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The impact of financial regulation on short-term abnormal
stock returns from M&A announcements.

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Abstract

In this thesis, I study whether financial legislation has significant effects on short-term abnormal stock returns from merger announcements. In an event study setting and multivariate regression analysis, a sample is used of 3196 public firms that are involved in 2732 merger announcements between 2003 and 2017. For these deals the daily firm stock prices are evaluated together with the country-specific market index to calculate abnormal returns around the merger announcements. Furthermore, firm-specific financial data is used in the multivariate regression to test the effects of specific factors on abnormal returns. I find that there is some evidence for a positive effect of financial legislation on short-term abnormal returns to merger announcements. However, the observed effect only persists in the country where the legislation was implemented, is only noticeable on a very short-term basis around the announcement, and only occurs in acquiring firms. This implies that the implementation of financial legislation does not seem to have unambiguous effects on all merger announcements, and it may only in certain circumstances result in significant effects to abnormal returns to merger announcements.

Contents

Chapter 1: Introduction	4
Chapter 2: Theoretical Framework.....	6
2.1 Shareholder returns from M&A announcements.....	6
2.2.1 Global financial crisis and the M&A market.....	8
2.2.2 The Dodd-Frank Wall Street Reform and Consumer Protection Act	8
2.3 Shareholder value drivers in mergers and acquisitions	9
2.4 Possible effects of Dodd-Frank on shareholder returns.....	10
2.5 Hypotheses	10
Chapter 3: Data.....	11
3.1 Data collection.....	11
3.2 Relevant independent variables	12
3.3 Descriptive statistics.....	14
Chapter 4: Methodology.....	15
4.1 Event study	15
4.2 Multivariate cross-sectional regression	16
Chapter 5: Results	16
5.1 Event study	16
5.2 Multivariate cross-sectional regression	18
5.3 Hypotheses	23
Chapter 6: Discussion.....	23
Chapter 7: Conclusion.....	24
Chapter 8: Limitations.....	25
References	26

Chapter 1: Introduction

During the last decade, the number of global mergers and acquisitions (M&A) broke more and more volume records, eventually reaching an all-time high of 62,193 closed deals in 2021 (Reuters, 2023). However, since the previous M&A wave of 2003-2007, the global M&A market has endured the effects of the 2007-2008 financial crisis, resulting in legislative changes and possibly more shareholder skepticism. This provokes a question which could also prove very valuable to (potential) investors: have the M&A market and investors' views of the market changed significantly since the Great Recession?

Previous papers examining the effect of M&A announcements on shareholders' returns of the firms involved have provided greatly varying conclusions. Nearly twenty years ago Campa and Hernando (2004) concluded that, in their study of European M&A announcements in the period 1998-2000, target firm shareholders on average received a 9% cumulative abnormal return on their shares in a one-month period around the announcement. However, they also concluded that on average, the acquiring firms' shareholders' cumulative abnormal returns were null. The authors argue that the cumulative abnormal returns after the announcement reflect the market's vision of the expected value of the merger. This market's vision includes the effects of possible future synergies or wealth distribution amongst stakeholders. In another article, Bruner (2004) states in his review of global academic studies that "shareholders of selling firms earn large returns from M&A" and that "acquiring firms' shareholders generally earn about the required rate of return on investment". Bruner therefore concludes that M&As provide at least a value-maintaining proposition. Kyei-Mensah et al. (2017) evaluate a sample of M&As in the period of 1991 to 2013 and infer that both target and acquiring firms' shareholders on average receive positive cumulative abnormal returns in short-term periods around the announcement. From the articles above, we can conclude that the authors have found varying shareholder returns, however the most recent study implies an expected positive relation between the announcement of M&As and shareholder returns.

Since the previously named studies were undertaken, much has changed in global financial markets. The global financial crisis of 2008 resulted in a great deal of economic downturn across the globe, giving rise to an increase in defaults of both smaller and bigger corporations everywhere. However, some major defaults in U.S. financial corporations could also be seen as one of the causes of the financial crisis (take the fall of Lehman Brothers, for example). To combat the "too-big-to-fail"-attitude and the accompanying risk that some financial corporations undertook, the United States implemented the "Dodd-Frank Wall Street Reform and Consumer Protection Act" on the 21st of July 2010. This act was meant to improve the stability, accountability, and reliability of primarily U.S.-based financial services corporations.

It is expected that the financial crisis and the following corresponding legislative changes have greatly impacted M&A deals, possibly also giving rise to significant changes in shareholder returns after M&A announcements. Therefore, this study aims to explore the possible effects of financial legislative changes on M&A announcements in the period 2003-2017. Using this period allows the paper to analyze possibly varying results in different years over periods both before and after the financial crisis, and before and after the implementation of the Dodd-Frank Act.

In this thesis, the research question answered is:

“How does financial legislation affect short-term shareholder returns around the announcement of mergers and acquisitions?”

To calculate the cumulative abnormal returns (CARs) to stocks in the period around M&A announcements, the expected returns of the firms' stocks will be estimated using the market model. Afterwards these expected returns are compared with the actual returns of the firm stocks to calculate the cumulative abnormal returns involved. Next, I will run tests on the cumulative average abnormal returns (CAARs) to test the CAARs for significance. Furthermore, a multivariate cross-sectional regression will be executed on the CARs using firm and deal-specific characteristics as independent variables. Afterwards, I will attempt to answer the research question.

The returns are calculated using a sample of M&A deal announcements made in the period 2003-2017, provided by Orbis M&A. All the firms in this sample are publicly traded and the acquiring company must be a member of the “Organization for Economic Co-operation and Development” (OECD), which is an intergovernmental organization of 38 member countries, created with the intent of stimulating economic progress. The value (or estimated value) of the announced deal must be at least 1 million USD. Furthermore, the deal must currently be completed. The M&A deal data is combined with stock price data of the firms involved in the announcements and the price levels of the firms' national stock index, both provided by Datastream.

In this thesis, I expect to find that target firms' shareholders on average, both before and after the implementation of the Dodd-Frank Act, receive a positive cumulative abnormal return in the period around the announcement of the merger or acquisition. This arises from the possibility that an announcement to take over the target company signals to the market that the acquiring firm perceives the target firm as a valuable firm or a valuable business addition. After noticing this signal, the market responds with a higher demand for the target's shares, causing the stock price to rise. Moreover, target firms' shareholders are often bought out with a bid premium significantly larger than the current share price. This also results in target firms' shares appreciating quickly after an M&A announcement.

With regards to acquiring firms' shareholders, I expect to find that, pre-Dodd-Frank, the cumulative average abnormal returns to their shares are close to zero or negative. The reason behind this is that the

acquiring firms take great risks in attempting to acquire target firms. One of these risks could be that for legislative reasons (e.g., antitrust measures) the merger will not be completed. Another risk of the M&A process could be that the acquiring firm overestimates the added value of the target firm, resulting in a potential loss on the acquisition/merger. The market might realize this uncertainty and respond to it in a negative manner or might decide to postpone investing in the acquiring firm until later in the M&A process, when there is less uncertainty involving the deal.

For the returns to acquiring firms' shareholders post Dodd-Frank, I expect positive cumulative average abnormal returns to shareholders. This is implied by the fact that the Dodd-Frank act implemented key points to decrease excessive risk taking by public firms. For example, one of these implementations is Section 951 of Dodd-Frank, which gives shareholders the right to yearly non-binding votes on executive compensation and "Golden Parachutes" (SEC, 2015). These increased rights to shareholders could result in the acquiring' firms management becoming more conservative in M&As, since their shareholders have relatively more power over management. Even if the votes involved are non-binding, if the firms' management decides to ignore a majority vote, a disgruntled majority of shareholders could still vote the board out. I expect some of the U.S.-based Dodd-Frank Act components to have also been implemented by other OECD members to follow the US in creating more stability and less risk-taking behavior in public corporations. Therefore, I expect the post Dodd-Frank US acquiring firms' returns to also (at least partly) pertain to the non-US firms.

The previous expectations will possibly be confirmed by evaluating the results of the cumulative abnormal returns and testing these returns for significant differences with the expected returns. There is also a very real possibility of not obtaining any significant different results to the expected returns, because the stock markets consist of investors that do not always think and act rationally, which might result in seemingly "random movements" of stock price.

Chapter 2: Theoretical Framework

In this chapter, the different theoretical parts behind the research question will be explained. Afterwards, the expectation of the relationship between the different theoretical parts will be elaborated on.

2.1 Shareholder returns from M&A announcements

As mentioned before, when it comes to shareholder returns from M&A announcements, previous academic literature has shown varying results. However, for a complete understanding of this paper, it is crucial to be concise in the definition of shareholder returns.

Returns to shareholders of the public firms involved in M&A announcements occur if the stock market responds in a certain way (either positively or negatively) to the announcement. This causes the stock price to either rise or fall, thereby creating or destroying value for the shareholders involved by raising

or lowering the price of their stocks. One general academic definition used for shareholder returns is the following: “The most statistically reliable evidence on whether mergers create value for shareholders comes from traditional short-window event studies, where the average abnormal stock market reaction at merger announcement is used as a gauge of value creation or destruction.”

(Andrade et al., 2001, p.109) The authors find that, over a sample period consisting of deals between 1973 and 1998, the short-term announcement period creates significant positive returns to both target and acquiring firms’ shareholders. Andrade et al. (2001) however, also state that most of the gains accrue to the shareholders of the target.

Moreover, Goergen and Renneboog (2004) discover within a sample of European acquisitions between 1993 and 2000 that target firms on average gain 13% significant short-term positive returns, while bidding firms on average receive a 1% significant positive return.

Jensen and Ruback (1983) add to these findings in their literature review that the evidence indicates positive returns to target firm shareholders, and that acquiring firm shareholders do not experience a significant destruction of value.

In their study of shareholder wealth effects in U.K. takeover announcements between 1955 and 1985, Franks and Harris (1989) find that around the announcement date target firm shareholders gain 25 to 30 percent and acquiring firm shareholders earn zero or close to zero returns.

There have also been studies that report negative returns to acquiring firms’ shareholders. Limmack (1991), in a study of U.K. acquisitions between 1977 and 1986, discovers that although there is no total value destruction to target and acquiring firms’ shareholders combined, shareholders of acquiring firms do suffer from wealth decreases.

In addition to the U.K.-based results, Peterson and Peterson (1991) conclude from a sample of U.S.-based M&A announcements in the period 1980-1986 that target firm shareholders receive a significant positive return around the announcement, while acquiring firms experience a significant negative return.

Performing a more specific study, Hazelkorn et al. (2004) find that between 1990 and 2002, U.S. acquirors in deal values worth at least \$250 million on average suffered losses of around 0.5-0.7% around the announcement.

Moreover, Yaghoubi et al. (2016) find in their recent study that “market reaction to announcement of acquisitions is, on average, slightly negative for acquirer stocks and significantly positive for target stocks.” Moreover, Yaghoubi et al. state that the combined abnormal return is positive, while their findings have been consistent over several decades.

2.2.1 Global financial crisis and the M&A market

The global financial crisis of 2007 caused a major shock to financial markets across the world, and the M&A market was no exception. Reddy et al. (2014) note, in a study of cross-border M&As during the pre-crisis and post-crisis period, that “the global financial crisis has negatively affected both cross-border M&A sale and purchase transactions all over the world from 2008 to 2009.” The authors, however, also find that in the post-crisis period emerging market countries noticed the relatively low asset prices in developed countries, inviting more investment into foreign acquisitions by emerging market participants.

Grave et al. (2012) report that M&A transactions in 2008 were down 30 percent compared to the previous year, whilst after two years of downturn, the year 2010 again brought an increase in cross-border M&A activity. The authors also find that in 2010, emerging markets accounted for 33 percent of M&A, which coincides with the concluding remarks of Reddy et al. (2014).

The financial crisis also exposed some of the managerial aspects that have attributed to the crisis. In the years leading up to the financial crisis of 2007, Murdock (2011) finds that the view of many public firm managers was “more business means more profits, which leads to higher stock prices and greater executive compensation “. This in turn incentivized management to take excessive risks for their own benefits, since often managers were compensated in bonuses based on share price or received stock options as compensation.

2.2.2 The Dodd-Frank Wall Street Reform and Consumer Protection Act

On July 21, 2010, the United States Congress enacted the Dodd-Frank Wall Street Reform and Consumer Protection Act. The act was meant to improve financial regulation, accountability and stability after the global financial crisis that started in 2007. The U.S. Congress (2010) states the goal of the act as: “To promote the financial stability of the United States by improving accountability and transparency in the financial system, to end “too big to fail”, (...) to protect consumers from abusive financial services practices, (...)”

Amongst other measures in the act, the Dodd-Frank act created measures obligating the management of public firms to disclose information on executive compensation and the ratio between the compensation of the CEO of the firm and its median salary of an employee (Congress, 2010). Moreover, shareholders of public U.S. based firms also get non-binding votes on executive compensation and potential golden parachute packages. In these packages managers receive certain benefits if their employment is terminated in cases such as an acquisition, where the target firm’s board is replaced by the acquiring firm’s board.

Fich et al. (2013) find that in a sample of 851 U.S. based target firms involved in acquisitions between 1999 and 2007, about 86% of the firms had a golden parachute package for their CEOs. For these

firms that had a golden parachute in place, the median parachute payment is \$2.55 million. It is also concluded that relatively larger parachutes cause target shareholders to receive lower takeover premia, meaning that the target firm shareholders realize less gains in a potential takeover (Fich et al., 2013).

There is evidence that risk taking, at least for U.S. financial institutions, declined since the implementation of the Dodd-Frank act. Akhigbe et al. (2016) find that, in a study of 694 financial institutions, the largest institutions experience the largest reduction of risk taking. The authors also find that banks that undertook the riskiest strategies pre-Dodd-Frank act reduced their risk the most.

2.3 Shareholder value drivers in M&A

Besides whether the Dodd-Frank act affects shareholder returns from M&A announcements, existing academic literature also suggests that certain intrinsic firm characteristics influence shareholder returns when the firm is involved in M&A.

One study, in a sample of 469 European M&A announcements, finds that the legal environment forms an important determining factor in how acquiring firms' shareholders view an M&A announcement (Feito-Ruiz and Menéndez-Requejo, 2011). In the same paper the authors also conclude that lower levels of the total stock market result in positive effects to target shareholder returns.

Campa and Hernando (2004) conclude in E.U. based mergers between 1998 and 2000, that previously heavily regulated industries create lower returns to shareholders than unregulated industries. The effect is multiplied in magnitude when the two merging firms are from different countries, implying the existence of obstacles in cross-country mergers (for example, obstacles caused by cultural or legal differences).

Other studies have focused more on the method of payment and type of deal in merger announcements. Datta et al. (1992) establish that the use of stock financing has significant negative effects to shareholder returns of both bidder and target firms, whilst target firms shareholders receive a significant positive return if the merger is performed by tender offer.

Bruner (2004) concludes that announcements of acquisitions by related firms (in related industries) result in higher returns to their shareholders than diversifying mergers. Furthermore, Bruner also finds that transactions involving cash financing create more value than transactions involving shares.

Elgers and Clark (1980) reveal that conglomerate mergers create significantly more value for shareholders than non-conglomerate mergers. Furthermore, they find that this effect is increased for horizontal mergers (where firms operate in the same industry).

The general market "landscape" seems to influence the announcement returns to acquiring firms' stocks, according to Rosen (2006). Rosen shows that the bidding firms' stock prices are more likely to increase when a merger is announced in a period when the stock market is doing relatively well.

Higson and Elliott (1998) remark that hostile takeovers induce significantly higher positive abnormal returns to target firm shares. This effect is created by an anticipation of performance gains by the market (Franks et al., 1991).

2.4 Possible effects of Dodd-Frank on shareholder returns

Although the global effects of the Dodd-Frank act on M&A shareholder returns are unknown, the effects of the act have recently been evaluated for a sample of U.S. bank M&As. Leledakis and Pyrgiotakis (2022) find that in a sample ranging between 1990 and 2014, the Dodd-Frank act creates a significant positive combined effect to the total shareholder returns around the announcement of small bank mergers. Furthermore, the authors also conclude that this effect does not exist for non-U.S. bank mergers.

A thesis by Koudelka (2015) suggests that post-Dodd-Frank, bank mergers are smaller and less frequent than pre-Dodd-Frank. However, the author also finds that, post-Dodd-Frank, mergers create more shareholder wealth. These results are statistically significant and robust to cross-sectional controls including geography, bid premium and firm size. Koudelka (2015) concludes from the research that “Dodd-Frank’s restrictions on bank mergers not only led to higher premiums being paid to target firms but also better selection by acquiring firms.”

2.5 Hypotheses

Even though the conditions of this research differ significantly from the individual parts of research mentioned in the above, the studies do imply some expectations for my research. Conventional research on shareholder returns from M&A implies that, target firms’ shareholders should generally experience a positive return from a public M&A announcement. The research finds mixed returns to acquiring firms, ranging from small destruction of shareholder value to small creation of value. However, a few studies do find that the Dodd-Frank act resulted in significant increases to acquiring shareholder returns, at least in the case of U.S. bank mergers. It is possible that the results observed in the banking sector could also apply to the general merger market.

Other than the Dodd-Frank act, previous academic literature implies that firm and deal characteristics also affect the perceived value of a merger deal, and therefore these “intrinsic” characteristics should also be accounted for. The conventional characteristics that significantly impact value positively are the mostly cash deal financing, horizontal mergers, and conglomerate mergers. Characteristics associated with negative returns are using shares to finance the deal and merging in heavily regulated industries, in which the effect is increased in magnitude when the merging firms are from different countries.

The hypotheses that follow from the summarized academic literature mentioned above are:

H1: Pre-Dodd-Frank, target firms' shareholders on average receive a positive cumulative abnormal return in M&A announcement periods.

H2: Post-Dodd-Frank, target firms' shareholders on average receive a positive cumulative abnormal return in M&A announcement periods.

H3: Pre-Dodd-Frank, acquiring firms' shareholders on average receive close to zero or negative cumulative abnormal returns in M&A announcement periods.

H4: Post-Dodd-Frank, acquiring firms' shareholders on average receive a positive cumulative abnormal return in M&A announcement periods.

These hypotheses will be tested using a sample of deal and firm data elaborated on in the next chapter.

Chapter 3: Data

3.1 Data collection

In order to test the forementioned hypotheses, the Orbis M&A database (previously known as Zephyr) is used to collect data. In this database, information of over 2.2 million deals can be found. For the purpose of this study, the largest 52360 deals are gathered that meet the following criteria:

1. The deal type is a merger or an acquisition.
2. The deal is announced in the period between 01/01/2003 and 31/12/2017.
3. The current deal status is completed.
4. The minimum deal value (including estimates) is \$1 million.
5. The acquiring firm is from a country within the OECD.

After gathering the deals conforming to the above, further sample selection must be performed for the following criteria:

6. Both the target and acquirer are publicly traded firms at the time of the announcement.
7. The acquirer at most has a minority stake in the target before the announcement.
8. The acquirer at least gains a majority stake in the target in the announcement.
9. The deal is not based on distressed companies, restructurings, or schemes of arrangement.
10. The announcement of a deal is not an increased bid of an earlier bid.

After applying the extra criteria, a sample of 4361 deals remains. Of these 4361 deals, the data on stock and index returns is available for 7107 public firms. The data on these firms are combined with financial data provided by Orbis, which after removal of firms with missing financial data, results in a total sample of 3196 firm observations of 2732 deals.

Table 1 shows the sample composition of the firms remaining in the sample after the above criteria have been applied to the data.

Table 1*Final firm sample composition*

	Targets	Acquirers
		<u>Pre Dodd-Frank</u>
U.S.	137	599
Non-U.S.	148	710
		<u>Post Dodd-Frank</u>
U.S.	182	543
Non-U.S.	162	712

3.2 Relevant independent variables

Within the financial firm data and deal-specific data, other than the announcement date of the deals, a few variables are crucial to the study of deal-specific effects and firm-specific effects. Therefore, adding these variables allows for testing the possible effects of certain deal or firm characteristics on shareholder returns. Table 2 lists the independent variables used in the multivariate regression.

Table 2*Independent variables multivariate cross-sectional regression*

Variable name	Variable description	Number of observations	Data type
$Ln(Total_Assets)$	$Ln(Total_Assets)$ is the natural logarithm of the total firm assets in the last book year before the announcement of the merger.	3196	Firm-specific
ROA	ROA is the firm Return-on-Assets of the last book year before the announcement of the merger. ROA is defined as Net Income divided by Total Assets.	3196	Firm-specific
DE	DE is the firm Debt-to-Equity-ratio of the last book year before the announcement of the merger. DE is defined as	3196	Firm-specific

	Total Liabilities divided by Shareholders Equity.		
<i>DC</i>	<i>DC</i> is a dummy variable that takes value 1 if the two merging firms are from the same country, 0 otherwise.	3196	Deal-specific
<i>SSIC</i>	<i>SSIC</i> is a dummy variable that takes value 1 if the two merging firms are from the same 2-digit NAICS industry code, 0 otherwise.	3196	Deal-specific
<i>Cash</i>	<i>Cash</i> is a dummy variable that takes value 1 if the merger is announced to be predominantly financed using cash, 0 otherwise.	3196	Deal-specific
<i>Shares</i>	<i>Shares</i> is a dummy variable that takes value 1 if the merger is announced to be predominantly financed using shares, 0 otherwise.	3196	Deal-specific
<i>Friendly</i>	<i>Friendly</i> is a dummy variable that takes value 1 if the announced deal is perceived as friendly by the target firm's management, 0 otherwise.	3196	Deal-specific
<i>US</i>	<i>US</i> is a dummy variable that takes value 1 if the firm is U.S.-based, 0 otherwise.	3196	Firm-specific
<i>Dodd_Frank</i>	<i>Dodd_Frank</i> is a dummy variable that takes value 1 if the merger announcement was made after the effective date of the Dodd-Frank act (July 21, 2010), 0 otherwise.	3196	Deal-specific

These independent variables include several variables that were elaborated on in the Theoretical Framework chapter. However, the list also adds some variables to control for certain characteristics that might affect cumulative abnormal returns to M&A announcements. These variables are ROA and DE, which control the effects of profitability and leverage of the firms. The idea behind these variables is that if investors have adequate information on firms involved in M&A announcements, they will observe the amount of profitability and leverage of companies. This in term changes their valuation of the company, in terms of future cash flow and risk. Therefore, this could possibly influence the stock price of the involved firms after M&A announcements.

3.3 Descriptive statistics

Table 3 shows the descriptive statistics (rounded to two decimals) of all the independent variables included in this study. The data shows outliers in the debt-to-equity ratio, however as far as I could tell these were not due to measurement error. The statistics also show that around 74 percent of deals in the sample are domestic deals, while 26 percent of the deals are cross-border. Furthermore, the sample shows that 68 percent of the deals are those by firms that operate in the same 2-digit SIC code, implying many horizontal mergers. Financial mergers only make up for 6 percent of the deals in the sample. Cash financed deals are well represented in the sample with around 50 percent of deals mostly paid for in cash, whilst only 32 percent of the deals are mostly paid for in shares. Pure friendly mergers do not appear to happen very often, as they only make up 26 percent of the sample. Furthermore, 46 percent of the firms in the sample are U.S.-based, while the total sample seems to be practically split in half between both pre- and post-Dodd-Frank.

Table 3

Independent variable descriptive statistics

Variable name	Mean	Median	Standard deviation	Minimum	Maximum
<i>Ln(Total_Assets)</i>	6,34	6,36	0,89	2,69	8,60
<i>ROA</i>	0,04	0,04	0,13	-2,07	1,63
<i>DE</i>	1,68	1,07	5,89	-74,94	136,55
<i>DC</i>	0,74	1	0,44	0	1
<i>SSIC</i>	0,68	1	0,47	0	1
<i>Cash</i>	0,50	0	0,50	0	1
<i>Shares</i>	0,32	1	0,47	0	1
<i>Friendly</i>	0,26	0	0,44	0	1
<i>US</i>	0,46	0	0,50	0	1
<i>Dodd_Frank</i>	0,50	1	0,50	0	1

Chapter 4: Methodology

4.1 Event study

To calculate and evaluate the total cumulative average abnormal returns (CAARs) to the different subsamples, an event study approach as per Brown and Warner (1980) is used. The model used to calculate the “normal” share returns and subsequent abnormal share returns per firm is the market model, which has the following form:

$$R_{i,t} = \alpha_i + \beta_i * R_{m,t} + \varepsilon_{i,t}$$

Where $R_{i,t}$ is the expected return of a firm i on period t (day t), which is implied to be composed of a constant α_i (the stock return of firm i unrelated to the market), a regression coefficient β_i (the sensitivity of $R_{i,t}$ to the reference market), the market return $R_{m,t}$ and an error term $\varepsilon_{i,t}$, which has an expected value of zero, has finite variance and is assumed to be uncorrelated to the market and firm stock return. In the application of the market model, the country-specific broad stock market index (compiled by MSCI) is used to calculate $R_{m,t}$.

The estimation window, in which the parameters of the market model are estimated, is set to run from 151 days before the first day of the event window period to 1 day before the event window period. The event window period, in which the possible abnormal stock return effects of M&A announcements are researched, ranges from 5 days before the merger announcement ($t-5$), up until 5 days after the announcement is made ($t+5$). Therefore, the event window comprises of 11 total days.

After using the above procedure to calculate the estimation parameters for normal returns of the stocks in the sample, we can use the market model to calculate abnormal returns per firm per period:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i * R_{m,t})$$

Where $AR_{i,t}$ is the abnormal return to a stock of firm i on period t (day t), which is composed of the actual return of the stock minus the expected return of the stock.

Next, the per day returns are cumulated across firms and across different event days, to arrive at the cumulative abnormal return (CARs) and cumulative average abnormal returns (CAARs):

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t}$$
$$CAAR(t_1, t_2) = \frac{1}{N} \sum_{i=1}^N CAR(t_1, t_2)$$

The CAAR formula can now be used to evaluate the possible cumulative average abnormal firms over multiple days within the event period and multiple firms. In order to calculate the statistical

significance of the subsample CAARs, the nonparametric Generalized Sign Test (Cowan, 1992) is used. The test is based on the percentage of positive abnormal returns in an estimation period, which it compares to the number of stocks in the event window for which the CAR is positive. This test allows for the relaxation of parametric tests' assumptions, such as the assumption that the abnormal returns per individual firm are normally distributed. Furthermore, the Generalized Sign Test is robust to increases in return variance and thin trading (Cowan, 1992). The generalized sign test statistic is:

$$Z = \frac{w - n\hat{p}}{[n\hat{p}(1 - \hat{p})]^{1/2}}$$

Where w is the number of stocks in the event window for which the CAR is positive, n is the number of firms in the event window and \hat{p} is the fraction of positive abnormal returns within the estimation period. The test statistic uses the normal approximation to the binomial distribution with parameter \hat{p} . The hypotheses of interest in this context are:

$$H_0 : CAAR(t_1, t_2) \leq 0$$

$$H_A : CAAR(t_1, t_2) > 0$$

4.2 Multivariate cross-sectional regression

To extract the possible abnormal return effects of the Dodd-Frank act from the effects of firm and deal characteristics, a multivariate cross-sectional regression will be executed. In the regression, different event window CARs form the dependent variable, while the independent variables are those mentioned in paragraph 3.2. For every separate regression model a Breusch-Pagan test will be performed to test for possible heteroskedasticity, which can then be taken into consideration. The regressions are formulated as follows:

$$CAR_i = \beta_0 + \beta_1 LN(Total_Assets)_i + \beta_2 ROA_i + \beta_3 DE_i + \beta_4 DC_i + \beta_5 SSIC_i + \beta_6 Cash_i + \beta_7 Shares_i + \beta_8 Friendly_i + \beta_9 US_i + \beta_{10} Dodd_Frank_i + \beta_{11} US_i * Dodd_Frank_i + \epsilon_i$$

Where CAR_i is the firm-specific cumulative abnormal return for the specified event window, β^0 is the sample intercept and β^j is the regression coefficient for variable j . The regression will be executed separately for the target and acquiring firms' samples. An interaction term is added between the U.S. variable and the Dodd-Frank variable, as to test if there exist significant interaction effects between these two independent variables.

Chapter 5: Results

5.1 Event study

Table 4 shows the cumulative average abnormal returns to acquiring firms' shareholders, both before and after the implementation of the Dodd-Frank act.

The results show that U.S. firms did experience a statistically significant small negative announcement effect before the implementation of the Dodd-Frank act. However, it seems that the announcement effect disappears after the act was introduced. For the post-Dodd-Frank period, I find no significant CAARs for any event window period in U.S. acquiring firms.

The results for non-U.S. firms tell a different story. Before the implementation of Dodd-Frank, non-U.S. firms experienced a small positive pre-announcement effect, which is significant at the 10% level. This indicates a possible leakage of information about M&A announcements to the market. The results after Dodd-Frank still imply an information leakage effect for non-U.S. firms, since there is a positive pre-announcement effect that is significant at the 10% level. However, the results also indicate a total cumulative average abnormal return to the non-U.S. acquiring firms. This implies that the market now views mergers to be value-creating, at least in the short run, for acquiring firms' shareholders.

Table 4

Median CAARs to acquiring firms

Period	<u>Pre-Dodd-Frank</u>	
	U.S.	Non-U.S.
	<i>n</i> =599	<i>n</i> =710
Pre-announcement (t-5, t-1)	-0,01%	0,02%*
Announcement (t-1, t+1)	-0,72%**	-0,08%
Post-announcement (t+1, t+5)	-0,57%	-0,33%
Total (t-5, t+5)	-1,10%*	-0,14%
	<u>Post-Dodd-Frank</u>	
	U.S.	Non-U.S.
	<i>n</i> =543	<i>n</i> =712
Pre-announcement (t-5, t-1)	-0,08%	0,11%*
Announcement (t-1, t+1)	0,07%	-0,07%
Post-announcement (t+1, t+5)	-0,13%	0,00%
Total (t-5, t+5)	-0,11%	0,20%**

Note. **/* denotes significance at 5%/10%, p-values calculated using Generalized Sign Test by Cowan (1992).

Table 5 shows the cumulative average abnormal returns to acquiring firms' shareholders, both before and after the implementation of the Dodd-Frank act.

The results show findings consistent with academic literature on this subject. Pre-Dodd-Frank, there are statistically significant positive cumulative average returns around announcements to both U.S.

and non-U.S. target firms. However, the effect is much larger in U.S. target firms, implying that the U.S. market on average views the mergers as relatively much more value-creating than mergers in the non-U.S. market.

The results after the enactment of Dodd-Frank show similar results, where the total positive announcement effects persist to target firms in mergers. However, there are two interesting differences relative to the Pre-Dodd-Frank period. The first is that there do not seem to be significant leakage effects in the pre-announcement period anymore, whilst in the Pre-Dodd-Frank period the leakage effects were still significant. It also appears that the total cumulative average abnormal returns to merger announcements have become even more positive in Post-Dodd-Frank target firms. This implies that the market may view these mergers as more value-creating to target firms' shareholders than before.

Table 5

Median CAARs to target firms

	<u>Pre-Dodd-Frank</u>	
	U.S.	Non-U.S.
	<i>n</i> =137	<i>n</i> =148
Pre-announcement (t-5, t-1)	0,27%*	1,22%**
Announcement (t-1, t+1)	16,57%**	3,96%**
Post-announcement (t+1, t+5)	0,34%*	0,55%**
Total (t-5, t+5)	16,32%**	4,88%**
	<u>Post-Dodd-Frank</u>	
	U.S.	Non-U.S.
	<i>n</i> =182	<i>n</i> =165
Pre-announcement (t-5, t-1)	0,59%	-0,16%
Announcement (t-1, t+1)	17,25%**	2,65%**
Post-announcement (t+1, t+5)	0,47%**	0,13%*
Total (t-5, t+5)	18,88%**	5,90%**

Note. **/* denotes significance at 5%/10%, p-values calculated using Generalized Sign Test by Cowan (1992).

5.2 Multivariate cross-sectional regression

To test if the event study results were an effect of the Dodd-Frank act or if they can be attributed to firm or deal characteristics, the multivariate regression as per paragraph 4.2 was executed. Table 6 shows the results regarding CARs to acquiring firms' stocks.

In the results to acquiring firms, it is evident that particularly whether the deal is perceived as friendly has a significant impact on the CARs per event window. Here, the dummy variable shows that there are relatively small, but statistically significant negative abnormal returns to merger announcements, if these are perceived as friendly by the target board. This effect might denote that the market considers acquiring firms to be paying bid premia that are too high, since higher bid premia possibly make it more likely for target firms' boards to perceive mergers as friendly.

Whether the acquiring firm is mostly paying for a merger in shares has a significant effect on the CAR in the announcement period. Payment in stock by acquiring firms signals that firms believes its' stock to be overpriced at the time of the announcement, therefore making it relatively more interesting to use as payment than cash. The market then responds negatively to this signaling.

The results also show that in the post-announcement period, a higher Return-on-Assets of acquiring firms seems to have a sizable significant positive effect on the CAR for this event window. This signals that the market takes note of the profitability of the acquiring firms in forming an opinion on whether a deal will be value creating or not.

The debt-to-equity ratio of acquiring firms also has a very small, but statistically significant positive effect on CARs in the post-announcement period. This means that, in the post-announcement period, merger announcements by acquiring firms with relatively more debt in comparison to the firms' equity are received as slightly more positive by the market than announcements by firms with less leverage.

Furthermore, in the post-announcement period and total event window, whether the acquiring firm and target firm are in the same 2-digit SIC code creates a small, but significant positive effect to acquiring firm CARs. This indicates that the market views these horizontal mergers as value-creating.

The effect of an acquiring firm being U.S.-based has a significant small negative effect in the announcement period. Interestingly, it does appear that this effect is reversed in the Post-Dodd-Frank period, since the interaction effect between the U.S. variable and the Post-Dodd-Frank variable creates sizable statistically significant positive returns to merger announcements in the announcement period event window. This could imply that investors, after the implementation of the Dodd-Frank Act, relatively have more confidence in U.S.-based acquiring firms that participate in mergers.

Table 6*Cross-sectional multivariate regression results to acquiring firms*

VARIABLES	(1) CAR(t-5, t-1)	(2) CAR(t-1, t+1)	(3) CAR(t+1, t+5)	(4) CAR(t-5, t+5)
LN(Total_Assets)	-0.000901 (0.00131)	-0.000466 (0.00182)	0.000797 (0.00154)	-0.000126 (0.00260)
ROA	-0.0110 (0.0142)	0.0269 (0.0167)	0.0235** (0.0105)	0.0225 (0.0196)
DE	-0.000277* (0.000164)	0.000358 (0.000307)	0.000502** (0.000212)	0.000177 (0.000382)
DC	-0.00241 (0.00235)	-0.00355 (0.00296)	0.00130 (0.00304)	-0.00241 (0.00412)
SSIC	0.00255 (0.00200)	0.00348 (0.00279)	0.00599** (0.00268)	0.00736* (0.00405)
Cash	-0.00147 (0.00256)	-0.00163 (0.00373)	-0.000367 (0.00349)	-0.00106 (0.00503)
Shares	0.00210 (0.00319)	-0.00798* (0.00469)	0.000492 (0.00386)	-0.00572 (0.00638)
Friendly	0.00457* (0.00235)	-0.00792*** (0.00299)	-0.00690** (0.00285)	-0.00865** (0.00438)
US	-0.00227 (0.00307)	-0.00985** (0.00389)	-5.28e-05 (0.00359)	-0.00953* (0.00563)
Post_DF	0.00106 (0.00279)	0.00129 (0.00337)	0.00422 (0.00336)	0.00666 (0.00506)
US*PostDF	-0.000794 (0.00379)	0.0126** (0.00542)	0.000154 (0.00503)	0.00678 (0.00751)
Constant	0.00760 (0.00969)	0.00648 (0.0134)	-0.0132 (0.0112)	-0.00183 (0.0190)
Observations	2,564	2,564	2,564	2,564
R-squared	0.008	0.017	0.010	0.010

Note. ***/**/* denote the significance at the 1%/5%/10% level, whilst the values in parentheses are the robust/normal standard errors.

Table 7 shows the regression results regarding target firms.

From these results, we can imply that the size of a target firm has significant negative effects on the cumulative abnormal returns to target firms' shares in merger announcements. For all announcement periods except the pre-announcement period, the market perceives a relatively larger target firm to be value-destroying in a merger announcement. This could imply that the market prefers "bargain" firms as opposed to large firms, possibly due to higher growth opportunities in smaller firms.

The results also show that whether the deal will be mostly paid for in shares has a significantly negative effect on CARs in target firms' merger announcements. This might be due to the signaling effect of payment in shares, which signals to the market that the acquiring firm perceives its shares as being overvalued. Since target firms' shareholders in a stock offer receive the acquiring firms' shares, the signaling effect causes the market to perceive a value destruction for target firm shareholders in the stock offer.

Whether the target firm is U.S.-based has a large significant positive effect on CARs in the announcement period and the total event window. This finding is in line with Table 5, which shows a very substantial difference in the median cumulative average abnormal returns between U.S. target firms and non-U.S. target firms.

The regression constant is significant for all periods except the pre-announcement period. This signals that there is still a significant amount of unexplained CAR, which might be the result of deal- or firm-specific characteristics that are difficult to measure in the variables selected in this study.

Also worth noting is that the R-squared of the (t-1, t+1) and (t-5, t+5) models is relatively much higher than all the acquiring regression results and the other target regression results. This implies that significantly more variance in target CARs in the (t-1, t+1) and (t-5, t+5) windows can be explained than all the other event windows.

Table 7*Cross-sectional multivariate regression results to target firms*

VARIABLES	(1) CAR(t-5, t-1)	(2) CAR(t-1, t+1)	(3) CAR(t+1, t+5)	(4) CAR(t-5, t+5)
LN(Total_Assets)	0.00285 (0.00390)	-0.0445*** (0.00980)	-0.0206*** (0.00762)	-0.0442*** (0.00994)
ROA	-0.0398 (0.0259)	-0.0696 (0.0590)	-0.00289 (0.0268)	-0.113* (0.0680)
DE	-0.000513 (0.000535)	-0.00133 (0.00169)	0.000425 (0.000819)	-0.00120 (0.00138)
DC	-0.00560 (0.00639)	-0.000966 (0.0187)	0.0214 (0.0136)	0.00320 (0.0192)
SSIC	0.00236 (0.00661)	-0.000115 (0.0176)	-0.0105 (0.0133)	-0.000557 (0.0184)
Cash	0.00636 (0.00771)	0.0281 (0.0216)	-0.000929 (0.0179)	0.0347 (0.0231)
Shares	-0.000379 (0.00774)	-0.0496** (0.0220)	-0.0429** (0.0182)	-0.0505** (0.0235)
Friendly	0.0115 (0.00718)	0.000495 (0.0188)	0.0257* (0.0152)	0.0172 (0.0197)
US	-0.0121 (0.00956)	0.141*** (0.0223)	0.0289 (0.0186)	0.129*** (0.0241)
Post_DF	-0.0155* (0.00867)	0.0248 (0.0194)	0.0144 (0.0160)	0.0230 (0.0221)
US*PostDF	0.0166 (0.0121)	0.00142 (0.0306)	-0.0142 (0.0245)	0.0104 (0.0325)
Constant	0.00605 (0.0238)	0.329*** (0.0609)	0.141*** (0.0438)	0.336*** (0.0625)
Observations	632	632	632	632
R-squared	0.023	0.165	0.040	0.154

Note. ***/**/* denote the significance at the 1%/5%/10% level, whilst the values in parentheses are the robust standard errors.

5.3 Hypotheses

Based on the event study and multivariate cross-sectional regressions, the hypotheses formulated in paragraph 2.5 can now be tested. These hypotheses are:

H1: Pre-Dodd-Frank, target firms' shareholders on average receive a positive cumulative abnormal return in M&A announcement periods.

From Table 5, we can conclude that there are indeed significant cumulative average abnormal returns to target firms' shareholders in the pre-Dodd-Frank period. For U.S. and non-U.S. target firms, the total event window (t-5, t+5) CAARs equal to 16 and 5 percent, respectively.

H2: Post-Dodd-Frank, target firms' shareholders on average receive a positive cumulative abnormal return in M&A announcement periods.

From Table 5, we can conclude that there are indeed significant cumulative average abnormal returns to target firms' shareholders in the post-Dodd-Frank period. For U.S. and non-U.S. target firms, the total event window (t-5, t+5) CAARs equal to 19 and 6 percent, respectively. These average total event window returns are higher than in the pre-Dodd-Frank period.

H3: Pre-Dodd-Frank, acquiring firms' shareholders on average receive close to zero or negative cumulative abnormal returns in M&A announcement periods.

From Table 4, we can conclude that pre-Dodd-Frank, the CAARs to acquiring firms' shareholders are significantly negative in U.S. firms, whilst non-U.S. acquiring firms do not experience statistically significant CAARs. The average total event window CAARs to U.S. firms is -1 percent.

H4: Post-Dodd-Frank, acquiring firms' shareholders on average receive a positive cumulative abnormal return in M&A announcement periods.

From Table 4, we can conclude that there are very small, but significant positive cumulative average abnormal returns to non-U.S. acquiring firms' shareholders in the post-Dodd-Frank period, while U.S. acquiring firms do not experience any CAARs in the post-Dodd-Frank period. The average total event window CAARs to non-U.S. firms is 0,2 percent.

Chapter 6: Discussion

My results show significant positive short-term cumulative average abnormal returns from merger announcements to target firms' shareholders, both pre- and post-Dodd-Frank. These findings are in line with the earlier mentioned findings of Andrade et al. (2001), Jensen and Ruback (1983), Franks and Harris (1989), Peterson and Peterson (1991), Yaghoubi et al. (2016) and Goergen and Renneboog (2004).

For acquiring firms' shareholders, my study shows no consensus on the cumulative average abnormal returns around merger announcements. The results to acquiring firms' shareholders differ between periods (pre- and post-Dodd-Frank) and seem to differ in U.S. versus non-U.S. acquiring firms. I do however find that, in pre-Dodd-Frank U.S. acquiring firms, there is evidence to support the views of Yaghoubi et al. (2016), Peterson and Peterson (1991), Hazelkorn et al. (2004) and Limmack (1991), which is that acquiring firms' shareholders on average experience slightly negative statistically significant CAARs around merger announcements.

With regards to what drives the cumulative abnormal returns for individual deals, my findings concur with those of Datta et al. (1992) and Bruner (2004), who conclude that the use of stock financing has significant negative effects to CAARs of both target and acquiring firms' shareholders. However, the results from my study do differ from the results of studies by Leledakis and Pyrgiotakis (2022) and Koudelka (2015), whose studies conclude that (for a sample of U.S. bank mergers) the Dodd-Frank act creates significant positive effects to the total cumulative average abnormal shareholder returns. My study finds that the Dodd-Frank act has insignificant effects to CAARs of U.S.-based acquiring firms, and that the Dodd-Frank act does seem to have a significant positive effect to CAARs of U.S.-based target firms. However, this effect only persists in the announcement period and might differ from the earlier mentioned studies because of the differences in the samples studied (U.S. banks only versus a global sample also containing non-financial firms).

Chapter 7: Conclusion

In this thesis, I have looked at the influence of the Dodd-Frank Wall Street Reform and Consumer Protection Act on the short-term cumulative average abnormal stock returns to shareholders in periods around public firm mergers and acquisitions announcements. Previous literature has shown that target firms' shareholders receive positive returns from announcements, whilst acquiring firms' shareholders receive close to zero or slightly negative returns. This study aims to find if financial legislation, embodied by the Dodd-Frank act, has significantly changed the abnormal returns around M&A announcements. Thus, the research question studied in this thesis was: "How does financial legislation affect short-term shareholder returns around the announcement of mergers and acquisitions?"

For this, a sample of 3196 firms involved in 2732 deals that were announced between 2003 and 2017 is used in an event study and a consequent multivariate cross-sectional regression.

The results show that the abnormal returns from M&A announcements have not changed much for target firms' shareholders (meaning that the effects to target firms' shareholders are still significantly positive), and that the returns to acquiring firms' shareholders are indeed close to zero or slightly negative.

Furthermore, the regression executed shows that, in accordance with previous research, stock financing has significant negative effects on both target and acquiring firms' CAARs. The regression does provide evidence for a significant positive effect of the Dodd-Frank act on abnormal returns in U.S.-based acquiring firms, however this effect only persists in the (t-1, t+1) event window. The results do not show significant evidence of Dodd-Frank effects on the CAARs of U.S. target firms or non-U.S. firms.

This study therefore concludes that financial legislation does not seem to have unambiguous effects on short-term shareholder returns from merger announcements. However, the legislation could still have significant effects on how the market reacts, but these are likely to only be persistent in the country where the legislation is in effect. Therefore, the results of this study combined with previous research show that many other factors, apart from (financial) legislative factors, affect the abnormal returns to shareholders around merger announcements.

Chapter 8: Limitations

Whilst this study provides some insights into the effects of financial legislation on shareholder returns, it is important to discuss some limitations to this research that could prove fruitful in other research.

A potential limitation to this study is the fact that the Dodd-Frank Act is only U.S.-based legislation, which non-U.S. firms do not have to abide by. Therefore, finding other more broadly applicable metrics to measure (the different amounts of) legislation could prove useful in explaining the possible effects of legislation. However, for the purpose of this study, one of the biggest legislative overhauls after the global financial crisis was used as a convenient proxy.

Another potential limitation is that thin trading of stocks results in biased estimators of the market model. This in turn could cause the abnormal stock returns measured to become biased. For further research on abnormal returns, I would advise implementing a measure to tackle these liquidity issues, or to find a sample that only consists of stocks that are traded often.

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