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The Wealth Effects of the 2010-2011 Arab Uprisings: A Market Model Event Study

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CLAREMONT McKENNA COLLEGE

**THE WEALTH EFFECTS OF THE 2010-2011 ARAB UPRISINGS: A MARKET
MODEL EVENT STUDY**

SUBMITTED TO

PROFESSOR JANET SMITH

AND

DEAN GREGORY HESS

BY

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FOR

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Abstract

Previous empirical analyses have concluded that political events can have significant linkages with stock returns. Using Brown & Warner's (1984) OLS market model, I examine the effect of political disruptions in the 2010-2011 Arab uprisings on major stock indices of Egypt, Tunisia, Jordan, Lebanon, Saudi Arabia, Dubai and London. My analysis finds mostly negative abnormal returns, highly statistically significant relative to the S&P 500, associated with many key events between December 1st, 2010 and December 1st, 2011. My findings suggest that the loss of investor wealth can be attributed to dramatic regime changes and large scale protests during that time period.

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On December 17, 2010, Muhammad Bouazizi became the most famous vegetable vendor in the world, when he set himself ablaze in front of the local government building in the Sidi Bouzid, a rural town in Tunisia. Earlier in the day, a policewoman had confiscated his wares and publicly humiliated him. He tried to complain to the municipality but to no avail. Bouazizi's self-immolation stood as a symbol not just against corruption, but also a sheer lack of economic opportunities that the youth of his generation was facing. The Arab uprisings represented a landmark disruption in the political landscape of the Arab world as well as the world at large. What began as peaceful protests in late 2010 has led to the overthrow in the entire governments of Egypt, Libya and Tunisia. While the sweeping rebellion manifested itself in different countries in varying degrees, protestors shared a common demand for democratic institutions, fundamental human rights and the creation of economic opportunities.

James Gelvin, in his analysis of the Arab uprisings asserts the significance of the "human element" in determining whether an uprising will or will not occur. He observes that oftentimes in the history of the world, even if certain conditions are met that make it ripe for an uprising, its occurrence is hardly inevitable. He argues that people's sense of deprivation changes as circumstances unfold, and they may suddenly discover a cause worth fighting for once their neighbors have taken to the streets. There is a role played by unexpected events that people might latch on (or not) to reinterpret their circumstances in new ways and that all rebellions, including the Arab uprisings, are by their nature unpredictable, as are the courses they take.

Consistent with Gelvin's argument, a voluminous body of past literature has shown that the effect of unexpected political events can oftentimes statistically significantly explain abnormal returns in stock markets. Many studies suggest a close association between political risks and stock markets. The inherent unpredictability of the Arab uprisings is reason to believe that the jump in stock market returns and jump in stock market volatility can perhaps be attributed to its dramatic political disruptions. Large scale protests and overthrow of entire regimes, characteristic of the Arab uprisings certainly affect fiscal and monetary policies thereby indirectly affecting stock markets. But moreover, such events send a strong signal to investors of a high degree of uncertainty in the stability of the political and economic apparatus, thereby directly manifesting their effect in abnormal stock market returns.

My paper seeks to examine and quantify abnormal stock returns during the uprisings in the region. As far as I know, there has been no prior literature that attempts to explore the Arab uprising in terms of its wealth implications. My research finds that many key events of the uprisings are associated with highly statistically significant negative abnormal returns particularly. The most notable events include the ousters of Tunisian President Ben Ali, Tunisian Prime Minister Mohammed Ghannouchi and Egyptian Prime Minister Ahmed Shafiq and the large scale occupation of Tahrir Square on November 21, 2011. Surprisingly, my study finds no statistically significant returns associated with the capture and assassination of Libyan dictator, Col. Gadhafi. It is also noteworthy that Egyptian and Tunisian stock markets suspend trading for most of the months of February and March 2011, at the height of their political and economic instability.

The organization of this paper is as follows. Section I provides an overview of the uprisings, with a detailed description of key events. Section II provides a survey of the existing literature with respect to the effect of news, both economic and political on stock returns. Section III describes the dataset and the methodology used in my empirical analysis. Section IV describes key results. Section V concludes, providing implications for further research.

I. Overview

Table I
A Chronology of Key Events¹

Date	Event
12/17/2010	Tunisia — A young man sets himself on fire in the Sidi Bouzid region after police confiscate the fruits and vegetables he sold without a permit. Mohamed Bouazizi had a university degree but no steady work, and his hardship resonates with many in Tunisia.
1/14/2011	Tunisia — President Zine al-Abidine Ben Ali flees to Saudi Arabia. Jordan — More than 5,000 Jordanians take to the streets across the country to protest rising prices for fuel and foodstuffs and demand the prime minister's ouster.
2/11/2011	Egypt — Egyptian Vice President Suleiman says President Mubarak is stepping down and delegating Egypt's affairs to the army.
2/27/2011	Tunisia — Prime Minister Mohammed Ghannouchi says he is stepping down. Protesters and policemen clash in central Tunis. Interim President Foued Mebazaa says he asked Béji Caïd-Essebsi, a former government minister, to replace Mr. Ghannouchi.
3/3/2011	Egypt — Prime Minister Ahmed Shafiq resigns and is replaced by a U.S.-educated former transport minister, Essam Sharaf. Protest leaders and opposition politicians welcome the choice.
10/20/2011	Libya — Col. Gadhafi is captured alive during a final push to seize his hometown, Sirte, but is killed by revolutionary forces.
11/21/2011	Egypt — The army-appointed government hands in its resignation as tens of thousands of protesters in Cairo's Tahrir Square clash with security forces for a third straight day in violence that has killed at least 24 people.

A. An Overview of Key Events

This section provides a brief history of the Arab uprisings by elaborating on the key events listed in Table I. Most of the information is based on James Gelvin's account in his book *The Arab Uprisings: What Everyone Needs to Know*.

¹ Timeline: The Major Events of The Arab Spring," NPR, accessed November 27, 2012, <http://www.npr.org/2012/01/02/144489844/timeline-the-major-events-of-the-arab-spring>.

The self-immolation of Muhammad Bouazizi in rural Sidi Bouzid touched off protests that reached Tunisia's capital by December 27. Tunisia's President Zine-al Abidine Ben Ali, who had ruled for a quarter of a century, tried to pacify protestors by making promises of new jobs and new parliamentary elections, but to no avail. With the army refusing to fire on the protestors, Ben Ali fled the country on January 14, leaving the country in the hands of a caretaker government.

The Tunisian uprising was the first in a series of cascading events that swept through the Arab world. About a week and a half after the departure of Ben Ali, young people, many of whom belonged to an organization called the "April 6 Movement," began their occupation of Tahrir Square in Cairo; strikes and antigovernment protests spread throughout Egypt. On February 11, the army took matters in its own hands: it deposed the incumbent ruler of thirty years, and established a new government under the Supreme Council of the Armed Forces.

After Ben Ali fled Tunisia, Mohamed Ghannouchi, his prime minister and political crony, announced he was taking the job of transitional president in direct violation of the Tunisian constitution. Despite the fact that he shortly returned to his original position, the real power still lay with him. The "second Tunisian revolution" lasted through March 2011, and by the six-month anniversary of the flight of Ben Ali, Ghannouchi was gone for good and the government had given in to a number of the protestors' demands.

In the aftermath of the Tunisian and Egyptian uprisings, a coalition of groups, including an umbrella group called the National Conference for the Libyan Opposition,

issued a call on social media for Libyans to participate in their own “Day of Rage” to protest political and economic conditions in Libya. From the beginning, the regime met the uprising with an appalling level of violence. After six months of intense fighting and the engagement of NATO jets providing close combat air support to the rebels, Tripoli fell to the rebels in August 2011. Two months later, rebels found and killed Gaddafi in home town of Surt.

In November 2011, the largest demonstrations in Egypt since the resignation of Hosni Mubarak took place in Tahrir Square, the focal point of the Egyptian revolution. With the cabinet offering its resignation a few days prior, transitional military rulers as security forces carried out an increasingly lethal crackdown on three days of violent street protests, reviving the uncertainty about Egypt’s future that marked the earliest days of the Arab uprising. Egypt’s military had been viewed as the linchpin of the political transition after the ouster of President Hosni Mubarak. The cabinet’s offer to resign, in a bow to protestors’ demands, was a blow to the tenuous legitimacy of the ruling military council².

B. Political and Economic Context

Many political analysts have argued that the pre-revolution state of affairs in the Arab world, particularly Egypt and Tunisia had created a pressure cooker waiting to burst. Although, as James Gelvin argues, there is no inevitability, some of the political and economic conditions on the eve of the revolution provide can help provide context to

² David Kirkpatrick, “Egypt’s Cabinet Offers to Resign as Protests Rage,” *New York Times*, November 21, 2011. (available at <http://www.nytimes.com/2011/11/22/world/middleeast/facing-calls-to-give-up-power-egypts-military-battles-crowds.html>).

the uprisings. The following outlines some of the key characteristics of the Arab world on the brink of insurrection.

A series of reports prepared by the Regional Bureau for Arab States of the United Nations Development Program (UNDP) outlined the political conditions of the region, and painted a bleak picture on the eve of the revolution. None of the countries, with the exception of Jordan, ranked above the international mean of metrics that measured civil rights, political rights and independence of media. Eight of the twenty Arab states surveyed ranked above the international means in the quality of public services and the bureaucracy and independence of civil service. The report categorized almost all Arab states as “black-hole states,” in which the executive branch of the government was so powerful that it “converts the surrounding environments into a setting in which nothing movies and from which nothing escapes.”³

In a separate report prepared by the International Monetary Fund (IMF) for the G-8 meeting in 2011, it outlined some of the key economic indicators of the Middle East and North Africa region. Over the course of the past three decades, the GDP growth in the region averaged 3 percent, while the rest of the developing world grew at the rate of 4.5 percent. It calculated that to absorb the unemployed and new entrants to the job market, the annual GDP would have to grow at a rate of 7.5 percent. Further, it highlighted that exports had remained flat in recent decades, with the exception of oil and gas, and about 60 percent of the region’s exports go to Europe implying limited interaction with emerging markets such as China. The number of jobs grew as 2 percent

³ James Gelvin, *The Arab Uprisings: What Everyone Needs to Know* (New York: Oxford University Press, 2012), 5

annually between 2000 and 2007 and overall unemployment in Egypt, Jordan, Lebanon, Syria and Tunisia hovered between 10 and 12 percent.⁴

⁴ Ibid., 11.

II. Literature Review

A. Economic News and Stock Markets

There is a substantial body of research devoted to understanding the determinants of stock prices, especially in terms of economic news. Most attempts to explain the sources of stock volatility have focused on the interplay of the stock market and easily observable real and financial variables. Fama et al. (1969) conducted one of the foremost studies of testing the speed of adjustment of stock prices to specific kinds of new information. By examining the process by which common stock prices adjust to the stock split information, they conclude that stock markets are “efficient” in the sense that stock markets adjust very rapidly to new information. Moreover, their evidence indicates that on average the market’s judgments concerning the information implications of a split are fully reflected in the price of a share at least by the end of the split month but most probably almost immediately after the announcement date.

Pearce & Roley (1984) examined the daily responses of stock prices, based on the S&P 500, to economic news such as announcements about the money supply, inflation, real economic activity, and the discount rate using survey data to identify the unexpected component, or the surprise, of the announcements. They use survey data on market participants’ expectations of economic announcements in order to construct direct measures of the unexpected changes. Although the authors found that new information related directly to monetary policy significantly affects stock prices, they found limited evidence of impact from inflation surprises and no evidence of an impact from real

activity surprise on the announcement days. Furthermore, they found weak evidence of stock price responses to surprises beyond the announcement day.

Chen et al. (1986) found several economic variables to be significant in explaining expected stock returns most notably, industrial production, changes in the risk premium, twists in the yield curves and somewhat more weakly, measures of unanticipated inflation and changes in expected inflation during periods when these variables were highly volatile. They concluded that stock returns are exposed to systematic economic news, that they are priced in accordance with their exposures, and that the news can be measured as innovations in state variables whose identification can be accomplished through simple and intuitive financial theory.

B. Political News and Stock Markets

It is difficult to study the effects of political disruptions on the market returns because of the complexity in controlling for investors' expectations prior to major events.

Cutler, Poterba & Summers (1989) analyze the stock market reactions to identifiable world news. Their results suggest the difficulty of explaining as much as half the variance in aggregate stock prices on the basis of publicly available news bearing on fundamental values. They find that while events such as wars, the Presidency, or significant changes in financial policies have an effect on moving stock prices, they are skeptical of the view that such qualitative news can account for all the variation in return.

On the other hand, there are several studies that found significant linkages between political uncertainty and stock prices. Bittlingmayer (1998) found that politics play a significant role in explaining volatility in Germany's stock market during World War I, the 1918 Armstice, and the political turbulence of 1920. His analysis considers key

events of post war Weimar Germany, marked by revolution, an unstable republic and insurrection among other political agitations. By using a different strategy from his predecessors, of examining a dramatic political shift rather than simple news stories, he was able to explain a significant amount of variation in returns in post war Germany. He concludes that his results offer support for the view that causation runs from political uncertainty to stock prices.

In the context of volatility, Mitchell & Mulherin (1994) find that publicly available information, including major news stories, accounts for only a small fraction of observed daily volatility in stock markets. Further, Voth (2002) identifies strong evidence in favor of a link between share price volatility during the Great Depression and the fear about social unrest and the danger of a violent challenge to the economic status quo. By explaining between half and two-thirds of the volatility during the Great Depression, he provides direct evidence in favor of the Merton/Schwert hypothesis⁵ by accounting for a measure of the risk of revolution, based on the observed correlations between social unrest, political violence, and the revolutions that do not occur in his sample period. He argues that this “threat variable” is a highly significant predictor of higher stock volatility.

C. Emerging Markets

In the context of emerging markets, Kim & Pei (2001) discovered that unexpected return jumps in the Hong Kong market index are closely associated with political news, and that the impact of this news is asymmetric, with bad news associated with greater

⁵ Schwert (1989) argues that when all likely explanations for abnormal volatility are insufficient, the most likely one is political risk, the nature of which threatens the survival of an entire regime. Merton (1980) further argues that relatively small changes in the probability of a momentous shock lead to extreme swings in market sentiment.

volatility than good news. Further, they find that the largest market movements in Hong Kong were often associated with major political news. Hassan et al. (2003) analyze the factors that determine the volatility and predictability using a sample of 10 emerging markets in the Middle East and Africa region (MEAF). They use quantitative measures of political, financial, and economic risk and find that shocks in these ratings shift volatility parameters in MEAF emerging markets. Furthermore, their results show that local factors represented by these risks have a high power in predicting returns in the MEAF emerging markets.

Amihud & Wuhl (2004) examine the effects of changes in the market's expectations of Saddam Hussein's fall from power. They find a significant difference in the effects of the probability of Saddam's fall between the war period and the pre-war period indicating a change in the interpretation of the news reflected in the Saddam contract prices⁶. However, the weak explanatory power of the news of his fall suggests that moves in stock markets reflect something other than fundamental values, as suggested by Cutler et al. (1989)⁷. Amihud & Wuhl also detect a gradual adjustment of stock prices to information prior to the war but hypothesize that fads and media attention contributed to setting investor expectations about Hussein's fall during the war itself revealing a stronger effect on stock prices, oil prices and exchange rates.

Jensen & Schmith (2005) perform an event study to examine the stock market responses to political events in the context of the 2002 Brazilian presidential election.

⁶ Amihud & Wulf refer to "Saddam contracts" as traded contracts that promise a fixed amount of Saddam were out of power by the contracts' expiration dates. They monitor the prices of these contracts as a means to control for investors' expectations.

⁷ Cutler et al. (1989) contend that volatility may reflect changes that take place in average assessments of given sets of information regarding fundamental values as investors re-examine existing data or present new arguments.

They use movements in the Brazilian stock market as proxies for future expectations for the Brazilian economy and employ a GARCH⁸ model which allows them to model both the conditional mean return and the variance. Their analysis finds no statistically significant impact of their political variables on mean return. They contend that while the rise of Lula (often regarded as the most popular politician in the history of Brazil) increased uncertainty about the country's economic future, it did not clearly signal a decline. More conclusively, they find a positive impact on the volatility of the Brazilian stock market and they attribute the increase in uncertainty in financial markets to the uncertainty of Lula's policies and not to the uncertainty of the election itself. Their findings suggest that markets did not expect that Lula's rise would have a clear negative impact on firms' future performance, contrary to the discussions in the popular media.

As Pagan & Schwert (1990) as well as Jensen & Schmith (2005) have demonstrated, conventional ARCH and GARCH models fail to capture the rise in share price variability. Schwert (1989) observes that the U.S. and world economies came out of the Depression quite well even though at the time, investors could not have had such confident expectations. He argues that when all likely explanations are insufficient, the most likely one is political risk during the Great Depression, in that the very survival of the capitalist system, even in the United States, was seen to be at risk. Merton (1980) also points to the relatively small changes in the probability of a momentous shock leading to the extreme swings in market sentiment.

⁸ GARCH refers to the generalized autoregressive conditional heteroskedasticity model.

D. Motivation

My research seeks to study the wealth effects of political events in the context of the Arab uprisings, a major contemporary world event with far-reaching economic and sociological ramifications. By employing the OLS market model as specified by Brown and Warner (1984), it seeks to calculate unexpected or abnormal stock returns of major indices in Egypt, Tunisia, Jordan, Lebanon, Saudi Arabia, Bahrain, Dubai and London with respect to the S&P 500, in the context of predefined time windows around major events. Specifically, it seeks to examine if key political events characterized by large scale protests and overthrow of regimes, can statistically significantly explain abnormality in return and by how much.

III. Methodology and Empirical Analysis

A. Dataset

The dataset for this study is constructed from closing day prices of aggregate capitalization weighted equity indices in each of the countries considered namely Egypt, Tunisia, Jordan, Lebanon, Saudi Arabia, Bahrain, Dubai, London and New York. The countries were selected based on impact of disruptions caused by the uprisings, and partly on the availability of data. Closing day prices for each index were obtained from the Bloomberg database. The specifics of each index are provided in Table II with detailed descriptions provided in Table A of the Appendix. Daily data is used for this study based on the conclusions drawn by Brown & Warner (1984) that the use of daily data is straightforward and generally reinforce the robustness of the OLS market model under a variety of conditions.

The event dates for this study mark either a large scale civilian protest, the ouster of an incumbent autocrat, or a simultaneous occurrence of both. Such massively disruptive events are potentially effective signals to investors about the instability of the regime and can give rise to a legitimate uncertainty about the survival of the economic and political apparatus. The event windows are defined as 7-day periods, assuming efficient markets, with 2 days prior and 4 days after the date of the actual event. This tries to take into account investors' expectations in anticipation of the event as well as the lag between the dissemination of news and the occurrence of the event itself as much as possible. The specifics of the event windows are provided in Table III.

Table V reports missing data points for each of the indices considered. The lack of data is attributed to either stock exchange closure over weekends or suspension of trading for more than 3 days. Data points over weekends outside event windows were extrapolated from the closing price of the previous day. No extrapolation was done for more than 3 days of missing data.

B. Daily Returns

To examine the wealth effects correlated with political upheavals during the Arab revolution, I analyze daily equity returns calculated using closing day index prices. Figure 1 is a simple line plot of daily returns over the entire time period of this study i.e. between 12/1/2010 and 12/1/2011. The dotted lines mark key events that I study, as specified above. It is noteworthy that many significant jumps in returns are seen immediately after major events.

Figure 2 is a simple line plot of cumulative daily returns of the stock indices, with dotted lines marking key events. This chart supports the view that large stock movements were the result of sudden, specific political developments. Moreover, it shows that overall wealth, as characterized by cumulative equity returns was lost over the course of the one year that this study takes into consideration. This effect is most significantly demonstrated by Egypt and Tunisia, the epicenters of the revolution, with each of them experiencing pervasive turmoil and consequently, dramatic changes in regime.

Tables VI (A) through VI (G) display daily index returns isolated by the event windows as defined earlier. The data in each of the tables is visually represented by a corresponding simple line plot, with dotted lines marking key events.

C. Descriptive Statistics

Table IV provides summary statistics of daily index returns during the entire time period of this study i.e. between 12/1/2010 and 12/1/2011. Figure 3 visually represents the corresponding means and standard deviations.

It is noteworthy that mean returns are mostly negative, signifying a loss of wealth during the time period. Although Egypt has the least available data points, it notably shows the lowest mean and minimum values indicating the lowest decline in market returns during the time period, as compared other nations. This is consistent with the fact that it was politically and economically the most affected by the uprisings during the time period. Further, Egypt's high standard deviation in returns suggests a high level of volatility during the time period reflecting the pervasive market sentiment of uncertainty.

D. OLS Market Model Regression Methodology

This section describes the methodology and regression model employed in my analysis. I use the OLS market model as specified by Brown & Warner (1984) to estimate daily abnormal returns of each country's representative index with respect to market returns as represented by the S&P 500. Figure 4 specifies the estimation period used to estimate regression coefficients and event windows within which abnormal returns are calculated.

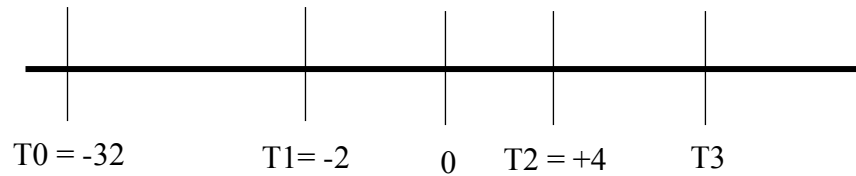


Figure 4. Event study timeline.

- The interval T0-T1 is the **estimation period** (-32 to -2 relative to event day 0 =>30 days)
- The interval T1-T2 is the **event window** (-2 to +4 relative to event day 0 => 7 days)
- Time 0 is the event date in calendar time
- The interval T2-T3 is the **post-event window**

I estimate abnormal returns using the following equation:

$$A_{i,t} = R_{i,t} - \hat{\alpha} - \hat{\beta}_i R_{m,t}$$

Where:

$A_{i,t}$ = Excess/abnormal return for index i at day t

$R_{i,t}$ = Observed arithmetic return for index i at day t

$R_{m,t}$ = The return on the S&P 500 index for day t

$\hat{\alpha}$ = the average return of the country index compared to the market average

$\hat{\beta}_i$ = the sensitivity of this country index's return to the market return

I regress the daily returns of each of the indices independently on daily market returns (represented by the S&P 500) to estimate intercept and slope coefficients $\hat{\alpha}$ and $\hat{\beta}_i$ within the 30-day estimation periods as specified. I then plug those coefficients into the OLS market model equation to obtain abnormal returns of each of the indices within the specific event windows as shown in Tables VII (A) through VII (G).

To test for statistical significance, I estimated the standard deviation of the residuals from the estimation period and the cumulative abnormal returns for each event window. I then calculated the t-value for N indices and T days using the following formula.

$$t - value = \frac{\frac{\sum AR_{n,t}}{T}}{\sigma_{AR(n)} \sqrt{T} / \sqrt{N}}$$

Where:

$AR_{n,t}$ = the abnormal return for country n on day t of the event window

$\sigma_{AR(n)}$ = the estimated standard deviation of abnormal returns (estimated as the standard deviation of residuals from the estimation period).

IV. Results

As observed by many scholars of existing literature, it is difficult to distinguish the part of the political news that is unanticipated. As stated by Fama et al. (1969), according to the efficient market hypothesis, security prices should only respond to the unexpected part of any announcement i.e. that part which is truly news, since the expected part of the announcement should already be embedded in stock prices. It is also difficult to rule out the overlapping effects of the events given their close proximity in occurrence. The event windows are defined to be as exclusive as possible with the aim of minimizing contamination in results. Contamination may also occur due to the effects of the simultaneous occurrence of other world events, which are difficult to control for.

In addition, there is potential for a lag between the occurrence of an event and investors' obtaining information about it, based on which they make decisions. This could be as a result of the deterioration of communication infrastructure as well as censorship from the respective governments that faced the threat of being overthrown. A lag could also be as a result of periods of uncertainty immediately following dramatic events characteristic of the uprisings, when risk-averse investors are quickly cashing out whereas more diversified investors remain bullish. Furthermore, the effects of most of the events I study are most likely to spill over into large global indices in an interconnected financial system. This potentially creates a bias in my measurement of abnormal returns relative to a market index like the S&P 500.

Tables VII (A) through VII (G) show daily abnormal index returns calculated with respect to market return (S&P 500) using the OLS market model for specified 7- day

event windows. Figures 6(a) through 6(g) visually represent the same. The dates of the actual events are in bold and weekends are marked in italics. The following is an analysis of key results with respect to of the event windows. T-statistics for each of the event windows are provided in Table B of the Appendix.

On December 17th, 2010, Mohammed Bouazizi, a vegetable vendor in a small town in Tunisia, sparked the beginning of the Arab uprisings through an act of self-immolation. Abnormal index returns for the corresponding event window reflect some of the initial wealth effects as shown by Table VII (A) with a visual representation in Figure 6(a). While Tunisia does not show any statistically significant declines, London shows negative abnormal returns of about 0.85 percent on the day of the event, significant at the 5 percent level.

On January 14th, 2011, President Ben Ali of Tunisia flees the country after many weeks of trying to mollify the raging crowds. Abnormal returns for the corresponding event are provided in Table VII (B) with a visual representation in Figure 6(b). Arguably in anticipation of his departure, the Tunisian stock market demonstrates dramatic negative abnormal returns of 2.6 percent two days prior and 2.5 percent one day prior to the event, both at a 1 percent level of statistical significance. Lebanon shows negative returns of a similar magnitude with a drop of about 3 percent two days prior and about 0.5 percent on the day prior to the event, also significant at the 1 percent level.

On February 9th, 2011, President Hosni Mubarak, the long incumbent dictator of Egypt announces his resignation. Abnormal returns for the corresponding event are provided in Table VII (C) with a visual representation in Figure 6(c). While the Egyptian

stock market remain closed for trading, Tunisia shows negative abnormal returns of about 2 percent at the 5 percent level on the day of the event and Jordan shows negative returns of about 0.75 percent on the day prior, at the 5 percent level. London shows negative returns of about 0.2 percent, albeit only at the 10 percent level.

On February 25th, 2011, the Prime Minister of Tunisia, Mohammed Ghannouchi also announces his resignation and large scale protests erupt in the capital city of Tunis. Abnormal returns for the corresponding event are provided in Table VII (D) with a visual representation of the same in Figure 6(d). The Tunisian stock index shows negative returns of about 3 percent two days prior to the event, significant at the 5 percent level, following which the Tunisian stock exchange suspends trading for the remainder of February and half way through March.

A few days later, on March 3rd, 2011, the Prime Minister of Egypt, Ahmed Shafiq steps down from office. Given the close proximity of Tunisian Prime Minister Ghannouchi's resignation with that of Egyptian Prime Minister Shafiq, there is most likely an overlap which makes it difficult to isolate effects. Abnormal returns for the corresponding event are provided in Table VII (E) with a visual representation in Figure 6(e). Taking into consideration the overlapping effect, Saudi Arabia partly reflects the sentiment of investors, with negative returns of 6.5 percent two days prior and 3.5 percent decline the day before the event, statistically significant at the 1 percent level. Bahrain also exhibits negative returns of about 2 percent, at the 1 percent level while Dubai shows negative returns of 1.5 percent, significant at the 10 percent level. Both the Egyptian and Tunisian stock exchanges remain closed for the duration of the last two event window.

On October 20, 2011, Col. Gadhafi of Libya is captured and killed in his hometown but surprisingly, none of the countries I consider reveal any statistically significant abnormal returns, as demonstrated by Table VII (F) and visually represented by Figure 6(f).

One month later, on November 21, 2011, Egypt takes the center stage of the uprisings once again with thousands of protestors occupying Tahrir Square in Cairo. Abnormal returns for this event are provided Table VII (G) and visually represented in Figure 6(g). The Egyptian stock market reacts dramatically with negative abnormal returns of about 5 percent, statistically significant at the 1 percent level, on the day of the event. No other countries show any statistically significant returns within this event window.

V. Conclusion

Using stock returns from major indices in Egypt, Tunisia, Jordan, Lebanon, Saudi Arabia, Bahrain and London, I find that, over the December 1, 2010 to December 1, 2011 period of the Arab uprisings, stock markets show negative abnormal returns oftentimes highly statistically significant relative to the S&P 500. My findings are consistent with the conclusion drawn by Bittlingmayer (1998) in that there are significant linkages between some of the dramatic political disruptions of the Arab uprisings and stock returns in the region.

While acknowledging the many possibilities of bias, one of the most notable events of my study is the ouster of Tunisian President Ben Ali with negative cumulative abnormal returns of 5 percent in Tunisia and 3.5 percent in Lebanon in the two days prior to the event. The subsequent ouster of Egyptian President Hosni Mubarak demonstrated statistically significant negative abnormal returns in Tunisia of about 2 percent on the day of the event. It is particularly difficult to isolate the effects of the resignations of Tunisian Prime Minister Ghannouchi and Egyptian Prime Minister Shafiq given their close proximity of occurrences, but Saudi Arabia showed highly statistically significant negative abnormal returns cumulated to about 10 percent in the two days prior to the event. The large scale occupation of Tahrir Square on November 19th is associated with a statistically significant negative abnormal return of 4.7 percent in Egypt on the day of the event. Surprisingly, my study finds no statistically significant returns associated with the capture and assassination of Libyan dictator, Col. Gadhafi. Finally, it is noteworthy that the stock exchanges of Egypt and Tunisia suspended trading during most of the months of February and March 2011, at the height of their political and economic instability.

While my research examines one dimension of the wealth implications of the uprisings, there are many other opportunities for further research on this topic. Other dependent variables such as oil price or insurance industry price indices can be used to calculate abnormal returns and examine wealth effects manifested in other markets. Further, the event study methodology could be extended to draw conclusions about stock volatility. Schwert (1989) shows that stock volatility increases for brief periods during and immediately after financial crises or bank panics, but there are no long-term effects on volatility, which he characterizes as the “volatility problem”. The events of the Arab uprisings can be effectively used to perform an explicit test of the Merton/Schwert hypothesis that dramatic changes in regime add to the fundamental uncertainty reflected in past and future volatility.

Charts & Tables

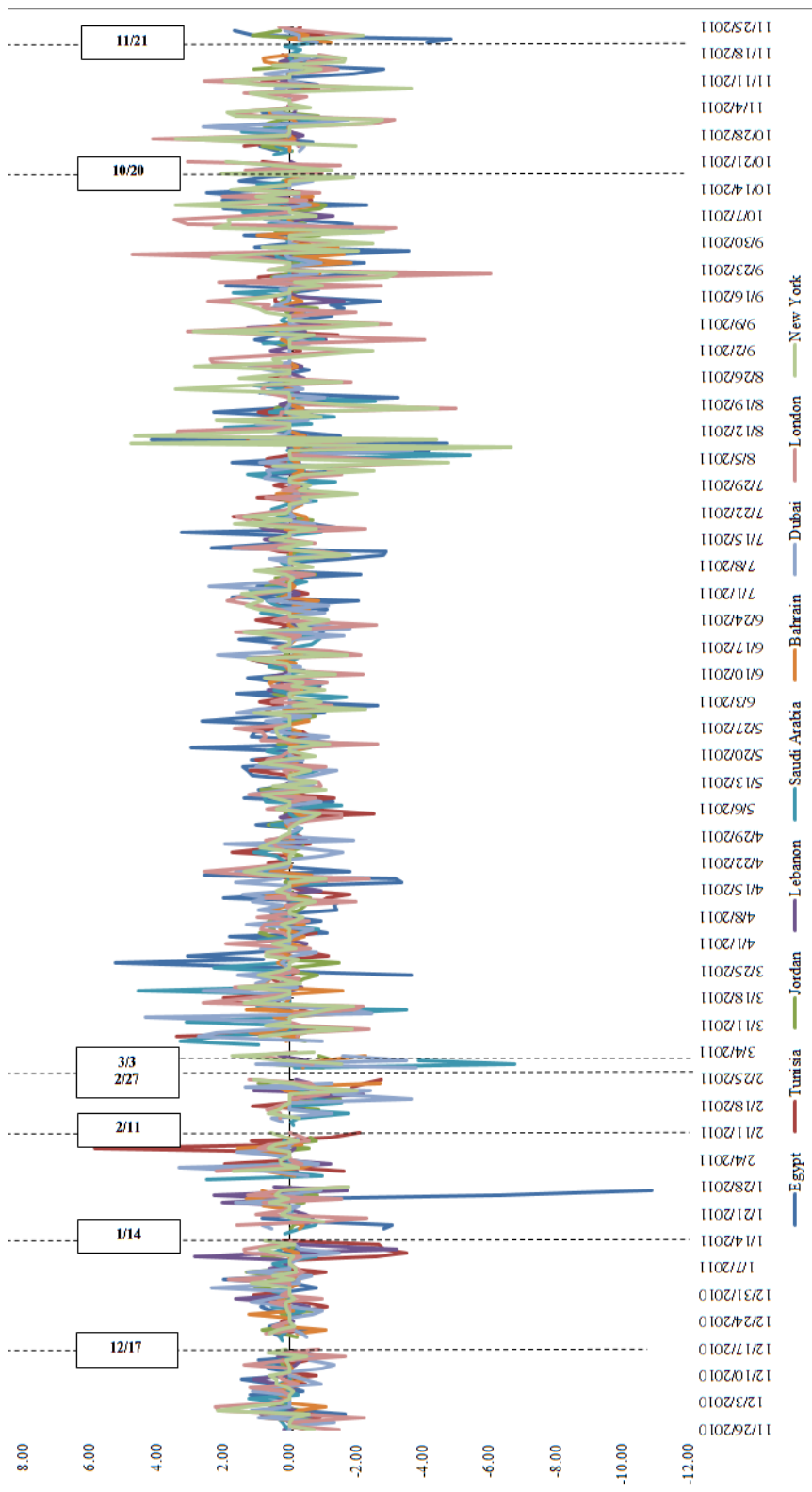


Figure 1. Daily Returns: 12/1/2010 – 12/1/2011. The dotted lines denote key events examined in this study. Data is from Bloomberg.

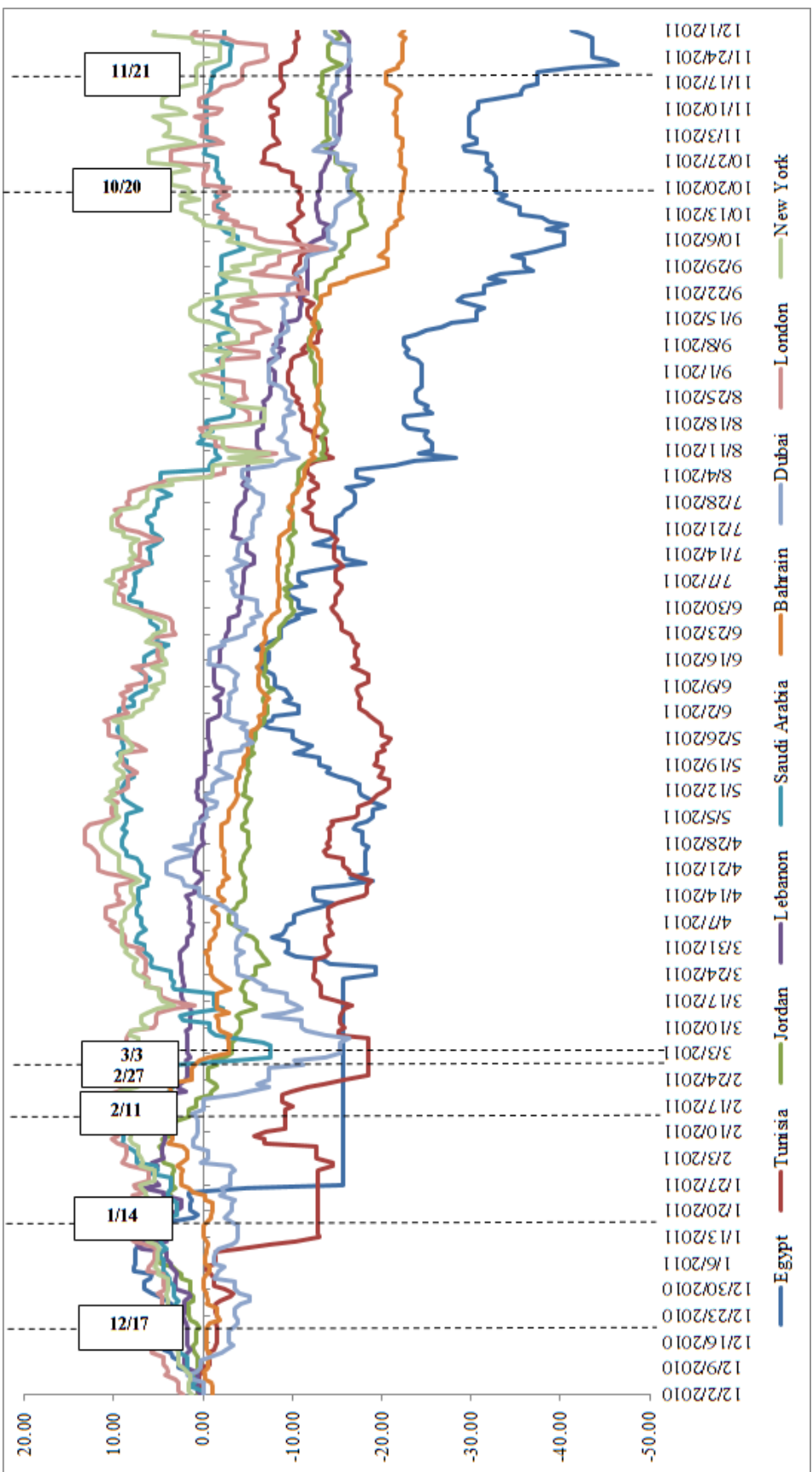


Figure 2. Cumulative Daily Returns: 12/1/2010 - 12/1/2011. The dotted lines denote key events examined in this study. Data is from Bloomberg.

Table II
Stock Indices

This table provides a list of stock indices employed in calculating returns. Closing day prices for each of the indices was obtained from the Bloomberg database for the 12/1/2010 - 12/1/2011 period. Each index is capitalization weighted and best represents aggregate equity returns for its respective country. A detailed description of each index is provided in the Appendix.

Country	Name	Date of Origination
Egypt	EGX 30 Index	2003
Tunisia	Tunisia Stock Exchange TUNINDEX	1997
Jordan	Amman Stock Exchange General Index	1993
Lebanon	BLOM Stock Index	1996
Saudi Arabia	Tawadul All Share TASI Index	2008*
Bahrain	Bahrain Bourse All Share Index	2004
Dubai	Dubai Financial Market General Index	2004
London	FTSE All-Share Index	1962
New York	S&P 500 Index	1957

*restructured in 2008

Table III
Event Windows

This table defines the 7-day event periods with respect to the date of the actual event between 12/1/2010 and 12/1/2011. The event dates for this study mark either a large scale civilian protest, the ouster of an incumbent autocrat, or a simultaneous occurrence of both. Dates of the actual event are obtained from NPR's timeline of major events cited in the references section.

Event Date	Event Window	Event
12/17/2010	12/15/2010 - 12/22/2010	Bouazizi (vegetable vendor) sets himself on fire. Ben Ali (President of Tunisia) flees; Mass protests in Jordan.
1/14/2011	1/12/2011 - 1/18/2011	Mubarak (President of Egypt) announces resignation.
2/11/2011	2/9/2011 - 2/15/2011	Ghannouchi (PM of Tunisia) announces resignation.
2/27/2011	2/25/2011 - 3/3/2011	
3/3/2011	3/1/2011 - 3/7/2011	Shafiq (PM of Egypt) steps down.
10/20/2011	10/18/2011 - 10/24/2011	Gaddafi (Ruler of Libya) is captured and killed. Mass demonstrations at Tahrir Square in Cairo, Egypt.
11/21/2011	11/19/2011 - 11/25/2011	

Table IV
Descriptive Statistics

This table provides summary statistics of daily index returns between 12/1/2010 and 12/1/2011. Descriptions of indices are provided in the Appendix.

Country	N	Mean	Std. Dev.	Min.	Max.
Egypt	294	-0.14	0.09	-10.89	5.22
Tunisia	323	-0.03	0.05	-3.51	5.85
Jordan	328	-0.04	0.02	-1.80	1.29
Lebanon	331	-0.05	0.03	-3.22	2.85
Saudi Arabia	321	-0.01	0.05	-6.78	4.52
Bahrain	333	-0.07	0.02	-2.71	1.52
Dubai	339	-0.04	0.05	-3.83	4.32
London	341	0.00	0.07	-6.05	4.71
New York	338	0.02	0.07	-6.66	4.74

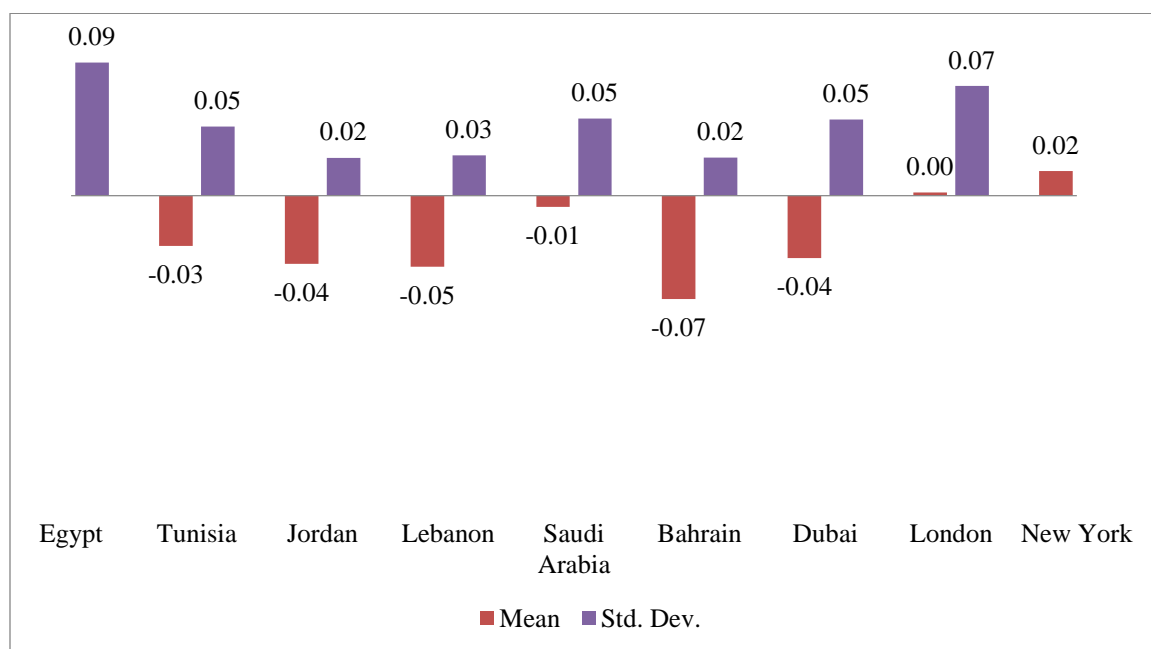


Figure 3. Descriptive Statistics: daily index returns between 12/1/2010 and 12/1/2011. Data is from Bloomberg.

Table V
Missing Data Points

This table provides a list of all the missing stock return data points within the period 12/1/2010 and 12/1/2011 (366 days). Closing day price data was obtained from Bloomberg. All the missing data points are attributed to either stock exchange closure over weekends or suspension of trading for more than 3 days, as reported by prominent sources such as BBC news.

Country	# of missing data points
Egypt	71
Tunisia	42
Jordan	37
Lebanon	34
Saudi Arabia	44
Bahrain	32
Dubai	26
London	24
New York	27

Table VI (A)
Daily Returns: 12/15/2010 - 12/21/2010

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
12/15/2010	-0.78	-0.29	0.04	0.33	-0.37	-	-0.84	-1.68	-0.51
12/16/2010	-0.58	-0.04	-0.48	-	-	-	0.56	0.28	0.62
12/17/2010	-	-	-	-	-	-	-	-0.89	0.08
<i>12/18/2010</i>	-	-	-	-	-	-	-	-	-
<i>12/19/2010</i>	-	-	-	-	0.20	-	-	-	-
12/20/2010	0.24	-	-0.22	-	0.28	-	-0.53	-	-
12/21/2010	0.45	0.09	0.23	0.12	0.15	-0.24	-0.39	0.70	0.60

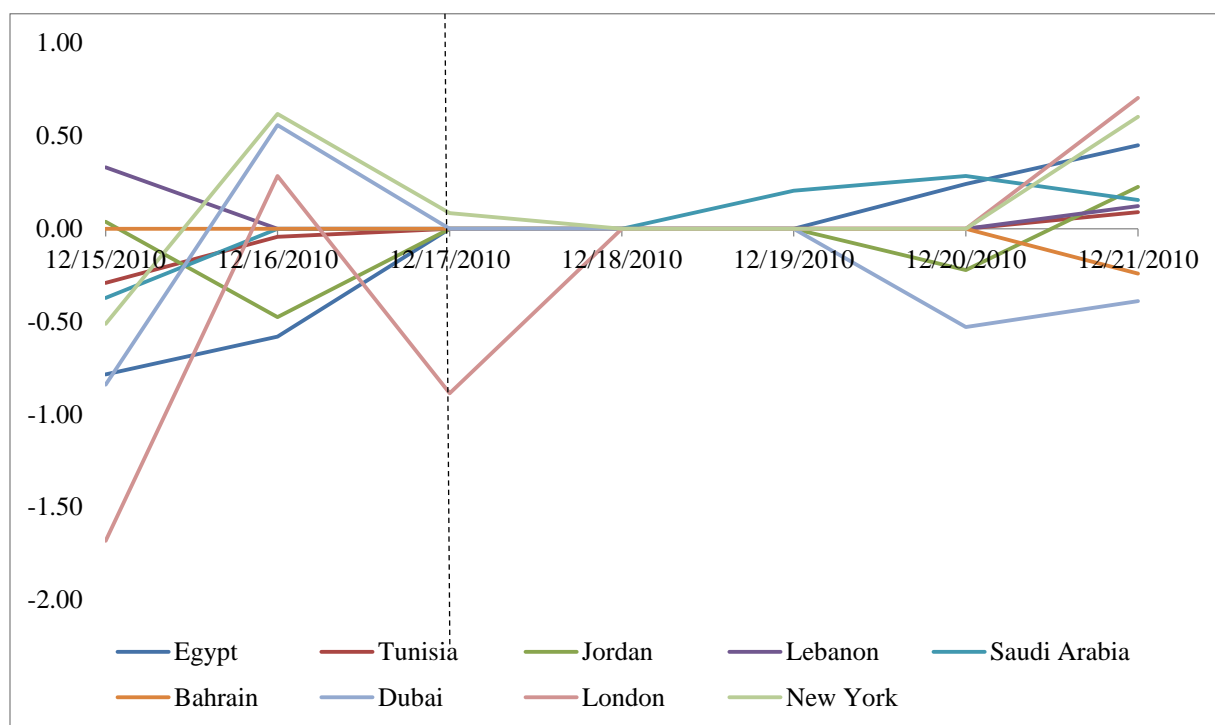


Figure 5(a). Daily Returns: 12/15/2010 – 12/21/2010. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VI (B)
Daily Returns: 1/12/2011 - 1/18/2011

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
1/12/2011	-0.30	-2.83	-0.06	-3.22	0.24	0.13	-0.35	1.36	0.90
1/13/2011	0.39	-2.68	-0.24	-0.25	-	0.34	-0.18	0.39	-0.17
1/14/2011	-	0.20	-	0.63	-	-	-	-0.22	0.74
<i>1/15/2011</i>	-	-	-	-	-	-	-	-	-
<i>1/16/2011</i>	-	-	-	-	0.14	-	-	-	-
1/17/2011	-2.82	-	-0.04	-	-0.30	-0.31	0.53	-	-
1/18/2011	-3.11	-	-0.11	-0.58	-0.78	-0.41	0.83	1.56	-

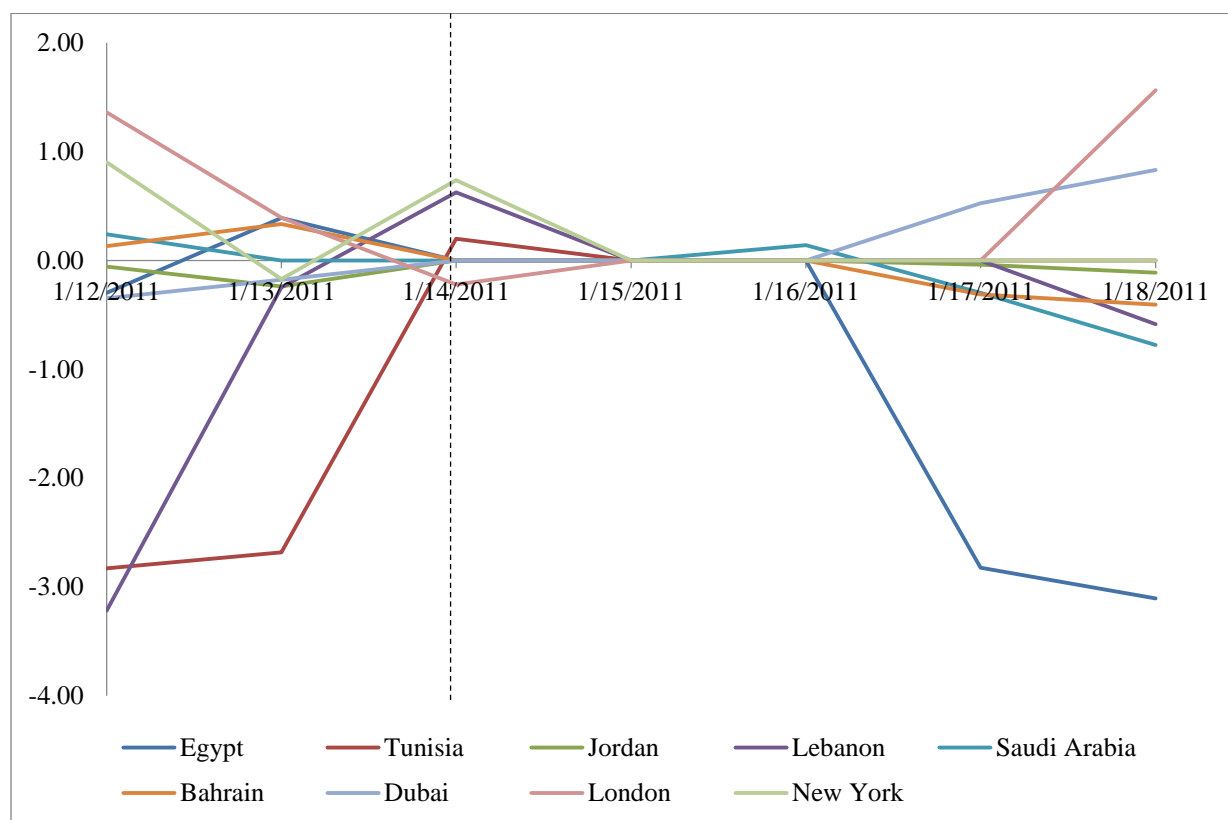


Figure 5(b). Daily Returns: 1/12/2011 – 1/18/2011. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VI (C)
Daily Returns: 2/9/2011 - 2/15/2011

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
2/9/2011	-	1.12	-0.81	-	0.15	-0.02	-0.22	-0.60	-0.28
2/10/2011	-	-1.26	-0.63	-	-	0.03	-0.27	-0.42	0.07
2/11/2011	-	-2.12	-	0.07	-	-	-	-0.01	0.55
<i>2/12/2011</i>	-	-	-	-	-	-	-	-	-
<i>2/13/2011</i>	-	-	-	-	-0.14	-	-	-	-
2/14/2011	-	-	-1.51	-	-0.05	0.12	0.21	-	-
2/15/2011	-	-	-	-	-0.27	-	0.51	0.28	-0.32

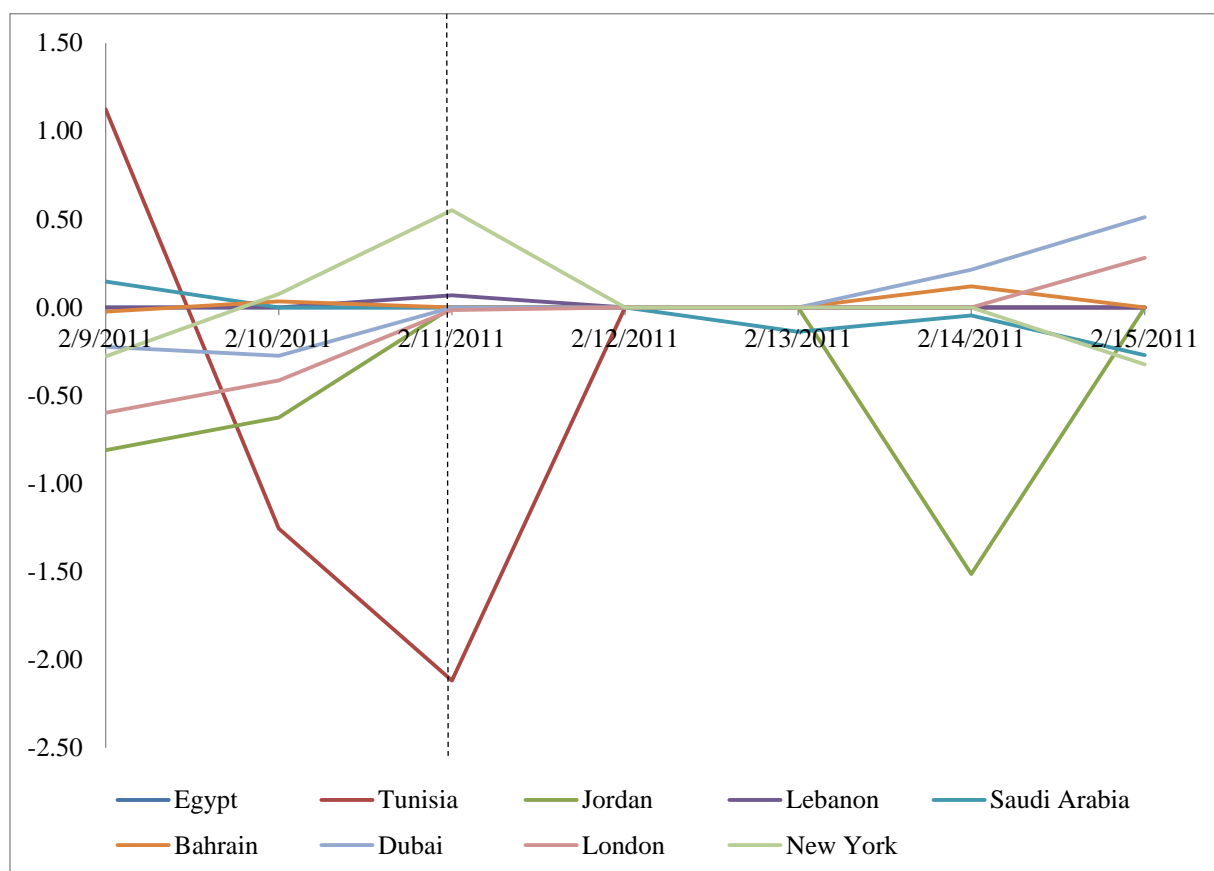


Figure 5(c). Daily Returns: 2/9/2011 – 2/15/2011. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VI (D)
Daily Returns: 2/25/2011 - 3/3/2011

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
2/25/2011	-	-2.76	-	-0.19	-	-	-	1.22	1.06
2/26/2011	-	-	-	-	-	-	-	-	-
<i>2/27/2011</i>	-	-	-	-	-	-	-	-	-
2/28/2011	-	-	-1.03		-0.16	-0.40	-3.83	-	-
3/1/2011	-	-	0.56	0.17	-6.78	-0.45	1.00	-0.71	-1.57
3/2/2011	-	-	-1.34	-0.56	-3.89	-1.02	-3.53	-0.04	0.16
3/3/2011	-	-	-0.87	0.31	-	-2.30	-1.61	1.02	1.72

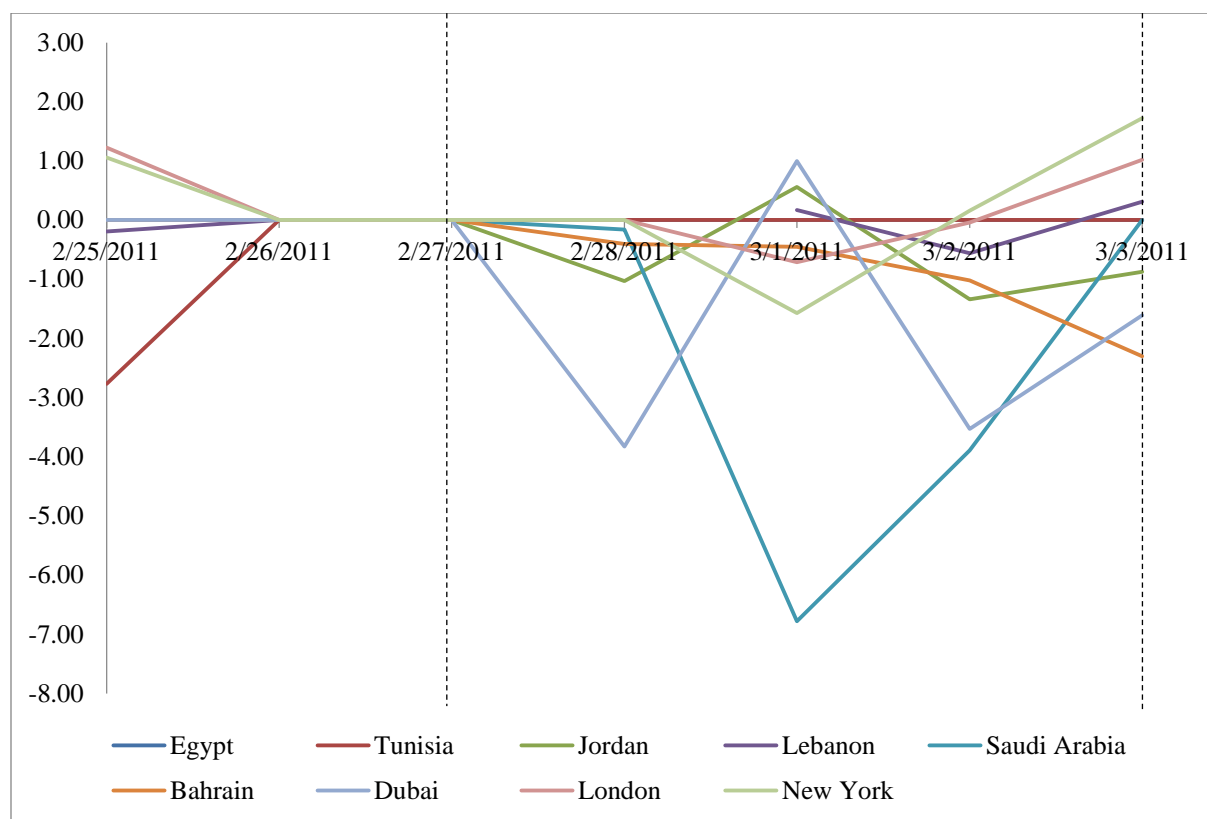


Figure 5(d). Daily Returns: 2/25/2011 – 3/3/2011. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VI (E)
Daily Returns: 3/1/2011 - 3/7/2011

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
3/1/2011	-	-	0.56	0.17	-6.78	-0.45	1.00	-0.71	-1.57
3/2/2011	-	-	-1.34	-0.56	-3.89	-1.02	-3.53	-0.04	0.16
3/3/2011	-	-	-0.87	0.31	-	-2.30	-1.61	1.02	1.72
3/4/2011	-	-	-	-	-	-	-	-0.20	-0.74
<i>3/5/2011</i>	-	-	-	-	-	-	-	-	-
<i>3/6/2011</i>	-	-	-	-	0.93	-	-	-	-
3/7/2011	-	-	-0.50	-	3.26	0.10	-1.00	-	-

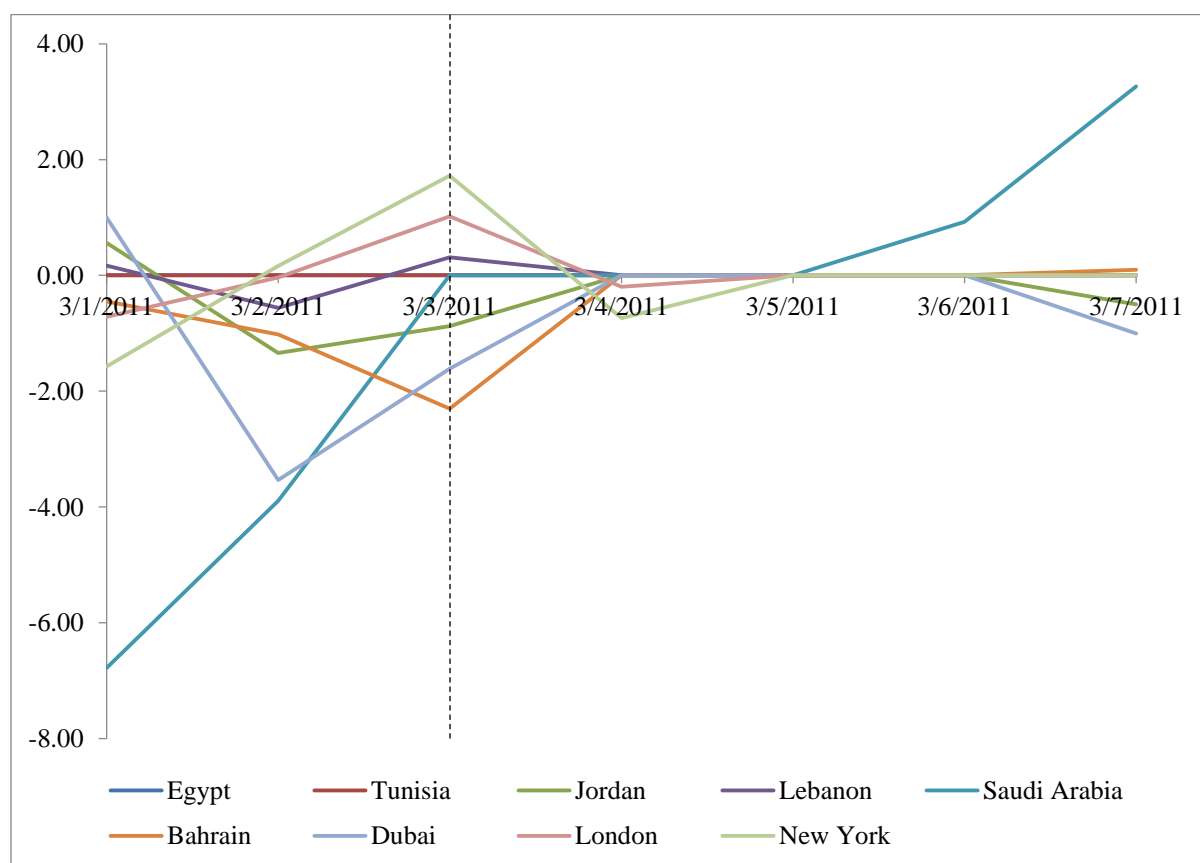


Figure 5(e). Daily Returns: 3/1/2011 – 3/7/2011. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VI (F)
Daily Returns: 10/18/2011 - 10/25/2011

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
10/18/2011	-0.78	-0.11	0.34	0.12	0.31	-0.04	-0.62	-1.00	2.04
10/19/2011	1.05	0.44	0.53	0.00	-0.71	-0.06	0.41	1.32	-1.26
10/20/2011	0.01	-0.20	0.42	-0.26	-	-0.25	0.22	-1.55	0.46
10/21/2011	-	0.81	-	-0.06	-	-	-	3.05	1.88
<i>10/22/2011</i>	-	-	-	-	-	-	-	-	-
<i>10/23/2011</i>	-	-	-	-	0.45	-	-	-	-
10/24/2011	0.36	-	-0.10	-	-0.07	-0.03	-0.32	-	-

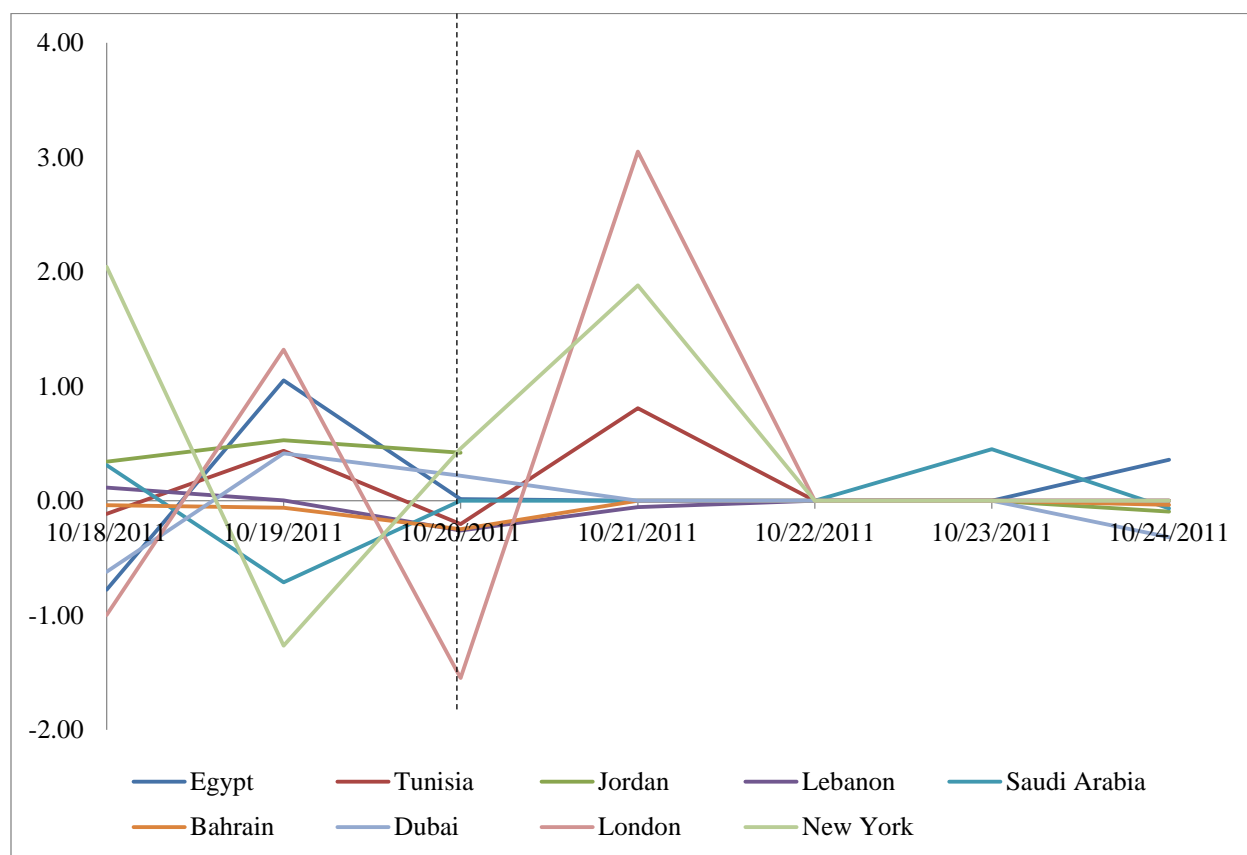


Figure 5(f). Daily Returns: 10/18/2011 – 10/25/2011. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VI (G)
Daily Returns: 11/19/2011 - 11/26/2011

This table provides daily returns of stock indices during the event period as specified above. Date(s) of actual events are marked in bold and weekends are marked in italics. “-” refers to the unavailability of a data point. Description of indices is given in the Appendix.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London	New York
<i>11/19/2011</i>	-	-	-	-	-0.34	-	-	-	-
<i>11/20/2011</i>	-	-	-	-	0.13	-	-	-	-
11/21/2011	-4.12	-	-1.24	-	-0.86	-1.26	-0.85	-	-
11/22/2011	-4.87	0.01	-0.85	-	-0.82	-	-0.30	-0.33	-0.41
11/23/2011	1.06	-1.04	1.11	-	-0.28	-0.56	-0.30	-2.11	-2.21
11/24/2011	1.63	-0.20	0.27	0.08	-	-	0.11	-0.37	-
11/25/2011	-	-0.33	-	0.01	-	-	-	0.30	-

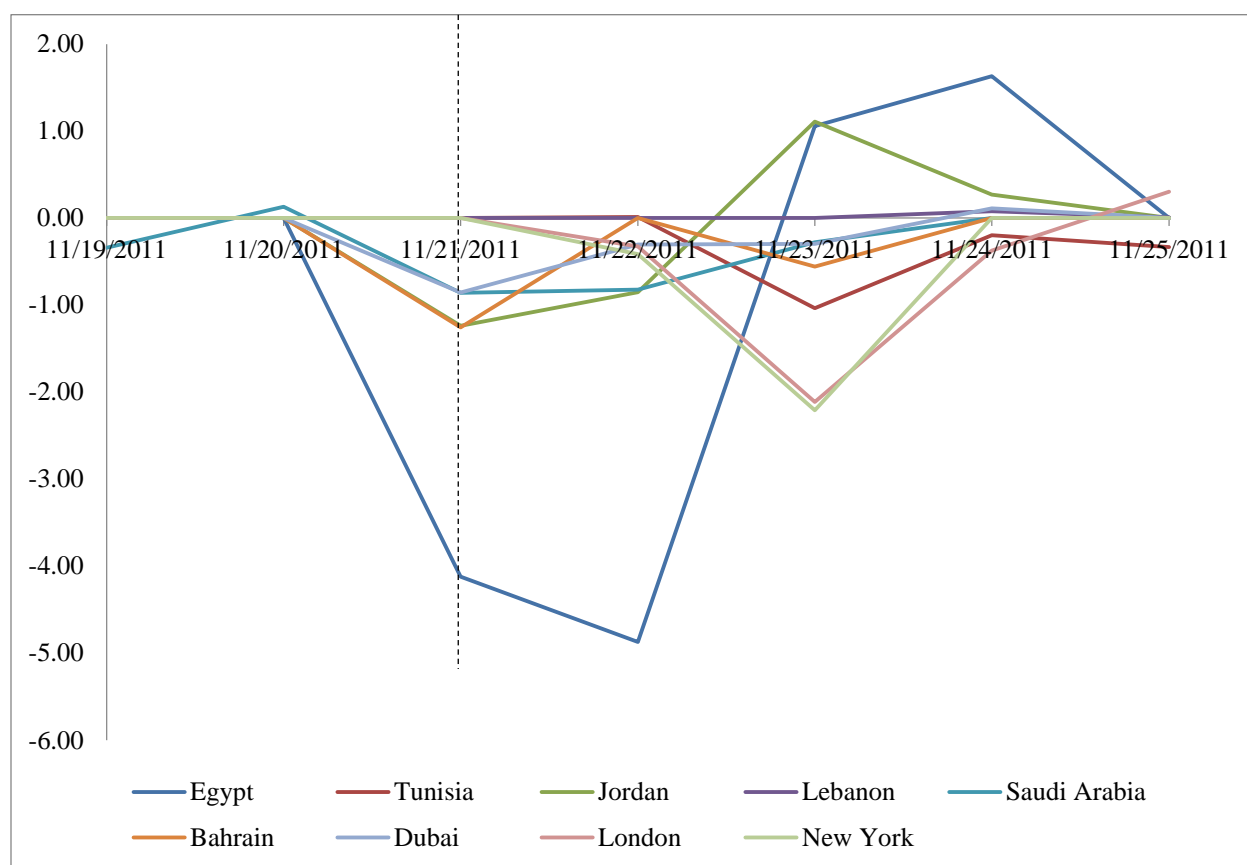


Figure 5(g). Daily Returns: 11/19/2011 – 11/26/2011. Dotted lines signify key events. Points at 0 signify unavailable data point. Data is from Bloomberg.

Table VII (A)
Abnormal Returns: 12/15/2010 - 12/21/2010

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
12/15/2010	-0.74	-0.02	-0.08	0.189	-0.34	-	-0.55	-0.84
12/16/2010	-0.77	0.044	-0.46	-	-	-	0.618	-0.41
12/17/2010	-	-	-	-	-	-	-	-0.85 **
<i>12/18/2010</i>	-	-	-	-	-	-	-	-
<i>12/19/2010</i>	-	-	-	-	-	-	-	-
12/20/2010	-	-	-	-	-	-	-	-
12/21/2010	0.26	0.18	0.245	0.097	-0.02	-0.03	-0.33	0.029

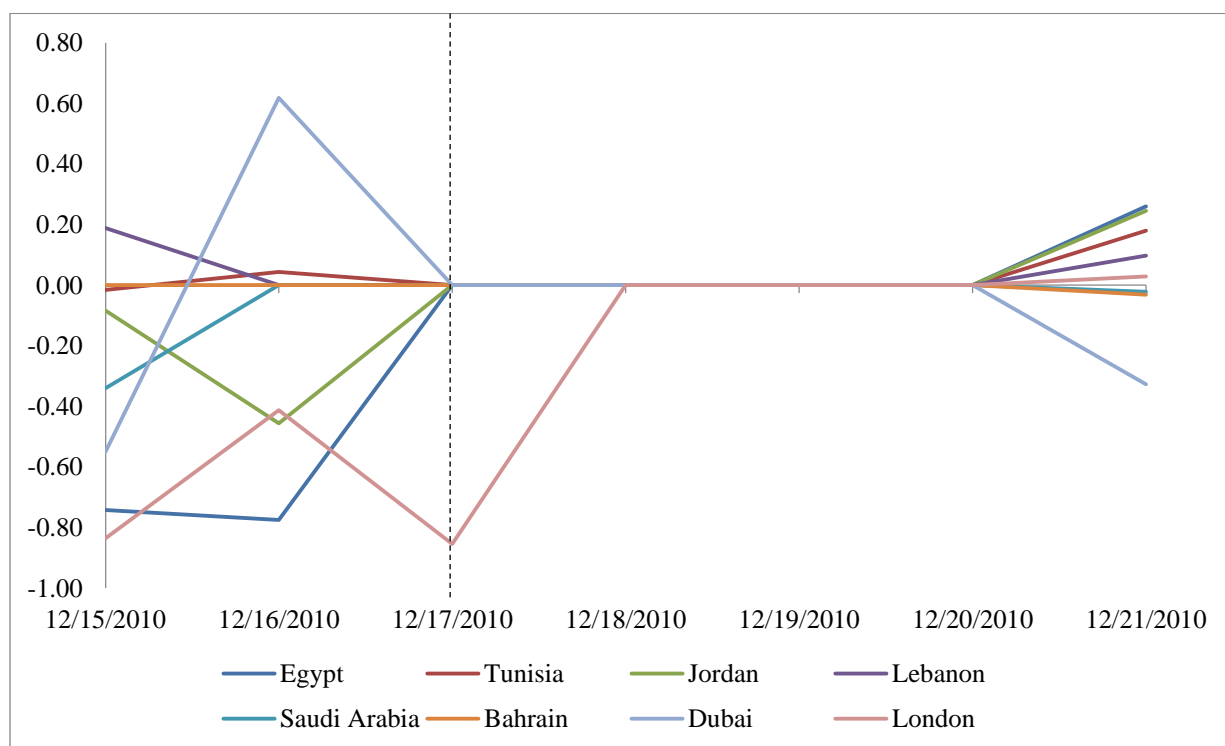


Figure 6(a). Abnormal returns: 12/15/2010 – 12/21/2010. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

Table VII (B)
Abnormal Returns: 1/12/2011 - 1/18/2011

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
1/12/2011	-0.23	-2.55 ***	-0.01	-2.97 ***	-0.07	0.444	0.023	0.779
1/13/2011	0.212	-2.47 ***	-0.45	-0.54 ***	-	0.24	-0.15	0.476 **
1/14/2011	-	0.472 ***	-	0.797 ***	-	-	-	-0.7
<i>1/15/2011</i>	-	-	-	-	-	-	-	-
<i>1/16/2011</i>	-	-	-	-	-	-	-	-
1/17/2011	-	-	-	-	-	-	-	-
1/18/2011	-	-	-	-	-	-	-	-

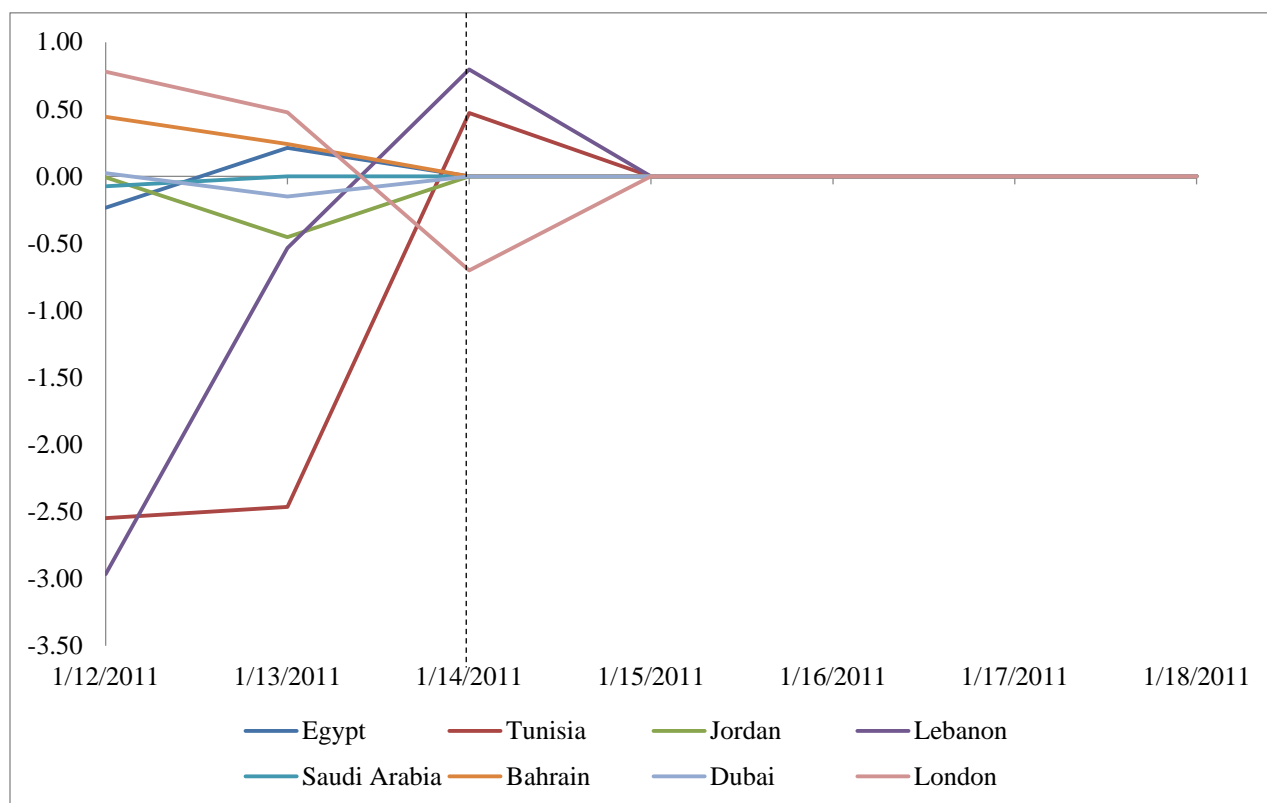


Figure 6(b). Abnormal returns: 1/12/2011 – 1/18/2011. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

Table VII (C)
Abnormal Returns: 2/9/2011 - 2/15/2011

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
2/9/2011	-	1.178	-1.02 *	-	0.044	-0.17	-0.25	-0.47
2/10/2011	-	-1.18	-0.75 **	-	-	0.017	-0.2	-0.45
2/11/2011	-	-2.01 **	-	0.036	-	-	-	-0.26 *
2/12/2011	-	-	-	-	-	-	-	-
2/13/2011	-	-	-	-	-	-	-	-
2/14/2011	-	-	-	-	-	-	-	-
2/15/2011	-	-	-	-	-0.37	n/d	0.47	0.426

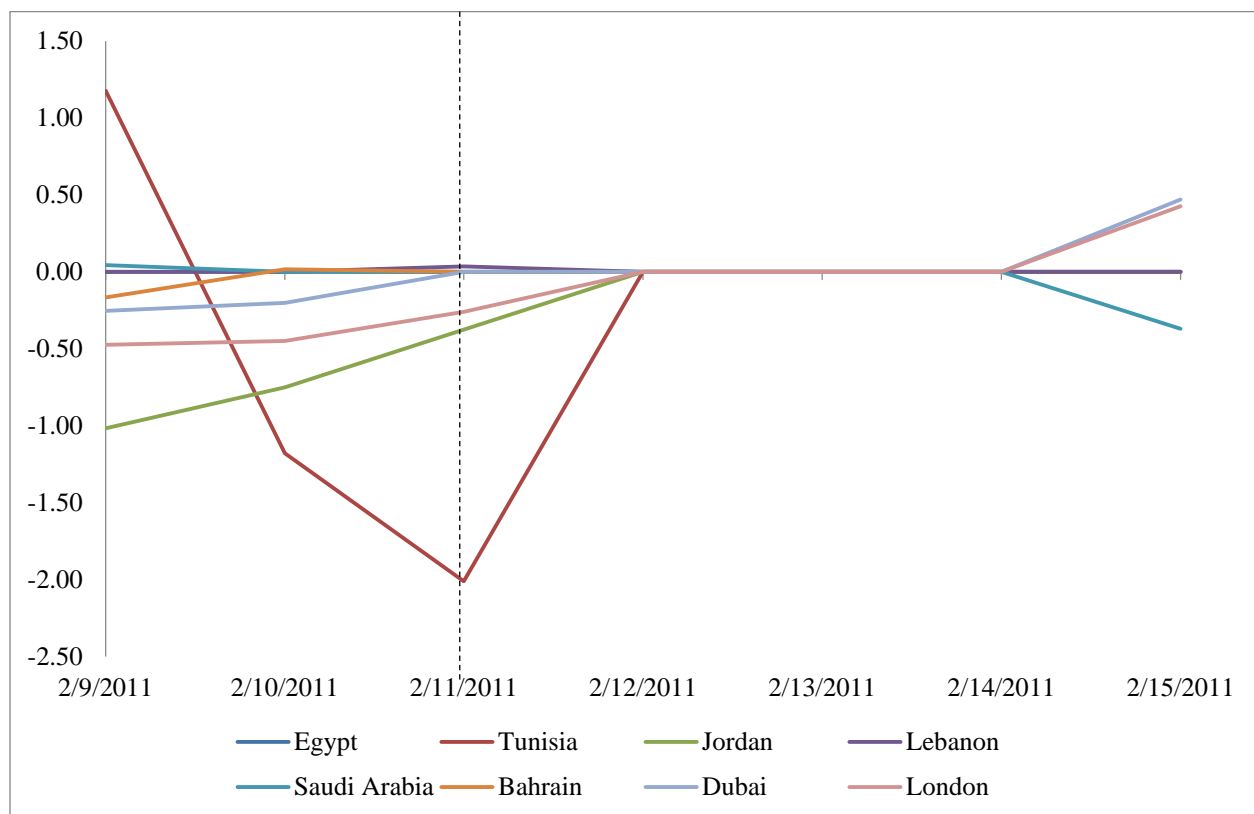


Figure 6(c). Abnormal returns: 2/9/2011 – 2/15/2011. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

Table VII (D)
Abnormal Returns: 2/25/2011 - 3/3/2011

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
2/25/2011	-	-3.02 **	-	0.137	-	-	-	0.327
2/26/2011	-	-	-	-	-	-	-	-
<i>2/27/2011</i>	-	-	-	-	-	-	-	-
2/28/2011	-	-	-	-	-	-	-	-
3/1/2011	-	-	0.71	-0.16	-6.65 ***	-0.19	1.751	0.661
3/2/2011	-	-	-1.09	-0.46	-3.69 ***	-1.04	-3.32	-0.16
3/3/2011	-	-	-0.53	0.804	-	-2.56 ***	-1.89 ***	-0.45 **

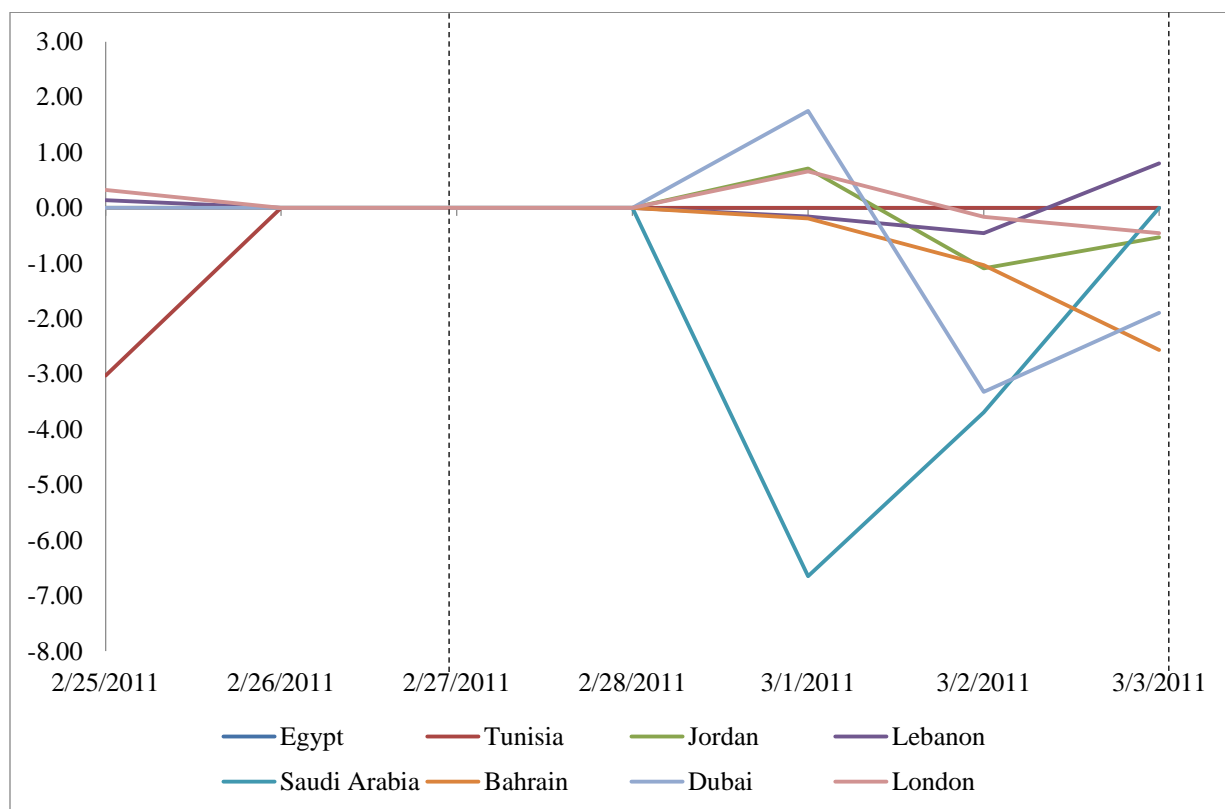


Figure 6(d). Abnormal returns: 2/25/2011 – 3/3/2011. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

Table VII (E)
Abnormal Returns: 3/1/2011 - 3/7/2011

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
3/1/2011	-	-	0.712	-0.25	-6.45 ***	-0.18	1.597	0.62
3/2/2011	-	-	-1.1	-0.37	-3.53 ***	-0.94	-3.14	-0.2
3/3/2011	-	-	-0.55	1.04	-	-2.4 ***	-1.4 *	-0.49
3/4/2011	-	-	-	-	-	-	-	0.42
3/5/2011	-	-	-	-	-	-	-	-0.02
3/6/2011	-	-	-	-	-	-	-	-0.02
3/7/2011	-	-	-	-	-	-	-	0.17

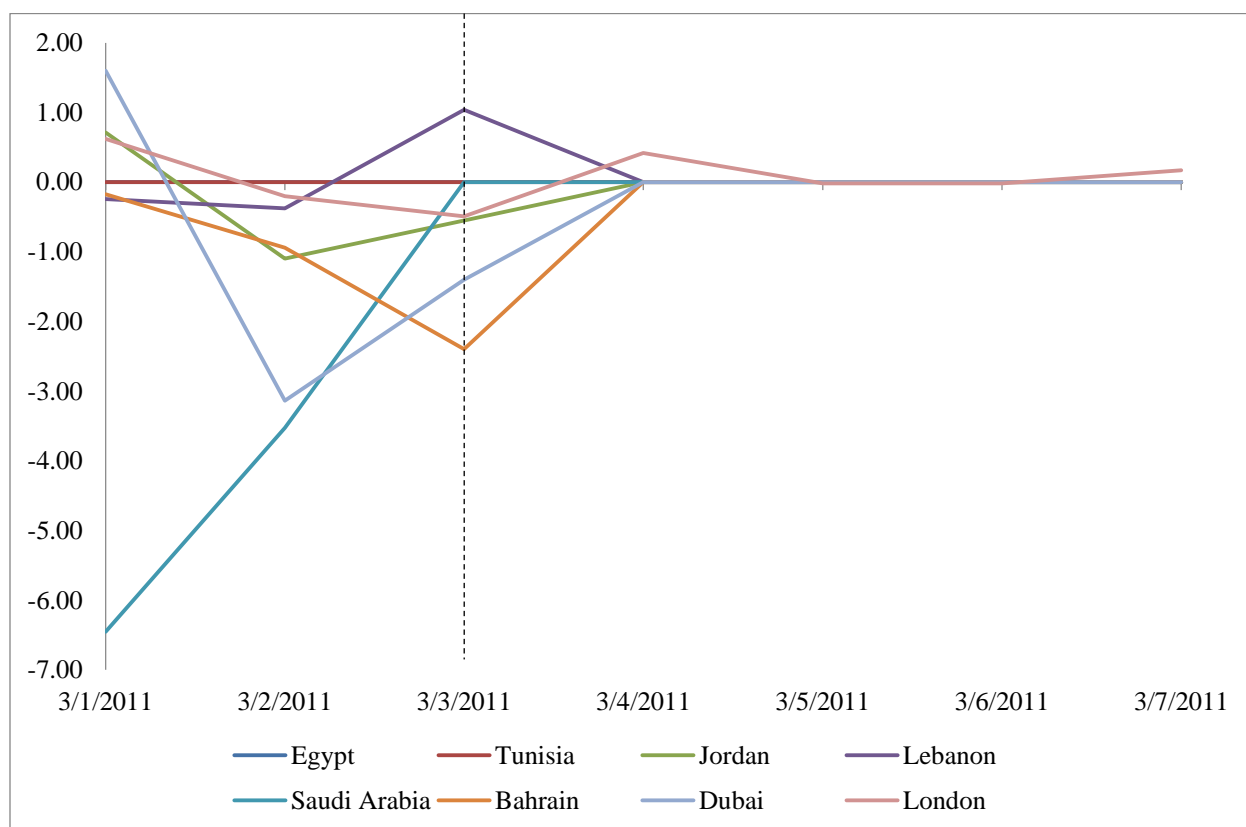


Figure 6(e). Abnormal returns: 3/1/2011 – 3/7/2011. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

Table VII (F)
Abnormal Returns: 10/18/2011 - 10/24/2011

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
10/18/2011	-0.62	-0.17	0.698	0.259	0.234	0.596	-0.16	-1.14
10/19/2011	0.952	0.469	0.307	-0.09	-0.66	-0.45	0.126	1.404
10/20/2011	0.049	-0.22	0.499	-0.23	-	-0.11	0.322	-1.58
10/21/2011	-	0.756	0.328	0.076	-	-	-	2.922
<i>10/22/2011</i>	-	-	-	-	-	-	-	-
<i>10/23/2011</i>	-	-	-	-	-	-	-	-
10/24/2011	-	-	-	-	-	-	-	-

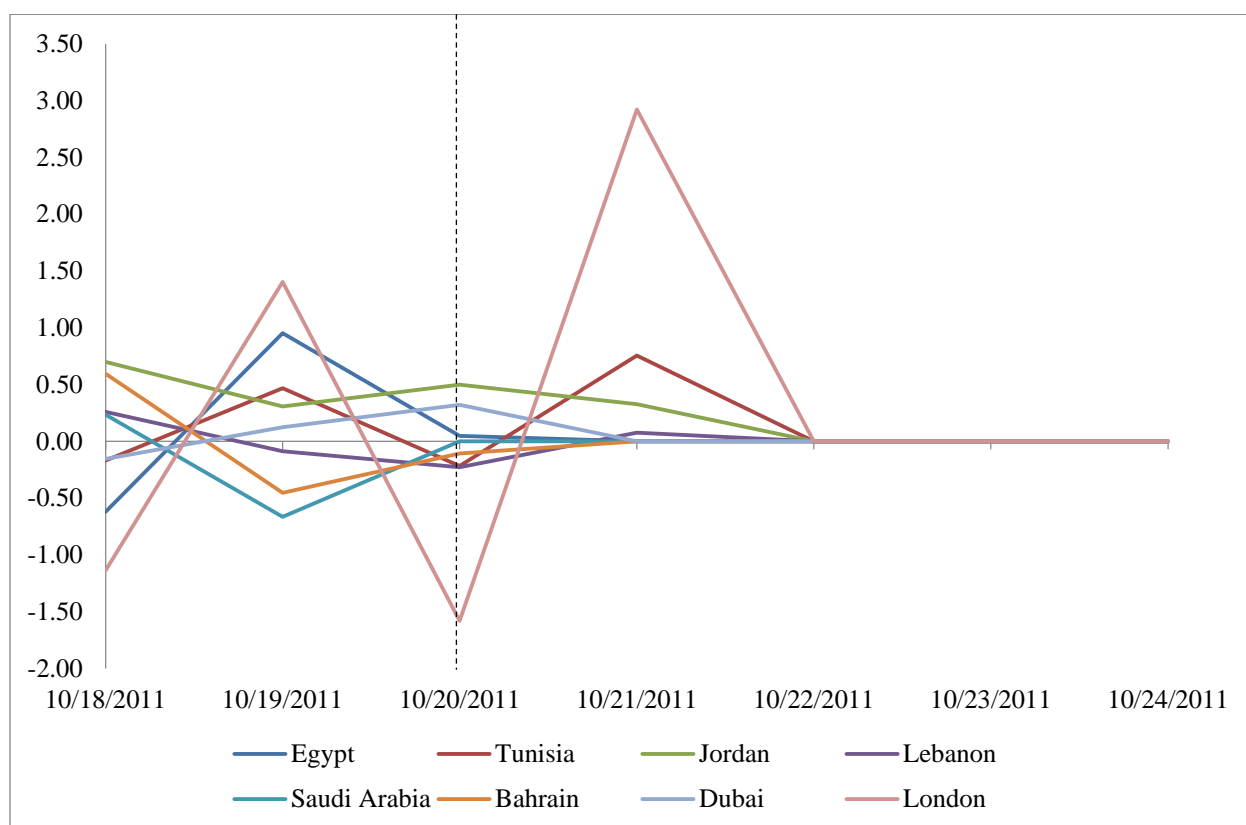


Figure 6(f). Abnormal returns: 10/18/2011 – 10/24/2011. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

Table VII (G)
Abnormal Returns: 11/19/2011 - 11/25/2011

This table presents the abnormal returns of each of the indices considered within the 7-day event period specified above. Descriptions of indices are provided in the Appendix. The date(s) of the actual events are in marked in bold and weekends are marked in italics. Abnormal returns are calculated using the OLS market model where regression coefficients are estimated from a 30-day estimation period prior to the event period. *, **, *** measure 10%, 5%, and 1% levels of statistical significance respectively. T-statistics are provided in the Appendix. “-” refers to an unavailable data point.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
<i>11/19/2011</i>	-	-	-	-	-	-	-	-
<i>11/20/2011</i>	-	-	-	-	-	-	-	-
11/21/2011	-	-	-	-	-	-	-	-
11/22/2011	-4.68 ***	0.081	-1.08	-	-0.82	-	-0.26	0.065
11/23/2011	1.431 **	-0.64	0.778	-	-0.07	-0.66	0.021	-0.33
11/24/2011	-	-	-	-	-	-	-	-
11/25/2011	-	-	-	-	-	-	-	-

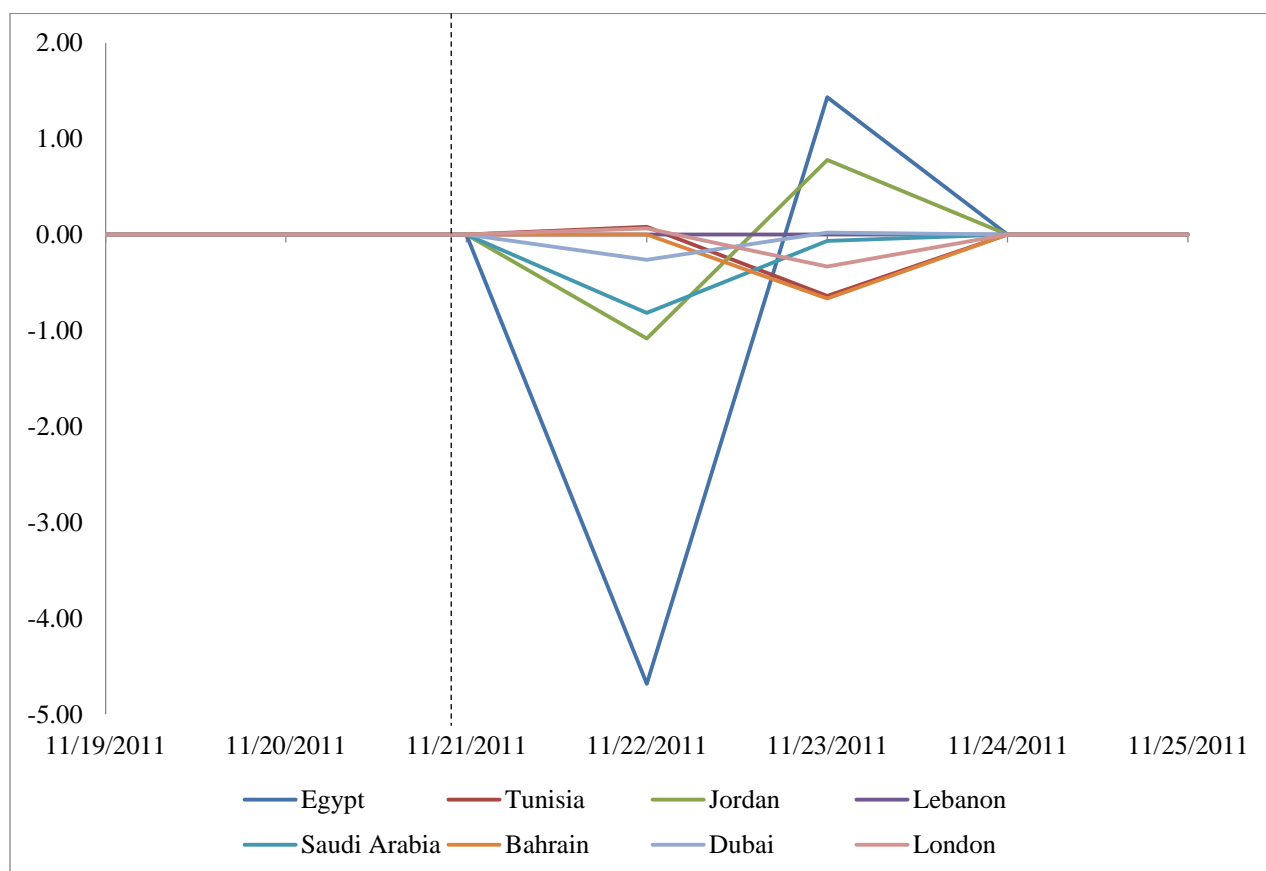


Figure 6(g). Abnormal returns: 11/19/2011 – 11/25/2011. Dotted lines signify key events. Points at 0 signify unavailable data points. Data is from Bloomberg.

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Appendix

Table A
Description of Stock Indices

This table provides a description of all stock indices used in this study. Closing day prices were obtained from the Bloomberg database for the period 12/1/2010 - 12/1/2011.

Country	Symbol	Name	Profile
Egypt	CASE:IND	EGX 30 Index	The EGX 30 Index is a free-float capitalization weighted index of the 30 most highly capitalized and liquid stocks traded on the Egyptian Exchange. EGX 30 constituents are reviewed and changed twice a year (February and August). The index was developed with a base level of 1000 as of January 1st 1998 and previously named CASE 30 Index.
Tunisia	TUSISE:IND	Tunisia Stock Exchange TUNINDEX	The Tunis Stock Exchange TUNINDEX is a capitalization weighted index containing equities from the TSE. This index is open to listed companies admitted in the capital market with minimum period of quotation of one month. The index was launched on December 31, 1997 with an initial base level of 1000. As of January 2, 2009 the index has become a free float weighted index.
Jordan	JOSMGNFF:IND	Amman Stock Exchange General Index	The ASE General Index is a free float market cap weighted index of the most highly liquid and capitalized companies traded on the First and Second markets of the Amman Stock Exchange. The base value is set to 1000 as end of year 1999. The index is maintained, calculated and disseminated by the Amman Stock Exchange.
Lebanon	BLOM:IND	BLOM Stock Exchange	The BLOM Stock Index (BSI) is the first and leading index for the stock market in Lebanon. It was established on the same day the Beirut Stock Exchange Reopened (January 22, 1996)
Saudi Arabia	SASAEIDX:IND	Tawadul All Share TASI Index	The Tadawul All Share Index (TASI) is disseminated by the Saudi Stock Market. The index was developed with a base value of 1000 in 1985 and it was restructured on 06/30/08. Volume in the index excludes 'small trades'. (Trades with value less than SAR 15000). Volume including the 'small trades' can be found in VOLTADA Index.

Table A – contd.
Description of Stock Indices

Country	Symbol	Name	Profile
Bahrain	BHSEASI:IND	Bahrain Bourse All Share Index	Bahrain Bourse All Share Index is a capitalization-weighted index of all Bahraini public shareholding companies listed on the Bahrain Stock Exchange. It was launched in 2004. It is a benchmark index consisting of all the local publicly listed companies on the BSE.
Dubai	DFMGI:IND	Dubai Financial Market General Index	Dubai Financial Market General Index is a capitalization weighted price index comprising stocks of listed companies. The base value of the index is 1000 as at January 1st 2004.
London	ASX:IND	FTSE All-Share Index	The FTSE All-Share Index is a capitalization-weighted index comprising of the FTSE 350 and the FTSE Small Cap Indices. The index was developed with a base value of 100.00 as of April 10, 1962.
New York	SPX:IND	S&P 500 Index	Standard and Poor's 500 Index is a capitalization-weighted index of 500 stocks. The index is designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries. The index was developed with a base level of 10 for the 1941- 43 base periods. See SPY US Equity for the tradable equivalent.

Table B
t-values: 12/15/2010 - 12/21/2010

This table provides t-statistics of abnormal returns relative to market (S&P 500) returns. Standard deviation of the residuals is calculated for the 30- day estimation period. Abnormal returns and cumulative abnormal returns are calculated for 7-day event windows. Critical values for a two-tailed test are 1.697 at the 10% level, 2.042 at the 5% level and 2.75 at the 1% level.

Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
12/15/2010	-0.855	-0.023	-0.105	0.237	-0.491	-	-0.646	-1.174
12/16/2010	-1.746	0.042	-0.670	-	-	-	0.081	-1.753
12/17/2010	-	-	-	-	-	-	-	-2.952
12/18/2010	-	-	-	-	-	-	-	-
12/19/2010	-	-	-	-	-	-	-	-
12/20/2010	-	-	-	-	-	-	-	-
12/21/2010	-1.395	0.437	-0.469	0.085	-0.457	-0.062	-0.177	-2.096
1/12/2011 - 1/18/2011								
Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
1/12/2011	-0.366	-2.925	-0.017	-4.271	-0.196	0.911	0.029	1.317
1/13/2011	-0.034	-5.754	-0.905	-5.042	-	1.403	-0.163	2.122
1/14/2011	-	-5.213	-	-3.895	-	-	-	0.934
1/15/2011	-	-	-	-	-	-	-	-
1/16/2011	-	-	-	-	-	-	-	-
1/17/2011	-	-	-	-	-	-	-	-
1/18/2011	-	-	-	-	-	-	-	-
2/9/2011 - 2/15/2011								
Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
2/9/2011	-	2.161	-1.991	-	0.117	-0.331	-0.328	-0.821
2/10/2011	-	-0.001	-3.460	-	-	-0.297	-0.589	-1.597
2/11/2011	-	-3.689	-	0.071	-	-	-	-2.046
2/12/2011	-	-	-	-	-	-	-	-
2/13/2011	-	-	-	-	-	-	-	-
2/14/2011	-	-	-	-	-	-	-	-
2/15/2011	-	-	-	-	-0.859	n/d	0.281	-1.309
2/25/2011 - 3/3/2011								
Date	Egypt	Tunisia	Jordan	Lebanon	Saudi Arabia	Bahrain	Dubai	London
2/25/2011	-	-2.162	-	0.124	-	-	-	0.627
2/26/2011	-	-	-	-	-	-	-	-
2/27/2011	-	-	-	-	-	-	-	-
2/28/2011	-	-	-	-	-	-	-	-
3/1/2011	-	-	0.772	-0.019	-4.562	-0.225	1.271	1.894
3/2/2011	-	-	-0.411	-0.430	-7.094	-1.436	-1.142	1.580
3/3/2011	-	-	-0.987	0.294	-	-4.431	-2.516	0.708

