

RESEARCH ARTICLE

Terrorism, elections, and financial market resilience in Kenya's financial sector

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ABSTRACT

The study examines the short-term effects of terrorism and general election events on financial sector equity performance in Kenya, with particular attention to implications for financial market stability and sustainability. An event-study framework is applied over a 0-14-day window, comparing three general elections (2007, 2013, and 2017) and four major terrorist attacks (Westgate Mall, Mpeketoni, Garissa University, and DusitD2). An EGARCH (1,1) market model is used to estimate AARs and CAARs for the six most frequently traded financial sector equities and the NSE20 index using Thomson Reuters EIKON daily data, with Parametric and non-parametric tests assessing differences in market reactions across event types. Election-related events generate negative financial sector equity impacts comparable in magnitude to those associated with major terrorist attacks. For example, the 7-day CAAR averaged -0.0255 for the Mpeketoni attack and -0.0282 for the 2017 election events, the two most severe events. Market losses are most pronounced in the pre-election period, following presidential result announcements, and during episodes of electoral dispute. Terrorism-related market responses are more closely associated with attack fatality rates, perceived domestic versus foreign attribution, and the effectiveness of government response. To reduce market instability, the findings imply government needs to strengthen electoral governance and transparency and enhance crisis-response capacity to sustain investor confidence in Kenya. The analysis is restricted to fourteen days following each event and therefore does not capture longer-term effects of prolonged post-election instability, particularly in cases where political disputes persist beyond the event window.

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1. Introduction

Terrorism and political instability are among several factors (such as financial crises, natural disasters, and pandemics among others) that elevate the levels of uncertainty in the markets. The threat of a terrorist event (or act if it happens) and political events such as election disputes have the potential to significantly distort what Slovik (2011) terms the "known information set". Emerging markets, unfortunately, are prone to market and policy uncertainty (Abid, 2020; Miescu, 2023). Spillover effects of economic policy uncertainty (EPU) (Al-Thaqeb and Algharabali, 2019) add to the risk. For example, a study by Li et al. (2019) shows that EPU in China and some G7 countries do affect the Chinese stock market.

Das et al. (2019) demonstrate that US-based EPU has a heterogeneous effect on a group of 24 emerging markets in terms of intensity. Terrorist events can have major political and economic consequences on an economy. Perret and Burgess (2018) point out the political impact lies in the uncertainty and the fear it creates, while its effects on investor sentiment are a significant driver of its impact on the stock market (Arfaoui and Naoui, 2021). Both terrorism and political instability increase uncertainty and influence investor sentiment, which literature (Baker and Wurgler, 2007; Wang et al., 2021; Griffith et al., 2020) has shown influences stock markets. Similarly, studies show that elections do impact both developed markets (Bialkowski et al., 2008; Obradović and Tomić, 2017) and emerging markets (Nippani and Arize, 2005; Carnahan and Saiegh, 2021).

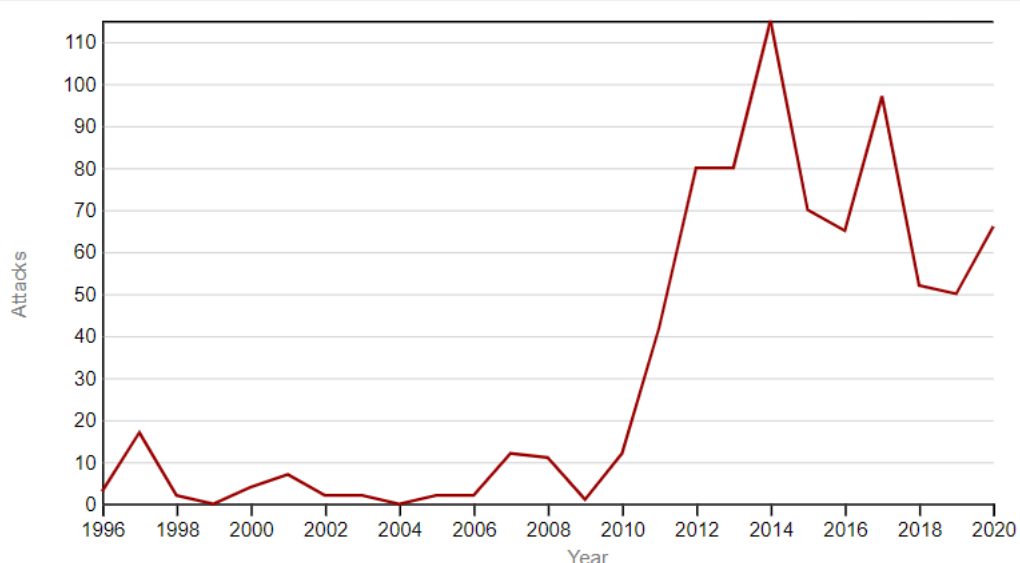
Terrorism has increased rapidly in several African countries. The UNDP estimated that terrorism cost Africa about 15.5 billion US dollars in 2016, a ten-fold increase over the 2007 estimate (UNDP, 2019). Furthermore, weak institutions that afflict many African countries, limit the capacity to (i) appropriately respond to terrorism and (ii) conduct credible elections. Studies do suggest political instability can be more harmful to the country. For example, studies (Fletcher and Morakabati, 2008) show events like coups can be more damaging to the tourism sector than low-to-medium one-off terror attacks. Fauzel and Seetanah (2023) identify spillover effects from terrorism, indicating terrorism shocks in one country can depress demand in other neighboring African countries. Country studies are important because the susceptibility to terrorism and political instability widely differ across countries, partly because the quality of governance also differs. A study of African countries (Asongu, 2012; Mensah et al., 2022) show that the quality of government institutions is correlated with stock market performance. Studies indicate terrorism (Kollias et al., 2011a) and investor sentiment (Wang et al., 2021) have disparate effects across countries and stock markets.

The present study analyses the effects of terrorism and election events on financial sector stock performance in Kenya. The specific research question tackled is how general election events compare to major terrorist attacks in their short-term impact on financial sector equity performance and market stability in Kenya. Terrorism and election-related violence have been perennial challenges faced by the country over the past two decades, with important implications for investor confidence. The study focuses on three recent national elections (2007, 2013, and 2017) and four major terrorism events that occurred in 2013, 2014, 2015, and 2019 (Table 1). While previous studies have examined the economic consequences of terrorism in Kenya, particularly its effects on the tourism sector (Buigut, 2018; Buigut and Amendah, 2016), its implications for stock market stability remain relatively underexplored. Similarly, studies assessing the impact of Kenya's national elections on the stock market (e.g. Buigut and Masinde, 2021) are limited. Currently, no existing study has systematically compared the effects of terrorism-related shocks and election events on financial market behavior and resilience. This study makes a novel contribution by providing the first direct comparison of election-related events and terrorist attacks within a unified event-study framework. It offers original evidence on their relative impacts on financial market stability in Kenya. It also contributes methodologically by using an EGARCH model to capture time-varying volatility in market reactions. Specifically, an EGARCH (1,1) model is implemented to account for asymmetries in positive and negative shocks (Kolaric et al., 2016), allowing for an assessment of volatility persistence following adverse events. To ensure robustness, the study computes average abnormal returns (AAR) and the cumulative average abnormal returns (CAAR), as well as carrying out t-tests.

The Kenya case is of particular interest. Over the last two decades, the country has faced a dual challenge of rising terrorism and severe election-related instability and

violence. Massive amounts of funds have had to be diverted especially in urban areas to enhance security systems (UNDP, 2017), while counter-terrorism efforts have been hampered by ethnic and regional fragmentation (Lind and Howell, 2010). The steepest increase in terrorist attacks is registered between 2010 and 2013 (Figure 1), which coincides with the period of increased attacks by Al-Shabaab - a terror group operating out of Somalia. In response to the kidnapping of tourists on Kenyan soils blamed on the terror group, the Kenya government made the fateful decision to send its military into war-torn Somalia. This happened in October 2011. It later joined the African Union Mission in Somalia (AMISOM). This action spawned retaliatory terror activity by Al-Shabaab. The present study focuses on the four most recent major terrorist attacks - all claimed by the Al-Shabaab group (Table 1), and all occurring around this period of heightened activity between 2011 and 2020.

Figure 1. Number of terrorist attacks in Kenya 1996 - 2020



Source: Global terrorism database, National Consortium for the Study of Terrorism and Responses to Terrorism, available at: <https://www.start.umd.edu/gtd/> . The number of terrorism attacks includes unsuccessful attempts as defined by the source.

Table 1. Terrorism and election events analysed

Event	Brief description
2007 Elections	Election results were officially announced on 30-12-2007 and the winner sworn in on the same day. The post-election violence that ensued led to a 1,000 plus deaths, and displaced over 500,000 persons (Human Rights Watch, 2008).
2013 Elections	Election results were officially announced on 09-03-2013. This was a relatively peaceful election. The presidential election results were contested at the supreme court with a petition filed on 16-03-2013. The supreme court ruled to uphold the results on 30-03-2013 (The Carter Center, 2013). The president was sworn in on 9-04-2013.
2017 Elections	The results of the elections were declared on 11-08-2017. Again, there was a petition and on 01-09-2017 the supreme court in a historic decision nullified the presidential election results (The Carter Center, 2018). It ordered a new vote to be held within 60 days. The repeat election was held on 26-10-2017.
Westgate mall attack	The attack, which began on 21-09-2013, turned into a four-day siege that was only contained on 24-09-2013 and resulted in 67 fatalities

	(Howden, 2013). Al-Shabaab claimed responsibility.
Mpeketoni attack	The attack started during the evening of 15-06-2014 to 16-06-2014 near Lamu Island, a well-known tourist spot. It resulted in at least 48 deaths (BBC, 2014). Al-Shabaab claimed responsibility.
Garissa university	The attack lasted about 16 hours. The death toll was 148, mostly college students, and led to the closure of the college for nine months (Mutiga, 2016). Al-Shabaab claimed responsibility.
DusitD2 attack	The attack occurred on 15-01-2019. The death toll was 21. Al-Shabaab claimed responsibility (Sevenzo et al., 2019).

Source: Authors research

1.1 Terrorism and election events

The attack on the Westgate mall started on September 21, 2013 and lasted nearly 4 days resulting in the loss of about 67 lives (Howden, 2013). The Al-Shabaab attacked Mpeketoni, a popular tourist destination near Lamu, on the evening of June 15, 2014. The attack lasted several hours with gunmen torching buildings and vehicles. The attack resulted in 48 fatalities (BBC, 2014). The Garissa University College attack on April 2, 2015, resulting in 148 fatalities, the majority of whom were students. This was the most fatalities in a terrorist since 224 lives were lost in the US Embassy bombing (August 7, 1998). Besides claiming so many lives, it paralyzed learning in the institution for about nine months (Mutiga, 2016). The DusitD2 hotel complex attack took place on January 15, 2019. The death toll was 21 (Sevenzo et al., 2019).

This and other less deadly attacks have plagued the country for about two decades. Several studies suggest the attacks have significantly impacted tourism in the country. Buigut and Amendah (2016) and Buigut (2018) using dynamic panel model estimation show terrorism has negatively affected international tourist arrivals into the country. Furthermore, travel warnings which increase directly with the threat of terrorism have also negatively impacted tourism demand in the country (Masinde and Buigut, 2018). There is, however, a paucity of studies on how terrorism has impacted the Nairobi Securities Exchange (NSE). Keitany and Lumumba (2013) is one such study. The study focuses on three terror events (the US embassy bombings of 1998 in Nairobi, the Paradise hotel (Kikambala) attack in 2002, and the kidnapping of tourists and aid workers in 2011). They use an event study approach and specifically compute the abnormal returns using a mean-adjusted approach. The present research goes beyond this by undertaking a comparison of terrorism and election effects. Their study also differs from the present study in terms of the terror events analyzed and the approach. The computation of the abnormal returns in the present study adopts an EGARCH (1,1), more suited to capture asymmetric behavior than the mean-adjusted model.

The second problem that has afflicted the country is election-related violence. After a prolonged period of one-party system, international and civil pressure prevailed on the Government to adopt a multiparty system in December 1991. The first multiparty elections took place in 1992. Ethnic violence before and after the elections resulted in over 15,000 dead and 300,000 internally displaced people (IDPs) between 1991 and 1996 (International Federation for Human Rights, 2007). The 1997 elections also resulted in nearly the same level of destructive violence. There were an estimated 150,000 people displaced compared to 20,000 in the 2002 elections (Kamungi, 2013). The 2002 elections were relatively more peaceful. Disputes over alleged election malpractices in 2007 led to one of the worst post-election violence in the country. It resulted in more than 1,000 fatalities and over 500,000 internally displaced (Human Rights Watch, 2008; Kamungi, 2013). The 2013 elections were

relatively calm, though tense, mainly because of the still fresh memories of the violence following the 2007 election. The International Criminal Court (ICC) charges, going on at the time, against prominent personalities thought to have been the masterminds in the 2007 election violence also helped reduced the appetite for violence (Elder et al., 2014). A petition against the presidential results was thrown out by the Supreme Court (SC) (The Carter Center, 2013). The 2017 elections results were also contested, and a petition led to a surprise nullification by the SC (The Carter Center, 2018). Tension remained high heading to the repeat election ordered by the SC for 26th October 2017. By December 2017 there were an estimated 92 deaths linked to the August and October elections (Kisika, 2017).

In every election from 1992 to 2017 the country witnessed varying degrees of election violence. However, there are very few studies that have estimated the effect of the elections and the related ethnic violence on specific sectors of the economy. The study by Kabiru et al. (2015) focuses on the 1997, 2002, 2007, and 2013 general elections. However, they have computed the cumulative abnormal returns using the basic market model. They found that the 2002 and 2013 elections had an insignificant effect, but the 1997 and 2007 elections were significant. Another paper related to our study is Buigut and Masinde (2021). This study analyses how elections affect sectors (Tourism, Financial, and Media) in the NSE. Their computation of CAAR is based on the basic market model. Their results suggest that election conflict harms the tourism sector's stocks more than the financial sector's stocks. Peaceful elections produce a larger positive effect on the tourism sector than financial sector stocks. The study, however, focused on elections only. The present study extends Buigut and Masinde (2021) significantly. It compares the effects of terrorism and elections using EGARCH (1,1), a procedure that is better suited to capture asymmetric behavior than the basic market model. To allow comparison over a similar period, the study covers the elections around the period of heightened terrorism (2007, 2013, and 2017).

A large volume of literature has applied event study to analyze the impact of a broad range of events on stock markets. MacKinlay (1997) and Cable and Holland (1999) discuss various approaches to measuring normal returns. The popular approaches are the constant return mean model (Brounen and Derwall, 2010) and the market model (Obradović and Tomić, 2017; Kolaric, and Schiereck, 2016). However, the time dependence exhibited in the stock return series requires that the assumption of homogeneity in the basic market model is modified. This can be captured by a GARCH model (Bollerslev, 1986) of the error term. While GARCH allows for symmetric impact of positive and negative innovations, the EGARCH model has the advantage of allowing for asymmetry of effects (Koulakiotis et al., 2016; Kollias et al., 2011b). For this reason, the present paper uses EGARCH (1,1). This study is founded in the Efficient Market Hypothesis (EMH) and Political Risk Theory. These together suggest that political and security shocks, such as elections and terrorist attacks, introduce new information and heighten uncertainty in financial markets. These shocks, according to the EMH, are rapidly incorporated into asset prices, causing observable changes in abnormal returns and volatility.

The paper is structured as follows: section 1 gives the introduction, methodology is Section 2, and the results and conclusion are in Section 3 and 4 respectively.

2. Methodology

2.1 Data

The daily closing prices of six frequently traded financial equities and the NSE20 market index were downloaded from the Thomson Reuters EIKON. The data collected

spanned from January 2003 to May 2019 to include the four major terrorist attacks witnessed in Kenya as well three general elections (Table 1). Six equities included are Barclays Bank of Kenya (BBK), Housing Finance (HFCK), Kenya Commercial Bank (KCB), National Bank of Kenya (NBK), NIC Bank (NIC), and Standard Chartered Bank (SCBK). These are the leading financial institutions in the country. The NSE20 is a major NSE share index constructed from the 20 best performers across sectors. It is used as the benchmark in the EGARCH (1,1) model in this study. For each of these events, AAR and CAAR values are generated, and corresponding parametric and non-parametric tests are conducted.

2.2 Empirical model

The study adopts an event study methodology. Following several studies (Kolaric et al., 2016; Kollias et al., 2011b) the market model is adopted with an EGARCH (1,1) fitted to the error term as in equation (1). This improves parameter estimation efficiency by accounting for the autoregressive conditional heteroskedasticity (ARCH effects) characteristically present in stock returns along with volatility clustering (Tsay, 2005). EGARCH is preferred over ARCH and GARCH models to account for asymmetry between positive and negative effects (Kolaric et al., 2016; Tsay, 2005).

$$R_{jt} = \hat{\alpha}_j + \hat{\beta}_j R_{mt} + \epsilon_{jt} \quad (1)$$

$$\epsilon_{jt} | \Omega_{t-1} \sim N(0, h_t)$$

Where R_{jt} is the continuously compounded returns of stock j on day t from the estimation period and R_{mt} is the continuously compounded market return m on day t . The Ω_{t-1} is the prior information set on the error term while $N(0, h_t)$ is the conditional distribution of the error term given information at time $t-1$ (Kolaric et al., 2016). The log of h_t is an asymmetric function of lagged shocks.

$$\ln(h_t^2) = \omega + \delta \ln(h_{t-1}^2) + \psi g(z_{t-1}) \quad (2)$$

Where h_t is the conditional variance time t , and ω , δ and ψ coefficients and $g(z_{t-1})$ defined as asymmetric function:

$$g(z_{t-1}) = \theta z_t + \gamma [|z_t| - E(z_t)] \quad (3)$$

The θ and γ are coefficients and z_t is iid, with mean zero. Equations (2) and (3) are estimated using maximum likelihood estimation (Kolaric et al., 2016). The abnormal returns are computed as:

$$AR_{jT} = R_{jT} - (\hat{\alpha}_j + \hat{\beta}_j R_{mT}) \quad (4)$$

Where T is the event window $([-7, 14])$ for elections and $[0, 14]$ for terror events). As the election date is known, it is expected there would be some effect earlier than the actual date of the election. This would not be the case with terrorism as it is not known to the public in advance of the event. The average abnormal return (AAR) is computed as follows:

$$AAR_T = \frac{1}{N} \sum_{j=1}^N AR_{jT} \quad (5)$$

And the CAAR are computed from the CAR for each firm j :

$$CAR_j = \sum_{T=T_1}^{T_2} AR_{j,T}$$

$$CAAR = \frac{1}{N} \sum_{j=1}^N CAR_j \quad (6)$$

Event studies require an estimation window that is representative of a period of normalcy, with minimal turbulence. While studies have used different estimation window lengths, the estimation period should not be too short or too long. For example, Kolaric et al. (2016) and Kolaric and Schiereck (2016) use 252 trading days, while Wang et al. (2008) use 90 days. Obradović and Tomić (2017) suggest an estimation period of 2 to 8 months, noting that estimates of the normal returns may be biased by a single event that is not compensated if too short a period is used, while a very long period may gather too many events leading to biased estimates. It is good practice not to overlap the estimation and event windows to ensure the parameters estimated are not biased by the event (MacKinlay, 1997). In their study of Athens stock market reaction to six elections, Koulakiotis et al. (2016) have used an event window of -10 to +10. In this study, a period of 100 trading days is used as the estimation window for both elections and terrorism events to minimize contamination by other events. Best practice suggests leaving a break period to avoid contamination, especially in the case of elections where the event date is known beforehand. As such a 10-day break is applied between the estimation and event window for elections in the present study. In the case of terrorism events, a 1-day break is used because the event date is not known beforehand. Therefore, $t = 100$ (estimation days), $N = 6$ representing the six banks (j), and T are days in the event window. For election events $T = [-7, 14]$ and terror events $T = [0, 14]$ in the AAR case. For the CAAR case elections event windows $T = [-7,0], [0,3], [0,7], [0,14]$ are considered and for terrorism CAAR case the event windows $T = [0,3], [0,7], [0,14]$ are considered. To test if the AARs and CAARs are statistically different from zero, both parametric (Csect T, and Patell Z) and non-parametric (Rank Z, Generalized Rank Z [GRZ]) tests are applied. The Csect T is susceptible to event-induced volatility, and thus, has low power (Brown and Warner, 1980). The Rank Z test is robust against event induced volatility though loses power over longer CARs. Patell Z, although immune to AR's distribution across the cumulated event window, is also prone to cross-sectional correlation (Schimmer et al., 2015). While four tests are performed, for brevity the results of only two of them, the Csect T and GRZ, are shown in the discussion below.

In addition, to analyze if the various events have disparate effects on financial equity, several tests of means of the AARs are carried out both at 0 to 7 window and over 0 to 14 windows. The H_0 and H_A are set up as:

$$H_0: \text{difference of mean} = 0 \quad (7)$$

$$H_A: \text{difference of mean} \neq 0$$

Where the difference of the means is obtained as ($\text{mean AAR event}_i - \text{mean AAR event}_j$) first over 0 to 7 and then over 0 to 14, and $i \neq j$, for i and $j = 1, 2, \dots, 7$.

3. Results

3.1 Election results

Digital Table 2 shows the computed AARs and test results for the three general elections. The event window used is from -7 to 14. Generally, the AAR values are relatively small over this period with some exceptions. Consider the 2007 elections (columns 2 - 4 of Table 2). Except for a mildly significant negative impact seen on [-5], there is little evidence of an adverse effect on returns before the elections. However, a market rally just before the elections is not sustained. There is a relatively large and significant negative response on [2]. This is the largest single-day decline recorded for the different events analyzed. This coincides with the announcement of presidential election results, with the opposition candidate losing by a small margin. This is an

indication the market sentiment was not unanimously positive on the results. While this is followed by some recovery, this is not sustained. The hurried swearing-in of the declared winner and the opposition leader's calls for a recount in an already tense environment triggered ethnic violence which escalated over the next several weeks. From [9] on, though not significant individually, there is a persistent negative trend in returns. A similar pattern is mirrored by the CAAR results (Table 3a). The CAAR is positive but not significant over the [-7,0] event window. However, the CAAR is negative though not significant over the [0,3] reflecting the market reaction to the announced result. The CAAR is also negative but not significant for [0, 14] a reflection of the effect of a deteriorating political climate. It is only after the signing of a compromise power-sharing agreement on February 28, 2008, that the political situation stabilize.

The 2013 election period was calmer compared to the 2007 elections which witnessed significant violence for weeks after the elections. Though relatively more peaceful, there are several days, [-6], and [-5], that show significant negative returns before elections (see columns 5 to 7 of Table 2. This likely reflects a market made nervousness by the memory of past election violence. A significant positive effect is witnessed after the elections around [3] which is about the time the results came out. This probably indicates the sector's relief following a better-managed election. The winner's margin was also considerably larger than the 2007 results. Though considered by observers better managed than in 2007 (Kimenyi, 2013), the losing presidential candidate still refused to accept the results. The announcement on March 14, 2013 (Lough, 2013) of a petition to be filed and the actual filing on March 16, 2013, led to a negative impact on the market around [7] to [9]. Overall, Table 3(b) shows the CAAR is negative (but not significant) going into the election over the [-7,0] event window, with significant recovery over the [0,7] window.

Like in the case of 2013, the 2017 results show there are several negative AARs close to the election event but unlike in 2013, these are not significant (Table 3(c)). Significant recovery is recorded from [1] to [3]. The 2017 presidential election result, just as in 2013, was contested. The opposition leader (who lost again) refused to accept the election results citing irregularities. The announcement by the opposition of their intention to move to court to contest the presidential election results came on August 16, 2017 (Lewis and Miriri, 2017), and the actual filing of the petition took place on August 18, 2017 (Malalo, 2017) with an adverse effect on the market. The market reacted negatively from [6] to [9], with [9] being significant. This is followed by a significant recovery. While there was some violence after the elections, the level was not in the magnitude witnessed in 2007. Overall, Table 3(c) shows the CAAR is negative (but not significant) going into the election over [-7,0], with significant recovery over [0,3], [0,7] and [0,14] windows.

Though the cumulative effects are not significant, the market depicts a similar pattern of swings, though of varying magnitude in all three elections. There is generally some loss heading into the elections (more pronounced in 2013 than the other two elections), followed by improvement after the elections. The recovery however is interrupted by announcements of the presidential results (substantial decline in the case of 2007), and petitions (in the case of 2013 and 2017).

Table 2. AAR test results for 2007, 2013, and 2017 general elections

Event window	AAR test results for the 2007 general elections			AAR test results for the 2013 general elections			AAR test results for the 2017 general elections		
	AAR	Csect T	Generalized Rank Z	AAR	Csect T	Generalized Rank Z	AAR	Csect T	Generalized Rank Z
-7	0.0034	0.5731	-0.3641	0.0119	2.6616**	2.9126***	-0.0032	-1.1511	-0.8122
-6	0.0136	1.2242	0.3361	-0.0053	-2.2484*	-1.9044*	0.0055	1.0471	1.6943*
-5	-0.0085	-1.7004	-2.0024**	-0.0070	-1.7150	-1.9604**	-0.0142	-1.4240	-1.0922
-4	0.0051	0.7981	1.0922	-0.0272	-1.8512	-1.5263	-0.0057	-0.4201	-1.0082
-3	0.0005	0.0912	-0.1680	-0.0030	-0.4941	-0.0420	-0.0032	-0.5747	0.1820
-2	-0.0160	-1.4149	-1.4563	0.0070	0.6416	0.5041	-0.0086	-0.9175	-1.2042
-1	0.0188	2.8387**	3.3187***	0.0153	2.6747**	2.4085**	0.0004	0.0937	0.6161
0	0.0152	1.2352	0.9802	0.0022	0.1619	0.7702	0.0007	0.1120	0.0560
1	-0.0204	-1.2552	-1.0782	-0.0020	-0.2702	-0.3781	0.0219	3.5212**	2.5765**
2	-0.0506	-4.1534***	-3.8368***	0.0098	1.1769	0.9522	0.0179	1.5732	1.6663*
3	0.0265	2.0456*	1.9324*	0.0077	3.2720**	2.8846***	0.0241	2.1468*	2.3525**
4	0.0259	2.1391*	1.6663*	0.0056	0.5140	0.3781	0.0286	1.8507	1.3723
5	0.0182	1.5931	1.2743	0.0208	1.9104	1.6383	0.0105	0.7335	0.6441
6	0.0006	0.1119	0.2801	0.0272	2.9106**	2.5905***	-0.0148	-1.9891	-1.4423
7	0.0022	0.3136	0.0140	-0.0205	-1.4360	-1.4143	-0.0176	-1.4041	-1.2462
8	0.0028	0.8250	1.0222	-0.0179	-1.3903	-1.1482	-0.0112	-1.3977	-0.9102
9	-0.0110	-0.8653	-0.5041	-0.0182	-2.0238*	-2.1424**	-0.0240	-2.0237*	-2.0164**
10	-0.0027	-0.2130	-0.4621	0.0069	0.8071	0.9242	0.0025	0.7493	0.6581
11	0.0030	0.2764	0.2380	0.0064	0.8684	1.0082	0.0079	0.6889	1.1342
12	-0.0160	-1.5992	-1.6103	0.0089	1.3764	1.1902	0.0060	1.8167	1.5403
13	-0.0032	-0.4972	-0.7421	-0.0023	-0.6397	-1.3863	0.0099	2.0574*	2.0304**
14	-0.0024	-0.2080	-0.5741	-0.0026	-0.4876	-0.1400	0.0005	0.0548	0.4481

Table 3. CAAR test results for 2007, 2013, and 2017 elections

<i>Table 3(a). CAAR test results for the 2007 elections</i>				
Event window	[-7,0]	[0,3]	[0,7]	[0,14]
CAAR	0.0321	-0.0293	0.0174	-0.012
Csect T	1.1947	-1.8604	1.2643	-0.3405
GRZ	1.4143	-1.2883	0.8962	0.042
<i>Table 3(b). CAAR test results for the 2013 elections</i>				
Event window	[-7,0]	[0,3]	[0,7]	[0,14]
CAAR	-0.0059	0.0177	0.0507	0.032
Csect T	-0.5179	0.8116	2.56*	0.8694
GRZ	-0.7562	1.1482	2.3805**	0.5041
<i>Table 3(c). CAAR test results for the 2017 elections</i>				
Event window	[-7,0]	[0,3]	[0,7]	[0,14]
CAAR	-0.0282	0.0646	0.0713	0.063
Csect T	-1.0925	3.4652**	3.5302**	2.8198***
GRZ	-0.7842	2.7445***	2.7866***	2.8146***

3.2 Terrorism results

The attack on the Westgate Mall in the capital city and financial hub, Nairobi, started on a Saturday. The response by an amalgam of security forces was disjointed (Howden, 2013), which contributed to the siege lasting for four days. The market response is significantly negative on [4] (Table 4). This is followed quickly by a recovery on [6] and [7]. The CAAR results (Table 6a) outline the transiency of the negative impact. Overall, the CAARs are all positive though not significant over the [0,3], [0,7] and [0,14] event windows.

The market reaction to the Mpeketoni attack (Table 4) is negative and significant on post-event days [1], [2], and [4]. Some significant recovery is recorded on [8]. The CAARs over [0,3] and [0,7] are negative and significant, and in magnitude larger than the corresponding numbers for the Westgate mall (Table 6b). Surprisingly, the market responded more negatively to the Mpeketoni attack than to the Westgate mall attack in the capital city that lasted longer and resulted in more deaths.

The reason likely is related to attribution. The Westgate mall attack was clearly a terrorist attack carried out by an external terror group, but the attribution was not that clear with the Mpeketoni attack. While the Mpeketoni attack was claimed by the Al-Shabab, the style of its execution left many to suspect the involvement of local political networks. The President of Kenya openly called it politically motivated ethnic violence (Okari, 2014). Political movements (such as the Mombasa Republican Council) known to be disenchanted with the central government, and who claim to fight for more autonomy for the coastal region came under suspicion. These perceived links to the local political network in the region may account for this extra market sensitivity. Mpeketoni is also near Lamu, a popular tourist spot, an indication of the significance of the region for the foreign exchange market.

Table 4. AAR test results for the Westgate Mall and Mpeketoni attacks

Event window	AAR test results for the Westgate Mall attack			AAR test results for the Mpeketoni attack		
	AAR	Csect T	Generalized Rank Z	AAR	Csect T	Generalize Rank Z
0	0.0007	0.1395	0.7001	0.0017	0.5423	0.6581
1	-0.0087	-1.3828	-0.4341	-0.0064	-1.7132	-1.9604**
2	0.0035	1.2593	1.3723	-0.0082	-2.5606*	-3.4587***
3	0.0069	1.3156	1.6383	-0.0040	-1.5857	-1.6243
4	-0.0193	-2.0718	-1.7784*	-0.0067	-4.8992***	-3.5707***
5	-0.0012	-0.2314	0.4481	-0.0061	-0.8440	-0.6441
6	0.0117	1.5996	2.3525**	0.0039	0.7989	0.2941
7	0.0071	1.4738	1.7083*	0.0003	0.0349	-0.6861
8	0.0024	0.3824	0.8402	0.0036	1.2538	2.3105**
9	0.0033	0.5608	0.8402	0.0036	0.6055	0.0280
10	-0.0052	-1.3909	-0.196	0.0155	1.0861	1.3443
11	0.0006	0.1198	1.3023	0.0058	1.4172	1.4423
12	-0.0034	-0.9098	0.07	0.0134	1.2589	1.5683
13	-0.0007	-0.2101	0.098	-0.0167	-1.8024	-2.2264**
14	0.0072	3.3003**	3.2627***	-0.0004	-0.0754	0.7702

Table 5. AAR test results for the Garissa University and DusitD2 attacks

Event window	AAR test results for the Garissa university attack			AAR test results for the DusitD2 attack		
	AAR	Csect T	Generalized Rank Z	AAR	Csect T	Generalized Rank Z
0	-0.0108	-0.9264	-0.7702	-0.0004	-0.0931	-0.1400
1	0.0027	0.3383	-0.3221	0.0106	0.7354	1.9184*
2	0.0004	0.0459	0.5601	0.0021	0.3200	0.6581
3	-0.0057	-0.7604	-0.3501	0.0118	2.7880**	1.8904*
4	0.0048	0.6032	0.7982	0.0008	0.0699	-0.2801
5	-0.0070	-1.1796	-1.6383	0.0154	1.0804	0.0840
6	0.0104	1.4278	1.7363*	-0.0018	-0.2065	0.2941
7	-0.0032	-0.4993	-0.3221	0.0038	0.6019	0.2941
8	0.0015	0.6821	0.8822	-0.0147	-3.1288**	-3.1646***
9	-0.0043	-1.0877	-1.1062	0.0047	1.5623	1.8064*
10	0.0037	1.4483	0.6441	0.0055	0.7361	0.4201
11	0.0045	0.6039	0.4061	0.0166	1.6570	1.4143
12	-0.0066	-0.9480	-0.7982	0.0418	1.9795	2.0164**
13	0.0009	0.3725	0.5181	-0.0059	-0.6443	-0.3501
14	0.0045	0.6847	0.5461	0.0004	0.0460	1.5963

Table 6. CAAR test results for the Westgate mall, Mpeketoni, Garissa University, and DusitD2 terrorism attacks

<i>Table 6(a). CAAR test results for the 2013 Westgate Mall attack</i>			
	[0,3]	[0,7]	[0,14]
CAAR	0.0024	0.0006	0.0048
Csect T	0.4693	0.0357	0.2613
GRZ	1.0082	0.6861	0.7141
<i>Table 6(b). CAAR test results for the 2014 Mpeketoni attack</i>			
	[0,3]	[0,7]	[0,14]
CAAR	-0.0168	-0.0255	-0.0006
Csect T	-3.3119**	-1.1595	-0.0173
GRZ	-3.2767***	-2.0724**	-0.9242
<i>Table 6(c). CAAR test results for the 2015 Garissa University attack</i>			
	[0,3]	[0,7]	[0,14]
CAAR	-0.0134	-0.0085	-0.0044
Csect T	-1.1744	-0.3838	-0.2046
GRZ	-1.4143	-0.5601	0.2801
<i>Table 6(d). CAAR test results for the 2019 DusitD2 hotel attack</i>			
	[0,3]	[0,7]	[0,14]
CAAR	0.0241	0.0423	0.0908
Csect T	1.4222	1.5915	2.4783*
GRZ	1.6523*	1.4143	2.3385**

The market reaction to the Garissa attack is muted. The AAR on event day [0] though negative is small and not significant. There are several other negative AARs, but none of them are individually significant (Table 5). A barely significant recovery is noted on [6]. The CAARs (Table 6c) portray the same picture. The CAARs for [0,3] [0,7], and [0,14] are negative but are not significant. This seems to be a low-key market reaction to an otherwise devastating terror attack. The Garissa University attack, to date, is only second to US embassy bombing in Nairobi in the number of deaths. Garissa town is located about 360 km from Nairobi, the financial center, in a less developed part of the country. Furthermore, unlike the Mpeketoni case, the attack was perpetrated by an external terror group, ruling out an internal political dimension. This probably contributed to blunting the market reaction. The market response to the DusitD2 attack seems even more subdued, while the rebound is stronger than the Garissa university attack (Table 5). The CAARs are all positive, with [0,3] and [0,14] significant (Table 6d). The DusitD2 attack in Nairobi was less deadly relative to the other attacks. Furthermore, the multi-agency response by the security forces and political spectrum was quicker and more coordinated (Omondi, 2019). It was a vastly different response compared to the sluggish and disjointed response witnessed during the Westgate attack. This helped not only to save lives but to manage public fear and limit any negative market response. So overall, some terrorism events show significant negative cumulative effects. Comparing the results from terrorism, and from election events, both terrorism and election events affect market returns. Terrorism often causes sharper short-term shocks and elections showing more cyclical, sentiment-driven movements. However, the magnitude of their effects is not significantly different on average, even though individual events can vary in strength and direction.

3.3 The Robustness check

To test if, overall, the effects of elections and terrorism on the returns of financial equities are different, two sets of t-tests are carried out. First the difference of the mean (AAR elections) - mean (AAR terrorism) over the 0 to 7 window is tested to check if the impact of election events is different from the effect of terrorism events. The test is also repeated over 0 to 14. The t-values obtained (1.450 and 0.133 respectively) indicate they are not significantly different. Thus, on average the effect of elections and terrorism over the period 0 to 7 and 0 to 14, on the financial sector equities is not significantly different. In addition, tests of the difference of the means of AARs for the seven events (3 election-related and 4 terrorism-related) are carried out. The results are given in Table 7 for AARs averaged over 0 to 7 and in Table 8 for AARs averaged over 0 to 14. Table 7 suggests that there are some significant differences. The mean of AARs for the Mpeketoni attack compared to those of the 2013 and 2017 elections are significantly different. The financial sector equities responded more negatively to the Mpeketoni attack than to the two election events over the same period. Furthermore, the market responded significantly more negatively to Mpeketoni and Garissa events relative to the DusitD2 attack. Over the 0 to 14 event window (Table 8), the response to the 2007 elections is now more negative than all the other events (t-values are all negative) but not significant. This is indicative of the persistent deterioration of the political conflict after the 2007 elections. The DusitD2 attack has less impact on the returns than all the other election and terrorism events, though only significantly different from the Garissa University attack at this window. It was noted also that t-tests comparing the pre-election (-7 to -1 window) effects for 2007, 2013, and 2017 elections show they were not significantly different. The t-values obtained were 0.507, 1.280, and 0.498 (for 2007/2013; 2007/2017; and 2013/2017 pairs respectively). Therefore, the results in answering the research question, show that both general elections and major terrorist events have comparable short-term

impacts on financial sector equity performance and market stability. There is no significant difference in their overall magnitude despite differing patterns of market reaction.

Table 7. Unpaired two-sided T-tests averaged over 0 to 7

	2007	2013	2017	Westgate	Mpeketoni	Garissa	DusitD2
2007	..						
2013	-0.390 ^a	...					
2017	-0.597	-0.317	...				
Westgate	0.212	1.008	1.226	...			
Mpeketoni	0.569	1.779*	1.869*	0.845	...		
Garissa	0.337	1.304	1.479	0.265	-0.729	...	
DusitD2	-0.321	0.190	0.544	-1.240	-3.054***	-1.895*	...

Note: ^a) indicates t-value for difference of the mean (AAR 2007) - mean (AAR 2013) averaged over 0 to 7. Stars *, ** and *** indicate significance at 10%, 5% and 1% respectively.

Table 8. Unpaired two-sided T-tests averaged over 0 to 14

	2007	2013	2017	Westgate	Mpeketoni	Garissa	DusitD2
2007	..						
2013	-0.478 ^a	...					
2017	-0.770	-0.384	...				
Westgate	-0.207	0.452	0.856	...			
Mpeketoni	-0.136	0.531	0.920	0.128	...		
Garissa	-0.098	0.637	1.032	0.247	0.089	...	
DusitD2	-1.136	-0.815	-0.354	-1.490	-1.544	-1.747*	...

Note: ^a) indicates t-value for difference of mean (AAR 2007) - mean (AAR 2013) averaged over 0 to 14. Stars *, ** and *** indicate significance at 10%, 5% and 1% respectively.

4. Conclusions

This study compared the effects of seven events (three recent elections and four major terrorism attacks) on financial sector equity performance and market stability over 0-7 and 0-14 event windows. An event-study approach is implemented using an EGARCH (1,1) model with data obtained from Thomson Reuters EIKON. Several t-tests are performed to examine if the events generate statistically distinct abnormal return responses. The t-test results suggest that in the short term, elections have, on average, caused comparable market disruptions to serious terrorism attacks over both event windows. An event-by-event analysis, however, reveals important differences. Announcements of closely contested presidential elections generate more negative market reactions. The largest negative daily outcome is observed on day 2 post-election, associated with the announcement of the 2007 presidential results, which had the narrowest margin among the elections analysed. Elections generally exhibit a similar pattern of market movements, with losses in the lead-up to elections, on announcement of results (particularly in 2007), and following election petitions (as observed in 2013 and 2017).

The market effects of terrorism events appear closely related to fatality levels, though fatalities are not the sole driver. The Garissa University attack, which recorded the highest number of fatalities, exhibits numerous negative AAR estimates and a significantly

larger cumulative impact than the DusitD2 attack over both event windows. However, the Mpeketoni attack produces significantly more damaging effects than the 2013 and 2017 elections and the DusitD2 attack, and effects comparable in magnitude to Garissa. This likely reflects market concern over its perceived domestic political dimension, suggesting that terrorism linked to internal fragmentation may pose a greater threat to market confidence. Several policy implications follow from these findings. It is necessary to strengthen election conduct as well as the judicial handling of election disputes to enhance market resilience and financial stability. Institutions and individuals contributing to violence and destruction must be held accountable, spanning electoral management bodies, security institutions, and political actors whose conduct may incite unrest. Accountability efforts should prioritize strengthening domestic institutions, as reliance on international mechanisms such as the ICC risks politicization (Endoh and Mbaio, 2016). The results further suggest that rapid and decisive responses to terrorist attacks that limit fatalities and contain public fear, as observed in the DusitD2 case, help mitigate adverse market effects. These findings are also relevant for the East African region, as studies have found high volatility shocks spill over across African markets (Atenga and Mougoue, 2021; Fauzel and Seetanah, 2023).

5. Limitations

A limitation of this study is that election effects are analysed only within the first fourteen days, while election-related instability may persist longer, as seen following the 2007 elections. Events such as judicial nullification and repeat elections as happened after the 2017 elections falling outside the study window are not captured. Nevertheless, the short-term focus remains important given the high volatility of financial markets. At the time of analysis, BBK, KCB, and SCBK were constituents of the NSE20, and since AARs are benchmarked against the index, this may bias estimates downward and reduce statistical significance. The results should therefore be interpreted as conservative estimates.

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