International conflicts and the United States stock market

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Abstract:

This paper examines the impact of international conflicts on the United States stock market using daily data from January 2000 until February 2014. A crisis index is created to act as a proxy for perceived conflict risk. The empirical analysis consists of two parts, both the influence of conflicts on the aggregate market and the effect on individual stocks is determined. The impact of the crisis index on the market yields some unexpected and interesting results. An increase in the index is related to a higher market excess return and market volatility is not significantly influenced by a rise in the conflict-related news. A cross-sectional analysis that uses a broad portfolio of stocks presents no evidence that conflict risk is priced. The stocks with different exposures to this risk do not have diverging returns.

Keywords:

International Conflicts; Stock Market Return; Conflict index; Crisis Index; Volatility premium; Equity Premium; International Political Crises

JEL code classifications:

G10; G12; G15

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Table of contents

1. Introduction

The impact of international conflicts on the asset market is a subject multiple researchers have covered in the past. The relationship between the capital markets and war, conflicts, rare disasters and large consumption declines have all received considerable attention. The tensions between nations have always been present in the world. International conflicts and crises can have a major impact on the everyday life in the world and this does not exclude the stock markets. Some of the most recent conflicts like the Syrian War, with its corresponding refugee crisis, and the Arab Spring are very important events that could impact the stock markets greatly. Moreover, for instance, the nuclear threats from North Korea can bring a lot of uncertainty in the world. A conflict does not necessarily have to escalate to have its effect, merely the threat of a conflict can be enough to turn investors nervous as it could create an uncertain outcome in the near future.

The global stock markets, measured by the total market capitalization of domestic listed companies peaked at almost 80 trillion US dollar in 2017. The $79.2 trillion figure is an all-time high and is up from $2.5 trillion in 1980. Right now the worldwide market capitalization is 30 percent higher than the 2007 top of $60.3 trillion. The United States accounts for $32.1 trillion and is, therefore, the largest stock market by some length. In comparison, the second largest national stock market is China, with a market value of $8.7 trillion. The Chinese stock market has been developing and growing enormously over the years though and is gaining importance (Worldbank, 2018).

In the current globalized world, many businesses do not keep their operations within their domestic borders and have a presence all around the world. It is highly relevant to determine how major global conflicts, as well as smaller ones, influence the integrated financial and capital markets. Moreover, the potential for rare economic disasters can explain many of the current puzzles in asset-pricing (Barro, 2006). The question addressed in this study is relevant for both individual and institutional investors. They can benefit from the knowledge how the stock market reacts with the occurrence of a major international conflict. It is worthwhile to know when creating a portfolio whether stocks with a higher sensitivity to conflict risk yield higher returns compared to stocks that have a lower

sensitivity. Shareholders would like to know whether this risk is priced and if they get rewarded for this uncertainty.

In this paper, the impact of the involvement of the United States in international conflicts is determined on the US stock market. The focus on the US market and its involvement in conflicts is based on two main reasons. First of all, the country is a dominant player on the global political stage and the instability risk is highly relevant for the market (Chen, Lu and Yang, 2014). In addition, the US stock market accounts for more than 40 percent of the global market capitalization as is noted earlier in this introduction.

The empirical tests are split into two subsections. Firstly, an analysis is performed on the aggregate market return and the market volatility. This first part attempts to answer the question whether asset prices react to the changes in the conflict risk and whether the market volatility is influenced by these same changes. Secondly, a cross-sectional part aims to provide support for the statement that individual stocks that have a larger exposure to the conflict risk should have higher expected returns to compensate for this risk. A time-varying risk approach is used to test this proposition. The financial markets are always forward-looking, the perceived probability of a conflict and/or political crisis can already have a big influence without it even happening. And as these expectations change continuously a time-varying risk approach is the most applicable and suitable research method.

Disaster risk and conflict studies are not a new research area. Recently there have been multiple interesting studies in this field. Some relevant and important contributions from the last ten to fifteen years have been made by, amongst others, Barro (2006), Berkman, Jacobsen and Lee (2011), Gabaix (2012), Wachter (2013), Chen, Lu and Yang (2014) and Brune, Hens, Rieger and Wang (2015). However, some of the results of these papers have been contradicting. The response of the stock markets on international conflicts can be both positive and negative and in other cases no significant link is found. This research attempts to clarify this relationship and improve the understanding of the topic. The main contribution of this study compared to the existing literature is the fact that the analysis is executed with daily data and that the conflict index is constructed with the use of the GDELT project database. Until now, most previous papers concerning this topic have used a monthly time-interval and the daily data could provide some new insights.

The empirical results of this study, which are based on thousands of conflict-related news and events are to some extent different from previous studies. The increases of the index constructed to capture crisis risk are significantly and positively, although the economic effect is small, related to the market return. This is in contrast with the hypothesis and many previous studies, but it could possibly be explained by the fact that conflicts may result in a better and more stable long-term outcome. Moreover, no significant outcomes are present for the interrelationship between volatility and the conflict index. Finally, I do not find evidence that the risk of conflict is priced in a portfolio of stocks. The expected returns of stocks that have a higher sensitivity to the index are found not to be different from those that have a lower exposure. The results imply that investors probably do not view conflict risk as a signifcant source of (systematic) risk.

In the next section, the existing literature concerning international conflicts, time-varying disaster risk and the capital markets will be reviewed. First the theoretical framework will be determined and afterwards, a selection of the most relevant empirical studies will be discussed. These will give a good overview of what already has been tested concerning the impact of international conflicts on the stock markets. Subsequently, section 3 will first state the hypotheses and then explain how these will be tested by discussing the model and methodology. Section 4 will describe and review the data and elaborate on the index creation process. Section 5 of this thesis will show the empirical results, the discussion of the outcomes and the final section 6 will review the most important conclusions from this study.

2. Literature review

Prior to discussing the empirical model and the data of this research, it is crucial to review why there should be a relation between global conflicts and the stock market in the first place. Moreover, some of the major empirical results from previous authors are relevant to get a better understanding of this interrelationship.

2.1 Theoretical background

The prices of stocks are determined by the supply and demand in the market and their returns usually fluctuate on the revisions of future earnings and dividends. These prospective cash flows can be valued differently with changing discount rates, which can also cause the stock price to change. The efficient markets present value model follows this line of thought. The fluctuations in the stock market are either a consequence of changing discount rates or revised expected future cash flows. According to this model, assets should always reflect their fundamental value (Barsky and Bradford De Long, 1993). Fama (1970) defines such an efficient market as the one that fully incorporates all of the available (public) information. However, the theory cannot explain all of the movement in asset prices. At the beginning of the 1980's strong evidence was found that this model can be improved significantly by most importantly Shiller (1981), LeRoy and Porter (1981) and Mehra and Prescott (1985).

Many asset pricing puzzles arise from the fact that there is a significant difference between the observed risk premia and the ones that are calculated by a model. For example, the equity risk premium, which translates to the expected excess return of holding stocks over bonds is much higher than is rationally expected (Wachter, 2013). Fama and French (2002) estimate these equity premia with the growth rates of both dividends and earnings. Their estimates using data from 1951 to 2000 give a premium of 2.55 percent for dividends and 4.32 percent for earnings. These estimates are a lot less than the equity premium of the average stock market return, which averaged 7.43 percent in those 50 years.

Mehra and Prescott (1985) conclude that the observed equity premium is way too small when it is predicted by the fluctuations in the consumption growth rate in the United States. This is done under the assumption of normal levels of risk-aversion. Infrequent and unlikely market crashes are found to be a fitting solution for the high risk-premia for equities and low

risk-free rates (Rietz, 1988). However, it remains to be seen if the risk for such a crisis is severe enough to fully explain the observed premium.

The volatility of the stock market is another puzzle. Shiller (1981) argues and proves that the volatility in the stock market is not justified by the changes in the dividends. Even when it is assumed that the logarithmic dividends were a random walk with a trend and independent increments, the volatility of the market greatly exceeds that of the dividends. For the volatility puzzle, it is relevant to note that the time variation of risk premia seems to be a major determinant of the stock market changes (Tsai and Wachter, 2015). Researchers have tried to explain this puzzle in the last decades. For example, Gabaix, Gopikrishnan, Plerou and Stanley (2006) have tried to link the excess volatility in the market to the behaviour of large institutional investors. According to their theory, large increases in trading volumes and returns are caused by a combination of both news and the trades that institutions execute.

When a regional (political) incident, crisis or conflict occurs, the global markets tend to react to such events. Previous research has determined that emerging markets tend to react differently and more negatively. This could mean that individual countries have different exposures to global political risk factors. An implication of this finding is that investors demand a greater return compensation in emerging markets to offset a higher exposure to (political) instability (Chen, Lu and Yang, 2014). These international crises could be one of the explanations for both the equity and volatility risk premia as identified in the earlier mentioned papers of Shiller (1981) and Mehra and Prescott (1985). The empirical finance literature has provided substantial evidence that these risk premia do vary over time, and are also found to be countercyclical (Gourio, 2012). Furthermore, an earlier paper of Gourio (2008b) shows that equities react more negatively to increases in disaster probability compared to bonds. This finding is confirmed by Gabaix (2012) who discovers that high yield assets, such as stocks, perform particularly poorly during disasters. A similar effect can be expected in the case of international conflicts.

Barro (2006) expands the Rietz model and proves that it is possible to clarify the equity premium when the disaster probability is calculated for a large number of countries. The study uses data from significant international economic contractions over the past century, including the Great Depression, World War I and World War II. Building on the work of Rietz (1988) and Barro (2006), Wachter (2013) extends this Barro-Rietz model by introducing a

continuous time endowment model with time-varying probability for rare disasters. This model can explain multiple characteristics of the aggregate stock market. In addition to the equity and volatility premia, it can also clarify the excess return predictability that is present in the data. Wachter (2013) also argues that the value of a dividend claim declines when the probability of a crisis rises. The investor demands a compensation for this risk and because the economic utility is recursive, the observed equity premium surges with a time-varying disaster risk.

One possible explanation for this 'disaster risk' concerns the rational expectations of investors. A rise in the probability of a disaster affects the real economy through lower expectations and increased risk (Gourio, 2012). A highly unlikely conflict could have a significant impact on both the investment and stock market returns. Low probability disasters and conflicts can potentially explain the equity premium puzzle, volatile stock markets and a low risk-free rate according to Barro (2006). An alternative interpretation is a behavioural explanation. The disaster risk is captured by the sentiment and beliefs of investors, which can vary over time. This sentiment alters between optimistic periods with high growth and little uncertainty and periods where the uncertainty is very high and growth is much lower. This asset price variation does not necessarily have to be connected to both future and current productivity levels. It does, however, influence macroeconomic factors (Gourio, 2012).

Most of the previous literature on this subject has opted for a time-varying rare disaster approach. According to this line of research, unlikely but significant production shocks as a result of an international conflict can cause increasing risk-premiums and enhance volatility in the market (Chen, Lu and Yang, 2014). In this study, this same time-varying approach is adopted. It could be that fluctuations in the sentiment of investors have cross-sectional implications when particular categories of stocks have different sensitivities to these changes in the market sentiment (Nagel, 2013).

2.2 Empirical outcomes

In section 2.1 the theoretical framework of this study is discussed. In this subsection, some of the most relevant empirical work will be reviewed.

Berkman, Jacobsen and Lee (2011) studied the effect of time-varying disaster risk on the performance of the stock market. A time-varying indicator for rare disaster probability is constructed through the use of the International Crisis Behavior (ICB) database. They find that the occurrences of international crises are significantly related to lower global stock returns and increased volatility. This especially holds for crisis starts, in those periods a profound and negative impact on the stock market is observed. The crisis risk is also positively correlated with the price-earnings ratio. Moreover, the authors see that the impact on the market is larger when more major nations with a lot of political power are involved. A time-period from 1918 to 2006 is used and the results remain similar when excluding the first 30 years of the sample period. Finally, the authors find the industries in the United States that have a greater exposure to 'crisis risk' have, on average, higher returns.

Brune et al. (2015) study multiple large wars in the recent history and find that an increased likelihood of war decreases the prices of stocks. However, when the war eventually breaks out, the authors provide evidence for a positive impact. This is not the case for unexpected and sudden conflicts and in those circumstances, the stock market reacts negatively.

Wars can be very costly to the economy. In the same paper of Brune et al. (2015), the most expensive wars to the US economy are shown from a research by Stephen Daggett. The second World War is with 4114 billion and 35.8% of GDP (in 2008 US dollars) the most expensive. The impact of both the Iraq and Afghanistan wars are also listed, both of which are included in this research's timeframe. The damage of the Iraq War to the economy is estimated to be 648 billion in 2008 US dollars and the Afghanistan War 171 billion, which translates to 1.0% and 0.3% of GDP respectively.

Focussing on country-specific effects, Guidolin and La Ferrara (2010) discover that while many indices in other countries have generally mixed reactions to the start of major conflicts, the indices in the United States tend to respond positively to this event instead of a negative reaction. In combination with results from other papers, it is concluded that the US market is often subject to uncertainty concerning a prospective conflict or war. Hence, the beginning of a conflict itself takes away this uncertainty and the asset prices respond accordingly. In an article by Schneider and Troeger (2006) the authors find that the markets normally react negatively to conflicts. However, 'war rallies' do occasionally occur. It is

argued that in those circumstances the investors view a conflict as less problematic to an alternative outcome by reducing uncertainty.

Gabaix (2012) proposes a new approach to the rare disaster hypothesis. Instead of a constant severity, a varying severity framework is used to be able to explain asset return predictability, volatile price-dividend ratios for equities and volatile risk premia for bonds. This variable rare disaster model can improve the understanding of some of the major finance puzzles and is able to explain the 'excess' volatility that is present in the capital markets. The possibility of disaster impacts mainly the risk premium, and to a lesser extent the expected loss.

The 'fear' in the market can play an important role when asset prices are driven by the time-varying tail risk. The expectations of investors of this risk can be difficult to capture. However, Bollerslev and Todorov (2011) determine the concerns for these unlikely events with the help of daily data and option prices. They find evidence that the risk premia can actually be attributed to these tail events and prove to be a significant part of the entire equity premium. Lastly, it is concluded that this premium is changing a lot over time.

Rigobon and Sack (2005) find that increased 'war risk' in the first 3 months of 2003 leading to the beginning of the Iraq War has a considerable negative impact on stock prices. In their paper, the authors empirically measure the effect of war-related news on the financial markets in the United States. Furthermore, the relative importance of the 'war risk' is high as a substantial part of the variation in the variables can be explained by this factor. It can be concluded that investors do care about the risk of a conflict and act accordingly. The days with a lot of war-related news are more volatile as well and, therefore, the risk of war can account for a relevant portion of the movements of stock prices.

3. Model & Methodology

3.1 Hypotheses

In order to test the impact of international conflicts on the US stock market, the empirical analysis will focus on testing two main hypotheses. The first one will concern the aggregate market and its volatility, while the second hypothesis is about the time-varying expected return of individual stocks and their sensitivity to the conflict risk. It concerns one of the fundamental debates in financial economics. It will consider whether assets, that have different exposures to risk and different characteristics, are priced by the market to earn distinct rates of return (Nagel, 2013).

Hypothesis 1: An increase in conflict risk will have a negative impact on the average market return and will tend to increase market volatility. Hence, it is expected that $\beta_1 < 0$ in equation one and $\beta_1 > 0$ in the second model (Wachter, 2013). A sudden rise in conflict risk will bring uncertainty to the stock market and will increase the risk for investors. This can cause negative returns and the increased uncertainty will surge the dispersion of returns (Gourio, 2012).

Hypothesis 2: This hypothesis concerns the question whether conflict risk is priced. For this pricing to hold the assets that do relatively well when there is an increase in conflict risk should have lower expected returns. In contrast, assets that are performing poorly in such a scenario are expected to have higher returns. Stocks that are more resilient to conflict risk will have lower equity premiums and higher valuations. In other words, this implicates that stocks that are more conflict risk sensitive will have, on average, higher expected returns to compensate for this risk (Gabaix, 2012; Berkman, Jacobsen and Lee, 2011; Gourio, 2008a). This time-varying equity premium is expected to be recognized with a negative value for β^{Crisis} in model number four, meaning that the shares of companies that do well during crisis periods have, on average, lower expected returns.

The first hypothesis will be tested by model one and two. These models concentrate on the return and volatility impact on the entire US stock market, while hypothesis two will be tested with the help of models three and four. More specifically, I first perform a rolling window regression and then a Fama-MacBeth (1973) cross-sectional regression. The

methodology used in this research is to a large extent similar to the article of Berkman, Jacobsen and Lee (2011).

3.2 Empirical model aggregate analysis

To determine whether the aggregate US stock market is influenced by international conflicts, the impact of the daily crisis index on the stock market returns is tested with model one below. With the help of a news coverage analysis, a conflict index is created. This index will act as an indicator of conflict risk on every date included in the sample. More detailed information about the index creation is provided in the following section. First, the model for the market returns is presented.

$$r_t^{USA} = c + \beta_1 Index_t + \varepsilon_t \quad (1)$$

In equation one the r stands for the Fama en French excess market return on day t, c is the constant, Index is the index value on day t and ε_t stands for the error term. The results of this regression are reported in the tables in section 5.1.

The volatility analysis is executed in a similar way, only substituting the Fama en French excess return with the return on the volatility index VIX. This index is constructed by the Chicago Board of Options Exchange (CBOE) and is commonly referred as an 'investor fear gauge'. Hence, in equation 2 r_t is the daily return on the S&P 500 VIX index and the other variables are the same as in the first model. These results are also reported and discussed in section 5.1 of this study.

$$r_t^{VIX} = c + \beta_1 Index_t + \varepsilon_t \quad (2)$$

3.3 Cross-sectional analysis

To be able to answer hypothesis two a different approach is required. A combination of a rolling window regression and a two-step Fama-MacBeth (1973) regression will help to determine the cross-sectional relationship between the next month return of each stock and its corresponding crisis sensitivity. A great number of US stocks is included in the analysis based on the selection criteria outlined in the next chapter.

It is important to elaborate on the relation between the average return and risk. Building on the work of Markovitz (1952), the creation of the capital asset pricing model (CAPM) by Sharpe (1964) and Litner (1965) has been very influential in the asset pricing theory. The

model forecasts that in equilibrium everyone will hold the market portfolio. Therefore, this means that only systematic risk will be priced and idiosyncratic risk will not be priced (Fu, 2009). Moreover, the early work on market efficiency assumed that equilibrium expected returns are constant over time. This is unlikely to be true since the expected return of a stock is a compensation for the risk that is taken. The risk appetite, the willingness to take this risk and the risk itself are continuously changing. For this study, this implies that if assets are priced rationally, the stocks that have a higher vulnerability towards the conflict risk should have higher expected returns. Investors will, in this case, incorporate this source of risk in their investment decision. However, they will only do this if the risk is perceived severe enough to have major implications. The asset-pricing literature finds significant cross-sectional predictability and the ability to describe the cross-sectional returns. The outcomes of this analysis are mainly interesting for long-term investors and how they create their portfolio and how they evaluate performance (Fama and French, 1992).

First, the variables are regressed to estimate the factor loadings for the Fama and French factors and the crisis sensitivity for each of the included individual stock *i*. This procedure is shown in model three.

$$r_{i,t} = \alpha_{i,t} + \beta_i MKTRF_t + \beta_i SMB_t + \beta_i HML_t + \beta_i Crisis_t + \eta_{i,t} \quad (3)$$

In this model $r_{i,\tau}$ is the holding period return of the stock on day τ, MKTRF, SMB and HML are the Fama-French factors for the market, size and book to market ratio respectively. Furthermore, the Crisis variable is the index value on that particular day, α is the constant and η the error term. The regression is performed as a rolling window regression. The rolling window is set to be equal to 365 calendar days (τ= t-365) which translates to about 252 trading days in most years. The highest number of trading days is 253, while the lowest number is 248 trading days because of the terrorist attacks on the World Trade Center in New York on September 11, 2001. As a result, the stock exchanges in the city were closed for a number of consecutive days

The factors from the three-factor model will improve the ability of the model to explain a stock's performance and the cross-sectional variation in the expected returns. Previous research concluded that these variables do empirically well when describing the returns of stocks. Small firms are expected to have higher returns because of excess risk and an

increased cost of capital. And companies with poor growth prospects, indicated by low prices and high book-to-market ratios, can also have higher expected returns than with firms with strong outlooks (Fama, French, 1993). Together with the crisis variable, they form the risk factors that aim to explain the expected return of the stock.

Subsequently, with the beta's that are estimated by the previous model, the second step can be executed. A Fama-MacBeth (1973) cross-sectional regression is performed with the use of these factor loadings and the crisis sensitivities. Every last trading day of the month is kept for analysis and all the other days are dropped from the sample. The dependent variable $r_{i,t}$ in model four stands for each stock's next month return. In every month the crosssection of the returns on stocks is regressed on the factors that are theoretically determined to explain the expected returns. The time-series means of these monthly regressions tell whether the included explanatory variables are, on average, priced. To prevent the occurrence of autocorrelation in the standard errors, the Newey-West (with one lag) method is applied to this model's results. This is a common procedure used in other studies as well.

Before the second step is executed, the crisis sensitivities $\beta^{Crisis}_{i,t-1}$ are transformed into decile ranks and afterwards those ranks are scaled back to an interval between zero and one. This transformation facilitates the interpretation of the results and reduces the sensitivity to measurement related errors (Berkman, Jacobsen and Lee 2011; Nagel, 2005).

$$r_{i,t} = \gamma_t + \gamma_{MKTRF,t}\beta^{MKTRF}_{i,t-1} + \gamma_{SMB,t}\beta^{SMB}_{i,t-1} + \gamma_{HML,t}\beta^{HML}_{i,t-1} + \gamma_{Crisis,t}\beta^{Crisis}_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

The results of the regression of model four are reported in section 5.2 of this study.

4. Data

4.1 Data sources and descriptives

This dataset includes observations from the first day of the year 2000 until the first two months of 2014. It covers 3552 trading days out of the total 5162 calendar days that are part of this period. This study focusses on the United States as the US stock markets are, as is noted in the introduction, by some length the biggest and most important in the world. Furthermore, as a 'global superpower', the US government and the United States in general, are often involved as a leading nation in interventions and major international conflicts. The included variables and their descriptives are shown in tables 1a, 1b and 2a.

The conflict index in this research is constructed through the use of the GDELT project database. GDELT is created by Kalev H. Leetaru and is an open database that monitors the global human society. The platform is very comprehensive and monitors all the world's main news media outlets from almost all corners of the planet. GDELT includes print, broadcast, and web formats, which makes it a very suitable database for studying international conflict impact (GDELT, 2018). This database has the great advantage that it includes very reliable data which is also available on a daily frequency that is required for the analysis. Specifically, the GDELT 1.0 'reduced' event dataset is used for the regression analysis. The stock market return and volatility data are coming from other databases, which were accessed through WRDS. A more detailed overview of the data sources and the variables can be seen in table 2b.

Variable	Obs	Mean	Std. Dev.	Min	Max
Market Excess Return (MKTRF)	3,552	0.000171	0.013234	-0.0895	0.1135
SMB	3,552	0.0001726	0.0064529	-0.0508	0.0383
HML	3,552	0.0002239	0.007063	-0.0422	0.0483
VIX return	3,552	0.001884	0.065366	-0.29573	0.642153

Table 1a: Return variables and descriptives

	Obs	Mean	Std. Dev.	Min	Max
Day Total	5,162	2192.661	1988.839	97	12116
Index- Broad 25%	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Crisis value	5,162	53.97152	52.34652	0	390
Index	5,162	0.024734	0.010783	0	0.092077
Index- Sritct 25%					
Crisis value	5,162	46.25397	46.57211	0	346
Index	5,162	0.0202331	0.0091742	0	0.0856531
Index- Broad 10%					
Crisis value	5,162	20.81441	22.21115	0	157
Index	5,162	0.0088181	0.0051375	0	0.0457516
Index- Sritct 10%					
Crisis value	5,162	18.40914	20.07095	0	141
Index	5,162	0.0076366	0.0046842	0	0.0413943
Index- Broad 5%					
Crisis value	5,162	10.29427	11.68899	0	95
Index	5,162	0.0044263	0.0033354	0	0.0283019
Index- Sritct 5%					
Crisis value	5,162	9.170089	10.69686	0	87
Index	5,162	0.0038243	0.0030267	0	0.0283019

Table 1b: Variables and descriptives of the index.

Variable	**Description**
Crisis Value	The sum of the number of events qualifying for the index
Index	Crisis value/ Day total
Day total	The sum of the number of news events on a particular day. These are all the observations with US involvement (only international events, the domestic events are excluded from the sample). These events are not filtered based on cameo code, it solely acts as a way to correct the index for the skewness in the dataset. This value is fixed for all of the indices, which means the crisis value is the only changing part of the calculation.

Table 2a: Overview and definition of the created variables

Source	Label	Description
GDELT Project (https://www.GDELTproject.org/)	Conflict/Crisis Index	A indicator for conflict risk (see table 2a for more information)
CRSP - The Center for Research in Security Prices (accessed through WRDS)	Stock Holding Period Return	The total return that is received for holding an asset over a certain period
	Share Price	Closing price on a trading day
	Shares outstanding	Number of (public) shares outstanding
Fama French factors (accessed through WRDS)	Market Excess Return |MKTRF	This variable describes the excess return on the US stock market. Specifically, it is the value-weighted return from all NYSE, NASDAQ and AMEX stocks substracted by the one-month Treasury bill rate
	Small minus Big | SMB	SMB represents the average return on three small Fama-French portfolios minus that of the three big portfolios
	High minus Low (HML)	HML is calculated as the average return on the two value portfolios from Fama and French substracted by the average return on the two growth portfolios
CBOE Indexes (accessed through WRDS)	VIX – volatility index	The VIX is the approximation of the market's expectation of the 30-day volatility measured through the S&P 500 index option prices

Table 2b: Variables, definitions and their respective sources.

4.2 Index construction and relevance

To be able to determine the impact of international conflicts and the corresponding crises on the US stock market, an index is created to capture the conflict risk perceived by the investors. The entire empirical analysis is based and reliant on a relevant index. Therefore, I will explain the decisions and criteria for the conflict index in this part. A suitable index only includes the events and developments investors and portfolio managers are concerned with. In addition, the index only includes the events that can have severe enough consequences.

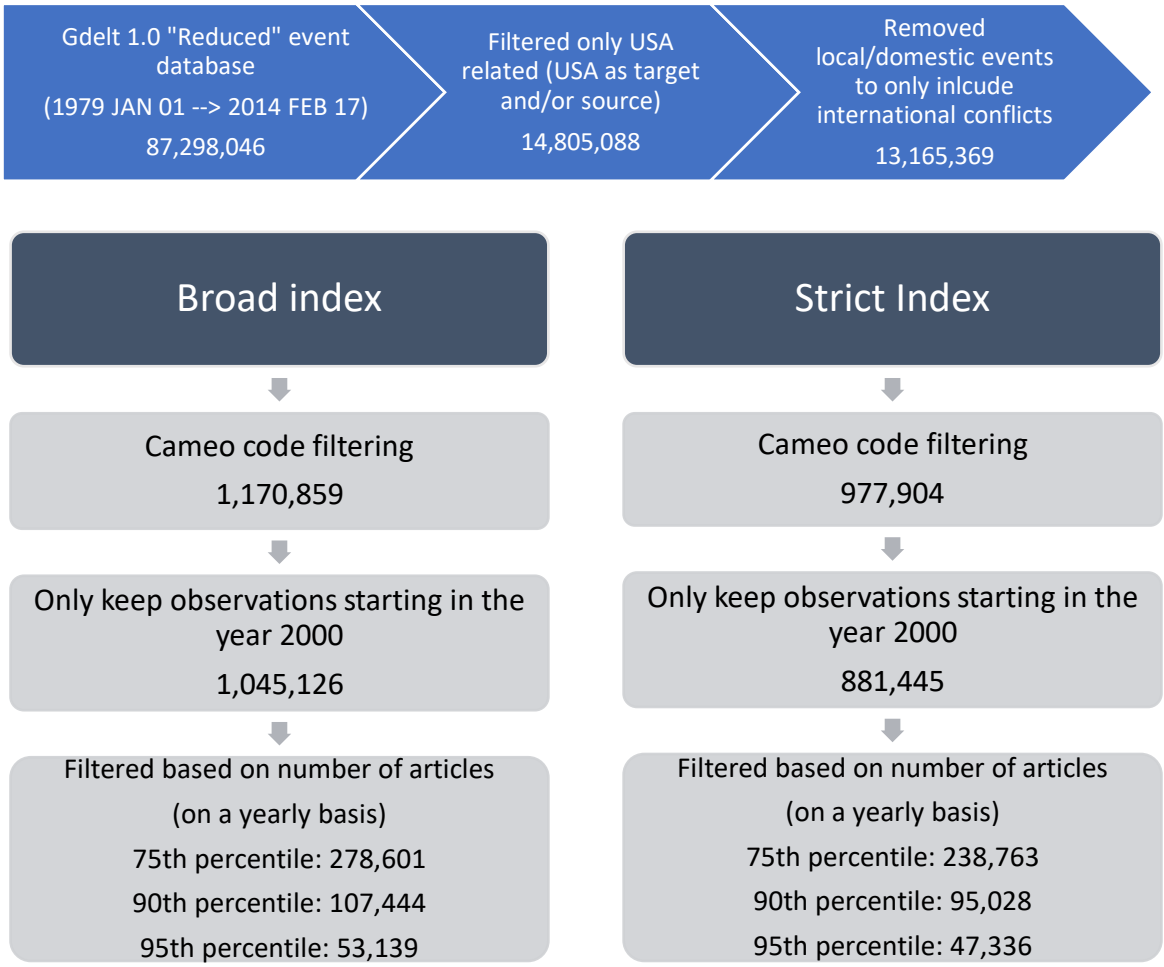

Figure 1: Data selection process diagram

First of all, the index is created with two distinct definitions. There is both a broader and a stricter index, with the biggest difference between the two indices being that the broader index includes threats and the strict index does not. Moreover, a couple of less important events are excluded from the strict index. The strict index only includes cases related to (physical) violence, conflicts and attacks. However, for the largest part, the indices contain the same events and both only contain the developments that can potentially have the greatest impact on the stability of the US economy. The tables with the selected events and corresponding frequencies are included in the appendix of this study.

Both the strict and the broad indices are constructed with different thresholds for the number of articles as an indicator of the importance of a particular event. In the GDELT codebook, the variable 'number of articles' can be used as a way of assessing the potential importance of an event. The more discussion there is about a certain matter, the more likely

it is to have a significant impact on both the stability of the country and its stock market. The variable is defined as the number of sources containing one or more mentions of this event (GDELT Dataformat Codebook, 2013). Figure 1 provides an overview of the data selection process.

With this criterium, the 25%, 10% and 5% most 'important' events are filtered and together they form the conflict indices. Introducing the threshold gets rid of any irrelevant cases and leaves the most applicable and important in the index. This correction mitigates the risk that investors might not have been aware of an event or the fact that the news is not that meaningful. This procedure is executed on a yearly basis since the number of articles is very much skewed to the more recent years in the database.

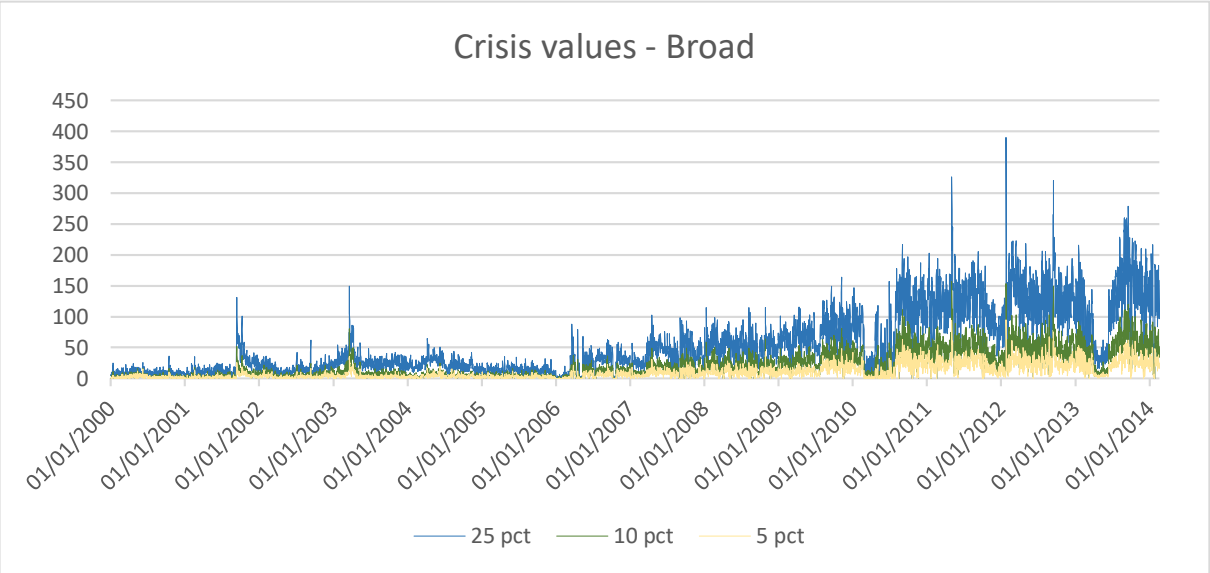

Figure 2a: The crisis values – broad index

To keep the consistency and improve comparability the number of articles for the strict index was also based on the broad index values. This has been done carefully and since the differences were either non-existent or very small, the influence of this decision on the outcomes will be negligible. It can be seen that also the index value is highly skewed to the more recent years in the sample. This is probably caused due to an increased number of sources over time, leading to more and better coverage. The spikes of the crisis values in 2001 and 2003 from figure 2a and 2b are relatively low compared to the average in for

example 2012. These peaks do belong to the most influential in the sample period and because of that an adjustment is necessary to end up with a reliable indicator of conflict risk. The index is corrected for this issue by dividing the index value by the total number of events on every single day (see table 2a). The result and the graphs of the index are summarized in figure 3.

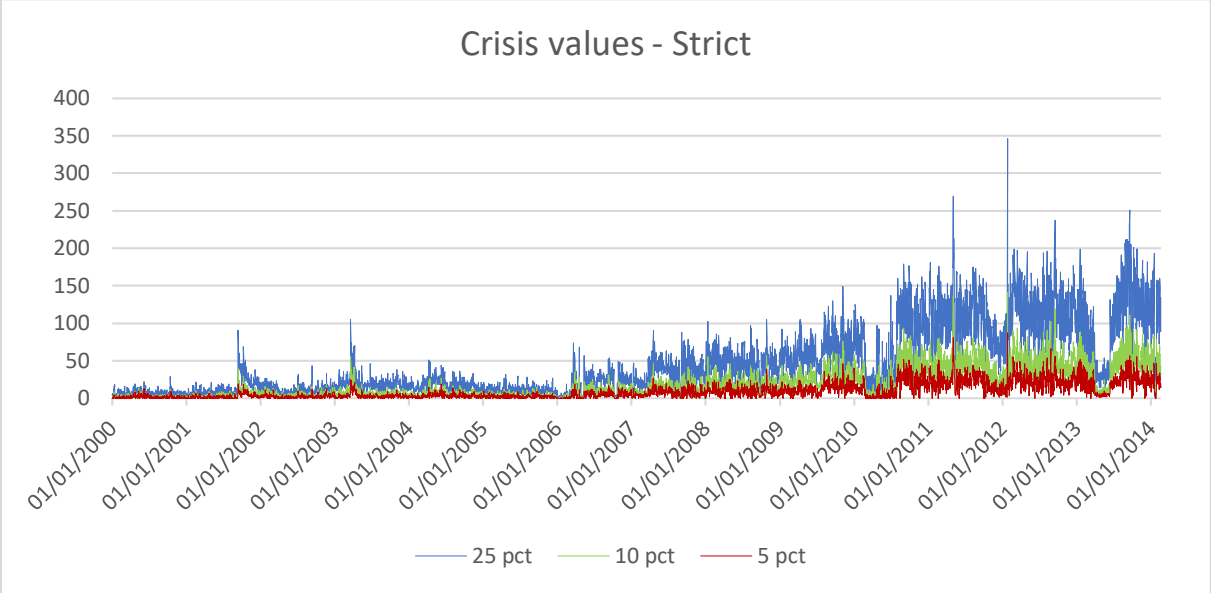

Figure 2b: The crisis values – strict index

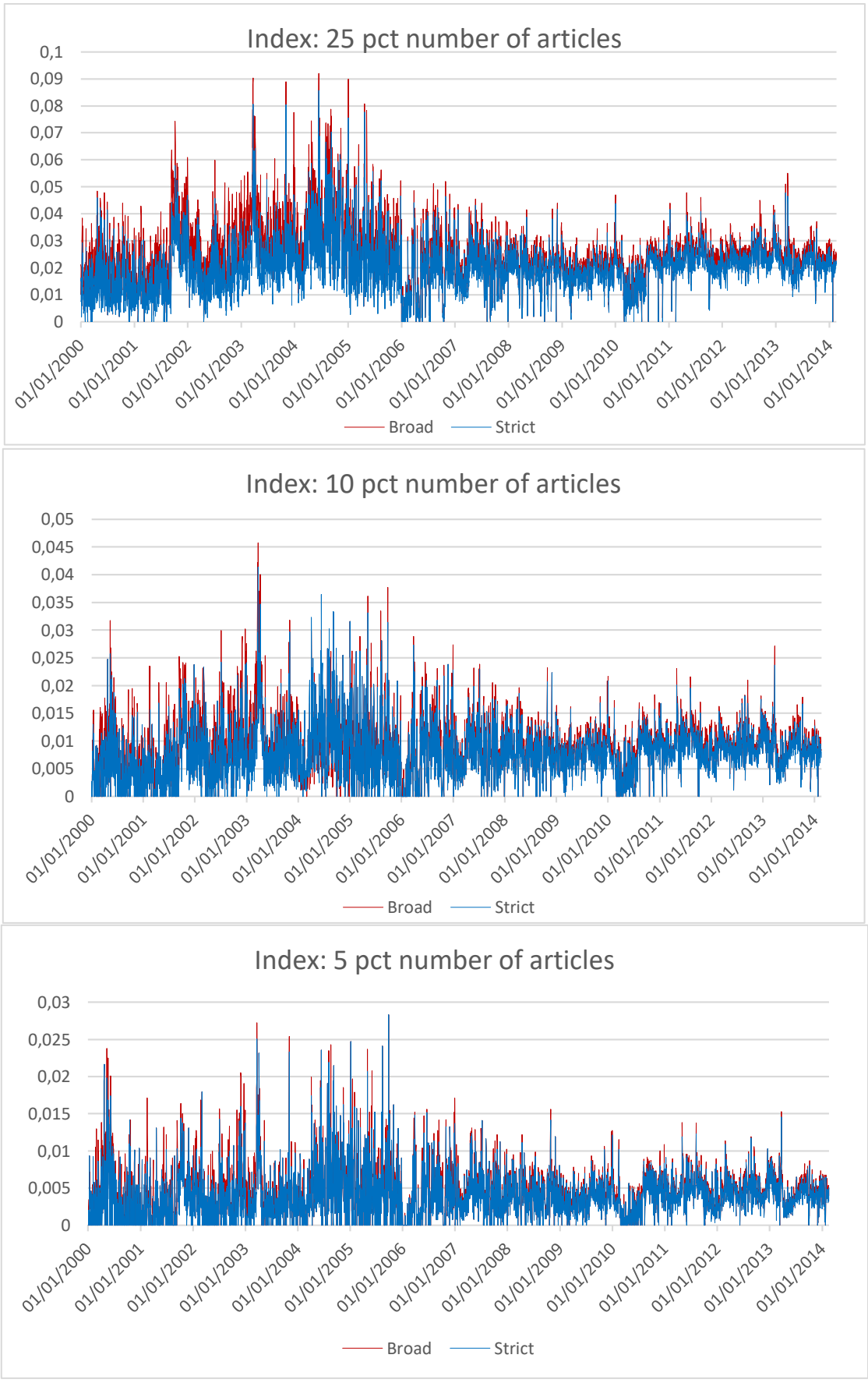

Figure 3: Graphs of the different indices (shown on the page above)

Multiple important and influential events can be identified in the index which are summarized in table 3. The September 11 terrorist attacks and the subsequent invasion of Afghanistan are easily pinpointed. About one and a half years later the start of the Iraq War can also clearly be identified. Moreover, later in the sample period spikes around the US-led intervention in Lybia and the occurrence of the Syrian Civil War can be seen. Generally, the graphs show similar patterns for all the indices. However, the indices with a higher threshold have a much larger frequency of days without any conflict-related news.

Some of the important dates that can be identified in the graphs	
September 11, 2001	The terrorist attack on the WTC in New York
October 7, 2001	The US invasion (with the help of NATO-allies) of Afghanistan, which meant the start of the Afghanistan war
March 20, 2003	Invasion of Iraq by US armed forces, which marked the start of the Iraq war
2011	US-led intervention in Lybia
2012 onwards	Syrian Civil War

Table 3: Important dates in the sample period

4.3 Data for the cross-section

For the cross-sectional analysis, the individual stock portfolio needs to be selected. Figure 4 lists the details of the process. The selection started with all of the available stocks in the US market, including every stock in the CRSP stock data universe. To improve the reliability of the results the penny stocks are removed from the dataset. The official definition of the U.S. Securities and Exchange Commission (SEC) is applied here, which defines a penny stock as a company's stock that trades at less than $5 per share. These stocks are often very illiquid and trade infrequently. Moreover, it is hard and sometimes impossible to value these companies accurately leading to unreliable prices. The SEC generally regards penny stocks as speculative investments (SEC, 2018). The companies whose market capitalization was less than $250 million at one point in the timeframe of the analysis are also removed from the sample. These stocks have potentially similar problems regarding liquidity and risk as the penny stocks. The added benefit from this procedure is that the few very small companies with stock prices above $5 are excluded from the sample as well.

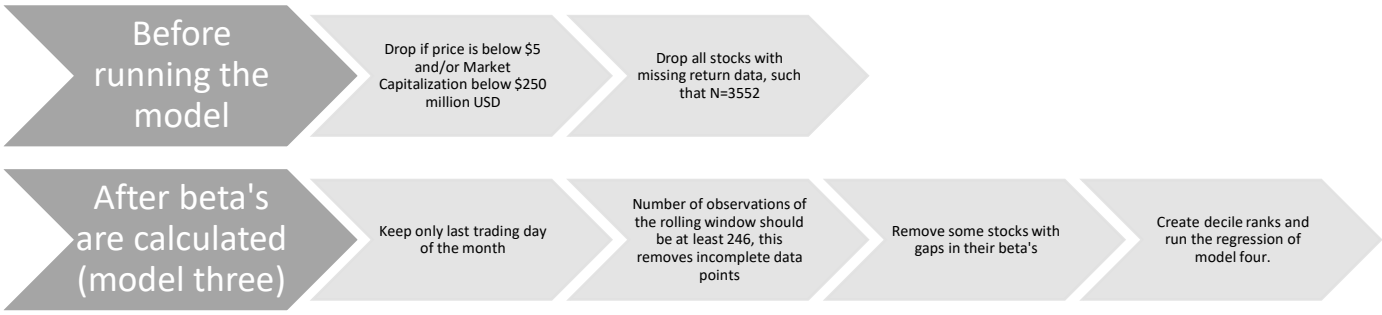

Figure 4: Data selection and steps for the cross-section.

Afterwards, the stocks with incomplete and missing data are removed in order to match the return data with the conflict index. Unfortunately, in the main model, this led to a substantial reduction in the number of included stocks. The sub-analysis which started with the estimation of the factor loadings in 2009 could cover a higher number of stocks as more companies met the selection criteria. This was mainly caused by a reduced number of missing data issues.

Furthermore, some data errors were present with a small number of stocks having return data on non-trading days. These were also removed to create a testable sample.[1]

[1] In almost all of these cases, the 29th of October, 2012 was the issue. On that day the hurricane Sandy landed in New Jersey which forced the stock exchanges in New York to close.

5. Empirical results

5.1 Results aggregate stock market and market volatility

The results of the market regressions are shown in table 4 and table 5. In table 4 the dependent variable is the stock market excess return, while table 5 has the return on the VIX index as its dependent variable. The coefficients in the tables are maybe a little difficult to interpret since they are quite small. To give an example, the return difference between the index value of 0 (its minimum) and 0.092077 (its maximum) would theoretically be 0.0054 in the broad 25% model.

Broad	**25%**		**10%**		**5%**	
	Crisis value	**Index**	**Crisis value**	**Index**	**Crisis value**	**Index**
Constant	-0.003421	-0.0012366 **	-0.0002968	-0.000677	-0.0002756	-0.0004999
T-statistic	-1.06	-2.08	-0.97	-1.48	-0.93	-1.31
Coefficient	0.00000863 **	0.0591579 **	0.0000204 **	0.1008298 **	0.0000396 **	0.1598736 **
Standard error	0.00000391	0.0232374	0.00000920	-0.000677	0.0000175	0.0739949
T-statistic	2.20	2.55	2.22	2.12	2.26	2.16
R^2	0.0014	0.0018	0.0014	0.0013	0.0014	0.0013
(Adj R^2)	(0.0011)	(0.0015)	(0.0011)	(0.0010)	(0.0012)	(0.0010)
Observations	3552					
Period	1/1/2000 – 17/2/2014					
Strict	**25%**		**10%**		**5%**	
	Crisis value	**Index**	**Crisis value**	**Index**	**Crisis value**	**Index**
Constant	-0.0003203	-0.001161 **	-0.0002951	-0.0006795	-0.0002555	-0.0002951
T-statistic	-1.02	-1.99	-0.97	-1.52	-0.87	-0.97
Coefficient	0.00000966 **	0.0687552 **	0.0000231 **	0.1171502 **	0.0000425 **	0.0000231 **
Standard error	0.00000440	0.027774	0.0000102	0.0534976	0.0000192	0.0000102
T-statistic	2.19	2.48	2.26	2.19	2.22	2.26
R^2	0.0014	0.0017	0.0014	0.0013	0.0014	0.0014
(Adj R^2)	(0.0011)	(0.0014)	(0.0012)	(0.0011)	(0.0011)	(0.0012)
Observations	3552					
Period	1/1/2000 – 17/2/2014					

Table 4: Dependent variable: Stock Market Excess Return | *** p<0,01, **p<0,05, *p<0,10

The conflict index coefficients are positive and statistically significant on a 5 percent level in all cases when the market return is the dependent variable. Their economic significance is rather limited though because of the small coefficients. For instance, one standard deviation above the index's mean translates to a 0.00052 return difference in the 10% broad model. There are similar results for all of the other models as well. The outcomes are in contrast to what is expected by the hypothesis, which predicts a negative reaction of the capital markets to rising index values. The crisis value estimates are also in the tables four and five, although they are less meaningful since these are not corrected for the imbalances in the data.

Broad	25%		10%		5%	
	Crisis value	Index	Crisis value	Index	Crisis value	Index
Constant T-statistic	0.0030584 * 1.92	0.0062425 2.12	0.0030584 * 1.92	0.0062425 ** 2.12	0.0028665 * 1.95	0.0036446 * 1.93
Coefficient Standard error T-statistic	-0.0000197 0.0000193 -1.02	-0.18311741 0.1148354 -1.60	-0.0000197 0.0000193 -1.02	-0.1831741 0.1148354 -1.60	-0.0000871 0.0000866 -1.01	-0.4195874 0.365641 -1.15
R^2 (Adj R^2)	0.0003 (0.0000)	0.0007 (0.0004)	0.0003 (0.0000)	0.0007 (0.0004)	0.0003 (0.0000)	0.0004 (0.0001)
Observations	3552					
Period	1/1/2000 – 17/2/2014					
Strict	25%		10%		5%	
	Crisis value	Index	Crisis value	Index	Crisis value	Index
Constant T-statistic	0.0029615 * 1.90	0.0051538 * 1.79	0.0029859 ** 2.00	0.0043295 * 1.96	0.0028199 * 1.94	0.0030852 * 1.67
Coefficient Standard error T-statistic	-0.0000212 0.0000218 -0.97	-0.1687853 0.1372676 -1.23	-0.0000545 0.0000504 -1.08	-0.3368505 0.2643484 -1.27	-0.0000933 0.0000947 -0.99	-0.333231 0.4110192 -0.81
R^2 (Adj R^2)	0.0003 (0.0000)	0.0004 (0.0001)	0.0003 (0.0000)	0.0005 (0.0002)	0.0003 (0.0000)	0.0002 (-0.0001)
Observations	3552					
Period	1/1/2000 – 17/2/2014					

Table 5: Dependent variable: VIX return | *** p<0,01, **p<0,05, *p<0,10

In table 5, the variation of the index does not significantly influence the return on the VIX index. The VIX is in this paper used to act as an indicator of the perceived volatility in the market. Although nothing can be concluded from the results since they are insignificant, it is remarkable to notice negative coefficients. Hypothetically this would actually imply that lower volatility is linked with increased conflict risk. Hence, in this study, international conflicts are not able to explain the 'excess' volatility in the market.

In table 6 the daily index results are taken together to form a monthly index. The coefficient of determination, r^2, is much higher with this monthly transformation. However, hardly any significant results remain with the single exception of the 10% strict index. In that case, only a small positive relationship between the conflict risk and the market return is noticeable. In a similar way, the regressions are also repeated with a one day lag of the index. It does not lead to any surprising or notable differences. These coefficients can be seen in the appendix table 1. The testing of different subperiods did not really result in major differences either.

Broad	Market Excess Return			VIX return		
	Index 25%	**Index 10%**	**Index 5%**	**Index 25%**	**Index 10%**	**Index 5%**
Constant	-0.0121326	-0.0127692	-0.0052462	0.074884	0.0850398 *	0.0724849 *
T-statistic	-0.96	-1.10		1.45	1.80	1.80
Coefficient	0.0196582	0.0575169	0.0587596	-0.0800267	-0.2623224	-0.4204464
Standard error	0.0161344	0.0411975	0.0687855	0.0656542	0.1673912	0.2785391
T-statistic	1.22	1.40	0.85	-1.22	-1.57	-1.54
R^2	0.0088	0.0115	0.0044	0.0088	0.0145	0.0140
(Adj)	(0.0029)	(0.0056)	(-0.0016)	(0.0029)	(0.0086)	(0.0081)
Observations	169					
Period	January 2000 – January 2014					
Strict	**Market Excess Return**			**VIX return**		
	Index 25%	**Index 10%**	**Index 5%**	**Index 25%**	**Index 10%**	**Index 5%**
Constant	-0.-164959	-0.0157685	-0.0079896	0.0695901	0.0780166 *	0.0645445
T-statistic	-1.28	-1.40	-0.83	1.33	1.70	1.64
Coefficient	0.0311211	0.0793341 *	0.0915898	-0.0892557	-0.2727593	-0.4289192
Standard error	0.0200211	0.0459035	0.0771782	0.0817662	0.1872688	0.3136252
T-statistic	1.55	1.73	1.19	-1.09	-1.46	-1.37
R^2	0.0143	0.0176	0.0084	0.0071	0.0125	0.0111
(Adj)	(0.0084)	(0.0117)	(0.0024)	(0.0011)	(0.0066)	(0.0052)
Observations	169					
Period	January 2000 – January 2014					

Table 6: Monthly Dependent variable: Stock Market Excess Return or VIX return *** p<0,01, **p<0,05, *p<0,10

Furthermore, the results from the aggregate market regressions suggest that investors don't seem to react very differently to the top 5% most important developments compared to the 25% most covered events. The results are very comparable across all different thresholds. Moreover, the differences between the broad and strict indices are very small. The removal of threats from the index did not have implications for the estimates. This could be due to fact that the threats were only a relatively small subset of the total number of observations. In other words, the outcomes indicate that investors in the stock market do not seem to react differently to the various indices used in this study.

5.2 Cross-sectional evidence

In the tables 7a and 7b the estimates of the cross-sectional regressions are recorded. The results can clarify the premise whether the stocks that have better returns during a crisis period get expected returns that are lower. This is a logical implication from the use of disaster-related asset pricing models.

Broad 10%	Constant	MKTRF	SMB	HML	Crisis Index
Full sample (Jan 2001- Feb 2014)					
Coefficient	0.0076282 ***	0.003581 **	0.001852	-0.0044663 **	0.003417
T-statistic	3.84	2.38	0.98	-2.48	0.64
Observations	120638				
Stocks included	764				
Time periods	158				
Average R^2	0.1116				
Post financial crisis (Jan 2010 – Feb 2014)					
Coefficient	0.0092733 ***	0.0042257 *	0.0013306	-0.0010846	0.0060366
T-statistic	3.96	1.71	0.63	-0.54	0.75
Observations	84349				
Stocks included	1688				
Time periods	50				
Average R^2	0.0824				

Table 7a: Individual results, broad index | dependent variable: stock's return of the next month

Strict 10%	Constant	MKTRF	SMB	HML	Crisis Index
Full sample (Jan 2001- Feb 2014)					
Coefficient	0.0075879 ***	0.003603 **	0.0018174	-0.0039098 **	0.0035267
T-statistic	3.83	2.38	0.96	-2.37	0.66
Observations	120638				
Stocks included	764				
Time periods	158				
Average R^2	0.1121				
Post financial crisis (Jan 2010 – Feb 2014)					
Coefficient	0.0092933 ***	0.0042092 *	0.0012707	-0.0014342	0.006001
T-statistic	3.96	1.70	0.60	-0.81	0.75
Observations	84349				
Stocks included	1688				
Time periods	50				
Average R^2	0.0824				

Table 7b: Individual results, strict index | dependent variable: stock's return of the next month

Hence, the cross-sectional analysis is performed to test if the conflict risk is priced and discuss whether the crisis sensitivities of stocks hold information about the expected future returns. As can be concluded from the coefficients in tables 7a and 7b, there is no significant evidence for this proposition. The t-statistic for the index is very low in all cases and, therefore, no evidence is present for return differences between stocks with different

sensitivities to the conflict index. The Fama-French factors for the market (MKTRF) and size (SMB) are positive, where the market factor is also statistically significant in all cases. This is in line with the expectations from the Fama and French (1993) research. The significantly negative coefficient of the book-to-market ratio (HML) is remarkable. In theory this should not be possible since the HML factor is positive. However, many stocks had to be dropped from the sample because these were missing a lot of return data. The sample used to create the HML factor is as a result not exactly similar to the sample used in this analysis. That is probably the reason that the HML has a significant negative gamma in this regression results. The exact data cleaning process is discussed at the end of section 4.

The results are very comparable in a sub-analysis starting after the financial crisis of 2008. The start of the rolling regression is altered and the estimation of the crisis sensitivities and factor loadings is started on January 1, 2009. As a result of this of this modification more than double the number of stocks are included as fewer stocks are missing a lot of data points. However, it does not lead to any different interpretations. In the appendix, the 25% index results are included as well. All in all, I can conclude that no support is found for the hypothesis that crisis risk is priced.

5.3 Discussion

It is worth noting that the national stock markets, based on empirical work, are on average more likely to react positively rather than negatively to conflict starts according to Guidolin and La Ferrara (2010). Especially the stocks in the United States yield the strongest returns and the writers find an abnormal return of 12% around the conflicts they investigate. The US market is often confronted with conflict risk and therefore an escalating crisis could actually take away some risk and uncertainty instead of the other way around. As a result, 'war rallies' can occur frequently on stock exchanges in the United States. This would be a feasible reason for the observed postive relationship between conflict risk and the market returns.

Moreover, assets may react in two ways to an increase in the likelihood of a conflict. In the phase leading up to the outbreak of the conflict, a negative response is observed when the prospects worsen. However, when a threat eventually materializes a positive reaction of the stock market can be seen. In that case, the uncertainty is removed in the market as the day

before, chances of a crisis were probably already quite high. Since a lot of news coverage is happening around this outbreak, this could be a possible explanation for the observed results in this research (Brune et al., 2015). On the other hand, Berkman, Jacobsen and Lee (2011) find that increases in crisis probabilities around crisis starts have a significant negative influence on the stock market returns.

Chen, Lu and Yang (2014) discover that the estimated price of risk for the global instability factor they create is not statistically significant. This could be an indication that investors in the US market are generally not overly concerned with the risk of international instability. According to their results, investors do not view conflicts as a source of systematic risk and hence they do not demand a return compensation for bearing this risk. The conclusion is consistent with earlier research by the same authors where it is found that the international instability risk plays a minor role and has little impact on the returns of the stock markets in developed economies.

The research of Berkman, Jacobsen and Lee (2011) provides support for the pricing of conflict risk on an industry level in the United States. Since this research finds no relation at the individual stock level, future research can perhaps clarify if the outcome is dependent on the level of investigation.

Unlike the results from Barro (2006) and Wachter (2013), the models in this paper are not able to explain the volatility in the market. The answer may come from Tsai and Wachter (2015). They are curious why the time-varying risk premia and the corresponding excess volatility remain since investors can decide to hold more equities as an answer to the increased risk premia. However, at those times the investors have the most fear for these rare events according to the diaster risk hypothesis. Investors are not willing to take the risk, even though the risk premia are higher. However, according to the results of this study, it may be that investors are holding more stocks when risk premia increase. Another explanation can be that the impact of conflict risk on the market returns is rather small and, therefore, volatility remained largely unchanged as well. Finally, the results of the analysis can potentially be influenced by unwanted noise in the data. The use of daily data can provide new insights and is more precise compared to a monthly frequency, but it can also be accompanied with harder to explain variation of the variables.

6. Conclusions

This study provides some interesting additions to the body of knowledge already set by the existing research concerning international conflicts. The empirical analysis focusses on answering two questions. The first one concerns the impact of conflicts on the aggregate market and the second question attempts to determine if the conflict risk is priced.

Data is used from the GDELT project to form an index of international conflict risk for the United States stock market. The dataset starts at the beginning of the 21st century and ends in February 2014. In contradiction to the hypothesis, increases of the crisis index are significantly and positively related to the market excess return. One reason for this outcome could be that an international conflict may lead to a better and more stable long-term situation. The volatility in the market and the conflict index seem to not be related, where it was expected that increases in conflict risk would enhance volatility because of risen uncertainty. Finally, the analysis does not support the proposition that the risk of conflict is actually priced. There is no significant relation and this does not change when the analysis is started after the financial crisis. In other words, the results do not indicate a significant difference in return between stocks with different exposures to conflict risk. This could imply that investors in the US stock market do not regard international conflicts as a major source of (systematic) risk.

The limitations of this study are mostly centred around the index creation, the index could possibly be improved to filter only events that really concern investors. However, this may be very difficult to determine. Moreover, it has proven to be very difficult to perfectly correct for the skewness in the number of crisis-related news. As a result, the days with a lot of conflict-related news are more pronounced earlier in the sample period. Finally, it has been sometimes proven difficult to match the stock market reaction with the variation in the index. For example, as a result of the attacks on the World Trade Center in New York the stock exchanges were closed for a couple of days. Hence, the reaction of the market to this major crisis was almost a week later and not on the day the conflict index spiked.

Following the results of this paper, further research could perhaps clarify the results. There are not many studies, hardly any to my best knowledge, that empirically use daily data. It

could be relevant to extend this research and examine the effects with a different approach, model and/or index.

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Appendix

Broad	Market Excess Return			VIX return		
	Index 25%	**Index 10%**	**Index 5%**	**Index 25%**	**Index 10%**	**Index 5%**
Constant	-0.0003278	-0.0006439	-0.0003292	0.000549	0.0025463	0.0027267
T-statistic	-0.57	-1.44	-0.89	0.19	1.15	1.49
Coefficient	0.204077	0.0933897 **	0.1147937 *	0.0546283	-0.758999	-0.1934026
Standard error	0.0215751	0.0444	0.681283	0.1065711	0.2194289	0.3366119
T-statistic	0.95	2.10	1.68	0.51	-0.35	-0.57
R^2	0.0003	0.0012	0.0008	0.0001	0.0000	0.0001
(Adj)	(0.0000)	(0.0010)	(0.0005)	(-0.0002)	(-0.0002)	(-0.0002)
Observations	3552					
Period	1/1/2000 – 17/2/2014					
Strict	**Market Excess Return**			**VIX return**		
	Index 25%	**Index 10%**	**Index 5%**	**Index 25%**	**Index 10%**	**Index 5%**
Constant	-0.0000956	-0.000379	-0.0000295	-0.0013575	0.0019206	0.0016395
T-statistic	-0.17	-0.88	-0.08	-0.50	090	0.92
Coefficient	0.0133211	0.0729034	0.053203	0.1620053	-0.0048521	0.0648851
Standard error	0.0251813	0.0487584	0.075411	0.1243481	0.2408985	0.3711542
T-statistic	0.53	1.50	0.71	1.30	-.0.02	0.17
R^2	0.0001	0.0006	0.0001	0.0005	0.0000	0.0000
(Adj)	(-0.0002)	(0.0003)	(-0.0001)	(0.0002)	(-0.0003)	(-0.0003)
Observations	3552					
Period	1/1/2000 – 17/2/2014					

*** p<0,01, **p<0,05, *p<0,10

Appendix 1: One-day lag on the index value | Dependent variable: Stock Market Excess Returnn or VIX return.

Broad 25%	**Constant**	**MKTRF**	**SMB**	**HML**	**Crisis Index**
Full sample (Jan 2001- Feb 2014)					
Coefficient	0.0076143	0.0035418 **	0.0020346	-0.0091779**	0.0034803
T-statistic	3.86	2.36	1.08	-2.38	0.64
Observations	120638				
Stocks included	764				
Time periods	158				
Average R^2	0.1121				
Strict 25%					
Full sample (Jan 2001- Feb 2014)					
Coefficient	0.0075756	0.0035482 **	0.0019851	-0.0080083**	0.0035988
T-statistic	3.86	2.37	1.04	-2.36	0.66
Observations	120638				
Stocks included	764				
Time periods	158				
Average R^2	0.1126				

*** p<0,01, **p<0,05, *p<0,10

Appendix 2: Individual results, broad and strict index 25%

Cameo code	Event	Broad		Strict	
		Frequency	*%*	*Frequency*	*%*
136	Threaten to halt international involvement (non-mediation)	24	0.01%	0	0.00%
137	Threaten with repression	31	0.01%	0	0.00%
138	Threaten with military force, not specified below	10218	3.67%	0	0.00%
1382	Threaten occupation	6	0.00%	0	0.00%
1383	Threaten unconventional violence	965	0.35%	0	0.00%
1384	Threaten conventional attack	1379	0.49%	0	0.00%
1385	Threaten attack with WMD	11	0.00%	0	0.00%
139	Give ultimatum	1096	0.39%	0	0.00%
145	Protest violently, riot, not specified below	1830	0.66%	0	0.00%
150	Demonstrate military or police power, not specified below	4135	1.48%	0	0.00%
151	Increase police alert status	350	0.13%	0	0.00%
152	Increase military alert status	720	0.26%	0	0.00%
153	Mobilize or increase police power	329	0.12%	0	0.00%
154	Mobilize or increase armed forces	5922	2.13%	0	0.00%
163	Impose embargo, boycott, or sanctions	6578	2.36%	0	0.00%
164	Halt negotiations	3634	1.30%	0	0.00%
165	Halt mediation	16	0.01%	0	0.00%
166	Expel or withdraw, not specified below	889	0.32%	0	0.00%
1661	Expel or withdraw peacekeepers	10	0.00%	0	0.00%
1662	Expel or withdraw inspectors, observers	36	0.01%	0	0.00%
170	Coerce, not specified below	1659	0.60%	0	0.00%
171	Seize or damage property, not specified below	1308	0.47%	1308	0.55%
1711	Confiscate property	812	0.29%	812	0.34%
1712	Destroy property	3871	1.39%	3871	1.62%
175	Use tactics of violent repression	1346	0.48%	1346	0.56%
180	Use unconventional violence, not specified below	16358	5.87%	16358	6.85%
181	Abduct, hijack, or take hostage	5679	2.04%	5679	2.38%
182	Physically assault, not specified below	6823	2.45%	6823	2.86%
1821	Sexually assault	3538	1.27%	3538	1.48%
1822	Torture	1723	0.62%	1723	0.72%
1823	Kill by physical assault	904	0.32%	904	0.38%
183	Conduct suicide, car, or other non-military bombing, not specified below	2271	0.82%	2271	0.95%
1831	Carry out suicide bombing	1484	0.53%	1484	0.62%
1832	Carry out vehicular bombing	773	0.28%	773	0.32%
1833	Carry out roadside bombing	8	0.00%	8	0.00%
184	Use as human shield	13	0.00%	13	0.01%
185	Attempt to assassinate	180	0.06%	180	0.08%
186	Assassinate	4144	1.49%	4144	1.74%
190	Use conventional military force, not specified below	121885	43.75%	121885	51.05%
191	Impose blockade, restrict movement	951	0.34%	951	0.40%
192	Occupy territory	9786	3.51%	9786	4.10%
193	Fight with small arms and light weapons	41263	14.81%	41263	17.28%
194	Fight with artillery and tanks	6134	2.20%	6134	2.57%
195	Employ aerial weapons, not specified below	6757	2.43%	6757	2.83%
196	Violate ceasefire	23	0.01%	23	0.01%
201	Engage in mass expulsion	38	0.01%	38	0.02%
202	Engage in mass killings	576	0.21%	576	0.24%
203	Engage in ethnic cleansing	115	0.04%	115	0.05%
Total		**278601**	**100%**	**238763**	**100%**

Appendix 3: Overview of GDELT Cameo codes used in the index 25%

Cameo code	Event	Broad		Strict	
		Frequency	*%*	*Frequency*	*%*
136	Threaten to halt international involvement (non-mediation)	3	0.00%	0	0.00%
137	Threaten with repression	12	0.01%	0	0.00%
138	Threaten with military force, not specified below	3469	3.23%	0	0.00%
1382	Threaten occupation	0	0.00%	0	0.00%
1383	Threaten unconventional violence	318	0.30%	0	0.00%
1384	Threaten conventional attack	469	0.44%	0	0.00%
1385	Threaten attack with WMD	5	0.00%	0	0.00%
139	Give ultimatum	359	0.33%	0	0.00%
145	Protest violently, riot, not specified below	643	0.60%	0	0.00%
150	Demonstrate military or police power, not specified below	1325	1.23%	0	0.00%
151	Increase police alert status	108	0.10%	0	0.00%
152	Increase military alert status	231	0.21%	0	0.00%
153	Mobilize or increase police power	76	0.07%	0	0.00%
154	Mobilize or increase armed forces	1837	1.71%	0	0.00%
163	Impose embargo, boycott, or sanctions	2122	1.97%	0	0.00%
164	Halt negotiations	1062	0.99%	0	0.00%
165	Halt mediation	10	0.01%	0	0.00%
166	Expel or withdraw, not specified below	316	0.29%	0	0.00%
1661	Expel or withdraw peacekeepers	4	0.00%	0	0.00%
1662	Expel or withdraw inspectors, observers	12	0.01%	0	0.00%
170	Coerce, not specified below	491	0.46%	0	0.00%
171	Seize or damage property, not specified below	337	0.31%	337	0.35%
1711	Confiscate property	245	0.23%	246	0.26%
1712	Destroy property	1278	1.19%	1285	1.35%
175	Use tactics of violent repression	468	0.44%	470	0.49%
180	Use unconventional violence, not specified below	5657	5.27%	5686	5.98%
181	Abduct, hijack, or take hostage	1890	1.76%	1904	2.00%
182	Physically assault, not specified below	2257	2.10%	2264	2.38%
1821	Sexually assault	1121	1.04%	1121	1.18%
1822	Torture	500	0.47%	506	0.53%
1823	Kill by physical assault	286	0.27%	295	0.31%
183	Conduct suicide, car, or other non-military bombing, not specified below	834	0.78%	842	0.89%
1831	Carry out suicide bombing	567	0.53%	572	0.60%
1832	Carry out vehicular bombing	270	0.25%	281	0.30%
1833	Carry out roadside bombing	3	0.00%	3	0.00%
184	Use as human shield	6	0.01%	6	0.01%
185	Attempt to assassinate	58	0.05%	58	0.06%
186	Assassinate	1195	1.11%	1202	1.26%
190	Use conventional military force, not specified below	52108	48.50%	52352	55.09%
191	Impose blockade, restrict movement	285	0.27%	292	0.31%
192	Occupy territory	2854	2.66%	2868	3.02%
193	Fight with small arms and light weapons	17171	15.98%	17207	18.11%
194	Fight with artillery and tanks	2276	2.12%	2297	2.42%
195	Employ aerial weapons, not specified below	2653	2.47%	2677	2.82%
196	Violate ceasefire	4	0.00%	4	0.00%
201	Engage in mass expulsion	14	0.01%	14	0.01%
202	Engage in mass killings	203	0.19%	205	0.22%
203	Engage in ethnic cleansing	32	0.03%	34	0.04%
Total		**107444**	**100%**	**95028**	**100%**

Appendix 4: Overview of GDELT Cameo codes used in the index 10%

Cameo code	Event	Broad		Strict	
		Frequency	*%*	*Frequency*	*%*
136	Threaten to halt international involvement (non-mediation)	0	0.00%	0	0.00%
137	Threaten with repression	3	0.01%	0	0.00%
138	Threaten with military force, not specified below	1625	3.06%	0	0.00%
1382	Threaten occupation	0	0.00%	0	0.00%
1383	Threaten unconventional violence	142	0.27%	0	0.00%
1384	Threaten conventional attack	212	0.40%	0	0.00%
1385	Threaten attack with WMD	1	0.00%	0	0.00%
139	Give ultimatum	162	0.30%	0	0.00%
145	Protest violently, riot, not specified below	282	0.53%	0	0.00%
150	Demonstrate military or police power, not specified below	595	1.12%	0	0.00%
151	Increase police alert status	49	0.09%	0	0.00%
152	Increase military alert status	90	0.17%	0	0.00%
153	Mobilize or increase police power	35	0.07%	0	0.00%
154	Mobilize or increase armed forces	841	1.58%	0	0.00%
163	Impose embargo, boycott, or sanctions	959	1.80%	0	0.00%
164	Halt negotiations	456	0.86%	0	0.00%
165	Halt mediation	8	0.02%	0	0.00%
166	Expel or withdraw, not specified below	159	0.30%	0	0.00%
1661	Expel or withdraw peacekeepers	4	0.01%	0	0.00%
1662	Expel or withdraw inspectors, observers	2	0.00%	0	0.00%
170	Coerce, not specified below	178	0.33%	0	0.00%
171	Seize or damage property, not specified below	122	0.23%	122	0.26%
1711	Confiscate property	104	0.20%	104	0.22%
1712	Destroy property	573	1.08%	573	1.21%
175	Use tactics of violent repression	193	0.36%	193	0.41%
180	Use unconventional violence, not specified below	2339	4.40%	2339	4.94%
181	Abduct, hijack, or take hostage	908	1.71%	908	1.92%
182	Physically assault, not specified below	938	1.77%	938	1.98%
1821	Sexually assault	482	0.91%	482	1.02%
1822	Torture	206	0.39%	206	0.44%
1823	Kill by physical assault	124	0.23%	124	0.26%
183	Conduct suicide, car, or other non-military bombing, not specified below	413	0.78%	413	0.87%
1831	Carry out suicide bombing	238	0.45%	238	0.50%
1832	Carry out vehicular bombing	93	0.18%	93	0.20%
1833	Carry out roadside bombing	0	0.00%	0	0.00%
184	Use as human shield	4	0.01%	4	0.01%
185	Attempt to assassinate	22	0.04%	22	0.05%
186	Assassinate	488	0.92%	488	1.03%
190	Use conventional military force, not specified below	27282	51.34%	27282	57.63%
191	Impose blockade, restrict movement	113	0.21%	113	0.24%
192	Occupy territory	1215	2.29%	1215	2.57%
193	Fight with small arms and light weapons	9004	16.94%	9004	19.02%
194	Fight with artillery and tanks	1042	1.96%	1042	2.20%
195	Employ aerial weapons, not specified below	1324	2.49%	1324	2.80%
196	Violate ceasefire	0	0.00%	0	0.00%
201	Engage in mass expulsion	7	0.01%	7	0.01%
202	Engage in mass killings	90	0.17%	90	0.19%
203	Engage in ethnic cleansing	12	0.02%	12	0.03%
Total		**53139**	**100%**	**47336**	**100%**

Appendix 5: Overview of GDELT Cameo codes used in the index 5%

	Variable	Obs	Mean	Std. Dev.	Min	Max
Broad 25%	Crisis value	169	1634.266	1414.6	43	5488
	Index	169	0.7530813	0.2232276	0.0820115	1.593712
	Market Excess Return (MKTRF)	169	0.0026716	0.0467499	-0.1723	0.1135
	VIX return	169	0.0146174	0.1902357	-0.3196294	0.9075061
Broad 10%	Crisis value	169	630.5917	582.9869	10	2318
	Index	169	0.2684574	0.0873034	0.0179475	0.7242839
	Market Excess Return (MKTRF)	169	0.0026716	0.0467499	-0.1723	0.1135
	VIX return	169	0.0146174	0.1902357	-0.3196294	0.9075061
Broad 5%	Crisis value	169	311.8698	295.1808	2	1153
	Index	169	0.134749	0.0524781	0.0029236	0.3158362
	Market Excess Return (MKTRF)	169	0.0026716	0.0467499	-0.1723	0.1135
	VIX return	169	0.0146174	0.1902357	-0.3196294	0.9075061
Strict 25%	Crisis value	169	1400.361	1267.683	37	4706
	Index	169	0.6159007	0.1793972	0.0699211	1.220904
	Market Excess Return (MKTRF)	169	0.0026716	0.0467499	-0.1723	0.1135
	VIX return	169	0.0146174	0.1902357	-0.3196294	0.9075061
Strict 10%	Crisis value	169	557.6805	528.6197	6	2030
	Index	169	0.2324364	0.0781137	0.0088052	0.4924812
	Market Excess Return (MKTRF)	169	0.0026716	0.0467499	-0.1723	0.1135
	VIX return	169	0.0146174	0.1902357	-0.3196294	0.9075061
Strict 5%	Crisis value	169	277.7811	271.0485	1	1021
	Index	169	0.116402	0.0466771	0.0013055	0.2450109
	Market Excess Return (MKTRF)	169	0.0026716	0.0467499	-0.1723	0.1135
	VIX return	169	0.0146174	0.1902357	-0.3196294	0.9075061

Appendix 6: Monthly descriptives

Broad 10%	**Obs**	**Mean**	**Std.**	**Min**	**Max**
rsquared	120,640	0.36796	0.194489	0.000509	0.998217
adjusted	120,640	0.357704	0.197654	-0.01561	0.998189
constant	120,640	0.000373	0.002613	-0.0255	0.032082
beta_index	120,640	0.940652	0.383243	-0.77749	3.447318
beta_mktrf	120,640	0.263955	0.486898	-1.94148	3.055342
beta_smb	120,640	0.185089	0.683892	-5.31682	5.247475
beta_hml	120,640	-0.00444	0.28491	-3.39026	2.622651
return next month	120,638	0.01117	0.08799	-0.63968	1.80032

Appendix 7: Summary statistics, cross-sectional analysis broad 10%

Period (month)	**Obs**	**R-squared**	**b_mktrf**	**b_smb**	**b_hml**	**b_index**	**Constant**
1	764	0.209494	0.040631	-0.08431	0.007758	0.141305	-0.00867
2	764	0.440712	-0.02501	0.093845	-0.00919	-0.14466	0.011304
3	764	0.094806	-0.02157	0.012027	0.014515	-0.0815	-0.00169
4	764	0.272977	0.052164	-0.06348	-0.03479	0.103027	0.052316
5	764	0.018467	-0.00118	0.014525	-0.00848	0.001128	0.020074
6	764	0.056464	0.033785	-0.02952	0.004153	-0.01078	0.015251
7	764	0.050552	-0.02515	0.022593	0.002124	-0.00822	0.001123
8	764	0.106552	0.014491	0.017694	0.011487	-0.07588	0.012352
9	764	0.318004	-0.02878	0.062109	0.020487	-0.14414	-0.0278
10	764	0.297905	0.046915	-0.05752	-0.07403	0.068605	0.013181
11	764	0.314216	-0.01724	-0.02413	-0.04161	0.151026	0.005033
12	764	0.097289	0.031934	0.007857	-0.00615	0.019008	0.017859
13	764	0.002577	-0.00501	0.001059	-0.01579	0.001787	0.005358
14	764	0.191119	0.004382	0.044803	0.020248	-0.04598	0.019378
15	764	0.13919	0.038527	-0.02559	-0.01653	0.028328	0.038418
16	764	0.184359	0.023467	0.030897	0.001988	-0.08094	0.021269
17	764	0.061789	-0.02153	0.017989	0.007625	-0.02026	0.005241
18	764	0.148643	0.016218	0.03181	-0.04324	-0.07416	-0.02935
19	764	0.058917	-0.01056	0.003933	-0.01527	-0.05969	-0.05089
20	764	0.038535	-0.00428	0.002961	-0.01773	-0.0372	0.03136
21	764	0.157823	0.023387	0.00225	-0.0578	-0.10318	-0.02308
22	764	0.247522	-0.00671	-0.05383	0.055495	0.141222	-0.00837
23	764	0.300739	0.013203	-0.01354	0.123163	0.150854	-0.0178
24	764	0.38982	-0.00245	0.04614	-0.04811	-0.12549	0.027023
25	764	0.037925	-0.00525	-0.02026	0.025972	-0.02485	-0.00463
26	764	0.041841	0.003466	-0.02358	0.027297	-0.01578	-0.00018
27	764	0.018501	0.005658	0.00531	-0.02433	-0.01259	0.014533
28	764	0.170112	-0.0026	0.00867	-0.00543	0.121275	0.010524
29	764	0.072815	0.01168	-0.01576	0.020225	0.055936	0.046932
30	764	0.02192	-0.00903	0.012285	0.039115	0.005312	0.01083
31	764	0.112435	0.026324	-0.00145	-0.02713	0.063993	-0.01072
32	764	0.132903	0.035462	-0.00529	-0.02317	0.036723	0.011396
33	764	0.140493	-0.01394	-0.00032	0.042613	-0.06019	0.0227

34	764	0.131317	0.009615	-0.01192	-0.04047	0.083307	0.023257
35	764	0.032373	0.02291	-0.00462	-0.0147	-0.02252	0.034755
36	764	0.081334	-0.01408	0.039887	-0.01472	-0.00791	0.041331
37	764	0.011345	0.013479	0.010485	0.018394	0.002278	0.014133
38	764	0.018549	-0.00967	0.005528	-0.00122	-0.01711	0.033845
39	764	0.013672	0.010618	-0.00109	0.011885	-0.0207	0.01233
40	764	0.057447	-0.03691	-0.02119	0.005393	0.011152	-0.0242
41	764	0.092163	0.035429	-0.00064	-0.01006	0.0221	0.004286
42	764	0.092013	0.014488	0.025241	0.039885	0.012515	0.022689
43	764	0.18655	-0.02894	0.022758	-0.01882	-0.06569	0.001989
44	764	0.103666	-0.01646	0.014979	-0.03118	-0.03564	0.024274
45	764	0.082902	0.032214	0.019396	-0.02167	0.022685	0.011677
46	764	0.032582	0.014413	-0.01541	-0.00303	0.009623	0.018223
47	764	0.113154	0.024453	0.027545	0.003915	0.046834	0.024759
48	764	0.03864	-0.01583	-0.01216	0.006688	0.014623	0.029184
49	764	0.087404	-0.01519	0.01747	-0.02004	-0.03213	-0.00612
50	764	0.124333	0.021138	0.025804	-0.05763	0.01481	0.006953
51	764	0.019075	-0.01303	-0.00404	-0.0086	-0.01096	-0.00295
52	764	0.132637	-0.03604	-0.00527	0.002099	-0.05314	0.014901
53	764	0.156705	0.02704	-0.01903	-0.05107	0.035691	0.02018
54	764	0.124994	0.009267	0.02074	-0.01098	-0.01954	0.025084
55	764	0.139165	0.034706	-0.00034	-0.01235	0.052865	0.012488
56	764	0.066424	0.00752	0.01159	-0.0625	-0.01094	-0.00711
57	764	0.044561	0.002511	0.012991	-0.00411	0.007853	0.002322
58	764	0.090379	-0.00939	-0.01679	0.048952	0.026885	-0.02378
59	764	0.075631	0.023128	-0.01199	-0.01395	0.031611	0.01884
60	764	0.055122	-0.00361	0.010139	0.015218	-0.01978	0.014153
61	764	0.241716	0.055301	0.020057	-0.00739	0.02634	0.017336
62	764	0.136348	0.000316	-0.01825	-0.03446	-0.02059	0.020821
63	764	0.081714	0.027309	0.006303	-0.01076	0.00718	0.012081
64	764	0.065902	-0.0021	0.012666	0.001565	0.017639	-0.00192
65	764	0.081853	-0.01568	0.007076	-0.01635	-0.05112	-0.00037
66	764	0.029816	-0.00814	0.005258	-0.00949	0.022738	-0.00832
67	764	0.167665	-0.04903	0.015498	-0.00705	-0.05984	0.033812
68	764	0.126125	0.002498	-0.02113	0.003952	-0.00349	0.032316
69	764	0.228357	0.001058	-0.02217	-0.04328	-0.00151	0.022012
70	764	0.079782	0.023453	0.002775	-0.0282	0.022427	0.023758
71	764	0.081301	0.008407	0.01579	0.012845	0.006216	0.021568
72	764	0.067195	-0.02055	-0.00184	-0.00871	-0.00739	0.013304
73	764	0.024292	0.013074	-0.00732	0.033167	0.002233	0.02027
74	764	0.010911	0.009828	0.001254	0.007928	-0.01073	0.002095
75	764	0.089793	-0.00061	0.019583	-0.02179	0.017144	0.003413
76	764	0.022954	0.001368	-0.00415	0.002805	0.031389	0.016212
77	764	0.052797	0.018017	-0.00517	-0.01017	0.027803	0.015689
78	764	0.033295	0.001703	-0.01097	0.016496	0.016026	-0.02674
79	764	0.104633	-0.01174	-0.02815	-0.01975	-0.0054	-0.0294

80	764	0.042117	0.020284	0.009833	0.008007	0.007261	0.006857
81	764	0.114114	-0.02659	-0.01412	-0.02182	0.042156	0.008188
82	764	0.014056	-0.01093	-0.00047	-0.00817	0.032851	0.006707
83	764	0.040512	-0.01181	-0.00079	0.00435	-0.04453	-0.01108
84	764	0.044277	-0.00541	-0.01398	-0.02445	0.018257	-0.01462
85	764	0.135554	0.00877	0.040939	-0.01615	-0.02776	-0.03212
86	763	0.116166	-0.00697	-0.03092	-0.01478	0.026504	-0.02899
87	763	0.085695	0.033023	0.002714	0.010204	0.009251	-0.00822
88	763	0.101637	-0.00723	-0.02212	-0.00725	0.075382	0.018045
89	763	0.084896	0.000915	-0.0206	0.025933	0.016446	0.028552
90	763	0.14979	-0.00425	-0.02959	-0.00157	-0.04173	-0.04865
91	763	0.173301	0.04051	0.033705	-0.02325	-0.0361	0.01745
92	763	0.113238	0.018284	0.02282	-0.02446	-0.0187	0.027434
93	763	0.358449	0.006491	0.092208	-0.00517	-0.08563	-0.04385
94	763	0.120464	0.003488	0.024741	-0.0044	-0.15055	-0.09764
95	763	0.057369	-0.02338	-0.01119	0.018554	-0.07386	-0.02874
96	763	0.063853	0.044894	0.007666	-0.00442	0.03547	0.013808
97	763	0.299831	-0.01629	-0.08266	-0.01001	-0.13844	0.022896
98	763	0.047921	-0.00253	-0.02819	0.015632	-0.03781	-0.07791
99	763	0.083939	0.013354	0.023838	0.016144	0.090452	0.030165
100	763	0.233704	0.035579	0.047598	-0.01333	0.261435	-0.02345
101	763	0.223801	-0.08554	0.004135	-0.02605	0.089765	0.01061
102	763	0.107699	0.019258	-0.01272	0.017741	-0.07654	0.041833
103	763	0.090897	0.014661	0.020194	0.002649	0.072797	0.04414
104	763	0.159846	-0.00539	0.045651	-0.0118	0.040012	0.009624
105	763	0.041927	0.001748	-0.00705	-0.00725	0.040783	0.022231
106	763	0.049415	-0.01565	-0.01338	-0.00017	-0.00875	-0.01757
107	763	0.01406	-0.00821	-0.00225	0.008691	0.020736	0.035363
108	763	0.081576	0.032951	-0.00531	0.001931	0.033116	0.020456
109	763	0.135329	-0.00908	0.029203	-0.00773	-0.05967	0.007975
110	763	0.063629	0.027436	-0.00538	0.003038	0.029667	0.01845
111	763	0.1318	0.017803	0.018919	0.004944	0.046149	0.030936
112	763	0.11386	0.030503	0.02155	-0.00644	0.028429	0.008771
113	763	0.113442	0.008066	-0.01309	0.004794	-0.06059	-0.03625
114	763	0.253599	-0.04768	-0.02773	-0.0017	-0.08411	0.006846
115	763	0.116883	-0.00289	0.017281	0.001305	0.082889	0.025257
116	763	0.137831	-0.04598	-0.01201	0.001111	-0.0617	-0.00114
117	763	0.260879	0.051005	-0.00268	-0.02314	0.113497	0.023281
118	763	0.06523	-0.00171	-0.00791	0.012232	0.0591	-0.00174
119	763	0.100959	0.029591	0.006695	0.015224	0.051727	-0.02398
120	763	0.22129	0.014375	0.053155	-0.01133	0.059434	0.026071
121	763	0.057525	-0.02429	0.014192	-0.00048	0.046328	-0.00608
122	763	0.007783	0.003876	-0.00445	0.006415	0.016155	0.027513
123	763	0.058876	0.027706	-0.01392	-0.02121	0.006214	0.005446
124	763	0.019508	-0.00632	-0.01327	-0.01653	-0.00497	0.030965
125	763	0.050885	-0.00124	-0.01735	-0.00513	-0.04491	0.020803

126	763	0.037037	0.000727	-0.01237	-0.01814	-0.01713	-0.00482
127	763	0.045309	-0.01665	0.000124	-0.00257	-0.03478	-0.01058
128	763	0.3127	-0.01498	-0.02902	-0.02432	-0.14721	0.033099
129	763	0.355623	-0.03471	-0.01768	0.007577	-0.15861	0.011825
130	763	0.425452	0.058199	0.006756	-0.01361	0.192025	0.005375
131	763	0.015353	0.008705	-0.00504	-0.01698	-0.02496	0.015586
132	763	0.196923	-0.0041	0.028113	-0.004	-0.06688	0.042503
133	763	0.237939	0.031134	-0.01008	-0.00335	0.112924	-0.018
134	763	0.070175	-0.01447	0.001315	-0.0128	0.060298	-0.0004
135	763	0.054036	0.009355	0.016347	0.014904	-0.00899	0.020803
136	763	0.063783	-0.01731	-0.00451	0.019265	-0.03272	0.01916
137	763	0.250896	-0.00041	0.004717	0.019111	-0.1336	0.016622
138	763	0.026313	-0.00346	0.019887	-0.00616	-0.00253	0.035064
139	763	0.037482	-0.02952	0.004758	0.007775	-0.00499	0.009889
140	763	0.093896	0.010997	-0.00539	-0.01268	0.057487	-0.01179
141	763	0.027378	-0.00133	0.015286	-0.00611	0.002423	0.017634
142	763	0.017084	-0.00637	0.015049	-0.00853	-0.00275	-0.00187
143	763	0.055147	0.005339	-0.02345	0.003254	0.027807	-0.00176
144	763	0.240577	0.01668	0.018702	-0.00551	0.059411	-0.01946
145	763	0.05495	-0.00038	0.012746	0.004709	0.037922	0.042903
146	763	0.021041	-0.00143	-0.00089	-0.01371	-0.01819	0.023912
147	763	0.014806	0.007976	-0.00013	-0.01093	-0.01266	0.042895
148	763	0.095895	-0.01894	-0.00772	0.000278	-0.04988	0.042111
149	763	0.285157	0.038358	0.000202	-0.00108	0.095986	-0.04172
150	763	0.060391	-0.01084	-0.00477	-0.02687	-0.02517	0.002886
151	763	0.089717	0.015269	0.007641	-0.01068	0.048108	0.022716
152	763	0.022712	-0.00537	0.011709	-0.00238	0.017276	-0.04203
153	763	0.150016	0.028332	-0.01533	0.015344	0.049696	0.012432
154	763	0.011996	0.00249	0.008898	0.008704	0.01008	0.033808
155	763	0.094445	0.018893	0.002207	-0.05343	0.007384	0.011637
156	763	0.043297	-0.00051	-0.00086	0.010172	0.039693	0.000161
157	763	0.069575	-0.01508	-0.01594	0.010985	-0.04414	0.002785
158	762	0.017613	-0.0057	0.000041	-0.00681	0.030704	0.031511
Mean		**0.111596**	**0.003581**	**0.001852**	**-0.00447**	**0.003417**	**0.007628**

Appendix 8: Cross-sectional analysis broad 10%

Strict 10%	**Obs**	**Mean**	**Std.**	**Min**	**Max**
rsquared	120,640	0.367996	0.194464	0.000618	0.998221
adjusted	120,640	0.35774	0.19763	-0.01553	0.998192
constant	120,640	0.000359	0.002527	-0.02464	0.030969
beta_index	120,640	0.940615	0.383192	-0.78288	3.45087
beta_mktrf	120,640	0.263976	0.486771	-1.9474	3.058855
beta_smb	120,640	0.184945	0.683956	-5.24999	5.24754
beta_hml	120,640	-0.00291	0.317099	-3.71372	2.84637
return next month	120,638	0.01117	0.08799	-0.63968	1.80032

Appendix 9: Summary statistics, cross-sectional analysis Strict 10%

Period (month)	**Obs**	**R-squared**	**b_mktrf**	**b_smb**	**b_hml**	**b_index**	**Constant**
1	764	0.210097	0.040705	-0.08376	0.004526	0.141098	-0.00856
2	764	0.441612	-0.02461	0.093817	-0.00735	-0.14469	0.011553
3	764	0.092487	-0.02247	0.014403	0.000796	-0.08337	-0.00022
4	764	0.264765	0.053244	-0.0663	-0.0121	0.105789	0.05037
5	764	0.018256	-0.00097	0.014264	-0.0064	0.001167	0.020186
6	764	0.057281	0.033517	-0.0287	-0.00423	-0.01273	0.015397
7	764	0.050595	-0.02517	0.022562	-0.00316	-0.0082	0.000876
8	764	0.10916	0.013945	0.018757	0.013949	-0.07547	0.012272
9	764	0.315704	-0.02892	0.063164	0.010038	-0.14637	-0.02745
10	764	0.279392	0.048769	-0.06264	-0.04883	0.075395	0.011237
11	764	0.310876	-0.01647	-0.02678	-0.02288	0.156775	0.003098
12	764	0.096936	0.03189	0.007725	-0.00591	0.01862	0.018011
13	764	0.000908	-0.00444	0.000827	-0.00463	0.003183	0.004644
14	764	0.19134	0.00415	0.045347	0.017003	-0.04816	0.020475
15	764	0.137384	0.039013	-0.02557	-0.00492	0.027808	0.038532
16	764	0.184967	0.02341	0.029589	-0.00767	-0.07879	0.02038
17	764	0.063854	-0.02166	0.01904	0.012041	-0.02305	0.006491
18	764	0.158927	0.015907	0.029463	-0.04708	-0.06707	-0.0322
19	764	0.058487	-0.01059	0.004165	-0.01088	-0.05869	-0.05148
20	764	0.0393	-0.00414	0.00308	-0.01449	-0.03681	0.030996
21	764	0.158704	0.023409	0.002437	-0.04841	-0.09865	-0.02564
22	764	0.25151	-0.00711	-0.0532	0.049962	0.137231	-0.00633
23	764	0.323712	0.012811	-0.01151	0.12344	0.136845	-0.01065
24	764	0.38824	-0.00243	0.045923	-0.03931	-0.12522	0.026987
25	764	0.044451	-0.00575	-0.01999	0.029743	-0.02888	-0.00284
26	764	0.042713	0.003272	-0.02345	0.023587	-0.01622	-0.00024
27	764	0.017671	0.005704	0.005427	-0.01997	-0.0131	0.014915
28	764	0.169916	-0.00239	0.008981	-0.00923	0.121989	0.01015
29	764	0.076225	0.012101	-0.0161	0.030176	0.054326	0.047532
30	764	0.015981	-0.00925	0.01308	0.012609	0.006759	0.009765
31	764	0.114548	0.025965	-0.00152	-0.02696	0.065107	-0.01107
32	764	0.133852	0.035248	-0.00517	-0.02133	0.036442	0.011605

33	764	0.139147	-0.01347	-0.00026	0.027504	-0.06036	0.022504
34	764	0.130473	0.009256	-0.01186	-0.02653	0.0831	0.023523
35	764	0.032246	0.022846	-0.00447	-0.00943	-0.02263	0.034839
36	764	0.08098	-0.014	0.039947	-0.00413	-0.00893	0.041845
37	764	0.010079	0.013454	0.010414	-0.00024	0.001783	0.014456
38	764	0.019175	-0.00947	0.005495	0.000479	-0.01798	0.03422
39	764	0.013934	0.010879	-0.00124	0.010214	-0.02069	0.012269
40	764	0.057915	-0.03686	-0.02118	0.00566	0.011094	-0.02414
41	764	0.11763	0.035834	-0.00147	-0.03842	0.027334	0.000666
42	764	0.121793	0.013226	0.025208	0.056928	0.009875	0.025014
43	764	0.192875	-0.02799	0.022078	-0.03428	-0.06243	0.000109
44	764	0.117888	-0.01586	0.014412	-0.04638	-0.03177	0.021832
45	764	0.079585	0.032337	0.019572	-0.00663	0.021365	0.012525
46	764	0.033442	0.01489	-0.01571	-0.01263	0.010212	0.017554
47	764	0.113878	0.024238	0.027551	0.003323	0.047292	0.024593
48	764	0.038481	-0.01568	-0.01227	-0.00704	0.015741	0.028141
49	764	0.085391	-0.01499	0.017756	-0.00238	-0.03352	-0.00488
50	764	0.110316	0.022928	0.027412	-0.03533	0.014159	0.007409
51	764	0.020177	-0.01306	-0.00425	-0.01493	-0.01071	-0.00335
52	764	0.13288	-0.03621	-0.00542	0.00103	-0.05322	0.014902
53	764	0.153759	0.028265	-0.01802	-0.05437	0.035153	0.020081
54	764	0.12726	0.008821	0.020524	-0.02583	-0.01918	0.024681
55	764	0.13771	0.035414	-0.00034	-0.00074	0.052722	0.012849
56	764	0.059588	0.008142	0.011614	-0.05722	-0.0113	-0.00673
57	764	0.045046	0.002312	0.012937	-0.01277	0.007269	0.002561
58	764	0.096292	-0.00857	-0.01595	0.059786	0.029019	-0.0253
59	764	0.075562	0.022948	-0.0123	-0.01589	0.030112	0.019774
60	764	0.053401	-0.00368	0.010553	0.008826	-0.01948	0.013793
61	764	0.241866	0.055075	0.020028	-0.01292	0.02603	0.017585
62	764	0.130015	0.001102	-0.01936	-0.01068	-0.02114	0.021629
63	764	0.081997	0.027153	0.006391	-0.01327	0.006774	0.012338
64	764	0.066432	-0.0025	0.012876	-0.00583	0.018247	-0.00227
65	764	0.085567	-0.01598	0.007357	-0.02516	-0.05109	-0.00039
66	764	0.029804	-0.00808	0.005125	-0.00675	0.022943	-0.00838
67	764	0.16805	-0.04905	0.015483	-0.00676	-0.05997	0.033887
68	764	0.12633	0.002528	-0.02126	0.008286	-0.00337	0.032284
69	764	0.231942	0.001138	-0.02196	-0.04167	-0.0001	0.021185
70	764	0.078958	0.023647	0.002901	-0.02293	0.022685	0.023599
71	764	0.08251	0.008329	0.015748	0.015375	0.005528	0.021952
72	764	0.06713	-0.02043	-0.00176	-0.00721	-0.0072	0.01319
73	764	0.021138	0.012674	-0.00781	0.020776	0.001919	0.020477
74	764	0.01292	0.009873	0.001452	0.013458	-0.0118	0.002657
75	764	0.089323	-0.00033	0.019703	-0.01931	0.017248	0.003316
76	764	0.023168	0.001466	-0.0039	0.006438	0.031338	0.016209
77	764	0.054084	0.017879	-0.0055	-0.01386	0.027448	0.015876
78	764	0.03363	0.001635	-0.01088	0.015958	0.015867	-0.02665

79	764	0.100302	-0.01167	-0.02806	-0.00854	-0.00611	-0.02888
80	764	0.041047	0.020545	0.009837	0.003189	0.007314	0.006704
81	764	0.108857	-0.02716	-0.01429	-0.01336	0.043187	0.007906
82	764	0.013554	-0.0111	-0.00055	-0.0046	0.032818	0.006857
83	764	0.041297	-0.01167	-0.00087	0.005831	-0.04502	-0.01071
84	764	0.038787	-0.00613	-0.01507	-0.00282	0.020389	-0.01515
85	764	0.137509	0.008776	0.040956	-0.02144	-0.02745	-0.03267
86	763	0.114758	-0.00733	-0.03143	0.004588	0.024519	-0.02708
87	763	0.08517	0.033187	0.002906	0.006981	0.009085	-0.00824
88	763	0.101078	-0.00717	-0.02202	-0.00366	0.07511	0.01821
89	763	0.085648	0.001001	-0.02	0.023777	0.01646	0.028484
90	763	0.14988	-0.00422	-0.02932	0.000566	-0.042	-0.04851
91	763	0.17785	0.04025	0.032324	-0.03037	-0.03548	0.017219
92	763	0.11405	0.018294	0.022405	-0.0219	-0.01909	0.027726
93	763	0.358601	0.006534	0.091697	-0.00745	-0.08527	-0.04387
94	763	0.121039	0.00289	0.024393	-0.01029	-0.14983	-0.0975
95	763	0.057996	-0.02326	-0.01124	0.018945	-0.07489	-0.02818
96	763	0.064118	0.045069	0.007381	-0.00688	0.035706	0.013703
97	763	0.299087	-0.01655	-0.08241	-0.0068	-0.1385	0.022887
98	763	0.04686	-0.0022	-0.02855	0.012167	-0.03804	-0.07783
99	763	0.085799	0.013653	0.023994	0.017598	0.091396	0.029383
100	763	0.23307	0.034938	0.047764	-0.00769	0.263656	-0.02471
101	763	0.218841	-0.08705	0.004259	-0.01983	0.092619	0.00934
102	763	0.106492	0.020009	-0.01241	0.015802	-0.07721	0.042037
103	763	0.091545	0.014655	0.02022	0.00392	0.073921	0.043425
104	763	0.160812	-0.00583	0.045509	-0.01189	0.039254	0.010192
105	763	0.041108	0.001307	-0.00706	-0.00606	0.041676	0.02179
106	763	0.049475	-0.01556	-0.01349	-0.0006	-0.00906	-0.01741
107	763	0.013944	-0.00778	-0.0022	0.008187	0.020636	0.035253
108	763	0.084263	0.03276	-0.00421	0.006496	0.03522	0.019335
109	763	0.134791	-0.00915	0.029124	-0.00806	-0.05933	0.007817
110	763	0.064646	0.027258	-0.00509	0.005044	0.030645	0.017899
111	763	0.130317	0.01779	0.018744	0.003194	0.045254	0.031429
112	763	0.11524	0.030635	0.021219	-0.00919	0.027906	0.008971
113	763	0.113918	0.008053	-0.013	0.006238	-0.0604	-0.03636
114	763	0.253577	-0.04773	-0.02781	-0.00481	-0.08442	0.007049
115	763	0.117443	-0.00289	0.017276	-0.00088	0.083052	0.025156
116	763	0.137786	-0.04609	-0.01202	0.003346	-0.06164	-0.00117
117	763	0.268518	0.051163	-0.0023	-0.03351	0.11359	0.023453
118	763	0.065062	-0.00145	-0.00773	0.006796	0.059553	-0.00207
119	763	0.101102	0.029642	0.006543	0.014278	0.051858	-0.02408
120	763	0.222865	0.014505	0.053444	-0.01448	0.06016	0.025565
121	763	0.058422	-0.02437	0.014233	-0.00127	0.046922	-0.00642
122	763	0.007631	0.003941	-0.00445	0.005448	0.015981	0.027595
123	763	0.060253	0.027459	-0.01373	-0.02149	0.007014	0.005029
124	763	0.019575	-0.00652	-0.01323	-0.01497	-0.00456	0.030795

125	763	0.050582	-0.00139	-0.01736	-0.00665	-0.04429	0.020393
126	763	0.036359	0.000593	-0.01237	-0.01547	-0.01734	-0.00465
127	763	0.045276	-0.01658	0.000105	-0.00033	-0.03502	-0.01045
128	763	0.312595	-0.01509	-0.0288	-0.02266	-0.14691	0.032994
129	763	0.355194	-0.03461	-0.01777	0.006791	-0.15856	0.011829
130	763	0.424483	0.058097	0.006582	-0.00921	0.191518	0.005808
131	763	0.014161	0.008409	-0.00517	-0.01355	-0.02475	0.015568
132	763	0.196452	-0.00417	0.028107	-0.00374	-0.06666	0.042416
133	763	0.238362	0.031064	-0.01015	-0.0029	0.113151	-0.01813
134	763	0.07008	-0.01458	0.001232	-0.00967	0.060788	-0.00066
135	763	0.055601	0.009458	0.016371	0.014609	-0.00928	0.020833
136	763	0.068935	-0.01768	-0.00473	0.021495	-0.0318	0.01858
137	763	0.251381	-0.0005	0.004763	0.017147	-0.13346	0.016455
138	763	0.026046	-0.00351	0.019772	-0.00441	-0.00268	0.035196
139	763	0.038435	-0.0296	0.004649	0.00926	-0.00493	0.009871
140	763	0.099016	0.011139	-0.0052	-0.01567	0.056712	-0.0113
141	763	0.027798	-0.0013	0.015216	-0.0064	0.001598	0.018089
142	763	0.016444	-0.0063	0.015033	-0.00634	-0.00262	-0.00183
143	763	0.056629	0.00613	-0.02342	0.007289	0.026769	-0.0012
144	763	0.24399	0.016477	0.01866	-0.00669	0.060447	-0.01995
145	763	0.054501	-0.00043	0.012724	0.003662	0.037671	0.04297
146	763	0.022662	-0.00144	-0.0008	-0.01327	-0.01821	0.024042
147	763	0.016188	0.007992	0.000047	-0.01152	-0.01183	0.042496
148	763	0.095538	-0.01896	-0.00779	0.001251	-0.0498	0.042084
149	763	0.286492	0.038327	0.000052	-0.00023	0.096087	-0.04172
150	763	0.057304	-0.01061	-0.00505	-0.02305	-0.02486	0.002846
151	763	0.091559	0.015137	0.007794	-0.01285	0.048361	0.022856
152	763	0.022301	-0.0053	0.011655	-0.00174	0.016935	-0.04182
153	763	0.148394	0.028171	-0.0148	0.013027	0.04917	0.012441
154	763	0.01167	0.002274	0.009273	0.006346	0.010814	0.033417
155	763	0.098595	0.019203	0.000632	-0.05004	0.007394	0.0125
156	763	0.041822	-0.00046	-0.00057	0.008618	0.03924	0.000355
157	763	0.069392	-0.01528	-0.01577	0.010679	-0.04298	0.001979
158	762	0.018351	-0.00567	-0.00022	-0.00579	0.031441	0.031168
Mean		**0.11214**	**0.003603**	**0.001817**	**-0.00391**	**0.003527**	**0.007588**

Appendix 10: Cross-sectional analysis strict 10%