STOCKHOLM SCHOOL OF ECONOMICS

- MASTER THESIS | DEPARTMENT OF FINANCE -

Too Big to Marry

A Quantitative Study of M&A Transactions Cancelled Due to Antitrust Authority's Veto in the United States and Europe

ABSTRACT

This study examines M&A transactions that have been terminated either due to strong antitrust scrutiny or an outright veto. In particular, the examination uses an event study method on the stock prices of involved companies as well as a difference-in-difference (DID) analysis on financial KPIs to determine the consequences of this event for the companies, their management as well as shareholders, with a sample of 91 terminated transactions and 136 companies distributed across the last twenty years. We find that such a termination event has significant negative effects on the stock prices and therefore on the wealth of shareholders, both in the short-term around the event as well as long-term up to a year after the event. Targets have much greater negative abnormal returns compared to acquirers, whereas there is no difference in results between the North American and European subsamples. While the event study results and our key hypothesis would therefore also expect declining performances with regards to the financial KPIs of acquirers, the performance does not differ from a basket of peers, resulting in neither an under- nor an outperformance. Judging from these results, we uncovered a discrepancy between the expectations assigned by the market of the consequences of the terminations with the actual development in companies' operational performance.

KEYWORDS

M&A, termination, cancellation, antitrust, competition, policy, event study, difference-in-difference

Stockholm School of Economics

Master Thesis – Department of Finance

Authors: Betty Andersson[1] and Alexandros Kakarakis[2]

May 15, 2017

[1] 22417@student.hhs.se

[2] 40938@student.hhs.se

Acknowledgements

We wish to warm-heartedly thank our tutor, Assistant Professor Dong Yan (Stockholm School of Economics, Swedish House of Finance), for her inspiration, guidance and continuous support during the writing process of this thesis.

We would further like to deeply thank our families and friends for their unlimited support and helpful remarks throughout this thesis.

1 INTRODUCTION 6

1.1 OVERVIEW 6

1.2. BACKGROUND 6

1.3 PURPOSE AND RESEARCH QUESTION 7

2 LITERATURE REVIEW 9

2.1 LITERATURE REVIEW ON TRANSACTION TERMINATIONS AND ANTITRUST 9

2.2 LITERATURE REVIEW ON EVENT STUDIES 10

2.3 LITERATURE REVIEW ON DIFFERENCE-IN-DIFFERENCE ANALYSES 11

3 RESEARCH HYPOTHESIS AND MOTIVATION 12

4 DATA AND DATA COLLECTION 15

5 METHODOLOGY 18

5.1 EVENT STUDY 18

5.1.1 SIGNIFICANCE TESTING - STUDENT T-TEST 21

5.1.2 SIGNIFICANCE TESTING - WELCH T-TEST 22

5.2 COMPARISON OF STOCK PRICES BEFORE THE TRANSACTION ANNOUNCEMENT AND AFTER THE TERMINATION ANNOUNCEMENT 22

5.3 FINANCIAL KPI DIFFERENCE-IN-DIFFERENCE ANALYSIS 22

5.3.1 FINANCIAL KPI SIGNIFICANCE TESTING 25

6 EMPIRICAL FINDINGS AND DISCUSSION 28

6.1 EVENT STUDY RESULTS 28

6.1.1 SUBSAMPLES 31

6.2 FINANCIAL KPI DIFFERENCE-IN-DIFFERENCE ANALYSIS RESULTS 42

7 SUMMARY AND CRITICAL APPRAISAL 48

7.1 SUMMARY OF FINDINGS 48

7.2 CONCLUDING REMARKS 49

7.3 LIMITATIONS 50

REFERENCES 52

APPENDICES 57

Figure 1: Transaction data distribution by year of termination 15
Figure 2: Transaction data distribution by transaction size 15
Figure 3: Transaction data split domestic versus cross-border transactions 15
Figure 4: Transaction data split by strategic nature 15
Figure 5: Distribution of sample companies by country 16
Figure 6: Distribution of sample companies by sector 16
Figure 7: Distribution of sample companies by industry 16
Figure 8: Event study time windows 19
Figure 9: Rebalanced stock price development t= -10 / 10 30
Figure 10: Return on Asset (ROA) median development over time 43
Figure 11: Capital Expenditure (CapEx) over total assets median development over time 44
Figure 12: Sales development median over time 46

Table 1: Cumulative Abnormal Return (CAR) results – full sample 28
Table 2: Comparison of stock prices from announcement to after termination 30
Table 3: Comparison of acquirer stock prices from announcement to after termination 30
Table 4: Comparison of target stock prices from announcement to after termination 31
Table 5: Cumulative Abnormal Return (CAR) results – acquirer subsample 32
Table 6: Cumulative Abnormal Return (CAR) results – target sample 33
Table 7: Cumulative Abnormal Return (CAR) results – Welch T-test 33
Table 8: Cumulative Abnormal Return (CAR) results – time periods 35
Table 9: Cumulative Abnormal Return (CAR) results – Welch T-test 35
Table 10: Cumulative Abnormal Return (CAR) results – North American subsample 37
Table 11: Cumulative Abnormal Return (CAR) results – European subsample 37
Table 12: Cumulative Abnormal Return (CAR) results – Welch T-test 37
Table 13: Cumulative Abnormal Return (CAR) results – Domestic subsample 38
Table 14: Cumulative Abnormal Return (CAR) results – Cross-border subsample 39
Table 15: Cumulative Abnormal Return (CAR) results – Welch T-test 39
Table 16: Cumulative Abnormal Return (CAR) results – Industry sectors 40
Table 17: Cumulative Abnormal Return (CAR) results – Welch T-test 40
Table 18: Cumulative Abnormal Return (CAR) results – Transaction sizes 41
Table 19: Cumulative Abnormal Return (CAR) results – Welch T-test 42
Table 20: Return on Asset (ROA) development for sample and peer companies 43
Table 21: Capital Expenditure/Total Assets development for sample and peer companies 44
Table 22: Sales development for sample and peer companies 45

”This antitrust thing will blow over.”

– Bill Gates

Co-Founder and former Chairman and CEO of Microsoft

1 Introduction

1.1 Overview

2015 was a record year both in terms of number of mergers and acquisitions (M&A) completed and in terms of deal value (Rogers, 2015). While the full year of 2016 did not see as high levels of deal volume, M&A activity was still very high relative to historical levels (Baigorri & Nair, 2016). Favourable underlying conditions such as strong economic growth and an incredibly long phase of low interest rates made M&A a popular strategic move. Billion dollar deals like the mergers between AT&T and Time Warner ($85.4bn deal value), Bayer and Monsanto ($66bn deal value) as well as British American Tobacco and Reynolds American ($58bn deal value) gained media attention worldwide (Shen, 2016). However, other high profile deals, that could have had significant impact on its respective industries, instead got cancelled. Examples of this were the $160 billion merger between Pfizer and Allergan, which would have been the second largest deal in history (Farrell, 2015), as well as Staples' announced acquisition of Office Depot. The reason why these deals were cancelled was in many cases antitrust issues. Because not only have the last couple of years been characterized by a high number of successful deals, there have also been an increasing number of cancelled deals, including a number of high profile deals being blocked by antirust regulators in both the US, Canada and the European Union (Fontanella-Khan, 2016). Reuters even called 2016 "The Year of Broken M&A Deals" (Roumeliotis & Barbaglia, 2016).

Antitrust clearly is a hot topic at the moment and it was one of the first issues to be mentioned when the most recent mega-deal between AT&T and Time Warner was announced in October last year. Then-candidate Donald Trump was asked about his opinion on the deal and his comment was that he would block any deal between AT&T and Time Warner if he became president (Roumeliotis & Toonkel, 2016). As mentioned, M&A activity was lower in 2016 compared to 2015 and there are several potential explanations. Political uncertainties related to events such as Brexit and the US Election can explain one part, but increased concerns about antitrust issues is by many considered to be just as important (Price, 2016). The international differences, especially between the US and Europe are particularly interesting as more and more deals are made cross-border and the decisions of one authority also affects companies domiciled in other countries.

1.2. Background

After signing a merger agreement between two companies, a transaction that has a material effect on its market is still conditional upon approval from relevant authorities. In the EU it is the European Commission (EC)'s Competition office together with the authorities in each country that hold the responsibility for the investigation and approval related to antitrust (European Commission, 2016). They work together through the European Competition Network (ECN) and aim to block mergers and

acquisitions that would "significantly reduce competition in the Single Market" which would for example lead to increased prices for consumers or limited market access for competitors.

In the United States on the other hand, it is the Department of Justice (DoJ) and the Federal Trade Commission (FTC) that are the agencies responsible for the matter. The two agencies complement each other since they focus mainly on different industries. FTC is primarily engaged in transactions in industries that involve private consumers such as health care, pharmaceuticals, food, energy and retail. The DoJ and FTC also collaborate with international agencies in cases where US consumers are affected (Federal Trade Commission, 2016). Different political administrations have different views on what deals should be approved. The Obama administration was active when it came to blocking deals that created antitrust issues as well as cross-border deals where the purpose was to move a company's tax base abroad. They blocked a record deal value of $404 billion as of May 2016. The number can be compared to the Bush administration, which blocked deals worth $26.6 billion and Clinton who abandoned deals worth $137.3 billion. However, the deal activity has also been higher in recent years (Fontanella-Khan, 2016).

1.3 Purpose and Research Question

As outlined, there have been many recent high-profile cases of terminated M&A transactions due to antitrust authorities' scrutiny or veto. Given the actuality, and with previous academic research on this topic being scarce, this research project hence wishes to add to the prevalently completion focused M&A research, provide insights into a topic dear to managers, shareholders and investors as well as wishes to provide an academic foundation for further investigations. Our two key research questions, which are connected to each other, are

I) What implications does an M&A transaction, that has been cancelled due to antitrust issues, have on the acquirer's and target's share price performance?
II) What are the operational implications for the acquirer?

By conducting an event study on the stock prices of acquirers and targets involved in an M&A transaction cancelled due to antitrust issues we found that the cancellation has a negative effect on both the target's and acquirer's stock price performance. However, by also conducting a difference-in-difference analysis of the same acquirers financial KPIs (ROA, CapEx/Total Assets and Sales development) we found that a cancelled M&A transaction does not have a significant effect on a company's operational performance.

Following this introduction, a literature review in chapter 2 provides an overview over relevant research that has thus far been conducted with respect to Corporate Finance transactions,

M&A transaction terminations as well as literature regarding our key methods of analysis, the stock price event study and the difference-in-difference analysis on Financial KPIs. Chapter 3 further develops and motivates our research question, giving specific backgrounds on the topic as well as the motivation and relevance. Chapter 4 presents our data and the method of data collection, while chapter 5 explains the methodology of how the data is being analysed for the purpose of answering our research questions. Chapter 6 then presents the results in details including analysis and interpretation, which are being summarized and critically acclaimed in chapter 7. The appendix entails many figures that are visually illustrating our results from chapter 6.

2 Literature Review

2.1 Literature review on transaction terminations and antitrust

As touched upon already, the research that has been conducted within the field of cancelled M&A transactions has mainly focused on the effects of break-up fees, such as Micah Officer (2003), Jin Q. Jeon and James A. Ligon (2011) and André, Khalil and Magnan (2007) as well as the overall effects of a terminated deal, by Ettore Croci (2006) and Tang (2015). Croci (2006) finds that the effect depends on who terminates the deal. In case a target company terminates the deal, the share price of the target company, on average, drops by 4.33%, while in cases of the acquirer terminating the deal, the share price of the target drops on average by 14.49%. However, in the long run there are generally no significant effects according to his study. Tang (2015), on the other hand, is analysing the effects on the *acquirer* and finds that for acquisitions of public firms the effect on the acquiring company after a cancellation is positive (+2.2%). This indicates that the market on average views M&A as a value destructing activity, however for the sample as a whole (i.e. both public and private targets) he does not find any significant abnormal result. Another interesting perspective is found in a research paper by Malmendier, Opp and Saidi (2012). Here the authors find that the value of targets involved in unsuccessful mergers will increase by 15% after the cancellation for cash deals, while the post-cancellation value of targets in stock deals will revert to its previous level. This is explained by the fact that cash deals signal that the target is undervalued, while the opposite holds for stock deals. The effect on the acquirers is also dependent on the payment method where stock deals result in a significant negative impact on valuation while cash deals leave the acquirer unaffected after an unsuccessful merger.

In terms of studies of the operational performance following a cancellation of an M&A transaction, the material is very limited. Research on accounting performance has instead been done around other types of events such as hedge fund activism, where Klein and Zur (2006) and Brav et. al. (2008) are prime examples.

Within the antitrust field related to M&A, the focus has historically been on how the regulation should be defined and what the goal should be. From an international perspective, the antitrust area is particularly interesting as there are significant differences between the EU and US regulations (Kokkoris, 2014). The tensions and divergence between the systems is often highlighted and the authorities are massively criticized when one authority does approve a deal while the other authority later blocks the same deal (Majoras, 2001). A critic is cited in Kokkoris' 2014 article, stating "Americans protect competition, while Europeans protect competitors". Nevertheless, the authorities collaborate to a large extent and the legal systems are often said to be converging. But the laws are built on fundamentally different values, the belief in the free market is for example much more prevalent in the US, which makes the process more difficult (Majoras, (2001).

2.2 Literature review on event studies

Event studies have taken an interesting development, mostly by analysing Corporate Finance events. According to MacKinlay (1997), the method was first published in 1933 when James Dolley examined the price effects of stock splits using a sample of 95 splits between 1921 and 1931. From there on until the 1960ies, the level of sophistication for event studies increased dramatically. The material improvement lays in the removal of general stock market price movements as well as cleaning out confounding events. Examples include John H. Meyrs and Archie Bakay (1948), C. Austin Baker (1956, 1957 and 1958) as well as John Ashley in 1962.

In the 1960ies, there was a vivid discussion about the wealth effects of mergers and acquisitions, however empirical evidence was scarce. At the time, the debate centred on the extent to which mergers should be regulated in order to foster competition in the product markets, a topic very relevant to this research as well. Manne (1965) argues that mergers represent a natural outcome in an efficiently operating market for corporate control and consequently provide protection for shareholders. At the end of his article, Manne (1965) suggests that the two competing hypotheses for mergers could be separated by studying the price effects of the involved companies. Unfortunately, he concluded that "no data are presently available on this subject." Since that time an enormous amount of empirical evidence on Corporate Finance events has developed, predominantly using event studies as the tool for analysis. The final form of event studies as we know them today has been introduced by Ray Ball and Philip Brown (1968) and Eugene Fama et. al. in 1969. Fama et. al. (1969) for example study again the effect of stock splits, but this time by removing the effect of simultaneous dividend increases (MacKinlay, 1997). Since then the event study methodology has been refined by correcting for wrong statistical assumptions used in the early work as well as design changes to accommodate far more specific hypotheses. Papers in the 1980ies, from Stephen Brown (1980) and Jerold Warner (1985) deal with the greater frequency of data, e.g. monthly or daily returns.

For successful and closed M&A transactions, according to Campbell, Lo and MacKinlay (1997), the general result is that abnormal returns of the targets are large and positive and the abnormal returns of the acquirer are close to zero. Jarrell and Poulsen (1989) find that the average abnormal return (AAR) for target shareholders exceeds 20% for their sample of 663 successful takeovers between 1960 and 1985. In contrast, the average abnormal returns for the acquirer is 1.14%, turning negative at -1.10% in the 1980's. Eckbo (1983) separates mergers of competing firms from other mergers and finds no evidence that the wealth effects for competing firms are different. Further, he finds no evidence that rivals of firms merging horizontally experience negative abnormal returns. The latter part is greatly interesting for this research, as most of the companies involved in our sample are rival firms merging horizontally, a reason why antitrust authorities vetoed the transaction on competition grounds. Jensen and Ruback (1983) and Jarrell, Brickley, and Netter (1988) provide detailed surveys of additional empirical work in the area of mergers and acquisitions. More recently, a study of expected gains from M&A transaction for banks, made by Lepetit, Patry and Rous (2004), searches for abnormal returns using a GARCH model and divide their sample into subsets based on geography and underlying

merger rationale. They find that there is, on average, a positive and significant increase in value for the group of targets banks and that on average there is a positive and significant market reaction for the two types of transactions: cross-product diversification and geographic specialisation. Another one is the study made by Mulherin and Aziz (2015), which tests whether the merger announcement dates provided in the Securities Data Corporation (SDC) database are handled correctly by researchers performing event studies. By hand collecting the merger-related events from news sources, they find that in 24.1% of deals, the popular choice of using the SDC's "Date Announced" field as the event date leads to biased estimates of target firm abnormal returns because of earlier abnormal price movements due to merger-related events such as merger rumours or search-for-buyer types of announcements.

We would also like to raise awareness to the following works using event studies, which can be referred to as classic references for this statistical tool:

- Brown and Warner (1980, 1985): Short-term performance studies
- Loughran and Ritter (1995), Barber and Lyon (1997) and Lyon, Barber and Tsai (1999): Long-term performance studies.
- Eckbo, Masulis and Norli (2000) and Mitchell and Stafford (2000): Potential problems with the existing long-term performance studies.
- Ahern (2009), WP: Sample selection and event study estimation.
- M.J. Seiler (2004), Performing Financial Studies: A Methodological Cookbook. Chapter 13.
- Kothari and Warner (2007), Econometrics of event studies, Chapter 1 in Handbook of Corporate Finance: Empirical Corporate Finance.

2.3 Literature review on difference-in-difference analyses

The difference-in-difference method is a statistical technique widely used in econometrics and quantitative research, mostly in social sciences such as by David Card and Alan B. Krueger (1994) in their study on differences in the minimum wage and employment in the fast food industry between New Jersey and Pennsylvania or in Health Economics. It attempts to mirror a design of experimental research using observed data, examining the difference between a so-called treatment group and a control group. According to Abadie (2005), other prominent applications of the difference-in-difference method include the effects of immigration on native wages and employment by Card (1990), the effects of temporary disability benefits on time out of work after an injury by Meyer, Viscusi and Durbin (1995), and the effect of anti-takeover laws on firms' leverage by Garvey and Hanka (1999).

3 Research Hypothesis and Motivation

Engaging in an M&A activity is a large investment for both the acquiring company as well as the target, not only financially, but also in terms of time and invested internal resources. It involves rethinking the companies' future strategy and positioning in the market. The potential transaction often takes focus from running the current business and both managers and employees think about the changes that lay ahead. An announced transaction between two high-profile companies with leading market shares, which is the case when antitrust authorities examine the transaction, also gains significant attention from the media and investors. Their view is in most cases specifically reflected in a change in share price of the company upon announcement of the transaction. However, what happens if the deal does not close? What are the consequences for the acquirer? What are the consequences for the target? To what degree are their respective operations and strategies moving forward affected? What does that mean for both long-term shareholders and event driven investors? These are questions that triggered a closer look at this in the form of our research. More specifically, this study aims to answer the following:

I) What implications does an M&A transaction, that has been cancelled due to antitrust issues, have on the acquirer's and target's share price performance?
II) What are the operational implications for the acquirer?

As transactions that are being investigated by antitrust authorities are between market relevant or market leading companies (with the exception of national interests), out of the numerous reasons M&A transactions happen, we see a very strong strategic rationale between these specific transactions that should save at least one, if not both parties from a challenging situation, competitively. This entails consolidation efforts in markets with overcapacity and low growth, cost-saving initiatives through large synergies as well as strengthening of a leading market share due to stronger competition. However, if the transaction is being blocked, those upsides vanish in an instant, leaving both parties in a difficult, unknown spot that is very tough to navigate. As there are many recent high-profile examples of this as of year-end 2016 (Pfizer and Allergan, Staples and Office Depot, Electrolux and GE's home appliance division, among others), we were intrigued to investigate the effects of this for both the intended acquirer and target further.

The study will focus both on the acquirer and target's side as well as on the difference between the North American and the European sample companies to compare the effects on the companies between the regions. As stock prices are known to be a reflection of the value market participants assign a company (divided by the number of shares outstanding) with all the information publicly available and under the assumption that markets are nearly perfectly efficient, we take the stock price development and with it the abnormal returns calculated in the event study as a proxy for how the event, in this case the termination of a transaction due to antitrust authorities' veto, affects a company's future. To support these interpretations, we also look at the operational performance of

sample companies by examining the development of financial KPIs compared to a basket of matched peers.

As mentioned earlier, the completion of a signed public M&A transaction is far from certain. Public M&A transactions are subject to many obstacles in the usually long time period between signing and closing, also referred to as the "deal risk". Failing to obtain antitrust approval is one potential obstacles but also changing business climates, negative due diligence outcomes and valuation mismatches are examples of reasons why a signed public M&A deal cannot be closed. To mitigate this risk and shy away other bidders, many transactions include a so-called "break-up fee". There has been a lot of research on the business and legal effect, as well as the size, of termination fees. However, there is hardly any research done on the consequences of a termination of a public M&A transaction, both on the shareholders and investors, the creditors as well as the enterprises themselves, including management. With previous academic research on this topic being scarce, this study hence wishes to add to the prevalently completion focused M&A research, as well as wishes to provide a foundation for further investigations.

”The history of antitrust law enforcement shows that successful antitrust prosecutions have often strengthened and brought vitality to extremely large companies and businesses.”

– Robert F. Kennedy,

64th United States Attorney General

4 Data and Data Collection

At the beginning of this research project, a list of transactions that had been terminated by antitrust authorities was compiled. Each such terminated transaction is considered an event. It has been chosen to look at such transactions in the last twenty years with parties in North America and Western Europe, as this provides a significant amount of international events for the event study and at the same time a security that the necessary data to conduct our analyses could be retrieved. Occurring greater obstacles than anticipated, such a list was ultimately retrieved with the help from the Bloomberg Support Team from the Bloomberg database. This list of terminated transactions of the last twenty years also includes information about the company's sector, industry, primary stock exchange and similar information to divide the full sample in meaningful subsamples later. Below is an excerpt of the transactions (events) collected. There are a total of N = 91 events in our sample.

Figure 1 – Distribution by year of termination

Figure 1 shows the distribution of events among the twenty-year window chosen from 1996 to 2016

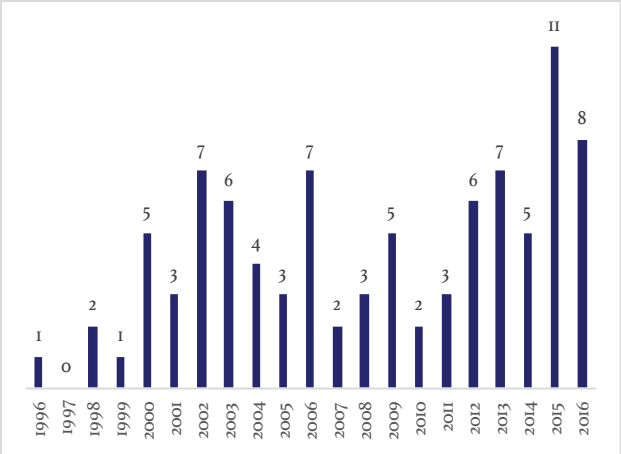


Figure 2 – Distribution by transaction size

Figure 2 shows the distribution of events among the various transaction sizes

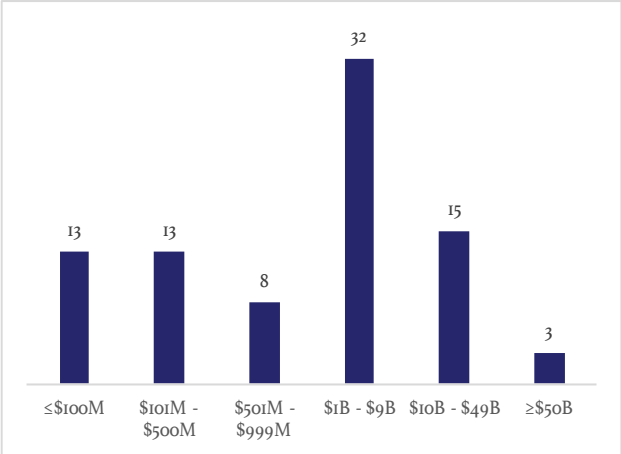


Figure 3 – Domestic vs. cross-border transactions

Figure 3 shows the number of domestic and cross-border transactions in the sample

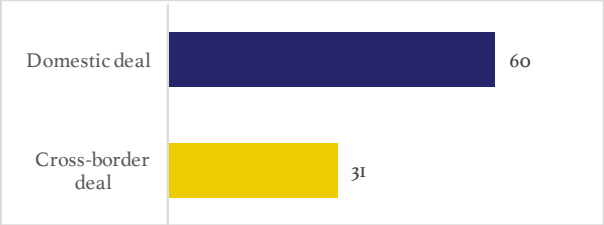
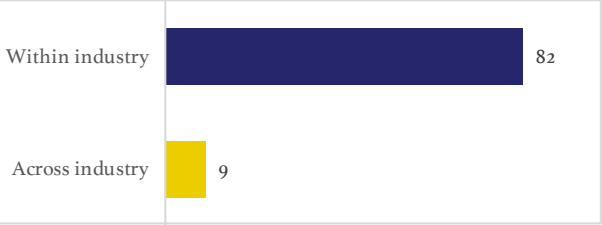


Figure 4 – Strategic nature of transaction

Figure 4 shows types of transactions in the sample



Each event has two participating companies, an acquirer and a target. The analyses will be on the companies' level rather than the events, which is why 148 public companies (91 acquirers and 57 targets) were the work base. Of these, 12 companies had to be eliminated because they lacked trustworthy records of their stock prices, leaving N = 136 companies in the sample (82 acquirers and 54 targets) to run event studies for. Below is an excerpt of the data on a company level.

Figure 5 – Distribution of companies by country

Figure 5 shows the distribution of companies in the sample by country

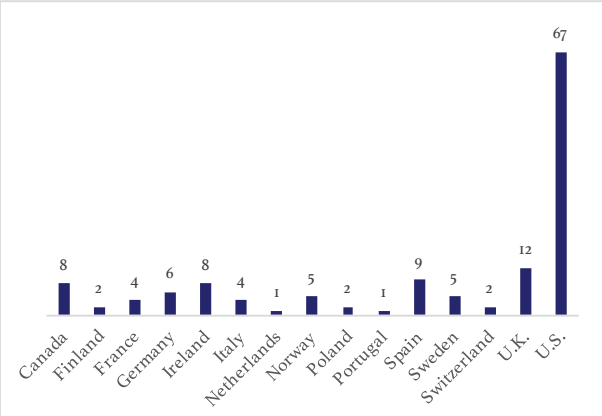


Figure 6 – Distribution of companies by sector

Figure 6 shows the distribution of companies in the sample by sector

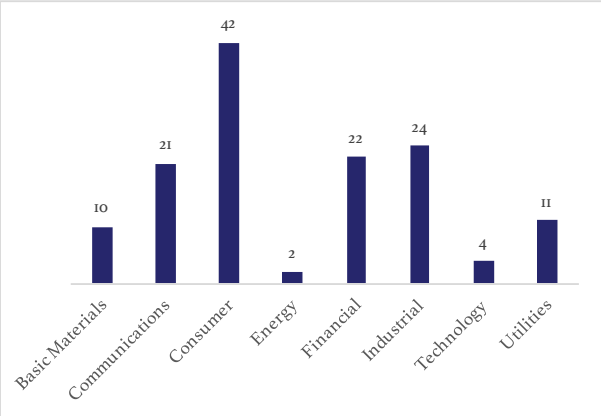
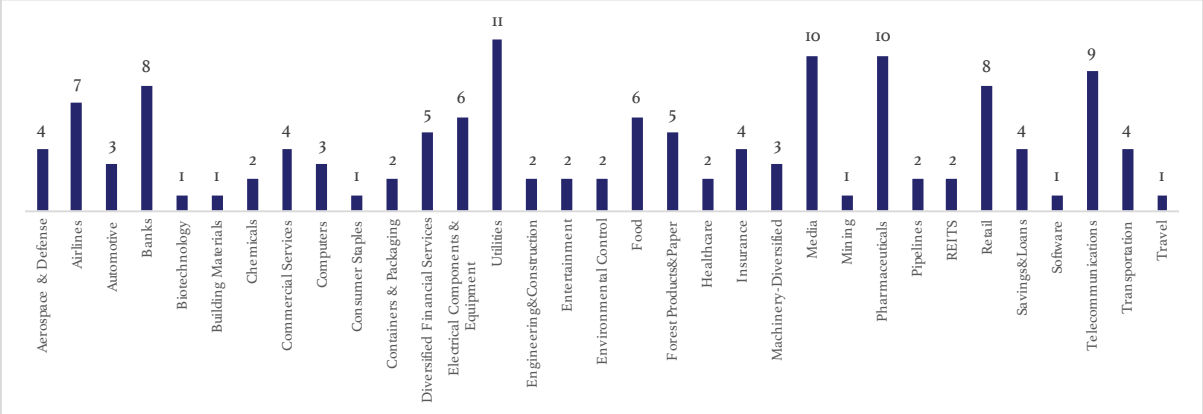


Figure 7 – Distribution of companies by industry

Figure 7 shows the distribution of companies in the sample by industry



For the 136 remaining companies, the stock prices and relevant market index data a year prior and a year after each respective event date (day 0) were downloaded from Bloomberg Database and Wharton Research Data Services (WRDS).

In the financial KPI difference-in-difference analysis, the focus is solely on the acquirers, as too many of the targets were either privately trading with no reliable information or the retrieved data was not of our quality standards to have a significant number of targets in that analysis. From the 83 acquirers, another 16 companies were eliminated due to the lack of available accounting data, resulting in 67 remaining acquirers.

To conduct the difference-in-difference analysis for the financial KPIs, we looked for a matching company (control group) for the remaining 67 acquirers (treatment group). To do so, we downloaded the Total Assets and Market Capitalization figures for industry peers with a window of -0.5 years | +0.5 years of the transaction date from Bloomberg. The industry peers were determined by the "Bloomberg list of peers curated by Analysts" within the Relative Valuation function (RV) in the Bloomberg Terminal. In case not available, we chose the peers determined by the Global Industry

Classification Standard (GICS) selection, also accessible within the Bloomberg Terminal. The prior yielded a much more accurate list of peers, hence our preference.

Following this, we matched the closest matching peers related our sample companies (67 acquirers), out of the peer list of 10-20 companies per sample company, regarding the Total Assets and/or Market Capitalization figures around the time of the transaction to create a second sample of matching companies to our acquirers. Due to the inability to match a suitable peer company to five of our acquirers in the sample, we removed these acquirers from the sample, leaving a remaining 62 acquirers (treatment group), and hence 62 matching companies (control group).

For both samples, the remaining 62 acquirers and 62 matching companies, the total assets, costs of goods sold, sales turnover, SG&A and the capital expenditure numbers for the quarter right after the event (Q1) as well as the following eleven quarters (Q2-Q12) were retrieved from WRDS and Compustat. With these figures, the Return on Asset (ROA), the capital expenditure over total assets ratio (Capex/Assets) and the Sales development were calculated to serve our analysis.

5 Methodology

To analyse the research question outlined in chapter 3, two different approaches were chosen: An analysis of the stock price development of both acquirers and targets of blocked M&A transactions in the last twenty years with an event study method according to MacKinlay (1997) and a similar-style financial KPI difference-in-difference analysis comparing three financial ratios one quarter after the termination to all other eleven quarters after the termination. These two analyses will put a light on the consequences for shareholders of the termination in addition to how the market assesses this event (event study) while also examining the consequences on the operations for the involved companies (Financial KPI difference-in-difference analysis).

5.1 Event study

The event study tool is an important research methodology in Finance. An event study is an attempt to measure the valuation effects of a corporate event by examining the response of the stock price around the announcement of the event. It is based on the assumption that markets are (nearly perfectly) efficient and that the market processes the information about the event in an efficient and unbiased manner, leading to an opportunity to see effects on the valuation and hence the stock price caused by events. This method is widely followed in capital markets and can be applied to either a single security or a full sample. Thus, an event study is a statistical method to measure the impact of a specific event on the value of a firm (Kumar, Mahadevan and Gunasekar, 2012).

The termination of a proposed, agreed and signed M&A transaction by an antitrust authority is considered an economic event (Croci, 2006). An event has a strong influence on a company and releases significant stock-relevant information. However, simply looking at the returns of a stock shortly after the event lacks general applicability, as pricing and returns in stock prices usually happen over a longer period of time (rumours, anticipation, leakage of information) and can include other effects. One has to isolate the effects of the returns related to the event (unsystemic return component) from the natural evolution of the company's stock price (systemic part). It is assumed that the unexplained part is due to an “abnormal” event that is not captured by the model, giving us an abnormal return. To do this, we calculate abnormal returns for each day in an event window. Abnormal returns are defined as

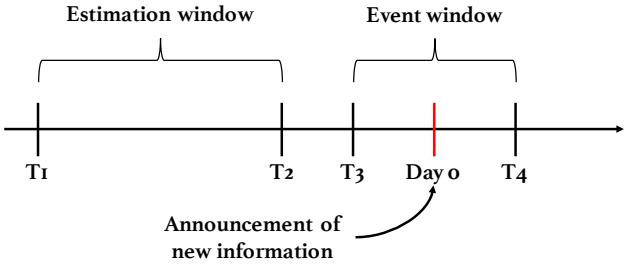
$$AR_{i,t} = r_{i,t} - \mathrm{E}[r_{i,t}] \tag{1}$$

of which $r_{i,t}$ is the actual return of stock i at day t, and $\mathrm{E}[r_{i,t}]$ is the expected returns for the same stock i at the same day t. Specifically, this means estimating the returns for each day in the event window ($\mathrm{E}[r_{i,t}]$) and then subtracting them from the actual returns, hence resulting in abnormal returns. Given, this approach cannot mitigate all other effects, but the picture of the event is clearly less distorted by other events, leaving us with an attributable stock price performance to the special event (Hauswald, 2002).

The time period for which the abnormal returns are calculated is called event window. By norm, the day of the event is called day 0, and the interval around it is the event window (e.g. -5,5). The event window can be of various lengths, and for our analysis we will include both very short-term windows (-1,1) and long-term ones (-10, 1 year). Information and reactions need time to settle and be priced in by the market participants, however the longer an event window, the higher the chance the results are distorted by other effects (MacKinlay, 1997 and Vollmar, 2010). Hence our decision to look at both.

Figure 8 – Event study time windows

Figure 8 shows graphically the time windows in the event study



To calculate abnormal returns, stock prices were gathered for the 136 sample companies, each for their respective window T1 to max. T4. Max. T4 is 252 trading days after the event date 0. One company comprises one event, and compound there are 91 events. Additionally, for each event prices of each company's respective stock market index were retrieved. To start, the daily returns ($R_{i,t}$) for the estimation and event window are calculated:

$$R_{i,t} = \frac{P_{i,t}}{P_{i,t-1}} - 1 \qquad (2)$$

whereas P stands for a company's stock price or a market index's daily value. As abnormal returns are calculated for each day t in the event windows according to Formula (1), the expected returns $E[r_{i,t}]$ for the same day have to be estimated. Calculating the expected (or "normal") return $E[r_{i,t}]$ is not simple. There is an extensive literature on this topic, and from the literature on CAPM/APT models, we know that what drives expected stock returns is not exactly clear. According to MacKinlay (1997) and Hauswald (2002), there are two ways to do this: a constant mean return model and a market model. As according to Campbell et. al. (1997) it is more commonly used and more intuitive to understand, we chose the market model, which has similarities to the CAPM model in that it assumes that individual security returns are related to the market returns:

$$\begin{aligned} R_{i,t} &= \alpha_i + \beta_i R_{m,t} + \varepsilon_i \\ E[\varepsilon_{i,t}] &= 0 \\ Var[\varepsilon_{i,t}] &= {\sigma^2}_{\varepsilon_i} \end{aligned} \qquad (3)$$

where ε_i has a mean zero, constant variance error term and $R_{m,t}$ is the return on the security i related market index such as the S&P 500. Because $R_{i,t}$ and $R_{m,t}$ were collected as data, the intercept ($\hat{\alpha}_i$) and the slope (β_i) can be estimated with a simple OLS regression in the estimation window. Our estimation window ranges from 252 days prior to the event (-252) to 20 days prior (-20). With $\hat{\alpha}_i$ and β_i we can calculate the expected return according to the market model with

$$E[R_{i,t}] = \hat{\alpha}_i + \beta_i \hat{R}_{m,t} \tag{4}$$

Abnormal returns are then calculated the following

$$AR_{i,t} = R_{i,t} - E[R_{i,t}] = R_{i,t} - (\hat{\alpha}_i + \beta_i \hat{R}_{m,t}) \tag{5}$$

According to the null hypothesis (H0) introduced in the next chapter, abnormal returns will be jointly normally distributed with a zero conditional mean and variance:

$$\sigma^2(AR_{i,t}) = \sigma^2{}_{\varepsilon_i} + \frac{1}{L_1}[1 + \frac{(R_{m,t} - \hat{\mu}_m)^2}{\hat{\sigma}^2{}_m}] \tag{6}$$

where L_1 is the length of the estimation period in number of days, $R_{m,t}$ the market return on a given date t, $\hat{\mu}_m$ is the mean market return during the estimation period with length L_1, $\hat{\sigma}^2{}_m$ the market's variance, and $\sigma^2{}_{\varepsilon_i}$ the variance of the disturbance term in equation (3). Per equation (6), it follows that the second component of the variance, which is a result from the sampling error estimating $\hat{\alpha}_i$ and β_i, tends towards zero when L_1 is becoming large. According to MacKinlay (1997), the abnormal return observation becomes independent over time and it is safe to assume that abnormal returns are normally distributed with mean zero and variance $\sigma^2(AR_{i,t})$, hence $AR_{i,t} \sim N(0, \sigma^2(AR_{i,t}))$.

To assume that information is released instantly in one moment only into the market would be wrong, also for a meaningful economic event such as the termination of an M&A transaction: Insiders might have gotten an advanced notice, rumours of a termination decision might have been around for a while and investors might only react with delay to the news. As a result, the abnormal returns should be aggregated around the event date to fully capture the event's effect on the stock returns. This results in the cumulative abnormal returns (CAR) for the chosen event window (T3,T4).

$$CAR_i(T3, T4) = \sum_{t=T3}^{T4} AR_{i,t} \tag{7}$$

We chose to look at event windows (-1,1) and (-2,2) to capture the immediate effects of the event, (-5,5) and (-10,10) to see the short-term effects and also (-10, 244) to see the long-term consequences. The reason for these various windows is that we think that among the 91

distinguishable events in our sample, the effects of the event will sink in at various speeds. Additionally, we can account for all effects influencing the event returns while also making sure to exclude other noises. These event windows are supported by MacKinlay (1997), Campbell et. al. (1997), Hauswald (2002), Ryngaert and Netter (1990) and Kothari and Warner (2007). Over the event window, one can also look at the cumulative average abnormal return (CAAR), a measure that allows for good comparison between multiple securities i.

The calculation of abnormal returns and the cumulated abnormal returns happened on an individual security i level. However, our research question aims to look at the full sample. To give a qualitative assessment for the full sample across all companies, we have to calculate the average CAR across all companies i in our sample.

$$\overline{CAR} = N^{-1} \sum_{i=1}^{N} CAR_i \tag{8}$$

5.1.1 Significance testing - Student T-test

All results according to the methodology above need to be tested for statistical significance to be able to say whether or not the event is deemed relevant by investors. To do so, we check whether the AR_i, CAR_i and $\overline{CAR}$ are significantly different from zero with a two-sided Student T-test. If that is not the case, this suggests that the abnormal and normal returns are indistinguishable (at least by statistical methods) and the event is a non-event in the eyes of the market (Hauswald, 2002). To measure the statistical significance, a so-called Student T-test is used. The null hypotheses are that the abnormal returns are not significantly different from zero (H_0: AR_i=0), that the cumulated abnormal returns for each event window are not significantly different from zero (H_0: CAR_i=0) and that across our sample the average cumulated abnormal return CAR is not significantly different from zero (H_0: $\overline{CAR}$=0). Given that our estimation window described above is larger than 100 days, we are able to assume that, based on the collected stock prices, our calculated T-statistic (z) is supposed to be higher in absolute value than |1.96| normally distributed, on a 5% significance level (MacKinley, 1997, Hauswald, 2002 and Bach, 2016).

$$\text{T-statistic for } AR_i \;\; z_{i,t} = \frac{AR_{i,t}}{\hat{\sigma}(AR_{i,t})}; \hat{\sigma}(AR_{i,t}) \cong \hat{\sigma}^2{}_{\varepsilon_i} \tag{9}$$

$$\text{T-statistic for } CAR_i \;\; z_i = \frac{CAR_i\,(T3,T4)}{\hat{\sigma}_i\,(T3,T4)}; \hat{\sigma}_i\,(T3,T4) = (T4 - T3 + 1)\hat{\sigma}^2{}_{\varepsilon_i} \tag{10}$$

$$\text{T-statistic for } \overline{CAR} \;\; z_{\overline{CAR}} = \frac{\overline{CAR}}{\sigma_{\overline{CAR}}}; \sigma^2{}_{\overline{CAR}} = N^{-2} \sum_{i=1}^{N} \hat{\sigma}^2{}_{CAR,i} \tag{11}$$

5.1.2 Significance testing - Welch T-test

Within our large sample, we also formed subsamples to compare the results among them (see chapter 6.1.1). To see if the $\overline{CAR}$ within the subsamples are significantly different from each other, we can apply the Welch T-test. The null hypothesis is that the average cumulative abnormal returns between two subsamples are not different from each other:

$$HO: \overline{CAR}\ (T3, T4)_a = \overline{CAR}\ (T3, T4)_b \tag{12}$$

The T-statistic for the Welch T-test is

$$z = \frac{\bar{\mu}_a - \bar{\mu}_b}{\sqrt{\frac{{\sigma_a}^2}{N_a} + \frac{{\sigma_b}^2}{N_b}}} \tag{13}$$

5.2 Comparison of stock prices before the transaction announcement and after the termination announcement

In addition to the event study, we also compare the stock prices in a time window of ten days before the announcement of the transaction by both parties with the stock price in a ten days window after the announcement of the termination by both parties. We want to see to what level the stock prices fall back to after the transaction is terminated and how they differ from the pre-transaction period. This could provide important insights on what the market thinks about the future of each party as a stand-alone company. Specifically, we compare the stock price for company i 10 days before the announcement with the stock price for the same company i 10 days after the termination -10/10, the same for 5 days prior and 5 days after -5/5, 1 days prior and 1 day after -1/1 and the average stock price of company i in the ten days leading to the announcement with the average stock price i for the following 10 days after the announcement. We look at the relative percentage change per company i and look at the average for the full sample.

5.3 Financial KPI difference-in-difference analysis

In order to understand what effects a cancelled M&A transaction has on the involved acquirer's operational performance, a difference-in-difference study of KPIs (Key Performance Indicators) between our sample companies, that represent the treatment group, as well as a control group of matched peers as described in chapter 4 has been conducted in addition to the previously described event study on stock prices. The results from this additional analysis will help us answer our second research question: "What are the operational implications for the acquirer?". The measures determined to best show operational performance are:

1. Development of return on Assets (ROA)
2. Development of Capital Expenditure (CapEx)
3. Sales development

ROA is a well-known financial ratio used to show a company's operational performance, both regularly as well as in the context of specific events (e.g. Brav et.al. (2008), Barber & Lyon (1995). ROA is calculated in accordance with Brav et. al. (2008) as EBITDA over Average Total Assets. More specifically this means

$$ROA = \frac{EBITDA}{Average\ Total\ Assets} = \frac{Net\ Sales - COGS - SG\&A}{Average\ Total\ Assets} \quad (14)$$

EBITDA is a useful proxy for operating performance, as it does not incorporate effects related to a company's capital structure, which for example Net Income does. Using EBITDA for the ROA calculation also enables comparisons between companies from different industries and legislations.

In addition to ROA, we are also studying the change in CapEx. The logic behind this is to see whether the acquirer, that failed his attempt to acquire another company, now changes his spending habits with the funds that became available because of the termination (measured through CapEx) and hence the company's new capital allocation strategy. In order to enable comparisons between different acquirers, the capex is scaled against total assets

$$CapEx\ ratio = \frac{Capital\ Expenditure}{Total\ Assets} \quad (15)$$

Further we also study the Sales development following the event (i.e. changes in quarterly net sales) in order to see the direct implications of the event on the turnover.

These three performance measures are calculated for the most recent quarter (Q1) after the event, as well as for each quarter following for the next three years (if the event took place less than three years ago, the ratios are calculated for every quarter available). Each of the quarterly ratios following the event is then benchmarked against the ratio of the first quarter after the termination of the transaction (Q1), to receive a relative quarter-by-quarter development in relation to the first quarter after. More specifically we use the formula

$$Quarterly\ ROA\ development\ (\%\ points) = \frac{ROA_{Qt}}{ROA_{Q1}} - 1 \quad (16)$$

where ROA_{Qt} represents the ROA for a certain quarter t and ROA_{Q1} is the ROA for the first quarter after the transaction. Subsequently, we arrive at the similar formula for the change in CapEx over total assets ratio

$$Quarterly\ Capex\ development\ (\%\ points) = \frac{CapEx\ ratio_{Qt}}{CapEx\ ratio_{Q1}} - 1 \quad (17)$$

For the Sales development KPI, the calculation is

$$Quarterly\ Sales\ Development = \frac{Net\ Sales_{Qt}}{Net\ Sales_{Q1}} - 1 \tag{18}$$

where again $Net\ Sales_{Qt}$ represents the net sales in a certain quarter t and $Net\ Sales_{Q1}$ again the net sales in the first quarter after the event.

This indexing to the first quarterly results after the termination allows us to gauge relative performance in each of the up to twelve quarters after the termination event with respect to a close time of the event (Q1) and draw conclusions about the short term (up to 4 quarters or 1 year) effects that should show little effect as well as the longer-term effects (up to 12 quarters or 3 years) to see the more strategic and market dynamic effects on the acquirer's performance (treatment group) as well as their matched peer companies (control group).

This initial difference calculation for both the treatment and the control group for all three indicators are conducted by using average, median, maximum value, minimum value, standard deviation as well as the p-value from a t-test to measure the statistical significance. Thus, we have results showing us the ROA development, CapEx development and Sales development for both our treatment group and the control group.

While individually interesting, the core part of this analysis is to calculate the difference (between treatment and control group) of the difference (say Return on Assets Q4 versus Q1), hence difference-in-difference analysis. We do this again for all three KPI groups (ROA, CapEx and Net Sales) for all our matched pairs between our treatment and control group. For example, the difference-in-difference (DiD) between the Return on Asset development in the 4th quarter after the transaction termination versus the first after of Ryanair's first takeover attempt of AerLingus, of which Deutsche Lufthansa AG is the matched peer company, is:

$$DiD\ ROA_{Q4-Q1} = \left(\frac{ROA_{Q4}}{ROA_{Q1}} - 1\right)_{Ryanair} - \left(\frac{ROA_{Q4}}{ROA_{Q1}} - 1\right)_{\ Deutsche\ Lufthansa\ AG} \tag{19}$$

Within their ratio group, we look at the quarterly difference-in-difference results again on aggregate by using average, median, minimum value, maximum value and standard deviation as well as the p-value for the statistical significance to derive meaningful conclusions discussed in chapter 6.2.

The logic behind studying not only the share price performance following a cancelled M&A transaction but also the effects on operational performance is based on the perception that engaging in mergers and acquisitions is a big investment for companies both in terms of time and resources. The proposed transaction receives a lot of attention from management, which could take away focus from

the running of the current business and hence have a negative effect on sales and the overall operational performance. In many cases a new strategy is built around the proposed merger or acquisition that were to shape the direction of the company for the coming years. Therefore, following the cancellation of a transaction, it is not unreasonable to think that it would create a sense of confusion, lack of direction and resignation among the employees, which consequently can affect the company performance. On top of that it is interesting to see how the acquirer deploys the financial resources it assembled to finance the acquisition. We want to capture that by looking at the CapEx development.

However, not only do internal problems following the event result in a negative impact on the operating performance, the cancelled transaction could hypothetically also have a direct negative impact on sales. For the acquiring company, a cancelled transaction is a sign of failure as it means that the management team took the wrong decisions of capital allocation. They were unable to predict that the transaction would not go through antitrust review (a skill in itself) and this can raise questions from their shareholders about whether they can further trust the management team, what strategic direction the company should take next, whether the management finds alternatives that yield similar returns and whether this cancelled transaction means that also future transactions are in jeopardy, hence "too big to marry". These are all potential concerns that could result in a negative impact on a company's sales performance following the cancellation of an M&A transaction. Nevertheless, this logic primarily applies to the acquirer (since they have the intention of buying, and subsequently fail to do so), and therefore it first and foremost makes sense to analyse the impact on the acquiring companies and this, together with lack of data, is the reason why we are only conducting the KPI analysis for the acquirers and not the for the targets.

5.3.1 Financial KPI significance testing

To test our results from the financial KPIs difference-in-difference analysis for their robustness, we applied a two-sided t-test to them resulting in a p-value, based on which we can determine the statistical significance for each of our results. Operating with a significance level of $\alpha = 0.05$, results that have a p-value lower than 0.05 result in rejecting the null hypothesis. Using the p-value, we try to determine how *likely* or *unlikely* the probability is of observing a more extreme test statistic in the direction of the alternative hypothesis than the one tested for (H0). Hence, the lower the p-value, especially below our significance level, the more unlikely this scenario becomes. If the P-value is less than (or equal to) α, then the null hypothesis is rejected in favour of an alternative hypothesis. And, if the P-value is greater than α, then the null hypothesis is not rejected (Wasserstein, Lazar, 2016).

We conducted the hypothesis testing by using the Excel T.TEST formula and setting up the two sided testing directly showing the p-value. What Excel does is using the following formula, which follows a t-distribution with n-1 degrees of freedom:

$$t^* = \frac{\bar{x} - \mu}{s/\sqrt{n}} \tag{20}$$

By using the known distribution of the test statistic, one can calculate the P-value: “If the null hypothesis is true, what is the probability that we'd observe a more extreme test statistic in the direction of the alternative hypothesis than we did?” By setting the significance level, α, the probability of making a Type I error small — at, one compares the P-value to α (The Pennsylvania State University, 2017).

"This is the cleanest deal you'll ever see."

– Jack Welch

Former Chairman & CEO of General Electric (1981 - 2001)

on the possibility of antitrust authority scrutiny on his acquisition of Honeywell International,

only to be later a witness to the veto of the European Merger Task force on 13 June 2001.

6 Empirical Findings and Discussion

The key research question is "***What implications does an M&A transaction, that has been cancelled due to antitrust issues, have on the acquirer's and target's share price performance?"***

6.1 Event study results

Based on this guideline, individual event studies according to MacKinley (1997) and Campbell et. al. (1997) were performed using the stock price and market price data that were gathered for our 136 companies in the final sample. Essentially, the event study method helps us to carve out abnormal returns related to the termination of these M&A transaction due to the interference by antitrust authorities, i.e. government stakeholders across the Western Hemisphere. With that, the main stated hypothesis for the full sample is

Hypothesis Ho_1: M&A terminations due to anti-trust disapproval have no impact on the stock prices - $AR_{it} = 0$

First the effect of the termination event on the full sample of 136 companies is being investigated, over the period from January 1996 to August 2016 (the research project was started in September 2016). We find average abnormal returns of -1.2% for a symmetrical window of 1 day around the event day (-1,1), -2.2% (-2,2), -3.4% (-5,5) and -3.8% (-10,10), all statistically significant at the 5% level with the T-test, while the median numbers show similar results. We can therefore reject the Ho_a hypothesis and assess that we have statistically significant negative abnormal returns.

Table 1 – Cumulative Abnormal Return (CAR) results – full sample

Table 1 shows the cumulative abnormal return (CAR) results of the full sample, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance. CAAR is the CAR divided by number of days in the event window. For the t-test, CAR values are being used.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0036		
	AR t=1			-0.0041		
	CAR	-0.0122	-0.0216	-0.0335	-0.0375	-0.0740
	CAAR	-0.0041	-0.0043	-0.0030	-0.0018	-0.0003
Median	AR t=0			-0.0029		
	AR t=1			-0.0001		
	CAR	-0.0057	-0.0096	-0.0177	-0.0320	-0.0892
	CAAR	-0.0019	-0.0019	-0.0016	-0.0015	-0.0004
Student T-statistic		4.9916	7.9041	8.2251	7.3227	5.3838
N		136	136	136	136	136

This result of negative returns in all event windows, short- and long-term, is both consistent with the literature on terminated M&A deals as well as common intuition (Croci, 2006 and Tang, 2015).

The interesting fact is that the cumulative returns decrease over time, indicating that the "bad news" of the aborted transaction is priced continuously and that the stock prices show a declining pattern over time. What is more, we can read from the long-term abnormal returns that this event clearly suggests negative consequences for involved companies in the long run. M&A deals that are being cancelled for antitrust reason are between significant market players in their respective industries or involve a company of great national interest, and all of these deals have a compelling strategic rationale and synergies behind, such as cost reductions based on economies of scale, greater purchasing power, access to intellectual property, cross-selling opportunities or simply market power (Damodaran, 2008). These synergies were priced into the stock prices of both the acquirers and the target prior to the closing of the transaction and therefore motivated their increase or decrease. With the terminated transaction, these inflated valuations are no longer justifiable, and together with assumed decreasing prospects for the involved parties, investors in the future combined companies dumped their holdings as the bubble busted. On top of that, as Jetley and Ji (2010) and Block (2006) say, hedge funds and merger arbitrageurs are responsible for a significant amount of the trading volume during the signing and closing period of M&A transactions. With a blockade by antitrust authorities, these speculative investors lose their investment thesis and therefore liquidate their positions as quickly as possible, further driving down the stock prices.

At this point it is interesting to closely examine to which point stock prices fall. It is also a natural consequence for target's share prices to fall significantly after a termination of a transaction, given that its share price between signing and closing is inflated by the premium of the buyout offer, minus a risk discount for the probability of a failed deal (Damodaran, 2015). To compare acquirers and targets on the same grounds, this artificial price increase needs to be mitigated. To do so, we compare the stock prices before the deal is even announced to the stock prices after the termination of the deals are made publicly, therefore factoring out the period of time when the target's share price is influenced by the offered premium.

The hypothesis here is that the stock prices fall back to their "fair value" prior to the announcement of the transaction as each company continues to exist as a stand-alone enterprise.

Hypothesis $H0_2$: Stock prices of companies involved in a failed transaction fall back to pre-announcement levels

As discussed in chapter 5.2 on page 22, we also look at this evaluation in various time window comparisons (one day prior to the deal announcement compared to one day after termination announcement -1/1, -5/5, -10/10 and the average over the full 21-day window [-10,10], averaging the stock prices 10 days prior to the average of 10 days after). N is 131, because of unavailability of reliable pre-transaction announcement stock prices of 5 sample companies. We detect that on average the stock prices fall beyond the pre-announcement price shortly after the termination announcement: -9.7% for -1/1, -2.5% for -5/5, and -3.8% for the average of the 10 days both prior and after [-10,10].

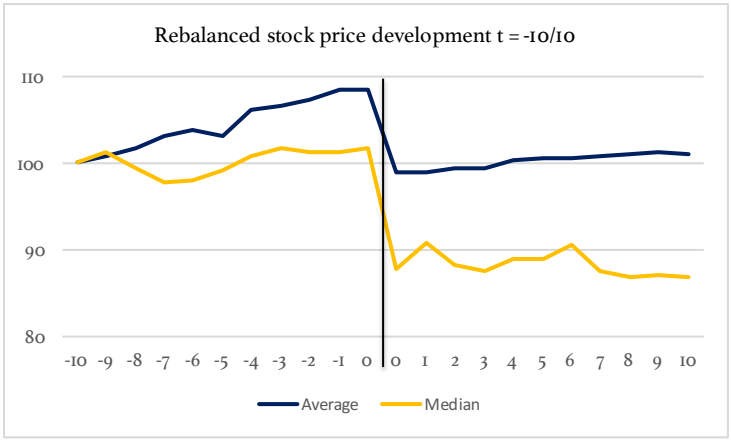
Table 2 – Comparison of stock prices from the deal announcement with the prices after termination

Table 2 shows the comparison of stock prices of day x prior to a transaction announcement with the prices of day y after the announcement of the transaction termination, resulting in a two-day comparison –x/y. The fourth column compares the average of stock prices 10 days prior to 10 days after the two announcement.

		-1/1	-5/5	-10/10	Average over period (-10,10)
% increase	Average	-9.72%	-2.53%	0.95%	-3.78%
	Median	-11.74%	-11.58%	-15.12%	-12.15%
	N	131	131	131	131

However, the comparison of the prices exactly 10 days prior to 10 days after -10/10 reveals that the prices actually increased by a tiny margin, 0.95%, painting a non-linear volatile stock price development after the termination announcement heaved into the positive by a few extreme examples. This becomes clear when considering the median instead of the average, where the stock price returns actually clearly fall below the pre-announcement price with -11.7% for -1|1, -11.6% for -5|5, and -15.1% for -10|10 and -12.2% for the full average [-10,10]. The median is deemed to show a more accurate picture here, rejecting the hypothesis that the companies' stock prices fall back to their "fair" value. Visually, the changes become even more apparent:

Figure 9 – Rebalanced stock price development -10/10



Splitting the sample into two subgroups, acquirers and targets, reveals an interesting pattern.

Table 3 – Comparison of acquirer stock prices from the deal announcement with the prices after termination

Table 3 shows the acquirer subsample of Table 2.

		-1/1	-5/5	-10/10	Average over period (-10,10)
% increase	Average	-3.32%	-2.21%	-0.33%	-1.60%
	Median	-10.17%	-7.77%	-5.45%	-3.55%
	N	80	80	80	80

Table 4 – Comparison of target stock prices from the deal announcement with the prices after termination

Table 4 shows the target subsample of Table 2.

		-1/1	-5/5	-10/10	Average over period (-10,10)
% increase	Average	-14.74%	-2.78%	1.92%	-5.46%
	Median	-7.85%	-10.95%	-4.70%	-9.71%
	N	51	51	51	51

We examine that shortly after the event, the targets' shareholders are off much worse as their share-prices fall below the level prior to the deal announcement, hence on average -14.7% (median -7.9%) lower excluding the offered premium. However, this trend reversed quickly within ten days of the publication of the termination, bringing the average stock price to a value 1.019 times the 10-days prior stock price. The median for the same numbers are again lower, suggesting outliers. For acquirers, the conclusion turns out the be the same, however the results are less volatile, showing a more linear trend of a negative shock after which the prices come back to slightly below the pre-announcement levels. The prices plateau around the pre-deal level, -0.3% on average, -5.5% median change for -10/10.

Overall, we can conclude that the stock prices initially after the termination fall meaningfully below the "fair" pre-announcement price, only to rebound and plateau a little below the fair price. We cannot confirm the hypothesis $H0_2$, rejecting its statement that the stock prices return to a normal "fair" level after the termination announcement.

From the overall sample, we were able to find negative abnormal return at a 5% significance level. With regards to the research question, it is also highly interesting to dissect the full sample into smaller subsamples and compare they results among them. For this reason, we have built and tested subsamples among six different criteria: 1) Acquirer versus targets, 2) Date of transaction, 3) geographic location of the company, 4) deals within the same country versus cross-border deals, 5) subsamples by industry sector and 6) by the size of the deals.

6.1.1 Subsamples

$H0_{3a}$: There is no difference in the cumulative abnormal returns between Acquirer and Target subsamples

$$\overline{CAR}(T3,T4)_{Acquirers} = \overline{CAR}(T3,T4)_{Targets}$$

With this sub-hypothesis we want to test whether or not there is a difference in the stock price reaction to the event between acquirers and targets. According to Jensen & Ruback (1983), who reviewed thirteen studies to summarize returns around the M&A announcements, target shareholders receive an average positive abnormal return of 30% in successful tender offers and 20% in successful mergers. This in turn leads to anticipation and hence a sharp increase in their stock price almost to the equivalent of the premium offered by the acquirer upon announcement, which is why the termination should lead a notable decline in the stock price and hence the returns. Malmendier et. al (2012) find

that the value of targets involved in unsuccessful mergers will increase by 15% after the cancellation for cash deals, while the post-cancellation value of targets in stock deals will revert to its previous level, we do not make that distinction. The effect on the acquirers is also dependent on the payment method where stock deals result in a significant negative impact on valuation while cash deals leave the acquirer unaffected after an unsuccessful merger. As Prof. Damodaran (2012) suggests, naturally the focus of the stock price development during an M&A transaction announcement is on the target. However, he notes that it is more interesting to look on the acquirer's stock price development, as this indicates what the market thinks of the transaction. With a few exceptions, acquirers' stock prices don't move as much comparably upon the announcement of a deal (Damodaran, 2008). However, it is unclear in which direction they move: Jensen and Ruback (1983) showed excess returns of 4% for bidders around the tender offers and no excess returns around completion. Jarrell, Brickley and Netter (1988) found in their examination of tender offers from 1962 to 1985 negative excess returns to bidders from 4.4% in the 1960s to 2% in the 1970s to -1% in the 1980s. Damodaran (2008) cites that some studies indicate that approximately half of all bidding firms earn negative excess returns around the announcement of takeovers, suggesting that shareholders are sceptical about the perceived value of the takeover in a significant number of cases, whereas the other half earns slightly positive, approving, returns. Our interest is now to see whether or not acquirers experience the same or also different effects upon the announcement of the termination of their deals.

Table 5 – Cumulative Abnormal Return (CAR) results – acquirer subsample

Table 5 shows the cumulative abnormal return (CAR) results of the acquirer subsample, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			0.0074		
	AR t=1			-0.0045		
	CAR	0.0039	-0.0008	-0.0014	0.0005	-0.0310
	CAAR	0.0013	-0.0002	-0.0001	0.0000	-0.0001
Median	AR t=0			-0.0007		
	AR t=1			-0.0001		
	CAR	-0.0013	0.0000	-0.0045	-0.0151	-0.0317
	CAAR	-0.0004	0.0000	-0.0004	-0.0007	-0.0001
Student T-statistic		1.3209	0.2931	0.3843	0.1013	1.7173
	N	82	82	82	82	82

Table 6 – Cumulative Abnormal Return (CAR) results – target subsample

Table 6 shows the cumulative abnormal return (CAR) results of the target subsample, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0202		
	AR t=1			-0.0034		
	CAR	-0.0365	-0.0532	-0.0822	-0.0952	-0.1392
	CAAR	-0.0122	-0.0106	-0.0075	-0.0045	-0.0006
Median	AR t=0			-0.0113		
	AR t=1			0.0020		
	CAR	-0.0230	-0.0392	-0.0449	-0.0814	-0.1488
	CAAR	-0.0077	-0.0078	-0.0041	-0.0039	-0.0009
Student T-statistic		8.5837	10.0198	9.6336	8.9693	6.6018
	N	54	54	54	54	54

Table 7 – Cumulative Abnormal Return (CAR) results – Welch T-test

Table 7 shows the Welch T-test results for the acquirer-target subsamples for all five event windows.

	(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Welch T-statistic Acquirer-Targets sub-samples	3.8248	4.4341	3.9964	3.8653	1.2872

As the table shows, with the exception of the long-term event window (-10,1yr), the cumulative abnormal returns between acquirers and targets are statistically significantly different from each other, being greatly negative for targets in all short-term event windows compared to barely any returns on the acquirer's side. However, the latter results are not statistically significant themselves. The results for targets confirm what we suspected: A reverse effect of the empirically examined stock price developments around the announcement of the deal. For the (-2,2) and (-5,5) event windows, only 11 and 10, respectively, out of 55 targets showed positive cumulative abnormal returns (CAR) and cumulative average abnormal returns (CAAR), whereas 44 and 45, respectively, showed negative cumulative abnormal (average) returns, grossly confirming our initial assumption. For the acquirer subsample, we also counted the companies with positive CARs around the same event windows (-2,2 and -5,5). Almost half, 42 and 39 out of 83 acquirers have positive CARs and CAARs, whereas 41 and 44, respectively, showed negative cumulative abnormal (average) returns.

When looking at the long-term development (-10,1yr) of both acquirer's and target's stock prices, both subsamples show negative CARs over the period of a year following the event. It can be concluded that the termination of a M&A transaction has indeed many forms of negative consequences on both parties, given that we take the stock prices and their development as the investor's opinion of the future of a company and therefore as a proxy of the consequences on the

whole company, both for prospects and operations (Croci, 2006). More specifically, targets seem to suffer from more negative consequences as their average CAAR is -0.6% versus -0.1% for bidders. It is however unclear whether this should be solely attributed to price correction related to the offer premium as elaborated before, or whether this can also be taken as an indication that the targets will underperform in comparison to acquirers in the future.

Ho_{3b}: There is no difference in the cumulative abnormal returns among different time periods

$\overline{CAR}(T3,T4)_{Period1} = \overline{CAR}(T3,T4)_{Period2}$

The full sample was split into five subsamples based on the timing of the termination:

1996 - 2001	Asian financial crisis, build-up & burst of the dot-com bubble, largest merger wave Starting in 1999, Mario Monti took over from Karel van Miert and implemented a more stringent and pro-competition policy at the EU competition office
2002 - 2006	Post dot-com bubble, worldwide recovery and growth period Bush administration (R) in the US, pro-business policy and lesser focus on competition, Neelie Kroes as EU competition officer with a free-market policy
2007 - 2009	Global Financial Crisis, credit restrictions, significantly lower profits across multiple industries, increased competition Begin of Obama Administration (D) in the United States with increased focus on antitrust issues
2010 - 2014	Recovery from the financial crisis, increased M&A activities due to record high level of cash on company's balance sheets, low interest rate environment Period of Joaquìn Almunia as EU competition officer, continuing the policy of Neelie Kroes
2015 - 2016	Increasingly large M&A deals being evaluated by antitrust authorities automatically consolidation in many industries Margarethe Vestager becomes head of the European Union's Directorate-General for Competition, taking over from Joaquìn Almunia

The rationale behind this split is elaborated in the table above. Various macroeconomic climates in addition to political policies in the last twenty years clearly justify looking at the data split into different periods. The number of blocked transactions by antitrust authorities has greatly increased in the last six years, with 62 involved parties out of our 136 deals in the sample, of which 28 alone in the last two years.

Table 8 – Cumulative Abnormal Return (CAR) results – Time periods

Table 8 shows the cumulative abnormal return (CAR) results of various time periods as subsamples, displaying both the average and median values of the cumulative abnormal returns (CAR) for five event windows as well as the respective Student T-statistic for statistical significance.

Cumulative Abnormal Return (CAR) average - Time periods							
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)	N
		CAR					
Average	1996 - 2001	0.0153	-0.0094	-0.0494	-0.0982	-0.1732	20
	2002 - 2006	-0.0244	-0.0339	-0.0321	-0.0290	-0.0509	40
	2007 - 2009	-0.0024	-0.0096	-0.0111	-0.0219	-0.2554	14
	2010 - 2014	-0.0162	-0.0222	-0.0287	-0.0273	-0.0163	34
	2015 - 2016	-0.0145	-0.0181	-0.0412	-0.0265	-0.0155	28
Median	1996 - 2001	0.0108	-0.0044	-0.0581	-0.1182	-0.2548	20
	2002 - 2006	-0.0069	-0.0078	-0.0106	-0.0222	-0.0273	40
	2007 - 2009	-0.0094	-0.0168	-0.0196	-0.0391	-0.1982	14
	2010 - 2014	-0.0096	-0.0119	-0.0144	-0.0265	-0.0224	34
	2015 - 2016	-0.0025	-0.0119	-0.0177	-0.0192	-0.0648	28
Student T-statistic	1996 - 2001	2.8838	1.6047	5.3289	7.1851	5.4145	
	2002 - 2006	4.3648	5.4001	4.0708	3.1408	1.5353	
	2007 - 2009	0.3452	1.2634	0.7074	1.0818	4.6159	
	2010 - 2014	3.9570	5.3279	3.8676	3.0833	1.6462	
	2015 - 2016	2.8283	2.9204	4.6747	2.3089	1.0459	

Table 9 – Cumulative Abnormal Return (CAR) results – Welch T-test

Table 9 shows the Welch T-test results for the acquirer-target subsamples for all five event windows.

CAR - Welch T-test (-1,1)

	1996 - 2001	2002 - 2006	2007 - 2009	2010 - 2014	2015 - 2016
1996 - 2001					
2002 - 2006	2.4388				
2007 - 2009	1.1849	-1.3883			
2010 - 2014	2.4351	-0.5876	1.1125		
2015 - 2016	1.9862	-0.6199	0.8336	-0.1324	

CAR - Welch T-test (-2,2)

	1996 - 2001	2002 - 2006	2007 - 2009	2010 - 2014	2015 - 2016
1996 - 2001					
2002 - 2006	1.2707				
2007 - 2009	0.0089	-1.0865			
2010 - 2014	0.8476	-0.6989	0.6667		
2015 - 2016	0.4882	-0.8247	0.4021	-0.2745	

CAR - Welch T-test (-5,5)

	1996 - 2001	2002 - 2006	2007 - 2009	2010 - 2014	2015 - 2016
1996 - 2001					
2002 - 2006	-0.6417				
2007 - 2009	-0.7980	-0.4683			
2010 - 2014	-0.7370	-0.1516	0.3879		
2015 - 2016	-0.2508	0.3291	0.6216	0.4337	

CAR - Welch T-test (-10,10)

	1996 - 2001	2002 - 2006	2007 - 2009	2010 - 2014	2015 - 2016
1996 - 2001					
2002 - 2006	-1.5476				
2007 - 2009	-1.2041	-0.1343			
2010 - 2014	-1.5926	-0.0621	0.1022		
2015 - 2016	-1.5232	-0.0772	0.0852	-0.0230	

CAR - Welch T-test (-10,1yr)

	1996 - 2001	2002 - 2006	2007 - 2009	2010 - 2014	2015 - 2016
1996 - 2001					
2002 - 2006	-0.8338				
2007 - 2009	0.5165	1.3137			
2010 - 2014	-1.2335	-0.2813	-1.7395		
2015 - 2016	-1.3744	-0.3219	-1.9037	-0.0102	

With the exception of the 2007 - 2009 period during the worldwide financial crisis, all individual event study subsamples were statistically significant. The insignificance can be explained

by the fact that other external events during the financial crisis (insecurity, spill-over effects, credit freeze downs, limited consumer optimism and possibility of bankruptcies) influenced the stock prices as well and the event effects cannot clearly be carved out. Despite an increase in antitrust scrutiny recently, which is also being publicly proclaimed by the agencies themselves ("the Obama administration has challenged a higher percentage of mergers than any administration since before Reagan's", Warren, 2016), the negative CARs of the most recent period, 2015 - 2016, are not greater than in other periods, despite unexpectedly tough decisions. Investors and Merger Arbitrageurs now assign a greater amount of their funds back to M&A investments, but also a greater probability to the failure of a deal by pricing this new information in (Foxman and Burton, 2016 and Kaissar and Lachapelle, 2016). Surprising however are the results for the period 1996 - 2001, also the only period that shows to be statistically different (5% level) from other periods according to the Welch T-test. Taking out the distorted results from the financial crisis period, this period's subsample has the highest average negative CAR in all event windows. In terms of antitrust policy in Europe, this period is shaped by Mario Monti's appointment to the newly formed EU Merger Task Force and his strict pro-competition policy, the first such policy since 1990 when the EU commission received the power to review mergers between companies of any nationality whose combined worldwide and European revenues were above the threshold established in the Merger Regulation, leading to high-profile merger blockades against Scania AB and Volvo in 1999, WorldCom and Sprint in 2000 as well as GE-Honeywell and Schneider Electric-Legrand in 2001 (European Commission, 2002 and Chapman, 2000). On the other side of the Atlantic, the Clinton administration became also significantly more active in antitrust competition issues, most notably on the Federal level. Litan and Shapiro (n.D.) attribute that to the new focus on "innovation competition", a term introduced during the Clinton Administration that describes competition in industries focused on research and development and the generation of intellectual property, leading to network effects and winner-takes-it-all markets. We can reject the null-hypothesis.

Ho_{3c}: There is no difference in the cumulative abnormal returns among companies from North America and Europe - $\overline{CAR}(T3,T4)_{North\ America} = \overline{CAR}(T3,T4)_{Europe}$

One focus of this research paper is the international comparison between firms in North America (United States and Canada) as well as in Europe (Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and United Kingdom), given the different legal frameworks and philosophies governing the antitrust review. Different political environments and policies, rules of law and economic climates as well as different sizes of industries and consumer consumption behaviour justify a closer look.

Table 10 – Cumulative Abnormal Return (CAR) results – North American subsample

Table 10 shows the cumulative abnormal return (CAR) results of sample companies headquartered in North America, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0040		
	AR t=1			-0.0067		
	CAR	-0.0181	-0.0296	-0.0325	-0.0380	-0.0676
	CAAR	-0.0060	-0.0059	-0.0030	-0.0018	-0.0002
Median	AR t=0			-0.0022		
	AR t=1			-0.0001		
	CAR	-0.0078	-0.0168	-0.0176	-0.0336	-0.0785
	CAAR	-0.0026	-0.0034	-0.0016	-0.0016	-0.0004
Student T-statistic		5.1328	7.6225	5.9146	5.5115	3.7480
	N	75	75	75	75	75

Table 11 – Cumulative Abnormal Return (CAR) results – European subsample

Table 11 shows the cumulative abnormal return (CAR) results of sample companies headquartered in Europe, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0031		
	AR t=1			-0.0009		
	CAR	-0.0049	-0.0119	-0.0347	-0.0368	-0.0818
	CAAR	-0.0016	-0.0024	-0.0032	-0.0018	-0.0005
Median	AR t=0			-0.0032		
	AR t=1			0.0000		
	CAR	-0.0026	-0.0070	-0.0179	-0.0240	-0.0959
	CAAR	-0.0009	-0.0014	-0.0016	-0.0011	-0.0004
Student T-statistic		1.4910	3.1183	5.7245	4.8224	3.8712
	N	61	61	61	61	61

Table 12 – Cumulative Abnormal Return (CAR) results – Welch T-test

Table 12 shows the Welch T-test results for the North American-European subsamples for all five event windows.

	(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Welch T-statistic NA-European sub-samples	1.3323	1.5187	0.1133	0.0514	0.1684

The two subsamples show clearly negative returns, both short-term and long-term, however the lack of difference in the data between the two subsamples is quite revealing. Despite the different jurisdictions, processes and market environments, the consequences due to negative abnormal returns for North American and European companies and their shareholders are equally worrisome. Statistically speaking, there is also no significant difference between the two samples, shown in very low Welch T-test statistics. We also discovered that there is a surprisingly equal variance in the CARs from North America and Europe, indicating that the stock price developments of every event in both subsample, and therefore the presumed consequences of the termination of the deal, is equal in both samples. We therefore cannot reject the hypothesis.

Ho_{3d}: There is no difference in the cumulative abnormal returns among companies involved in domestic or cross-border deals - $\overline{CAR}(T3,T4)_{Domestic} = \overline{CAR}(T3,T4)_{Cross\text{-}border}$

The principal reason we look at this subsample comparison is given by the fact that cross-border transactions require an extensive preparation and due diligence phase beyond the required steps for a domestic deal, multiple regulatory environments, unknown markets and consumer behaviours and cultural differences turn into larger deal risks for both parties, including antitrust scrutiny.

Table 13 – Cumulative Abnormal Return (CAR) results – Domestic subsample

Table 13 shows the cumulative abnormal return (CAR) results of sample companies involved in domestic transactions, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0035		
	AR t=1			-0.0040		
	CAR	-0.0148	-0.0274	-0.0407	-0.0494	-0.1310
	CAAR	-0.0049	-0.0055	-0.0037	-0.0024	-0.0005
Median	AR t=0			-0.0029		
	AR t=1			-0.0007		
	CAR	-0.0039	-0.0125	-0.0226	-0.0423	-0.0986
	CAAR	-0.0013	-0.0025	-0.0021	-0.0020	-0.0005
Student T-statistic		4.4261	7.3953	7.6377	7.2778	7.6354
	N	87	87	87	87	87

Table 14 – Cumulative Abnormal Return (CAR) results – Cross-border subsample

Table 14 shows the cumulative abnormal return (CAR) results of sample companies involved in cross-border transactions, displaying both the average and median values of the abnormal returns at day 0, day 1 as well as the CAR and the cumulative average abnormal return (CAAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0038		
	AR t=1			-0.0042		
	CAR	-0.0076	-0.0114	-0.0207	-0.0164	0.0272
	CAAR	-0.0025	-0.0023	-0.0019	-0.0008	0.0000
Median	AR t=0			-0.0019		
	AR t=1			0.0018		
	CAR	-0.0066	-0.0033	-0.0076	-0.0219	-0.0821
	CAAR	-0.0022	-0.0007	-0.0007	-0.0010	-0.0003
Student T-statistic		2.3111	2.9973	3.3477	2.1754	1.1859
	N	49	49	49	49	49

Table 15 – Cumulative Abnormal Return (CAR) results – Welch T-test

Table 15 shows the Welch T-test results for the domestic-cross-border subsamples for all five event windows.

	(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Welch T-statistic Domestic - Corss-boder sub-samples	0.7557	1.3810	1.0710	1.3769	1.8102

Of our sample, 87 out of 136 deals (64%) were domestic, similar to the overall trend that 58% of deals by value were domestic deals in the first two quarters in 2016 (Mergermarket, 2016). The reason for this must lie in the fact that deals subject to antitrust scrutiny feature companies that combined have too strong of a market position and competitive advantage. This in turn is usually achieved when a country's leading companies in their respective industries merge. One such example, which makes up three distinct events in our overall sample, are the three attempts by Ryanair to buy its Irish rival Aer Lingus, each time accompanied by regulators raising concern or opposition, leading to three failed attempts (Associated Press, 2006; BBC News 2007 and AerLingus, 2012). The results show no clear difference in the short-term windows (-1,1), (-2,2), (-5,5) and (-10,10), with both subsamples having negative CARs and CAARs of about the same size. This is supported by the fact that there is also no statistical significance between the two samples, meaning we cannot reject the null-hypothesis for the short-term windows. However, there is a clear, and statistically significant divergence in the long-term returns (-10,1yr): Companies involved in failed cross-border deals have CAR of 2.7%, whereas companies involved in failed domestic deals have a CAR of -13.1% over the same period. Naturally, the consolidation effects of synergies on domestic deal are greater, suggesting an explanation for this strong divergence that goes against our hypothesis stated in the introduction to this subsample.

Ho_{3e}: There is no difference in the cumulative abnormal returns across companies in various industry sectors

- $\overline{CAR}(T3,T4)_{Sector\,1} = \overline{CAR}(T3,T4)_{Sector2}$

For this hypothesis testing, we categorized our sample companies into eight industry sectors: Basic materials, Communications, Consumer, Energy, Financial, Industrial, Technology and Utilities. Sectors like Communications, Energy or Utilities are industries with characteristics of an oligopoly. These sectors are especially prone for antitrust competition interference.

Table 16 – Cumulative Abnormal Return (CAR) results – Industry sectors

Table 16 shows the cumulative abnormal return (CAR) results of industry sectors as subsamples, displaying both the average and median values of the cumulative abnormal returns (CAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)	N
		CAR					
Average	Basic materials	-0.0035	-0.0058	-0.0165	-0.0591	0.1996	10
	Communications	-0.0171	-0.0315	-0.0387	-0.0274	-0.0099	21
	Consumer	-0.0146	-0.0288	-0.0514	-0.0622	-0.2631	42
	Energy	-0.0453	-0.0851	0.0152	0.1494	0.4205	2
	Financial	-0.0125	-0.0161	-0.0320	-0.0527	-0.0122	22
	Industrial	-0.0172	-0.0183	-0.0437	-0.0524	-0.1093	24
	Technology	0.0020	0.0001	0.1023	0.1619	0.0246	4
	Utilities	0.0111	-0.0043	-0.0097	0.0136	0.1047	11
Median	Basic materials	0.0008	-0.0042	-0.0344	-0.0609	0.1385	10
	Communications	-0.0065	-0.0141	-0.0200	-0.0165	0.0456	21
	Consumer	-0.0082	-0.0101	-0.0206	-0.0482	-0.1255	42
	Energy	-0.0453	-0.0851	0.0152	0.1494	0.4205	2
	Financial	-0.0084	-0.0125	-0.0148	-0.0486	-0.0943	22
	Industrial	-0.0043	-0.0049	-0.0134	-0.0308	-0.1905	24
	Technology	-0.0059	0.0049	0.0941	0.1812	-0.0058	4
	Utilities	-0.0026	-0.0054	-0.0133	0.0135	0.1513	11
Student T-statistic	Basic materials	0.7372	0.9236	1.8367	4.7045	3.8118	
	Communications	2.3756	3.7619	3.7186	2.1003	0.3438	
	Consumer	3.0322	5.6794	6.2888	5.9967	9.4773	
	Energy	2.1848	2.8890	0.5490	3.6101	4.1674	
	Financial	2.0825	2.6932	4.0502	4.5390	0.3066	
	Industrial	2.7957	2.4887	4.0100	4.2949	3.8084	
	Technology	0.2544	0.0076	2.8154	3.6414	0.3130	
	Utilities	2.6464	0.6933	1.0488	1.2203	3.3809	

Table 17 – Cumulative Abnormal Return (CAR) results – Welch T-test

Table 17 shows the Welch T-test results for the industry sector subsamples for all five event windows.

CAR - Welch T-test (-1,1)

	Materials	Commun.	Consumer	Energy	Financial	Industrial	Technology	Utilities
Materials								
Commun.	0.6289							
Consumer	0.8378	-0.1257						
Energy	2.7363	1.3146	2.3812					
Financial	0.5737	-0.2134	-0.1585	-2.1365				
Industrial	0.7596	0.0008	0.1589	-1.5918	0.2582			
Technology	-0.2032	-0.6158	-1.0689	-1.7501	-0.5324	-0.6692		
Utilities	-0.8821	-1.2617	-1.7876	-3.4680	-1.4185	-1.5018	-0.3262	

CAR - Welch T-test (-2,2)

	Materials	Commun.	Consumer	Energy	Financial	Industrial	Technology	Utilities
Materials								
Commun.	1.0315							
Consumer	1.1290	-0.1233						
Energy	3.5160	2.2286	2.9247					
Financial	0.5159	-0.7120	-0.7846	-3.6633				
Industrial	0.5594	-0.5557	-0.5540	-3.1361	0.1171			
Technology	-0.1999	-1.0435	-0.1764	-3.0074	-0.6134	-0.6511		
Utilities	-0.0620	-1.0880	-1.1972	-3.5723	-0.5872	-0.6233	0.1494	

CAR - Welch T-test (-5,5)

	Materials	Commun.	Consumer	Energy	Financial	Industrial	Technology	Utilities
Materials								
Commun.	0.7427							
Consumer	1.2868	0.4150						
Energy	-0.5142	-0.8521	-1.0738					
Financial	0.5992	-0.2319	-0.7360	0.7674				
Industrial	0.9155	0.1501	-0.2560	0.9317	0.4036			
Technology	-1.5985	-1.8641	-0.6607	-0.9373	-1.8114	-1.9318		
Utilities	-0.2294	-0.8825	-1.3728	0.3940	-0.7628	-1.0398	1.4818	

CAR - Welch T-test (-10,10)

	Materials	Commun.	Consumer	Energy	Financial	Industrial	Technology	Utilities
Materials								
Commun.	-0.6376							
Consumer	0.0749	0.8489						
Energy	-3.1301	-2.6434	-3.5073					
Financial	-0.1405	0.5504	-0.2637	3.1649				
Industrial	-0.1556	0.5782	-0.3008	3.2580	-0.0070			
Technology	-2.4707	-2.1113	-0.9378	-0.1245	-2.4549	-2.4912		
Utilities	-1.5102	-0.8448	-1.9438	2.0679	-1.4983	-1.5929	1.6708	

CAR - Welch T-test (-10,1yr)								
	Materials	Commun.	Consumer	Energy	Financial	Industrial	Technology	Utilities
Materials								
Commun.	1.3987							
Consumer	3.0520	2.2473						
Energy	-1.4357	-3.7189	-5.7877					
Financial	1.2425	0.0171	-1.8046	3.0579				
Industrial	2.0077	0.8594	-1.3026	4.3791	0.6862			
Technology	0.7844	-0.1737	-1.1539	1.9618	-0.1716	-0.6638		
Utilities	0.5514	-0.8238	-2.6075	2.2009	-0.7254	-1.4915	-0.3706	

In the very short term event windows (-1,1) and (-2,2), the Energy sector shows greater negative CARs than all other sectors. However, the results become less clear in the other short-term window (-5,5). Interestingly, the Energy, Technology and Utilities sector actually start showing positive CARs starting from the (-10,10) window, with significant positive cumulated abnormal returns in the long-term event window (-10,1yr). Basic Materials actually have the second highest long-term cumulated abnormal returns after the Energy sector. However, since there are only two companies in our Energy subsample, their results are not representative. Also, the Welch t-statistic at a 5% significance level between the various subsamples is rarely significant, which is why we cannot reject the null-hypothesis and therefore see no meaningful differences among these subsamples.

$H0_{3f}$: There is no difference in the cumulative abnormal returns across companies involved in transactions of various levels in value - $\overline{CAR}(T3,T4)_{Transaction\ size\ 1} = \overline{CAR}(T3,T4)_{Transaction\ size\ 2}$

In this comparison, subsamples were built based on the deal value size to see whether or not this is any difference in the abnormal returns. Again, given that the nature of companies involved in deals that are under competition reviews are very large and market leading (or soon to become market leading), transaction values are tilted towards the higher end of the spectrum. In our sample of 136 companies, the deal value information on 7 companies is missing, leaving 131 companies to analyse.

Table 18 – Cumulative Abnormal Return (CAR) results – Transaction sizes

Table 18 shows the cumulative abnormal return (CAR) results of transaction sizes as subsamples, displaying both the average and median values of the cumulative abnormal returns (CAR) for five event windows as well as the respective Student T-statistic for statistical significance.

		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)	N
				CAR			
Average	<$100M	-0.0157	-0.0175	-0.0042	0.0117	0.0740	13
	$100M - $500M	-0.0250	-0.0236	-0.0356	-0.0487	-0.0165	16
	$500M - $1,000M	-0.0160	-0.0195	-0.0256	-0.0449	0.0242	15
	$1B - $10B	-0.0097	-0.0162	-0.0424	-0.0478	-0.1198	54
	$10B - $50B	-0.0111	-0.0197	-0.0130	0.0153	0.0588	23
	>$50B	0.0063	-0.0306	-0.0992	-0.1160	-0.2981	8
Median	<$100M	-0.0073	-0.0060	0.0005	-0.0240	-0.0248	13
	$100M - $500M	-0.0144	-0.0101	-0.0325	-0.0581	-0.1174	16
	$500M - $1,000M	-0.0220	-0.0229	-0.0242	-0.0313	-0.0564	15
	$1B - $10B	-0.0027	0.0014	-0.0180	-0.0427	-0.1073	54
	$10B - $50B	-0.0065	-0.0070	-0.0134	0.0289	0.1049	23
	>$50B	0.0012	-0.0329	-0.0821	-0.0541	-0.1376	8
Student T-statistic	<$100M	0.0026	0.0021	0.0030	0.0082	0.2348	
	$100M - $500M	0.0008	0.0013	0.0033	0.0194	0.2907	
	$500M - $1,000M	0.0042	0.0061	0.0189	0.0218	0.1737	
	$1B - $10B	0.0030	0.0034	0.0033	0.0090	0.0912	
	$10B - $50B	0.0040	0.0043	0.0203	0.0413	0.2038	
	>$50B	0.0798	0.0743	0.1312	0.1630	0.4297	

Table 19 – Cumulative Abnormal Return (CAR) results – Welch T-test

Table 19 shows the Welch T-test results for the transaction size subsamples for all five event windows.

CAR - Welch T-test (-1,1)

	<$100M	$100M - $500M	$500M - $1,000M	$1B - $10B	$10B - $50B	>$50B
<$100M						
$100M - $500M	0.3640					
$500M - $1,000M	0.0141	-0.6114				
$1B - $10B	-0.2519	-0.9881	-0.5549			
$10B - $50B	-0.1826	-0.8071	-0.3590	0.1000		
>$50B	-0.7014	-1.2204	-0.9539	-0.6692	-0.6971	

CAR - Welch T-test (-2,2)

	<$100M	$100M - $500M	$500M - $1,000M	$1B - $10B	$10B - $50B	>$50B
<$100M						
$100M - $500M	0.2610					
$500M - $1,000M	0.0884	-0.2809				
$1B - $10B	-0.0553	-0.4752	-0.2320			
$10B - $50B	0.0943	-0.2328	0.0168	0.2187		
>$50B	0.4243	0.2704	0.4469	0.5668	0.4164	

CAR - Welch T-test (-5,5)

	<$100M	$100M - $500M	$500M - $1,000M	$1B - $10B	$10B - $50B	>$50B
<$100M						
$100M - $500M	0.8077					
$500M - $1,000M	0.5463	-0.4945				
$1B - $10B	0.9344	0.2924	0.7044			
$10B - $50B	0.2314	-1.2313	-0.6606	-1.3186		
>$50B	1.5300	1.2184	1.4028	1.0574	1.6644	

CAR - Welch T-test (-10,10)

	<$100M	$100M - $500M	$500M - $1,000M	$1B - $10B	$10B - $50B	>$50B
<$100M						
$100M - $500M	1.1937					
$500M - $1,000M	0.9803	-0.0884				
$1B - $10B	1.2043	-0.0269	0.0715			
$10B - $50B	-0.0721	-2.1248	-1.4671	-2.2415		
>$50B	1.5052	0.8941	0.8854	0.9140	1.7625	

CAR - Welch T-test (-10,1yr)

	<$100M	$100M - $500M	$500M - $1,000M	$1B - $10B	$10B - $50B	>$50B
<$100M						
$100M - $500M	0.5324					
$500M - $1,000M	0.2714	-0.2208				
$1B - $10B	1.4680	0.7721	0.9581			
$10B - $50B	0.1124	-0.5518	-0.2264	-2.1077		
>$50B	1.8676	1.4050	1.5217	1.0524	2.0798	

The results of the short-term event windows all show the same negative trend and are not statistically significantly different from each other. Notably, in the windows (-5,5) and (-10,10), the companies involved in larger deals of a billion dollar in value and higher show different patterns. While the $1 to $10bn deal section shows negative CARs slightly bigger than in lower value deals, the companies $10 - $50bn deals actually turn to positive cumulative abnormal returns. Contrary to this again, the eight companies involved in deals larger than $50 billions show strongly negative abnormal returns.

For the long-term window (-10,1yr), half of our subsamples experience actually positive cumulative abnormal returns. Notably here again are the eight companies involved in the biggest deals in value terms, generating negative CARs of -29.8% during that time window with one of the lowest CAR variances among all the subsamples.

6.2 Financial KPI difference-in-difference analysis results

Based on the guidelines from chapter 5.3, an accounting KPI difference-in-difference analysis with data gathered for our 62 acquirers in the final sample as well as their matching peers was performed. The indexation to the performance level of the first quarterly results after the termination gives a simple and clear view of the development following the termination. In essence, we test whether our acquirers in the sample as well as their matching peers have a difference in performance, to gauge whether or not the termination also has an operational influence. With that, the main stated hypothesis for all three KPIs is

H_0: There is no difference in performance in the financial KPIs between treatment and control group following the termination – Difference-in-difference = 0

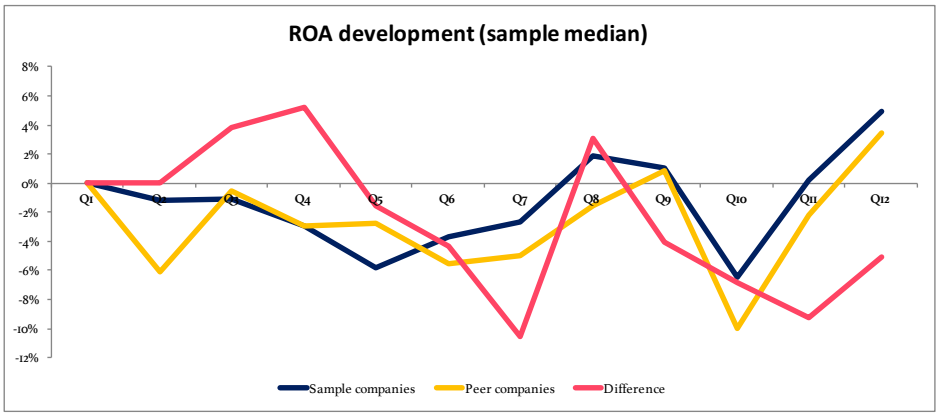
Following, we present the results for our main three financial performance indicators.

Table 20 – Return on Asset (ROA) development for sample and peer companies

Table 20 shows the Return on Asset (ROA) development for our sample companies, their matched peer companies as well as the differences from the two as the difference-in-difference analysis. The results are indexed to the first quarter and show the ROA development with respect to the first quarter after the termination (Q1).

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Sample companies												
N	62	58	55	52	50	48	46	44	43	40	40	40
Average	0.0000	0.3124	-0.0541	-0.0697	-0.1328	-0.7256	-1.0823	-0.0002	-0.1592	0.7237	0.3162	0.1353
Median	0.0000	-0.0122	-0.0107	-0.0295	-0.0584	-0.0371	-0.0262	0.0184	0.0101	-0.0644	0.0025	0.0492
max	0.0000	23.7398	12.8019	2.9967	11.1690	27.0189	12.5375	11.8328	8.2131	34.1015	14.8926	16.5154
min	0.0000	-5.9096	-10.2609	-4.4546	-6.7114	-57.1743	-53.8638	-6.2413	-10.0563	-5.5624	-6.3902	-8.8635
p-value	0.0000	0.4761	0.8727	0.6912	0.6400	0.5914	0.3821	0.9995	0.6702	0.4226	0.5143	0.7964
Peer companies												
N	61	61	60	55	55	52	50	47	45	42	42	39
Average	0.0000	-0.1560	-0.0619	0.0998	-0.2108	-0.2049	-0.0742	0.0936	0.1087	-0.0892	0.0733	0.1755
Median	0.0000	-0.0606	-0.0051	-0.0295	-0.0273	-0.0555	-0.0499	-0.0157	0.0084	-0.0997	-0.0221	0.0347
max	0.0000	2.1079	2.2493	6.3434	3.0911	2.4340	2.6007	3.2768	3.4523	2.8301	2.9650	2.6704
min	0.0000	-2.9068	-3.2636	-6.9041	-6.4337	-4.1072	-2.9778	-5.0883	-1.3116	-3.0685	-3.1838	-2.4410
p-value	0.0000	0.0676	0.5223	0.6062	0.1677	0.1870	0.5788	0.5929	0.2996	0.5229	0.6402	0.2605
Difference-in-difference analysis												
N	61	58	55	52	50	48	46	44	42	39	39	38
Average	0.0000	0.4769	0.0526	-0.1674	0.1024	-0.4721	-1.0807	-0.2072	-0.2778	0.8472	0.2740	-0.0605
Median	0.0000	0.0003	0.0379	0.0526	-0.0158	-0.0432	-0.1052	0.0312	-0.0402	-0.0686	-0.0926	-0.0504
max	0.0000	23.8492	14.3972	8.4617	10.8882	27.1890	14.5321	11.6155	7.9958	34.4482	17.1534	16.4031
min	0.0000	-5.7676	-10.1189	-6.2989	-6.4929	-55.8132	-52.5028	-7.8948	-10.0541	-5.4487	-6.6487	-10.8757
p-value	0.0000	0.4969	0.7262	0.5697	0.7121	0.5626	0.2479	0.4128	0.2860	0.5582	0.8325	0.7247

Figure 10 – Return on Asset (ROA) median development over time



The graph shows that for the return on assets (ROA) ratio, for the median of both samples as well as their difference, the results tend to be highly volatile. Nevertheless, we can see that both the treatment as well as the control group follow a similar pattern in ROA development, which a marginal outperformance of the acquirer sample compared to their peers in the short term and an underperformance in the long-term. While the results and the table for both the individual samples as well as the difference calculation give grounds for many interpretations, such as the maximum outperformance (max) and underperformance (min) of an acquirer over their peer, all the results are however not statistically significant with a p-value greater than our α of 0.05. Hence, the probability of

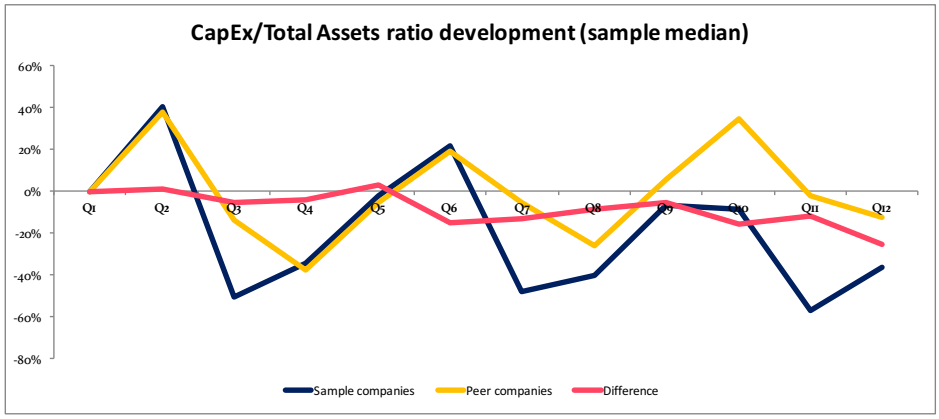
our hypothesis is very high and we are unable to say that there is any clear distinct pattern in ROA performance following the cancellation of the transactions. In other words, we cannot reject our null hypothesis that there is no distinct performance by the treatment or the control group for the Return on Asset metric (i.e. H_0: Difference-in-Difference$_{ROA}$ = 0).

Table 21 – Capital Expenditure/Total Assets development for sample and peer companies

Table 21 shows the Capital Expenditure development in relation to their total assets for our sample companies, their matched peer companies as well as the differences from the two as the difference-in-difference analysis. The results are indexed to the first quarter and show the CapEx/Total assets development with respect to the first quarter after the termination (Q1).

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Sample companies												
N	60	55	53	50	48	46	44	42	41	38	38	38
Average	0.0000	0.2025	0.1191	0.0776	0.1719	0.2581	0.2215	-0.2049	0.0418	0.0110	0.0285	-0.0556
Median	0.0000	0.4093	-0.5023	-0.3409	-0.0177	0.2167	-0.4769	-0.4035	-0.0666	-0.0850	-0.5651	-0.3614
max	0.0000	2.8159	4.2544	4.7265	4.5009	6.8830	9.5958	4.5062	2.4858	4.8881	7.7343	4.2097
min	0.0000	-4.4698	-8.8316	-4.1700	-0.9627	-4.8151	-8.4205	-12.4427	-0.9470	-4.1960	-9.8239	-9.2065
p-value	0.0000	0.1316	0.6316	0.7057	0.2409	0.3141	0.5443	0.5683	0.7097	0.9620	0.9409	0.8627
Peer companies												
N	58	57	56	51	51	48	46	43	41	38	38	35
Average	0.0000	0.2114	0.4431	0.3561	0.1020	0.3154	0.4447	0.3685	0.1309	0.2738	0.5690	0.5265
Median	0.0000	0.3805	-0.1387	-0.3723	-0.0514	0.1903	-0.0496	-0.2576	0.0570	0.3497	-0.0228	-0.1254
max	0.0000	2.8204	6.3415	8.4658	3.1916	2.6968	3.5690	5.0559	2.2994	2.3234	8.8258	10.4348
min	0.0000	-0.9435	-0.8542	-0.7830	-0.7135	-0.9383	-0.8497	-0.6837	-0.6368	-0.9219	-0.8255	-0.6694
p-value	0.0000	0.0308	0.0170	0.1545	0.2636	0.0189	0.0215	0.0976	0.1270	0.0327	0.0592	0.1478
Difference (DiD)												
N	58	53	51	48	46	44	42	40	38	35	35	34
Average	0.0000	0.0069	-0.2738	-0.3568	0.0504	-0.0814	-0.2191	-0.4981	-0.0342	-0.2288	-0.5023	-0.5999
Median	0.0000	0.0133	-0.0535	-0.0420	0.0295	-0.1481	-0.1290	-0.0851	-0.0541	-0.1523	-0.1167	-0.2491
max	0.0000	2.6697	3.3706	4.1242	4.2966	6.4984	8.6997	4.7556	2.2058	3.6762	5.8284	4.3351
min	0.0000	-5.0209	-9.9472	-6.6118	-3.7670	-5.4070	-9.5295	-12.0383	-2.9476	-4.8296	-11.1246	-9.5872
p-value	0.0000	0.8858	0.4532	0.3535	0.3002	0.1436	0.1164	0.1574	0.2704	0.1556	0.1322	0.1984

Figure 11 – Capital Expenditure (CapEx) over total assets median development over time



The idea looking at CapEx following the termination of a transaction is to see how failed acquirers, in comparison to their peers, invest into their own business and hence into organic growth as an alternative to M&A. Our analysis shows that both acquirers and their peers experience the same

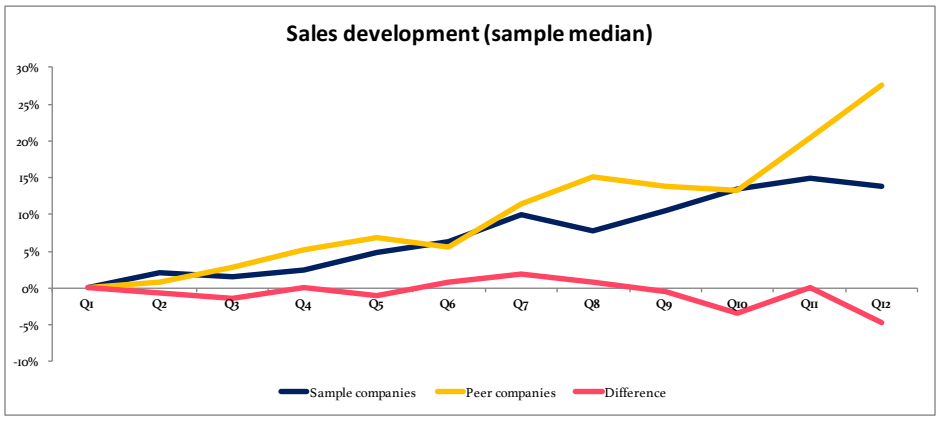
seasonality with CapEx investments, however there is a divergence from the 6th quarter after the termination, where the acquirers' level of CapEx starts to trail their matching peers' level to an increasing gap of -24.9% in the median and -59.9% on average! One would assume that acquirers, having collected substantial amount of financing for their failed acquisition, would use a considerable amount of these funds for internal growth instead, coming back to the point that their "universe of similar targets" is remarkably small after a veto by antitrust authorities. However, this seems not to be the case. There are certainly some individual instances where this is true, given that the max value of CapEx of total assets in our sample companies is increasing dramatically to 420.91% in 3 years after the termination compared to Q1. Again, our results are however not statistically significant enough to draw a finite and robust conclusion, except for the control group (peer companies)'s CapEx development, which shows significant results in half of all the quarters. Thus, cannot reject our null hypothesis (H_0: Difference-in-Difference$_{\text{CapEx/Total Assets}}$ = 0) due to the high probability levels (p-values) for the CapEx/Total assets ratio as well due to the lack of robustness. One factor that could explain this is that we realized that the gathered CapEx data, though from the same source, tends to be incoherent and inconsistent, and could be anchored to annual levels rather than quarterly.

Table 22 – Sales development for sample and peer companies

Table 22 shows the Sales development for our sample companies, their matched peer companies as well as the differences from the two as the difference-in-difference analysis. The results are indexed to the first quarter and show the Sales development with respect to the first quarter after the termination (Q1).

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Sample companies												
N	62	62	58	55	52	50	48	46	45	43	41	40
Average	0.0000	0.0738	0.2666	0.0690	0.0848	0.1505	0.4709	0.1963	0.2115	0.2376	0.7144	0.3222
Median	0.0000	0.0212	0.0157	0.0245	0.0485	0.0631	0.1002	0.0787	0.1062	0.1350	0.1489	0.1383
max	0.0000	4.1340	14.4858	0.9742	0.7609	2.6533	16.0303	1.6591	1.7091	1.7110	18.8383	2.3626
min	0.0000	-0.3753	-0.3669	-0.2941	-0.2370	-0.3810	-0.3152	-0.3164	-0.3153	-0.2748	-0.2702	-0.2939
p-value	0.0000	0.2850	0.2912	0.0405	0.0019	0.0169	0.1639	0.0015	0.0002	0.0002	0.1263	0.0007
Peer companies												
N	62	61	60	55	55	52	50	47	45	42	42	38
Average	0.0000	0.0315	0.0764	0.1206	0.1192	0.1444	0.1861	0.2505	0.2018	0.2612	0.3835	0.4965
Median	0.0000	0.0074	0.0283	0.0519	0.0679	0.0564	0.1138	0.1504	0.1381	0.1333	0.2043	0.2753
max	0.0000	0.4956	0.7283	2.5113	1.1908	1.0293	1.1308	3.8532	1.6941	2.2546	3.1457	5.0363
min	0.0000	-0.3642	-0.3406	-0.4678	-0.1496	-0.3467	-0.2903	-0.3295	-0.1847	-0.3407	-0.3036	-0.3650
p-value	0.0000	0.1213	0.0028	0.0378	0.0003	0.0004	0.0000	0.0062	0.0001	0.0012	0.0005	0.0034
Difference (DiD)												
N	62	61	58	55	52	50	48	46	44	42	40	37
Average	0.0000	0.0426	0.2021	-0.0516	-0.0406	0.0077	0.2882	-0.0388	-0.0134	-0.0417	0.3895	-0.1423
Median	0.0000	-0.0073	-0.0133	0.0003	-0.0111	0.0076	0.0186	0.0087	-0.0056	-0.0339	0.0008	-0.0477
max	0.0000	4.0573	14.2811	0.8683	0.6953	2.4833	15.7680	1.0869	1.1046	1.0136	18.7089	1.3363
min	0.0000	-0.8021	-0.7413	-2.7424	-1.3230	-1.2776	-1.3746	-4.0892	-1.8145	-1.9730	-2.6620	-5.3159
p-value	0.0000	0.7950	0.6532	0.6120	0.6466	0.2282	0.7730	0.2115	0.1145	0.1259	0.7082	0.2162

Figure 12 – Sales development median over time



For the Sales development comparison between acquirers and their peers, we expected no initial change after the transaction but were wondering how acquirers perform long-term compared to their matched peers. The reason why there should not be much of a difference initially is that both consumers and business customers do not react to the failed transaction and are mostly likely either not directly affected by it or are tied in contracts. However longer-term, the strategic rationale that was behind the failed transaction could actually come back to haunt the acquirer and its position in market, leading to a change in net-sales level, either because it cannot offer customers and client the same amount or quality of product or service or other market participants have a superior offering if the acquirer did not adjust their strategy in time.

The results from the net Sales development analysis confirms our initial thoughts with the median difference in the net Sales development between the acquirers and the peers hovering around -1% to 2% for the first year after the termination, when the difference starts to diverge and become more meaningful (up to -5%). Another interesting insight is that both groups experience a dramatic median increase in sales, contrary to our initial thoughts that mostly companies in competitive, consolidating industries are involved in antitrust-relevant M&A transactions. While the relative quarterly development of both the acquirer and the peer sample are statistically robust, the calculations of the differences are not, so that we also cannot reject the null hypothesis that there is a difference between the acquirer group's Sales development and the peer group's Sales development with a confidence level of $\alpha = 0.05$. Hence,

H_0: Difference-in-Difference$_{\text{Sales development}} = 0$.

With this difference-in-difference analysis regarding three financial accounting key performance indicators, we can notice that despite interesting developments between the acquirer sample group and the peer sample group for all three indicators, we do not have statistically robust enough results to reject all three hypotheses, leaving us with the conclusion that a terminated M&A transaction due to an antitrust authority veto does not result in an expected underperformance of the affected acquirer compared to their respective industry peers, nor to an outperformance. The results

also indicate that a terminated M&A transaction does not have any long-term negative impact on the acquirer's strategy, operating performance or sales level. The released funds for acquirers, that were originally meant for transaction payments, are also not allocated for other investments and it can be therefore assumed that they are kept in a "war chest" for future M&A opportunities. This result clearly sets the operating performance for the companies apart from the price-in expectation in their stock prices seen in the stock price event study results in chapter 6.1.

7 Summary and Critical Appraisal

As initially stated, we looked at this topic for the reason of actuality, the relevance for both long-term and event-driven investors (Merger arbitrage), the consequence for the enterprises and their managers as well as a lack of specific previous research in this area of terminated M&A transactions due to failed approvals from antitrust authorities. We were also interested in the differences between acquirers and targets, geographical variations as well as the different deal sizes, to highlight a few subsamples. Part of our key hypothesis is that companies in transactions that have been negotiated and agreed between management teams, approved by shareholders and accompanied by experienced advisors, but had to be terminated due to an external factor in the form of missing antitrust competition approval, experience a greater negative impact given the non-manageable nature of the authorities, their policies and own politics.

7.1 Summary of findings

Targets take the greater hit in terms of negative abnormal returns from the events in the short term, as the results from subsample 1 show. This is consistent with the results from Croci (2006). Naturally, the premium offered in the transactions by the acquirer on the target's current share price vanishes after the transaction is terminated, driving the largest part in the target's share price decline. While Croci (2006) also argues that the large share price decline (and hence abnormal returns) for targets is explained by the new release of information about the company, we consider the fact that targets in our sample are being labelled "unbuyable" for most suitors also a decisive factor. The prospects of the stand-alone target companies are well intact, however the chances of a high return for shareholders in another buyout decrease dramatically, which is presumably priced-in. Extreme examples include the three failed attempts from Ryanair to buy its Irish rival AerLingus as well as the multiple failed efforts of Office Depot to buy industry rival Staples, even though the office supplies industry is in strong decline (McLaughlin and Harris, 2016).

From the 136 stock price event studies in our full sample with both acquirer and targets, we examine that the termination event of a transaction has significant negative effects on the stock prices and therefore on the wealth of shareholders, both in the short term around the event as well as long-term up to a year after the event. Even though acquirers show small positive abnormal returns in the short-term windows, they also experience negative CARs in the long term, similar to targets. Taking the abnormal returns of the event as a proxy for the future prospects of sample companies, we can conclude that the termination is harmful for all involved parties in terms of future prospects, be it for their market positions, Sales development or increased costs. Flipping the events hypothetically, in case these deals were approved for closing, the merged entities would benefit from market dominance, generating incomparably higher returns based on lowers costs and fewer competitive market players, leaving the consumers with fewer choices. This, however, is not happening.

When comparing the stock prices after the termination announcement to the stock prices prior to the transaction announcement, we saw that short-term, the targets' shareholders are off much worse as their share-prices tumble below the level prior to the deal announcement, erasing more than just the premium offered. However, this trend reversed quickly within ten days of the publication of the termination, resulting in no meaningful difference between the acquirers' and targets' share price level, plateauing around the pre-deal value at a range of -0.3% to 1.9% 10 days after the event, which is contrary to the findings of Croci (2006) for targets and Tang (2015) for acquirers. This means for us that besides a significant drop in target's share prices due to the lost premium (explained as a natural cause of the termination on page 28), we cannot observe a meaningful difference in the consequences for acquirers or targets, given that we take the share price development and the abnormal returns in the event studies as proxies.

Including the results from the difference-in-difference analysis on financial KPIs of acquirers in our sample as well as their matched peer companies, we can actually see a clear discrepancy between the expectations of the upcoming development of acquirers beyond the termination of the transaction. While the treatment group shows an average of -3.1% cumulative abnormal return related to the termination event, their KPIs do not defer statistically significantly from their peer group, resulting in no meaningful operating performance difference with regards to Return on Asset, CapEx/Total Assets investments as well as their Sales development. Judging from these results, we examine a discrepancy between the negative expectations of the consequences of the termination seen in the stock price event study results (as they are being "priced in") with the actual development in sample companies' operational and financial performance (as the latter does not show a meaningful underperformance compared to their peers as a result of the terminated transaction).

With every rule, there are exceptions. We would like to highlight the following four exceptions from our event study subsample comparisons. First, our sample companies with a termination date between 1996 and 2001 experienced significantly greater negative CARs compared to all other companies in our sample. Second, there is no difference in results between our North American and European subsamples. Thirdly, failed domestic transactions have a significantly greater negative long-term cumulative abnormal return than failed cross-border deals. Lastly, the bigger the deals, the bigger the negative returns and consequences after they fail to close.

7.2 Concluding remarks

The results from this study clearly indicate a mismatch between market expectations on the consequences of the involuntary termination of an agreed-upon transaction for the involved enterprises and the actual performance compared to industry peers according to meaningful financial KPIs. While this is a reaffirming result for managers involved in such situations, long-term shareholders and event-driven investors that used the signed deal as an investment hypothesis are on the losing end over the following year. However, the continuous operational performance in line with industry peers should give them good hope for the correction in the pricing. What is more, this

discrepancy also opens the possibility for value investors to invest in mispriced shares along the philosophy of Benjamin Graham and his *Margin of Safety*. Hence, this study not only elaborates on the consequences of failed M&A transactions due to antirust authority scrutiny, but also presents a new investing hypothesis. We suggest the latter to be subject for further research.

While we shed lights on the short and long-term consequences for companies and their shareholders of terminated M&A deals by antitrust, we also want to mention the implications of stricter antitrust competition regimes, both within the European Single Market and the free trade markets of NAFTA, at least as long as the latter still exists. We are certain that the probability of large transactions (above a deal value of $10bn), despite such deals occurring more often than ever thanks to record high cash on balance sheets and continuous cheap debt financing, will decline meaningfully as long as the current competition policies are being upheld or continued. Statements from then-U.S. President-candidate Donald Trump (now sitting President) about interfering with the AT&T-Time Warner deal due to competition concerns are just the tip of the iceberg (Gold, 2016 and Karty, 2016). Such scrutiny will most certainly lead to a lower jump of target's stock prices upon announcement of deals, which is also an interesting research topic for further analysis. The Financial press is often first in picking up and discussing potential antitrust issues in a newly publicized deal and the hugely negative consequences. As we have concluded, the Financial press, managers and shareholders of both acquirers and targets, that do not qualify themselves of speculative nature and have a long-term view, ought to worry about the antitrust approval risk, because there are meaningful negative implications over the first year in a deal termination by an antitrust competition veto. We hope that in the future, there will be a more proactive and pre-cautions approach by all involved parties prior to announcing an at-risk transaction, an initiative that should be led by investment banks and M&A lawyers.

7.3 Limitations

This study has been conducted to the best of our abilities using the empirical and statistical tools that should allow calculating and analysing price effects to a termination event by antitrust authorities. However, we acknowledge there are limitations to event studies.

The literature on event studies elaborated in chapter 2.2 commonly agrees that the tool has certain econometric problems. Generally, they can be divided into two categories:

1) Misspecifications of the expected returns ($E[R_{i,t}] = \hat{\alpha}_i + \beta_i \hat{R}_{m,t}$) due to potential errors in the regression and therefore biased calculation of abnormal returns, which in turn bias the outcome
2) Having a non-random sample, which would lead to non-normal distributions resulting in wrong inference due to standard error calculations, and hence would require a different method to calculate the statistical significance compared to the methods applied in this report based on a normally distributed sample. However, given that the final sample of companies is larger than 100 (N=136), there is great certainty that the full sample is normally distributed. For smaller subsamples, we are aware that the case is less certain.

Another issue that has come up over the event study analysis period has been the case of irregular trading patterns of stock prices. In the original sample of 150 companies, a small of number of these have shown low volume trading and hardly a price movements during the event window, leading to extreme abnormal return calculations based on the expected returns gathered during the estimation windows while the stock showed no irregularities. This resulted in outlier data, which is why we excluded those from our final sample. However, we cannot exclude the fact that similar effects have caused one or the other event results to be slightly distorted.

With respect to the difference-in-difference financial KPI analysis, we see limitations in the results coming from the fact that there is limited basis of comparison, as the analysis looks exclusively on our sample companies and matched pairs according to Bloomberg curated peers list and our own judgement of finding the closest pairing company with respect to market capitalization and total assets at the time of the termination. Additionally, the accuracy and coherence of the accounting data derived from Compustat cannot be confirmed entirely. This is especially true for the CapEx figures we used in the analysis. The use of the CapEx figure is intended to give us the level of investments by a sample company, however we realise that from an accounting point of view this is not reflected in CapEx in certain industries (Financial industries, R&D heavy industries).

With regards to a sample bias, we have included almost all M&A transactions that have been blocked by antitrust authorities in our sample for which all acquirers where public. For the sake of quality data availability and thus reliable results, we do not have the full population of such events in our study. However, there is great certainty that this does not result in any kind of sample bias, as our events are greatly distributed, both over the twenty-year window as well as geographically. However, the fact that our sample size is relatively small could be part of explaining why we did not get statistically significant results for many of the tests.

For future studies, it would be interesting to take into consideration the length of the antitrust approval process i.e. how long it took from signing the deal to cancellation. A longer process could mean more uncertainty, disruption and wasted time for management. Another interesting aspect to account for is how much of a surprise it was for the market and the companies themselves that the deal got cancelled. If the termination of the deal was anticipated one could imagine that the effect on both the operational performance as well as the share price would be less disruptive. Furthermore, the market's view on the transaction in the first place also has an impact. If the market had a negative view on the proposed transaction already before, the termination of the deal might be seen as good news. Finally, accounting for the size of the transaction can be a valuable addition to the study. If the target is small in comparison to the acquirer, it is likely to have less impact on the acquirer.

-THE END-

References

Abadie, A. (2005). Semiparametric difference-in-differences estimators. *Review of Economic Studies*. Volume 72 (1). p.1–19

Aer Lingus. (2012). Statement regarding Ryanair offer. Aer Lingus Group plc. Retrieved from http://corporate.aerlingus.com/media/corporateaerlinguscom/content/pdfs/Statement_Re_Ryanair_Offer.pdf

Ahern, K. R. (2009). Sample Selection and Event Study Estimation. Journal of Empirical Finance. Volume 16 (3). p. 466-482

André, P., Khalil, S., & Magnan, M. (2007). Termination Fees in Mergers and Acquisitions: Protecting Investors or Managers?. *Journal Of Business Finance & Accounting*. Vol. 34 (3/4). p.541-566

Ashley, J. W. (1962). Stock prices and changes in earnings and dividends: Some empirical results. *Journal of Political Economy*. Volume 70 (1). p. 82-85

Bach, L. (2016). 4320 Quantitative Methods in Corporate Finance: Part 2, Lecture 6 - Event studies. Stockholm, Sweden: Stockholm School of Economics. p.35

Baigorri, M. & Nair, D. (2016). Global M&A Down, But Not Out, After Weathering 2016's Surprises. Bloomberg News. Retrieved from https://www.bloomberg.com/news/articles/2016-12-21/global-m-a-down-but-not-out-after-weathering-2016-s-surprises

Baker, C.A. (1956). Effective stock-splits. *Harvard Business Review*. Volume 34 (1). p.101-106

Baker, C.A. (1957). Stock splits in a bull market. *Harvard Business Review*. Volume 35 (3). p. 72-79

Baker, C.A. (1958). Evaluation of stock dividends. Harvard Business Review. Volume 36 (4). p. 99-114

Ball, R. & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*. Vol. 6, (2). p. 159-178

Barber, B. & Lyon, J. (1997). Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics*. Volume 43. p.341-372

BBC News. (2007). Ryanair's Aer Lingus bid blocked. BBC News. Retrieved from http://news.bbc.co.uk/2/hi/business/6244894.stm

Block, S.B. (2006). Merger Arbitrage Hedge Funds. Journal of Applied Finance. Vol. 16 (1). Unknown pages

Brav, A., Jiang, W., Partnoy, F. & Thomas, R. (2008). Hedge Fund Activism, Corporate Governance, and Firm Performance. *The Journal of Finance.* Vol. 63 (4). p. 1729-1775

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

Brown, S. & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics*. Volume 14 (1). p.3-31.

Campbell, J. Y., Lo, A.W. & MacKinlay, A.C. (1997). The Econometrics of Financial Markets. Princeton University Press: 1997

Card, D. & Krueger, A. B. (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *American Economic Review*. Volume 84 (4). p.772–793

Card, D. (1990). The Impact of the Mariel Boatlift on the Miami Labor Market. *Industrial and Labor Relations Review.* Volume 43(2). p.245-257.

Chapman, P. (2000). Monti puts breaks on EU merger mania. *Politico*. Retrieved from http://www.politico.eu/article/monti-puts-brakes-on-eu-merger-mania/

Croci, E. (2006). Stock price performance of target firms in unsuccessful mergers and acquisitions. Lugano: University of Lugano

Damodaran, A. (2008). Acquisition and takeovers. Handbook of Finance. II:5:86. New York: New York University Stern School of Business. Retrieved from http://people.stern.nyu.edu/adamodar/pdfiles/papers/acquisitions.pdf

Damodaran, A. (2012). Acquisition Archives: Winners and Losers. Musing on Markets blog. Retrieved from http://aswathdamodaran.blogspot.se/2012/12/acquisition-archives-winners-and-losers.html

Damodaran, A. (2015). Acquisitions are great for target companies but not always for acquiring company stockholders. New York: New York University Stern School of Business

Dolley, J.C. (1933). Characteristics and procedures of common stock split-ups. *Harvard Business Review*. Volume 11. p. 316-326

Eckbo, B.E. (1983). Horizontal mergers, collusion, and stockholder wealth. *Journal of Financial Economics*. Volume 11. p.241-273

Eckbo, B. E., Masulis, R. W. & Norli, O. (2000) Seasoned Public Offerings: Resolution of the 'New Issues Puzzle'. *Journal of Financial Economics*. Vol. 56. p.251-291

European Commission. (2002). Commission adopts comprehensive reform of EU merger control. EU Press release database. Retrieved from http://europa.eu/rapid/press-release_IP-02-1856_en.htm?locale=en

European Commission. (2016). European Competition Network (ECN). European Commission. Retrieved from http://ec.europa.eu/competition/ecn/index_en.html

Fama, E.F., Fisher, L., Jensen, M.C. & Roll, R. (1969). The Adjustment of Stock Prices to New Information. *International Economic Review*. Vol. 10 (1). p. 1-21

Farrell, M. (2015). 2015 Becomes the Biggest M&A Year Ever. The Wall Street Journal. Retrieved from http://www.wsj.com/articles/2015-becomes-the-biggest-m-a-year-ever-1449187101

Federal Trade Commission FTC. (2016). The Enforcers. Federal Trace Commission. Retrieved from https://www.ftc.gov/tips-advice/competition-guidance/guide-antitrust-laws/enforcers

Fontanella-Khan, J. (2016). Blocked US deals a sign that mergers have become more aggressive. *Financial Times*. Retrieved from https://www.ft.com/content/7608d102-177c-11e6-b197-a4af20d5575e

Foxman, S. & Burton, K. (2016). Hedge Fund Investors Have Fallen in Love With Merger Arb (Again). Bloomberg News. Retrieved from https://www.bloomberg.com/news/articles/2016-04-27/hedge-fund-investors-have-fallen-in-love-with-merger-arb-again

Garvey, G. & Hanka, G. (1999). Capital Structure and Corporate Control: The Effect of Antitakeover Statutes on Firm Leverage. *The Journal of Finance*. Volume 54(2). p.519-546

Gold, A. (2016). Blumenthal 'may well agree' with Trump on AT&T-Time Warner merger. Politico. Retrieved from http://www.politico.com/story/2016/12/richard-blumenthal-att-t-time-warner-merger-232323

Hauswald, R. (2002). Event Studies: Assessing the Market Impact of Corporate Policy. American University Kogod School of Business. P. 1-8. Retrieved from

http://www1.american.edu/academic.depts/ksb/finance_realestate/rhauswald/fin673/673mat/Hauswald%20(2002),%20Event%20Studies%20Note%20(FIN-02-005).pdf

Jarrell, G. A & Poulsen, A. B. (1989). The returns to acquiring firms in tender offers: Evidence from three decades. *Financial Management*. Volume 18. p.12-19

Jarrell, G.A., Brickley, J.A. & Netter, J.M. (1988). The Market for Corporate Control: The Empirical Evidence since 1980. *Journal of Economic Perspectives*. Vol 2. p. 49-68

Jensen, M. & Ruback, R.S. (1983). The market for corporate control. *Journal of Financial Economics.* Volume 11. p. 5 – 50

Jeon, J. Q. & Ligon, J. A. (2011). How much is reasonable? The size of termination fees in mergers and acquisitions. *Journal Of Corporate Finance*, Vol. 17(4). p. 959-981

Jetley, G. & Ji, X. (2010). The Shrinking Merger Arbitrage Spread: Reasons and Implications. *Financial Analysts Journal*. Volume 66 (2), p.54-68

Kaissar, N. & Lachapelle, T. (2016). Hedge Funds Bet on the Mating Dance. Bloomberg News. Retrieved from https://www.bloomberg.com/gadfly/articles/2016-08-19/hedge-funds-mergers-and-the-mating-dance

Karty, C. (2016). An Unpredictable Upcoming Matchup: Donald Trump vs. Big Business. The Atlantic. Retrieved from http://www.theatlantic.com/business/archive/2016/11/donald-trump-vs-big-business/507878/

Klein, A. & Zur, E. (2006). Entrepreneurial Shareholder Activism: Hedge Funds and Other Private Investors. AAA 2007 Financial Accounting & Reporting Section (FARS) Meeting Paper; ECGI - Finance Working Paper No. 140/2006; NYU Law and Economics Research Paper No. 06-41; 1st Annual Conference on Empirical Legal Studies. Retrieved from: https://ssrn.com/abstract=913362

Kokkoris, I. (2014). Introduction: EU and U.S. competition enforcement – Convergence or divergence. *The Antitrust Bulletin*. Vol. 59 (1). p. 1

Kothari, S. P. & Warner, J. B. (2007). Econometrics of event studies. In B. E. Eckbo (Ed.), Handbook of Corporate Finance: Empirical Corporate Finance. North Holland: Elsevier.

Kumar, S., Mahadevan, A. & Gunasekar, S. (2012). Market Reaction to Dividend Announcement: An Empirical Study Using Event Study Technique. *Prestige International Journal of Management & IT-Sanchayan*. Vol. 1(1). p. 141-153.

Lepetit, L., Patry, S. & Rous, P. (2004). Diversification versus specialization: an event study of M&As in the European banking industry. *Applied Financial Economics*. Vol. 14(9). p. 663-669

Litan, R.E. & Shapiro, C. (n.D.) Antitrust Policy in the Clinton Administration. Panel at the University of California Berkeley Haas School of Business. Retrieved from http://faculty.haas.berkeley.edu/shapiro/antitrust.pdf

Loughran, T. & Ritter, J. (2000). Uniformly least powerful tests of market efficiency. *Journal of Financial Economics.* Volume 55. p.361-389

Lyon, J., Barber, B. & Tsai, C. (1999). Improved methods of tests of long-horizon abnormal stock returns. *Journal of Finance*. Volume 54. p.165-201.

MacKinlay, A.C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature.* Volume 35(1). p.13-39. Retrieved from http://www.jstor.org/stable/2729691

Majoras, D.P. (2001). GE-Honeywell: The U.S. Decision – Remarks of Deborah Platt Majoras, Deputy Assistant Attorney General Antitrust Division. U.S. Department of Justice. Retrieved from https://www.justice.gov/atr/file/519031/download

Malmendier, U., Opp, M. M. & Saidi, F. (2012). Target revaluation after failed takeover attempts: Cash versus stock. *Journal of Financial Economics.* Volume 119 (1): p. 92-106

Manne, H. G. (1965). Mergers and the market for corporate control. *Journal of Political Economy*. Volume 73 (2). p. 110-120

McGowan, Carl B. Jr. & Zunaidah, S. (2008). A Note On The Effect Of M&A Announcements On Stock Price Behavior And Financial Performance Changes: The Case Of Arab Malaysian Bank Berhad And Hong Leong Bank Berhad. *International Business & Economics Research Journal*. Volume 7 (9): p. 21-26

McLaughlin, D. & Harris, A. H. (2016). Staples-Office Depot Merger Collapses After Block by Judge. Bloomberg News. Retrieved from https://www.bloomberg.com/news/articles/2016-05-10/staples-office-depot-merger-blocked-as-anticompetitive

Mergermarket. (2016). Global and regional M&A: H1 2016. Mergermarket Trendreport. Retrieved from http://www.mergermarket.com/pdf/MergermarketTrendreport.H12016.FinancialAdvisorLeagueTables.pdf?utm_source=Mergermarket%20Ltd&utm_medium=email&utm_campaign=7287500_H1%20UK%20Quarterly%20trend%20report%202016%20press%20release

Meyer, B., Viscusi, W. & Durbin, D. (1995). Workers' Compensation and Injury Duration: Evidence from a Natural Experiment. *The American Economic Review*. Volume 85(3). p.322-340

Meyers, J.H. & Bakay, A. (1948). Influence of stock split-ups on market price. *Harvard Business Review*. Volume 26. p. 251-255

Mitchell, M. & Stafford, E. (2000). Managerial decisions and long-term stock price performance. *Journal of Business*. Volume 73. p.287-329

Mulherin, H. & Aziz, S. S. (2015). Measuring Deal Premiums in Takeovers. *Financial Management (Wiley-Blackwell)*. Vol. 44 (1). p. 1-14

Officer, M. S. (2003). Termination fees in mergers and acquisitions. *Journal Of Financial Economics*. Vol. 69(3). p. 431-467

Price, E. (2016). Antitrust and Cfius blamed for US M&A slowdown. International Financial Law Review. Retrieved from http://www.iflr.com/Article/3564202/Antitrust-and-Cfius-blamed-for-US-M-A-slowdown.html

Rogers, R. (2015). Mergers & Acquisitions Review – Financial Advisors. *Thomson Reuters*. Retrieved from http://share.thomsonreuters.com/general/PR/MA-4Q15-(E).pdf

Roumeliotis, G. & Barbaglia, P. (2016). Global M&A declines in second quarter as mega deals seen too risky. Reuters. Retrieved from http://www.reuters.com/article/us-global-m-a-analysis-idUSKCN0ZF2YG

Roumeliotis, G. & Toonkel, J. (2016). AT&T to pay $85 billion for Time Warner, create telecom-media giant. Reuters. Retrieved from http://www.reuters.com/article/us-time-warner-m-a-at-t-source-idUSKCN12M0SI

Ryngaert, M. & Netter, J. (1990). Shareholder wealth effects of the 1986 Ohio antitakeover law revisited: It's real effects. Journal of Law, Economics and Organisation. Volume 6. P. 253 - 262

Seiler, M.J. (2004). Performing Financial Studies: A Methodological Cookbook. Chapter 13. Upper Saddle River: Prentice Hall

Shen, L. (2016). Here Are the 5 Biggest M&A Deals of 2016. Fortune Magazine. Retrieved from http://fortune.com/2016/12/28/mergers-and-acquisitions-donald-trump/

Tang, T. (2015). Bidder's Gain: Evidence from Termination Returns. *International Review Of Finance*. Volume 15(4). p. 457-487

The Pennsylvania State University. (2017). Hypothesis Testing (P-value approach). Statistics – Resrouces for Online Courses. Retrieved from https://onlinecourses.science.psu.edu/statprogram/node/138

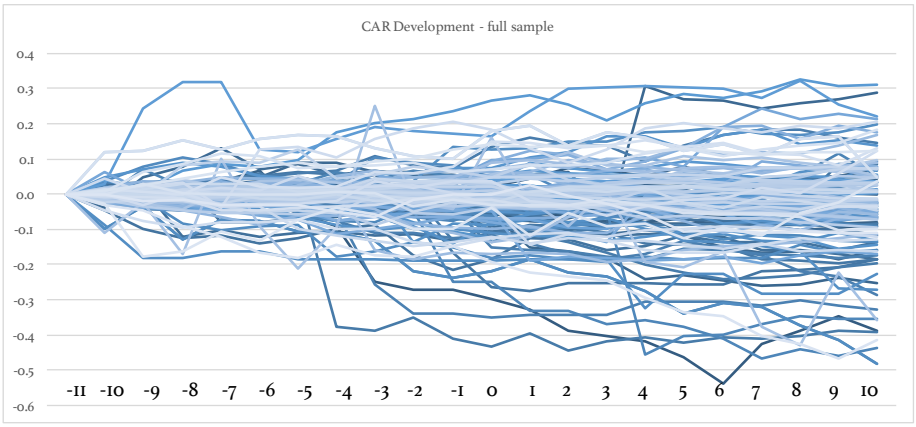
Vollmar, J. (2010). *Änderungen in der Klassifizierung von Finanzinstrumenten in den IAS/IFRS: Eine empirische Analyse der Auswirkungen auf den Unternehmenswert von Banken in der Finanzkrise 2007-2010 (Changes to the classification of derivatives in the IAS/IFRS rules: An empirical analysis of the consequences on the market capitalization of banks in the financial crisis 2007-2010)*. Master thesis. St.Gallen: University of St.Gallen (HSG).

Senator Warren, E. (2016). Reigniting Competition in the American Economy. Keynote Remarks at New America's Open Markets Program Event June 29, 2016. Retrieved from http://www.warren.senate.gov/files/documents/2016-6-29_Warren_Antitrust_Speech.pdf

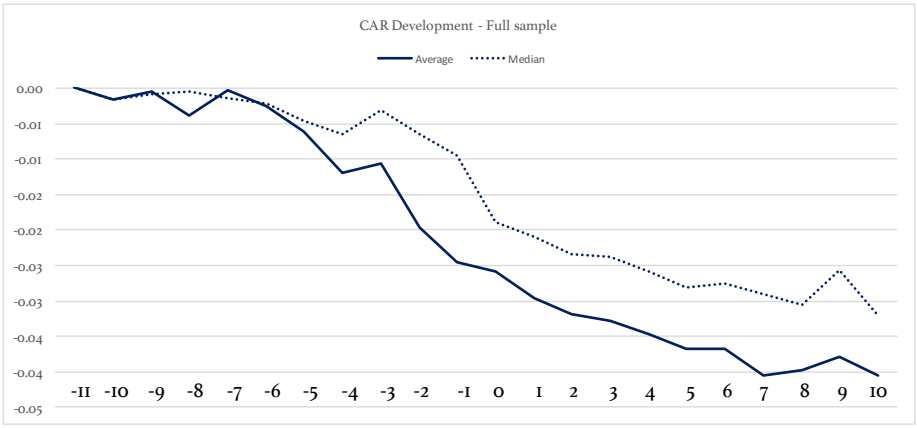
Wasserstein, R.L. & Lazar, N. A. (2016). The ASA's Statement on p-Values: Context, Process, and Purpose. *The American Statistician*. Volume 70 (2). p.129-133

Appendices

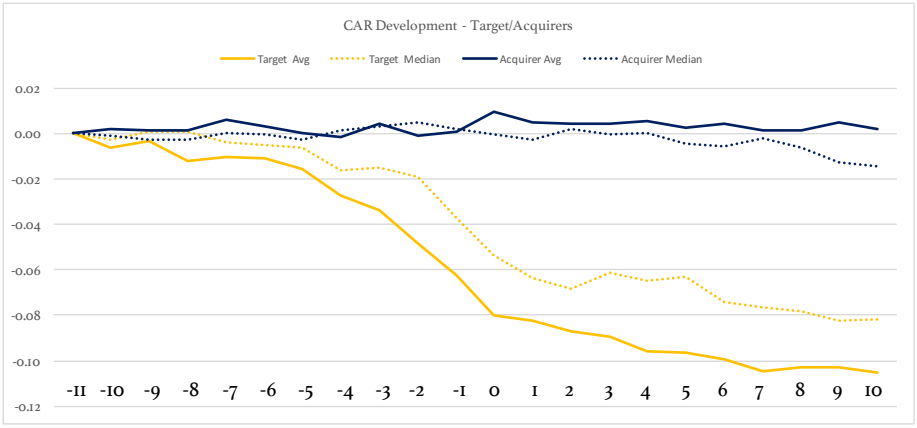
Appendix 1 – CAR development of full sample showing every event



Appendix 2 – CAR development of full sample showing sample average and median



Appendix 3 – Subsample A: CAR development of acquirer and target subsamples



Appendix 4 – Subsample B: CAR results of every time period subsample

Cumulative Abnormal Return (CAR) results - 1996 - 2001						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			0.0044		
	AR t=1			0.0070		
	CAR	0.0153	-0.0094	0.0140	-0.0982	-0.1732
	CAAR	0.0051	-0.0019	-0.0045	-0.0047	-0.0007
Median	AR t=0			-0.0016		
	AR t=1			0.0076		
	CAR	0.0108	-0.0044	#REF!	-0.1182	-0.2548
	CAAR	0.0036	-0.0009	-0.0053	-0.0056	-0.0010
Student T-statistic		2.8838	1.6047	5.3289	7.1851	5.4145
	N	20	20	20	20	20

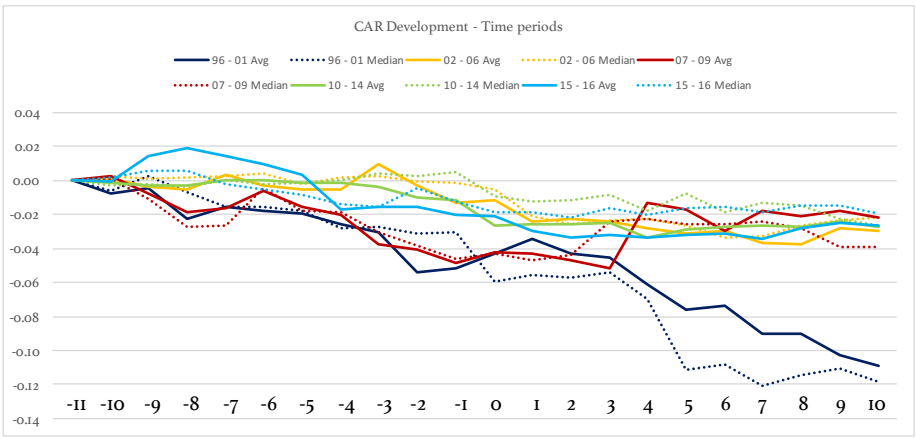
Cumulative Abnormal Return (CAR) results - 2002 - 2006						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0034		
	AR t=1			-0.0114		
	CAR	-0.0244	-0.0339	-0.0321	-0.0290	-0.0509
	CAAR	-0.0081	-0.0068	-0.0029	-0.0014	-0.0004
Median	AR t=0			-0.0020		
	AR t=1			-0.0019		
	CAR	-0.0069	-0.0078	-0.0106	-0.0222	-0.0273
	CAAR	-0.0023	-0.0016	-0.0010	-0.0011	-0.0001
Student T-statistic		4.3648	5.4001	4.0708	3.1408	1.5353
	N	40	40	40	40	40

Cumulative Abnormal Return (CAR) results - 2007 - 2009						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			0.0065		
	CAR	-0.0024	-0.0096	-0.0111	-0.0219	-0.2554
	CAAR	-0.0008	-0.0019	-0.0010	-0.0010	-0.0007
Median	AR t=0			0.0009		
	AR t=1			0.0057		
	CAR	-0.0094	-0.0168	-0.0196	-0.0391	-0.1982
	CAAR	-0.0031	-0.0034	-0.0018	-0.0019	-0.0009
Student T-statistic		0.3452	1.2634	0.7074	1.0818	4.6159
	N	14	14	14	14	14

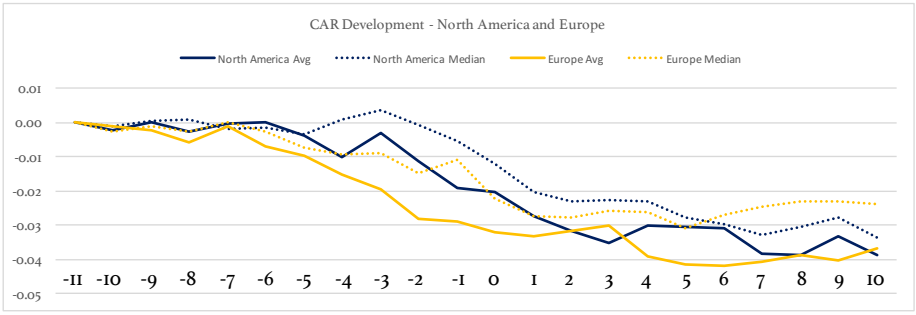
Cumulative Abnormal Return (CAR) results - 2010 - 2014						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0148		
	AR t=1			0.0006		
	CAR	-0.0162	-0.0222	-0.0287	-0.0273	-0.0163
	CAAR	-0.0054	-0.0044	-0.0026	-0.0013	-0.0001
Median	AR t=0			-0.0093		
	AR t=1			-0.0015		
	CAR	-0.0096	-0.0119	-0.0144	-0.0265	-0.0224
	CAAR	-0.0032	-0.0024	-0.0013	-0.0013	-0.0001
Student T-statistic		3.9570	5.3279	3.8676	3.0833	1.6462
	N	34	34	34	34	34

Cumulative Abnormal Return (CAR) results - 2015-2016						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0010		
	AR t=1			-0.0090		
	CAR	-0.0145	-0.0181	-0.0412	-0.0265	-0.0155
	CAAR	-0.0048	-0.0036	-0.0037	-0.0013	-0.0001
Median	AR t=0			-0.0011		
	AR t=1			0.0025		
	CAR	-0.0025	-0.0119	-0.0177	-0.0192	-0.0648
	CAAR	-0.0008	-0.0024	-0.0016	-0.0009	-0.0003
Student T-statistic		2.8283	2.9204	4.6747	2.3089	1.0459
	N	28	28	28	28	28

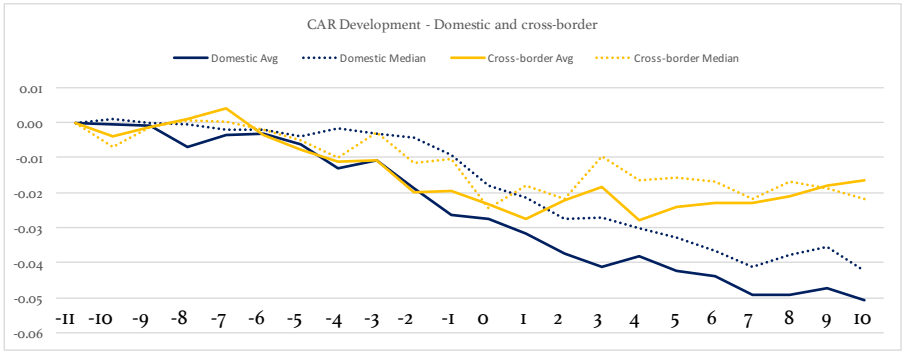
Appendix 5 – Subsample B: CAR development of time period subsamples



Appendix 6 – Subsample C: CAR development of North American and European subsamples



Appendix 7 – Subsample D: CAR development of Domestic and cross-border transaction subsamples



Appendix 8 – Subsample E: CAR results of every sector subsample

Cumulative Abnormal Return (CAR) results - Basic materials						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0095		
	AR t=1			0.0052		
	CAR	-0.0035	-0.0058	-0.0165	-0.0591	0.1996
	CAAR	-0.0012	-0.0012	-0.0015	-0.0028	0.0008
Median	AR t=0			-0.0102		
	AR t=1			0.0060		
	CAR	0.0008	-0.0042	-0.0344	-0.0609	0.1385
	CAAR	0.0003	-0.0008	-0.0031	-0.0029	0.0005
Student T-statistic		0.7372	0.9236	1.8367	4.7045	3.8118
	N	10	10	10	10	10

Cumulative Abnormal Return (CAR) results - Comunications						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			0.0070		
	AR t=1			-0.0120		
	CAR	-0.0171	-0.0315	-0.0387	-0.0274	-0.0099
	CAAR	-0.0057	-0.0063	-0.0035	-0.0013	-0.0001
Median	AR t=0			-0.0019		
	AR t=1			-0.0034		
	CAR	-0.0065	-0.0141	-0.0200	-0.0165	0.0456
	CAAR	-0.0022	-0.0028	-0.0018	-0.0008	0.0002
Student T-statistic		2.3756	3.7619	3.7186	2.1003	0.3438
	N	21	21	21	21	21

Cumulative Abnormal Return (CAR) results - Consumer						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0060		
	AR t=1			-0.0037		
	CAR	-0.0146	-0.0288	-0.0514	-0.0622	-0.2631
	CAAR	-0.0049	-0.0058	-0.0047	-0.0030	-0.0011
Median	AR t=0			-0.0046		
	AR t=1			-0.0015		
	CAR	-0.0082	-0.0101	-0.0206	-0.0482	-0.1255
	CAAR	-0.0027	-0.0020	-0.0019	-0.0023	-0.0007
Student T-statistic		3.0322	5.6794	6.2888	5.9967	9.4773
	N	42	42	42	42	42

Cumulative Abnormal Return (CAR) results - Energy						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0252		
	AR t=1			-0.0239		
	CAR	-0.0453	-0.0851	0.0152	0.1494	0.4205
	CAAR	-0.0151	-0.0170	0.0014	0.0071	0.0055
Median	AR t=0			-0.0252		
	AR t=1			-0.0239		
	CAR	-0.0453	-0.0851	0.0152	0.1494	0.4205
	CAAR	-0.0151	-0.0170	0.0014	0.0071	0.0055
Student T-statistic		2.1848	2.8890	0.5490	3.6101	4.1674
	N	2	2	2	2	2

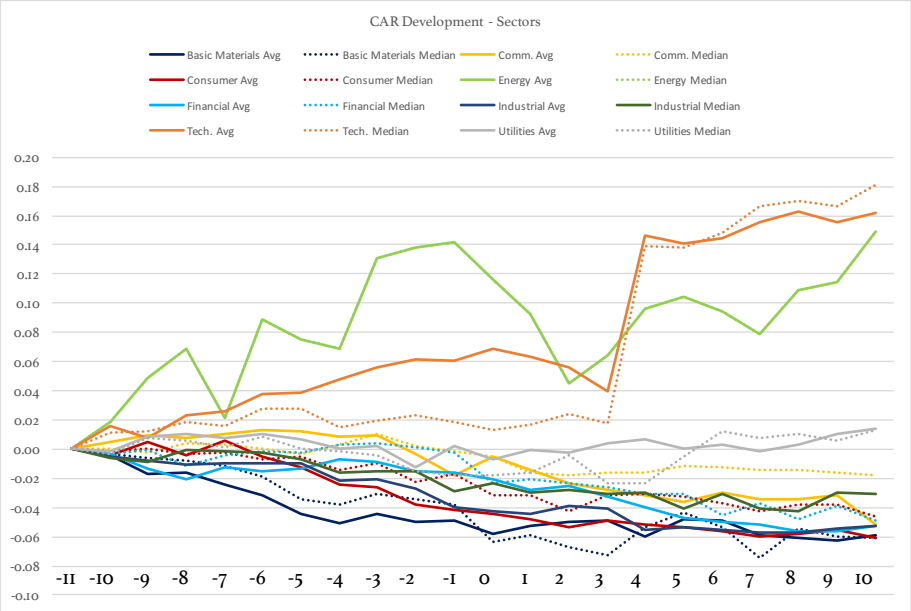
Cumulative Abnormal Return (CAR) results - Financial Services						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0047		
	AR t=1			-0.0068		
	CAR	-0.0125	-0.0161	-0.0320	-0.0527	-0.0122
	CAAR	-0.0042	-0.0032	-0.0029	-0.0025	-0.0001
Median	AR t=0			-0.0017		
	AR t=1			-0.0002		
	CAR	-0.0084	-0.0125	-0.0148	-0.0486	-0.0943
	CAAR	-0.0028	-0.0025	-0.0013	-0.0023	-0.0005
Student T-statistic		2.0825	2.6932	4.0502	4.5390	0.3066
	N	22	22	22	22	22

Cumulative Abnormal Return (CAR) results - Industrial						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0029		
	AR t=1			-0.0021		
	CAR	-0.0172	-0.0183	-0.0437	-0.0524	-0.1093
	CAAR	-0.0057	-0.0037	-0.0040	-0.0025	-0.0006
Median	AR t=0			-0.0017		
	AR t=1			-0.0009		
	CAR	-0.0043	-0.0049	-0.0134	-0.0308	-0.1905
	CAAR	-0.0014	-0.0010	-0.0012	-0.0015	-0.0008
Student T-statistic		2.7957	2.4887	4.0100	4.2949	3.8084
	N	24	24	24	24	24

Cumulative Abnormal Return (CAR) results - Technology						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			0.0081		
	AR t=1			-0.0052		
	CAR	0.0020	0.0001	0.1023	0.1619	0.0246
	CAAR	0.0007	0.0000	0.0093	0.0077	0.0008
Median	AR t=0			0.0043		
	AR t=1			0.0033		
	CAR	-0.0059	0.0049	0.0941	0.1812	-0.0058
	CAAR	-0.0020	0.0010	0.0086	0.0086	0.0000
Student T-statistic		0.2544	0.0076	2.8154	3.6414	0.3130
	N	4	4	4	4	4

Cumulative Abnormal Return (CAR) results - Utilities						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0085		
	AR t=1			0.0058		
	CAR	0.0111	-0.0043	-0.0097	0.0136	0.1047
	CAAR	0.0037	-0.0009	-0.0009	0.0006	0.0002
Median	AR t=0			-0.0032		
	AR t=1			0.0072		
	CAR	-0.0026	-0.0054	-0.0133	0.0135	0.1513
	CAAR	-0.0009	-0.0011	-0.0012	0.0006	0.0006
Student T-statistic		2.6464	0.6933	1.0488	1.2203	3.3809
	N	11	11	11	11	11

Appendix 9 – Subsample E: CAR development of sector subsamples



Appendix 10 – Subsample F: CAR results of every transaction size subsample

Cumulative Abnormal Return (CAR) results - <$100M						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0003		
	AR t=1			-0.0037		
	CAR	-0.0157	-0.0175	-0.0042	0.0117	0.0740
	CAAR	-0.0052	-0.0035	-0.0004	0.0006	0.0005
Median	AR t=0			-0.0023		
	AR t=1			0.0000		
	CAR	-0.0073	-0.0060	0.0005	-0.0240	-0.0248
	CAAR	-0.0024	-0.0012	0.0000	-0.0011	-0.0001
Student T-statistic		2.5219	1.8199	0.2597	0.5945	1.3964
	N	13	13	13	13	13

Cumulative Abnormal Return (CAR) results - $100M - $500M						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0143		
	AR t=1			-0.0094		
	CAR	-0.0250	-0.0236	-0.0356	-0.0487	-0.0165
	CAAR	-0.0083	-0.0047	-0.0032	-0.0023	-0.0004
Median	AR t=0			-0.0091		
	AR t=1			0.0023		
	CAR	-0.0144	-0.0101	-0.0325	-0.0581	-0.1174
	CAAR	-0.0048	-0.0020	-0.0030	-0.0028	-0.0005
Student T-statistic		3.1837	3.1791	4.2931	4.8573	0.4162
	N	16	16	16	16	16

Cumulative Abnormal Return (CAR) results - $500M - $1,000M						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0123		
	AR t=1			-0.0068		
	CAR	-0.0160	-0.0195	-0.0256	-0.0449	0.0242
	CAAR	-0.0053	-0.0039	-0.0023	-0.0021	0.0000
Median	AR t=0			-0.0064		
	AR t=1			-0.0017		
	CAR	-0.0220	-0.0229	-0.0242	-0.0313	-0.0564
	CAAR	-0.0073	-0.0046	-0.0022	-0.0015	-0.0005
Student T-statistic		3.0226	3.5031	3.0684	3.7467	0.4947
	N	15	15	15	15	15

Cumulative Abnormal Return (CAR) results - $1B - $10B						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0031		
	AR t=1			-0.0006		
	CAR	-0.0097	-0.0162	-0.0424	-0.0478	-0.1198
	CAAR	-0.0032	-0.0032	-0.0039	-0.0023	-0.0006
Median	AR t=0			-0.0018		
	AR t=1			0.0023		
	CAR	-0.0027	0.0014	-0.0180	-0.0427	-0.1073
	CAAR	-0.0009	0.0003	-0.0016	-0.0020	-0.0007
Student T-statistic		2.5612	3.5073	5.7873	5.2065	6.5947
	N	54	54	54	54	54

Cumulative Abnormal Return (CAR) results - $10B - $50B						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			-0.0100		
	AR t=1			-0.0021		
	CAR	-0.0111	-0.0197	-0.0130	0.0153	0.0588
	CAAR	-0.0037	-0.0039	-0.0012	0.0007	0.0006
Median	AR t=0			-0.0099		
	AR t=1			-0.0047		
	CAR	-0.0065	-0.0070	-0.0134	0.0289	0.1049
	CAAR	-0.0022	-0.0014	-0.0012	0.0014	0.0006
Student T-statistic		1.7045	3.0200	2.0036	1.9384	2.8202
	N	23	23	23	23	23

Cumulative Abnormal Return (CAR) results - >$50B						
		(-1,1)	(-2,2)	(-5,5)	(-10,10)	(-10,1yr)
Average	AR t=0			0.0195		
	AR t=1			0.0049		
	CAR	0.0063	-0.0306	-0.0992	-0.1160	-0.2981
	CAAR	0.0021	-0.0061	-0.0090	-0.0055	-0.0012
Median	AR t=0			0.0130		
	AR t=1			0.0063		
	CAR	0.0012	-0.0329	-0.0821	-0.0541	-0.1376
	CAAR	0.0004	-0.0066	-0.0075	-0.0026	-0.0006
Student T-statistic		0.7820	2.9476	4.6919	4.1028	6.1746
	N	8	8	8	8	8

Appendix 11 – Subsample F: CAR development of every transaction size subsamples