

Terrorism and Stock Market Performance

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Abstract

Our study examines the long term impact of terrorism on stock market performance. we focus on 12 stock markets exchange which will be classified into three categories (developed, emerging and frontier market) over a 8-year period (2008 to 2015) and by using fixed-effect panel regression model where the MSCI Standard Total Return Index for each country in the sample as proxy to stock market performance and the global terrorism index (gti).we deduce that: Confirmed to the finding of previous researches, terrorism has an immediate an short term negative impact on all the stock market return and developed markets benefits by a positive stock return for emerging market we found that terrorism has a significant negative impact on stock performance. For frontier markets, the stock market return has no correlation with the terrorism impact; that is means each terrorism score given to these markets, the stock market reaction will be indifferent in the long term.

Keywords: terrorism, stock market performance, long term impact, Developed, emerging, frontier stock market

1. Introduction

Deaths from terrorism in 2015 were **29,376**. The five countries with the highest impact from terrorism as measured by the global terrorism index are Iraq, Afghanistan, Nigeria, Pakistan and Syria. Tunisia's terrorism score increased from **3.29** in 2014 to **4.69** in 2015 and France from **3.58** to **5.6**. The global economic impact of terrorism reached **US\$89.6** billion in 2015. Tourism's contribution to GDP is twice as large in countries with no terrorist attacks compared to countries with attacks...; statistics that we actually listening from medias and economic analysts. We choose to introduce with this statistics provided by the global terrorism index report 2016 to show the direct and indirect costs of terrorism. Such number of analyst studied the economic impact of terrorism on some specific macroeconomic indicator such GDP and foreign direct investment (FDI); (Enders and Sandler, 1996; Eckstein and Tsiddon, 2004; Bloomberg, Hess and Orphanides, 2004; Enders et al., 2006; Abadie and Gardeazabal, 2008) who found a significant negative impact of terrorism on these economic indicators.

The speech about terrorism nowadays and its social, political and economic costs in the talk shows, news papers and social Medias push us to ask and search about his costs on financial and specially stock markets and we found that after the attack of 11/09 in the USA the attention of researchers had derivate to the impact of this attack on financial markets and specially stock markets; after that researches had concerned other countries and different attacks. The authors had study the short term impact on stock return or volatility by using an event study. But the longer term impact of terrorism on stock market is far and less pronounced. From that we have gotten the idea and decide to study the longer term impact of terrorism on stock market. Hence the central problematic of our research is articulated around the existence of a long term effect of terrorism on the stock market performance. And we address the following question: **does terrorism has a longer term effect on stock market performance?**

To solve this question we focus on 12 stock markets exchange which will be classified into three categories (developed, emerging and frontier market) over a 8-year period (2008 to 2015) and by using fixed-effect panel regression model where the MSCI Standard Total Return Index for each country in the sample as proxy to stock market performance (Dimic, Orlov, and Piljak 2015) and the global terrorism index (gti) (Procasky and Ujah 2016) we found different results which will be surprised for a few.

The remainder of our study is structured as follows: we develop our hypothesis by reference to previous research in section 2 then in section 3 we present the data and its sources; subsequently the model adopted in the context of an empirical validation and in section 4 we present the empirical evidence as well as the interpretations. Finally in section 5, we conclude at least with summarizing and presenting the findings as well as the limit of our article.

2. Review of the Literature and Hypotheses Developing

Financial institutions analyze regularly the response of the stock market and look at specific types of events (political, economic, social, environmental or demographic) in their analysis. But after the attacks of 11 September 2001 in the United States, academic research is moving towards the study of the impact of terrorism on the stock markets.

Abodie and Gardeazabal (2003) analyzed the impact of ETA¹ on the stock prices of companies that exist in the Basque country. In their studies, they compared the evolution of a portfolio with a mortgage character which contains 14 shares of the Basque country, compared to another portfolio that contains 59 shares of the rest of Spain over the period 1998-1999. While Basque terrorism was considered a negative factor in the region's economy, the announcement of the truce had a positive influence on the actions of the Basque companies. While the end of the same truce has a negative influence. Their results show that the performance of Basque stocks is better than other stocks during the cease fire period. The authors estimated the coefficients of the dummy variables which measure the incidence of the 22 days when the bad news occurred and the 66 sessions for the good news respectively. For Basque companies, the results show a statistically significant increase and a negative impact in the first case and a positive one in the second. For companies in the rest of Spain, the two cases are not statistically significant and the impact is very small.

In addition, (Chen and Siems 2004) examined the reaction of the stock market to 14 terrorist and military attacks from 1915 to 11 September 2001. The authors have shown that terrorist and military attacks exert a significant influence on stocks and generate significant immediate effects on the stock markets around the world. Nevertheless, the effect of these events has been short-term, as well as new results show that the stock markets absorb the terrorist shocks which leads to a rapid readjustment of prices of stock prices.

¹ **Euskadi Ta Askatasuna** known by its acronym ETA (for Basque Country and Liberty), is a Basque autonomous organization based on Marxist (revolutionary) independence.

(Drakos 2004), Carter and Simkins (2004) examined the extent to which the September 11, 2001 attacks changed risk by using Beta as a measuring instrument. They calculated the market volatility for the general and sectoral indices corresponds to each share. Precisely, according to size difference, geographic location and sector, they compared the Beta in the period before and after the attacks of 11/09 which contains 20 US companies. Their results revealed that the impact varies according to the characteristics of each company. Indeed, 15 companies have Betas that increase after the attacks even though the changes were marginal in the majority of cases. They also detected that the volatility of the share increases for the ten companies. In contrast, Drakos (2004) focused on one sector and analyzed the Beta alteration of 13 airlines in the US and the rest of the world in the post-9/11 phase. Based on this phase, equity prices declined by 30% on average for non-US companies. While, stock prices have declined on average by 53% for US companies. The authors conclude that the risk associated with the actions of airlines has increased following this attack. Indeed, the beta recorded a significant increase for the nine companies of thirteen companies studied; hence the difference is statistically significant since the risk is divided between the systematic risk and the specific risk. Hon et al. (2004) focus on how the cross-country correlation of assets was affected by this terrorist mega event.

The work of Carter and Simkins (2004) focuses on the reaction of investors in terms of price rationality and not just the impact of September 11 on prices. It should be noted that they have detected a clearly negative reaction although there is a difference in intensity for the various airlines. The latter have been less affected because they have relatively high capital reserves. What can be retained as the main idea after Carter and Simkins that the rationality of investors was different.

Karolyi and Martell (2006) use an event-study analysis around the day of the terrorist attacks uncovers evidence of a statistically significant negative stock price reaction of -0.83%, which corresponds to an average loss per firm per attack of \$401 million in firm market capitalization

Arin, Ceferri and Spagnolo (2008) revealed very pertinent results about the impact of terrorist events on stock markets. These authors used data from six different countries (Indonesia, Israel, Spain, Thailand, Turkey and United Kingdom) to take into account volatility and not just stock markets. Their research resulted in the fact that the impact of this kind of events is significantly greater in emerging markets.

On their part, Baumert (2009) examined the terrorist event of 11 March 2004 in Madrid and their effects on the market. The study verified that the size of the attack (in terms of number of deaths and injuries) and also the alleged perpetrators of ETA against Al Qaeda were the two main reasons that significantly affect the market. On the other hand, investors have a tendency to act through rational behavior, despite their excessive reactions on the market. Baumert deduced that except the shares are directly related to this terrorist attack that has suffered very heavy losses.

Broken and Derwall (2010) identified the stock market reactions to terrorist events. It should be interpreted that the impact of these events and their effects on the stock markets is slightly negative, without taking into account the attack of September 11, 2001 which has shown harmful and long-term consequences. These two added that natural disasters, such as earthquakes have a greater influence on the stock market.

The work of Nikkenen and Vahamaa (2010) focuses on the reaction and comparison of the FTSE 100 index after the attacks of 11 September 2001 in the United States and of 11 March 2004 in Madrid and 7 July 2005 in London. So their research has shown that these attacks transform the expectations of investors down and also the increase in uncertainty regarding the stock markets.

Using event study methodology and GARCH family models, the paper investigates the effects of two terrorist incidents – the bomb attacks of 11th March 2004 in Madrid and 7th July 2005 in London – on equity sectors. Significant negative abnormal returns are widespread across the majority of sectors in the Spanish markets but not so in the case of London. Furthermore, the market rebound is much quicker in London compared to the Spanish markets where the attackers were not suicide bombers (Kollias, Papadamou, and Stagiannis 2011)

(Graham and Ramiah 2012) apply event study methodology to examine the impact of five terrorist attacks (New York World Trade Centre, Bali, Madrid, London, and Mumbai) on Japanese

industries. Being a watershed event, the negative impact of the attacks in the U.S. was apparent. Their evidence suggests an initial step-change in risk incorporated into expectations after the U.S., Bali and Madrid bombings. The two subsequent attacks had no effect on the market implying on the forecast error in risk expectation in Japan after the initial terrorist attacks.

(Essaddam and Karagianis 2014) by using a volatility event-study approach and a new bootstrapping technique, they find volatility increases on the day of the terrorist attack and remain significant for at least fifteen days following the day of the attack. Cross-sectional analysis of the abnormal volatility indicates that the impact of terrorist attacks differs according to the country characteristics in which the incident occurred.

The unique work that we found studying the long term impact of terrorism is that of (Procasky and Ujah 2016) which examine the terrorism and its impact on the cost of debt. They found that terrorism results in a higher cost of debt for sovereigns and by extension, firms in impacted countries. In fact, a two point increase in terrorism on the utilized 10-point scale on average results in a half notch reduction in a sovereign's credit rating, roughly equivalent to a change in outlook. Furthermore, this impact is more pronounced in developing markets where we find that a comparable two-point increase in terrorism on average results in an entire notch downgrade in the sovereign credit rating, e.g., from BB to BB-.

Almost theses researches focused on the short term effect of terrorism; means they use daily or monthly data to measure the abnormal returns or the volatility of a stock market and founded that terrorism has a significant and negative effect on stock market performance. But the longer term impact is less pronounced and especially on the stock market performance. Nevertheless, according to the results provided by the previous researches we can suppose that terrorism has a longer term impact on stock market performance and this impact differs according to each market category (developed, emerging and frontier).

So we can deduce two hypotheses:

H₁: terrorism has an impact on stock market performance.

H₂: the impact of terrorism differs according to stock market's classification

3. Data and Methodology

In order to study the impact of terrorism on stock markets we will at first define the data adopting in the model and their source then we will present the research methodology.

a. Data

In this part we discuss the data and its sources so we operationalize for the independent variable of interest, terrorism index, the dependent variable is stock market performance, and the controlling variables which have been shown to have explanatory value with respect to the dependent variable.

b. Stock Market Performance

To measure the stock market performance we will use the MSCI index which will be the dependent variable in our model.

Definition of MSCI Index

“The **MSCI Global Standard Indexes** include large and mid-cap segments and provide exhaustive coverage of these size segments. The indexes target a coverage range of around 85% of the free float-adjusted market capitalization in each market. The **Large Cap Indexes** target a coverage range of around 70% of the free float-adjusted market capitalization in each market and the **Mid Cap Indexes** target a coverage range of around 15% of the free float-adjusted market capitalization in each market”².

² MSCI index defintions (www.MSCI.com)

MSCI is an organization specialized in calculation of this index and other indexes like MSCI ACWI and MSCI EM ... and MSCI Global Standard index is an index that measures the stock markets return in each country. There are indexes similar to this index which is S&P index and FSTE index.

a. Terrorism

As a proxy to measure the effect of terrorism we use Global Terrorism Index (GTI) and it will be the independent variable in our model

The Global Terrorism Index (GTI) is a comprehensive study that accounts for the direct and indirect impact of terrorism in 162 countries in terms of lives lost, injuries, property damage and the psychological after-effects of terrorism. This study covers 99.6 per cent of the world's population. It aggregates the most authoritative data source on terrorism today, the Global Terrorism Database (GTD) into a composite score in order to provide an ordinal ranking of nations on the negative impact of terrorism. The GTD is unique in that it consists of systematically and comprehensively coded data on domestic as well as international terrorist incidents and now includes more than 125,000 cases. Given the resources committed to counter-terrorism efforts internationally, it is important to analyze and aggregate available data related to terrorism to better understand its various properties such as:

- The differing socio-economic conditions under which it occurs.
- The geopolitical drivers associated with terrorism and ideological aims of terrorists groups.
- The types of strategies deployed, tactical terrorist targets and how these evolve over time

Simply the global terrorism index is a score given to each country to measure the socio-economic effects of terrorism attacks and classify the countries according to this score which is between 0 and 10 with 10 refers the highest impact of terrorism and 0 there is no impact.

b. Control Variable

The stock prices compress a large amount of information, because we are studying return data with yearly frequency. In our econometric framework, we must control changes in both the financial and economic environments. The effects of macroeconomic factors and their relationship to equity returns (Kollias, Papadamou, and Stagiannis 2011) were studied by a significant number of analysts (see e.g., Chen et al., 1986, Flannery and Protopapadakis, 2002 and Rapach et al., 2005 and references therein) and found that interest rate, inflation, industrial production... have an impact on stock market returns specially in the U.S and other developed countries. Our control variables are divided to tow basic categories: economic control variable and with annual GDP growth we capture the countries' current level of economic development; with inflation measured by a GDP deflator we can rate the macroeconomic uncertainty of the economy; rating global market risk factor and global stock market uncertainty and proxied by the MSCI World Index.

The description of all the variables will be summarizing in the table below:

Table 1: variables description

| Variables | notation | Simple years | Sample size |
|--|----------|--------------|-------------|
| Stock market return measured by MSCI Global Standard Indexes | r | 2008-2015 | 96 |
| The Global Terrorism Index data is obtained from the Institute for Economics and Peace (IEP). Although IEP reports data for 158 countries, we only use the 12 Countries. | GTI | 2008-2015 | 96 |
| GDP annual growth (annual %) data is obtained from the World Development Indicators and Global Development Finance Database | GDP | 2008-2015 | 96 |
| Inflation deflated by GDP deflator (annual %) data is obtained from the World Development Indicators and Global Development Finance. | INF | 2008-2015 | 96 |
| MSCI all countries world index (MSCI ACWI) data is obtained from MSCI ACWI index. | World | 2008-2015 | 96 |

d. Methodology

It should be noted that we will refer to the work of (Lehkonen and Heimonen 2015) in our econometric framework. The later have studied the impact of political risk factor on stock performance of developed, emerging and frontier markets by using a panel fixed effect regression.

Our total sample comprises 12 countries divided into three categories (emerging, frontier, and developed) based on their classification by the MSCI: 4 frontiers markets (Tunisia, Morocco, Pakistan and Nigeria) and 4 emerging markets (Egypt, Russia, China and South Africa) and 4 developed markets (USA, France, UK and Japan) for the period 2008–2015.

Because we have a variable (*world*) which is constant for all the sample countries we aim to capture the long term effect of terrorism on stock market performance by using the following fixed-effect panel regression model:

$$r_{i,t} = \alpha_0 + \beta_1 GTI_{i,t} + \beta_2 World_t + \beta_3 GDP_{i,t} + \beta_4 INF_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $r_{i,t}$ is the stock market return for country i at time t measured by the MSCI Standard Total Return Index, $World$ is the return on the world stock index, GTI_i is the terrorism score of country i , GDP_i is the annual growth rate of GDP, and INF_i denotes the inflation rates of country i , and $\varepsilon_{i,t}$ is the residuals.

4. Results Discussion

a. Descriptive Statistics

At the beginning we will present the descriptive statistics and sample sizes for the variables for all sample years (2008 through 2015). Then, we split the countries into three subsamples, those of developed markets and those of emerging markets and those of frontier markets so that we may examine the long term effect of terrorism on those subsamples individually.

Table 2: Descriptive statistics

| Variable | mean | St.dv | min | max | obs |
|------------------|----------|----------|--------|--------|---------------------|
| All world | | | | | |
| Msci index | 3.038333 | 29.59349 | -75.39 | 103.43 | N=96 n=12 T=8 |
| GTI | 4.536292 | 2.401155 | 0.01 | 9.314 | N=96 n=12 T=8 |
| Gdp | 2.769309 | 3.16553 | -7.82 | 10.63 | N=96 n=12 T=8 |
| Inf | 4.881313 | 5.199962 | -4.32 | 23.641 | N=96 n=12 T=8 |
| World | 5.3775 | 22.06046 | -41.85 | 35.41 | N=96 n=12 T=8 |
| frontier | | | | | |
| Msci index | -.37625 | 29.74042 | -75.39 | 78.07 | N=32 n=4 T=8 |
| GTI | 5.215937 | 3.124687 | .89 | 9.314 | N=32 n=4 T=8 |
| Gdp | 3.840969 | 1.98703 | -2.38 | 7.84 | N=32 n=4 T=8 |
| Inf | 5.684844 | 5.394957 | -4.32 | 20.666 | N=32 |

| Variable | mean | St.dv | min | max | obs |
|------------------|----------|----------|--------|--------|--------------------|
| | | | | | n=4 T=8 |
| World | 5.3775 | 22.29641 | -41.85 | 35.41 | N=32 n=4 T=8 |
| emerging | | | | | |
| Msci index | 4.93125 | 36.43961 | -67.43 | 103.43 | N=32 n=4 T=8 |
| GTI | 4.684281 | 1.977339 | 0.22 | 7.328 | N=32 n=4 T=8 |
| Gdp | 3.788553 | 3.923524 | -7.82 | 10.63 | N=32 n=4 T=8 |
| Inf | 7.957156 | 5.110144 | -.453 | 23.641 | N=32 n=4 T=8 |
| World | 5.3775 | 22.29641 | -41.85 | 35.41 | N=32 n=4 T=8 |
| developed | | | | | |
| Msci index | 4.56 | 21.29233 | -48.32 | 43.37 | N=32 n=4 T=8 |
| GTI | 3.708656 | 1.6699 | 0.01 | 5.6 | N=32 n=4 T=8 |
| Gdp | .6784062 | 2.143623 | -5.53 | 4.71 | N=32 n=4 T=8 |
| Inf | 1.001937 | 1.294853 | -2.164 | 3.111 | N=32 n=4 T=8 |
| World | 5.3775 | 22.29641 | -41.85 | 35.41 | N=32 n=4 T=8 |

As it is showing for all the sample countries, the MSCI index (proxy of the stock markets return) has a mean of 3.038% and -75.39% as a minimum and 103.43% as a maximum. The GTI have a mean of 4.536 which is considered a higher score that means all the countries world suffer from terrorist behavior; the lowest score is 0.01 given to Japan in 2014 and the highest score is 9.314 given to Nigeria in 2015.

Looking for the statistics of the subsamples we remark that the highest MSCI index mean is given to developed and emerging markets with 4.56% and 4.93% respectively and the lowest mean is given to frontier markets with 3.03%. In contrast, the highest GTI mean is given to frontier countries (5.21) then emerging countries with 4.68 and at least developed with mean score 3.07. the drivers of which can be seen/found in the accompanying control variable statistics, which are generally much lower and subject to greater variation for the frontier country sample.

b. Regression Results

We have used a fixed effect panel regression to estimate the impact of terrorism on stock market performance. All the empirical results of our fixed effect regression are given in the tables bellow and for more details see appendix:

Table 3: Fixed effect regression of the impact of terrorism on stocks return

| | world | Frontier | emerging | developed |
|------------------|---------------------|--------------------|----------------------|---------------------|
| constant | 5.338 (0.46) | -41.975 (-1.39) | 33.591 (1.98)* | -16.569 (-1.90)* |
| GTI | -1.366 (-0.63) | 2.315 (0.52) | -4.664 (-1.60)* | 3.851 (1.71)* |
| GDP | -2.196 (-2.18)** | 2.024 (0.74) | -4.694 (-2.74)*** | 1.13 (1.58)* |
| INF | 0.898 (1.34)* | 2.892 (2.67)*** | 0.557 (0.47) | 1.154 (0.69) |
| world | 1.031 (10.62)*** | 0.987 (5.22)*** | 1.216 (6.92)*** | 0.915 (13.17)*** |
| N | 96 | 32 | 32 | 32 |
| R-squared | 0.629 | 0.5381 | 0.7968 | 0.8840 |

*p<0.1 **p<0.05 ***p<0.01

As is it showing, our model is overall statistically significant in all the subsamples where all R-squared are more then 0.5 and that is mean that the variables used (GTI, GDP, INF and world) have explained the variation of our dependent variable which is the stock return.

Now we will take such subsample alone to interpret the result

The World Sample

Let's start with the World sample, we found that terrorism have a negative effect on stock return (-1.336) but it isn't significant. We can conclude that when we talking about the long term the effect of terrorism will degrade over time and disappears because: firstly almost countries world are affected by this threat and the entire world are in war counter terrorism. Secondly, according to Chen and Siems (2004) who have shown that terrorist and military attacks exert a significant influence on stocks and generate significant immediate effects on the stock markets around the world. Nevertheless, the effect of these events has been short-term, as well as new results show that the stock markets absorb the terrorist shocks which leads to a rapid readjustment of stock prices.

Developed Market

Our sample contains 4 developed countries (USA, France, UK and Japan) to test the terrorism impact on their stock market performance. As the estimation result shows, the GTI has a significant and positive effect (3.851) that is mean if the terrorism index increases by 1% the stocks market return increases by 3.851% and that isn't surprised for us for many reasons: on the one hand, The market appears to incorporate security risk since the spectacular New York bombings of 11/09, as most listed groups are multinationals exposed to a multitude of controllable risks and uncontrollable over all geographical areas of the globe. Acting as true geopolitical analysts, the professional managers and savvy investors have acquired the necessary reflexes as the occurrence of this kind of events increases. For example, the bombing of Paris, one of the most murderous and spectacular, having taken place on November 13th 2015. This attack appears to have an opposite effect to that expected in the Euro zone as the Stoxx Europe 600 index posted a positive weekly return of 3.32%. Over the week following the betting attack, the CAC 40 gained 2.14% while the German DAX won almost 3.84%. The British index, FUTSE 100, followed the same trend, marked by an equally appreciable rise of 3.54%. On the US market, the S & P 500 even went so far as to achieve its best weekly performance in 2015 (+3.3%), and these results are confirmed with the finding of Graham and Ramiah (2011).

On the other hand, this behavior is explained by a form of solidarity in the face of terrorism which might seem irrational in view of the financial orthodoxy and the need to revise upwards the market risk premium. This mimetic behavior on the world's biggest financial markets is especially peculiar to developed Western markets that have surprised by their ability to rebound in the latest tragic events.

Finally, we can deduce that developed countries have learned a lesson from the bombing of September 11th 2001 and London and Madrid bombings and by incorporating security risk, they succeed to transfer the negative effect of terrorism (bad news) to a positive effect on stock market performance and whatever the score of terrorism given to each developed countries that will affect positively on their financial and economic markets.

Emerging Markets

We choose to test the impact of terrorism on annual stock return on four emerging countries: Egypt, South Africa, Russia and China. As it showing, we found a negative coefficient of the GTI (-4.66) and that means that terrorism has a negative and significant (at level 10%) effect on stock market return and we remark that is a normal result. Also the negative and statically significant impact of GDP is not surprised because, as known nowadays, Even though many of these economies are still experiencing growth rates that would envy many developed countries, they are now showing signs of slowing, breaking, at least temporarily, with the spectacular growth rates they displayed these last years. Evident signs of a slowdown appear on the emergent market growth side, which raise doubts about the latter's ability to resist the deterioration of the global economy. This situation is due to the subprime crisis ³ (or financial crisis in 2007) and the global economic crisis of 2008 and following, sometime called world Great Recession (Great Recession, in reference to the Great Depression of 1929)⁴, is a recession in which entered most countries Industrialized countries in the aftermath of the 2008 autumn crash⁵. Itself a consequence of the 2006-2007 subprime crisis. We should remember that our sample period begin from 2008. Returning to our main variable which is GTI and his negative impact on stock market return is due to these main reasons: The notion of emergence is so ingrained that the "emerging country" label, which is based on the macroeconomic performance of countries coupled with political stability and a favorable business climate that supposed implicitly open for all countries, so the increase of the level of terrorism will create a political instability and a climate of uncertainty and mistrust. And as we know emerging economies are invested by capital markets which are opened to foreign, so this climate of instability and the growth of the terrorism score overtime will frighten foreign investors.

Frontier Market

Our sample contains 4 frontier countries: Tunisia, Morocco, Pakistan and Nigeria. The GTI, our dependent variable, has no significant effect on frontier stock market (p-value =0.52) and that is a normal result, even these countries have the highest (in mean) score terrorism but in the long term terrorism has no impact on stock market performance. The reason that explain this result is: we are talking about frontier markets, means small, newest, less developed stock market exchange and less opened to foreign so the information that there is a terrorist attacks in these countries will just interest the investors of these concerned countries so the market reaction will be immediate and for a short time (a few days after the attack) and this finding is confirmed with the finding of Chen and Siems (2004).

³ The **United States (U.S.) subprime mortgage crisis** was a nationwide banking emergency that contributed to the U.S. recession of December 2007 – June 2009. It was triggered by a large decline in home prices after the collapse of a housing bubble, leading to mortgage delinquencies and foreclosures and the devaluation of housing-related securities.

⁴ Catherine Rampell, « *The 'Great Recession' Earns Its Title* », *The New York Times*, 30 juillet 2010.

⁵ Fredric S. Mishkin How Should We Respond to Asset Price Bubbles?

6. Conclusion

In searching for originality and uniqueness to our study, we choose to study the long term effect of terrorism on stock market performance. By using yearly data and according to a fixed -effect panel regression we succeed to estimate the long term effect of terrorism in the three market categories and with a sample of 12 countries (developed, emerging and frontier) during the period 2008-2015. We deduce the following findings:

- Confirmed to the finding of previous researches, terrorism has an immediate and short term negative impact on all the stock market return;
- In the longer term, developed markets benefit by a positive stock return and that is due to the immediate reaction of stock market after the attack and that translates the “irrational” behavior of investors which adopt a strategy opposite to the financial hypothesis and that express first their solidarity with the country affected second their confidence in their markets and finally their confidence in their country's policy and in their armed forces;
- In contrast with developed markets, emerging markets which their specification is related with macroeconomic development and political stability and favorable climate; suffering more from terrorism impact. We found that terrorism has a significant negative impact on stock performance, we should remember also that these markets suffer from two crises: financial crisis and economic crisis, and the existence of the terrorism risk has aggravated the situation and any ‘bad news’ will influence negatively on market reaction: if the terrorist attacks increase from a year to another (the yearly score given to each country to measure terrorism impact increases) the confidence of investors in these markets will decrease and then the stock market performance will decrease too.
- Finally for frontier markets, the stock market return has no correlation with the terrorism impact; that means each terrorism score given to these markets, the stock market reaction will be indifferent in the long term. This result can be explained by: as it is confirmed by a number of researchers, the reaction of this stock market is immediate and for a short term, means the abnormal return during a few days after the terrorist attack.

We found that the strategy adopted by developed markets is so impressive and how they transfer negative and bad information to a positive event and positive return and that is due to the strong confidence on these stock market and to the role played by their Medias in treating this type of subject.

As it is known any research study contains contributions and limits. We can find as limits:

- Reduced sample: our sample contains just 12 countries and 8 years then we divided into 3 subsamples and each one contains only 4 countries so we guess that affect the model shooting; if the sample contains a large number of observations the estimation results will be more interesting
- Limit number of control variables: we use just economic and financial control variables; maybe if we add other control variables the model will be more significant such as political or governmental factors;
- Absence of robustness checks: these checks will confirm the validity and significance of our results. As a robustness test we can replace the MSCI index (proxy to measure the stock market return) by S&P index, or we can switch the regression model.

Despite these limits we could identify a longer term impact of terrorism on stock market performance. Otherwise, a deep analysis which contains a larger sample (large number of countries and large period) and other control variables could be a subject of other research.

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Sitographies

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Appendix

Result from STATA of descriptive statistic and the model regression

• All the world

. xtsu

| Variable | | Mean | Std. Dev. | Min | Max | Observations |
|----------|---------|----------|-----------|----------|----------|--------------|
| code | overall | 6.5 | 3.470174 | 1 | 12 | N = 96 |
| | between | | 3.605551 | 1 | 12 | n = 12 |
| | within | 0 | 6.5 | 6.5 | | T = 8 |
| year | overall | 2011.5 | 2.303316 | 2008 | 2015 | N = 96 |
| | between | 0 | 2.303316 | 2011.5 | 2011.5 | n = 12 |
| | within | | 2.303316 | 2008 | 2015 | T = 8 |
| msciin~x | overall | 3.038333 | 29.59349 | -75.39 | 103.43 | N = 96 |
| | between | | 4.364641 | -5.3325 | 10.70375 | n = 12 |
| | within | 29.29383 | -77.89667 | 95.76458 | | T = 8 |
| gti | overall | 4.536292 | 2.401155 | .01 | 9.314 | N = 96 |
| | between | | 2.298418 | 1.125875 | 8.695375 | n = 12 |
| | within | .9338486 | 2.375292 | 6.953292 | | T = 8 |
| gdpan~h | overall | 2.769309 | 3.16553 | -7.82 | 10.63 | N = 96 |
| | between | | 2.472476 | .153625 | 8.571375 | n = 12 |
| | within | 2.087555 | -6.047566 | 7.325684 | | T = 8 |
| gdpdef~r | overall | 4.881313 | 5.199962 | -4.32 | 23.641 | N = 96 |
| | between | | 4.224857 | -.450375 | 11.11825 | n = 12 |
| | within | 3.241204 | -5.573188 | 17.58294 | | T = 8 |
| msciwo~d | overall | 5.3775 | 22.06046 | -41.85 | 35.41 | N = 96 |
| | between | 0 | 5.3775 | 5.3775 | | n = 12 |
| | within | 22.06046 | -41.85 | 35.41 | | T = 8 |

. xtreg msciindex gti gdpanuelgrowth gdpdeflator msciworld, fe

Fixed-effects (within) regression
 Group variable: code
 Number of obs = 96
 Number of groups = 12
 R-sq: within = 0.6297
 between = 0.1495
 overall = 0.5974
 Obs per group: min = 8
 avg = 8.0
 max = 8
 F(4,80) = 34.02
 corr(u_i, xb) = -0.1987
 Prob > F = 0.0000

| msciindex | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|-------------|-----------|-----------|-------|-------|-----------------------------------|
| gti | -1.365921 | 2.16357 | -0.63 | 0.530 | -5.671563 2.939721 |
| gdpanuelg-h | -2.196283 | 1.005609 | -2.18 | 0.032 | -4.197509 -.1950567 |
| gdpdeflator | .8984525 | .6682517 | 1.34 | 0.183 | -.4314107 2.228316 |
| msciworld | 1.030625 | .0970831 | 10.62 | 0.000 | .8374239 1.223827 |
| _cons | 5.38892 | 11.35781 | 0.47 | 0.636 | -17.21385 27.99169 |
| sigma_u | 6.2622934 | | | | |
| sigma_e | 19.424087 | | | | |
| rho | .09415424 | | | | (fraction of variance due to u_i) |

F test that all u_i=0: F(11, 80) = 0.42 Prob > F = 0.9453

- Frontier Markets

. xtsum

| Variable | | Mean | Std. Dev. | Min | Max | Observations |
|----------|---------|----------|-----------|----------|----------|--------------|
| code | overall | 2.5 | 1.135924 | 1 | 4 | N = 32 |
| | between | | 1.290994 | 1 | 4 | n = 4 |
| | within | 0 | 2.5 | 2.5 | 2.5 | T = 8 |
| year | overall | 2011.5 | 2.327951 | 2008 | 2015 | N = 32 |
| | between | | 0 | 2011.5 | 2011.5 | n = 4 |
| | within | 2.327951 | 2008 | 2015 | 2015 | T = 8 |
| msciin-x | overall | -.37625 | 29.74042 | -75.39 | 78.07 | N = 32 |
| | between | | 4.723892 | -5.3325 | 5.545 | n = 4 |
| | within | 29.44854 | -81.31125 | 72.14875 | 72.14875 | T = 8 |
| gti | overall | 5.215937 | 3.124687 | .89 | 9.314 | N = 32 |
| | between | | 3.383012 | 2.02625 | 8.695375 | n = 4 |
| | within | .9503705 | 3.484187 | 7.288562 | 7.288562 | T = 8 |
| gdpann-h | overall | 3.840969 | 1.98703 | -2.38 | 7.84 | N = 32 |
| | between | | 1.423338 | 2.18875 | 5.570125 | n = 4 |
| | within | 1.542679 | -.7277813 | 6.110844 | 6.110844 | T = 8 |
| gdpdef~r | overall | 5.684844 | 5.394957 | -4.32 | 20.666 | N = 32 |
| | between | | 4.111284 | 1.064375 | 10.96863 | n = 4 |
| | within | 4.002454 | -4.769656 | 15.38222 | 15.38222 | T = 8 |
| msciwo-d | overall | 5.3775 | 22.29641 | -41.85 | 35.41 | N = 32 |
| | between | | 0 | 5.3775 | 5.3775 | n = 4 |
| | within | 22.29641 | -41.85 | 35.41 | 35.41 | T = 8 |

. xtreg msciindex gti gdpannuelgrowth gdpdeflator msciworld, fe

Fixed-effects (within) regression
 Group variable: code
 Number of obs = 32
 Number of groups = 4
 R-sq: within = 0.5467
 between = 0.4680
 overall = 0.4001
 Obs per group: min = 8
 avg = 8.0
 max = 8
 corr(u_i, xb) = -0.6092
 F(4,24) = 7.24
 Prob > F = 0.0006

| msciindex | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|--------------|-----------|-----------|-------|-------|-----------------------------------|
| gti | 2.315235 | 4.456617 | 0.52 | 0.608 | -6.88277 11.51324 |
| gdpannuelg-h | 2.024226 | 2.747958 | 0.74 | 0.468 | -3.647281 7.695733 |
| gdpdeflator | 2.892036 | 1.084419 | 2.67 | 0.013 | .6539056 5.130166 |
| msciworld | .9870371 | .1891197 | 5.22 | 0.000 | .5967133 1.377361 |
| _cons | -41.97592 | 30.29593 | -1.39 | 0.179 | -104.5037 20.55181 |
| sigma_u | 16.804472 | | | | |
| sigma_e | 22.53319 | | | | |
| rho | .35739499 | | | | (fraction of variance due to u_i) |

F test that all u_i=0: F(3, 24) = 0.31 Prob > F = 0.8152

- Emerging Market

. xtsum

| Variable | | Mean | Std. Dev. | Min | Max | Observations | |
|----------|---------|----------|-----------|----------|----------|--------------|-------|
| code | overall | 6.5 | 1.135924 | 5 | 8 | N = 32 | |
| | between | | 1.290994 | 5 | 8 | | n = 4 |
| | within | 0 | 6.5 | 6.5 | 6.5 | | |
| anne | overall | 2011.5 | 2.327951 | 2008 | 2015 | N = 32 | |
| | between | 0 | 2.327951 | 2011.5 | 2011.5 | | n = 4 |
| | within | | 2.327951 | 2008 | 2015 | | |
| msciin~x | overall | 4.93125 | 36.43961 | -67.43 | 103.43 | N = 32 | |
| | between | | 3.960047 | 1.7575 | 10.70375 | | n = 4 |
| | within | 36.27264 | -73.2025 | 97.6575 | 97.6575 | | |
| gti | overall | 4.684281 | 1.977339 | .22 | 7.328 | N = 32 | |
| | between | 1.82306 | 2.148875 | 6.48125 | 6.48125 | | n = 4 |
| | within | 1.156202 | 2.523281 | 7.101281 | 7.101281 | | |
| gdpan~h | overall | 3.788553 | 3.923524 | -7.82 | 10.63 | N = 32 | |
| | between | 3.379372 | .9968749 | 8.571375 | 8.571375 | | n = 4 |
| | within | 2.559811 | -5.028322 | 8.041678 | 8.041678 | | |
| gdpdef~r | overall | 7.957156 | 5.110144 | -.453 | 23.641 | N = 32 | |
| | between | 3.730953 | 3.470625 | 11.11825 | 11.11825 | | n = 4 |
| | within | 3.916222 | -.9892188 | 20.65878 | 20.65878 | | |
| msciwo~d | overall | 5.3775 | 22.29641 | -41.85 | 35.41 | N = 32 | |
| | between | 0 | 5.3775 | 5.3775 | 5.3775 | | n = 4 |
| | within | 22.29641 | -41.85 | 35.41 | 35.41 | | |

. xtreg msciindex gti gdpanuelgrowth gdpdeflator msciworld, fe

Fixed-effects (within) regression
 Group variable: code

| | | |
|--------------------|---|---------|
| Number of obs | = | 32 |
| Number of groups | = | 4 |
| R-sq: within | = | 0.7968 |
| between | = | 0.0657 |
| overall | = | 0.6300 |
| Obs per group: min | = | 8 |
| avg | = | 8.0 |
| max | = | 8 |
| F(4,24) | = | 23.53 |
| corr(u_i, xb) | = | -0.4651 |
| Prob > F | = | 0.0000 |

| msciindex | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|-------------|-----------|-----------|-------|-------|-----------------------------------|
| gti | -4.664102 | 2.92139 | -1.60 | 0.123 | -10.69355 1.36535 |
| gdpanuelg-h | -4.694616 | 1.714449 | -2.74 | 0.011 | -8.233065 -1.156167 |
| gdpdeflator | .5570493 | 1.174157 | 0.47 | 0.639 | -1.866292 2.980391 |
| msciworld | 1.216451 | .1757913 | 6.92 | 0.000 | .853636 1.379267 |
| _cons | 33.59102 | 16.95868 | 1.98 | 0.059 | -1.409968 68.59201 |
| sigma_u | 19.211911 | | | | |
| sigma_e | 18.583034 | | | | |
| rho | .51663458 | | | | (fraction of variance due to u_i) |

F test that all u_i=0: F(3, 24) = 2.14 Prob > F = 0.1218

- Developed

. xtsum

| Variable | | Mean | Std. Dev. | Min | Max | Observations |
|----------|---------|----------|-----------|-----------|----------|--------------|
| code | overall | 10.5 | 1.135924 | 9 | 12 | N = 32 |
| | between | | 1.290994 | 9 | 12 | n = 4 |
| | within | | 0 | 10.5 | 10.5 | T = 8 |
| year | overall | 2011.5 | 2.327951 | 2008 | 2015 | N = 32 |
| | between | | 0 | 2011.5 | 2011.5 | n = 4 |
| | within | | 2.327951 | 2008 | 2015 | T = 8 |
| msciin~x | overall | 4.56 | 21.29233 | -48.32 | 43.37 | N = 32 |
| | between | | 2.90561 | 2.57125 | 8.8575 | n = 4 |
| | within | | 21.13829 | -46.82 | 44.87 | T = 8 |
| gti | overall | 3.708656 | 1.6699 | .01 | 5.6 | N = 32 |
| | between | | 1.744501 | 1.125875 | 4.96375 | n = 4 |
| | within | | .6576287 | 2.592781 | 5.029781 | T = 8 |
| gdpann~h | overall | .6784062 | 2.143623 | -5.53 | 4.71 | N = 32 |
| | between | | .4724409 | .153625 | 1.20375 | n = 4 |
| | within | | 2.102931 | -5.005219 | 5.234781 | T = 8 |
| gdpdef~r | overall | 1.001937 | 1.294853 | -2.164 | 3.111 | N = 32 |
| | between | | 1.041069 | -.450375 | 1.963 | n = 4 |
| | within | | .9151805 | -.7116875 | 3.466312 | T = 8 |
| msciwo~d | overall | 5.3775 | 22.29641 | -41.85 | 35.41 | N = 32 |
| | between | | 0 | 5.3775 | 5.3775 | n = 4 |
| | within | | 22.29641 | -41.85 | 35.41 | T = 8 |

. xtreg msciindex gti gdpannuelgrowth gdpdeflator msciworld, fe

Fixed-effects (within) regression
 Group variable: code
 Number of obs = 32
 Number of groups = 4
 R-sq: within = 0.8840
 between = 0.1529
 overall = 0.7963
 Obs per group: min = 8
 avg = 8.0
 max = 8
 F(4,24) = 45.74
 Prob > F = 0.0000

| msciindex | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|--------------|-----------|-----------|-------|-------|-----------------------------------|
| gti | 3.851382 | 2.251242 | 1.71 | 0.100 | -.7949526 8.497717 |
| gdpannuelg~h | 1.134418 | .7202561 | 1.58 | 0.128 | -.3521179 2.620953 |
| gdpdeflator | 1.154534 | 1.669242 | 0.69 | 0.496 | -2.290612 4.59968 |
| msciworld | .9149086 | .0694442 | 13.17 | 0.000 | .7715829 1.058234 |
| _cons | -16.56974 | 8.724646 | -1.90 | 0.070 | -34.57652 1.437043 |
| sigma_u | 7.6457369 | | | | |
| sigma_e | 8.181407 | | | | |
| rho | .4661937 | | | | (fraction of variance due to u_i) |

F test that all u_i=0: F(3, 24) = 1.56 Prob > F = 0.2244