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International conflict's impact on the stock market

A GDELT project-based event study

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ABSTRACT

This research is an attempt to statistically demonstrate this phenomenon that there is a relation between the stock market and international conflicts and, moreover, that this effect is negative. For this the GDELT project database, an entirely new and innovative dataset, on international events is used. This thesis uses an event study methodology with which the abnormal stock market returns are calculated for the different events. Evidence is found in favour of a negative stock market reaction around the time of the international conflict. The media plays a large role in this giving high-attention events a more negative stock market reaction. The severity of the events plays a role but only for a larger period after the event. Religious events also have a tendency to give a larger negative stock market reaction.

Keywords:

GDELT, International conflicts, Stock market

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1 Introduction

"Turkish lira plunges as Trump takes tariff action", the headline of the Financial Times August 11th 2018 (Yackley and Sevastopulo; 2018). The world is in a place during which tensions on the international level are higher as ever. Not only Trump with all his measures to "make America great again" (for one example see the article above), but an upcoming exit of Great-Britain out of the European Union as well as continued restlessness in the Syria region. During times as these the real economy suffers hard (see for an example again the article mentioned above). International conflicts are often at the basis of times of economic crisis in a country. The financial system is currently the backbone that keeps society driving, are these systems capable of surviving the lurking potential crises?

This research is an attempt to statistically demonstrate this phenomenon that there is a relation between the stock market and international conflicts and, moreover, that this effect is negative. Following the efficient market hypothesis as set forth in the paper of Fama (1970) stocks should be a reflection of all available information. Given that international conflicts are usually followed by times of despair, causing a negative effect on the real economy of the country, it is highly likely that this should lead to times of crisis on the stock market as well. This reasoning is on the basis of the research question that is central in this research and is formulated as follows:

'Is there a negative reaction on the stock market for the target country of an international conflict?'

This research will give an insight on how stock markets react to bad news, which is not new, at all. A lot of research has been done on the matter of stock market reactions to different types of events. This research, however, is one of the very little that focuses on big international conflicts and is one of the first that tries to prove this reaction on stock markets of over 40 different countries. Besides this, an entirely new and innovative dataset from the people at the GDELT project is used which for the entire dataset has over 87 million records of international events for period between the 1st of January 1970 and the 17th of February 2014.

With this dataset this research is capable of distinguishing between the different events that are included in the research. One of the variables included in the data measures the amount of articles mentioning the events. With this the degree of media-attention the event received can be assigned to the research. Furthermore, the dataset includes the Goldstein scale with which the degree of severity can be assigned to the event. Besides this, one of the codes in the data tells if the conflict is based on a religion and what religion. To add to this the paper of Chen and Siems (2004), that stock markets nowadays are more intertwined and that therefore the reaction of recent events should be higher compared to those that happened at an earlier date, is investigated.

This thesis will make use of an event study methodology with which the abnormal stock market returns are calculated for the different events. In order to come to this abnormal return, first the normal return has to be approximated. This is done by means of the widely known market model in which the benchmark return (in this case the world market index) is followed during an estimation period well before the actual event date. Then different event periods are determined in order to construct the cumulative abnormal return (or the sum of the abnormal returns during the predetermined event period). Four different types of event periods are chosen to give a clear overview on how the market reacts.

Using this method this thesis finds evidence in favour of a negative stock market reaction around the time of the international conflict. It is found that the media plays a large role in this as events that are mentioned in the news a lot give a more negative stock market reaction. The severity of the events plays a role but only for a larger period after the event. Religious events also have a tendency to give a larger negative stock market reaction.

With this research the basis is created upon which further research can evolve. The macroeconomic variables used for this thesis were not optimal and more research should be done on this. As it is an ever developing line in the current literature on what (in this case, macroeconomic) variables affect the stock market return, the model that is created in this research is created so to the best knowledge, but can always be improved.

This paper thus uses the event study methodology to see if international conflicts have an effect on the stock market and, if so, what the direction of this effect is. The thesis is constructed as follows. Chapter two gives an overview of the existing literature, chapter three is about the data used for the research, chapter four gives an overview of the different methods, chapter five gives the results and in chapter six the conclusion is given.

2 Literature review and hypotheses

2.1 Efficient market hypothesis

According to the Efficient Market Hypothesis (EMH) constructed by Fama (1970), stock market returns are expected to reflect all available information there is in the market. According to the theory, changes in the stock return are due to changes in the information about this stock return and its underlying factors. The underlying thought of this is that in a market all capital is optimally allocated between the different parties in the market and that all capital that is tradable in the market is perfectly allocated between the different parties in the market. Concerning the subject treated in this paper, it is thus expected that the new information that is brought along with these international conflicts have an effect on the stock market return. Since the stock return should reflect all available information, the new information that comes along with international conflicts should be translated into changes in the stock market. Based on the reasoning given by the EMH that, in efficient markets, stock prices should be a reflection of all available information the following hypothesis is constructed:

H1: International conflicts have a significant negative effect on the stock market return of the target country.

2.2 Modelling stock returns

It has been, and still is, one of the biggest sources of discussion for economic papers, the model to capture the stock return. One of the first models that tried and capture this stock return was developed by Sharpe (1964) and is called the capital asset pricing model (or short CAPM). The model of Sharpe tries to capture one of the biggest problems that troubled previous attempts to predict the behaviour of the capital market, namely how to deal with risk.

In their paper, Fama and French (1993) first set forth the relation between changes in the degree of risk and changes in the stock market returns. They used the book-to-market ratio as an indication for the degree of risk in the stock market return. The reasoning followed in this paper was that when the risk on stocks increases, investors want to have a higher premium on their returns because they want to be rewarded for the risk they take. Investors select their portfolios based on their preferred exposition to this risk. There is then no

anomaly with respect to the EMH, as the swifts in the stock market return are explained by a higher availability of information on the degree of risk of the stock (Van der Sar, 2015).

Fama and French (1992) paper will be discussed. They assign the value premium on stocks to a high degree of risk. Their reasoning is that the market does not misprice stocks, and thus value stocks are assumed to be priced correctly. They assign the value premium of stocks to a subsequently high degree of risk, that is not captured by CAPM. In this paper they explained that not the market beta, but the book-to-market ratio and the market value of equity, capture the stock price variation of stock returns.

Chen, Roll and Ross (1986) compiled a set of macroeconomic variables that are expected to have an effect on the stock market returns. The set of variables consists of the inflation rate, the treasury-bill rate, the long-term government bonds, industrial production, low-grade bonds, equally weighted equities, value-weighted equities, consumption and oil price. They find that the industrial production, changes in risk premium, twists in the yield curve significantly explain the expected stock market returns. During periods in which these variables were highly volatile it was found that the measures of unanticipated inflation and changes in expected inflation were more weakly significant. In the end they find five systematic factors that have an effect on the stock market return. First there is the unexpected inflation rate, second the expected inflation rate, third the yield curve, fourth a (default) risk premium, and finally they found that changes in the growth rate of industrial production has an effect on the stock market return.

Shanken and Weinstein (2006) test the five factors compiled by Chen, Roll and Ross (1986) that are expected to affect stock market returns. These factors are the percentage change in industrial production, the change in expected inflation, the contemporaneous unanticipated inflation, the excess return of low grade corporate bonds over long-term government bonds and the excess return of long-term government bonds over T-bills. They find that there is a significance in the variable of industrial production. However, for the other factors they don't find significant results. This has to do with the fact that, other than Chen, Roll and Ross (1986), they looked at the post-ranking returns instead of the backward-looking returns.

2.3 The role of media attention on the stock market

It has been widely investigated what influence the media has on the stock market (see, e.g. Antweiler and Frank (2004)). Though it is beyond the scope of this paper to extensively set forth the previous literature on this topic, it is important, given the research question of the paper, to at least briefly stipulate that the media does play a role on the stock market. This is explained by use of the paper by Tetlock (2007). The author of this paper shows that a lot of pessimism in the media leads to a downward pressure on the prices on the stock market. A few days after these news messages, the stock prices are reversed to get back to their initial values. It is also showed that the price impact is especially large on the small stocks and it takes longer for the small stocks to get back to their initial value. It has to be noted that this paper uses news articles of the Wall Street Journal that tell whether the stock price has gone up or down. But this paper does show that media attention, and especially bad news, has an effect on the stock price. Based on this paper the following hypothesis is constructed:

H2: International conflicts that receive a lot of media-attention have a larger negative effect on the stock market compared to events that receive little attention.

2.4 International conflicts and the stock market

It is difficult to give assign values to the different international conflicts. In one paper by Goldstein (1992) **that is already mentioned briefly in the introduction** this is done. On the basis of his event coding is the World Events Interaction Survey (WEIS) data set that was constructed by McClelland, et al. (1971). The way the WEIS event dataset is put together is within a conceptual framework that does not allow for the possibility to reduce the data to one dimension of conflict-cooperation. It is considered to be more a “categorical” than a “scaled” dataset. However, researches still prefer to use the “categorical” WEIS dataset over “scaled” datasets like the COPDAB dataset (Azar, 1980) because WEIS is the only one that include data from the 1980s (COPDAB stops in the year 1978 for example). Therefore, the way the WEIS dataset can be weighted for aggregation is important, and the paper of Goldstein (1992) found a way to do so. The weights start at -10 being a military attack, clash or assault, and end at 8.3 being and extend in military assistance.

In an early paper written by Rietz (1988), the author attempts to solve the equity premium puzzle by adding a rare disaster risk factor. His reasoning is that allowing for a rare disaster probability explains a lot of puzzles about asset returns. This paper is a reaction to the Mehra and Prescott (1985) paper in which the equity premium puzzle was first introduced. In this they created an Arrow-Debreu asset pricing model, based on the model for the equity premium by Lucas (1978), but rejected it because it was not able to explain high enough risk premia, and thus was not able to solve the puzzle. Rietz uses the same model, only specifying the model making it able to capture the effects of possible, but unlikely, crashes. He shows that after this the model is able to explain both high risk premia and low risk-free returns.

Based on this model, Barro (2006) writes a paper explaining the asset pricing puzzle through rare economic disasters. After his publication, the work of Rietz (1988) received a lot of criticism. The major reason for this criticism is the size of the economic disasters and that the model is based for a great deal on counterfactual probabilities. Therefore, Barro focuses in his paper on proving this criticism wrong, by extending the model of Rietz (1988) with parameters for disaster size and disaster probability. Barro builds its research around three principal events, namely: World War I, the Great Depression and World War II. For these three events he uses the contractions in the GDP (gross domestic product). He finds that the results for the model including parameters for disaster size and probability hold for i.i.d. shocks to productivity growth in a Lucas-tree type economy and also after including capital formations to this.

Amihud and Wohl (2004) investigated the effect of the capturing of Sadam Hussein and with that a faster ending of the war. The study is based on a platform for online betting that promised a $10 if Sasam Hussein was out of power. Prices were quoted in integers between 0 and 100 (100 meaning $10). They called these integers “Sadam contracts” and used it as a measure for the probability that Sadam Hussein was captured. They assign two meanings to these contracts one before and one after an outbreak of the war. For the pre-war measure, a rise in the contract prices could then have mixed meanings. On the one hand it could mean the starting of a costly war which would have a negative effect on the economy. On the other hand, the increase could mean a faster capture of Sadam Hussein and consequently lower risk of future terror attacks, and this would induce positive economic effects. Conditional that there is an outbreak of the war, a rise in the price of a “Sadam contract” would mean a faster conclusion of the war and this would in turn bring along positive economic effects. It is found that a rise in the pre-war rise in the contract lowers the

stock price, while a rise in the contract after an outbreak of a war means positive effects on stock prices as well as an improved position of the dollar against the euro.

Schneider and Troeger (2006) found that the international market reacts more negatively than positively to international conflicts, however with this they also found the existence of "war rallies" on the stock market. Prominent in their paper is the view of commercial liberalism. This view says that international markets are sensitive to international conflicts and that the international agents on these markets dislike war because of its threat towards international exchanges. According to this theory it is thus expected that the values on the stock market decrease. This paper takes the "war rallies" into account in this theory, saying that the markets contain economic agents looking to exploit these types of events. They looked at three different war events. First, they looked at the confrontation between Iraq and the United Nations and some of the member states after the invasion of Kuwait. Second, they took the conflict between Israel and the Palestinians and third the civil wars in Ex-Yugoslavia. This research relied on the Goldstein index for the indication of the conflict, whether it concerns a conflictive or a cooperative conflict. Their statistical tests showed that the stock market generally does not react to the ups and downs in these three conflicts. Moreover, the Gulf War even provides some statistical evidence for the argument of a positive reaction to conflicts in the short term. This is because of these "war rallies", that the stock market is more predictable for traders in times of crisis. Their findings are in line with the commercial liberalism theory, finding that the stock market reactions were often negative. However, they also found that with some events traders rallied the market suggesting that "even in an increasingly integrated world economy, not all international crises affect the stock markets in the same way."

Berkman, Jacobsen and Lee (2011) write in their paper about the effect of rare disaster risk on the mean and volatility of world stock markets. They give empirical support to the existing literature that theoretical models are able to capture this time-varying rare disaster risk. For this they use a large sample of potential crises, instead of only looking at actual rare disasters. The database they use, is the ICB (International Crisis Behaviour project) database. From this database they are able to create a "Crisis" variable, that showed the total number of crises in a certain month. For their model construction they use the Fama and French three factor model, adding their crisis index. An interesting extension of this model is the addition of an "unexpected disaster risk"-factor complementary to only the "expected disaster risk"-factor. Their results show that the three factors of Fama and French are insignificant, but the

constructed crisis coefficient is significant and negative, excepts for the crises involving major powers and protracted crises. They conclude that this shows that there is a negative relation between crises and stock market prices and that the volatility of the stock prices increases when the crises are more severe. Based on this paper, which gives evidence that there is a relation between the severity of a crisis and the volatility of stock prices and, moreover, finds the relation between crises and stock prices to be negative, the following hypothesis is constructed:

H3: The more severe an international conflict is, the higher the effect of this event is on the stock market price

In the paper written by Chen, Lu and Yang (2017) the effect of international conflicts on the stock market returns is measured. This paper differs from that of Berkman, Jacobsen and Lee (2011) in that Berkman, Jacobsen and Lee focus on the ex post consequence of crises, while this paper looks at the continuously evolving tension among countries. Their measure for international conflicts is reflected by the growth of the global military expenditure to GDP ratio. They look at this rather than actual events, as this measure also captures conflicts that "did not actually happen." Investors might have been disordered by this and have affected macroeconomic performance. It is thus assumed that the actual conflicts (of wars) may not be a good indicator for international instability. They then conducted stock market returns of 44 countries. After this a GMM estimation is implemented. With this it is found that there is a significantly negative relation with the variable for international instability risk and the excess return. Moreover, the authors test whether their proxy for international instability has an effect on the stock market volatility. They find that there is a positive and significant relation between international conflicts and the level of stock market volatility.

In another paper, written by Brune, Hens, Rieger and Wang (2014), it is investigated what the impact is of large military conflicts since World War II on the stock market. The focus here lied on actual wars. So in order to investigate their research question they looked at events that disordered international political stability individually to see how it affected the stock market price of the S&P 500. It is found that stock prices have the tendency to fall when

there is an increase in the probability of a war and have the tendency to rise if the probability of a peaceful settlement increases. They call this the war puzzle.

Chen and Siems (2004) looked at the effect of terrorist attacks on the global capital market. For their data they used 14 terrorist/military attacks using as their earliest event the 1915 torpedo attack on the luxury ocean liner 'Lusitania' and as their latest the September 11, 2001 terrorist attack on the World Trade Centre in New York. For these 14 events they looked at the abnormal returns and the cumulative abnormal returns for the 6 and 11-day period following the day of the event. 6 of the 14 events had a significant negative abnormal return on the 1% level, one event had a negative abnormal return significant on the 5% level. For the cumulative abnormal returns, they found less significant results. So, they found some significance, but the results were not all unambiguously. Two events this paper focused on in particular were the market's response to the September 11th terrorist attack and to Iraq's invasion into Kuwait. This is because Arshanapalli and Doukas (1993) and Hameo, et al. (1990) showed in their papers that the global capital markets nowadays are extremely intertwined, due to the fact that in this information age news spreads very rapidly around the world. For the 9/11 terrorist attack the authors found for all 33 countries they looked at significant negative abnormal returns. The other event, the invasion of Iraq into Kuwait, resulted in significant negative abnormal returns for 14 of the 18 countries. This paper thus also shows results that lean towards an intertwined global capital market. Based on this paper the following hypothesis is constructed:

H4: The price reaction on the stock market is stronger for international conflicts that took place in more recent years in comparison to those that took place in earlier years.

Karolyi and Martell (2010) looked at the stock price impact of terrorist attacks. They looked at the price effect on the stock market of 75 different terrorist attacks, focusing on the short term price reaction. Their paper differs from papers such as that of Hon, Strauss and Yong (2003), Burch, Emery and Fuerst (2003) or Poteshman (2006) as these focused on one event while this paper takes into account multiple events. The second reason that their paper stands out is that they focus on the stock price reaction of individual firms rather than looking at the effect on a national market index (like the paper of Chen and Siems (2004)). For their research they first conducted a standard event study as constructed by Brown and Warner

(1985) in which they estimated the abnormal returns. For this they found an average negative abnormal return of -0.88% which is significant at the 1% level for the first day after the event. After this they created regression functions to be able to control for different variables. Some of these regressions had a dummy variable called 'kidnapping' (taking the value 1 if the terrorist attack includes the kidnapping of people and 0 if not). This variable was based on the paper from Johnson, et al. (1985) that there was a significant price reaction to the sudden death of executives. Interestingly Karolyi and Martell found a stronger negative price reaction when the terrorist attack included the kidnapping of an executive.

In a paper written by Kollias, Papadamou and Stagiannis (2011) the effects of two terrorist attacks (namely the bomb attacks in Madrid at 11th of March 2004 and in London on 7th of July 2005) on the capital market is investigated. To investigate this, they use an event study methodology as well as an EGARCH analysis approach. First, they look at the effect of the bomb attack in Madrid on the Spanish stock market. Spain has four stock market exchanges, that from Barcelona, Valencia, Madrid and the Bilbao stock exchange. All these are implemented in the research. After this the effect of the London bomb attack on the London Stock Exchange is measured. It is found that both events show similar effects on the day of the event. However, when it comes to the recovery of the event significantly different results were found in terms of days needed to recovery, with the London Stock Exchange only needing one day. For both the events they find negative returns on the day of the event. Both the Madrid and London bombing were terrorist attacks which were based on a religion. Although this paper does not give a comparison between religious and non-religious events, it does give evidence that two religious events had a significant negative impact on the stock market. It is assumed that, by the example of the two terrorist attacks above, when religion is based on an international conflict the impact from such an event is heavier on society compared to non-religious conflicts. It is reasoned that this is because people are capable of more extreme events through an ideology (in this case religion). Based on this the following hypothesis is constructed:

H5: Religious-based international conflicts tend to have a larger, negative impact on the stock market.

3 Data

3.1 Data on international events: the GDELT Project

3.1.1 The GDELT Project

Because the dataset used in this research is an alternative one to the ones that have already been used in previous research, and because the dataset is very extensive, this section will explain the dataset as thoroughly as possible. As mentioned before in the introduction, this research uses the GDELT project data for international events. The GDELT project is a free and open database that is the largest and most complete in the world. In 2015 alone there have been 750 million observations on emotional snapshots and over 1,5 trillion location references. Its complete archives store data for more than 215 years. The dataset used for this research has a timespan from 1970 to 2014 with in total more than 87 million observations. The dataset consists of events of countries ranging from as little as two countries just talking to each other to extreme events as "unconventional mass violence" (Leetaru & Schrodt, 2013).

The use of political event data for event studies has been very popular throughout the years. The collection of these events first was done mainly done manually and now mainly has been automated by machines. The first real efforts made to quantify political events had been done by Azar (Azar, 1980) with his COPDAB events and the WEIS coded events constructed by McClelland (McClelland, 1976). However, because these coding efforts were done by humans they were very costly in the 1980s the funding of this type of data coding ended. It was not until the 1990s when event data coding arose again, but this time with automated event coding systems. At that time there were two of these automated coding systems, the KEDS (Gerner et al., 1994; Schrodt and Gerner, 1994) and the VRA-reader (King and Lowe, 2003). In the 2000s two new event coding types were developed, especially designed for these automated coding systems, the IDEA by Bond et al. (2003) and CAMEO by Gerner, et al. (2009), the latter is more extensively explained below, as it is constituent of the GDELT project dataset as well. the mid-2000s almost all articles used data that has been coded by machines rather than by humans. The GDELT project also is a database based on machine coding technology. Despite this shift to machine-coded event data, the amount of money that was reserved for these types of databases remained relatively small.

The first real large scale event database only dates back to 2010 and is called the Integrated Conflict Early Warning System project (ICEWS). Like the databases before, this database uses CAMEO-codes to enable for numerical values in political data. But because this ICEWS project received a $37-million funding from the U.S. Defence Advanced Research Projects Agency they were able to become the first large-scale machine-coded event database, with 6.5 million collected news stories for the period 1998-2996. (O'Brien, 2010). Although it was suggested that the ICEWS event database was going to be available for the use of the general public, it soon disappeared behind classified walls and it is to date only available for the U.S. government.

That is up until the new GDELT project database. Because of the combination of both the availability of news text on the worldwide web and the open source efforts at coding software and dictionary development due to funds of the NSF, the GDELT project was able to produce the global event database, without any large-scale financial backing. The achievements of this project are quite impressive in comparison to previous attempts: more than 200-million events, global coverage and a period ranging 1979 to present. They use the open-source TABARI system to code events that are retrieved from all sorts of international news reports (Leetaru & Schrodt, 2013).

The TABARI system was introduced in 2009 by Schrodt (Schrodt, 2009). The system was primarily being used by the abovementioned WEIS (McClelland, 1976) and CAMEO event coding system (Gerner, et al., 1994). In his introduction of the paper in which he presents TABARI he gives two advantages on machine-coded data systems in comparison to human coding. The first is about the speed, with machines the coding is done more quickly. Second there's the advantage of the consistency of machines over humans. The TABARI system uses three types of information from the news reports in its pattern of recognition. First, there are the *Actors*. These are proper nouns that are used in identifying the political actors in the news reports that the system recognizes. Second, there are the *Verbs*. This is what the system recognizes as the most important part of the sentence, in distinguishing the different event categories on the basis of the actions one actor takes towards another. Third, there are the *Phrases*. These are used to distinguish between different meanings of the verb, so (to give the example in the paper) "promised to send troops" versus "promised to consider proposal." Here "promised" is the *Verb* and tells something about the action of one *Actor* to the other, "to send troops" or "to consider proposal" would then be the *Phrase* and gives

information on the meaning. Moreover, it will also give information on the location of the source and the target.

The easiness with which the GDELT database can be used for event studies is mainly thanks to this TABARI system. The GDELT project database improved the TABARI so that it automatically gathers codes from different combinations of named actors and generic agents. To get an impression of how this works the following example: when "Philippine soldiers" do something, this would automatically generate the code "PHILMIL". Or if the "Philippine Secretary of Agriculture" acted on something, it would generate "PHILGOV." This helps enormously in interpreting the results of this research.

3.1.2 Data on international conflicts: the variables of the GDELT project

The previous section gave an overview on where the GDELT project finds its basis and how it is constructed. This section will be focusing more on what data is included in the GDELT database and what is used for this research. First of all, the period for which the GDELT project has data available ranges from the 1st of January 1970 to the 17th of February 2014. As briefly mentioned above the dataset includes different *Actors* that can either serve as an actor or as a target, meaning either the initiator of an event or the receiver. As mentioned in the introduction and the research question, this thesis focuses on the receiving end of a conflict, and will thus exclude the source variable of the database. The data also includes actors that are not countries, when a news article doesn't mention a country, only the government for instance. As stock data related to countries is added later, data on events that do not mention countries is not workable in this case. Therefore, these data are also excluded from the dataset so that only data are left with countries that are the target (at the receiving end) of an event.

As can be seen from the introduction and the research question, this thesis is a research of the impact of international *conflicts* on the stock market. This means that only data should be included that has a degree of hostility in it or, in other words, events that theoretically should have a negative impact on the country. One of the variables in the GDELT database is the Goldstein scale, or the 'Conflict-Cooperation' scale as it was introduced in the paper of Goldstein (1992). This scale measures the theoretical intensity of an international event. The scale ranges from 10 to -10 and in this the highest/lowest values have, theoretically speaking, the highest impact. In his research Goldstein uses 61 events from

the WEIS dataset, which has already been mentioned earlier. To make this rating more visual: the event rated as most conflictual (the minus 10 rating) is a military attack and the event rated as most cooperative (the plus 10 rating) is extending military assistance. The other ratings of the Goldstein scale can be found in Appendix 1. Goldstein also included a standard deviation about the agreement of panellists, which showed that they were less unanimous for event types in the middle area compared to both ends of the scale. It also showed that there was less agreement for mildly cooperative events compared to mildly conflictual ones (a phenomenon which has already been showed by Azar and Havener (1976) and by Beer, et al. (1990)). The GDELT project thus has data with Goldstein indices from minus 10 up to and including plus 10. The Goldstein scale helps grading events for its intensity. As the intention of this research paper is to look at the impact of international conflicts it is reasoned that there should be a certain amount of intensity within the event. Therefore, only the events with a Goldstein score ranging from -8 to -10 are included in the dataset and the rest is left out. Since the dataset is so extensive, the amount of the remaining values still suffices in order to give a sound conclusion in the end.

So the Goldstein scale indicates the severity of the event, as we're looking for a stock market reaction and following the reasoning of EMH that stocks are a reflection of all available information, it is important to include the degree of attention from the general public for these events, otherwise no stock reaction would be seen. The GDELT dataset has a variable that shows the amount of articles that mention the event. This variable is used as a measurement of the degree of attention that the event received from the public. The events that were mentioned in at least 100 articles are kept, the rest is left out as they did not receive enough attention from the public and no stock market reaction is expected from these events. An amount of 100 articles may seem large at first, but it is not that much, taking the amount of news articles on which the GDELT dataset has based its data into account.

One of the variables included in the dataset is that of the number of events. This variable shows how many events can be linked to this one event. This variable indicates the amount of events for a country on a certain day tells something about the impact of the event, it gives an indication about the force of the conflict. So this variable is important in the way that it gives an indication of the weight of the event, rather than the significance (like with the number of articles) or the theoretical impact (as with the Goldstein index).

Regarding the integers concerning the international conflicts there are a couple of variables that are important for this research. One of the main variables of the dataset is the

CAMEO code. CAMEO stands for the Conflict and Mediation Event Observations, this is a way in which observations concerning conflicts between countries are coded. Different values are given to different types of conflicts. To give an example, the CAMEO code 013 is given when a country gives an optimistic comment, or a CAMEO code of 141 when there is a demonstration or rally in the country. The CAMEO codes are divided in different groups; 1: Make a public statement, 2: Appeal, 3: Express intent to cooperate, 4: Consult, 5: Engage in diplomatic cooperation, 6: Engage in material cooperation, 7: Provide aid, 8: Yield, 9: Investigate, 10: Demand, 11: Disapprove, 12: Reject, 13: Threaten, 14: Protest, 15: Exhibit military exposure, 16: Reduce relations, 17: Coerce, 18: Assault, 19: Fight, 20: Engage in unconventional mass violence. As is seen the different types of events go from a small impact on society (making a statement) to, in the end, a very big impact (mass violence) (Leetaru & Schrodt, 2013). This information that the CAMEO codes give is not used to restrict the dataset to the desired specifications for this research. It is rather used for interpretation in the end to show how the different types of events make the stock market react.

In order to answer the hypothesis to see if the stock markets nowadays are intertwined, a variable has to be created to indicate if an international conflict is regarded as 'recent.' After restricting the data as indicated above on the Goldstein scale, the number of articles written on the event and the number of events happening at once, not a lot of data for the early days remained. It has to be said that the data for these days already was scarce, even without concerning the restrictions above. It is highly likely that this is due to the fact that nowadays the access to all sorts of news reports is easier compared to the 1980's at which these data start. For this thesis it is therefore chosen to regard the top 25% of the events as 'recent.' This way the results of the analyses coming forth of this are set off against a proper benchmark. This means that regarding the date, events later than the 5th of June 2012 are regarded as 'recent.'

For the final hypothesis to see if religion has any effect on the impact of international conflicts on the stock market, a variable for this has to be constructed. In their coding the GDELT project included an indication if any religion was involved with the conflict, and if so, which one. The list of all the different religions that are included in this thesis can be found in Appendix 2. This thesis does not make any distinction between the different religions and is solely curious to see if any effect exists, and if so what this effect is. Therefore, the variable for religion is constructed as a dummy-variable that takes the value one if any religion is involved and the value zero if not.

3.2 Data on stock market returns and including GDELT events

3.2.1 MSCI Stock market data

In order to investigate the effect of international conflicts on the stock market, it is necessary to have data on the stock market. For this the MSCI All composite country list in local currency is used. The MSCI data has been retrieved from the Thomson Reuters Datastream financial time series database. Concerning the MSCI market indices, the advantage of using these indices is that it has no gaps or overlaps. Also it provides a mixture of both developed and emerging markets. The country specific indices are constructed by companies from that country that have a market capitalisation that represents approximately 85% of the market. On their website they give three main benefits of the MSCI index. First, it uses a maintenance methodology which causes it to be a constant index but which is able to quickly adjust if necessary. The second reason is that it uses a Global Industry Classification Standard (GICS) framework to classify stocks. This covers a comprehensive set of stocks that are segmented in style and size, without this causing any overlap. Their third reason, and the main reason for using the index in this paper, is that the methodology for coming up with the indices is consistent across the different markets. By using an index that is constructed across countries in the same, consistent way, there is no noise between the different stock indices, as MSCI has the means to make sure for this, that there is no overlap between stock price indices.

MSCI constructs the price indices in such a way that they each capture the market capitalization weighted return. The formula used for this uses the index level of the previous period multiplied by the change in the market performance, or in formula:

(1) $$PriceIndexLevelLocal_t = PriceIndexLevelLocal_{t-1} * \frac{IndexAdjustedMarketCapForLocal_t}{IndexInitialMarketCapUSD_t}$$

In this $PriceIndexLevelLocal_t$ stands for the price level index at time t in local currency, $PriceIndexLevelLocal_{t-1}$ stands for the price level at time t-1 in local currency, $IndexAdjustedMarketCapForLocal_t$ for the adjusted market capitalization in USD which is converted using the FX rate of time t-1 and which is used for the local currency index at time t and $IndexInitialMarketCapUSD_t$ is the initial market capitalization of the index in USD at time t.

Concerning the data, the period for which most countries had available data spanned from the 31st of December 1987 to today. Already one can see that this conflicts with the GDELT data, how this is dealt with can be read below. The MSCI data had stock price indices. To assure consistency throughout the entire dataset, this thesis decided to use stock return changes rather than the stock prices given by MSCI stock market data, done by calculating the daily growth rate for the stock prices. For this the log return is calculated following the formula given in the paper of Ding, Engle and Granger (1993). It is the logarithmic price difference of stocks at time t in comparison to time t-1, or in formula:

(2) $$R_t = \ln(P_t) - \ln(P_{t-1})$$

In this R_t stands for the stock return at time t, $\ln(P_t)$ stands for the natural logarithm of the stock price at time t and $\ln(P_{t-1})$ stands for the natural logarithm of the stock price at time t-1.

3.2.2 Combining the GDELT with the stock market data

The MSCI data only includes trading days, this meant that some international conflicts occurred during the weekends or during holidays, days on which the market was closed. For this research it is decided to focus on the direct effect of international conflicts on the stock market. Therefore, the events that occurred on non-trading days are left out of the eventual dataset.

To organize the data so that the two datasets (for events and for stock prices) could be combined, the different countries had to be given codes. By coding the countries, the transition of two datasets to one happens more sound. The different codes for the countries can be found in Appendix 3, this is an overview from all the 44 countries that are included in the dataset and with which is worked with. The GDELT data had way more countries for which there were international events. As one could imagine, the data for the stock market of a country like, for example, Kenya is limited or, in this case, non-existent. This meant that on the basis of countries for which stock market data was available, a lot of event data was lost. The amount of countries that remained was 44 and for this was a very acceptable amount of events still available. Still, for a couple of the countries that remained some stock market data was not available before a certain period (for example Egypt or Hungary had stock data available only from 30th December 1994), these data were left out of the eventual dataset.

3.3 Macroeconomic data

This thesis makes use of some country-specific macroeconomic variables to attempt to isolate the effect of the conflicts on the stock market. The selection of these variables is based on the existing literature, according to which the chosen controls (the unemployment ratio, the inflation ratio and the ratio for the gross domestic product) should have a relation with the stock market index are added to assign more robustness to the findings of the simple regression method. These data are, like the stock market data, retrieved from Thomson Reuters Datastream. Three country-specific factors are chosen because of their likeliness to have an effect on the stock market indices. The first factor that is chosen is the unemployment rate, secondly the inflation rate and lastly the ratio for the gross domestic product (or GDP ratio) of the country.

The unemployment rate is chosen because of a paper written by Boyd, Hu and Jagannathan (2005) in which the stock market's reaction to the monthly announcement of the unemployment rate is assessed. It is found in the paper that, on average, stock prices rise after bad labour market news. The unemployment ratio per country is retrieved from Datastream using the constituents list "Unemployment rate each country" as is assembled by Datastream. These data concern quarterly unemployment ratios. As above with the stock market data, to make sure that the data are consistent throughout the entire dataset used for this thesis the quarterly growth rates are calculated by using the log return, which looks as follows in formula:

$$\Delta Unemployment_t = lnUnemployment_t - lnUnemployment_{t-1} \quad (3)$$

In which $\Delta Unemployment_t$ stands for the quarterly growth rate of unemployment, $lnUnemployment_t$ stands for the natural logarithm of the unemployment ratio at time t and $lnUnemployment_{t-1}$ stands for the natural logarithm of the unemployment ratio at time t-1. As this concerns quarterly data that is implemented in a dataset with daily data, the average growth rate throughout the years is calculated. This way each country has its own growth rate for unemployment.

The country's inflation ratio is chosen because of the important effect this ratio has on the stock market, stipulated in the paper of Chen, Roll and Ross (1986). In their paper they find that there exists a negative relation between the country's inflation rate and the stock market returns. These findings strengthen the similar earlier findings of Fama (1981) about

the negative relation between inflation and stock market returns. The intuition behind this is that of the quantity theory of money in which it is reasoned that a higher anticipated growth ratio of the real activity of the country is in combination with lower inflation rates. For the inflation rate the consumer price index (or CPI) for each country constituent list from Datastream is conducted, these are quarterly data. Again, the quarterly growth rates are calculated by using the log return, in formula this looks as follows:

(4) $$\Delta CPI_t = lnCPI_t - lnCPI_{t-1}$$

In which ΔCPI_t stands for the growth rate of inflation, $lnCPI_t$ stands for the natural logarithm of inflation at time t and $lnCPI_{t-1}$ stands for the natural logarithm of inflation at time t-1. As with the unemployment ratio above, this ratio is quarterly and has to be merged with daily data. Again, the average of this ratio is calculated.

The GDP ratio of a country is chosen as the third and final macroeconomic variable because it is a widely used indicator of economic growth of a country. In their paper Levine and Zervos (1996) show that there is a positive relation between the development of the stock market and economic growth as indicated by the GDP ratio. For GDP ratio again a constituents list of Datastream is used (named "Gross domestic product each country"), these are again quarterly data. As with the ratios above, the quarterly growth rates are retrieved by using the log return, which looks as follows in formula:

(5) $$\Delta GDP_t = lnGDP_t - lnGDP_{t-1}$$

In which ΔGDP_t stands for the growth rate of the GDP ratio, $lnGDP_t$ stands for the natural logarithm of the GDP ratio at time t and $lnGDP_{t-1}$ stands for the natural logarithm of the GDP ratio at time t-1. Like with above, as this concerns quarterly data, the average growth rate is calculated so that there is one value per country.

3.4 Descriptive statistics

An overview with the descriptive statistics can be found below in tables 1 and 2 below:

	Stock Return	**World Return**	**Event_Count**
Mean	.0002583	.0002059	1
Obs.	3,050,810	3,050,880	462

Table 1; Showing summary statistics of the three most important variables for this thesis

As can be seen from Table 1 the variable indicating how many events there are included in the dataset has an amount of 462 observations, meaning that there are 462 international conflicts included in the dataset. The mean of 'Event_Count' is one as it is a simple dummy-variable that is one at the day of the event and the variable does not have any other values. The mean values for the stock return and the world return are quite similar, which is not surprising as the MSCI World Index is based on the ACWI All country index, so these values should not be far apart. It can be seen from the amount of observations that there is a difference of 70 observations, in which the stock returns of the countries have 70 observations less than the world index. This difference is due to unavailable data for some countries. As is mentioned just above, for example Egypt only has available data from the 30th of December 1994, which means that for this day it was not yet possible to conduct a stock return. However, for the world return, one was already made. As this concerns only 70 observations on over 3 million, is causes no concern that this is going to affect the results.

	NumArts	Goldstein	RecentYears	Religion	Unemployment	CPI	GDP
Mean	811.4241	-9.931752	.2514066	.004469	-.0005391	.0094403	.0067372
Median	376	-10	0	0	.0013738	.0068033	.0061873
Max.	39780	-8	1	1	.0222827	.1340116	.0373339
Min.	105	-10	0	0	-.0318787	-.000534	.0010414
Std. Dev.	3361.812	.2719769	.4338218	.0667007	.0062383	.0108841	.0030102
Skewness	10.86338	4.868451	1.146062	14.85834	-2.753891	6.597213	6.07461
Kurtosis	10.86338	29.46847	2.313459	221.7704	15.76049	50.7992	59.90095
Prob.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs.	3,051,272	3,051,272	3,051,272	3,051,272	3,041,049	3,053,486	3,028,526

Table 2; Descriptive statistics of the variables for the number of articles mentioning the event, Goldstein scale, for indicating if the event happened in recent years, for religion, for the unemployment rate, for the CPI and for the GDP ratio

As can be seen from Table 2 the mean of the number of articles that report on an international conflict is way below the maximum of this variable. This means that there are a few events on which a lot has been written, but that most of them are around this 800 articles mark. The mean of the Goldstein index is almost -10, which means that a lot of international conflicts that are included in the dataset are graded as highly severe. As is seen from the mean of the recent year variable, approximately 25% of the international conflicts are regarded as 'recent.' This is according to the way this variable is constructed. As mentioned above, the religion variable is a dummy variable. The mean is close to zero which means that most of the international conflicts were not religious related. The unemployment ratio shows that on

average there is a negative growth rate in the unemployment ratio. For both CPI and GDP these growth rates are slightly positive.

Regarding the skewness and kurtosis, the skewness of a variable shows the asymmetry within the distribution around its mean and the kurtosis gives an indication on the sharpness of the peak of this distribution curve. For the variables for the number of articles, the Goldstein scale, recent years, religion, CPI and GDP the data are right-skewed and for unemployment the data are left-skewed. For all the variables the data show high values for the kurtosis, which means that the distribution of all the data has fat tails and is flat-shaped. Regarding the probability of the Jarque-Bera test for non-normality (indicated with "Prob." in the table), for each variable the value is below the 5% significance level which means that the null-hypothesis for normality is rejected, showing that there is non-normality in the data.

	cameocode	numarts	Goldstein	religion	recent_year	ln_av_unempl	ln_av_CPI	ln_av_GDP
cameocode	1.0000							
numarts	0.0008	1.0000						
Goldstein	0.1459	-0.0157	1.0000					
religion	-0.0078	-0.0108	-0.0164	10.000				
recent_year	0.0927	-0.0420	-0.0129	-0.0388	1.0000			
ln_av_unempl	0.0389	-0.1010	0.0638	0.0214	0.1797	1.0000		
ln_av_CPI	0.2110	0.0061	0.2548	-0.0156	-0.0140	0.0368	1.0000	
ln_av_GDP	0.0440	-0.0382	0.2630	-0.0121	-0.0456	-0.1819	0.2395	1.0000

Table 3; Correlation matrix of the variables Cameocode, numarts, religion, recent_year, ln_av_unempl, ln_av_CPI and ln_av_GDP

As can be seen from the correlation matrix given in table 3 above, there is no high correlation for the variables in the GDELT event dataset among each other, for the macroeconomic variables among each other, or between the variables of the GDELT event dataset and the macroeconomic variables. This means that it is possible to insert these variables into a regression without having to worry about the assumption that variables are uncorrelated for heteroscedasticity.

4 Methodology

4.1 About event studies

In order to investigate if international conflicts have an effect on the stock market, it is necessary to carry out an event studies. A lot of event studies have been conducted in the economic literature over the past decades. On the basis of this is the reasoning to research if the market efficiently processes information, which can be lead back to the Efficient Market Hypothesis which already has been discussed previously. The research of Ball and Brown (1968) and Fama, Fisher, Jensen and Roll (1969) is considered to be on the basis of event study methodology. In their research, Ball and Brown (1968) looked at the effect of earnings announcements on the stock price, to see if there is a reaction. For this they created an abnormal return index. The methodology behind this index is still the foundation for many long term event studies. Fama, Fisher, Jensen and Roll (1969) created a method using the cumulative abnormal returns. With this they looked at the event of a stock split and investigated what the reaction of stock market returns is for this. Although the events for above two articles are different from looking at country-level events/conflicts, the purpose of the method remains the same.

4.2 The abnormal return

The crucial variable to calculate the effect of international conflicts on the stock returns is the abnormal return. The abnormal return is the ex post stock return during an event period subtracted by (an approximation) of the normal return over the same event period. So it is important to determine an event period. Different event periods are looked at to determine which one gives the best representation of the event.

For this paper the normal return is approximated in two ways. The first way to calculate the abnormal returns is to look at the stock returns as regression wherein the stock return serves as the dependent variable of the market return as independent variable. The second, and simplest, method is that the MSCI World Index is used as normal return. This method will serve more as a robustness check.

4.2.1 The event and estimation period

This research uses an estimation period to determine the normal return and compares this normal return to the stock return in the event period. Two methods on how to determine this normal return will be explained below. This section focuses on explaining what event and estimation periods will be used. To find a sound estimation period it is important to have a clear image of the data. As is shown above some countries have multiple events during the research period. These events can cause noise in determining the normal return as they can be occurring during the estimation period with which the normal returns are determined. Therefore, this thesis uses a longer estimation period spanning from minus 255 to minus 50 days prior to the event day. The reasoning for this is by making the estimation period longer, the potential noise of an event will be flattened out, which gives more trustworthy normal returns.

When it comes to the event period, this thesis looks at different time periods. The results of these different event periods will all be set forth to give some explaining how long it takes for such an event to have an impact on the stock market return and how long such an impact would last.

4.2.2 The market model

The first method to calculate the abnormal returns is by determining the normal returns on the basis of the market model. Initial papers that used this method include that of Beaver (1968), Fama, Fisher, Jensen & Roll (1969) and Kaplan & Roll (1972) and it is still a widely used method. A problem that might arise when using this method is that it is unclear at what time the information of the event was received by the market and thus when one would expect to see the abnormal return. A solution for this problem, suggested by Fama, et al. (1969) is to use the cumulative abnormal return. This is done for this thesis as well. Despite its popularity, there are still some weaknesses in this model, pointed out in Fama (1991). This means that the results given in this thesis that use this method have to be treated with caution. The market model method still is one of the most precise methods in predicting the normal return and it is therefore chosen as the core method for assessing the abnormal returns. The model uses a beta of the market index, which is calculated in the estimation period. The formula to calculate the normal return would then look as follows (Coutts, Mills & Roberts; 1994):

(6) $$R_j = \alpha_j + \beta_j R_M + \epsilon_j$$

In this R_j stands for the normal return, α_j is the constant in the model, $\beta_j R_M$ is the market return (the MSCI World Index) multiplied by the beta, which is thus determined in the estimation period and ϵ_j is the error term. To calculate the abnormal return from this the following formula is used:

(7) $$AR_i = R_i - R_j$$

In this AR_i is the abnormal return of country i, R_i is the stock return of country i and R_j is the predicted normal return as calculated under formula (6). The next step then is to calculate the cumulative abnormal return; this is done by the following formula:

(8) $$CAR_i = \sum_{t=0}^{n} AR_i$$

In this CAR_i is the cumulative abnormal return of country i and $\sum_{t=0}^{n} AR_i$ is the sum of the abnormal returns from formula (7), t=0 stands for the start of the event period and n the number of days in this period.

4.2.3 The market return model

The market return model was first developed by MacKinlay (1997). With this model the abnormal return is generated by subtracting a contemporaneous market index from the stock return. In formula it looks as follows:

(9) $$AR_i = R_i - R_M$$

In this regression AR_i stands for the abnormal return of country i, R_i stands for the stock return of country i, and R_M stands for the market return. With these abnormal return, again, like above, the cumulative abnormal return is calculated using the following formula:

(10) $$CAR_i = \sum_{t=0}^{n} AR_i$$

In this CAR_i is the cumulative abnormal return of country i and $\sum_{t=0}^{n} AR_i$ is the sum of the abnormal returns from formula (9), t=0 stands for the start of the event period and n the number of days in this period.

As written above this research uses the MSCI World market index as the indicator for the contemporaneous market index. With this it is assumed that the MSCI World Index has a beta of 1, unlike the other model described above. This is quite a strong assumption, but still

this is a widely used method to calculate abnormal returns in event studies. The reasoning behind using the market index is that the ability to detect the event effect was improved in comparison to previous models. Important to note here is that the benefit of the market return model can be found in its R-squared. If this is high, it means that the decline of the model its variance is high as well.

4.3 Methodology of the tests

4.3.1 Tests for significance

In order to be able to answer the first hypothesis, the abnormal returns that are found using the above methodology have to be tested on significance and on direction (as the first hypothesis includes both a significant effect as well as a negative effect). The first significance test for this is simple t-test. This test solely shows whether or not there exists a significant relationship between the impact of an international conflict and the stock market and it tests each event individually. This is done by using the following formula:

(11) $$t - test = \frac{\frac{CAR}{N}}{\frac{\sigma(AR)}{\sqrt{N}}}$$

In this CAR is the cumulative abnormal return (the sum of the abnormal returns during the event window). N is the number of days in the event window and $\sigma(AR)$ stands for the standard deviation of the abnormal returns during the event window.

The second test is that of an OLS regression of the cumulative abnormal returns at the day of the event (thus t=0). Other than the previous test with which each event is looked at separately, this test enables to look at the significance of the events across all the countries. The benefit of using this method is in comparison to the abovementioned t-test is that this method allows to use robust standard errors. The significance of the events across can be retrieved from the p-value of the constant of this regression.

The third and final test to show a possible significant effect of international conflicts on the stock market is by means of the Wilcoxon signed rank test. This is a test to see if the two sets of scores are significantly different from each other. This is done by comparing the two samples by giving signs to the difference (either positive or negative). This test thus only looks whether the difference between the two values is positive or negative, without looking

at the magnitude of this difference. The benefit of using this test is that it does not assume normality in the data.

4.3.2 Regression analysis

The second part of this thesis focuses on the hypotheses two up to and including five on the possibility of a different stock market reactions, due to variations in the event dataset. These regressions will in first instance have a very simple form, solely focused to see if a significant relation between the variable, representing the desired event characteristic, and the previously calculated cumulative abnormal return. These regressions will have the following form:

(12) $$CAR = \alpha + \beta_1 Variable_1 + \epsilon$$

In this CAR stands for the cumulative abnormal returns of the different countries, α stands for the constant in the model and $\beta_1 Variable_1$ stands for the independent variable representing the desired event data characteristic and ϵ stands for the error term. After this procedure different macroeconomic factors are included in the model as generated by the formula (12). The objective of the use of different macroeconomic variables is to isolate the effect of an international conflict and its characteristics on the stock market. Besides different macroeconomic factors, the different models as constructed by the formula (12) are combined to create the ideal model to explain where the cumulative abnormal return comes from. In the section below an overview will be given with the different variables concerning the event data and macroeconomic factors. The regression analysis used in this research will have the following form:

(13) $$CAR = \alpha + \beta_1 Variable_1 + \cdots + \beta_n Variable_n + \epsilon$$

In this CAR stands for the cumulative abnormal return of stock i, α stands for the constant in the model, $\beta_1 Variable_1$ stands for the relation between the dependent variable CAR and the one of the predetermined independent variables and finally ϵ stands for the error term. Implementing different independent variables in the model with the cumulative abnormal return as dependent variable enables to find the relation between the cumulative abnormal return and the variable, and thus shows how (a part of) the cumulative abnormal return can be explained by this variable.

4.4 List of variables

For this research several variables were used. Because different event windows were used, the amount of abnormal returns and cumulative abnormal returns is extensive. The use of multiple event windows gives a more complete image about what happens to the stock market when an international conflict appears and, moreover, it helps in our own reasoning. To make sure that this paper is easily readable, a list of the variables can be found below:

Dependent Variables	
Abbreviation	**Meaning**
PRET	The predicted normal return using the market model method under formula (6)
PCAR	The cumulative abnormal return as calculated under formula (8) using the predicted normal return
CAR	The cumulative abnormal returns as calculated under formula (10) using the MSCI World index as normal return

Table 4; List of the variables PRET, PCAR and CAR

Independent variables	
Abbreviation	**Meaning**
numarts	The number of articles mentioning the event, used to show the amount of media-attention the event received
Goldstein	The Goldstein scale, used to show the severity of the event
recent_year	The dummy variable indicating if an event happened in later years.
religion	The dummy variable indicating if religion played a role in the specific international conflict
ln_av_unempl	The quarterly average growth rate of the unemployment ratio of the country
ln_av_CPI	The quarterly average growth rate of the inflation ratio of the country
ln_av_GDP	The quarterly average growth rate of the GDP ratio of the country

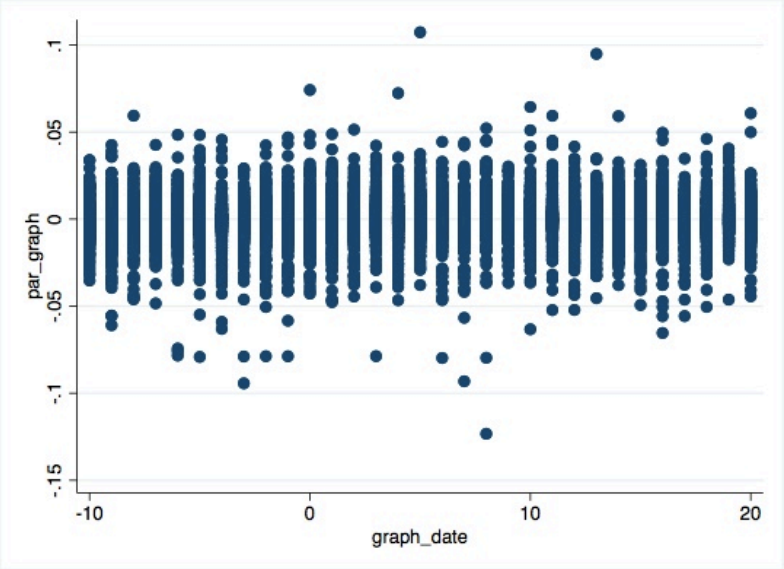
Table 5; List of the variables numarts, Goldstein, recent_year, religion, ln_av_unempl, ln_av_CPI and ln_av_GDP

5 Results

5.1 Significance analyses

For the first hypothesis, it is tested what the impact of an international conflict is on the stock market return and what direction this possible reaction has. First, the t-test is used to see if there is a significant effect. These significance tests are done for each event individually. The results of these t-test on the events can be found in Appendix 4. From the table it can be seen that the most significant results were found for the first and second event period (ranging from minus two to two and zero to five days respectively). Less significant results were found for event periods three and four (ranging from zero to ten days and zero to 20 days respectively), which indicates that the market adjusts really quickly to these events but that after a little while the market adjusts back to its initial value. Also, for the first event period that includes days prior to the event there seems to exist some sort of 'information leakage' of the events to the market. This is not so strange as for example a military attack on a country already receives attention before it actually happens. The second event period (so from zero to five days) has the most significant results. The results on the ten percent and five percent level do not differ much between the first and second event period but for but more events yielded significant results for the second event period at the one percent significance level.

Another interesting observation is that some events had significant results across all event periods. However, many events only showed significant results for one or two event periods. This indicates that it really is dependent upon type of event how the stock market reacts. This observation about the different characteristics of the events will be further investigated below.



Graph 1; On the X-axis the amount of days to the event, on the Y-axis the abnormal returns.

This graph shows movement of the abnormal returns for all the events that are included in the dataset. On the y-axis the abnormal stock market return is displayed, on the x-axis are the event dates from 10 days prior to the event till 20 days after the event. As can be seen the majority of the events does not seem to affect the stock market by much. The abnormal returns fluctuate around the null line. Some events show strong movements up or down. What can be seen from the graph is that around the event date there is some movement down in the index. Still, it is not the downward sloping line that would have given a clear indication that there indeed exists a negative relation between international conflicts and the stock market reaction. However, when looking at the outliers, it is clear to see that there exists some movement and that most of this movement is a downward reaction.

Another interesting thing to point out is that although the events that are included in the dataset all have a large, negative Goldstein index (which means that they theoretically should have a strong negative impact on society), the reaction to these events is not all negative. In fact, for some events it is shown that there is a strong positive abnormal return reaction to the event. This can be explained by the fact that the GDELT database includes lots of events in the dataset, which means that there also a lot of different types of events.

VARIABLES	Model (1) PCAR_1	Model (2) PCAR_2	Model (3) PCAR_3	Model (4) PCAR_4
Constant	-0.00148* (0.000852)	-0.000583 (0.000954)	0.000159 (0.00128)	-6.94e-05 (0.00170)
Observations	462	462	462	462
R-squared	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6; Regression analyses for the significance of the cumulative abnormal returns with the predicted normal returns across all countries.

Thus, looking at all countries at a group which enables to see if, generally speaking, international conflicts yields significant effects on the stock returns. Again, same as above, the different event periods are investigated. The first regression with the event period from minus two to plus two days from the event period is displayed above. This regression shows the significance of the cumulative abnormal return (the sum of the abnormal returns during the event window), across all events. The event window used for this regression ranges from two days prior to the event to two days after the event. The p-value for this regression is below 0.01, which means that the abnormal returns were significant during this typical event window at a 10% significance level. This is in line with what is found with the t-tests that this event period yields some significance. Moreover, the coefficient of the constant is negative which means that there exists a negative relation between the stock returns and international conflicts. This is in line with the first hypothesis and suggests that the hypothesis can be rejected.

The results for the test across all countries for the second event period are displayed above. As is seen from the p-value, this event window was not significant. The p-value is larger than ten percent. This means that international conflicts have generally no significant effect on the stock market for a period of five days after the event. A possible explanation for this insignificance is that it takes some time for the market to incorporate the 'shock' of the event into the returns on the market and thus that five days is not long enough for the event to have an impact on the stock market. It is seen that the second event period has less significant results in comparison to the first event period. This is contradicting the findings of the t-tests. When looking at the table, the most significant results were found for the first two event periods, but this is not shown in the findings above.

The results for the third regression with the cumulative abnormal results of the third event period (from zero to ten days from the event day) are shown above. As is seen from the

table, very insignificant results were found for this period. This means that within the ten-day period after the event no significant impact is seen. This means that the market has the tendency to react really quickly to these events, even before the event happened already a significant effect on the stock market is seen. This strengthens the observation of information leakage mentioned above.

The results for the fourth and final event period ranging from zero to twenty days are shown above. From the table it is seen that again, like the previous regression, the p-value is insignificant. This means that the observation set forth in the previous regression that the stock market shows a quick response to international conflicts and that this effect fades away causing the stock returns to go back to their initial value. The results above are in favour of rejecting the first null hypothesis that there is no significant relation between the stock market and international conflicts. In other words, it is indeed found that international conflicts have a significant negative effect on the stock market.

Results for the regressions used with the world market index as normal return can be found in table 7 below:

	Model (1)	Model (2)	Model (3)	Model (4)
VARIABLES	CAR_1	CAR_2	CAR_3	CAR_4
Constant	-0.000481	0.00110	0.00244**	0.00247
	(0.000888)	(0.00100)	(0.00123)	(0.00157)
Observations	462	462	462	462
R-squared	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7; Regression analyses for the significance of the cumulative abnormal returns with the world index as normal return across all countries

As can be seen from the output, the first two and the fourth and last event periods yield no significant results. For the third period (so from zero to ten days from the event day) has significant results at a 5% level. This would mean that for a period of ten days after the event the market shows a reaction. The results of the regression show a positive coefficient which shows that the effect would have a positive sign. However, as mentioned above, since the events included in the dataset are expected to have a strong impact on the market, it is very likely that these events have some impact on the world index as well. This would mean that the normal returns are not reliable as they suffer from noise from the events. Another explanation why this constant coefficient in the third period shows a positive significant result is that the impact on the world market is larger in comparison to solely the country (so the

returns of the countries stay higher in comparison to the world return, which would explain the positive sign). Why it shows significance at the ten-day period would then probably be due to the fact that it takes some time for the world market to adjust to the new information of the conflict.

	PRET_1			PRET_2			PRET_3			PRET_4		
sign	N	Rank	Expected	N	Rank	Expected	N	Rank	Expected	N	Rank	Expected
positive	1119	2E+09	2E+09	34493	1E+09	2E+09	33713	1E+09	2E+09	35095	1E+09	2E+09
negative	1190	3E+09	2E+09	57801	3E+09	2E+09	58566	3E+09	2E+09	57190	3E+09	2E+09
zero	0	0	0	0	0	0	0	0	0	0	0	0
all	2309	4E+09	4E+09	92294	4E+09	4E+09	92279	4E+09	4E+09	92285	4E+09	4E+09
Z-value	-1.038			-85.891			-92.428			-83.397		
prob.	0.2991			0.0000			0.0000			0.0000		

Table 8; Wilcoxon signed-rank test for the sign between the stock returns and the predicted normal returns of the different countries.

The results of the Wilcoxon signed-rank test can be found in the table above. As can be seen from the table, for all the event periods the p-values of the z-scores are insignificant. There are more negative than positive observations but this difference is insignificant. For all the event periods, the amount of negative observations is larger than the amount of positive observations. However, this is not significantly different from zero. This means that according to the Wilcoxon signed-rank test there is no significant impact of international conflicts on the stock market.

5.2 Regression analyses

5.2.1 Answering the hypotheses

In order to answer the second to the fifth hypothesis different regressions are run in different orders. With this it is attempted to find a model with which the origin of the abnormal return during the different event periods is best explained. The first sets of regressions that are run are very basic and only include the variable with which hypotheses two till five can be answered.

The second hypothesis looks at the effect the media has on the stock market reaction for international conflicts. It is expected to see a negative relation between the amount of news articles mentioning the event and the stock market reaction and thus it is expected to see lower cumulative abnormal returns for the events that received a lot of attention. This results for this regression can be seen below:

VARIABLES	Model (1) PCAR_1	Model (2) PCAR_2	Model (3) PCAR_3	Model (4) PCAR_4
numarts	2.39e-07***	-6.72e-08	-2.75e-07***	8.14e-08
	(7.78e-08)	(5.58e-08)	(8.18e-08)	(9.88e-08)
Constant	-0.00167*	-0.000529	0.000381	-0.000135
	(0.000860)	(0.000977)	(0.00131)	(0.00174)
Observations	462	462	462	462
R-squared	0.002	0.000	0.001	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9; Regression analyses using the variable representing the amount of news articles as independent and the different CAR's as dependent variables.

As can be seen from table 9 for variable representing the amount of news articles writing about the event, only the first and third event periods yield significant results. The coefficient for the first event period is positive meaning that the amount of media attention has a positive effect on the cumulative abnormal return for the period of two days prior to and two days after the event day. So if an international conflict already receives media attention before the event has happened, this positively influences the stock return. An economic explanation for this is that traders can take the new information into account and adjust their trading strategy to it, causing the stock return reaction of the country to be positive rather than negative as the market already had some time to process the information. The third period also showed significance. This relation however is negative, meaning that for the ten-day period from the day of the event, the degree of media-attention that the conflict receives has a negative effect on the cumulative return. This thus means that for this period high-attention events affect the stock market negatively.

The third hypothesis examines if the severity of international conflicts has an influence on the abnormal return. It is expected to see a sharper decline in the stock return and thus a lower cumulative abnormal return of the stock. For the level of severity, the Goldstein index is used. As mentioned above, the Goldstein scale is a perfect tool with which the level of intensity and thus the severity of an event can be given. The results of the regressions with the different event periods can be seen below:

VARIABLES	Model (1) PCAR_1	Model (2) PCAR_2	Model (3) PCAR_3	Model (4) PCAR_4
Goldstein	0.00166	0.00714	0.00643	0.0110*
	(0.00265)	(0.00477)	(0.00398)	(0.00642)
Constant	0.0150	0.0703	0.0639	0.109*
	(0.0263)	(0.0475)	(0.0396)	(0.0640)
Observations	462	462	462	462
R-squared	0.001	0.010	0.004	0.007

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10; Regression analyses using Goldstein scale as independent and the different CAR's as dependent variables.

Surprisingly, for the first three event periods no significant results are found. This means that for these periods the severity of the conflict does not appear to have any influence on the cumulative abnormal return. The fourth event period does appear to yield a significant relation between the Goldstein scale and the cumulative abnormal return. In the model above looking for the significance using the regression analysis, the cumulative average abnormal return (CAAR) is calculated for this event period (the constant in Model(4) in table 10) and is found to be negative. Taking into account that the Goldstein scales included in this thesis range from minus eight to minus ten, the positive beta for the independent variable, means indeed that there is a negative relation between the severity of the conflict and the stock market. This result means that for a period of 20 days from the event day, the severity of a conflict has an effect on the stock market. A possible economic explanation for this is that the aftermath of a conflict plays a role in this. The more severe the conflict is, the bigger the aftermath of such an event, which causes that the significance of such severe events can be seen only 20 days after the day of the event.

The third model tested here is to answer the fourth hypothesis, on the influence that the novelty of the international conflict has on the impact of this event on the stock market. As is explained in the literature section it is expected to see a negative relation between the recent years' variable and the cumulative abnormal return. This is due to the fact that stock markets are nowadays more internationally intertwined compared to earlier years. The results of this regression can be found below:

VARIABLES	Model (1) PCAR_1	Model (2) PCAR_2	Model (3) PCAR_3	Model (4) PCAR_4
recent_year	-0.000581	-0.00124	-0.000494	0.000455
	(0.00154)	(0.00160)	(0.00225)	(0.00309)
Constant	-0.00133	-0.000275	0.000282	-0.000183
	(0.00108)	(0.00122)	(0.00162)	(0.00214)
Observations	462	462	462	462
R-squared	0.000	0.001	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11; Regression analyses using the variable for recent years as independent and the different CAR's as dependent variables.

As can be seen from the table 11, no significant results are found. This means that it appears that it does not matter if an event happens in the earlier years compared to later years. Though these results have to be treated with caution. As mentioned above, the variable to indicate if an event occurred in later years is constructed in such a way that it dates only from the 5th of June 2012, meaning that the 'recent years' are not so recent. Still, it does give some indication that the findings of Chen and Siems (2004) may not entirely hold.

The fourth and final model is to answer hypothesis five, which is about a possible steeper negative stock market reaction when the international conflict is on the basis of religion. The results of the regressions with the different event periods can be found below:

VARIABLES	Model (1) PCAR_1	Model (2) PCAR_2	Model (3) PCAR_3	Model (4) PCAR_4
religion	-0.00291	-0.00347	-0.00799***	0.00525
	(0.00234)	(0.00240)	(0.00268)	(0.00385)
Constant	-0.00147*	-0.000568	0.000193	-9.21e-05
	(0.000857)	(0.000959)	(0.00129)	(0.00171)
Observations	462	462	462	462
R-squared	0.000	0.000	0.000	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12; Regression analyses using the variable for religion as independent and the different CAR's as dependent variables.

As can be seen from table 12 it is seen that for the first, second and fourth event period no significant results are found. For the third period the religion variable has a negative and significant coefficient. This means that for the period of ten days after the event the impact of the international conflict is significantly more negative when the conflict is religious in nature. An economic explanation for this could be that religious conflicts generally have a

large impact on society, these are often violent events, this would explain the negative direction of the coefficient. Why only the ten-day period would be the same as an explanation that has already been given previously, that it takes some time for the market to adjust to the information, just because the events are that violent.

5.2.2 Adding the control variables

As mentioned in the methodology part of this thesis, the effect of the different variables included above (the degree of media-attention, the severity of the event and the recent year variable) is going to be given more soundness/robustness by isolating the effect by means of both adding control variables to and combining the variables of the different models.

The models concerning the first event period are first looked at. As is shown above, only the variable indicating the number of articles mentioning the event had a significant effect on the cumulative abnormal return of this event period (from two days prior to and two days after the day of the event). A couple of regressions are run to see how the different variables react. With this the attention is especially directed to the variable about the number of articles mentioning the event. The results of these regressions can be found in table 13 below:

VARIABLES	Model (1) PCAR_1	Model (2) PCAR_1	Model (3) PCAR_1	Model (4) PCAR_1
numarts	2.77e-07***	2.80e-07***	2.38e-07***	2.41e-07***
	(9.36e-08)	(9.35e-08)	(7.99e-08)	(8.44e-08)
Goldstein	0.00257		0.00169	
	(0.00231)		(0.00265)	
recent_year	-0.000580		-0.000531	
	(0.00151)		(0.00155)	
religion	-0.00351		-0.00279	
	(0.00250)		(0.00243)	
ln_av_unempl	0.239	0.242		
	(0.268)	(0.258)		
ln_av_CPI	0.108	0.121		
	(0.0817)	(0.0828)		
ln_av_GDP	-0.590*	-0.533*		-0.418
	(0.307)	(0.288)		(0.311)
Constant	0.0274	0.00115	0.0153	0.00152
	(0.0237)	(0.00195)	(0.0264)	(0.00205)
Observations	455	455	462	457
R-squared	0.027	0.025	0.003	0.008

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13; Regression analyses run using the cumulative abnormal return calculated over the first event period (-2,+2)

As can be seen from table 13, first a regression is run including all the variables to see how they generally react and to look for significance and the sign of the coefficients (Model (1)). The table shows that control variable for the GDP ratio is significant at the 10% significance level and the coefficient is negative. This means that a negative relation is found between the GDP ratio and the cumulative abnormal return. This means that if the average growth rate of a country is high, the cumulative abnormal return after an event is lower. This is quite a surprising result. Following the paper from Levine and Zervos (1996) that there is a positive relation between the stock market development and the economic growth of a country, one would expect that its cumulative abnormal return would be lower as this country is better able to cope with a blow from a conflict. An explanation for these findings is that for a country that has known an average positive economic growth, the international conflict hits harder, as such a country would have more to lose. The variable of interest here, the number of articles, again shows a positive coefficient and is again significant at the 1% significance level. After dropping the different event-related variables, both the variable for number of articles as well as the GDP ratio still remain significant (Model (2)). After dropping the other control variables (Model (4)) the variable for the GDP ratio loses significance, however the R-

squared drops from 0.025 to 0.008 meaning that Model (4) is worse in explaining the data in comparison to Model (2).

The second event period that is tested is the one that ranges from the day of the event to five days after the event. As is seen from the results above no significant results were found for this time period. The results for the different regressions run for the second event period are set forth in table 14 below:

VARIABLES	Model (1) PCAR_2	Model (2) PCAR_2	Model (3) PCAR_2	Model (4) PCAR_2
numarts	4.82e-08		5.06e-08	
	(6.49e-08)		(6.03e-08)	
Goldstein	0.00634		0.00687	
	(0.00446)		(0.00530)	
recent_year	-0.00279*	-0.00285*	-0.00272*	-0.00288*
	(0.00159)	(0.00157)	(0.00160)	(0.00160)
religion	-0.00462*	-0.00496*	-0.00477*	-0.00536**
	(0.00255)	(0.00252)	(0.00255)	(0.00255)
ln_av_unempl	0.635***	0.659***	0.655***	0.677***
	(0.186)	(0.188)	(0.178)	(0.175)
ln_av_CPI	-0.00781	0.0227		
	(0.151)	(0.151)		
ln_av_GDP	0.0590	0.190		
	(0.607)	(0.713)		
Constant	0.0628	-0.00131	0.0685	0.000391
	(0.0430)	(0.00432)	(0.0528)	(0.00122)
Observations	455	455	460	460
R-squared	0.045	0.039	0.049	0.041

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14; Regression analyses run using the cumulative abnormal return calculated over the first event period (0,+5)

As can be seen from the table, in Model (1) that includes all variables, all of a sudden the variable indicating if an event happened in the recent years and the religion variable both got significant at the 10% significance level. The control variable for the average unemployment ratio for a country is significant at a 1% significance level. The coefficient for the average growth rate of unemployment is positive, suggesting a positive relation between unemployment and the abnormal return. This means that countries with an on average higher unemployment rate, have a higher cumulative abnormal return from the international conflict, so the stock market suffers more for these countries. This is in line with the findings in the paper of Boyd, Hu and Jagannathan (2005) in which a stock market increase is found after bad news on the labour market. The coefficients for both the recent year and the religion variable are negative. As mentioned above, the variable recent year has to be treated with

caution, but these findings do indeed suggest that for this particular event period, the impact of an international conflict is larger in later years, possibly because the stock markets nowadays are more intertwined (as suggested in Chen and Siems (2004)). The findings for the variable religion show that this coefficient is negative, which is similar to the findings for Model (3) in table 12 showing that for the event period of ten days from the event religion has a negative effect on the stock market reaction. These findings (significance and sign) stay the same across Models (2), (3) and (4).

The next set of regressions that is run is for the third event period ranging from the day of the event to ten days after the event. For this model significant results were found for the variables for the number of articles and religion. These variables should therefore have the attention when looking at the results of the regressions, set forth in table 15 below:

VARIABLES	Model (1) PCAR_3	Model (2) PCAR_3	Model (3) PCAR_3	Model (4) PCAR_3
numarts	-1.17e-07	-2.73e-07***	-1.01e-07	-5.82e-08
	(1.23e-07)	(8.66e-08)	(1.23e-07)	(1.27e-07)
Goldstein	0.00485	0.00636		
	(0.00414)	(0.00400)		
recent_year	-0.00448**	-0.000651		
	(0.00195)	(0.00228)		
religion	-0.0104***	-0.00783***	-0.00935***	-0.00986***
	(0.00281)	(0.00291)	(0.00262)	(0.00265)
ln_av_unempl	1.107**		1.073**	1.126**
	(0.500)		(0.493)	(0.482)
ln_av_CPI	0.107		0.133	
	(0.166)		(0.169)	
ln_av_GDP	-0.290		-0.172	
	(0.625)		(0.665)	
Constant	0.0506	0.0637	0.000273	0.000531
	(0.0413)	(0.0397)	(0.00412)	(0.00120)
Observations	455	462	455	460
R-squared	0.077	0.006	0.070	0.066

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15; Regression analyses run using the cumulative abnormal return calculated over the first event period (0,+10)

In table 14 above it is shown that for Model (1) significant results are found for the variables recent year and religion. Like in the regressions run above in table 14 the recent year variable is negative meaning that also for the ten-day period from the event evidence is found supporting the 'intertwined-markets' idea for later years from Chen and Siems (2004). Also, like the regressions from table 14 above, the religion variable is significantly negative. This means that like above, the conflicts involving religion had a lower cumulative abnormal

return. When looking at table 15 it stands out that the religion variable remains significant at the 1% significance level and negative across the different models. Strong evidence is thus found that religion plays a role in the five- and ten-day periods after the initiation day of the international conflict. Looking at Model (2) in which only the event-based variables are added, it is seen that the number of articles variable again gets strongly significant. Like what was found above in the simple regression methods (table 9), the coefficient is negative. But as soon as the other control variables are added, which is seen in Models (3) and (4) the variable becomes insignificant. This means that some evidence is found that for the ten-day period after the event the amount of media attention matters, however, this is not as strong as might be suggested above. Regarding the controls, again significant results are found for the average unemployment ratio. The coefficient again is positive.

For the final set of regressions, the fourth event period is used, ranging from the day of the event, till the 20th day after the event. For this time period, some results were found in the set of simple regressions, namely the Goldstein scale. This showed that the severity of the events mattered for a time span of 20 days after the event. An overview of the results from the different sets of regressions can be found below:

VARIABLES	Model (1) PCAR_4	Model (2) PCAR_4	Model (3) PCAR_4	Model (4) PCAR_4
numarts	1.71e-07		9.84e-08	7.24e-08
	(1.37e-07)		(1.03e-07)	(9.24e-08)
Goldstein	0.0122*	0.0122*	0.0111*	0.0123*
	(0.00660)	(0.00653)	(0.00644)	(0.00637)
recent_year	-0.00234		0.000471	
	(0.00302)		(0.00310)	
religion	0.00463		0.00624	0.00632*
	(0.00409)		(0.00408)	(0.00383)
ln_av_unempl	0.530	0.491		
	(0.410)	(0.395)		
ln_av_CPI	-0.118	-0.116		
	(0.363)	(0.362)		
ln_av_GDP	-0.353	-0.359		-0.400
	(0.992)	(0.984)		(0.918)
Constant	0.125*	0.125*	0.110*	0.124*
	(0.0667)	(0.0660)	(0.0643)	(0.0641)
Observations	455	455	462	457
R-squared	0.018	0.017	0.007	0.009

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 16; Regression analyses run using the cumulative abnormal return calculated over the first event period (0,+20)

From table 16 above it is seen that there are only significant results for the variable representing the Goldstein scale. The significant results are only found across all. The coefficient is positive which means that the lower the Goldstein scale gets, the lower the cumulative abnormal return. This is exactly in line with what is find above in table 10. These findings suggest that the more severe the international conflict is, the larger the impact on the stock market. These findings remain even after keeping the Goldstein variable alone with the macroeconomic controls (Model (2)), or alone with the event-based variables (Model (3)). The variables in Model (4) are added to see if some other significance could be found. The variable for religion becomes significant at a 10% level when adding the control variable for the average GDP growth rate. This finding is surprising in that the coefficient all of a sudden becomes positive, which would mean that speaking for the stock market value, it is a positive when an international conflict is religious. This is contradicting both the results in table 14 and 15 and especially for the latter for which the results were highly significant. When the same regression model is run for the third event period, the variable for religion still is highly significant and negative.

6 Conclusion

This thesis attempts to find a negative relation between international conflicts and the stock market. This is done by making use of a new, innovative database called the GDELT project, this is immediately what sets this paper apart from the rest. Because of the size of the dataset, the events are restricted on three event-based variables: the amount of media-attention, or as later referred to in this paper the number of articles that write about the event, the severity of the event measured by the Goldstein scale and the number of events which can be linked to one event. After this the events that remained have been merged to the stock market data which are retrieved from the MSCI All country index list.

After an extensive literature review the widely used market model approach is chosen as the core model to calculate the abnormal returns. Even though the model receives some criticism which should definitely be taken into account when evaluating these findings, the market model still is one of the most popular methods due to its precision with which it can predict normal returns.

By means of this dataset different event methodology tools have been used to look for an effect of these events on the stock market data. The t-test for single events, an OLS regression at the intersection and the Wilcoxon signed rank test have been used for this. For the t-test significant results were found especially for the first and second event periods. This gives an indication that the market adjusts really quickly to the news and that for some there even is 'information leakage' about the event. The second test that was used is that of the OLS regression in the intersection to show significance across the events instead of looking at single events. It is found that for the first event period there is significance, which strengthens the previous findings that there is indeed some information leakage for these type of events. Despite the insignificance found in the Wilcoxon signed rank test, it is still found that there is a negative relation between international conflicts and the stock market, mainly based on the significant findings of the OLS regression method.

For the second part of the thesis to test hypotheses two up to and including five, different event-related variables are added to the OLS regression mentioned above. The second hypothesis questions if the amount of media-attention has any influence on the stock market reaction to international conflicts. The results of the simple regression method, with only including the variable show significance for the first and third event period. This is later confirmed after adding the macroeconomic controls. Regarding the first event period, highly

it cannot be said that there exists a negative relation, as apparently when there is some sort of information leakage the market already adjusts to the news and the effect on the stock market return is positive rather than negative.

The third hypothesis regarding the severity of the event surprisingly only showed significance for the final event period for twenty days after the day of the event. The results, however, were consistently significant throughout the model, which means that indeed more severe conflicts have a stronger effect on the stock market. The reason that this only happens for the 20-day period after the event is probably due to the fact that the market needs time to adjust to the new information and because of its severity, this takes time.

The fourth hypothesis questions if the period in which the international conflict took place matters for the impact on the stock market. As is suggested by the paper of Chen and Siems (2004) the stock markets nowadays are more intertwined which means that if one country is affected, others will as well which eventually has again a larger impact on the stock market of the country in which the conflict happened. For the second and third event periods significance is found in favour of this theory. However, as stipulated above a couple of times, because of the way the variable is constructed, it cannot, with full confidence, be said that these findings are entirely robust.

The fifth hypothesis looks at the effect religion has on the impact of the international conflict. For both the second and third period significant negative results are found, which means that for the periods ranging from five days to ten days from the event the international conflicts that have a larger negative effect on the stock market when religion was involved with the conflict compared to those for which there was not. For the fourth period however, significant positive results were found for this variable.

Overall, in conclusion to the research question whether international conflicts have a negative impact on the stock market, it can be said around the time of the international conflict the market has a significant negative reaction. The underlying forces that drive this negativity, however, is still up for debate as these vary among the different event periods. With some confidence it can be said though, that the events that appeared a lot in the news have a larger impact. This is not surprising as the players on the stock market base their investment decisions on this news. It is found that the severity of the event and whether or not the conflict was based on religion is of importance to the impact. Some evidence is found in favour of the theory that markets nowadays are more intertwined (Chen and Siems (2004)).

7 Discussion and Limitations and Recommendations

A big shortcoming of this research is that the macroeconomic variables that are used should have a significant relation with the stock market returns, but they have not in this thesis. They are used to isolate and assign more significance to the event, and for some they do, but there has not been one regression in which all three showed significance. This means that there should be a better model representing the abnormal return with which the effect can be more isolated and that the combination of the three variables used in this paper probably is not optimal. This is a recommendation for further research to find a more optimal combination of macroeconomic variables related to the stock market.

The research could have included even data that occurred during days on which the stock market was closed, by including some sort of measure that enabled to look at the effect of these events directly at the first day that the market opened again. This is a possibility for further research to extend this.

For the third hypothesis a variable indicating is the international conflict happened in recent years was created. The amount of events was way more for recent years compared to earlier years. This is not surprising as the news sources at which the GDELT dataset bases its data has developed, meaning that international events in later years are better documented better than earlier years. This does have an influence on the recent years' variable as the date 5th of June 2012 had to be picked as date after which events would be recognized as 'recent.' This is because otherwise there would not be a benchmark against which these events could be measured.

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APPENDIX

Appendix 1: Goldstein scale

-10.0	223	Military attack; clash; assault
-9.2	211	Seize position or possessions
-8.7	222	Nonmilitary destruction/injury
-8.3	221	Noninjury destructive action
-7.6	182	Armed force mobilization, exercise, display; military buildup
-7.0	195	Break diplomatic relations
-7.0	173	Threat with force specified
-6.9	174	Ultimatum; threat with negative sanction and time limit
-5.8	172	Threat with specific negative nonmilitary sanction
-5.6	193	Reduce or cut off aid or assistance; act to punish/deprive
-5.2	181	Nonmilitary demonstration, walk out on
-5.0	201	Order person or personnel out of country
-4.9	202	Expel organization or group
-4.9	150	Issue order or command, insist, demand compliance
-4.4	171	Threat without specific negative sanction stated
-4.4	212	Detain or arrest person(s)
-4.1	192	Reduce routine international activity; recall officials
-4.0	112	Refuse; oppose; refuse to allow
-4.0	111	Turn down proposal; reject protest, demand, threat
-3.8	194	Halt negotiation
-3.4	122	Denounce; denigrate; abuse
-3.0	160	Give warning
-2.4	132	Issue formal complaint or protest
-2.2	121	Charge; criticize; blame; disapprove
-2.2	191	Cancel or postpone planned event
-1.9	131	Make complaint (not formal)
-1.1	063	Grant asylum
-1.1	142	Deny an attributed policy, action, role or position
-0.9	141	Deny an accusation
-0.2	023	Comment on situation
-0.1	102	Urge or suggest action or policy
-0.1	021	Explicit decline to comment
-0.1	094	Request action; call for
0.0	025	Explain or state policy; state future position
0.1	091	Ask for information
0.6	011	Surrender, yield to order, submit to arrest
0.6	012	Yield position; retreat; evacuate
1.0	031	Meet with; send note
1.2	095	Entreat; plead; appeal to; beg
1.5	101	Offer proposal
1.8	061	Express regret; apologize
1.9	032	Visit; go to
1.9	066	Release and/or return persons or property
2.0	013	Admit wrongdoing; apologize, retract statement
2.5	062	Give state invitation
2.8	054	Assure; reassure
2.8	033	Receive visit; host
2.9	065	Suspend sanctions; end punishment; call truce
3.0	082	Agree to future action or procedure, to meet or to negotiate
3.4	092	Ask for policy assistance
3.4	093	Ask for material assistance
3.4	041	Praise, hail, applaud, extend condolences
3.6	042	Endorse other's policy or position; give verbal support
4.5	053	Promise other future support
4.5	051	Promise own policy support
5.2	052	Promise material support
5.4	064	Grant privilege; diplomatic recognition; de facto relations
6.5	073	Give other assistance
6.5	081	Make substantive agreement
7.4	071	Extend economic aid; give, buy, sell, loan, borrow
8.3	072	Extend military assistance

Appendix 2: Religions

CODE	LABEL
ADR	African Diasporic Religion
ALE	Alewi
ATH	Agnostic
BAH	Bahai Faith
BUD	Buddhism
CHR	Christianity
CON	Confucianism
CPT	Coptic
CTH	Catholic
DOX	Orthodox
DRZ	Druze
HIN	Hinduism
HSD	Hasidic
ITR	Indigenous Tribal Religion
JAN	Jainism
JEW	Judaism
JHW	Jehovah's Witness
LDS	Latter Day Saints
MOS	Muslim
MRN	Maronite
NRM	New Religious Movement
PAG	Pagan
PRO	Protestant
SFI	Sufi
SHI	Shia
SHN	Old Shinto School
SIK	Sikh
SUN	Sunni
TAO	Taoist
UDX	Ultra-Orthodox
ZRO	Zoroastrianism

Appendix 3: All included countries

COUNTRY	CODE
Australia	1
Austria	2
Belgium	3
Brazil	4
Canada	5
Chile	6
China	7
Columbia	8
Czech Republic	9
Denmark	10
Egypt	11
Finland	12
France	13
Germany	14
Greece	15
Hong Kong	16
Hungary	17
India	18
Indonesia	19
Ireland	20
Israel	21
Italy	22
Japan	23
Korea	24
Malaysia	25
Mexico	26
Netherlands	27
New Zealand	28

Norway	29
Peru	30
Philippines	31
Poland	32
Portugal	33
Russia	34
Singapore	35
South Africa	36
Spain	37
Sweden	38
Switzerland	39
Taiwan	40
Thailand	41
Turkey	42
United Kingdom	43
United States of America	44

Appendix 4: T-test for each individual event

	Amount			
Significantie	test_par_1	test_par_2	test_par_3	test_par_4
10%	31	31	17	9
5%	30	30	17	9
1%	9	14	1	0

	Amount			
Significantie	test_ar_1	test_ar_2	test_ar_3	test_ar_4
10%	29	34	17	9
5%	26	34	17	9
1%	13	14	2	0