Unraveling Market Dynamics: Assessing the Diverse Impact of Terrorism on Sectoral Equity Values in the MENA Region

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Abstract

This study explores how sectors in the MENA region exhibit disproportionate responses to terrorism and external shocks. The empirical methodology employs microdata at the firm level, encompassing various sectors in MENA countries from 2016 to 2020. The findings of this research unveil the nuanced effects of terrorism across different sectors. For instance, Terrorism incidents have notably negatively impacted sectors such as Consumer Cyclical, Consumer Non-Cyclical, and Industrial, leading to a decline in the market equity value. However, intriguingly, they positively influence the market equity value of Financial sectors within the MENA region. Furthermore, the degree of these negative and positive impacts appears to vary based on the severity of the terrorism incidents. The main contribution of this study lies in its comprehensive exploration of how terrorism incidents influence firm market equity value, shedding light on sector-specific vulnerabilities and resilience strategies.

Keywords: Sectoral Equity Values, Terrorism incidents, Financial Market, MENA region

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1. Introduction

The international trade literature consistently underscores the heterogeneity of firms, emphasizing that their responses to external shocks are complex and varied (Durante et al., 2022). Within the MENA region, firms have grappled with a myriad of external shocks over the past two decades, with terrorism incidents standing out as a prominent factor significantly influencing market dynamics. The MENA region had a 26.3% rise in terrorism between 1970 and 2018 on a worldwide scale (Institute for Economics and Peace, 2017). The region has unfortunately been marred by various terrorism incidents impacting the equity market value of businesses operating therein (Mnasri and Nechi, 2016).

This study seeks to delve into the consequences of terrorism incidents on sectorial equity market value, specifically emphasizing understanding investor reactions within the MENA capital market. By examining the aftermath of terrorist incidents, this research aims to elucidate how investors respond regarding their investment behaviors, whether it involves reallocating investments within sectors, withdrawing investments, or increasing investments in specific sectors within the MENA region's capital market. This analysis will provide insights into the intricate dynamics of investor sentiments and behaviors following terrorist events, shedding light on the nuanced changes in investment patterns across various sectors in the MENA capital market.

The Middle East and North Africa (MENA) region, known for its geopolitical volatility and socio-economic diversity, has been a focal point of academic research due to its susceptibility to external shocks and internal conflicts (Ferreira et al., 2023; Moussa and Talbi, 2019). The macroeconomic and financial development in the region has been negatively impacted by political instability and violence (The World Bank, 2016). Terrorist strikes that target vital economic sectors such as tourism in other MENA nations and oil and gas in GCC countries typically have more detrimental economic effects on the area. While a significant body of literature has explored the broad impacts of these challenges on the MENA economy (Dimitrova et al., 2022; Tahir et al., 2022), scant attention has been given to the intricate sectorial effects, which this paper endeavors to address this research gap by conducting a micro-level analysis that delves into the sectorial implications of terrorism incidents on the equity market value of firms in the MENA region play a crucial role in understanding the region's economic resilience.

This study explores the impact of terrorist incidents on the equity market value of firms operating within the MENA region. Notably, it distinguishes itself from previous studies in several key ways. Firstly, it conducts a detailed analysis of firm-level data in the MENA region, representing a relatively underexplored study area. Secondly, the study encompasses various significant economic sectors in the region, such as industrial, financial, technology, basic material, consumer cyclical, and non-cyclical, shedding light on which sectors are most and least affected by terrorist incidents. Lastly, given the distinctive and sensitive nature of the MENA region, this research aims to provide a more nuanced comprehension of the terrorism consequences on firm equity market value of vital sectorial

in the MENA region, offering valuable insights for policymakers, investors, and businesses to make informed decisions and foster economic resilience.

This study employed fixed-effect model to meticulously investigate the impact of terrorism incidents on the firm equity market value within the MENA region. This study stands out for its unique use of firm-level data specific to MENA, providing an exceptional perspective on the consequences of ongoing terrorism incidents. The study utilized an extensive dataset, primarily focusing on the MENA region, with firm equity market value as the dependent variable. The independent variables encompass an array of firm-specific factors, including growth, country income, corporate Tax, leverage cost, and terrorism-related proxies such as the growth number of killed wounds and incidents. The data are exported from the Thomson Reuters database and Global Terrorism Database (GTD) over the period 2016 to 2020. Through rigorous empirical analysis, the study aims to offer valuable insights into how regional economic sectors respond to terrorism, illuminating the driving forces behind market capitalization fluctuations.

A remarkable aspect of this study is the variability in impact across different sectors. While some sectors, such as the service industry, appear surprisingly resilient to terrorism incidents, others exhibit heightened sensitivity, notably the industrial and consumer product sectors. This intriguing divergence underscores the complexity of the MENA region's economic dynamics and the need for a more granular examination to unravel the factors contributing to sector-specific equity market value fluctuations.

This study is structured as follows: The subsequent section provides a comprehensive literature review. Following that, the third section details the data and methodology employed. The fourth section delves into the discussion of empirical results. The study concludes with the final section.

2. Literature Review

As conceptualized by Scott (1987), the institutional theory provides a framework for comprehending how firms respond to the external environment. The neoclassical growth model anticipates limited investment and returns for the economy during such shocks. In these theoretical constructs, firms are frequently observed to be influenced by external environmental conditions, as suggested by Collier (1999), who posited that the adverse effects of these shocks may extend to the long-term indicators of the firms. The international financial trade theory asserts that geopolitical events and substantial external shocks can have far-reaching global implications, impacting various regions, financial markets, and firms (Sami, 2023; Froyen et al., 1997).

Terrorist incidents are defined as the illegitimate use of force or violence by non-state actors to achieve specific objectives, encompassing political, economic, religious, or social aims through fear, intimidation, and coercion (Lutz and Lutz, 2018). Terrorists aim to realize their goals by causing losses across various facets of a country's social fabric, ranging from loss of human lives to the destruction of valuable physical infrastructure. Existing literature has established connections

between terrorism and diverse economic and financial factors, including FDI, foreign trade, economic development, economic policies, stock markets, and the risk of stock price crashes (Kong et al., 2021; Meierrieks and Schneider, 2021; Zakaria et al., 2019). For example, Enders and Sandler (1996) observed a 13.5% decline in FDI in Spain and an 11.9% decrease in Greece in response to terrorist risks. Similarly, Abadie and Gardeazabal (2003) noted a 10% reduction in the GDP of the Basque region following terrorist attacks.

Previous research has documented the adverse effects of terrorist incidents, including cyber terrorism, on financial markets in many regions, such as the U.S. capital market (Smith et al., 2023; Bevilacqua et al., 2019); global capital markets (Sharma et al., 2023; Arfaoui and Naoui, 2022, Chen and Siems, 2004), Spanish and London capital markets (Laborda and Olmo, 2021; Kollias et al.,2011; Nikkinen and Vähämaa, 2010), Israel's foreign exchange and stock markets (Peleg et al., 2011; Eldor and Melnick, 2004), Basque country stock market (Barros and Gil-Alana, 2008), Borsa Istanbul equity market (Gok et al., 2020; Christofis et al., 2010), SAARC region (Chaudhry et al., 2018), developed versus developing economies (Ahmad et al., 2023; Butt et al., 2020; Arin et al., 2008), Europe (Corbet et al., 2018), Pakistan (Khan and Ahmed, 2019; MengYun et al., 2018; Shahbaz et al., 2013; Alam, 2012), G7 countries (Papakyriakou et al., 2019; Balcilar et al., 2016) and OECD countries (Narayan, Le and Sriananthakumar, 2018). The persistent occurrence of such incidents has instilled uncertainty and apprehension in investors, resulting in decreased firms' equity market value. Investors tend to become more risk-averse, leading to declining stock prices and market valuations for firms. However, those studies lack focus on the impact of terrorist incidents on the sectorial equity market value of firms operating in the MENA region.

In addition to this, many research predominantly concentrates on macro-level analyses, often overlooking the sectorial nuances vital in comprehending the MENA economic landscape (Khelifi et al., 2023; Wang and Young, 2023; Blomberg et al., 2004; Nitsch and Schumacher, 2004; Abadie and Gardeazabal, 2003). Even within the limited scope of micro-level investigations, only a handful of studies have ventured into sectorial effects, and their findings are often confined to specific industries (Albaity et al., 2023; Zheng et al., 2021; MengYun et al., 2018; Chesney et al., 2011). Given the high sensitivity of the MENA region to geopolitical and economic disruptions, this research aims to provide a holistic and detailed account of the sectorial equity market value responses to terrorism incidents.

The collective body of research suggests that terrorism incidents negatively impact stock markets, particularly within specific sectors. Markoulis and Neofytou (2019) observed that major terror attacks led to significant negative abnormal returns on the day of the attack, with more pronounced effects evident in the global airline and hospitality industries compared to the global utility industry. Eruygur and Omay (2014) demonstrated a statistically significant negative impact of terrorist activities on Turkey's stock index, especially when the intensity of these activities surpassed a certain threshold level. Examining the impact across multiple countries, Masood et al. (2020)

concluded that terrorist events significantly influence market returns. In a more recent study, Markoulis and Katsikides (2020) noted that earlier terrorist events resulted in higher negative abnormal returns, while more recent events did not significantly impact local or international markets. This suggests that investors may have learned to better assess and react to terror events over time (Arif and Suleman, 2017).

In light of these findings, it is evident that terrorism incidents can have a detrimental effect on stock markets, with specific sectors displaying varying degrees of vulnerability to these impacts. Importantly, MENA region has experienced a notable lack of comprehensive analysis regarding the varied impact of terrorism incidents on sectorial equity market values (Souffargi and Boubaker, 2023). This research addresses this gap by investigating how terrorism influences different sectors within the MENA region's financial markets. Despite the understanding that external shocks affect markets, there is insufficient understanding of the nuanced responses across sectors to incidents like terrorism. Therefore, this study endeavors to elucidate the differential impact of terrorism on sectorial equity market values in the MENA region, providing insights into sector-specific vulnerabilities and resilience strategies. The preceding discussion involves formulating three primary hypotheses for this research.

H1: Following the institutional theory framework, it is hypothesized that firms within the MENA region, in response to substantial external shocks such as terrorism incidents, will exhibit variations in investment behavior across sectors (Belkhir et al., 2016; Arayssi and Fakih, 2015).

H2: Drawing from the neoclassical growth model and international financial trade theory, it is hypothesized that significant external shocks, specifically terrorist incidents, will lead to a measurable decline in sectorial equity market value within the MENA region's financial markets (Bilson et al., 2012).

H3: Building upon the implications of the international financial trade theory, it is hypothesized that the severity and frequency of terrorist incidents within the MENA region will significantly correlate with the volatility of sectorial equity market value across various industries. Specifically, sectors more directly affected by these incidents will exhibit higher market volatility than those less directly impacted (Chau et al., 2014).

3. Data and Methodology

3.1 Data

The researcher obtained firm-level data from Thomson Reuters from 2016 to 2020 for countries including Bahrain, Egypt, Iraq, Israel, Jordan, Kuwait, Lebanon, Morocco, Qatar, Saudi Arabia, Syria, Turkey, and the United Arab Emirates. Equity market value, reflecting the market worth of the firm's ownership stake or equity, as determined by investors in the financial markets, served as the dependent variable in this study. The dependent variable variation can stem from market sentiments, industry trends, economic conditions, and global events (Khraiche et al., 2023). Notably, some

countries had missing observations for this variable, resulting in the final regression analysis sample primarily comprising positive observations from Egypt, Jordan, Lebanon, Kuwait, Qatar, and Israel. These chosen nations collectively represent around half of the region's GDP and comprise over a third of the MENA region's population (Sami & Abdallah, 2023).

The firm-level data is integrated with the Global Terrorism Database (GTD), a comprehensive repository documenting terrorist activities worldwide from 1970 to 2020, with ongoing annual updates anticipated. Distinguished from numerous event databases, the GTD encompasses detailed data on both domestic and international terrorist incidents during this span, amassing over 200,000 recorded cases to date. This research aims to analyze the impact of terrorism incidents, including the escalation in casualties, injuries, and the frequency of incidents, on the equity market value of firms in the MENA region. By investigating these aspects, the study seeks to provide critical insights into how various regional economic sectors react and adapt in response to terrorist activities.

The study incorporates additional control variables at the firm level. One of the primary control variables introduced is Firm Capital, which indicates a company's financial robustness and well-being. Firm capital, comprising both debt and equity, plays a pivotal role in long-term investment decisions, subject to influence by terrorism incidents, albeit with varying impacts across sectors. Firm Capital, sourced from Thomson Reuters data, is denoted in U.S. dollars and signifies the financial capacity of firms. Another control variable is Firm Growth, which is extracted from Thomson Reuters data and denominated in U.S. dollars. Firm growth represents the year-over-year increase or decrease in dollar sales attributable to a company's direct operations through the sale of goods or provision of services.

Additional control variables at the country level were incorporated, including Country Income, assessed as purchasing power parity (PPP) in current international dollars for 2019. This metric is sourced annually from the Index of Economic Freedom. Moreover, utilizing data from the same source, Corporate Tax data is extracted, representing the government's proportion of income derived from corporate taxes relative to the total gross domestic product (GDP). The final control variable, Leverage Cost, signifies the borrowing rates incurred by firms, determined by sector-specific factors. This data is sourced from Thomson Reuters. This study delineates the adverse impact of terrorism incidents and their severity on firm market equity value across six primary sectors in the MENA countries: industrial, financial, technology, basic materials, consumer cyclical, and non-cyclical.

For a more transparent comprehension of that variable, the Table below furnishes descriptive statistics of these variables.

Table 1. Descriptive Statistics

Stats	Firm Equity Market Value (in logs)	Firm Capital (in logs)	Firm Growth (in logs)	Country Income (in logs)	Corpo-rate Tax (in %)	Leverage Cost (% change)	Growth Number of Killed (in logs)	Growth Number of Wound (in logs)	Growth Number of Incidents (in logs)
Mean	13.79	13.91	13.00	23.48	23.49	-0.32	0.009	0.143	0.0162
SD	2.74	2.62	3.35	16.64	5.08	3.11	0.945	1.432	0.713
Min	6.96	6.15	0	0.99	0	-29.47	-1	-1	-0.952
Max	23.44	22.40	21.42	127.66	35	25.51	87.66	99.4	40

3.2 Methodology

The empirical methodology follows some previous studies that implemented the fixed effect model during those special events as by (Sami, 2021). In particular, the paper estimates the following equation:

$$Equity\ Market_{f,c,t,s} = \alpha + \delta Z_{f,t} + \beta X_{c,t} + \Phi T_{c,t} + \gamma_t + \Delta_l + v_{f,c,t,s}$$

The dependent variable is the $Equity\ Market$ of firms f located in country c and time t operating in a given sector s. The model assumes that the market equity is driven by four main matrices. First, $Z_{f,t}$ is a matrix of variables that changes with firms over time such as firm Capital and Growth. $X_{c,t}$ is a matrix of variables that changes with countries over time such as Corporate tax level and country income. $T_{c,t}$ is a matrix that measures the effect of terrorism proxied by three main variables: Number of incidents, Number of Killed, and Number of Wounded. The goal is to estimate the parameters associated to those variables $\delta, \beta\ , and\ \Phi$. This paper provides a special focus on the Φ parameters as it will measure how the firm market equity responds to such hostile events. There is also dummies introduced as fixed effect for the time captured in γ_t and location of fixed effect capture by Δ_l as shown by (Sami, 2021) Finally, $v_{f,c,t,s}$ is the error term that is assumed to be independently and identically distributed (i.i.d.) and estimated through robust matrix.

4. Empirical Results

Table (2) presents the factors influencing firm market equity value in the MENA region. Successive equations (1), (2), and (3) introduce the effects of Growth Number of Killed (severe impact), Growth Number of Wounded (mild impact), and Growth Number of Incidents. Notably, all regressions account for unobserved heterogeneity and time-invariant factors by including firm and time-fixed effects. All variables are depicted in initial lags, aligning with the main econometric regression's specifications†.

† The correlation matrix and Variance Inflation Factor (VIF) for Multicollinearity test is reported in table A1 and table A2 in the appendix.

The findings concerning firm-specific variables indicate a notable association between a firm's capital and its market equity value despite the impact of terrorism. Specifically, for every 1 percent rise in firm capital, there's a corresponding increase of 0.38% in the firm's market equity value. This finding resonates with a substantial body of existing research (Didier et al., 2021). This variable reflects how investors in the MENA region perceive the significance of firms' capital augmentation across various sectors, consequently influencing fundamental valuations and enterprise values. Essentially, firms amassing more capital tend to forecast more positive expected free cash flows in the future and exhibit more significant potential for growth, irrespective of the challenges posed by terrorism.

A negative correlation exists between firm growth and market equity value. This is supported by (Hao et al., 2011), who found that growth can hurt equity value for lower-profitability firms. The findings unveiled that with every 10% decline in firm growth, there is a marginal decrease of 0.06% in the firm's market equity value. This empirical result contradicts conventional expectations, suggesting that a reduction in firm growth doesn't significantly impact the firm's market value, and these results hold significance irrespective of the challenges posed by both severe or mild instances of terrorism. Possible reasons for this unexpected result could be attributed to various factors. Investors in the MENA region place higher importance on factors other than short-term growth metrics when evaluating firm value. Alternatively, a decline in growth might signal a strategic shift within the company towards stability or consolidation, which positively influences investors' perceptions of the firm's long-term prospects and financial health.

Secondly, concerning the macroeconomic variables, the fixed effect model indicates that the significance of leverage cost, particularly associated with central bank lending rates, is noteworthy for firms within the MENA region. For instance, a 10 percent growth in leverage cost corresponds to a 0.05 percent increase in firm market equity value. This observation aligns with previous research findings (Cheng and Tzeng, 2014). This finding offers valuable insights into MENA firms' strategies regarding debt financing, empowering them to optimize their overall worth, even during political unrest and terrorism incidents. Moreover, while Corporate Tax exhibited significance in regressions (1) and (3), it lost significance in regression (2) upon the introduction of the Number of Wounds variable. Furthermore, Country Income displayed significance solely in regression (1).

A closer examination of the regression results reveals that the growth in the number of incidents, followed by the growth in the number of killed individuals and, subsequently, the growth in the number of wounds, negatively affects the firm's market equity value. These findings collectively indicate that as these variables increase, there's a subsequent decrease in firm market equity value, implying a detrimental impact on market valuation attributed to these specific aspects of incidents. In particular, each 10% growth in number of killed is correlated by 0.5 % decrease in equity market value. The negative effect is also important as seen by growth in number of wound (0.2%) and number of incidents (0.8%).

Table 2. Main Regressions

	(1)	**(2)**	**(3)**
Firm Capital	0.3825***	0.3827***	0.3848***
	(0.0643)	(0.0641)	(0.0647)
Firm Growth	-0.0060***	-0.0063***	-0.0058**
	(0.0023)	(0.0023)	(0.0023)
Country Income	0.0485*	0.0382	0.0383
	(0.0276)	(0.0284)	(0.0269)
Corporate Tax	0.0616**	0.0397	0.0966***
	(0.0277)	(0.0264)	(0.0323)
Leverage Cost	0.0046***	0.0051***	0.0043***
	(0.0017)	(0.0016)	(0.0016)
Growth Number of Killed	-0.0510***		
	(0.0103)		
Growth Number of Wound		-0.0239***	
		(0.0069)	
Growth Number of Incidents			-0.0892***
			(0.0190)
Constant	5.7981***	6.5743***	5.1428***
	(1.4033)	(1.3939)	(1.4947)
Observations	10,470	10,470	10,470
R-squared	0.1694	0.1651	0.1705
F-statistic (p-Value)	<0.001***	<0.001***	<0.001***

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 The dependent variable is change in the firm market equity value. The equations control for firm location and time by dummies.

To delve deeper into the impact of the growth in the number of killed during terrorist incidents in the MENA region, the findings in Table (3) offer insights categorized by firm sector. Notably, Firm capital exhibits influence across almost all sectors except for Consumer Cyclicals, which can be attributed to the fact that Consumer Cyclicals may rely more on short-term funding or operational strategies that emphasize revenue turnover rather than accumulated capital, thus resulting in a lack of significant impact from firm capital change. Meanwhile, Firm growth emerges as a substantial factor in the industrial sector, while Corporate Tax holds significance within Financials. Interestingly, leverage cost exhibits significance within Consumer Cyclicals due to higher dependence on borrowing and debt structures, making leverage cost more influential in this sector than others.

Table 3. Regressions results by sector (Growth Number of Killed)

	(1) Basic Materials	(2) Consumer Cyclicals	(3) Consumer Non-Cyclicals	(4) Financials	(5) Industrials	(6) Technology
Firm Capital	0.4796***	0.2460	0.2800***	0.5762**	0.4998***	0.3102**
	(0.0693)	(0.1693)	(0.0648)	(0.2707)	(0.1346)	(0.1210)
Firm Growth	-0.0012	-0.0054	-0.0051	0.0124	-0.0061**	-0.0097
	(0.0025)	(0.0071)	(0.0087)	(0.0096)	(0.0029)	(0.0066)
Country Income	0.0638	-0.0028	0.0859	-0.0004	0.0152	0.1436
	(0.0492)	(0.0588)	(0.0715)	(0.1125)	(0.0637)	(0.1216)
Corporate Tax	0.0656	0.0462	0.0252	0.1183*	0.0620	-0.0004
	(0.0415)	(0.0555)	(0.0721)	(0.0654)	(0.0393)	(0.0605)
Leverage Cost	-0.0015	0.0085***	0.0015	0.0074	0.0065	0.0145
	(0.0024)	(0.0032)	(0.0052)	(0.0096)	(0.0042)	(0.0114)
Growth Number of Killed	-0.0441	**-0.0495*** **	**-0.0375***	-0.0328	**-0.0799*** **	0.0245
	(0.0338)	**(0.0178)**	**(0.0200)**	(0.0463)	**(0.0207)**	(0.0360)
Constant	4.4460**	8.9367**	7.4791***	2.6639	4.8013*	5.1213
	(1.7770)	(3.3868)	(2.6661)	(6.9408)	(2.4539)	(4.8941)
Observations	1,507	2,555	1,412	452	1,409	1,467
R-squared	0.3538	0.1370	0.1287	0.3590	0.2385	0.2445
F-statistic (p-Value)	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, all regressions have country and year dummies. The dependent variable is the change in the firm market equity value. The equations control for firm location and time by dummies.

Analyzing the growth effects in the number of people killed, the Table highlights that the consumer cyclical, non-cyclical, and industrial sectors are the most susceptible to the adverse impacts. Consumer Cyclical, Consumer Non-Cyclical, and Industrial sectors' vulnerability to the negative effects of the growing number of killed during terrorist incidents in the MENA region stems from their reliance on stable consumer behavior, uninterrupted supply chains, and economic stability. Any disruption or uncertainty in these areas significantly affects these sectors' performance, leading to decreased consumer spending, disrupted supply chains, delayed projects, and investor apprehension, adversely impacting their firms' market equity value.

Conversely, the Basic Materials, Financials, and Technology sectors appear unaffected. Basic Materials sectors are less sensitive to terrorist incidents as they provide foundational materials for infrastructure projects that are generally long-term and less impacted by short-term disruptions caused by such incidents. Financial sectors in the MENA region might possess robust risk management strategies that mitigate the effects of terrorist incidents on market valuation. Technology companies might experience limited direct effects as they often operate globally, diversifying risk across various regions and markets.

Table 4. Regressions results by sector (Growth Number of Wounds)

	(1) Basic Materials	(2) Consumer Cyclicals	(3) Consumer Non-Cyclicals	(5) Financials	(6) Industrials	(8) Technology
Firm Capital	0.4763***	0.2476	0.2852***	0.5822**	0.4923***	0.3078**
	(0.0691)	(0.1685)	(0.0619)	(0.2698)	(0.1347)	(0.1205)
Firm Growth	-0.0014	-0.0059	-0.0056	0.0114	-0.0059*	-0.0098
	(0.0025)	(0.0071)	(0.0087)	(0.0104)	(0.0031)	(0.0066)
Country Income	0.0527	-0.0091	0.0774	0.0116	-0.0058	0.1610
	(0.0534)	(0.0583)	(0.0727)	(0.1133)	(0.0656)	(0.1339)
Corporate Tax	0.0477	0.0273	0.0096	0.1097*	0.0237	0.0032
	(0.0460)	(0.0529)	(0.0739)	(0.0588)	(0.0414)	(0.0684)
Leverage Cost	-0.0013	0.0090***	0.0017	0.0088	0.0074*	0.0149
	(0.0023)	(0.0031)	(0.0050)	(0.0090)	(0.0040)	(0.0115)
Growth Number of Wounds	-0.0267	-0.0166	-0.0266*	0.0273*	-0.0456***	0.0530
	(0.0208)	(0.0112)	(0.0147)	(0.0150)	(0.0151)	(0.0494)
Constant	5.1105**	9.5374***	7.9706***	2.5550	6.3355**	4.5350
	(1.9925)	(3.3156)	(2.7698)	(6.7874)	(2.5690)	(5.4737)
Observations	1,507	2,555	1,412	452	1,409	1,467
R-squared	0.3544	0.1314	0.1292	0.3612	0.2320	0.2466
F-statistic (p-Value)	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, all regressions have country and year dummies. The dependent variable is the change in the firm market equity value. The equations control for firm location and time by dummies.

In Table 4, after excluding the variable for the growth number of Killed and introducing the growth number of Wounds in the regression analysis, the impact of control variables at the firm level remained consistent across sectors, mirroring the trends observed in Table 3. However, an intriguing observation emerged concerning the influence of the growing number of wounds on specific sectors within the MENA region. Notably, the negative impact on firm market value was evident in the Consumer Non-Cyclical and Industrial sectors, while in the Consumer Cyclical sector, the effect was not statistically significant.

Surprisingly, a positive significance was found in the Financial sector, suggesting a unique relationship between the growth of wounds and financial entities' equity market value. This unexpected finding could be attributed to increased investor perception of stability and resilience within financial institutions amidst localized incidents. Additionally, it might indicate improved risk management strategies or adaptive measures implemented by financial entities in response to such incidents, leading to a counterintuitive positive effect on market valuation.

Table 5. Regressions results by sector (Growth Number of Incidents)

	(1) Basic Materials	(2) Consumer Cyclicals	(3) Consumer Non-Cyclicals	(4) Financials	(5) Industrials	(6) Technology
Firm Capital	0.4883***	0.2480	0.2823***	0.5948**	0.5067***	0.3106**
	(0.0703)	(0.1695)	(0.0669)	(0.2804)	(0.1359)	(0.1211)
Firm Growth	-0.0014	-0.0050	-0.0049	0.0129	-0.0054*	-0.0098
	(0.0025)	(0.0071)	(0.0086)	(0.0089)	(0.0032)	(0.0066)
Country Income	0.0618	-0.0147	0.0787	-0.0032	0.0037	0.1466
	(0.0505)	(0.0563)	(0.0686)	(0.1081)	(0.0616)	(0.1283)
Corporate Tax	0.0775	0.0814	0.0429	0.1684*	0.1065**	0.0057
	(0.0506)	(0.0674)	(0.0827)	(0.0956)	(0.0483)	(0.0617)
Leverage Cost	-0.0015	0.0083**	0.0015	0.0067	0.0064	0.0143
	(0.0024)	(0.0032)	(0.0052)	(0.0097)	(0.0042)	(0.0113)
Growth Number of Incidents	-0.0375	-0.0855**	-0.0489	-0.0828	-0.1105***	0.0118
	(0.0467)	(0.0342)	(0.0376)	(0.0844)	(0.0338)	(0.0691)
Constant	4.0755**	8.3116**	7.1522**	1.2498	3.9062	4.8576
	(1.8504)	(3.5965)	(2.8361)	(7.6272)	(2.6365)	(4.8207)
Observations	1,507	2,555	1,412	452	1,409	1,467
R-squared	0.3477	0.1374	0.1260	0.3643	0.2335	0.2442
F-statistic (p-Value)	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, all regressions have country and year dummies. The dependent variable is the change in the firm market equity value. The equations control for firm location and time by dummies.

In Table 5, the analysis focused on the distinct impacts of incident severity by incorporating the growth number of incidents while excluding the growth number of wounds. This allowed for examining whether the seriousness of incidents (represented by the growth number of killed or wounded) or the occurrence of incidents significantly influences firm equity market value across the MENA region within the same sectors. The results in Table 5 reaffirmed the consistency of control variables at the firm level, aligning with the trends observed in Tables 3 and 4.

However, the sectorial impact varied. The Consumer Cyclical and Industrial sectors displayed significant adverse effects, whereas the Consumer Non-Cyclical and Financial sectors showed statistically insignificant results. Notably, the Industrial sector emerged as the most consistently and significantly negatively impacted sector by terrorism within the MENA region. This could be attributed to the sector's susceptibility to supply chain disruptions, increased investor risk perception, and decreased consumer confidence, amplifying the adverse effects of incidents on market valuation.

Additionally, the Consumer Cyclical sector displayed negative impacts attributed to both the growth in the number of incidents and the growth in the number of killed. This could be due to the

sector's reliance on consumer spending and market sentiment, making it highly responsive to adverse events, particularly severe incidents resulting in casualties. These findings underscore the differentiated impacts of incidents across sectors and emphasize the pronounced vulnerability of specific sectors, providing essential insights for sector-specific risk assessments and strategic planning.

5. Conclusion

The empirical results from this study demonstrate the nuanced effects of terrorism incidents on firm market equity value across sectors in the MENA region. Notably, variables like firm capital, firm growth, and macroeconomic factors such as leverage cost have displayed significant associations with market valuation despite the challenges posed by incidents of varying severity.

However, the differential impacts across sectors highlight the sector-specific vulnerability to incidents, emphasizing the need for tailored risk assessment strategies. Industries reliant on stable consumer behavior and supply chains, like Consumer Cyclical, Consumer Non-Cyclical, and Industrial sectors, exhibited significant adverse effects on market valuation due to incidents and political unrest. Surprisingly, the financial sector showcased a positive relationship with incidents, suggesting unique resilience or adaptive measures that warrant further investigation.

For future research, a deeper exploration into the mechanisms that render specific sectors resilient or vulnerable to incidents, as seen in the Financial and Industrial sectors, respectively, would be invaluable. Additionally, examining the role of risk management strategies and adaptive measures employed by firms during incidents could provide insights into mitigating adverse effects on market valuation.

Furthermore, considering cross-country analysis within the MENA region and evaluating the long-term impact of incidents on firm performance would enrich the understanding of terrorism's repercussions on market dynamics. It is also becoming important to understand how digital currencies affect the expansion of such terror attacks (Sami and Abdallah, 2021) and the important of knowledge and innovations to face such challenging events and maintain the sustainability of firms (Sami & Abdallah, 2022)

In conclusion, while this study sheds light on sector-specific impacts of incidents, further research investigating sector resilience, adaptive strategies, and long-term implications would contribute significantly to refining risk assessment frameworks and fostering robust market resilience in the face of adversities.

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Appendix

Table A1. Correlation matrix

	Firm Capital	Firm Growth	Country Income	Corporate Tax	Leverage Cost	Growth Number of Killed	Growth Number of Wound	Growth Number of Incidents
Firm Capital	1							
Firm Growth	0.708	1						
Country Income	-0.2398	-0.1811	1					
Corporate Tax	0.5955	0.5098	-0.4223	1				
Leverage Cost	-0.0274	-0.0181	0.0615	-0.0087	1			
Growth Number of Killed	0.0385	0.0472	0.1551	-0.0104	0.0015	1		
Growth number of Wound	-0.2637	-0.2229	0.0035	-0.2854	0.0641	0.5486	1	
Growth number of Incidents	0.0483	0.052	0.1449	0.032	0.0173	0.7587	0.2936	1

Table A2. Variance Inflation Factor

Variable	VIF	$\frac{1}{VIF}$
Firm Capital	1.84	0.542972
Firm Growth	1.73	0.577335
Country Income	1.28	0.781623
Corporate Tax	1.72	0.581957
Leverage Cost	1.41	0.709384
Growth Number of Killed	1.27	0.787093
Mean VIF	2.06	