13	-0.38%	-1.79	0.08 *	-0.81%	-0.70	0.48
14	-0.01%	-0.07	0.94	-0.82%	-0.79	0.43
15	0.09%	0.49	0.62	-0.73%	-0.70	0.49

10.38 AAR and CAAR t-test of transactions > 10% of acquirer's asset value / market cap in the normal interest rate environment

>10% of acquirer's value (normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.14%	0.74	0.46	0.14%	0.74	0.46
-14	-0.13%	-1.12	0.26	0.01%	0.05	0.96
-13	0.06%	0.56	0.58	0.07%	0.37	0.72
-12	0.16%	1.15	0.25	0.23%	0.83	0.41
-11	-0.16%	-1.34	0.18	0.07%	0.26	0.80
-10	0.25%	1.82	0.07 *	0.32%	0.95	0.35
-9	0.16%	1.13	0.26	0.47%	1.29	0.20
-8	-0.09%	-0.69	0.49	0.38%	1.03	0.31
-7	0.06%	0.48	0.63	0.44%	1.26	0.21
-6	-0.01%	-0.06	0.95	0.43%	0.73	0.47
-5	-0.17%	-0.96	0.34	0.26%	0.43	0.67
-4	0.10%	0.66	0.51	0.36%	0.65	0.52
-3	-0.07%	-0.46	0.64	0.29%	0.55	0.58
-2	-0.22%	-1.16	0.25	0.07%	0.10	0.92
-1	0.02%	0.11	0.91	0.09%	0.11	0.91
0	**-1.45%**	**-4.48**	**0.00 *****	**-1.36%**	**-1.05**	**0.29**
1	-0.97%	-3.16	0.00 ***	-2.34%	-1.84	0.07 *
2	-0.32%	-1.86	0.06 *	-2.66%	-3.63	0.00 ***
3	0.11%	0.57	0.57	-2.55%	-2.99	0.00 ***
4	-0.11%	-0.83	0.41	-2.66%	-4.46	0.00 ***
5	-0.21%	-1.55	0.12	-2.87%	-4.54	0.00 ***
6	-0.16%	-1.16	0.25	-3.03%	-4.68	0.00 ***
7	-0.08%	-0.58	0.56	-3.11%	-4.53	0.00 ***
8	0.08%	0.52	0.60	-3.04%	-4.19	0.00 ***
9	0.05%	0.39	0.70	-2.99%	-4.39	0.00 ***
10	0.07%	0.62	0.54	-2.91%	-5.01	0.00 ***
11	0.11%	0.91	0.36	-2.81%	-4.63	0.00 ***
12	0.21%	1.66	0.10 *	-2.60%	-3.93	0.00 ***
13	-0.12%	-1.02	0.31	-2.72%	-4.45	0.00 ***
14	-0.30%	-2.14	0.03 **	-3.01%	-3.98	0.00 ***
15	-0.03%	-0.18	0.85	-3.04%	-3.60	0.00 ***
N	196					

10.39 AAR and CAAR Welch's t-test of transactions > 10% of acquirer's asset value / market cap in the low interest rate vs normal interest rate environment

>10% of acquirer's value (low vs normal interest rates - 15 day horizon)						
Event day (t)	AAR	t-stat	p-value	CAAR	t-stat	p-value
-15	0.07%	0.19	0.85	0.07%	0.19	0.85
-14	0.09%	0.41	0.69	0.17%	0.52	0.61
-13	-0.12%	-0.57	0.57	0.05%	0.15	0.88
-12	-0.17%	-0.65	0.52	-0.11%	-0.22	0.82
-11	0.34%	1.82	0.07 *	0.23%	0.54	0.59
-10	-0.74%	-2.20	0.03 **	-0.51%	-0.62	0.53
-9	0.20%	0.74	0.46	-0.31%	-0.42	0.67
-8	0.24%	0.94	0.35	-0.07%	-0.09	0.93
-7	-0.15%	-0.58	0.56	-0.22%	-0.28	0.78
-6	0.20%	0.62	0.54	-0.02%	-0.02	0.98
-5	0.01%	0.03	0.98	-0.01%	-0.02	0.99
-4	-0.09%	-0.39	0.70	-0.11%	-0.13	0.90
-3	0.27%	0.88	0.38	0.16%	0.15	0.88
-2	0.28%	1.08	0.28	0.44%	0.45	0.65
-1	-0.33%	-1.17	0.24	0.11%	0.10	0.92
0	**-0.63%**	**-0.83**	**0.41**	**-0.52%**	**-0.17**	**0.86**
1	-0.25%	-0.52	0.61	-0.77%	-0.39	0.70
2	0.31%	1.00	0.32	-0.46%	-0.35	0.73
3	-0.23%	-0.78	0.44	-0.69%	-0.54	0.59
4	0.14%	0.54	0.59	-0.55%	-0.49	0.62
5	0.39%	1.71	0.09 *	-0.16%	-0.15	0.88
6	0.19%	0.86	0.39	0.03%	0.03	0.98
7	-0.05%	-0.19	0.85	-0.01%	-0.01	0.99
8	0.10%	0.38	0.70	0.09%	0.07	0.95
9	0.22%	0.86	0.39	0.31%	0.24	0.81
10	-0.10%	-0.42	0.68	0.21%	0.18	0.86
11	-0.30%	-0.90	0.37	-0.09%	-0.05	0.96
12	0.02%	0.11	0.91	-0.07%	-0.07	0.95
13	-0.16%	-0.68	0.50	-0.22%	-0.18	0.86
14	0.30%	1.38	0.17	0.08%	0.07	0.95
15	0.08%	0.36	0.72	0.16%	0.13	0.90