Do Acquisition Announcements Have an Effect on the Acquiring Firm's Credit Default Swap Spread?

ABSTRACT:

Credit Default Swaps are a recent financial innovation that allow bond owners to minimize their credit risk exposure by purchasing an insurance on the bonds in their portfolio. By paying a quarterly fee to the protection seller, normally a financial institution, the protection insures that incase the issuer of bonds is unable to pay its interest; they will not lose any of their investment.

The purpose of this study is to investigate what effect announcements of acquisitions have on the acquiring firm's credit default swap spread (CDS spread). To investigate this, an event study was conducted on the firms belonging to the Europe Itraxx 125 list between December 2007 and November 2010. In total 93 unique acquisitions were recorded and tested included in the sample. The results of the study found that announcements did have a statistically significant effect on a corporation's credit default swap spread. Further tests aimed at identifying what factors led to a higher or lower impact were not as successful. This is the first study researching the relationship between mergers and acquisitions with a firms' credit default swap. The findings of this

KEY WORDS: Credit Default Swaps, Event Study, Mergers & Acquisition, Information Content, Efficient Market Hypothesis

Author Markus Ahlberg

Instructor Alexander Herbertsson, PhD

Semester Fall 2010

Acknowledgements

I want to thank my instructor, Alexander Herbertsson, for his continued guidance and support throughout the composition of this thesis. Dr. Herbertsson pushed me to refine and clarify my thesis and supported me from start to finish.

I also want to thank Joakim Westerlund for his support in questions regarding the modeling of my model and my econometric tests. Lastly, I would also like to thank Martin Holmen for being able to cover for my instructor when it was time for me to present my thesis. Thank you.

Markus Ahlberg

Table of Contents

1. Introduction

1.1 Background

Credit Default Swaps (CDS) were developed in the mid 1990s as way for financial institutions to free up capital and minimize their exposure to credit risk (O'kane 2003). A credit default swap is an agreement between two entities to exchange cash-flows and credit risk for a pre-determined period of time. A protection buyer can transfer the credit risk of a bond it owns to a protection seller by paying the seller a quarterly fee, known as the CDS premium. In case of a credit event by the reference entity (the issuer of bonds), the protection seller will cover the credit loss the protection buyer may suffer. Since their development, CDSs have become the most common over-the-counter issued credit derivatives (O'kane 2003). Since the recent financial crisis, more and more CDSs are traded through clearing houses and will completely disappear from the OTC market (Van Duyn & Mackenzie 2009). Due to the swaps dependence on credit events, they have also become a measure of the probability of default of the reference entity and thus given investors and banks a qualitative, instantaneous and efficient measure of credit risk (Jacobs, Karagozoglu & Peluso 2010).

The purpose of this thesis is to look at the changes in a company's credit default swap spread to identify if announcements of acquisitions affect the company's perceived credit risk or not. As mergers & acquisitions become more popular, and more companies have credit default swaps, it has become interesting to study the relationship between announcements of acquisitions and CDSs in order to learn more about what drives credit risk and what firms can do to minimize any negative consequences. To our knowledge, this is the first study of its kind. It is important to note that although this study will not determine whether acquisitions increase or decrease an acquiring firm's CDS spread, it will seeks to determine whether a relationship exists and pave the way for future studies to determine the extent and direction of the relationship.

To do identify if acquisition announcements have an effect on the CDS spread of the acquiring firm, and thereby on the company's credit risk, we will use an event study. Event studies have been used for over 80 years as a financial and economic model to evaluate the effect an event has on, most commonly, a firm's valuation (MacKinlay 1997). The event study methodology will be explained in more detail later in this thesis; but in its most simple form, an event study is a statistical test that determines if an event has an effect on a company by observing if the returns are above, or under,

the normal during a certain time period. Most often these returns are calculated on companies' stock price, but we intend to use the same model adapted to the daily return on companies' credit default swaps. Our focus in this study will be limited to the companies that make up the iTraxx Europe 125 index, an index of the 125 firms with the most liquid credit default swaps in Europe.

As was stated previously, this is, to the best of our knowledge, the first study that sets to focus on what effect acquisitions announcements have on CDS spreads. There has, however, been much research focused on credit default swaps, event studies and credit risk. Made and Olszamowski (2008) studied what effects changes in credit ratings had on a company's CDS spread. They found significant effects indicating that CDS spreads were affected by credit rating changes and announcements, especially by negative changes. Jacobs, Karagozoglu and Peluso (2010) also studied the relationship between credit ratings and CDS spreads. They found that CDS spreads increase (perceived credit risk goes up) as a company's debt credit rating is lowered, which is in line with what Made & Olszamowski discovered. Lastly, as an example of how event studies can be used, Horsky and Swyngedouw (1987) used an event study to study what effect the changing of a company's name had on the company's performance. They found significant evidence proving the name changes were a signal of improved performance. Through our thesis, we hope to further the research on credit default swaps as a measure of risk, on the effects that mergers and acquisitions have on companies as well as give more examples of using credit default swaps in event studies.

1.2 Purpose

The purpose of this study is to determine whether or not acquisition announcements have an effect on the acquiring firm's credit default swap spread. This is an interesting topic to study as it is the first study that attempts to relate the effect that announcements of acquisitions have on CDS spreads. Many studies have been conducted determining the impact that certain events have on CDS spreads but none where the event is an announcement of acquisitions. Determining what effect acquisition announcements have on CDS spreads is interesting for several different groups. Companies and their management want to know more about what factors influence their CDS spread and are especially interested in determining what effect acquiring other firms has on their CDS spread. Investors and banks would be interested in the results of this study as they are the primary buyers and sellers of CDS contracts and the ones who stand to lose the most in case a company fails to meet their interest payments. The more knowledge investors and banks have about the effects acquisitions have on CDS spreads, the better they can price bonds and swaps.

This study will contribute to the existing understanding of credit default swaps by introducing more data concerning the information content of acquisition announcements as well as on the impact that these announcements have on the perceived risk of acquisitions. The results of this study can also be used to further the research in this field and examine how firms can use acquisitions to minimize their risk profile, measured through their CDS spread. More examples of possible continued studies will be presented in the conclusion of this study.

1.3 Thesis Outline

This thesis is divided in to five different parts. In the first section, this section, we have introduced the reader to our thesis, given a background on what credit default swaps are, what the purpose of this study is and how we hope to further the discussion on credit default swaps. In the following section, we will introduce credit default swaps more fully: we will briefly elaborate on their history as well as detail how CDSs are constructed, how the CDS spread is defined and lastly, how CDS indexes function. In Section 3 we will review the theoretical background as well as present the hypothesis, data and the methodology of the thesis. Following this presentation, in Section 4 we will present our empirical findings and test our hypothesis and see if we can accept or reject them. In the final section we will conclude our thesis, discuss the results and also suggest ways in which this study could be continued.

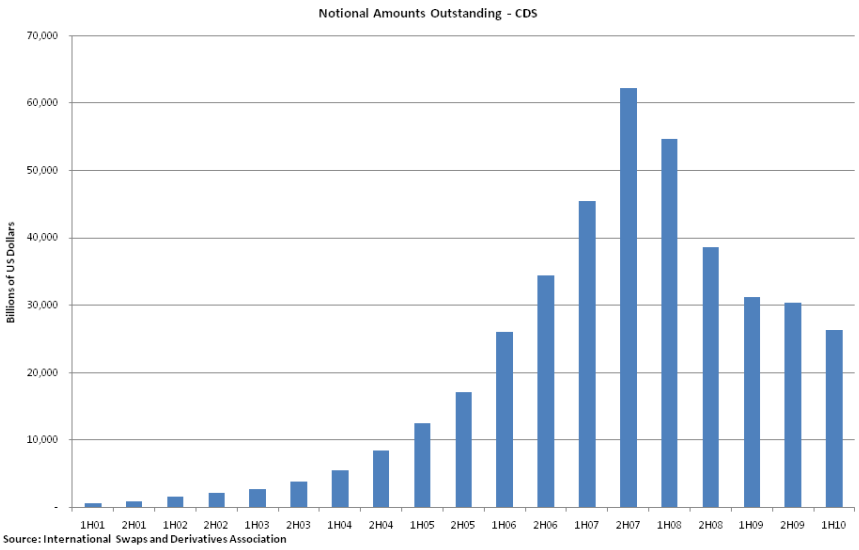
2. Credit Default Swaps

In this section we will introduce Credit Default Swaps, the background to their development, explain how they are constructed and how the Credit Default Swap spread is calculated. We will end the section by discussing Credit Default Swap indexes and compare them to stock indexes.

2.1 History

Credit Default Swaps (CDS) were originally created by investment banks in the United States in the mid 1990's (Pratt). As Figure 1 indicates, CDSs have grown incredibly since their creation and have now become the most traded credit derivatives. Credit Default Swaps played an important role in the recent financial crisis of 2007-2009. The crisis caused the outstanding amount of CDS to decrease drastically and also forced policy makers and central banks around the world to reevaluate the derivative and standardize it in order to create a simple way of managing and containing the effect of widespread defaults.

Figure 1 Notional Amount Credit Default Swaps Outstanding



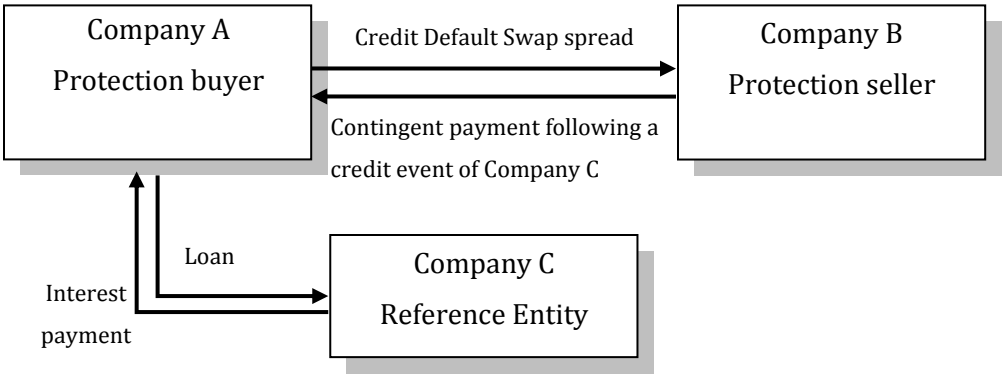
The Credit Default Swap was originally created in order to minimize credit risk and to free up capital in the bank. Banks could use CDS to reduce their risk by buying protections on the event of a default by a corporation they had lent money to (Federal Reserve Bank of Atlanta 2008). For example, a bank could issue bonds worth $1 Billion to a corporation for five years at a 10 % interest rate. The corporation would make yearly interest payments of $100 Million to the bank and after five years it would return the principal. The bank is receiving interest on the money the corporation has borrowed, but if the corporation defaults the bank would stand to lose all, or a big part, of their

money. The bank, is in other words, exposed to a potential loss of $1 Billion if the corporation were to default. The bank can reduce its exposure by purchasing credit default swaps. The bank could contact a protection seller, often a bank or other financial institution, and buy a credit default swap. The bank would make regular payments to its counterparty (the seller of protection) and if the corporation goes into bankruptcy, the protection seller would pay the bank whatever it lost due to the bankruptcy (Federal Reserve Bank of Atlanta 2008). The method previously described explained a case where the bank protected itself from a particular bonds issued by a certain corporation, but credit default swaps can also be used to reduce a bank's exposure to an industry or a country. If a financial institution believes it has lent too much to a certain industry or in a country, it can protect (or hedge) itself by buying credit default swaps on the specific industry in the form of industry index CDS (Mengle 2007).

The second main reason for why banks and other financial institutions would buy CDSs is for regulatory reasons. Most countries have rules that establish that banks must set aside a certain amount of cash to protect itself in case its loans go bad. By buying CDS swaps, banks can reduce the amount of cash they must have in their reserves and instead lend more money to other ventures (Weistroffer 2009).

Before the standardization of the credit default swap by the International Swaps and Derivatives Association (ISDA) parties were free to set any terms they agreed upon in their agreements. The basic structure of any credit default swap is, however, quite simple. Figure 2 shows a common CDS agreement: Company A buys bonds issued by Company C, Company A is called the protection buyer and Company C as the reference entity. Company A, to protect itself from the credit risk they are exposed to through the bonds they bought from Company C, buys a Credit Default Swap from Company B, known as the protection seller. Company C will make regular interest payments to Company A. Company A will make regular, quarterly, payments to Company B. If Company C is unable to pay interest, or any other credit event occurs, such as a restructuring, a failure to pay interest or bankruptcy (Mengle 2007), Company B will compensate Company A on any loss they may have had. This will continue until the Credit Default Swap matures, usually after five years.

Figure 2. Illustration of a typical CDS structure



2.2 Credit Default Swap Spreads

The Credit Default Swap spread is the amount the protection buyer is required to pay for the protection offered by the protection seller. Spreads are usually quoted in basis points (one basis point is one hundredth of 1%) on the face value of the bond protection is bought on (O'kane & Tumbull 2003). In its simplest form, the spread of a credit default swap is based on the discounted premium payments combined with the risk-neutral probability that the reference entity defaults between the date of issue and the maturity of the swap (Herbertsson 2010). Although the spread is agreed upon by the two parties and is fixed for the duration of the CDS swap, the credit default swap spread is quoted daily and firms usually mark-to-market their CDSs on a daily basis (O'kane & Tumbull 2003).

The CDS spread with maturity T for an obligor i, at time t denoted by $S_{i,t}(T)$ is defined so that the expected discounted cash flows paid by the protection buyer to the protection seller in the period [t, t+T] is equal to the expected discounted cash flows paid by the protection seller to the protection buyer in the same period. Hence, the T-year CDS spread for obligor i at time t is then given by

$$S_{i,t}(T) = \frac{(1-R_{\mathrm{i}})\sum_{n=1}^{4T} e^{-r\frac{n}{4}}\left(p_{i,t}\left(\frac{n}{4}+t\right)-p_{i,t}\left(\frac{n-1}{4}+t\right)\right)}{\sum_{n=1}^{4T} e^{-r\frac{n}{4}}\left(1-p_{i,t}\left(\frac{n}{4}+t\right)\right)\frac{1}{4}}$$

where $p_{i,t}(s)$ is the probability of a default of obligor i up to time s for $s \geq t$, conditional on the available information at time t. Furthermore, R_{i} is the recovery rate for obligor i. A more detailed derivation can be found in in O'Kane 2008. For s>t>0, then the quantity $p_{i,t}(s)$ as seen from today (i.e. at time t=0), is a random variable in [0,1], since we don't know the market information available at the future time point t. Consequently, the T-year CDS spread $S_{i,t}(T)$ at the future time

point t, will be treated as a random variable, just as the stock price for company i at the future time t is considered as a random variable. For t=0, i.e. today, it is possible to observe market spreads for the T-year CDS spread for obligor i, that is $S_{i,0}(T)$. Consequently, if we have observed CDS spreads daily at the previous time points $t_1, t_2, t_3 \ldots . t_N$ (during N days, say) we can then treat these observations as outcomes of the corresponding random variables $S_{i,t_k}(T)$ for $k = 1,2, \ldots N$. Alternatively, we may consider the observed CDS spreads as a realization of the stochastic process $\{S_{i,t}(T)\}$ sampled at the time points $t_1, t_2, t_3 \ldots . t_N$.

Today, it is standard to use the CDS spread of a company as a measure of the credit risk associated to the company (Jacobs, Karagozoglu & Peluso 2010). During the financial crisis credit default swaps were tracked and followed and any spike or increase would lead to much discussion over the chances of survival of the entity, most commonly a bank (Davies 2008). CDS spreads as a measure of credit risk is an important concept in regard to this thesis because the purpose of this paper is to study if acquisition announcements have an effect of a firm's credit risk, as measured through the firm's credit default swap.

2.3 How CDS Indexes Work

A credit default swap index is a financial contract between a protection buyer and a protection seller on protection from credit events on a portfolio of bonds issued by multiple companies (Herbertsson 2010). The protection seller will reimburse the protection buyer if any company's bonds included in the contract defaults or suffer any similar credit event. In exchange the protection buyer will make regular payments to the seller. In case one company suffers a credit event, the protection seller will reimburse the protection buyer for the loss suffered and the protection buyer will continue to make regular payments to the buyer for protection on the remaining bonds in the index until the maturity of their financial contract, typically five years (Alexander 2010). The fee that the protection buyer pays to the protection seller is referred as the CDS spread and is calculated in much the same way a CDS on a single firm is: by setting the expected cash flows between the protection seller and protection buyer equal at time t=0.

Credit default swap indexes are different from stock indexes. A stock index, in its most simple form, is compiled by aggregating corporate stocks, weighted by share price or market capitalization, and made into in index by selecting a starting point and setting the aggregated sum equal to 100. When the stocks in part of the index rise or fall, so will the index. The most common CDS indexes are created by aggregating the firms with the most liquid CDSs and weighting them equally in an index.

(O'Kane 2008). Stock indexes are rebalanced when needed while CDS indexes are not. Instead, new series of a CDS index are created every six months to include an up-to-date list of the most liquid firms. Most holders of a CDS index will roll over to the new index when it is released, but it is not required (O'Kane 2008). The new series does not necessarily have to include the same underlying entities as the previous series as some firms may no longer qualify (due to possible rating changes, liquidity issues or credit events).

The main provider of CDS indexes is Markit and the most common indexes are CDX indexes in North America and iTraxx indexes in Asia and Europe. The index that we will use in our study is the Itraxx Europe 125 which will be described in more detail in section 3.3.2 in this thesis.

3. Hypothesis, Data and Methodology

Section 3 will begin by going through the most important theory this thesis is based upon: Eugene Fama's Efficient Market Hypothesis. This will be followed by an introduction to the hypothesis we will test, the data this thesis is based upon and the method we intend to apply to test our hypothesis.

3.1 Efficient Market Hypothesis

Eugene Fama postulated that given certain assumptions, financial markets are efficient. An efficient market was described as a market where at any given moment in time, the prices of securities fully reflect all available information (Fama 1970). This hypothesis has come to be known as the Efficient Market Hypothesis. The assumptions that Fama required for the hypothesis to be valid are that markets are active markets, with many profit-maximizing participants who all had access to the latest information.

Fama's reasoning for why markets are efficient is based on the idea that investors are profit-maximizers who will look at all available information before making their judgment on the value of a security. The price of any security will be efficient as it will reflect the collective knowledge of the entire market. Prices of securities will rise until no investor believes they will be able to make a profit by buying the security; this will lead the security to stabilize at an efficient level (Fama 1970). When new information is available (for example at an earnings announcement or an acquisition announcement), investors will re-evaluate the security given the new information and the price will either fall or rise depending on the information content of the introduced information. Fama identified three different levels of efficient markets: weak-form, semi-strong-form and strong-form. Below we will explain each level and discuss how they relate to each other.

In the first category, weak-form markets, prices fully reflect all available past information concerning the price of an asset. This would imply that it would not be possible to, in the long run, earn profits above what would be considered normal, by using a trading strategy based on technical analysis, the studying of historic prices to look for patterns that can predict future prices (Malkiel). On the other hand, trading strategies based on fundamental analysis (analyzing a company by looking at more factors than just historic prices, for example the firm's market and its management) would lead to outperformance. Fama's evidence suggests that these are the most common types of efficient markets as the category is the easiest to prove.

Semi-strong form markets are market where security prices reflect all available public information. This would imply that security price movements are based on the arrival of new information to the public. In semi-strong-form markets, the only way to outperform the markets in the long run would be to trade based on private insider-information. Neither fundamental nor technical analysis would lead to market outperformance as this information is already priced in. Although weak-form markets are the most common types of markets, Fama and others have found evidence that indicate that semi-strong markets do exist. For example, several studies have found that active fund management (where fund managers try to pick stocks that will outperform) does not add value to investors (Jensen 1968 and Malkiel 1995). Malkiel also found that that active fund managers are "regularly outperformed" by broad index funds (Malkiel 2003). This would be evidence that stock picking is, in the long-run, useless if only based on fundamental and technical analysis and should be replaced by passive fund management, the holding of large, diversified portfolios.

Strong-form markets are markets where asset prices fully reflect all available public and private information. This would imply that not even by trading on insider information would fund managers be able to outperform the market as there is no such thing as inside-information. Fama admits that this is a rare kind of market but believes that the classification is interesting as a benchmark for the previous two forms of efficient markets.

One of the primary implications of the efficient market hypothesis is that it assumes that security prices are moved by the arrival of new information. This would reject the idea that stock pickers and fund managers can successfully and consistently outperform the market. If markets are efficient, there can be no price anomalies that managers can take advantage of. Prices will only go up or down when new information is introduced; and as it is impossible to say what new information will be made available, and whether that information will be positive or negative, stock picking would be pure speculation.

We assume that the European CDS market is a semi-strong efficient market. This is an important assumption as we will be analyzing the deviation of returns compared to their "normal return" throughout certain time periods. The semi-strong-form assumes that asset prices adjust when new information is introduced. This study will focus on acquisition announcements being the new information that is added. In the hypothesis we are expecting that the announcements will have a

noticeable effect on the returns. We believe that assuming that the CDS market is semi-strong is a valid assumption because other studies have already been conducted using the same assumption. Made & Olszamowski used this assumption and found significant levels information content in several credit events.

3.2 Our Hypothesis

In this subsection we will introduce the hypothesis that will be tested in this thesis.

H1: The information content of acquisition announcement is high and we will see a reaction to the announcements in the CDS spreads

In accordance with the efficient market hypothesis, any new information with high information content introduced to the market will cause the market to re-evaluate the firm and the firm's risk level. The first hypothesis will test whether or not the information content in acquisition announcements is sufficiently high to affect CDS spreads or not.

We will not test whether acquisitions increase or reduce the credit default spread of firms because the direction of change is outside of the scope of this study. The reasoning behind this is that we want to focus on identifying if there is information content in acquisitions announcements or not. However, although the direction of the change will not be the focus of this study, we will, where data permits us, comment on the direction.

H2: Acquisitions of companies outside of the acquirer's industry class (inter-industry acquisitions) will have higher information content and thus see a higher impact compared with intra-industry acquisitions

Intra-industry acquisitions, acquisitions where both the acquiring firm and target firm belong to the same industry will notice a smaller effect compared with inter-industry acquisitions, acquisition where there is no industry match between acquiring firm and target firm. The reasoning behind this hypothesis is that acquisitions within the same industry should be less risky compared with inter-industry acquisitions. In inter-industry acquisitions the acquiring firm is acquiring a firm involved in activities outside of its core competencies which is more risky compared with an intra-industry acquisitions.

Although this study will not directly focus on the spread of the acquiring firm, we can still make the separation above as we are looking at cumulative abnormal returns during certain time periods.

Higher impact will be studied by looking at the cumulative abnormal return. We expect that inter-industry acquisitions will have a higher cumulative abnormal return compared with intra-industry cumulative returns.

H3: Acquisitions by frequent acquirers will notice a smaller effect compared with companies who do not often engage in M&A

Companies that frequently acquire other companies should be more accustomed to acquiring companies and incorporating them into their existing business and therefore see smaller effects on their spread than firms that seldom acquire other firms. The buyers of credit default swaps on the bonds of companies that often acquire firms are also accustomed to the strategies of the company and therefore the effect of an acquisition announcement should already be priced into the CDS spread. There should be a more pronounced effect on firms that do not frequently acquire other firms as the holders of the companies' CDS will not have priced in this in the price of its CDS.

The information content in acquisitions by companies that do not frequently acquire other firms will be higher than companies where investors expect them to acquire as the information content includes a certain amount of surprise.

Frequent acquirers are firms that have conducted two or more acquisitions in the time period of this study. This is not a perfect measurement as there may be firms who have completed many acquisitions right before or after the boundaries of this study who will be classified as not frequent acquirers. Notwithstanding this possible limitation, we still believe that this segmentation will be insightful.

H4: Acquisitions in Brazil, Russia, India or China will have a higher impact than acquisitions outside of Emerging Markets

Acquisitions where either the acquiring firm or the target firm is located in Brazil, Russia, India or China (BRIC countries) will see a stronger response compared with firms that are not related to BRIC-countries. The reasoning behind this hypothesis is based on the inherent risk of acquisitions in emerging markets compared with in mature markets.

3.3 The Data

In the following section we will begin by presenting the data that will be used in the study, the source of the data and how it has been handled. Thereafter we will present the event study methodology and introduce the reader to the statistical tests we will use to test our hypothesis.

3.3.1 Overview

The primary source for credit default swap spreads and for acquisition announcements is Reuters 3000. We have chosen to use the CDS spreads of the five-year maturity CDS contracts as they are the most liquid contracts; using the most liquid contracts is important in order satisfy the assumptions of the efficient market hypothesis. This study will focus on looking at acquisitions by firms in the market index between the 17th of December 2007 and the 15th of November 2010. These were tumultuous years in the CDS-market but we do not believe that this will have any effects on our results as our study is based on comparing returns above what would be considered normal and also compared to the overall market performance.

3.3.2 Market Index

In subsection 2.3 we introduced the concept of CDS indexes. In this section we will present the market index we have chosen to use for our study.

We have decided to use Markit's Itraxx Europe List as our market index. The Itraxx Europe List is an index composed of the Credit Default Swap spreads of the 125 most liquid investment-grade European firms and every firm in the list accounts for 0.8 % of the list exposure. It was developed to give a benchmark index for both investors and asset managers for their CDS investments. The index is rebalanced every March and September, to ensure that the list always contains the 125 most liquid investment-grade firms in Europe. Given that the Itraxx Europe list is such a broad index, we have chosen not attempt to change or correct the data in any way to take into consideration the changes caused by rebalancing. The list contains companies from all major industries. The exact breakdown by industry group is presented in Table 1. A list of the firms in the index is available in Appendix 1.

Table 1 iTraxx Europe Industry Composition

Industry	No. of Companies	Weight in %
Autos & Industrials	30	24
Consumers	30	24
Energy	20	16
Financials	25	20
Technology, Media & Telecom	20	16
Total	125	100 %

Source: iTraxx

3.3.3 Acquisitions

In total there were 104 acquisitions in our date range. From the 104 acquisitions, 11 were removed from the study as there was not enough CDS data to calculate accurate normal returns, which is required to be able to use the event study methodology we will present in a later section. Appendix 2 includes a complete list of the acquisitions observed in this study.

The first hypothesis tests all acquisition announcements while the remaining three hypothesis test different segmentations of acquisition announcements. Segmenting acquisitions into different groups is interesting in order to test and see if the information content of the acquisitions is different depending on the type of acquisition. A side effect of segmenting the acquisitions is that we are left with smaller sample sizes. In some cases this will mean we will not be able to assume that the data is normally distributed. This is a setback but we believe the segmentations are interesting nonetheless. Some acquisitions are more risky than others and these announcements should therefore have a more significant impact on the CDS spread. The segmentations are:

- **Intra-industry acquisitions:** Acquisitions where the acquiring firm and target firm are in the same industry.
- **Inter-industry acquisitions:** Acquisitions where the acquiring firm and target firm are in the different industry.
- **Frequent acquirer:** Acquisition by a firm that has conducted multiple acquisitions within the thesis studied time frame.
- **Rare acquirer:** Acquisitions by a firm that has conducted only one acquisition within the time frame of this study.
- **BRIC Related:** Acquisitions where either acquiring firm and/or target firm is a Brazilian, Russian, Indian or Chinese firm.

- **BRIC Unrelated:** Acquisitions where there is no relation to any BRIC-country.

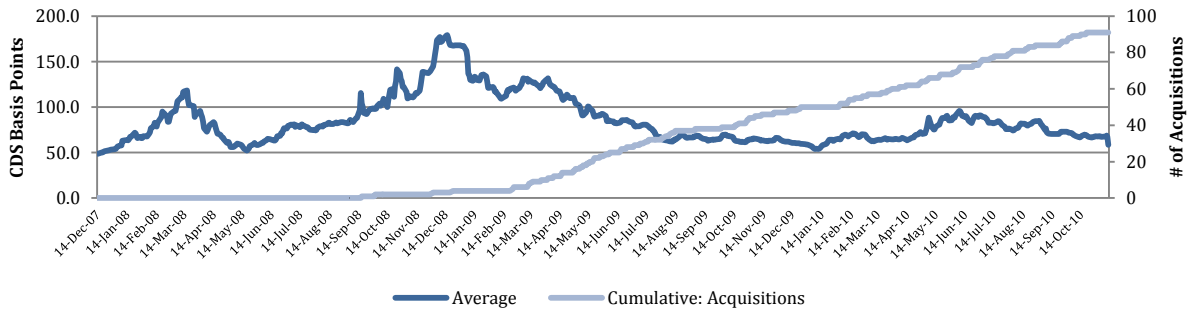
In Table 2 we show the number of acquisitions in each segment:

Table 2 Frequency of Announcement Type

Type of Acquisition	Number of Acquisitions
Number of Acquisitions (Events) (Al)	93
Intra-industry Acquisitions (intra)	72
Inter-industry Acquisitions (Inter)	21
Frequent acquirer (Often)	68
Rare acquirer (N.Often)	25
BRIC Related Acquisitions (BRIC)	10
BRIC Unrelated Acquisitions (N.BRIC)	83

3.3.4 Credit Default Swap Spread Over Time

Figure 3 Average Credit Default Swap Spread and Date of Acquisitions 14th December 2007 – 15th November 2010



In Figure 3 we shows how the average credit default swap spread for the 93 firms has moved between the 17th of December 2007 and the 15th of November 2010. The average spread was 84.70 basis points, min 48.8 on the 17th of December 2007 and max 179 on the 16th December 2008. As stated before, the time period between 2007 and 2010 includes the recent financial crisis, a crisis where credit default swaps played a central role (Davies 2008). The crisis is evident in the graph above, the average CDS spread increased by more than 300 % between December 2007 and December 2008, after which it steadily decreased and returned to a more stable level.

The lighter blue line in the graph above shows the cumulative number of acquisitions. There reason that there are no acquisitions in the beginning is due to the requirement of having an estimation window between the period t=-150 and t=-10 to calculate normal returns. Acquisitions are spread out over time with no particular clustering.

3.4 The Methodology

In this subsection we will present the Event Study methodology formalized by A. Craig MacKinlay. This will be followed by an introduction to the statistical test we will use to test our hypothesis.

3.4.1 Introduction

A. Craig MacKinlay has in his influential work, Event Studies in Economic and Finance, compiled all background information concerning event studies and also formalized the event study methodology. Event studies are based on calculating the cumulative abnormal returns of a security around the time period of an event (MacKinlay 1997). The abnormal returns are then statistically tested to identify whether the returns are statistically different from zero. The reason for why the returns are tested to see if they are statistically different than zero is because, in accordance with the efficient market hypothesis, prices increase or decrease only when new information is added. If we can prove that the returns are statistically different than zero we can conclude that the event had an impact.

Although event studies can be conducted on most securities, so far the most common security used in the available literature are stocks. We will use credit default swaps as the underlying security and use the same methodology that Made & Olszamowski introduced for calculating abnormal returns on credit default swaps. They observe the daily buy-and-hold returns of CDSs to study what effect rating announcements have on firms' CDS spread. The daily buy-and-hold returns are calculated in the following manner:

$$R_{i,t} = \frac{P_{i,t}}{P_{i,t-1}} - 1 = \frac{S_{i,t} \cdot PV_{i,t}(Premia)}{S_{i,t-1} \cdot PV_{i,t-1}(Premia)} - 1 = \frac{S_{i,t}}{S_{i,t-1}} - 1$$

Where, $R_{i,t}$ = Return of issuer i on day t

$P_{i,t}$ = Expected present value of all payments the buyer of a CDS contract makes to the seller

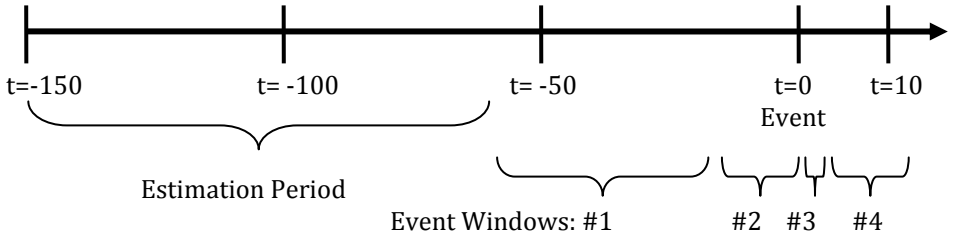
$PV_{i,t}(Premia)$ = Present value of one basis point stream of premia on day t

$S_{i,t}$ = CDS spread for issuer i on day t

The formula states that the return for issuer i on day t is $R_{i,t}$. Made & Olszamowski make an assumption that $PV_{i,t}(Premia) = PV_{i,t-1}(Premia)$. The reasoning behind this assumption is that $PV_{i,t}(Premia)$ is the "probability that the issuer does not default prior to a certain payment date" (Made och Olszamowski) and as the time between t and t-1 is just one trading day, we can assume the value will be the same, or nearly the same, from one day to the other.

As proposed by Mackinlay in his previously mentioned work, expected returns will be calculated using the market model, a model that determines how a security moves in relation to the market. The market model method of calculating abnormal returns relates the return of issuer i to the return of the market portfolio (Mackinlay 1997). An estimation period is selected from which the returns of the issuer and the market will be related to create expected returns. The estimation period should not include the event as its inclusion may skew the model. The estimation period in this study is between t=-150 and t=-10 days. Figure 4 gives a brief summary of the different periods of time that will be used.

Figure 4 Estimation Period and Event Windows



Event studies are based on observing if there are any cumulative abnormal returns over a period of times surrounding an event. In our case, the event is an acquisition announcement by a firm. An estimation period is used to calculate normal returns. Later, abnormal returns are calculated by comparing actual returns with the returns our model predicted. Cumulative abnormal returns are created by summing all abnormal returns over a given time period, known as event windows. If the announcement of an acquisition has no effect, the cumulative abnormal returns in the period will be insignificant and equal to zero. If this proves to be false, one can assume that the event had an impact on the security price (MacKinlay 1997). We will focus on four different event windows in order to make sure that we are able to identify any information leakage before the event as well as any corrections after the event. The event windows are:

t=-60 and t=-11: Pre event window. By observing the abnormal returns before the event, information leakage can be detected.

t=-10 and t=-1: Similar to the pre-event window proposed above but more focused on the time right before the event.

t=0 and t=1: Event window including the release of the information. Check the market reaction.

t=2 and t=10: Post even window. Observe the market adjustment process

3.4.2 Calculating Abnormal Returns

As previously mentioned, abnormal returns are calculated by comparing actual returns ($R_{i,t}$) with the returns our model has predicted ($E(R_{i,t}|\Phi_{t-1}, R_{m,t})$):

$AR_{i,t} = R_{i,t} - E(R_{i,t}|\Phi_{t-1})$

Where, AR_i = Abnormal return for issuer i during time t, that is the difference between the actual return for issuer i compared with the expected return given our model

$R_{i,t}$ = Is the actual return for issuer i during time t

$E(R_{i,t}|\Phi_{t-1}, R_{m,t}) = \propto_i + \beta_i(R_{m,t}) + \varepsilon_i$

$E(R_{i,t}|\Phi_{t-1}, R_{m,t})$ = Expected return for issuer i given our model

$R_{m,t}$ = The actual return for the market index m during time t

$\propto_i$ = An estimate of the intercept for issuer i in the market model. This number has no real significance but is included to make our predictions more reliable.

β_i = An estimate of beta for issuer i. Defined as the correlation between the daily returns of issuer i and the market index

ε_i = Error term with zero mean

Abnormal returns for issuer i at time t are calculated as the return of issuer i at time t in excess of the market return at the same time. Expected returns, including $\propto_i$ and β_i, are calculated using standard ordinary least square regressions.

The abnormal returns for the issuer are aggregated over time in order to create cumulative abnormal returns (CAR):

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{i,t}$$

As we are investigating the relationship between acquisition announcements and CDS spreads, we have to aggregate multiple different cases of acquisition announcements and create a sample of announcements. This is done by aggregating the cumulative abnormal returns across our sample to create the Sample Aggregated Cumulative Abnormal Return (SACAR):

$$SACAR(t_1, t_2) = \sum_{i=1}^{N} CAR_i(t_1, t_2)$$

3.4.3 Testing For Significance

We will use a Student's two sided t-test to test whether or not acquisition announcements have an effect on the CDS returns. Student, whose real name was William Sealy Gosset, worked as a chemist and statistician for the Guinness Brewery in Dublin. He developed his t-test as a statistical method to test the quality of the brew produced by the brewery (J. J O'Connor and E F Robertson 2003). To test the quality of the beer he took many small samples and compared their properties to what was considered normal. He tested if the properties were significantly different from what was expected by comparing the calculated sample means with a normal distribution. If the calculated average of his sample was significantly different, the brew was considered to be of low quality and would be rejected. Credit default swaps are quite different from Guinness, but the testing method Gosset created can be used to test how a sample of values compare with what is considered normal (Raju TN 2005).

The null hypothesis in our test is that the sample aggregated cumulative abnormal returns (SACAR) are equal to zero, in other words that there is no impact. The alternative hypothesis is that SACAR is not equal to zero. The reasoning behind the null hypothesis is: if there is no impact on the CDS spread by the announcement, according to the efficient market hypothesis, there should not be any cumulative abnormal returns either. By testing whether SACAR is equal to zero we test if the cumulative abnormal returns are significantly different from zero. To test this statistical significance of the returns predicted by the model, standardized test statistics are constructed. SACAR is divided by the sample variance to construct standardized prediction error:

$$\theta_1 = \frac{SACAR(t_1, t_2)}{\sqrt{var(SACAR(t_1, t_2))}} \sim N(0,1)$$

The resulting standardized prediction error has a 0 mean and variance of 1 and can be used to test the null hypothesis (MacKinlay 1997) by comparing θ_1 to a critical value. If $\theta_1$is larger than the critical value, or less than the negative critical value (because this is a two-sided test), we can reject the null hypothesis. An alternative to using critical values are to use probability-values, p-values. P-values indicate the lowest value at which the null hypothesis can be rejected. We will reject our null hypothesis if the calculated p-value is less than our chosen significance level, 0.05. P-values are preferable to critical values because they give us a clearer understanding of how confident we are when we reject, or fail to reject, our hypothesis. For example, if the calculated p-value is 0.06 we fail to reject our null hypothesis, but we know we are fairly close. If the calculate p-value is 0.45 we know we can safely reject our null hypothesis.

4. Empirical Findings

In the following section we present and analyze the results of our study. We will begin by examining the main question: do acquisition announcements have any effect on the CDS spread of the acquiring firm? After going through the main hypothesis, we will examine the effects of more specific sorts of acquisitions as well as present the results from our statistical tests which will lead us to reject, or fail to reject, our hypothesis..

4.1 Daily and Accumulated Changes

In this subsection we will present and discuss the empirical findings for all acquisitions using charts.

4.1.1 All Acquisitions

Figures 5 and 6, below, display the daily and cumulative abnormal returns for our sample set between the time period t=-10 to t=10 and also t=-30 to t=10. These periods show any pre-event changes and post-event changes as well as changes on the date of the actual event. Observing the daily and cumulative returns during these two time periods is interesting as it gives us a way to observe the effects of the event and any pre- or post-adjustments indicating information leakage or over reactions.

Figure 5 Average Abnormal CDS Return for the period t=-10 to t=10 for all acquisition announcements

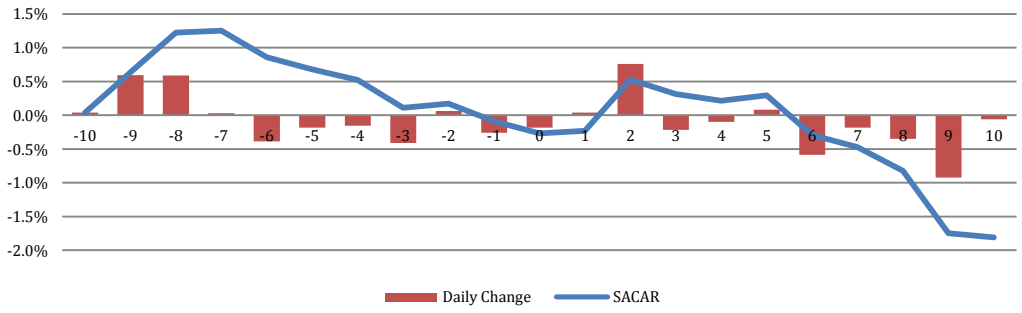


Figure 6 Average Abnormal CDS Return for the period t=-30 to t=10 for all acquisition announcements

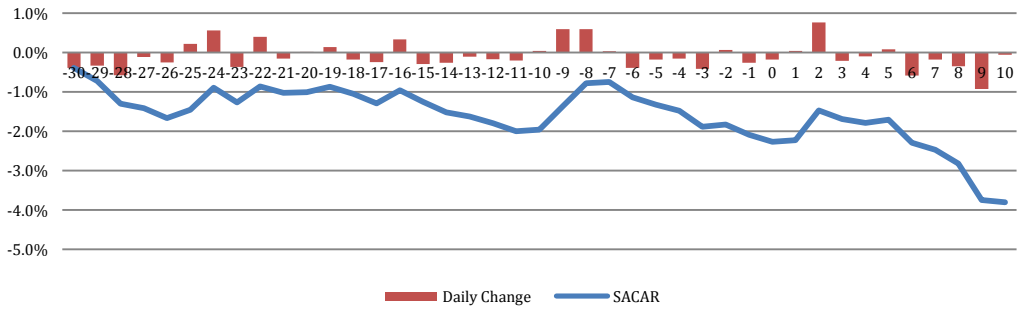


Figure 5 and 6 indicate that acquisition announcements coincide with a tightening of the acquiring firm's CDS spread. Between t=-10 and t=10, the cumulative abnormal return is almost -4.0 %. The daily abnormal returns are for the most part negative, indicating a tightening or a decreasing CDS spread which would indicate a decrease in the perceived risk of the acquirer.

From Figures 5 and 6, there is no clear visual indication that the announcement of an acquisition at t=0 has an immediate effect on the abnormal return. The average abnormal return at t=0 is -0.18 %. t=0 is followed by two consecutive days of positive abnormal returns indicating a possible increase in perceived risk which could have been caused by the acquisition announcement. This may be a belated response to the information content of the announcement at t=0.

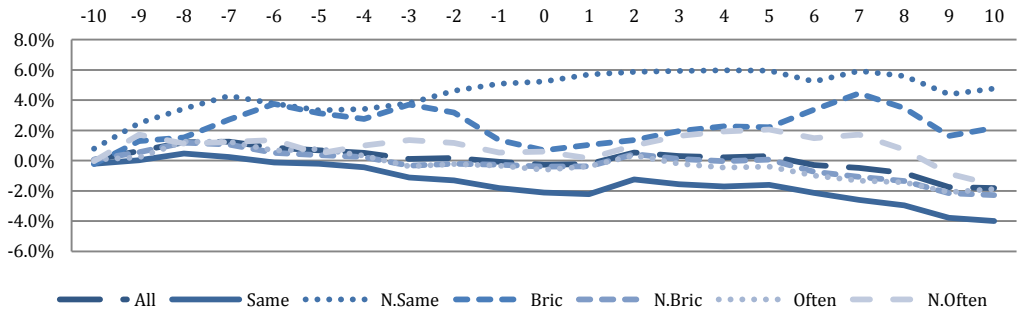
Looking at a longer period (Figure 6) it becomes clear that the tightening of the CDS spread is a trend that started earlier than what the first Figure 5 would explain. This indicates that the returns between t=-10 and t=10 are not adjustment of previous increases but rather just a continuation of an ongoing trend.

One clear pattern that becomes visible is that the majority of the daily returns are negative. The returns seem to be fairly random with certain trends, negative events are usually followed by other negative events and positive events are often followed by positive events. Although the trend is towards a tightening of the spread, there are occasional positive adjustments.

4.1.2 t=-10 – t=10 Cumulative For Different Types of Acquisitions

Below we have plotted the cumulative returns for all different types of acquisitions in order to make it easier to compare and contrast the abnormal returns in the different segments of acquisitions.

Figure 7 Abnormal CDS Returns for different types of acquisitions between t=-10 and t=10



From the graph it becomes evident that there are clear positive returns for *inter-industry acquisitions* and *BRIC-related-acquisitions*. There are minor cumulative returns for *all acquisitions* and for *both frequent* and *non-frequent acquirers*. *Intra-industry acquisitions* and *non-BRIC-related acquisitions* have a clear negative cumulative return.

Although the graph above shows some interesting trends, it is important to remember that the cumulative returns have not been statistically tested and that we are simply commenting on the visible abnormal return trends. These results are not surprising. *Inter-industry acquisitions* and *BRIC-related acquisitions* should result in an increase in the CDS spread as they are more risky. When a firm acquires a firm from a different industry, the potential risk is higher than when both acquiring and target firms are in the same industry. The same is true for *BRIC-related acquisitions*. *BRIC-related acquisitions* imply that a firm is expanding geographically which would imply taking more risks. The only surprising results are that there is no difference between firms that often engage in acquisitions compared with firms that do not.

4.2 Event Study Results

In this subsection we will present the results of the statistical tests and discuss what they mean to our hypothesis.

4.2.1 H1. There will be an effect

Table 4 shows the sample cumulative abnormal returns and the P-value from the student's t-test for all acquisition announcements during our 5 different time periods.

Table 4 SACAR and P-values for T-Test For Acquisition Announcements

	-60 to -11	-10 to -1	0 to 1	2 to 10	-10 to 10
SACAR	-7.170 %***	-0.0088 %	-0.142 %**	-1.577 %*	-1.807%**
P-Value	0.000720641	0.429136721	0.019246187	0.05363899	0.017540427

*, ** and *** indicates significance at the 10%, 5% and 1% level respectively for one-sided hypothesis testing of value equal to zero

The results indicate that there are significant abnormal returns during all time periods except for between t=-10 to t=-1. During the event window t=-60 to t=-11 the cumulative abnormal returns are -7.17% which is significant at the 1 % level. In the most important event window, t=0 to t=1, the abnormal returns are significant at the 5% level indicating that announcements of acquisitions have, on average, a significant effect on a firms credit default swap spread. This leads us to accept our hypothesis that acquisitions have an effect. The direction of the cumulative abnormal returns in the period t=0 to t=1 is negative indicating that an announcement is usually followed by a decrease in the CDS spread.

The primary hypothesis of this study was that we would see a reaction in CDS spreads due to announcements. The cumulative changes between t=0 and t=1 for all acquisitions are significantly different than zero which would imply that investors react to the new information released at t=0 . This information is useful as we can determine that acquisitions will have an impact on firm's CDS spread and in return, their perceived risk level.

4.2.2 H2. Intra- and Inter-Industry Acquisitions

Figure 8 shows the sample cumulative abnormal returns between t=-10 and t=10 segmented into two groups: acquisitions where both acquirer and target firms belong to the same industry (Intra) and where acquirer and target belong to different industry groups (Inter).

Figure 8 Abnormal CDS Returns for the period t=-10 to t=10 for Intra- and Inter-Industry Acquisitions

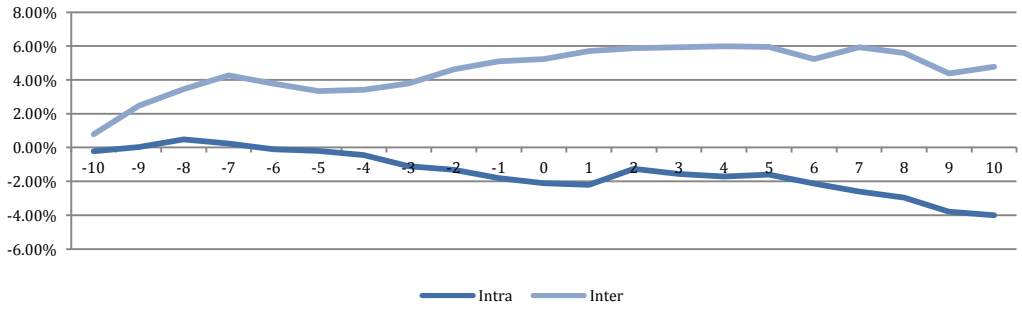


Figure 8 indicates that acquisitions where there is an industry match between acquirer and target result in a tightening of the CDS spread while the opposite is true for acquisitions between industry classes during the time period t=-10 and t=10. In Table 5, the results from the statistical tests are presented.

Table 5 SACAR and P-values for T-Test For Intra-/Inter-Industry Acquisitions

		-60 to -11	-10 to -1	0 to 1	2 to 10	-10 to 10
SACAR	Intra	-5.703 % ***	-1.816 % **	-0.394 % **	-1.792 %*	-4.001%***
	Inter	-11.572 % ***	5.096 % ***	0.611 %	-0.931 %*	4.776%***
P-Value	Intra	0.00008204	0.016503536	0.01594924	0.054096904	0.002382909
	Inter	0.005868754	0.00085896	0.103163507	0.074645117	0.001042139

*, ** and *** indicates significance at the 10%, 5% and 1% level respectively for one-sided hypothesis testing of value equal to zero

From Table 5 we see that there is significance in most time periods. That intra-industry acquisitions is significant to the 5% level between t=0 and t=1 indicates that the information content of the acquisition is significant. Inter-industry acquisitions are not significant at the same time interval and we can thus not test which had a higher impact. At the t=-10 to t=-1 period both intra- and inter-industry acquisitions are significant at the 5% level in the direction that we can expect. Intra-industry acquisitions should coincide with a lower increase in CDS spread than inter-industry acquisitions.

One anomaly in Table 5 is that Inter-industry acquisitions have a sample cumulative abnormal return of almost -12 % during the time period t=-60 to t=-11, this is not what is expected. Looking at a longer time period though (see appendix Figure 3.3 t=-150 to t=10) it is clear that this is an adjustment from a previous, very strong increase of the CDS spread.

Our second hypothesis stated that acquisitions where there is no industry match between acquiring firm and acquired firm (inter-industry acquisitions) should have more pronounced reactions compared with acquisitions where there is a match can be regarded as inconclusive. The data says that there is a significant reaction to acquisitions where there is an industry match between the time period t=0 and t=1 but for acquisitions with no industry match, no such significant results were identified. The cumulative abnormal returns are in accordance with our hypothesis (larger cumulative abnormal returns for non-industry match acquisitions) but as the results are not statistically significant we can neither accept nor reject the hypothesis.

4.2.3 H3. Frequent announcers

The abnormal CDS returns for frequent (Often) and infrequent (N.Often) acquisition announcements between t=-10 and t=10 are plotted in Figure 9.

Figure 9 Abnormal CDS Returns for the period t=-10 to t=10 for Often and N.Often Acquisitions

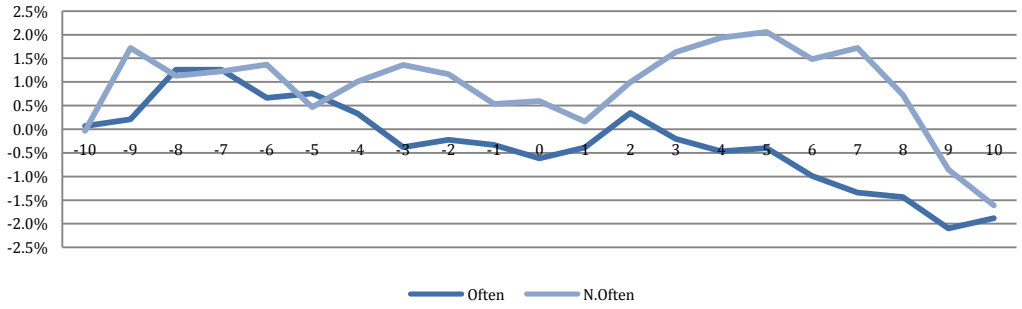


Figure 9 does not indicate that there is any clear, visual, evidence of strong information content regarding acquisitions in the event window between t=-10 and t=10. Neither are there any clear differences between firms that often engage in acquisitions compared with firms that rarely acquire other firms. However, by looking at a longer period (see Figure 3.3 in appendix), firms that often acquire other firms have a negative cumulative abnormal return. Firms that seldom acquire other firms can expect positive cumulative abnormal returns during the same, extended, time period.

Table 6 SACAR and P-values for T-Test For Often/N.Often Acquisitions

		-60 to -11	-10 to -1	0 to 1	2 to 10	-10 to 10
SACAR	Often	-11.590 %***	-0.332 %	-0.052 %	-1.500 % **	-1.883%**
	N. Often	4.048 %***	0.532 %	-0.372 %	-1.772 %	-1.612%**
P-Value	Often	0.000347364	0.29889085	0.389724735	0.049887544	0.02642097
	N. Often	0.004991072	0.165581341	0.176542696	0.101894825	0.04540419

*, ** and *** indicates significance at the 10%, 5% and 1% level respectively for one-sided hypothesis testing of value equal to zero

Our hypothesis stated that acquisitions done by firms that often conduct acquisitions should have a lower information content compared with acquisition announcements by firms that seldom acquire firms seems cannot be proved true. From Table 6 we see that, at the most important event window, t=0-t=1, there are no indications of any significant changes in returns for either segment. During the time period t=-60 and t=-11, *Often acquirers* can expect to see cumulative negative CDS spread returns amounting to -11.59 %, signifying a lower CDS spread, whilst firms that rarely acquire other firms can expect to positive cumulative abnormal returns. Both of these are significant at the 1 % level but it is impossible to determine if this is caused by the acquisition announcement or not.

4.2.4 H3. BRIC Announcements

Figure 10 shows the abnormal CDS returns between t=-10 and t=10 segmented in to two group: BRIC-related acquisitions and non-BRIC-related acquisitions.

Figure 10 Abnormal CDS Returns for the period t=-10 to t=10 for BRIC and N. BRIC Acquisitions

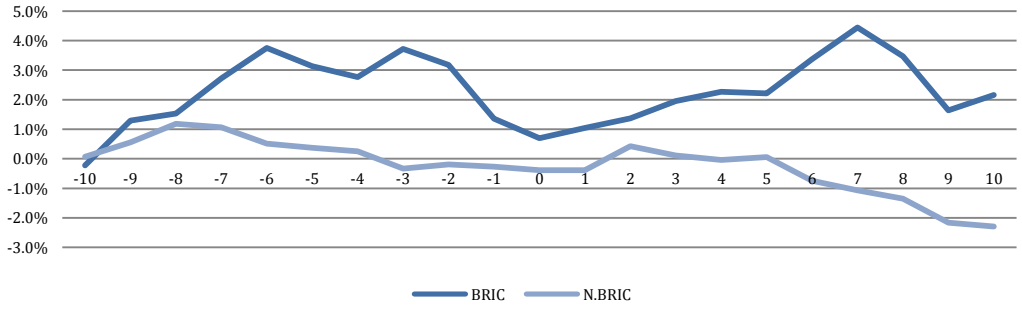


Figure 9 indicates that BRIC-related acquisitions show positive cumulative abnormal returns while non-BRIC related acquisitions show no or negative returns. BRIC-related firms seem to be affected by the acquisition announcement at t=0 resulting in a series of days with positive CDS returns, the same does not seem to be true for non-BRIC related acquisitions.

Table 7 SACAR and P-values for T-Test For BRIC/N.BRIC Related Acquisitions

		-60 to -11	-10 to -1	0 to 1	2 to 10	-10 to 10
SACAR	BRIC	-9.497 %***	1.360 %	-0.321 %	1.124 %	2.163%**
	N. BRIC	-6.887 %***	-0.264 %	-0.121 %***	-1.906 %**	-2.291%***
P-Value	BRIC	0.001563725	0.157213232	0.15937407	0.145642357	0.039789288
	N. BRIC	0.0007633	0.313417067	0.000225666	0.045446111	0.009839322

*, ** and *** indicates significance at the 10%, 5% and 1% level respectively for one-sided hypothesis testing of value equal to zero

From Table 7 we can see that the cumulative returns in the period t=-10 to t=10 are significant at the 5% level for both BRIC-related acquisitions and non-BRIC-related acquisitions. However only non-BRIC-related acquisitions are significant at the t=0 to t=1 period indicating that the announcement of an acquisition at t=0 had an impact.

The hypothesis testing whether acquisitions where either one or both firms are based in one of the BRIC countries show higher impact compared with non-BRIC-related acquisitions cannot be determined. Non-BRIC-related acquisitions show significant cumulative abnormal returns between t=0 and t=1, but BRIC-related acquisition do not show similar significance.

The sample of BRIC-related acquisitions consists of only 10 acquisitions which lead us to question the robustness and validity of the results in Table 7 and Figure 10. We have nonetheless decided include the groupings in the study as we believe it is an interesting perspective to study.

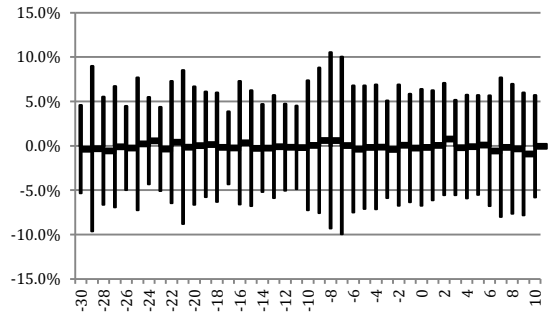
4.3 Volatility

If the information content of acquisition announcements is strong we expect that the market will react to the new information on, or around, the day of the announcement. We have therefore included a short analysis on the volatility of the abnormal returns around the acquisition date, t=0.

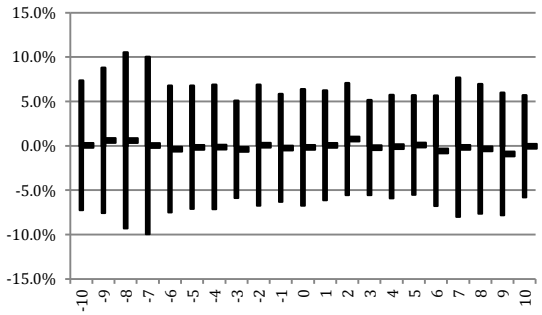
As an indicator of volatility we have chosen to present the distribution of the abnormal returns around the event windows in Figure 11. The black vertical lines are two standard deviations of returns and the black horizontal line is the average return. A more spread out distribution of abnormal returns, that is longer vertical lines, would be an indication of heightened volatility.

Figure 11 Volatility of Abnormal Returns For All Acquisitions

A) t = -30 – t=10



B) t= -10 – t=10



Neither Figure 11 A nor figure 11 B seem to indicate that there is in any heightened volatility during the time periods t=-30 to t=10. We see an increase in volatility one week before the announcement, perhaps indicating information leakage but there is no way to prove this given the information we have. Our results contrast to the results of Made & Olszamwoski. They found significant evidence of increases in volatility around the announcement date for negative announcements (credit grade downgrades and other similar announcements or warnings).

5. Conclusion

In this section we will conclude the study, include closing remarks concerning the methodology and also provide examples for how this study can be extended.

The results from study indicate that announcemenets of acquisitions have a significant and noticeable impact on the CDS spread of the acquiring firm at several different time periods, including the most important itme period between t=0 and t=1. The results are interesting and p2insightful. Interesting as they indicate that a firm's CDS spread is impacted by the acquisitions they complete and the firm must therefore take into consideration what effect an acquisition will have on their CDS spread when acquiring firms. The results are insightful as they give further evidence that the perceived risk of a firm can be adjusted by investments and divestments of businesses and business units.

The exact way that acquisitions impact CDS spreads has not been studied in this thesis. Focus lay instead on identifying if acquisition announcements had an impact on CDS spreads or not, not on the direction of the impact. Studying the direction of the impact would be insightful as it would give proof to the question of: do acquisitions increase or decrease a company's credit default swap? The results of a study like that could be used to create trading strategies and also risk management.

Due to statistical uncertainty in the segemented acquisitions, only the first hypothesis could be statistically tested. The remaining hypothesis could not be tested as the significance levels in the returns were not high enough. Once again, the segmentations were interesting as the results would shed more light on exactly what kind of acquisitions impacted CDS swaps the most. One of the main problems in these segmentations was that the sample sizes were too small; we had, for example, only 10 BRIC-related acquisitions. As was stated in 3.3.3., not all samples used in the study could be assumed to be normally distributed, meaning that the results from running statistical tests on the samples were not all reliable. If this study were to be continue, we would want to extend the time frame we observed in order to increase the number of observations in each sample. Even if some samples could not be assumed to be normally distributed, we believe that the results are meaningful and interesting.

This is the first paper that, to our knowledge, studies the effect of acquisition announcements on CDS spreads. The study of this paper has just touched on a tiny part of a very interesting subject;

and we believe that there are several ways in which this study could be continued which would lead to both interesting and useful knowledge about how acquisition announcements affect CDS spreads. Below we have suggest four ideas for how this studied could be continued, but there are many, many more.

Although we have briefly mentioned the direction of the impact acquisitions had when we stated the results from the study, the focus of this study lay in identifying if there was an impact or not. We believe that by reframing this study and focusing on the direction of impact, we would gain insights in to how exactly different types of acquisitions impact CDS spreads. This information could be used to identify possible trading strategies as investors could develop strategies taking advantage of the expected changes in CDS based possible rumors.

One very important factor that was left out of this study due to insufficient data was the size of the acquisition being announced. We are certain that this is an important factor which would lead to very interesting and even more meaningful results. A major weakness of this study is that large acquisitions and small acquisitions are both treated the same. Large acquisitions will undoubtedly have a higher impact on CDS spreads than a small acquisition. We would suggest re-doing this study and focus on acquisitions where the size of the acquisition was announced. A further very interesting factor to include would be a ratio of the size of the acquisition compared with the acquiring firm. This would give more context to the size of the acquisition than simply including the sum of the transaction.

A fourth suggestion would be to combine the event study on a company's credit default swap spread with a similar study on the same firm's stock price. By combining the stock price information with the information contained in the credit default swap spread of a company, we would be able to compare and contrast what stock investors thought of the proposed deal with bond investors.

Lastly, it would be interesting to do a similar analysis as this study but changing the event from acquisitions to divestments. What happens when a firm sells-off a major business unit or subsidiary company? A study of this would be interesting for many of the same reasons for why this study is interesting: analyzing the impact of perceived risk and effects of divestments; this is also something that, to our knowledge, has never been studied before.

References

Davies, Paul J, 2008, "Rising CDS Action Increases the Strain." Financial Times. 9 Oct. 2008. Web.

Eugene Fama, 1970, “Efficient Capital Markets: A Review of Theory and Empirical Work”, The Journal of Finance, Vol. 25

Federal Reserve Bank of Atlanta, 2008-04-14, "Did You Know? A Primer on Credit Default Swaps". Financial update **21**(2). Retrieved March 31, 2010.

Hearing to Review the Role of Credit Derivatives in the U.S. Economy, 110th Cong. (2008) (testimony of Eric Dinallo).

Herbertsson, Alexander. "Advanced Derivatives: Credit Derivatives Lecture 1", 18 Feb. 2011. Lecture.

Hill, R. Carter., William E. Griffiths, and G. C. Lim, “Principles of Econometrics Third Edition”, Hoboken, NJ: Wiley, 2007. Print.

Horsky & Swyngedouw, 1987, “Does It Pay to Change Your Company’s Name? A Stock Market Perspective”, Marketing Science Vol. 6, No. 4.

Jacobs, Karagozoglu & Peluso, 2010, “Measuring Credit Risk: CDS Spreads vs. Credit Ratings”.

Jensen, Michael, 1968, "The Performance of Mutual Funds in the Period 1945-1964", The Journal of Finance, Vol. 23, No. 2.

Mackinlay, 1997, “Event Studies in Economics and Finance”, Journal of Economic Literature, Vol. 35, No. 1.

Made & Olszamowski, 2008, “The effect of changes in credit ratings on CDS spreads”

Malkiel, 1995, “Returns from Investing in Equity Mutual Funds 1971 to 1991”, The Journal of Finance, Vol. 50

Malkiel, 2003, “The Efficient Market Hypothesis and Its Critics”, CEPS Working Paper No. 91

Mengle, 2007, "Credit Derivatives: An Overview" , Economic Review (FRB Atlanta) 92 (4)

O'Connor, J. J., and E. F. Robertson. "Gosset Biography." MacTutor History of Mathematics. University of St Andrews, Scotland, Oct. 2003. Web. 10 Nov. 2011. <http://www-history.mcs.st-andrews.ac.uk/Biographies/Gosset.html>.

O'Kane, Dominic, 2008, “Modelling Single-name and Multi-name Credit Derivatives”. Chichester, West Sussex: John Wiley & Sons, 2008. Print

O'kane & Turnbull, 2003, “Valuation of Credit Default Swaps”, Lehman Brothers Fixed Income Quantitative Credit Research

Raju TN, 2009**,** "William Sealy Gosset and William A. Silverman: two "students" of science". Pediatrics

Warner, Watts & Wruck, 1987, “Stock Prices and Top Management Changes”, The Journal of Financial Economics, No. 20.

Van Duyn, Aline, and Michael Mackenzie, 2009 "CDS Market Set to Begin Switch Into Clearing Format." Financial Times [London] 26 Mar. 2009. Print.

Weistroffer, Christian, 2009, "Credit default swaps: Heading towards a more stable system" (PDF). Deutsche Bank Research: Current Issues.

Appendix

1. iTraxx 125 Europe Series 13 List of Companies

AAUK Anglo American plc
ACAFP CREDIT AGRICOLE S
ADO Adecco S.A.
AEGON Aegon N.V.
AHOLD Koninklijke Ahold N.V.
AKZO AKZO Nobel N.V.
ALSTOM ALSTOM
ALZSE Allianz SE
ARMLL ArcelorMittal
ASSGEN ASSICURAZIONI GENERALI - SOCIETA PER AZIONI
AUCHAN GROUPE AUCHAN
AVLN AVIVA PLC
AXAF AXA
AYLL SAFEWAY LIMITED
BACR-Bank BARCLAYS BANK PLC
BAD EnBW Energie Baden-Wuerttemberg AG
BAPLC BAE SYSTEMS PLC
BASFSE BASF SE
BATSLN BRITISH AMERICAN TOBACCO p.l.c.
BBVSM
BERTEL Bertelsmann AG
BMW Bayerische Motoren Werke Aktiengesellschaft
BNP BNP PARIBAS
BPLN BP P.L.C.
BPSC BANCO POPOLARE SOCIETA COOPERATIVA
BRITEL-BritTel BRITISH TELECOMMUNICATIONS public limited company
BYIF Bayer Aktiengesellschaft
CARR CARREFOUR
CDBRYH CADBURY HOLDINGS LIMITED
CENTRI Centrica Plc
CMZB COMMERZBANK Aktiengesellschaft
CPGLN COMPASS GROUP PLC
CSGAG Credit Suisse Group Ltd
DAMLR Daimler AG
DANONE DANONE
DB DEUTSCHE BANK AKTIENGESELLSCHAFT
DEXO SODEXO
DIAG DIAGEO PLC
DPW Deutsche Post AG
DT Deutsche Telekom AG
EAD European Aeronautic Defence and Space Company EADS N.V.
EDF ELECTRICITE DE FRANCE
EDP EDP - Energias de Portugal, S.A.
ELTLX Aktiebolaget Electrolux
ENEL ENEL S.P.A.
ENI ENI S.P.A.
EON E.ON AG
EXPGRL-EXPFIN EXPERIAN FINANCE PLC
FERRUZ EDISON S.P.A.
FINMEC FINMECCANICA S.P.A.
FORTUM Fortum Oyj
FRTEL FRANCE TELECOM
GASSM GAS NATURAL SDG, S.A.
GDFS GDF SUEZ
GLCORE Glencore International AG
GROUPE CASINO GUICHARD-PERRACHON
HANRUE Hannover Rueckversicherung AG
HENAGK Henkel AG & Co. KGaA
HOLZSW Holcim Ltd
IBERDRU IBERDROLA, S.A.
IMPTOB IMPERIAL TOBACCO GROUP PLC
JTI JTI (UK) FINANCE PLC
KDSM Koninklijke DSM N.V.
KINGFI KINGFISHER PLC
KPN Koninklijke KPN N.V.
LINDE Linde Aktiengesellschaft
LLOYDS-Bank LLOYDS TSB BANK plc
LNX LANXESS Aktiengesellschaft
METFNL METRO AG
MICH-CoFinMich Compagnie Financiere Michelin
MKS-M+SPlc MARKS AND SPENCER p.l.c.
MOET LVMH MOET HENNESSY LOUIS VUITTON
MONTE BANCA MONTE DEI PASCHI DI SIENA S.P.A.
MUNRE
NESTLE Nestle S.A.
NGP NATIONAL GRID PLC
NOKIA Nokia Oyj
NXT NEXT PLC
PHG Koninklijke Philips Electronics N.V.
PLTMPL-IntFin Portugal Telecom International Finance B.V.
PPR PPR
PSON PEARSON plc
PUBFP PUBLICIS GROUPE SA
RBOS-RBOSplc
REEDLN REED ELSEVIER PLC
REP REPSOL YPF, S.A.
RNTKIL RENTOKIL INITIAL PLC
ROLLS ROLLS-ROYCE plc
RWE RWE Aktiengesellschaft
SANPAO INTESA SANPAOLO SPA
SANTNDR BANCO SANTANDER, S.A.
SASY SANOFI-AVENTIS
SCACAP Svenska Cellulosa Aktiebolaget SCA
SIEM Siemens Aktiengesellschaft
SOCGEN SOCIETE GENERALE
SOLVAY Solvay
STGOBN COMPAGNIE DE SAINT-GOBAIN
STM STMicroelectronics N.V.
SUEDZU Suedzucker Aktiengesellschaft Mannheim/Ochsenfurt
SWEMAT Swedish Match AB
SWREL Swiss Reinsurance Company Ltd
TATELN TATE & LYLE PUBLIC LIMITED COMPANY
TELEFO TELEFONICA, S.A.
TELNOR TELENOR ASA
TIIMN TELECOM ITALIA SPA
TKA Telekom Austria Aktiengesellschaft
TLIASS TeliaSonera Aktiebolag
TNT TNT N.V.
TOTALN TOTAL SA
TSCO TESCO PLC
UBS UBS AG
ULVR Unilever N.V.
USPA UNICREDIT, SOCIETA PER AZIONI
UU UNITED UTILITIES PLC
VATFAL Vattenfall Aktiebolag
VEOLIA VEOLIA ENVIRONNEMENT
VINCI VINCI
VIVNDI VIVENDI
VLVY Aktiebolaget Volvo
VOD VODAFONE GROUP PUBLIC LIMITED COMPANY
VW VOLKSWAGEN AKTIENGESELLSCHAFT
WOLKLU Wolters Kluwer N.V.
WPPGRP-2005 WPP 2005 LIMITED
XSTR XSTRATA PLC
ZINCO Zurich Insurance Company Ltd

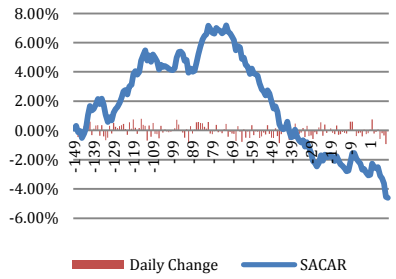
2. Acquisitions

Announce Date	Entity Name	Target	Acquirer Industry Class	Target Industry Class
2010/10/20	BAE SYSTEMS PLC	OASYS Technology LLC	Aerospace & Defence	Aerospace & Defence
2010/10/14	TELECOM ITALIA SPA	Sofora Telecomunicaciones S.A.	Integrated Telecommunication	Integrated Telecommunication
2010/10/05	BNP PARIBAS	BNP Paribas Energy Trading GP	Diversified Banks	Diversified Banks
2010/10/01	Publicis Groupe SA	20:20 MEDIA & 2020Social	Advertising	Advertising
2010/09/30	France Telecom	Elettra TLC S.p.A.	Integrated Telecommunication	Supplier to Telecom
2010/09/24	Siemens Aktiengesellschaft	Republic Intelligent Transportation Services Inc.	Electronic Equipment Manufacturer	Other
2010/09/22	EnBW Energie Baden-Wuerttemberg AG	Prazska energetika a.s.	Electric Utilities	Electric Utilities
2010/08/27	Deutsche Post AG	nugg.ad AG	Air Freight & Logistics	Online Advertising
2010/08/20	Koninklijke Philips Electronics N.V.	Medical Products Corporation	Consumer Electronics	Consumer Products
2010/08/17	Compass Group PLC	§	Restaurants	Restaurants
2010/08/03	Pearson Plc	America's Choice Inc	Publishing	Publishing
2010/08/02	Publicis Groupe SA	AG2	Advertising	Advertising
2010/08/02	Nestle S.A.	Vitaflo International Limited	Packaged Foods & Meats	Healthcare
2010/07/29	Pearson Plc	WSI International, Inc	Publishing	Education
2010/07/29	Koninklijke Philips Electronics N.V.	Shanghai Apex Electronics Technology Co., Ltd.	Consumer Electronics	Consumer Electronics
2010/07/15	CARREFOUR	Hebei Baolongcang Group Co., Ltd.	Hypermarkets & Super	Hypermarkets & Super
2010/07/12	Publicis Groupe SA	G4 Advertising Co. Ltd.	Advertising	Advertising
2010/07/02	Lvmh Moet Hennessy Louis Vuitton	Sack's.com	Apparel, Accessories	Apparel, Accessories
2010/06/30	SANOFI-AVENTIS	TargeGen Inc.	Pharmaceuticals	Pharmaceuticals
2010/06/29	DIAGEO PLC	London Group, LLC	Distillers & Vintners	Distillers & Vintners
2010/06/23	BASF SE	Cognis Holding Luxembourg S.a.r.l.	Diversified Chemicals	Diversified Chemicals
2010/06/09	BANCO SANTANDER, S.A.	Grupo Financiero Santander	Diversified Banks	Diversified Banks
2010/06/08	Compass Group PLC	Southeast Service Corporation	Restaurants	Cleaning
2010/06/07	Zurich Insurance Company Ltd	PT Mayapada Life	Property & Casualty Insurance	Property & Casualty Insurance
2010/06/01	ELECTRICITE DE FRANCE	SPE-Luminus	Electric Utilities	Electric Utilities
2010/05/19	Publicis Groupe SA	Resolute Communications Ltd.	Advertising	Advertising
2010/05/19	Pearson Plc	Melorio plc	Publishing	Education
2010/05/18	BNP PARIBAS	Hill Street Capital LLC	Diversified Banks	Diversified Banks
2010/05/18	BAE SYSTEMS PLC	Atlantic Marine Holding Company	Aerospace & Defence	Shipyard
2010/05/07	GDF SUEZ	Utilicom Group	Gas Utilities	Supplier to Gas
2010/05/05	Compass Group PLC	Caterine Restauration S.A.S	Restaurants	Restaurants
2010/04/29	UBS AG	Link Holding Financeira S.A.	Diversified Banks	
2010/04/29	Publicis Groupe SA	W&K Beijing Advertising Co., Ltd.	Advertising	Advertising
2010/04/27	VIVENDI	GVT (Holding) SA	Multi-Sector Holdings	Telecom
2010/04/13	Centrica PLC	Hillserve Limited	Multi-Utilities	Insular
2010/04/06	Publicis Groupe SA	in-sync Consumer Insight Corp.	Advertising	Advertising
2010/03/29	COMPAGNIE DE SAINT-GOBAIN	MAG	Building Products	Building Products
2010/03/24	Deutsche Telekom AG	Firstgate Holding AG	Integrated Telecommunication	Integrated Telecommunication
2010/03/18	AVIVA PLC	PT Asuransi Winterthur Life Indonesia	Multi-Line Insurance	Multi-Line Insurance
2010/03/04	Commerzbank Aktiengesellschaft	Bank Forum JSC	Diversified Banks	Diversified Banks
2010/02/26	Nestle S.A.	LLC Technocom	Packaged Foods & Meats	Packaged Foods & Meats
2010/02/18	SOCIETE GENERALE	Sogessur	Diversified Banks	Insurance
2010/02/11	Koninklijke Philips Electronics N.V.	Luceplan SpA	Consumer Electronics	Consumer Electronics
2010/02/03	Pearson Plc	Medley Global Advisors LLC	Publishing	
2010/02/02	COMPAGNIE DE SAINT-GOBAIN	SolarWood Technologies S.A	Building Products	Building Products
2009/12/23	TELEFONICA, S.A.	JAJAH Inc.	Integrated Telecommunication	
2009/12/21	SANOFI-AVENTIS	Chattem, Inc.	Pharmaceuticals	Pharmaceuticals
2009/12/10	DANONE	Danone Clover	Packaged Foods & Meats	Packaged Foods & Meats
2009/11/25	TELEFONICA, S.A.	Digital+	Integrated Telecommunication	TV
2009/11/05	TELEFONICA, S.A.	HanseNet Telekommunikation GmbH	Integrated Telecommunication	Integrated Telecommunication
2009/10/30	SANOFI-AVENTIS	Laboratoire Oenobiol SA	Pharmaceuticals	Pharmaceuticals
2009/10/28	Deutsche Bank Aktiengesellschaft	Sal. Oppenheim jr. & Cie. S.C.A.	Diversified Banks	Diversified Banks
2009/10/27	Svenska Cellulosa Aktiebolaget SCA	Algodonera Aconcagua S.A.	Household Products	Household Products
2009/10/19	Pearson Plc	A+RISE	Publishing	Education
2009/10/15	Siemens Aktiengesellschaft	Solel Solar Systems Ltd.	Electronic Equipment Manufacturer	Electronic Equipment Manufacturer
2009/10/01	SANOFI-AVENTIS	Fovea Pharmaceuticals SA	Pharmaceuticals	Pharmaceuticals
2009/10/01	Holcim Ltd	Cemex Australia Holdings Pty. Limited	Construction Materials	Construction Materials
2009/09/03	Publicis Groupe SA	The Womens Forum for the Economy & Society	Advertising	-
2009/08/13	VOLKSWAGEN AKTIENGESELLSCHAFT	Porsche AG	Automobile Manufacture	Automobile Manufacture
2009/08/13	National Bank and Trust Company/The	La Tour du Pin & Cheval Blanc SA		
2009/08/09	Publicis Groupe SA	Razorfish, Inc.	Advertising	Advertising
2009/08/07	Centrica PLC	British Energy Group plc	Multi-Utilities	Multi-Utilities
2009/08/03	Centrica PLC	Newnova Group Ltd	Multi-Utilities	Multi-Utilities
2009/07/30	SANOFI-AVENTIS	Merial Limited	Pharmaceuticals	Pharmaceuticals
2009/07/16	Koninklijke Philips Electronics N.V.	Teletrol Systems Inc.	Consumer Electronics	Consumer Electronics
2009/07/13	Koninklijke KPN N.V.	iBasis, Inc.	Integrated Telecommunication	Integrated Telecommunication
2009/07/07	E.On AG	Societe Conilhac Energies S.A.S.	Industrial Conglomerat	-
2009/07/01	Koninklijke KPN N.V.	Talk &Vision	Integrated Telecommunication	Tech
2009/06/23	Aegon N.V.	BT AEGON	Life & Health Insurance	Life & Health Insurance
2009/06/17	British American Tobacco P.L.C.	PT Bentoel Internasional Investama Tbk	Tobacco	Tobacco
2009/06/16	DIAGEO PLC	Stirrings LLC	Distillers & Vintners	Distillers & Vintners
2009/06/05	TNT N.V.	Mikropakket Nederland BV	Air Freight & Logistics	Air Freight & Logistics
2009/06/01	Centrica PLC	Energy and Building Management Solutions Limited	Multi-Utilities	Multi-Utilities
2009/05/25	Koninklijke Philips Electronics N.V.	Saeco International Group S.p.A.	Consumer Electronics	Consumer Electronics
2009/05/20	Publicis Groupe SA	Publicis MARC Group	Advertising	Advertising
2009/05/19	Daimler AG	Tesla Motors Inc	Automobile Manufacture	Automobile Manufacture
2009/05/15	Lvmh Moet Hennessy Louis Vuitton	Edun Apparel Ltd	Apparel, Accessories	Apparel, Accessories
2009/05/12	BNP PARIBAS	Fortis Bank	Diversified Banks	Diversified Banks
2009/05/04	Koninklijke Philips Electronics N.V.	Traxtal Inc	Consumer Electronics	Consumer Electronics
2009/04/30	TOTAL SA	Gevo	Integrated Oil & Gas	Integrated Oil & Gas
2009/04/28	TNT N.V.	Espresso Aracatuba Transportes e Logistica S.A.	Air Freight & Logistics	Air Freight & Logistics
2009/04/16	Gas Natural SDG, S.A.	Union Fenosa S.A.	Gas Utilities	Gas Utilities
2009/04/15	SANOFI-AVENTIS	BiPar Sciences Inc	Pharmaceuticals	Pharmaceuticals
2009/04/09	SANOFI-AVENTIS	Medley SA	Pharmaceuticals	Pharmaceuticals
2009/04/09	Pearson Plc	Intellipro, Inc. & National Transcript Center	Publishing	Education
2009/04/07	Reed Elsevier Plc	Professional Development Software, Inc	Publishing	Education
2009/04/07	Publicis Groupe SA	Nemos GmbH	Advertising	Advertising
2009/04/01	Siemens Aktiengesellschaft	Elan Software Systems SA	Electronic Equipment Manufacturer	Electronic Equipment Manufacturer
2009/04/01	Koninklijke Philips Electronics N.V.	Selecon North America LLC & Selecon New Zealand Limited & Selecon UK Limited & Aureol Lighting Limited	Consumer Electronics	Consumer Electronics
2009/04/01	Centrica PLC	Econergy Ltd	Multi-Utilities	Multi-Utilities
2009/03/25	Koninklijke Philips Electronics N.V.	Dynalite Inc	Consumer Electronics	Consumer Electronics
2009/03/16	TNT N.V.	LIT Cargo	Air Freight & Logistics	Air Freight & Logistics
2009/03/12	BAE SYSTEMS PLC	Advanced Ceramic Research, Inc.	Aerospace & Defence	Aerospace & Defence

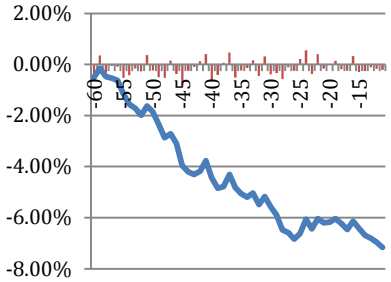
3. Graphs

3.1 All Acquisition Announcements

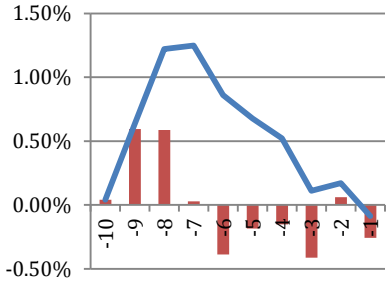
t=-150 – t=10



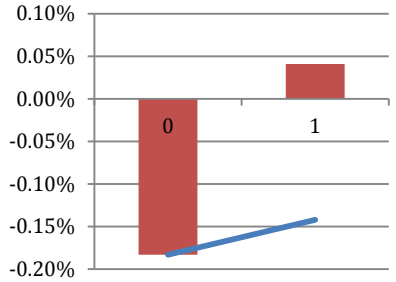
t=-60 – t=-11



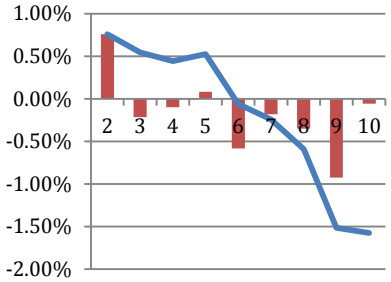
t=-10 – t=-1



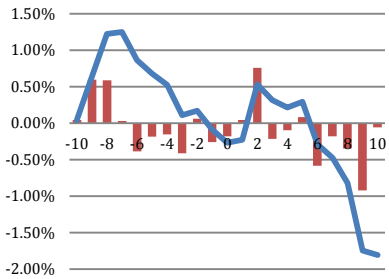
t=0 – t=1



t=2 – t=10

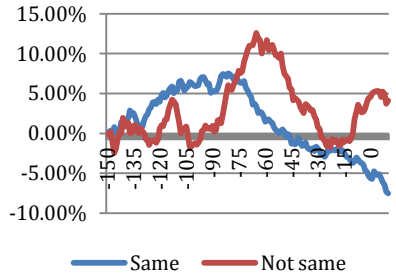


t=-10 – t=10

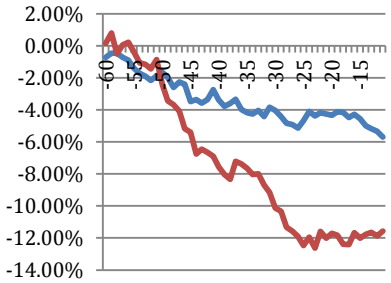


3.2 Same

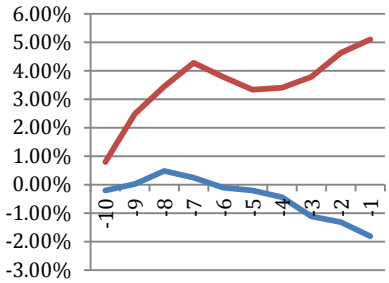
t=-150 – t=10



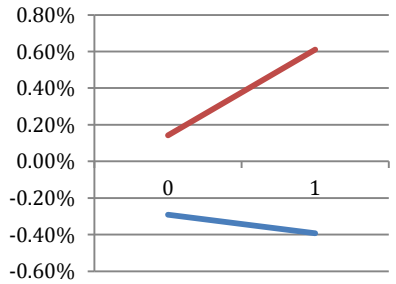
t=-60 – t=-11



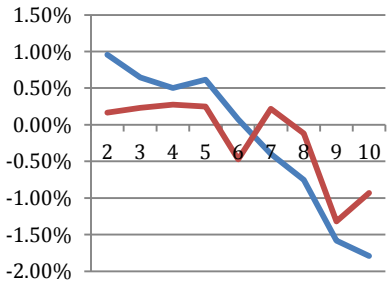
t=-10 – t=-1



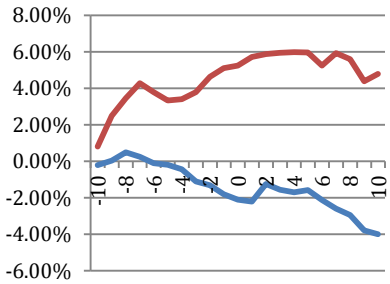
t=0 – t=1



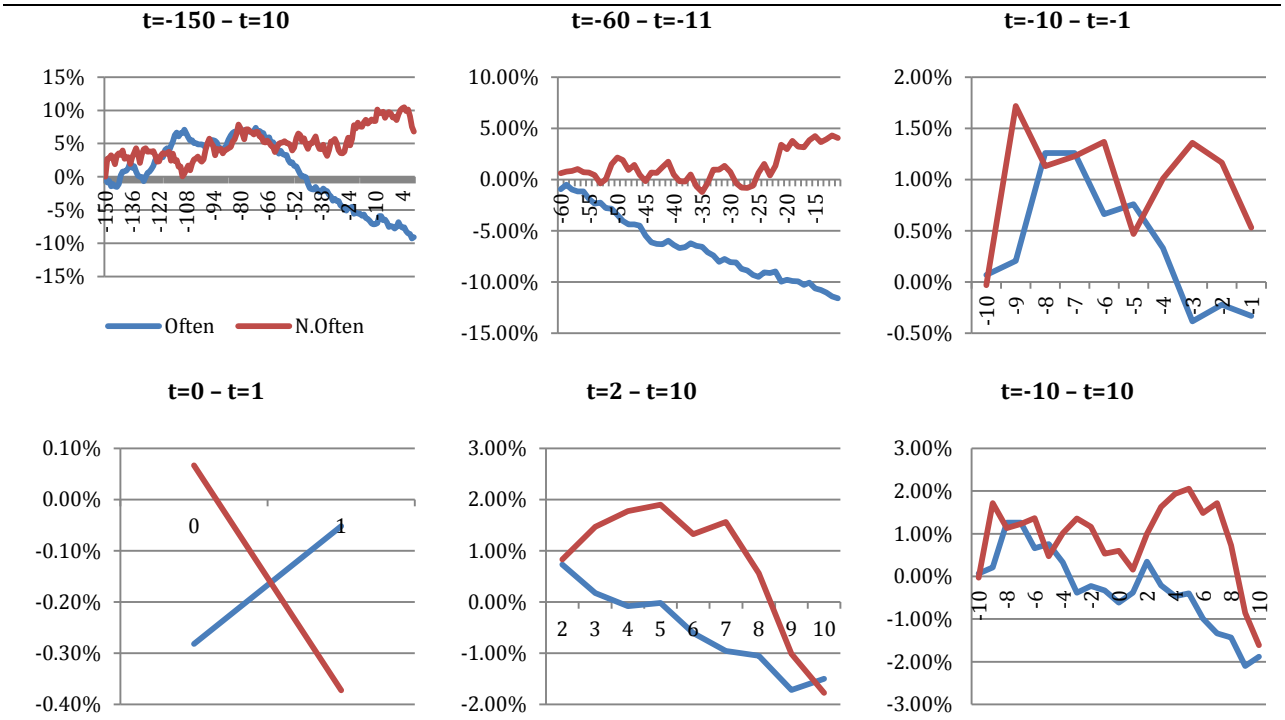
t=2 – t=10



t=-10 – t=10



3.3 Often



3.4 BRIC