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Terrorist Attacks and Financial Markets

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Abstract

This paper investigates the magnitude and the duration of the effect of a terrorist attack on stock market indices. We investigate the impact of New York (2001), Madrid (2004), London (2005), Boston (2013), Paris (2015), Brussels (2016), Nice (2016) and Berlin(2016) on the stock indices of the USA (S&P), Japan (NIKKEI), Germany (DAX), Spain (IBEX), UK (FTSE), France (CAC) and the Euronext Index (BEL). We use both a graphical analysis and an event study methodology to assess the effect of terrorist attacks on stock market indices. We conclude that both the magnitude and the duration of the effect are moderate and have diminished over the years.

JEL-Codes: G100, G140, G150.

Keywords: terrorist attacks, event studies, stock market indices.

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1. Introduction

What is the impact of terrorist attacks on financial markets? Do terrorist attacks lead to a significant decrease in the prices of stocks because of growing uncertainty? And if so, is this effect persistent? Do investors get used to such attacks and hence are the effects decreasing with the number of attacks? In Box 1.1 in Chapter 1 of the EEAG report 2016 it is concluded that “all in all, both financial market variables and confidence indicators showed only a slight reaction to the terrorist attacks” (EEAG report 2016, p. 35). This conclusion was based on a short descriptive analysis of the stock markets of the USA, UK, Spain and France after the attacks in New York (2001), Madrid (2004), London (2005) and Paris (2015). This paper extends the analysis and investigates the impact of New York (2001), Madrid (2004), London (2005), Boston (2013), Paris (2015), Brussels (2016), Nice (2016) and Berlin(2016) on the stock indices of the USA (S&P), Japan (NIKKEI), Germany (DAX), Spain (IBEX), UK (FTSE), France (CAC) and the Euronext Index (BEL). We use both a graphical analysis and an event study methodology to assess the effect of terrorist attacks on stock market indices.

2. Recent attacks and their framing

Terrorist attacks are unexpected external shocks which create uncertainty. They raise many questions: who has been responsible? What has been the motivation for the attack? Against whom has the attack been directed? Will there be more attacks? Every attack is different and hence the answers differ. But there are parallels as well. In this paper we analyse whether the attacks in New York (2001), Madrid (2004), London (2005), Boston (2013), Paris (2015), Brussels (2016), Nice (2016) and Berlin (2016) have led to abnormal changes in the prices of stocks on major global stock markets.

Terrorist attacks increase the risk for investors. Consequently, one may expect a decrease in the prices of stocks and an increase in the risk premium that investors require. This does not only hold for stocks in specific sectors like aviation and tourism, but for all sectors. Terrorist attacks lead to a decrease in consumer and producer confidence and this affects all sectors (EEAG, 2016, p. 35).

An important question is whether investors perceive the increased risk as temporary or as permanent? Does this depend on the type and the motivation for the attack? For example, the attack on the Twin Towers was seen as an attack on the Western World, while the attack in Spain was seen as an attack on Spain because of its specific role in the Iraq war. One may expect that the impact of the attacks on the stock prices depends on the information about the motivation for the attack and the extent of the attack. Therefore, in Box 1 we shortly describe the attacks that we analyse and list how the attacks have been framed in the media.

BOX 1 Short description and framing of the terrorist attacks

11 September 2001, World Trade Center, New York, 9/11; death-roll: 2996 ; injured: 6000+ . Local time: 08.25, GMT: 12.25,

In general, the attack has been perceived as an attack on the Western World. The media characterized the attack as a declaration of war to the Western World (*“Act of war; terrorist strike, death toll “horrendous” – USA Today; “A declaration of war” – The Guardian*)

11 March 2004, Public Transport, Madrid; death-roll: 192 ; injured: +/- 2000. Local time: 07.39, GMT: 06.39,

Initially, the ETA was accused for being responsible for this attack but later on the Spanish government claimed to have proof of responsibility of Al Qaeda for the attack. This was never confirmed by Al Qaeda. The confusion about the responsibility was also listed in the media (*“Massacra in Madrid. ETA or Al-Qaeda” – The Guardian; “Affreux: le terrorisme-massacre arrive en Europe” – le Parisien*)

7 July 2005, Public Transport, London; death-roll: 56; injured: 700+ . Local time: 08.50, GMT: 08.50.

The cause has been the increasing radicalization of young people in the UK.. Al Qaeda has been perceived as a source of inspiration. This has been the first attack that points at radicalization causing a terrorist attack. (*“52 dead, 700 injured in England’s worst ever terrorist outrage” – Daily Mail; “Bloodied but unbowed” – Daily Mirror; “Al Qa’eda brings terror to the heart of London” – The Daily Telegraph*)

15 April 2013, Boston Marathon; death-roll: 6; injured: 280. Local time: 14.49, GMT: 18.49.

The intervention of the US in the Middle-East and the influence of Bin Laden and radicalization have been pointed out as the cause for the attack. “Stop killing our innocent people and we will stop”, says the offender. (*“Terror at the finish line” – Boston Herald; “An ‘act of terror’ in Boston” – The Washington Post; “Blasts at Boston marathon kill 3 and injure 100” – The New York Times*)

13 November 2015, City Centre Paris; death-roll: 137; injured: 368. Local time: 21.20, GMT: 20.20,

The occurrence of IS has been mentioned as the main cause of the radicalization of the offenders. The media suggest that the threat of IS will have economic consequences for the future. (*“L’Horreur” – L’Equipe; “The bloody siege of Paris – The Daily Telegraph; “Paris terrorist attacks kill over 100; France declares state of emergency” – The New York Times*)

22 March 2016, Brussel-Zaventem and Maalbeek; death-roll: 35; injured: 340. Local time: 07.58-08.58, GMT: 06.58-07.58.

The occurrence of IS has been mentioned as the main cause for the attacks. Belgium is a large exporter of Jihadists to Syria and participates in the battle against IS. Because Brussels is the capital of Europe it is difficult to know whether the attack is an attack against Belgium or against Europe. (*“Isis strikes at the heart of Europe” – Financial Times; “Never safe again” – De Tijd; “22/3; Black day” – Het Belang van Limburg*)

14 Juli 2016, City Centre Nice; death-roll: 86; injured: 434. Local time: 22.30, GMT: 20.30.

Although the attack was immediately related to IS and radicalization of young people, it took a few days before IS claimed responsibility for the attack. (*“Nice terror attack”- The Daily Telegraph; “Nice terror attack: Isis claims responsibility for lorry massacre in French coastal city” – Independent*)

19th December 2016, Christmas market City Centre Berlin; death roll: 12; injured: 56.

Local time: 20:02, GMT: 19.02.

A similar act as the one in Nice, occurred in the end of December 2016 in Berlin. Although Germany is not involved in the military fight against IS, the country supports the military actions. A Tunisian asylum seeker appeared to be the culprit of the attack, for which IS claimed responsibility. (*“Berlin terror attack: Lorry ploughs into crowd at Christmas market” – Daily Mail; “Anschlag von Berlin: Verändert dieser Terror Deutschland” – Bild; “Islamischer Staat” reklamiert Lkw-Attentat für sich” – der Spiegel*)

From Box 1 it follows that the media related the attacks in New York and in Madrid to organizations, while for the other attacks individuals have been held accountable. This might be relevant as one might expect that the impact of an attack for which an organization is responsible is higher than the impact of an attack for which an individual is accountable. On the other hand, the capriciousness and the extent of the attacks by the individuals might lead to an equal uncertainty among investors. Moreover, many individuals claim that they act on behalf of an organization, although it is not always clear that the organization supports the attack. Hence, a priori it is not clear whether this difference causes a different impact of terrorist attacks on financial markets. Second, it is noteworthy that the number of death rolls and injured differ substantially between the attacks, in particular between New York/Madrid and the other attacks.

A terrorist attack can be seen as an exogenous shock that hits the financial markets. According to the efficient market hypothesis (Fama, 1965) , this is “news” on which the financial markets react immediately. If because of the attacks, uncertainty increases, investors will sell their financial assets and ask for a higher risk premium. This will lead to a temporary “abnormal return” because one might expect that after a certain period, stock prices return to their mean or their normal level before the attack¹. This paper analyses movements in stock prices around the date of a terrorist attack to investigate the impact of such an attack on stock price indices. We will analyse both the changes and the duration of the effect.

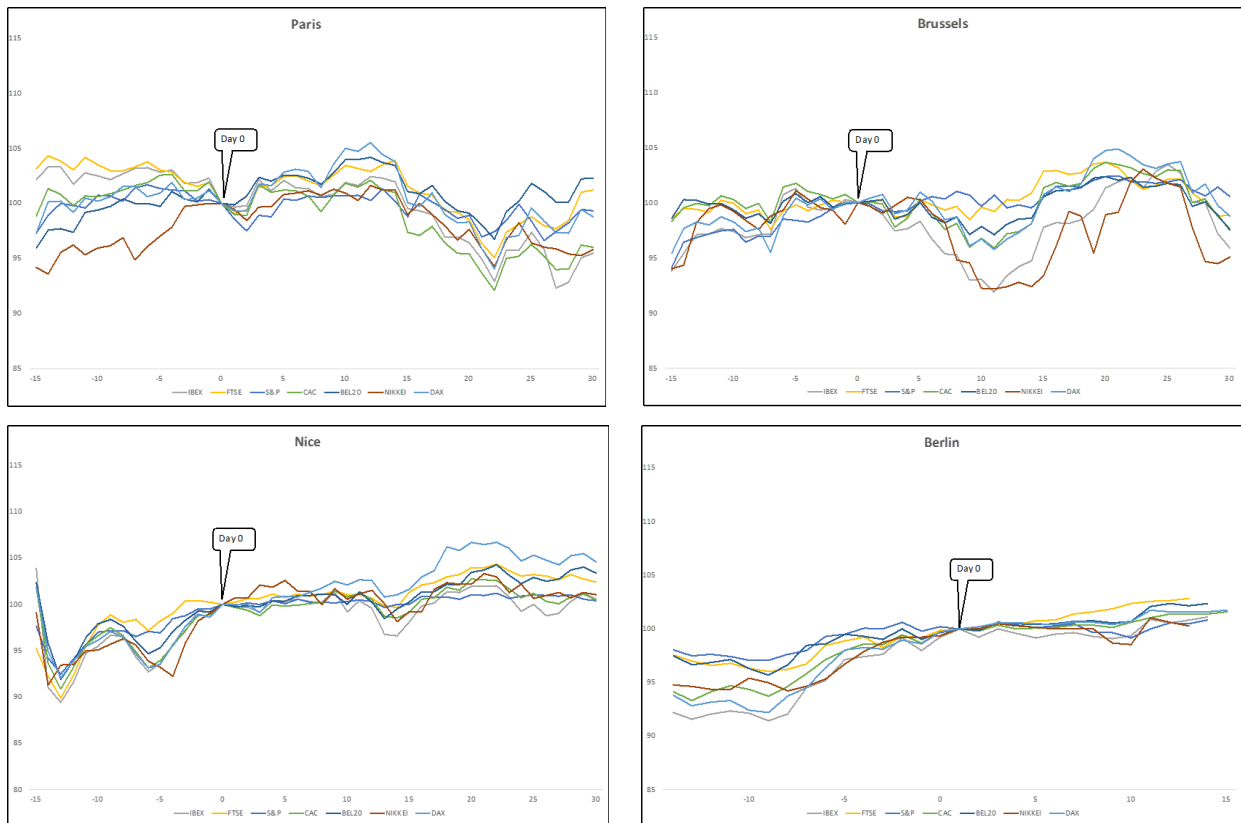
¹ This will only hold if the various terrorist attacks are perceived as independent events.

3. The development of stock market indices

What has happened with the stock market indices around the various attacks? Can we notice a decrease in the indices? To analyse this question we investigate the behaviour of the stock indices around the attacks in the countries where the attacks were committed. To also analyse the effect in Asia, we include the Japanese stock market as well. Hence, we analyse the indices of the stock markets in the USA (S&P), Japan (NIKKEI), Germany (DAX), Spain (IBEX), the UK (FTSE), France (CAC) and the European stocks in Brussels (Euronext). We assume that attacks have not only a local effect, but also a global effect because of contagion. News spreads fast and stock indices are correlated. Figure 1 shows the developments of the various stock indices before and after the attacks at the various stock exchanges.

Figure 1 The development of stock indices around the attacks





Source: Datastream Thomson Reuters (2016)

To investigate the length of the effect, we have chosen to analyse a period of 45 days around the attack: 15 days before the attack and 30 days after the attack. For the recent Berlin attack, we could only select 15 days after the attack. In the graphs, *Day 0* is the last trading rate before the attack. We have taken different points of time, different closing times of the exchanges and different time zones, into account. The first abnormal return can thus be calculated on *Day 1*. This can be the day of the attack or the day after if the exchange was closed at the time of the attack. A number of striking points follow from the graphs. First, the effects of the attacks in New York and Madrid have been larger than those of the other attacks. This also holds to a certain extent for the Paris attack. This might be related to the larger number of victims in these attacks and the larger uncertainty surrounding these attacks. In addition, the attack in New York was a direct attack on a financial centre. The other attacks show smaller and similar effects on the stock markets. Second, the attack in London (2005) has had a larger effect on the European stock markets than on the stock markets outside Europe. This does not hold for the other attacks in Europe. This might be related to the position of London as *the* financial centre in Europe. Third, the financial markets seem to suffer from a short memory and quickly return to business as usual. There is no evidence for

a structural break in the development of the stock indices and the effects seem to diminish with the number of attacks. This suggests that investors learn how to deal with this kind of extraordinary external shocks and that the markets have been much better prepared for such unexpected events. This is in line with the policies that the FED and the ECB have announced to protect the credit channels and the financial system after the terrorist attacks. Moreover, investments in safety and fight against terrorism have increased and in 2016, a number of countries announced further increases in defense and anti-terrorism expenditures (EEAG, 2016). Finally, the initial effect of the attacks happens with some delay. After the attacks in New York, Madrid, Paris and Brussels, the stock prices reached their bottom level after about ten days of the event. In the case of the S&P, IBEX and DAX after 9/11, this might be the result of the temporary closing of the concerned stock exchanges. The NYSE and NASDAQ were not opened on the 11th of September and kept closed for four consecutive days. Both the IBEX and DAX were closed on 9/11 only. In Figure 1, one can recognize the closing of these stock exchanges in the horizontal line after Day 0 in the graph of the attack of 9/11. Although most other attacks happened in the morning (local time), none of them led to a temporary closing of a stock exchange. Moreover, a delay can imply that investors not immediately sell their shares but first wait until more news is available. Apparently, this additional information leads to more uncertainty with a strong decline in stock indices as a result.

4. Event study

Are these declines in daily returns significant? Do they deviate significantly from downward movements in share prices during “normal” periods? The methodology of event studies offers an appropriate approach to investigate these questions. An event study is used to investigate the effects of certain political, economic or other event on (economic) variables. Event studies have many applications. An example of such a study is the research on the impact of an announcement of the European Central Bank on the expected inflation. Other examples include the impact of a merger, stock splits, the announcement of macroeconomic variables, the exit of a CEO and earnings announcements on the value of a firm. The application of event studies is not only restricted to the field of economics. In other fields of expertise, as for example law, the methodology can be used to investigate the effect of new regulatory policies on the value of firms (MacKinley, 1997).

The interdependence of news and stock prices can be investigated by using the method of event studies as well. This paper analyses stock price movements around the date of a terroristic attack and investigates whether the changes differ significantly from the changes outside the event period. For this, we follow the methodology developed by Brown and Warner (1985), which was also implemented and extended by MacKinley (1997) and Chenn and Siems (2004).

An abnormal return for index i on day t ($AR_{i,t}$) is defined as the difference between the return on day t ($R_{i,t}$) and the average return of these index in a certain period (R_i):

$$AR_{i,t} = R_{i,t} - R_i \quad (1)$$

The null hypothesis is that an attack has no effect on the stock prices and that, consequently, the average return in the event period does not significantly differ from the average return outside the event period ($AR_{i,t} = 0$). To investigate this null hypothesis, an event period and an estimation period have to be created. The event period is the window of the event. Both a period before and after the event can serve as estimation period and in both cases $AR_{i,t}$ can be calculated. We label $AR_{i,t}$ during the event period $AR_{i,t}^e$. The significance of $AR_{i,t}^e$ can be determined by relating $AR_{i,t}^e$ to the standard deviation of the average abnormal return in the estimation period ($S(AR_{i,t})$), hence the period outside the event. Under the assumption that stock indices are normally distributed ($AR_{i,t} \sim N(0, \sigma^2(AR_{i,t}))$) and deviations from the mean are temporary, the ratio ($AR_{i,t}^e / S(AR_{i,t})$), follows a t-distribution which helps to determine the significance of $AR_{i,t}^e$ (Brown and Warner, 1985).

In this paper, the estimation period is twenty days before the event ($t=-20 - t=-1$). The estimation period entirely consists of days before a certain event because the effects of a possible event will be captured in the figures of the post-event period. This will hamper and bias the isolation process of the pure effect of a terrorist attack. To not only investigate the existence of an effect but also investigate the duration of an effect, different event periods with several values for t (the length of the event window) are estimated: ($t=1$), ($t=1 - t=5$) and ($t=1 - t=10$). $T=1$ is the first trading day after the attack. Hence, this method researches and analyses if abnormal returns can be observed on the day of the event or in a, respectively, five or ten day period after the attack. Besides, this paper analyses how many days it takes for the stock prices to rebound to their pre-event level.

Table 1 shows the results of these analyses for the stock price developments of the researched indices on the first trading day after the event.

Table 1 shows the results of these analyses for t=1, the stock price developments of the researched indices on the first trading day after the event. The numbers show the level of the abnormal return during the event period and the asterisks indicate the significance of the abnormal return.

Table 1. Abnormal returns and terrorist attacks (t=1)

	New York (2001)	Madrid (2004)	London (2005)	Boston (2013)	Paris (2015)	Brussels (2016)	Nice (2016)	Berlin (2016)
S & P (USA)	-4,50%*** (-4,28)	-1,53%** (-2,77)	0,21% (0,43)	-2,42%*** (-4,10)	-1,59%** (-2,19)	-0,42% (-0,49)	-0,29% (-0,24)	0,00% (0,01)
	23	14	1	11	5	5	2	1
NIKKEI (Japan)	-6,06%*** (-3,30)	-1,71%* (-1,77)	-0,35% (-0,61)	-0,85% (-0,51)	-0,90% (-0,79)	-0,52% (-0,41)	0,56% (0,23)	-0,43% (-0,75)
	20	5	2	2	5	4	1	2
DAX (Germany)	-5,76%*** (-3,33)	-3,43%*** (-3,62)	-1,89%*** (-3,28)	-0,20% (-0,19)	-1,17% (-1,11)	0,11% (0,07)	-0,20% (-0,09)	-0,11% (-0,14)
	23	18	3	7	3	1	4	1
IBEX (Spain)	-4,11%** (-2,69)	-2,25%*** (-3,47)	-2,05%*** (-4,19)	-0,55% (-0,38)	-0,49% (-0,59)	-0,83% (-0,54)	-0,44% (-0,13)	-1,16% (-1,20)
	26	20	3	5	3	20	4	10
FTSE (UK)	-5,38%*** (-4,85)	0,34% (0,57)	-1,53%*** (-3,29)	-0,54% (-0,77)	-1,00% (-1,59)	-0,07% (-0,07)	-0,35% (-0,21)	-0,07% (-0,12)
	19	1	2	6	3	1	1	1
CAC (France)	-6,93%*** (-5,20)	-3,07%*** (-4,31)	-1,47%** (-2,46)	-0,53% (-0,47)	-1,37% (-1,45)	-0,19% (-0,15)	-0,52% (-0,21)	-0,53% (-0,77)
	27	18	2	6	3	1	7	2
BEL (Euronext)	-5,26%*** (-6,96)	-3,10%*** (-5,25)	-1,09%* (-1,99)	-0,70% (-0,75)	-0,57% (-0,79)	0,03% (0,03)	-0,35% (-0,16)	-0,32% (-0,42)
	76	22	3	6	2	1	4	2

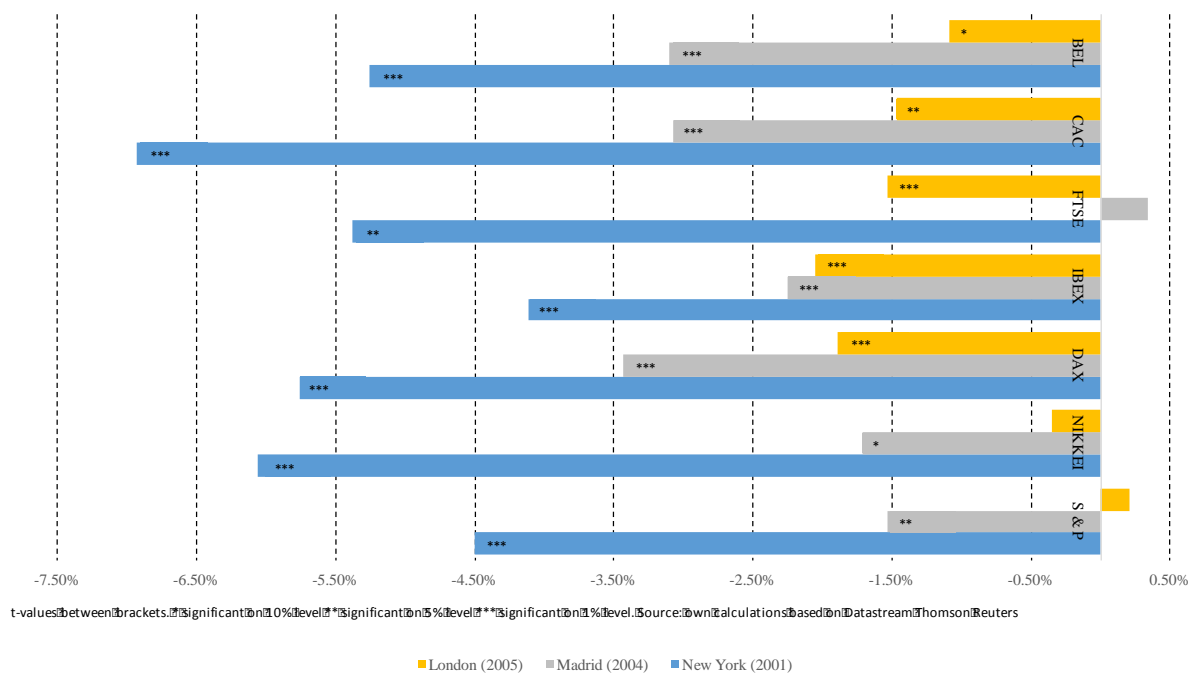
t-values between brackets. * significant on 10% level ** significant on 5% level *** significant on 1% level. Number of trading days to rebound in bold. Source: own calculations based on Datastream Thomson Reuters

Some remarkable insights are gained when analysing Table 1. First of all, the attacks in New York and Madrid have had, both in terms of size and duration, a larger effect on the stock market indices than any of the other attacks. This can be due to the fact that significantly more people were killed during these bombings and the large uncertainty that arose accordingly. Secondly, the bombing in London (2005) had larger effects on the European stock exchanges than on exchanges outside Europe. Spillover effects were limited to the European stock exchanges, something which was not the case for any of the other attacks. Thirdly, when we look at the number of trading days it took before the indices returned to their outside-event average, we can conclude that financial markets appear to have a short memory and adapt quickly to the unexpected event by going back to day-to-day business.

Excluding the attacks in New York City on 9/11/2001 and Madrid, the share prices return to their pre-event level in no more than ten days. This can be the result of the fact that the direct material damage of the attacks is in general relatively limited. WordAtlas (2016) estimated that the direct costs of the attack in New York, such as (medical) costs related to the immediate response on an emergency and capital spent on restoration, were roughly 25 billion dollar. The damage in London was significantly lower, namely 63 million dollar.

Figure 2 visualizes the results of Table 1 and shows the effect and corresponding significance of the attacks in New York, Madrid and London on the various stock exchanges on the first adjusted closing price after the attack. This figure clearly shows the difference in impact of the different attacks and the large impact of the 9/11 attack.

Figure 2: AR (t=1) as the result of bombings in New York, Madrid and London



However, the indirect costs, including the distortion of the economy, are notably higher than the direct costs and are spread over a longer period. The disruption in the interconnected economy and supply chain channels is an example of these indirect costs. A terrorist attack can increase market, credit and operational risks and the immediate impact of an unexpected event as a terrorist attack on financial and goods markets can lead to changes in investors' risk profiles.

In order to determine the effect on stock prices for a period longer than one day, cumulative abnormal returns have to be estimated. For an event window of five days, this is the sum of the abnormal returns on the first five days after the event:

$$CAR_{i,t} = \sum_{t=1}^5 (AR_{i,t}) \quad (2)$$

To research the effects over a longer period, the cumulative abnormal returns for a ten day interval are calculated. Besides, in this scenario too, the significance of these cumulative returns is estimated by calculating the corresponding t-values, where the variation of the cumulative abnormal returns ($\sigma^2(CAR)$) is determined in the following way (Brooks, 2013):

$$\sigma^2(CAR_i(T_1, T_2)) = (T_1 - T_2 + 1)\sigma^2(AR_{i,t}) \quad (3)$$

Just as in the single day case, the ratio $CAR_i(T_1, T_2) / \sigma^2(CAR_i(T_1, T_2))$ follows a t-distribution which can be used to determine the significance of $CAR_i(T_1, T_2)$. Table 2 shows the results of our calculations and displays the cumulative abnormal returns for the five and ten day intervals. Table 2 confirms the observations and conclusions of Table 1. What strikes most is the fact that the majority of the indices returns to a positive level within ten trading days after the attack. However, since the effects last longer, the bombings in New York and Madrid had a larger effect than any of the other attacks.

The influence of an act of terror is principally confined to short term effects. This primary response shows the overreaction of investors. Both the extra uncertainty and new information, combined with the hedging behaviour of investors, leads to a quick and strong decline in share prices. However, this behaviour seems to be mainly limited to the first day after an attack. From the attacks in London (2005) onwards, in which case the effects are even tiny positive, investors and markets seem to take into account the possibility of a terroristic attack in the pricing of shares. (BBC, 2005)

The statement above is supported by the findings of table 2. The more appropriate immediate responses of keeping credit channels open by government agencies and banks, seems to diminish the impact of an attack. Markets and investors learn how to deal with such external

shocks as terrorist attacks and with extraordinary circumstances. Besides, due to the active attitude of the USA in the wars in Iraq, Afghanistan and most recently Syria, the pricing of stock prices nowadays includes the chance of backfire from terrorist organizations. Although the activity of terrorist in Europe and USA increased in the recent years, (significant) abnormal returns have disappeared and markets have become more resilient.

Table 2. Cumulative abnormal returns and terrorist attacks ($t=1-t=5$) and ($t=1-t=10$)

		New York (2001)	Madrid (2004)	London (2005)	Boston (2013)	Paris (2015)	Brussels (2016)	Nice (2016)	Berlin (2016)
S & P (USA)	CAR $t=5$	-10,00%*** (-4,25)	0,00% (0,00)	2,19%* (1,98)	-2,71%* (-2,05)	-0,52% (-0,32)	-1,51% (-0,78)	-0,93% (-0,34)	-0,71% (-0,66)
	CAR $t=10$	-0,28% (-0,08)	-2,94% (-1,68)	3,00%* (1,92)	-1,61% (-0,86)	-1,23% (-0,54)	-3,66% (-1,34)	-1,70% (-0,44)	-1,93% (-1,27)
NIKKEI (Japan)	CAR $t=5$	-2,81% (-0,69)	-2,53% (-1,17)	0,79% (0,61)	0,01% (0,00)	-1,12% (-0,44)	-0,87% (-0,31)	1,93% (0,35)	-1,93% (-1,50)
	CAR $t=10$	-0,25% (-0,04)	-5,76%* (-1,89)	-0,51% (-0,28)	-0,04% (-0,01)	-2,95% (-0,81)	-10,32%** (-2,59)	-0,67% (-0,09)	-2,79% (-1,53)
DAX (Germany)	CAR $t=5$	-6,88%* (-1,78)	-3,49% (-1,65)	1,21% (0,94)	-2,09% (-0,93)	0,39% (0,17)	-0,51% (-0,15)	-0,07% (-0,01)	-1,16% (-0,64)
	CAR $t=10$	-7,58% (-1,39)	-7,81%** (-2,60)	3,22%* (1,77)	4,07% (1,27)	0,12% (0,04)	-6,26% (-1,27)	0,14% (0,02)	-1,43% (-0,56)
IBEX (Spain)	CAR $t=5$	-6,61%* (-1,94)	-4,46%*** (-3,08)	0,39% (0,36)	1,54% (0,47)	1,24% (0,66)	-4,22% (-1,23)	-0,58% (-0,08)	-2,22% (-1,03)
	CAR $t=10$	-5,23% (-1,08)	-7,27%*** (-3,55)	0,38% (0,25)	8,09%* (1,76)	0,19% (0,07)	-12,18%** (-2,51)	-2,74% (-0,26)	-2,61% (-0,86)
FTSE (UK)	CAR $t=5$	-0,71% (-0,29)	-1,82% (-1,35)	-0,48% (-0,46)	-0,59% (-0,38)	2,33% (1,65)	-0,69% (-0,28)	-2,18% (-0,59)	0,05% (0,04)
	CAR $t=10$	-4,82% (-1,37)	-3,12% (-1,64)	-1,88% (-1,28)	2,61% (1,19)	3,21% (1,61)	-2,37% (-0,68)	-4,72% (-0,90)	1,01% (0,52)
CAC (France)	CAR $t=5$	-6,03%* (-2,02)	-3,14%* (-1,97)	1,07% (0,80)	-0,87% (-0,35)	-0,58% (-0,28)	-1,01% (-0,34)	-1,32% (-0,24)	-1,44% (-0,93)
	CAR $t=10$	-7,37%* (-1,75)	-7,41%*** (-3,29)	2,35% (1,24)	5,65% (1,59)	-1,75% (-0,59)	-6,04% (-1,47)	-1,43% (-0,18)	-2,13% (-0,97)
BEL (Euronext)	CAR $t=5$	-7,46%*** (-4,43)	-3,65%** (-2,77)	0,16% (0,13)	-0,07% (-0,03)	0,55% (0,34)	-0,66% (-0,28)	-0,33% (-0,07)	-0,24% (-0,14)
	CAR $t=10$	-9,36%*** (-3,93)	-7,82%*** (-4,19)	1,34% (0,77)	2,33% (0,79)	-0,07% (-0,03)	-3,52% (-1,06)	-1,27% (-0,18)	0,62% (0,25)

t-values between brackets. * significant on 10% level ** significant on 5% level *** significant on 1% level. Number of trading days to rebound in bold. Source: own calculations based on Datastream Thomson Reuters

5. Conclusion

What is the impact of terroristic attacks on financial markets? This paper investigates this question for a number of recent attacks by using the event study method. The conclusion is that the impact is relatively small and short-term. The (new) information of an assault certainly leads to extra uncertainty and contagion effects, which is reflected in an immediate decline of stock prices, but the effects are mainly short term and stock indices recover fast. These results are in line with the observations from other researchers, for example Johnston and Nedelescu (2005) and EEAG (2016). However, some remarks must be made. First of all, this paper only researches the developments of stock indices. Not every sector is hurt to the

same extent by the occurrence of a terroristic event. Consequently, the effects per sector can differ and some sectors might even benefit from an attack. Hence, the effects on the returns of different sectors could deviate from the average picture. Moreover, this paper only analyses the effects of episodic terrorist attacks in the Western world. In terminology of terrorism, Jackson, Dixon & Greenfield (2007) define episodic terrorism as high profile and impact, isolated attacks. However, the most and most deadly terrorist attacks take place in the Middle East and Africa. The latter kind of campaign terrorism, which consists of extended and repeating terrorist conflicts, is worth further research too.

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