Ascertaining the effects of malevolent acts in a developing market on the stock returns of firms operating in those markets

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

Experiencing malevolent acts is a common feature when conducting business in parts of the developing world, but the effects that these acts have on a firm's stock price have not received sufficient attention by the literature. Filling the gap, this thesis looks at the oil industry in Nigeria and the effects of multiple malevolent acts over a five year period (ranging from 2006 to 2010) on the stock prices of the four major international oil firms operating therein: Shell, Chevron, Exxon, and Total.

The stock price data was presented in the form of abnormal returns, the difference in stock price from the expected price. Ordinary least squares regression as well as Wilcoxian sign-rank techniques were used to test the abnormal returns data for our firms. This data was segregated by firm name as well as by event types to isolate the effects that each has on the returns of the firms under study. This thesis raises several hypotheses, such as that a negative event in general will lead to negative returns and that negative events affecting one firm will lead to positive returns for that firm's competitors. We managed to determine that the only event types that had a significant impact on any firm's returns were kidnappings and government policies (either political or economic) targeted to harm the firms.

We discovered that kidnapping events affected Shell's returns negatively, whereas they have positive impact on the returns of Chevron and Exxon. We postulate that the latter results are a reaction to the relatively strong negative effect on Shell's returns. In response to negative government actions, Shell and Total experienced positive returns , we postulate that this is due to the market's perception that these policies will lead to less supply and consequently to higher

prices for Nigerian oil. Our results indicate that violent events have no impact, at least on the four major firms, whereas kidnappings and government policies do.

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1. Introduction

The effects of malevolent acts on developed economies and on capital markets have been extensively studied; however there is a dearth of literature on the effects of malevolent acts in developing markets and their effect on developed/developing markets and economies. Past studies analyzed the impact of a war or violent conflict on a countries' economy (Anderton et al. 2001; Caplan 2002; Guidolin et al. 2005; Miguel, 2004), others delved into the effects of terrorism on capital markets (Chen et al., 2004; Chesney et al., 2010). These studies have primarily been very general in scope and usually concentrated on developed countries. Meanwhile, some researchers have concentrated their studies on the markets of developing/emerging countries (Meznar et al., 1998) as well as on specific industries within those countries (Guidolin et al. 2007; Le Billon, 2000).

As the above sample can attest studies on the effects of malevolent acts and wars on developed markets are extensive, fewer studies exist on the effects of these acts on developing markets and their effect on firms in developed markets whom have operations within the developing market. Saez et al. (2007) is one study that looks at how shocks (caused by malevolent as well as non-malevolent acts) in developing markets are transmitted to developed markets. Guidolin (2007) is another study that went into further detail, focusing on the effect of events (specifically, a single event, the death of Angolan rebel leader, Jonas Savimbi) on diamond firms operating in Angola.

This thesis aims to discern how extensively a malevolent act can affect the stock price of a firm that is operating within a developing market. For simplicity we focus on only one industry within that market and the largest publicly traded firms operating therein. We chose Nigeria's oil

industry as our example and proceeded to collect data about numerous directed malevolent acts during a 5 year period ranging from 2006 to 2010. We then studied the effects of these acts on the four largest oil companies operating in Nigeria. Nigeria has been a leader in oil exports for the past few decades; the country has the tenth largest reserves of oil in the world, accounting for 3% of world supply. As of 2009, oil revenues are the primary source of income for the Nigerian state, representing 95% of Nigerian export income. The entirety of this oil originates in the Niger Delta, where Multinational Oil Companies (MNOCs) such as Shell, Chevron, Exxon Mobil and Total SA have significant production operations. Beginning in the mid 90's oil production has decreased significantly as a result of supply shocks caused by malevolent acts, such as armed conflict in and around the oil fields and sabotage aimed at oil extraction facilities, refineries and the oil pipeline network. It's estimated that the country lost $33 billion in oil revenues in 2008 due to malevolent acts of sabotage, terrorism and kidnapping (Davies, 2009).

Current scholars feel that the cause of this malevolence can be attributed to an increase in armed groups of disenfranchised residents of the Niger Delta (Ojakorotu et al., 2010) as well as rent seeking Nigerian politicians who attempt to influence the area by arming and sponsoring instigators of violence (Akinbobola, 2010). Some researchers, such as Ojakorotu and Gilbert point to violent behavior by the Nigerian state in the past two decades against the civilian population of the Niger Delta, to date thousands of civilians (including women and children) have been killed by the Nigerian military in the region. Others (Epelle, 2010), also point to increased environmental degradation caused by the MNOCs operating in the region, as well as their subcontractors and the negative effects this has on the secondary agricultural market of the region. This coupled with the influx of arms and the poor economic state of much of the civilian population has led to the "democratization of the means of violence" in the region (Ojakorotu et

al., 2010). The primary antagonist in the region has been credibly identified as the Movement for the Emancipation of the Niger Delta, MEND, is a well-organized and armed group of militants (consisting of militiamen and former soldiers) that operate throughout the Nigerian oil region targeting the MNOCs located therein.

This thesis attempts to quantify the affects that these supply shocks caused by violent events, such as attacks on refineries or pipeline sabotage, have on the stock price of a select group of MNOCs operating within Nigeria. This thesis also hopes to capture non-supply related effects on these MNOC's returns; this includes kidnappings and non-specific general events, usually political, directed at the oil industry. For comparison, events with positive impacts are also studied. We first hypothesize that as the MNOC's primary business rests in oil, 'negative events', those that decrease any MNOC's ability to produce oil, shall be perceived negatively by the markets and lead to lower returns for that MNOC. By isolating events into event categories we can study the effects of each event type on the MNOCs as a whole as well on each individual MNOC, we expect results similar to those obtained by the researchers we referenced earlier, such as Guidolin et al. (2007) and Chen et al.(2004). We expect that, in general, negative events such as malevolent acts will lead to a drop in returns for the MNOCs. However, the results of our regression and sign rank tests are unexpected and interesting; specifically, in regards to the effects of kidnap events on each MNOC's returns. In this case, Shell, experiences negative returns directly after a kidnap event, whereas all the other MNOCs experience positive returns.

We also propose that a negative event affecting one MNOC will be perceived positively by the markets in terms of that MNOC's competitors operating within Nigeria, as those competitors now have a temporarily larger share of the market. We found that this was not the

case, violent events, those that damage production capacity, led to positive returns for some firms. We postulate that the reason behind this paradoxical result can be attributed to basic psychology, in that investors feel that because one facility was attacked, the other facilities are safe for now; and to a lesser degree to economics, in that a drop in supply capacity will lead to a higher equilibrium price if demand does not change, this in turn leads to higher returns for a firm whose primary source of income is the sale of oil.

Finally, we propose that a negative event or series of such events will lead to positive returns for the MNOC's competitors whom do not operate within Nigeria. Our rationale is similar to that mentioned earlier in that a negatively perceived event on one MNOC, or group thereof, will raise perception of that or those firm's competitors.

We accomplish these studies by normalizing raw stock prices into abnormal returns so that only day to day abnormal returns for each MNOC's stock price are presented. This effectively makes the study only about the daily changes in each MNOC's stock price and eliminates the difference in relative value of each MNOC's stock price. Theoretically, a negative event on day 0 (the day of the event occurrence) should lead to a negative/positive abnormal return the following day. The abnormal returns are then subjected to parametric testing via ordinary least squares regression as well as non-parametric Wilcoxian sign rank tests.

This thesis aims to increase the current body of knowledge about the effects of events in developing markets and their transmission to developed markets. We focus on Nigeria's oil industry because no other researcher has looked at it in the way that we plan to. We hope that our findings will help to lead to an answer regarding why violence and strife have persisted in Nigeria's oil region for decades (an occurrence that is rare in other global oil regions). We

determine to what extent a malevolent act or event aimed at a firm (or group of firms) in a developing market affects the stock price of that firm (or group of firms) in a developed market. For simplicity, the study is focused on a single industry in one country only. From prior studies conducted on similar topics, we expect that targeted malevolent acts will lead to lower returns for the target. We also expect higher returns for the target's competitors.

We used the case of the oil industry in Nigeria, focusing on the four largest oil firms (with a presence in developed markets) operating therein. Our results were not as expected; in fact we found that some firms obtained higher returns directly after a malevolent event. We postulate that the fluctuations caused by these events affect the market for oil in such a way as to create higher returns for all involved. This leads us to believe that there is a perverse incentive on the part of the beneficiary firms to allow malevolent acts to occur.

2. Literature Review

Scholarly work has been undertaken by other researchers on topics similar to this thesis. Cilliers et al. (2000) as well as Le Billon (2000) studied the oil and diamonds industries of Angola; however their work was limited in that it did not look at empirics. Saez et al. (2007) looked at how extensively emerging market shocks are felt in developed markets. Corrado (2010) provided a basis for the event study methods conducted in this thesis, whilst Gardeazabal's (2010) work provided a focus for the methodology. Meanwhile Caplan (2002), Chen et al. (2004), Guidolin et al. (2005) and Chesney et al. (2010) provided extensive study on the effects of violence on economies and markets. Finally Guidolin et al. (2007), researched the effects of events on a specific industry in a specific developed market, in terms of event study methods and thesis formulation their work was the most informative. The key results found by other studies on the effects of violence, terrorism and/or conflict on asset markets can be found in Table 1.

The most pertinent background for examining the Nigerian example is a study of the Angolan oil and diamond industries. These studies concentrated on the role of the oil and diamond industries within the Angolan economy and their effect on the continuation of the decade's long civil war in that country (Cilliers et al., 2000; Le Billon, 2000). These studies did not focus on the effects of events within the market under study or on other markets.

In 2007 a Working Paper Series article issued by the European Central Bank, studied the effects of emerging market events on the price movement of stock markets (Saez et al., 2007). The authors compiled data on hundreds of events in Latin America, Emerging Europe and Emerging Asia, and organized these events into economic and political events, as well as into positive and negative events. They then applied ordinary least squares regression to study the

effects of these events on the stock markets of the developed world as well as on that of the emerging world. They found that on average a negative shock event in an emerging market will produce a 0.3% change in the stock markets of the developed world a day after the event, a value that can rise to 0.5% when accumulated over 5 days. Saez, Fratzscher and Thimann effectively proved that it is possible to study the effects of an event in an emerging market on a stock value in the developed world, and that results can be achieved from such an endeavor. Their data collection, compilation and categorization methods are replicated in this thesis.

The initial source of research methodology for this thesis was Corrado (2010), who in his paper presented event study methods although they are limited to situations comprising of consistent stock price movements for common events in developed markets. Corrado provides an econometric framework for studying events, beginning with linear regressions of abnormal returns and as to current event study literature by providing methods for determining the level of event induced volatility. These methods conclude with a complex methodology for studying the effects of events. Unfortunately, as Corrado admits in this paper, these methods are not suitable for small populations or where the sample constitutes the entire population; not to mention that throughout his paper Corrado refers to commonly occurring events and does not delve into the relatively rare and irregular events that under study in this thesis.

For a treatise that focuses on conflict, we turned to Gardeazabal (2010). His work provides the reader with various methods for measuring the costs of conflict, although we are most interested in the section on event studies. Gardeazabal provides a broad range of methods for studying the effects of violence on firms and primarily focuses on the economic cost of conflict. Most of the methods presented are basic and are tailored to the unit of study (the firm,

sector or country) to the unit of output (aggregate output, stock price) and to the data availability (cross section, time series, panel). The paper presents cost accounting methods, inference methods using cross sectional data as well as time series data. The paper also presents panel data methods, natural experiments and comparative case study methods. The section that relates to this thesis is the one on event studies. Gardeazabal presents a simple method for determining abnormal returns from stock prices and creating cumulative abnormal returns from this. Simple regression analysis is then conducted to determine the effect of each variable on the abnormal returns. Most importantly for this thesis, Gardeazabal specifically focuses on conflict events, referencing conflict events in developing countries, and leading us to the next set of authors and papers.

Research exists on the effects of conflict on national economies (Caplan, 2002), on the effects of terrorism on capital markets (Chen at al., 2004; Chesney et al., 2005), on the effects of violence and conflict on asset markets (Guidolin et al., 2005) and on the effects of conflict on a specific industry, such as diamonds, in a frontier market, Angola (Guidolin et al., 2007).

Caplan examines the output of a range of countries during wartime. Caplan separates the effect of foreign and domestic wars on these countries and using pooled time series, finds that whilst domestic wars substantially reduce real output, foreign wars slightly increase real output. Caplan's data is primarily macroeconomic and the results deal with such macroeconomic topics as aggregate output. Whilst Caplan did inform this thesis, ultimately we are looking at a wholly different category of data and results.

Chen and Siems analyze the effects of 14 terrorist and military attacks, some of which are targeted against the US, from 1915 to 2001, on capital markets in the US. Using basic event

study methodology as referenced in Gardeazabal (2010), they measure abnormal returns relative to the prior month as well as cumulative abnormal returns for the next two weeks. Chen and Siems determine that contemporary markets recover faster from these acts than those in the past did. The authors utilize basic abnormal returns and cumulative abnormal returns methodology, as mentioned in Gardeazabal's paper earlier, to compile their data. They then utilize ordinary least squares regressions to determine their results. Their work is a simple study in compiling stock market price data into abnormal returns and using basic parametric methods to determine the effect of their events data on the stock markets under study. This thesis borrows this framework from them. Chesney and Reshetar, employ three methods to study the effects of 77 terrorist events in 25 countries over 11 years on multiple markets and industries in the developed world. They use event studies, non-parametric methodology and GARCH-Extreme Value Theory (EVT) methods. Chesney et al. find that non-parametric methodology is the simplest and best way to determine the effects of violent events on world markets. Using this methodology they find that US markets are least affected by terrorist and violent events, they also find that oil stocks can experience mixed reactions to these events depending on how tight the supply of worldwide oil is, and on whether the events lead to a decrease in transport use (such as a decrease in passenger flights after 9/11). Prior to studying the effects of events on the Angolan diamond industry (Guidolin et al., 2007); Guidolin and La Ferrara studied the effects of violent conflict (internal and international) on worldwide markets. In their 2005 paper they studied the effects of over 100 violent events, taken over a span of 30 years, on various stock markets. Using basic event study methods, they determined the abnormal returns and cumulative abnormal returns that each event had on the markets under study. Their findings indicated that US markets reacted positively to conflict, especially international conflict.

In 2007, Guidolin and La Ferrara focused on the effects of events on the returns of diamond mining firms in Angola. They used similar event study methods to Chen and Siems, i.e., finding cumulative abnormal returns over an event window. However, Guidolin and La Ferrara also applied hypothesis testing in order to determine the significance of their abnormal returns results. Finally they employed a control portfolio of diamond miners that were not active in Angola to isolate only those events that affected diamond miners in Angola. Guidolin and Ferrara found that the decades long civil war in Angola caused positive returns for diamond miners operating in that country, they reason that this was due to conflict-generated entry barriers, as well as increased bargaining power for miners in dealing with the Angolan government.

Guidolin and La Ferrara's work utilized similar methods to Chen and Siems, however they reason that due to the relatively small sample size as well as due to the focus of their research on one industry in one country there will be a tendency for fat tails leading to incorrect or vague results when using parametric testing. They applied non-parametric Wilcoxian sign rank tests, in order to account for these possible fat tails. They also introduced a control group of firms that operated outside of the country of study to gauge if a difference existed between the returns of the two groups of firms as a result of events within the country under study.

Other than Guidolin and La Ferrara's work, no research appears clearly evident on the effects of conflict and malevolent acts on the equity values of specific firms operating in emerging and frontier markets. However, it is possible to use the aforementioned mentioned research as a baseline for developing data collection and dissemination methods as well as determining results and the significance of those results. Saez, Fratzscher and Thimann (2007),

provide insights on the collection and categorization of events data in order to facilitate effective modeling and testing. Corrado (2011) provides a thorough selection of modeling techniques but his most important purpose is to lead us to Gardeazabal. Gardeazabal (2010) affirms the use of abnormal returns and cumulative abnormal returns when performing event studies using stock price data. Chen and Siems (2004), apply similar methods to those expounded upon by Gardeazabal to determine the effect of violent events on stock prices. Finally, Guidolin and La Ferrara apply the same methods to a specific emerging market for a specific industry, they also introduce non-parametric testing via Wilcoxian sign rank tests to account for the fat tails that can be generated In the data as a consequence of focusing so strongly on one industry and emerging market country.

Using this collected research we are able to formulate a data creation, compilation and testing methodology in order to develop an analysis for the effects of locally originating malevolent acts on MNOCs operating in Nigeria.

Table 1.Recent work on the effects of malevolent acts on markets and a general abstract of their results

Paper Title	Author	Key results as they pertain to this work
The economics effects of violent conflict: evidence from asset market reactions (2005)	M. Guidolin and E. La Ferrara	1) US markets respond positively to conflict events, 2) International conflicts have a stronger effect on stock prices than internal conflicts.
Diamonds are Forever, Wars are Not. Is Conflict Bad for Private Firms? (2007)	M. Guidolin and E. La Ferrara	1) Diamond firms with Angolan operations experienced above average returns from violence and civil war, 2) The cessation of hostilities in Angola led to negative abnormal returns for diamond firms located in Angola, and positive returns for those with no operations in the country.
The Impact of Terrorism on Financial Markets: An Empirical Study (2010)	M. Chesney and G. Reshetar	1) US stock markets exhibit the least reaction to malevolent acts of any worldwide stock market, 2) Oil and gas stocks experience both negative and positive price moves as a result of malevolent acts, Negative • Malevolent acts lead to a decrease in transport use and a subsequent decline in oil and gas demand Positive • Malevolent acts that affect supply will cause positive price moves if oil supply is already tight
The effects of terrorism on global capital markets (2004)	A.H. Chen and T.F. Siems	1) US markets experience negative returns as a result of worldwide malevolent acts, albeit of a lower magnitude than most other stock markets, 2) US markets recover faster from negative price moves caused by malevolent acts than most other stock markets.
The Transmission of Emerging Market Shocks to Global Equity Markets (2007)	L.C. Saez, M. Fratzscher and C. Thimann	1) Emerging market shocks affect world markets by 0.3% (on average) on the day of the event 2) US markets are least affected by shocks in emerging markets

3. Hypothesis Development

In this thesis we raise three hypotheses regarding the direct and indirect effects of negative as well as positive events on firms operating within a country. We assume that a firm's returns are the best indicator of the extent of the effect that an event has on said firm. Returns fluctuate based on the firm's income, and income derives from the sale of a product or service. Thus when a firm experiences a loss in its ability to create the product or service it will experience lower income and consequently lower returns. In terms of oil firms, oil is the product from which income is derived, an event (such as sabotage or the kidnap of crucial employees) that lowers the target firm's capability to produce oil will thus lead to lower income and lower returns. These effects may be generalized over a group of target firms or localized to individual ones; similarly some events may produce more pronounced effects.

In terms of the Nigerian oil region, target means all MNOCs operating therein. The region is isolated to a very small area when compared to other oil regions, meaning that MNOCs operate in close proximity to each other. Our belief is that this agglomeration can suggest that events affecting one MNOC will also impact all nearby MNOCs especially those caused by MEND. MEND's operations are extensive enough that it could conceivably affect every MNOC in the region, thus a negative event caused by MEND against one MNOC may cause the others to believe that they will be targeted next. It could also suggest that the oil price for Nigerian oil is determined almost exclusively by events within this relatively tiny region, thus a negative event could affect the price of Nigerian oil which in turn could affect the returns of all other MNOCs. Specifically we state our first hypothesis.

Hypothesis #1 [DIRECT EFFECTS]:

An event wherein a physically aggressive or hostile action is taken against a target (whether it's to property, operations or personnel) will have a negative effect on the returns of the target.

Two studies discussed in the literature review support the hypothesis that negative events lead to negative returns. The work by Chen et al. (2004), wherein a clear negative abnormal return was observed on stock markets after a terrorist event, served as a good general overview in order to frame the hypothesis. Guidolin et al. (2007), observed the negative effects of violent events on the returns of diamond firms that specifically operate in the diamond industry within Angola. We are attempting a similar study here. Based on the work of Chen et al. (2004) and Guidolin et al (2007), we expect that our testing will yield the result that negative events in Nigeria lead to negative abnormal returns for the MNOCs in our study. Herein we state our second hypothesis.

Hypothesis #2 [DIRECT EFFECTS: POSITIVE VS. NEGATIVE]:

A. Negative events targeting a specific firm will cause that firm's returns to fall;

B. Positive events targeting a specific firm will cause that firm's returns to rise.

As an appendix to that hypothesis, we expect some firms' returns to respond more strongly to the different event types. This hypothesis is an offshoot of the first hypothesis discussed above. Specifically we state that if a negative event targets an individual firm, that target will experience a drop in stock price for reasons mentioned above. Conversely if the same firm experiences a positive event, its returns will increase.

Guidolin et al. (2007) observed that some negative events did in fact lead to positive returns for the affected firm's competitors or for firms not operating within that market. Based on

the reasons mentioned for the first hypothesis and on the theory of efficient markets we expect that an event of a negative nature affecting a specific MNOC will lead to negative returns for said MNOC operating in the region and positive returns for the other MNOCs operating within the region. This leads to our third hypothesis.

Hypothesis #3 [CROSS EFFECTS – INTERNAL AND EXTERNAL]:

A. We hypothesize that a negative event affecting one firm may lead to positive returns for that firm's competitors.

B. Negative events within the country of study will lead to positive returns for competing firms whom do not have interests in the country

For part B, we simply compared the returns of all the MNOCs in Nigeria during a negative event with that of BP, the only MNOC not operating in Nigeria. Based on Guidolin et al. (2007), we expect BP to have positive returns when negative events in Nigeria occur to MNOCs operating in that country.

4. Data

We focus our attention on Nigerian events only as the primary purpose of this thesis is to determine the effects of events in the developing market and not in the developed or home market of the target firm. Historical stock price data was collected for each firm under study, as well as for the NYSE, between January 1, 2006, and December 31, 2010, from Yahoo Finance. An extensive review of news sources was conducted for this time period and incidents involving malevolent acts against the four major MNOCs operating in Nigeria (Shell, Chevron, Exxon Mobil and Total SA) were isolated. For the purposes of this thesis, malevolent acts are limited to the following:

- Oil pipeline attacks,
- Oil facility attacks and,
- Kidnapping of oil company personnel or their relatives.

These malevolent acts were chosen because they are the ones that strike right at the heart of each MNOC's operations, and consequently have an effect at the source. Pipeline and facility attacks prevent the production of oil, and effectively diminish the affected MNOC's capability to generate revenue. Kidnappings of employees diminish the available manpower and have an effect on employee morale. Kidnappings also affect an MNOC's bottom line as a cash outlay is required in order to ransom these hostages. A cash outlay is also necessary in order to repair damaged operations equipment; however, the MNOC has the option of not doing so, whereas the MNOC must pay a ransom, or risk facing harsh public outcry. We isolated malevolent acts that

were specifically directed at a single MNOC, in order to determine the effects of events on each MNOC and determine if any variation exists between the effects on each.

Countrywide events, those that could have an impact on all oil companies in Nigeria, were also collected. These included threats issued by the Movement for the Emancipation of the Niger Delta (MEND) against MNOCs operating in Nigeria, general undirected violence within the oil region, as well as political actions and decrees that may be perceived as being to the detriment of the MNOCs. Examples of the latter include, tariffs against foreign MNOCs or the administration of new laws and procedures designed to favor local firms over the MNOCs.

Finally, data was collected for positive events; this was collected via the same method as those for negative events. These events include the release of hostages employed by a specific MNOC as well as truces negotiated with MEND. Both are positive for obvious reasons.

Altogether, 57 events were found during the range of the survey. The amount for each type can be found in Table 2, a description of each event type can be found in Table 3, and a summary of each variable studied can be found in Table 4 (please note that we tested for coefficients only and as such had no independent variables in our data), the reference material for each event can be found in the appendices. Figures graphing the timeline of each event in every year from 2006 to 2010 can be found in Figures 1 through 5. Violent events are represented by a V indicator, kidnap by K, positive by P, miscellaneous negative by M and miscellaneous neutral by N.

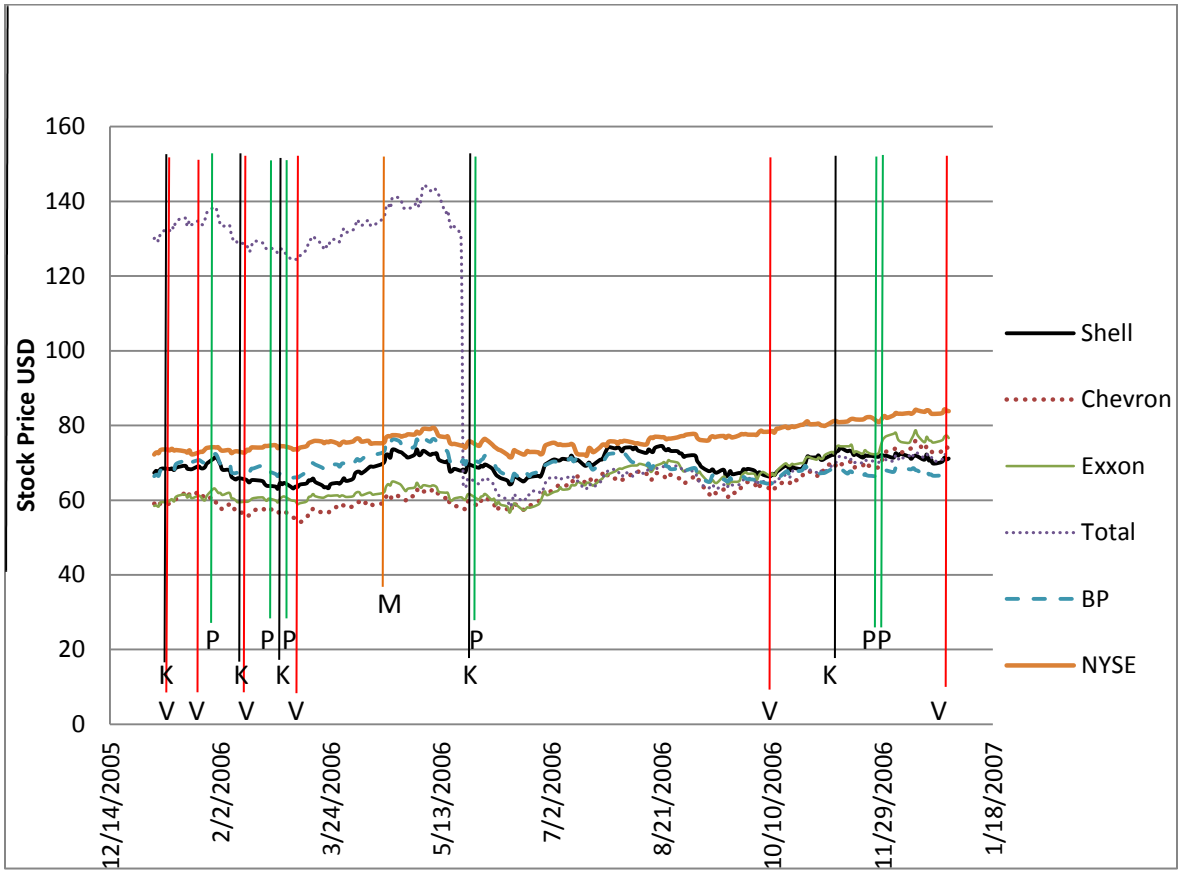

Figure 1. Timeline of events compared to returns for the NYSE and our MNOCs - 2006

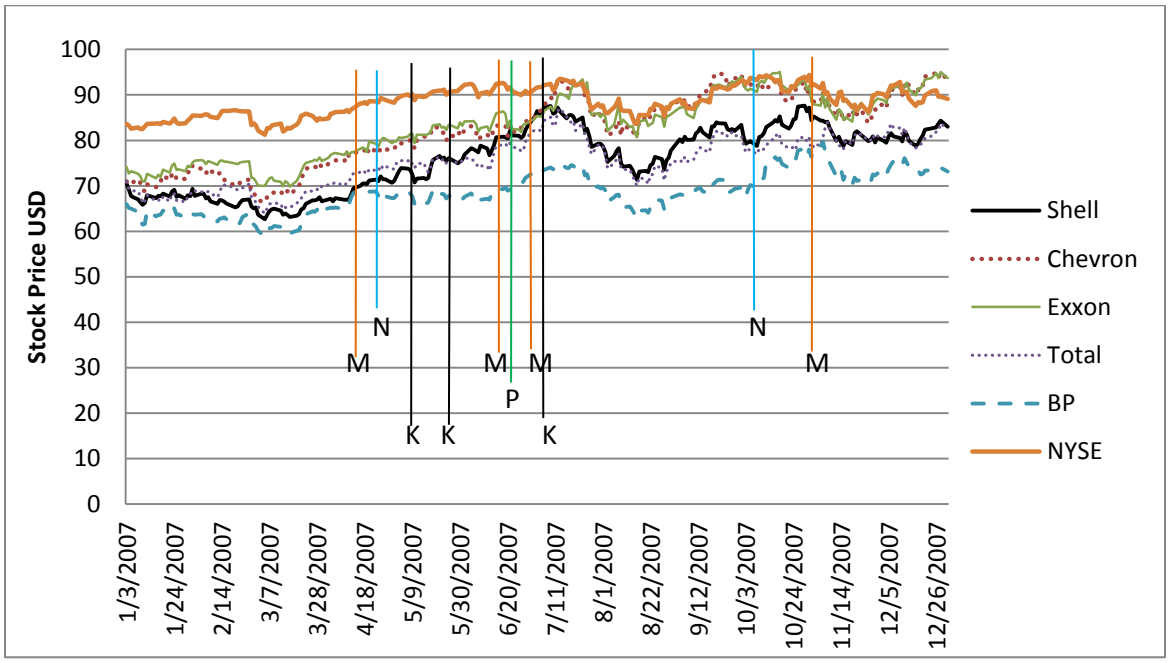

Figure 2. Timeline of events compared to returns for the NYSE and our MNOCs - 2007

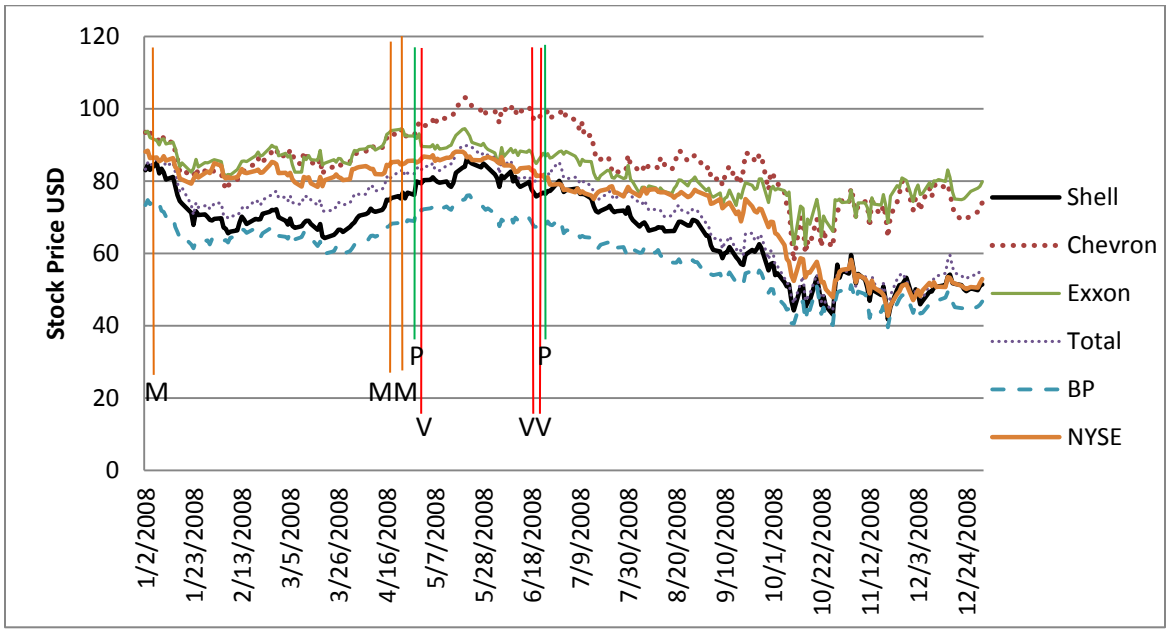

Figure 3. Timeline of events compared to returns for the NYSE and our MNOCs – 2008

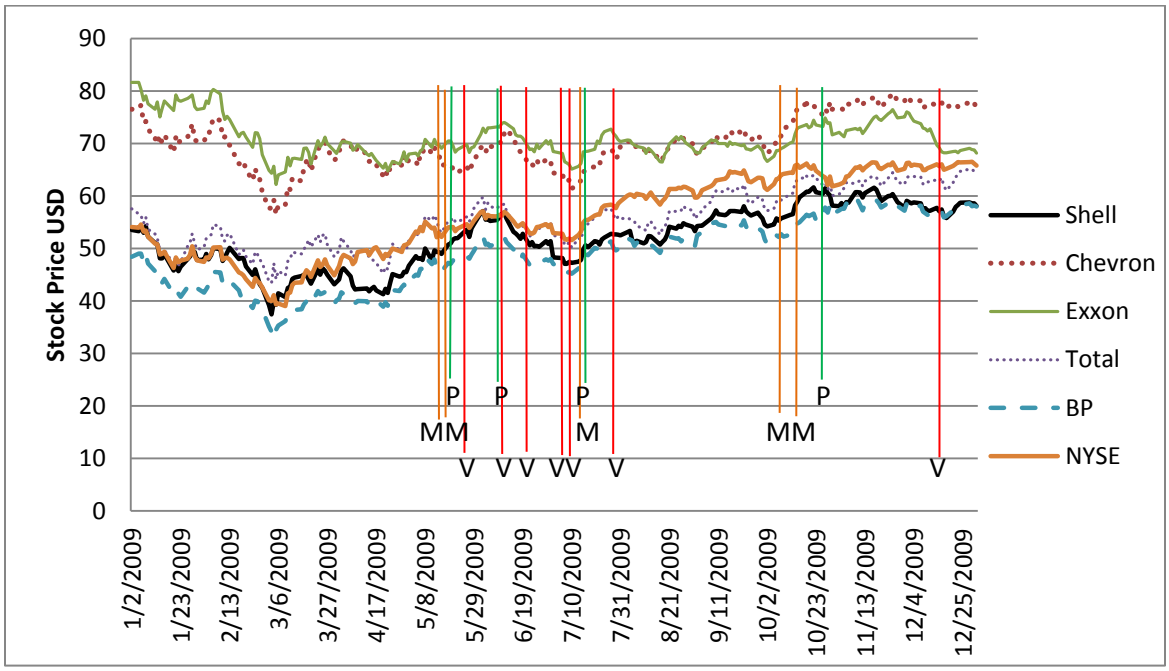

Figure 4. Timeline of events compared to returns for the NYSE and our MNOCs - 2009

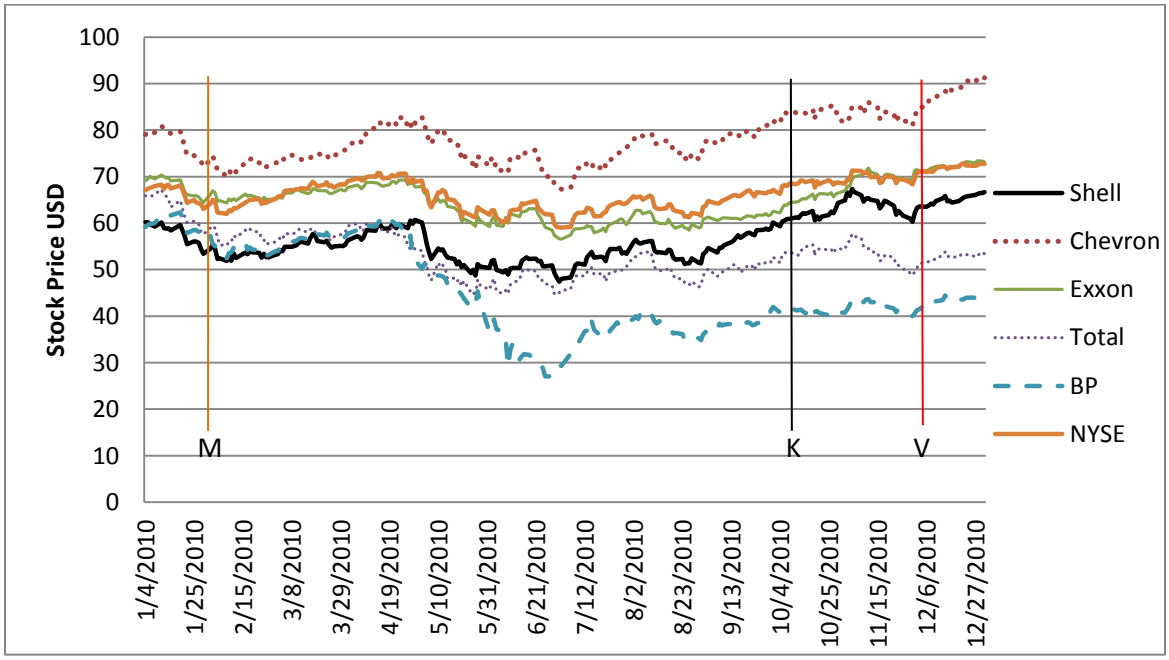

Figure 5. Timeline of events compared to returns for the NYSE and our MNOCs - 2010

Table 2.Breakdown of the amount of each type of event

Event type	**Violent**	**Kidnap**	**Misc. negative**	**Positive**	**Misc. neutral**	**Negative Shell only**	**Negative Chevron only**	**Positive Shell only**
# of events	17	10	16	13	2	17	6	4

Table 3.Description of each event type

Event type	**Description**
Violent	Events that are of a malicious nature and have caused damage to a specific company's operations
Kidnap	Events wherein workers from a specific oil company have been kidnapped
Miscellaneous negative	Countrywide economic/political events of a negative aspect in regards to the MNOCs under study and/or the Nigerian oil industry
Positive	Events with positive connotations, hostage release, sabotage repairs, truces with MEND
Miscellaneous neutral	Countrywide economic/political events with no discernible link to the MNOCs under study and/or the Nigerian oil industry
Negative - Shell only	Violent and kidnap events directed at Shell only
Negative - Chevron only	Violent and kidnap events directed at Chevron only
Positive - Shell only	Positive events relating to Shell only

Table 4.Summary of each dependent variable

Variable	Mean	Std. Dev.	Std. Err.
car5	0.0012	0.0322	0.0017
car10	0.0008	0.0507	0.0027
ar0	0.0001	0.0126	0.0006
ar1	0.0010	0.0155	0.0008
ar2	0.0025	0.0127	0.0006

Note: Testing for coefficients occurred only, no independent variables were used.

The collection of the dates of events necessitated thorough research through worldwide news sources, such as Reuters and CNN, as well local and industry specific sources, such as the Nigerian national newspapers and oil and gas industry magazines and reports. Using the criteria outlined above possible events were screened and segregated into their various types based on keywords within each report/data source. The date of each eligible event was not based on the date's actual occurrence but on the date that the event was recorded and information about it was published. In cases where multiple sources recorded the event, the source whose date was earliest was used. This was done In order to obtain dates that were as close as possible to the actual date that the markets would receive the information. Due to Nigeria's remote location and the especially remote locations of oil operations within that country news of an event may not reach the markets for a few days. Unfortunately, most news sources were local or industry specific and thus we cannot gauge the exact date that event information was available to the worldwide market instead of just select local or industry groups. The delay in some abnormal returns for some of our results (especially for kidnappings) may be a result of this information delay.

Stock price data was collected from publicly available sources for each of the four major MNOCs for the day of the event as well as for the 40 days prior to and 10 days after the event. Finally, the stock price of BP was used to provide a control oil company with no financial position within Nigeria, again using the same parameters as for those MNOC's operating within Nigeria.

All stock price data was collected in US currency and sourced from the NYSE to eliminate anomalies due to currency fluctuations during the 50 day stock price sampling period for each event. When the sampling period for an event included a weekend or a day wherein no

trading occurred on US stock exchanges, stock price data was recorded for the next trading day i.e. if the event occurred on a Saturday, Monday's stock price was recorded as the actual day of the event. This was done because typically news of a market event would not be actionable by traders until the next trading day. By the same reasoning, all reasonable attempts were taken to determine at what time news of each event was released in order to record stock price on the day of release (if released before close of trading) and on the next day (if released after close of trading).

5. Methodology

Using event study methodology as recommended by Gardeazabal (2010), wherein he reviews various methods for the measurement of the economic costs of conflict. Event study methodology was found to be the best method with which to analyze the data in this thesis, as this is typically used to measure the effect on stock prices of individual discrete events. Other methods that were considered but ultimately not used were time series, which is best utilized to assess changes in overall macroeconomic data as a result of conflict, and panel data methods, which are best used together with time series data on a panel of firms or countries and over very long time spans.

From Gardeazabal (2010), the basic calculation of abnormal returns was computed starting at time t=0 (i.e., the event date), here the return on the day was compared to the average returns over a 31 day long control period ranging from 40 days prior to the event up to 10 days prior to the event, this is computed as the following:

$$AR_t = R_t - \frac{1}{T}\sum_{t=-10}^{t=-40} R_t$$

Cumulative abnormal returns were also calculated for the first and second weeks after the event in order to determine the long term effect of the event on the stock price.

$$CAR_x = \Pi_{0 \le t \le x}(1 + AR_{t+1}) - 1$$

t = amount of time w.r.t. the event occurrence

AR = abnormal return

R = return

T = total amount of days = 31

x = maximum amount of time w.r.t. the event occurrence

Chen and Siems (2004) used this methodology to analyze the effects on the Dow Jones Industrials index of 14 separate worldwide events involving violence or military actions. Guidolin and La Ferrara (2007) narrowed their focus and applied these calculations to the effect of a single event, rebel leader Jonas Savimbi's death, in a single country, Angola on the stock prices of diamond firms operating within the country.

Calculations were produced for the abnormal returns of each MNOC, the spot price of Nigerian Bonny Light and BP (the control company). The abnormal return for each was calculated for the day of the event, as well for the 2 days following the event day, the cumulative abnormal returns for the 5 days and 10 days following the event day were also calculated. This data was isolated using dummy variables into the various event types.

We tested our hypotheses by assuming that the data was parametric and proceeded to determine if there was any significance in the results when conducting ordinary least squares regressions on a target's abnormal returns with respect to certain event types (or combinations thereof). For thoroughness, we assumed that the data was non-parametric and conducted Wilcoxian sign rank tests under the same input characteristics as for parametric testing. These tests are a simple yet comprehensive way to test our hypothesis, as they incorporate the event and subject pools, yet are also detailed enough to determine the effects of specific events on specific targets

We included non-parametric testing in our analysis because our initial parametric tests yielded fat tails. Corrado (2010) suggests that parametric tests may not provide accurate results, as the assumptions that the stock price data is parametric may not hold true. Corrado concedes that research has shown that stock price data from the NYSE is parametric (which is where data for this thesis was sourced). Guidolin et al. (2007) argue that when dealing with small cross sections, fat tails are more likely to occur, yielding inaccurate results when using parametric testing, they add that recent econometric literature notes the huge heteroskedasticity that occurs in high frequency (daily) data. They also note that clustering of events (more than one stock is affected by an event) can create cross-correlation and heteroskedastic effects when more than one stock is being investigated for a period longer than a day, effectively violating the assumptions of classical parametric tests. Heeding Guidolin's advice, we conducted non-parametric testing, applying Wilcoxian Signed Rank Tests as recommended, to account for differences in means between the various stocks.

6. Results

All of the MNOCs under study derive only a small percentage of their revenue from Nigeria, on the order of 3% to 5% (according to the 2010 financial statements of Shell, Exxon, Chevron and Total SA), thus if any abnormal returns are being generated by events in Nigeria, their significance is obscured by these stock's strong correlation with the NYSE. However, it also means that if a result with some significance were found (that could not be attributed to the NYSE), then it has a definite link to a Nigerian event. These are even more significant than the results suggest as they have managed to emerge even under the intense correlation of their sources to the NYSE.

Testing Hypothesis 1

The first hypothesis postulated that an event wherein a physically aggressive or hostile action is taken against any MNOC target in Nigeria, whether it be to property, operations or personnel, will have a negative effect on the returns of all firms with a substantial stake in that industry in the country. Our testing identified that this is not the case for all firms, returns for some firms responded more acutely to events in general, while some firms' returns were more affected by certain events than others'. Some firm's returns were even positively impacted by 'negative' events. Essentially we could not find results of any significance when combining violent, kidnap and miscellaneous negative event types together into a general negative event condition.

To gain more insight we focused our testing on each negative event type, violent, kidnap and miscellaneous negative and analyzed the effect of each event type on the MNOCs. This allowed us to test the specific effect that each event type had on the MNOCs in our study. We

found significant results for miscellaneous negative as well as for kidnap events, using parametric testing, see Table 5.

We found very little evidence regarding the lack of significant results for violent events; we propose three arguments that could explain this situation:

- The results are obscured by each MNOC's strong correlation to the NYSE, the returns correlate roughly 100 to 200 times stronger than a typical significant correlation obtained during hypothesis testing,
- The market does not take violent events into account, investors simply ignore news of violent events, violence has become viewed as a cost of doing business in Nigeria for the past two decades or more,
- Market perception may also be that since MEND has never attacked two facilities simultaneously (at least not between 2006 and 2010), once an attack occurs against one facility the others are safe for the time-being
- The supply shocks caused by violent events lead to price increases in Nigerian oil leading to increased revenues (and returns) for the MNOCs, as per basic economic theory, if supply decreases and demand remains static, equilibrium price will increase. (Please note that we profer this argument tentatively as nothing prevents the consumer from sourcing oil from other international suppliers)

When isolating for kidnap events, we found results of significance with respect to Shell. These are supported by the fact that kidnap events are a relatively new occurrence for Shell and that the firm has recently begun to lower the exposure of its employees to kidnapping, suggesting

that there is a definite negative impact on Shell from kidnap events. Other results for kidnap events show evidence that negative returns for Shell lead to positive returns for Shell's competitors in Nigeria, Chevron, Exxon and Total, this cross-effect is discussed in the section for Hypothesis #1, although it relates to hypothesis #3 as the kidnap event data set features many Shell kidnap events.

Our results for the effect of miscellaneous negative events on returns appear to support our conclusion that MNOCs may actually earn positive returns as a result of supply shocks due to an increase in the market price for Nigerian oil (caused by a decrease in supply). When the government introduces measures that will effectively lower or constrain supply, and effectively increase the market price for Nigerian Bonny Light, all of our MNOCs experience significant positive returns.

To gain further insight into the effects of the different negative events we next study each event type in isolation.

Violent events only

The results we discovered for the effects of violent events were severely limited, with only Chevron, and to a lesser extent Total, exhibiting outcomes of any significance. Regression testing revealed that violent events had a positive effect on the mid-term returns of Chevron, 0.011335, significant at 90%, see Table 5.

Wilcoxian sign rank testing confirmed that Chevron's returns are significantly different from zero and positive a day after a violent event occurs, 1.811, significant at 90%, as well as two days after a violent event occurs, 2.193, significant at 95%, see Table 6.

We have a few theories regarding this lack of significant results, any single theory or a combination thereof may be the cause. First the strong correlation that the MNOC stocks have to the NYSE could obscure any results that ordinarily would be significant. Meaning that market forces or events that affected the NYSE may have occurred during the time period during which some of our violent events occurred, effectively causing our MNOC's returns to react to those events and not to violent events in Nigeria.

Secondly, perhaps violent events against a MNOCs operation in Nigeria are not perceived by the market as significant in the grand scheme of things, leading investors to disregard this information and to consequently place less value on its significance, leading to smaller abnormal returns. Alternatively, investors may feel that because one facility was attacked, the others are safe for the time-being as MEND has a limited range of operations and manpower. This has some credence as MEND has never struck multiple facilities simultaneously during the five year range for which data was collected for this thesis.

Finally, when any oil producer's production capacity is lowered, supply obviously decreases and thus according to equilibrium theory, price increases assuming demand remains constant. Nigeria's oil region is tiny compared to that of other oil regions and it produces only one type of oil, Nigerian Bonny Light. The country's oil supply is very tight and isolated from other regions, meaning that the occurrence of a supply shock, such as one caused by a violent event that disrupts oil output capacity, will lead to an absolute drop in the supply of Nigerian Bonny Light. This oil is almost exclusively sold in the US market thus any price effects as a result of supply shocks are focused on the US. This means that negative results could be

obscured by the positive effects of increased market prices (and revenue) for Nigerian oil. This is the least probable cause as Bonny Light comprises a comparatively small amount of the world oil supply, and consumers have other worldwide supply options.

The results show that there is no evidence to suggest that the hypothesis is supported at least in terms of violent events, in fact, the opposite is possibly true. If we follow the thread of our final theory mentioned above, Chevron and Total's returns may simply be more strongly correlated to the price movements of Nigerian Bonny Light than the other MNOCs. This theory could account for the fact that violent events have been affecting the Nigerian operations of the MNOCs under study for over a decade prior to our first data point, yet little has changed in the way these firms have conducted business in Nigeria, that is until a recent increase in the number of kidnappings has forced some MNOCs to change course.

Kidnap events only

When agglomerating the MNOCs under study, regression testing revealed that kidnap events had a significant negative effect on the returns of all the MNOCs operating in Nigeria. Further regression testing indicated a more complex result. Having found no results of significance when grouping all the MNOCs operating in Nigeria, we decided to attempt grouping triplets and pairs of MNOCs to determine if perhaps a single MNOC or two may be disproportionately affecting our outcome.

We did not find results of any significance when isolating for three MNOCs, however when isolating for pairs of MNOCs, it was revealed that some MNOC combinations exhibited significant abnormal returns. For example, the long term effects of all kidnap events on Shell and Total's abnormal returns is decidedly negative, -0.01842 at the 95% significance level. Whereas

the mid-term effects of all kidnap events on Chevron and Total's abnormal returns is positive, 0.009341, at the 90% significance level. In general, results with the highest significance were determined two days after the kidnap event occurred, with an average result of 0.006 and a standard error 0.002. The most significant results, at the 99% significance level, occurred when isolating for Exxon and Total, occurring two days after the event takes place, 0.006921; as well as when isolating for Exxon and Chevron, again two days after the event, 0.010533, see Table 5.

We did isolate for the effects of kidnap events on a single MNOC, however a discussion of that analysis is not germane to hypothesis #1. Isolating the effects of kidnap events on each MNOC technically applies to hypothesis #3, especially since the majority of the kidnap events in our data set are actually targeted at Shell. For continuity, we have decided to include the results and discussion under this subsection and not under' Testing hypothesis #3'. When isolating for kidnap event conditions we noticed that Shell experienced negative returns and that Shell's competitors, Chevron and Exxon, exhibited positive returns. Shell's results were only significant in the long term and were decidedly negative, -0.01842, significant at 90%. Whereas, Chevron's and Exxon's results were both strongly positive and significant two days after the event took place, 0.010749 (significant at 95%), and 0.010317 (significant at 99%), respectively. Refer to Table 5 for a results summary.

Non-parametric testing using Wilcoxian sign rank testing revealed that the abnormal returns of all the MNOC's were significantly different from zero and positive, both one and two days after a kidnap event, z=1.774, significant at 90% and z=3.307, significant at 95%, respectively. Refer to Table 6 below.

The same test found that Shell's abnormal returns were negatively different from zero in the long term, although at 88% significance. Whereas Chevron's returns were significantly different from zero, two days after a kidnap event, z=2.193, significant at 95%, confirming our parametric test results.

As the effects of kidnap events were primarily visible two days after such an event occurred, we postulate that this is caused by a delay in the news of the event reaching markets. Typically, a kidnap event is not registered until the kidnappers ask for a ransom; even then, knowledge of the event is not published until later for fear of antagonizing the kidnappers. Results showing abnormal returns two days after a kidnap event occurs seem reasonable in this case. The disparity between the effect on Shell's returns and that of Chevron could be explained if more kidnappings were directed at Shell employees or if Chevron responded more swiftly than Shell to the kidnappings of its employees. Certainly, the presence of several high exposure kidnappings related to Shell in the dataset could account for the negative results seen, such as the kidnapping of the toddler daughter of a Shell employee on July 5th, 2007. Shell's restructuring of business operations during the past 5 years may also confirm our results; the company has outsourced a large portion of its work to local firms and smaller operators, thus lowering the amount of Shell employees in the country. Shell has rarely outsourced or decreased operations significantly in Nigeria during the two decades that it experienced violent events (Omeje, 2006).

That Chevron, Exxon and Total experience positive returns as a result of kidnap events is less easy to explain. We postulate that as these companies are in direct competition with Shell, and kidnappings of Shell employees are perceived as being especially negative by the markets, any negative effect on Shell would cause its competitors' returns to increase.

Again, our results are mixed; we can conclusively say that there is evidence that our hypothesis is correct at least in terms of the effects of kidnap events on Shell's returns. The opposite is true for kidnap events for Chevron, Exxon and Total, whose returns appear to increase when kidnap events occur. The relatively high proportion of kidnap events studied, wherein Shell employees were the target, supports our conclusion that kidnap events lead to negative returns for the affected MNOC as well as supporting another hypothesis we made, that negative returns for one MNOC lead to positive returns for that MNOCs competitors.

These results also lead us to conclude that unlike violent events which affect the entire market for Nigerian oil, kidnap events affect individual MNOCs.

Miscellaneous negative events only

Corollary to the surprisingly positive results noticed for kidnap events, miscellaneous negative events yielded positive abnormal returns for all MNOCs operating in Nigeria. These events included measures by the Nigerian government to restrict the oil operations of foreign MNOCs in Nigeria as well as measures to grant competitive advantages to local firms over the much larger MNOCs. Our reasoning is that these events are negative because they restrict our MNOC's operations and ability to produce oil and consequently revenue. Parametric testing, via ordinary least squares regression, revealed that significant results didn't manifest until two days

after the event. And then was only visible for Shell and Total's returns. See Table 5 for a full results summary.

Non-parametric testing, using Wilcoxian sign rank testing, confirmed these results, it was observed that the abnormal returns of all MNOCs operating in Nigeria differed significantly from zero and were positive. Results a day after the event were significant at the 95% level, z=2.299, and those two days after the event were significant at 99%, z=2.848, see Table 6.

This paradoxical outcome could be explained by two factors; first, markets interpret the MNOC's oil operations in Nigeria negatively, thus an event that would lead to a perceived withdrawal/diminishment of an MNOC's operations from/in Nigeria could lead to positive returns. The markets may view a pull-out from Nigeria as a signal that the MNOC will concentrate on more profitable ventures and reap larger profits in the future. Conversely, markets may interpret that these seemingly negative political events will forcibly lower a MNOC's exposure to risks in Nigeria, thus decreasing operational volatility and increasing returns. Alternatively, the markets may perceive that local firms will operate less efficiently than our MNOCs, leading to less output and less supply to the market, causing higher prices for Nigerian Bonny Light and consequently higher returns for our MNOCs (per our discussion in an earlier section).

Positive events only

Testing was conducted on returns during positive events, such as the release of hostages, or truces with MEND. No significant results were found at all, using neither parametric regression testing nor non-parametric sign rank testing.

This either suggests that the markets do not respond to positive events or that extraneous impacts on the NYSE obscured any results. We suspect the former, as our dataset showed isolated individual cases of positive abnormal returns for a MNOC immediately after the hostage release of its employees; refer to Appendix A for a description of each event and the abnormal returns associated with each one.

Testing Hypothesis 2

The second hypothesis is that negative events affecting a firm will cause that firm's returns to fall, and vice versa. We also expect some firms' returns to respond more strongly to the different event types, i.e., Violence, kidnappings or positive events. Results obtained by testing the hypothesis #1 illustrated the fact that negative events do have some impact on the returns of the MNOCs under study, with restrictions. However, events directed specifically at an MNOC, such as event types "Negative Shell only" and "Negative Chevron only", do not provide significant results for this hypothesis we isolated only those events that affected specific MNOC's and compared that to the returns of those MNOC's. We could only isolate events in this way for two MNOCs, Shell and Chevron, and consequently only conducted testing on those firms.

Our findings did not identify any significant link between a negative event targeted at a firm and that firm's returns when assuming that the data is parametric and thus using ordinary least squares regression. We reason that this may be due to the opposite effects each event type has on returns, for example, violent events engendered positive returns (per hypothesis #1's results) and kidnap events engendered negative returns (for Shell). When combined, these opposing individual results could have caused the regression to be completely inaccurate.

Testing Hypothesis 3

The third hypothesis that this thesis makes is that a negative event affecting a single target firm may lead to positive returns for that firm's competitors and that negative events within the country will lead to positive returns for MNOCs whom do not have interests in the country. Using parametric testing, absolutely no significant results were found to confirm this hypothesis when the event condition included every negative event affecting Shell or Chevron. This does not mean that the hypothesis is incorrect; it is possible that if there is an effect its value is tiny compared to the scale and scope of each firm. The source for this hypothesis, Guidolin's (2007) results, were based on firms with a larger portion of revenue coming from Angola and with less diversity of income sources than the MNOCs under study in this thesis. A significant result appears when using Wilcoxian sign rank tests; here Exxon's returns have a strong positive correlation and display significant results, at 95%, in response to negative Shell events. See Table 6.

When testing the second part of this hypothesis we concentrated on BP's return's data only. Ordinary least squares regression testing shows very weak significance; a few results reach 80% significance, but most hover in the 40% to 60% range. When isolating for each event type, there is a mild positive returns response to violent events and a mild negative returns response to kidnap events, assuming the data is parametric. Wilcoxian sign rank testing identifies a much stronger link, significance values for returns for BP when tested against violent events are 94%, with $z = 1.690$ with less significant values for kidnap events, 86% significance and $z = -1.5$, see Table 6.

It should be noted that we did find proof to support this hypothesis, albeit via testing hypothesis #1. When isolating for kidnap event conditions we noticed that Shell experienced negative returns and that Shell's competitors, Chevron and Exxon, exhibited positive returns, refer to Table 6 for full results. A more thorough discussion of these results can be found under the kidnap events subsection of 'Testing hypothesis #1' discussed earlier.

Table 5.Results of parametric OLS regression testing

Dependant	Conditions	Firms	Coefficient	Standard	# of	R^2
AR1	Miscellaneous negative	All MNOCs operating in	0.00671*	0.00288	44	0.00001
AR1	Kidnap events	All MNOCs operating in	-0.00486 +	0.00249	40	0.00001
CAR5	Violent events	Chevron	0.01134 +	0.00591	19	0.00001
AR0	Kidnap events	Chevron and Total	0.00380 +	0.00205	20	0.00001
AR2	Kidnap events	Shell and Chevron	0.00638 *	0.00249	20	0.00001
AR2	Kidnap events	Shell and Exxon	0.00616 *	0.00221	20	0.00001
AR2	Kidnap events	Exxon and Total	0.00692 **	0.00227	20	0.00001
AR2	Kidnap events	Chevron and Total	0.00714 *	0.00255	20	0.00001
AR2	Kidnap events	Chevron and Exxon	0.01053 **	0.00235	20	0.00001
CAR10	Kidnap events	Shell and Total	-0.01842 *	0.00743	20	0.00001
AR2	Kidnap events	Chevron	0.01075 *	0.00377	10	0.00001
AR2	Kidnap events	Exxon	0.01032 **	0.00300	10	0.00001
CAR10	Kidnap events	Shell	-0.01842 +	0.00990	10	0.00001
AR2	Miscellaneous negative	Shell	0.00891 *	0.00352	11	0.00001
AR2	Miscellaneous negative	Total	0.00750 *	0.00338	11	0.00001

Note: ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$

Table 6.Results of non-parametric Wilcoxian sign rank testing

Hypothesis test	Z - value	# of observations	Adjusted variance
Hypothesis 1			
Are the abnormal returns for Chevron significantly different from 0, 1 day after a violent event?	1.811 +	19	617.50
Are the abnormal returns for Chevron significantly different from 0, 2 days after a kidnap event?	2.193 *	10	96.13
Are all MNOC's (operating in Nigeria) abnormal returns significantly different from 0, 1 day after a kidnap event?	1.774 +	40	5534.50
Are all MNOC's (operating in Nigeria) abnormal returns significantly different from 0, 2 days after a kidnap event?	3.307 **	40	5534.50
Are all MNOC's (except BP) abnormal returns significantly different from 0, 1 day after a miscellaneous negative event?	2.299 *	44	7342.50
Are all MNOC's (except BP) abnormal returns significantly different from 0, 2 days after a miscellaneous negative event?	2.848 **	44	7342.50
Hypothesis 3			
Are the abnormal returns for Exxon significantly different from 0, 1 day after a negative event affects Shell?	2.344 *	17	446.00
Are the midterm abnormal returns of BP significantly different from 0, after a violent event?	1.690 +	19	617.50

Note: ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$

7. Conclusions

This thesis studied the effects of malevolent acts in a developing market on the performance of the targeted entity in its home market. This work borrowed inspiration from Saez et al. (2007) and their analysis of the transmission of shocks in developing markets to developed markets, as well as from Chen et al. (2004) and Chesney et al. (2010), who studied the effects of violent events on the returns of stock markets. In terms of method and data organization, Guidolin et al. (2007) was consulted, their coverage of the Angolan diamond industry provided inspiration (along with Cilliers et al. (2000) and Le Billon (2000)) for choosing our example, the Nigerian oil industry.

Nigeria's oil industry is one of the ten most bountiful in the world; its resources are concentrated into a single comparatively tiny region called the Niger Delta. The product, Nigerian Bonny Light oil, is primarily sold to the US market and is considered to be of very high quality. Unfortunately, this font of plentiful oil has caused disaster in the Niger Delta both environmental and humanitarian. The country has few environmental controls and thus oil firms pollute heedlessly to save costs, and crony capitalism is prevalent as politicians at all levels seek to funnel as much oil wealth as they can. This situation has led to many of the area's residents to protest and ultimately to take up arms against the government and specifically the oil firms. A lack of other opportunities has also funneled willing young men from the area to the local anti-government and anti-oil militia MEND. MEND is the lead antagonist in this region, responsible for most malevolent acts for the past two decades.

During a period of five years from 2006 to 2010, we collected 57 events and divided them into eight individual event types. We then collected stock price data for each of the four

MNOCs and determined abnormal returns for each one. We had three hypotheses that we tested via linear regression and sign-rank techniques. An event wherein a physically aggressive or hostile action is taken against a target (whether it's to property, operations or personnel) will have a negative effect on the returns of the target. Negative events targeting a specific firm will cause that firm's returns to fall and, positive events targeting a specific firm will cause that firm's returns to rise. A negative event affecting one firm may lead to positive returns for that firm's competitors and negative events within the country of study will lead to positive returns for competing firms whom do not have interests in the country.

Prior to conducting hypothesis testing we decided to conduct a linear regression to see how strongly the stock prices of our MNOCs follow the NYSE, in order to determine how closely the returns of our MNOCs track the NYSE (the exchange on which they are listed). It was noticed that the MNOC's returns do track the NYSE extremely strongly, but this is to be expected as the data comes from the NYSE. Our testing found some evidence that the returns of the MNOCs do respond to malevolent acts; although what was more telling was the absence of effects. For instance, violent events did not register any significant effect on our MNOCs, we postulate that this could be due to events in other markets that the MNOCs responded to more strongly, or a lack of concern on the part of the markets about the effect of this violence on the bottom line of the MNOCs or less likely it could be caused by a general obscuration of the returns picture caused by a price increase for Nigerian oil concurrent with the supply decrease caused by the violent event

Analysis of kidnappings (kidnap events) and government policies targeted against MNOCs (miscellaneous negative events) provided significant results. When isolating for all

kidnappings only, we found that Shell experienced negative returns, whereas its competitors, Chevron and Exxon experienced positive returns, suggesting that the latter two firms prosper from kidnap events. Given that most of the kidnap events in our sample where directed at Shell, we reason that the results we obtained for kidnap events confirm that hypothesis 2A and 3 are correct, negative events against a specific firm do lead to negative returns for said firm, and negative events affecting one firm will cause their competitors returns to rise, respectively.

Shell and Total's returns were paradoxically positive as a result of government policies that should cause negative returns. We reason that this is so due to markets perceiving the MNOC's operations in Nigeria negatively, i.e. that less involvement in Nigeria will lead to more involvement in more lucrative markets for these firms. Markets may also perceive Nigerian oil operations as being risky, thus less involvement leads to less risk and consequently higher returns. Finally the markets could perceive that the MNOCs produce more oil more efficiently than the local competitors that these policies will now assist, thus leading to less supply and a higher price.

In undertaking this thesis, we hoped to inform the reader about possible reasons behind the continuation of this situation in the Niger Delta. Our findings are paradoxical, in that basic business theory dictates that anything that lessens a firm's ability to produce a profitable product would directly translate into a loss for that firm, and thus the firm needs to prevent such a thing from occurring. In the case of Nigeria, the firms udner study have a perverse incentive to allow such extraneous behavior to continue. If our analysis of the results is correct, there is no incentive for the oil firms to change the status quo in terms of initiatives to lessen violent attacks as according to our postulations the supply decrease caused by destroying supply capacity simply

leads to an increase in the price for Nigerian oil (leading to increased revenues from sales). There is also an incentive on the part of each MNOC to prevent kidnapping of its own personnel, if anything this is the overriding objective for the MNOC operating in Nigeria, and the recent increase in kidnappings of oil company employees may be one reason why firms are finally trying to address problems in the Niger Delta. Finally, it seems that there is an incentive, at least for the efficient MNOCs, to engender government policies that foster a more competitive environment.

The situation affecting multinational oil companies in Nigeria is not unique, many MNOCs experience similar conditions in countries around the world. A study of the effects of these conditions on a firm's performance should be essential, given the increasing interconnectedness of the global economy. Many models of market and business behavior are based on extensive study of events within developed markets. In order to better understand the global marketplace, further study needs to take place on developing/emerging markets as well as the events most likely to occur in those markets, such as violence, kidnapping, sudden government policy changes. Simply applying the current knowledge base on developed markets to predict behavior in developing ones is not adequate. The author hopes that this thesis can serve as a basis for calculating the effects of malevolent acts on firms operating in other markets as well as informing the business strategy of firms operating within such an environment. It should be noted that this thesis only addresses the effects of a focused set of events on a single industry in an emerging market, and care should be taken when applying the results of this thesis to developed markets or industries other than oil and gas.

8. Future Work

This work was a focused extension of the works by Chen et al. (2004) and Guidolin et al. (2007); every effort has been taken to incorporate their research methods and techniques into this work. However, we cannot assume that these authors' work is perfect, nor can we assume that this work is, certain elements could definitely be expounded upon.

One way in which this work can be improved is by sourcing data from a variety of stock exchanges instead of just one to determine the effects of events on different markets as well as to mitigate the correlation effects of one stock exchange on the results, such as the NYSE had on the data for this work. It should be noted that data collection for this work was limited by the lack of dependable daily stock price data available on the Nigerian stock exchange. If it had been readily available, data from the Nigerian stock exchange could have mitigated the strong correlation our data had with the NYSE. Ultimately, some of the MNOCs under study were not registered on the Nigerian stock exchange, and those that were did not present historical prices that ranged as far back as the beginning of our study.

Utilizing other methods of manipulating the data may also be possible. All the authors of event study papers dealing with violent events or events related to conflict suggested the same methods that we used in this thesis; however there is no reason that volatility studies cannot be conducted, such as using GARCH methods to determine the volatility of a stock price after an event. In this case a base case volatility can be created prior to an event, by studying the volatility of the stock's price from 40 to 10 days prior to the event. This base case can then be compared to the volatility of the stock price after an event occurs to discern if the event has an

impact on the stock price. This method may present an altogether different result, or it may help to clarify our results.

The results have shown that violent events exhibit no visible effect on the abnormal returns of the MNOCs. Extending the timeline over which data is collected may present a clearer picture of the effect of violent events. Similarly, a clearer picture may emerge about the effects of positive events as well as kidnap and miscellaneous negative events.

The methods and techniques utilized in this work could be applied to the oil industry in neighboring countries to develop a comparison between the effects of malevolent acts in these countries; some examples include the oil industry in Angola, Libya, Iraq or Kuwait. In the case of Angola, a study of the effects of the end of malevolent acts in the diamond industry was already conducted by Guidolin & La Ferrara, and study on the effects of these same events on the oil industry may be feasible. In the case of Libya, a study on the effects of the government's downward spiral and eventual collapse on world markets should be relatively easy to achieve using the methods contained in this work, as long as reliable data is available. A study based on Iraq could track the effects of major events within that country on abnormal returns for firms operating in the area. A similar but smaller study could be conducted on Kuwaiti events.

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Appendix

Input data – Events, abnormal returns and STATA inputs

Table A1.Events information by date

Date	Event type	Event	Further event description	MNOC targeted	Comments
January-11-06	Violent	pipeline attack		Shell	
January-11-06	Kidnap	kidnap	1 US 1 UK 2 others	Shell	
January-15-06	Violent	facility attack		Shell	
January-30-06	Positive	hostage release (of those captured on Jan 11)		Shell	
February-18-06	Kidnap	kidnap	2 US 1 UK, 6 others	Shell	
February-20-06	Violent	pipeline attack		Shell	
March-01-06	Positive	hostage release (of those captured on Feb 18th)		Shell	
March-09-06	Kidnap	kidnap	25 employees	Shell	
March-10-06	Positive	hostage release (of those captured on Mar 9th)		Shell	
March-17-06	Violent	pipeline attack		Eni	
April-20-06	Miscellaneous Negative	bomb explosion in city			32 cent oil price rise
June-02-06	Kidnap	Kidnap		Peak petroleum	
June-04-06	Positive	hostage release (of those captured on Jun 2)		Peak petroleum	
October-04-06	Violent	facility attack		Agip	attack was against supply convoy to Agip facility
November-06-06	Kidnap	facility and workers kept hostage		Agip	
November-20-06	Positive	facility and workers released (from Nov 6)		Agip	
November-23-06	Positive	hostage rescue		ENI	
December-26-06	Violent	pipeline explosion	260 dead	national	caused by fuel theft
April-15-07	Miscellaneous Negative	Voting	marred by violence		
April-23-07	Miscellaneous Neutral	election results	claimed to be fraudulent		
May-09-07	Kidnap	Kidnap	4 Americans	Chevron	
May-25-07	Kidnap	Kidnap	3 Americans 4 Brits	Conoil	

June-19-07	Miscellaneous Negative	nationwide union strike begins			
June-23-07	Positive	nationwide union strike ends			
July-03-07	Miscellaneous Negative	MEND truce over			
July-05-07	Kidnap	Kidnap	British child kidnapped		
July-05-07	Kidnap	Kidnap	New Zealanders among captives		
October-07-07	Miscellaneous Neutral	interest rate hike from 8 to 9 %			
November-01-07	Miscellaneous Negative	government announces favored status to small firms		all big oil firms - Shell, Exxon Mobil etc.	government is getting "tired" of big oil and wants to favor small firms in oil bid process
November-14-07	Miscellaneous Negative	government imposes fines for gas flaring start Jan 1 08		all oil firms	
January-03-08	Miscellaneous Negative	violence in oil town			
April-21-08	Miscellaneous Negative	force majeure declaration		Shell	
April-25-08	Miscellaneous Negative	strike		Exxon Mobil	
May-02-08	Positive	strike ends (from Apr 25 2008)		Exxon Mobil	
May-03-08	Violent	pipeline attack		Shell	
June-19-08	Violent	facility attack	American kidnapped	Shell	
June-21-08	Violent	pipeline attack		Chevron	
June-22-08	Positive	cease fire called			
May-13-09	Miscellaneous Negative	MEND warns of attacks on May 14			
May-15-09	Miscellaneous Negative	declaration of all-out war by MEND			
May-17-09	Positive	hostages freed by military			
May-26-09	Violent	pipeline attack		Chevron	
June-09-09	Positive	goodwill payout by oil company		Shell	Positive event, payout to affected families by Shell,
June-10-09	Violent	facility attack		Chevron	considered false account (internal fire, not caused by

					external violence)
June-21-09	Violent	pipeline attack		Shell	
July-08-09	Violent	pipeline attack		Shell and Agip	
July-10-09	Violent	pipeline attack		Chevron	
July-14-09	Violent	oil depot attack in Lagos (major city)		national	Atlas Cove is the depot - one of the largest in Nigeria
July-15-09	Positive	truce announced			Truce with MEND
July-29-09	Violent	facility attack		Shell	
October-07-09	Miscellaneous Negative	threats of attack			
October-15-09	Miscellaneous Negative	truce ends (from Jul 15, 2009)			
October-25-09	Positive	truce signed			Truce with MEND
December-19-09	Violent	pipeline attack		Shell and Chevron	
January-30-10	Miscellaneous Negative	truce ends (from Oct 25, 2009)			
November-08-10	Kidnap	employee kidnapping		Afren	
December-05-10	Violent	pipeline attack		Nigerian National Petroleum Corp (NNPC)	NNPC has strong ties to Shell

Table A2. Event references by date and event type

Date	Event	Reference
January-11-06	Violent	"Nigerian Oil Platform Attacked, Militias Battling Troops", January 15, 2006, Associated Press
January-11-06	Kidnap	"Nigerian Oil Platform Attacked, Militias Battling Troops", January 15, 2006, Associated Press
January-15-06	Violent	T. Ashby, "Attacks threaten Nigerian oil flow", January 17, 2006, Reuters
January-30-06	Positive	H. Igbikiuwubo, J. Ajani, and S. Oyadongha, "I Won't Come Back to Nigeria – Hostage", February 1, 2006, The Vanguard
February-18-06	Kidnap	E. Okpani, "Hostages: Security Beefed Up in Niger-Delta", February 20, 2006, The Daily Trust
February-20-06	Violent	J. Mouawad, "Violence In Nigeria Sends Oil Higher", February 21, 2006, New York Times
March-01-06	Positive	O. Orere, and C. Okafar, " Militants free six hostage", March 2, 2006, The Guardian (Nigeria)
March-09-06	Kidnap	M. Ebonugwo, "The Militants and Their Hostages", March 15, 2006, The Vanguard
March-10-06	Positive	M. Ebonugwo, "The Militants and Their Hostages", March 15, 2006, The Vanguard
March-17-06	Violent	"Oil Price up on Nigerian attack", March 20, 2006, BBC News
April-20-06	Miscellaneous Negative	"Militants Explode Car Bomb At Military Base In Oil Hub", April 21, 2006, New York Times
June-02-06	Kidnap	"Foreign oil workers abducted in Niger Delta", June 3, 2006, Spero News
June-04-06	Positive	"Nigeria: All eight hostages freed", June 4, 2006, Breakingnews.ie
October-04-06	Violent	D. Udoh, "Nigeria searches for missing soldiers", October 6 2006, The Independent Online
November-06-06	Kidnap	K. Houreld, "Gunmen attack oil facility in Nigeria", November 12 2006, The Independent Online
November-20-06	Positive	"Nigerian hostage rescue effort leaves 1 foreign worker dead", November 22, 2006, USA Today
November-23-06	Positive	S. Fletcher, "Nigerian strife raises crude prices", November 27, 2006, Oil & Gas Journal
December-26-06	Violent	"Gas Line Explodes in Nigeria, Killing at Least 260", December 27, 2006, New York Times

April-15-07	Miscellaneous Negative	O. Quist-Arcton, “Nigerian Election Results Hotly Disputed”, April 23, 2007, NPR
April-23-07	Miscellaneous Neutral	O. Quist-Arcton, “Nigerian Election Results Hotly Disputed”, April 23, 2007, NPR
May-09-07	Kidnap	T. Ashby, “Nigerian militants kidnap US workers”, May 9 2007, The Independent Online
May-25-07	Kidnap	“Gunmen kidnap Nigeria oil workers”, May 25, 2007, BBC News
June-19-07	Miscellaneous Negative	J. McBride, “Oil falls, Nigeria strike supports”, June 19, 2007, Reuters
June-23-07	Positive	P. Gorondi, “Oil prices fall as Nigeria strike ends”, June 25 2007, Toronto Star
July-03-07	Miscellaneous Negative	A. Ekeinde, “Nigerian rebels end truce, others attack oil rig”, July 4, 2007, Reuters
July-05-07	Kidnap	E. Henry, “Nigeria kidnap girl 'could be freed today', July 8, 2007, The Telegraph
July-05-07	Kidnap	“Waiting game for Nigeria kidnap victims' families”, July 5, 2007, New Zealand Herald
October-07-07	Miscellaneous Neutral	“Nigerian central bank raises interest rate”, October 8, 2007, Reuters
November-01-07	Miscellaneous Negative	“Nigeria to stop cash call payments to oil majors”, November 3, 2007, Reuters
November-14-07	Miscellaneous Negative	K. Ekundayo, “Flaring Deadline - Govt Vows to Penalise Erring Oil Firms”, November 14, 2007, All Africa
January-03-08	Miscellaneous Negative	A. Ekeinde , “Suspected militants hit Nigerian oil city, 18 dead”, January 1, 2008, Reuters
April-21-08	Miscellaneous Negative	I. Kao, “Shell shuts some Nigeria output, force majeure on Bonny”, April 21, 2008, Reuters
April-25-08	Miscellaneous Negative	T. Ahemba, “Strike, rebel attacks hit Nigerian oil output”, April 25, 2008, Reuters
May-02-08	Positive	I. Kao, “Exxon resumes 300,000 bpd Nigeria oil production”, May 2, 2008, Reuters
May-03-08	Violent	D. Flynn, “Shell shuts more Nigerian oil after rebel attack”, May 3, 2008, Reuters
June-19-08	Violent	“Shell shuts down Nigerian oilfield after attack”, June 19, 2008, USA Today
June-21-08	Violent	“Nigeria oil pipeline 'attacked'”, June 21, 2008, BBC News
June-22-08	Positive	N. Tattersall, “Nigerian oil militants vow ceasefire in delta”, June 23, 2008, Reuters

May-13-09	Miscellaneous Negative	A. Ekeinde, “Nigerian militants warn oil firms to evacuate staff”, May 13, 2009, Reuters
May-15-09	Miscellaneous Negative	“Unrest in Nigeria's oil heartland”, May 15, 2009, Reuters
May-17-09	Positive	N. Tattersall, “Nigeria militants say blow up two oil, gas pipelines”, May 17, 2009, Reuters
May-26-09	Violent	O.Onabu, S. Ojeifo, and E. Alike, “Militants Blow Up Chevron Pipeline”, May 26, 2009, This Day
June-09-09	Positive	“Nigeria victims hail $19m Shell payout”, June 10, 2009, news.com.au
June-10-09	Violent	“Chevron confirms fire at Nigeria oil facility”, June 10, 2009, The Independent Online
June-21-09	Violent	R. Fabi, “Nigerian rebels say they attacked Shell pipeline”, June 25, 2009, Reuters
July-08-09	Violent	“Nigerian militants claim oil pipeline sabotage”, July 8, 2009, CNN
July-10-09	Violent	“Nigerian rebels blow up Chevron pipeline”, July 11, 2009, Channel News Asia
July-14-09	Violent	“Atlas Cove - MEND Cripples Fuel Supply Chain”, July 14, 2009, Vanguard
July-15-09	Positive	M. Faul, “Analysis: Nigeria oil truce won't end conflict”, July 15, 2009, Omaha World Herald
July-29-09	Violent	F. Erive, “Mr. President, this house is falling!”, August 2, 2009, The Nation
October-07-09	Miscellaneous Negative	E. Amaize, G. Onah, and S. Oyadongha, “Mend Under Fire Over Attack Threat”, October 18, 2009, The Vanguard
October-15-09	Miscellaneous Negative	“Nigeria militants end ceasefire”, October 16, 2009, BBC News
October-25-09	Positive	D. Mbachu, “Nigeria Delta Truce Depends on Progress in Talks”, October 27, 2009, Bloomberg
December-19-09	Violent	J. Gambrell, “Nigeria militants attack pipeline; break cease-fire”, December 19, 2009, The Associated Press
January-30-10	Miscellaneous Negative	“Nigeria’s MEND call off unilateral truce”, January 30, 2010, Zeenews.com
November-08-10	Kidnap	N. Tattersall, “Gunmen kidnap five from Afren oil rig in Nigeria”, November 8, 2010, Reuters
December-05-10	Violent	Y. Ibukun, “Nigeria militants claim major oil pipeline attack”, December 6, 2010, The Associated Press

Table A3.Abnormal returns results (from expected value of 0) for each event for the NYSE, Shell and Chevron

Date	Event type	NYSE					Shell					Chevron				
		CAR5	CAR10	AR0	AR1	AR2	CAR5	CAR10	AR0	AR1	AR2	CAR5	CAR10	AR0	AR1	AR2
January-11-06	Violent	-0.01331	-0.01524	0.00509	-0.00777	0.00086	-0.00157	-0.00373	0.00241	-0.00724	0.00889	0.02713	0.03267	0.01002	0.00039	0.00774
January-11-06	Kidnap	-0.01331	-0.01524	0.00509	-0.00777	0.00086	-0.00157	-0.00373	0.00241	-0.00724	0.00889	0.02713	0.03267	0.01002	0.00039	0.00774
January-15-06	Violent	-0.01869	0.00028	0.00095	-0.00563	-0.00575	0.00066	0.02165	0.00904	0.00691	-0.01207	0.01998	0.00707	0.00774	0.02475	-0.01563
January-30-06	Positive	-0.01668	-0.02587	0.00108	-0.00215	-0.00041	-0.03558	-0.07753	0.01555	0.00737	-0.01765	-0.05929	-0.0857	0.00357	-0.02444	-0.01401
February-18-06	Kidnap	0.00191	-0.005	-0.00028	-0.0014	0.00471	-0.03275	-0.02993	-0.00072	-0.00622	-0.01346	0.01749	-0.00055	0.01425	0.01119	-0.0126
February-20-06	Violent	0.00191	-0.005	-0.00028	-0.0014	0.00471	-0.03275	-0.02993	-0.00072	-0.00622	-0.01346	0.01749	-0.00055	0.01425	0.01119	-0.0126
March-01-06	Positive	-0.01057	0.00664	0.00604	-0.00109	-0.0014	0.00051	0.03443	0.02504	-0.00591	0.00542	-0.01792	0.00214	0.01381	-0.00279	-0.00034
March-09-06	Kidnap	0.02281	0.02169	-0.0026	0.0072	0.00484	0.03641	0.01905	9.8E-05	0.01237	0.00697	0.02981	0.03373	-0.01136	-0.00531	0.02114
March-10-06	Positive	0.02798	0.02268	0.00706	0.00453	0.01005	0.04785	0.01842	0.01255	0.00715	0.01534	0.06814	0.05515	-0.00537	0.02197	0.02263
March-17-06	Violent	-0.00498	-0.00456	0.00156	-0.00331	-0.0061	-0.02829	0.02422	-0.01186	-0.01114	-0.00632	-0.00398	0.04494	-0.00661	-0.00447	-8.8E-05
April-20-06	Miscellaneous Negative	-0.00298	0.00082	-0.00159	0.00351	-0.00223	-0.00665	-0.01791	-0.01314	0.02933	-0.00993	-0.01867	0.0024	-0.01732	0.0234	-0.00923
June-02-06	Kidnap	-0.03086	-0.0304	0.00466	-0.01796	-0.00741	-0.04114	-0.0427	0.00793	-0.01514	-0.01346	-0.03353	-0.005	0.01331	-0.02305	-0.00661
June-04-06	Positive	-0.03086	-0.0304	0.00466	-0.01796	-0.00741	-0.04114	-0.0427	0.00793	-0.01514	-0.01346	-0.03353	-0.005	0.01331	-0.02305	-0.00661
October-04-06	Violent	0.00995	0.01623	0.00897	0.00415	-0.00478	0.01831	0.06116	0.01338	-0.00126	-0.00381	0.02750	0.05702	0.01455	0.00497	-0.00097
November-06-06	Kidnap	0.00382	0.00355	0.01089	0.00158	-0.00163	0.03558	0.01032	0.01151	0.00069	0.01066	-0.00413	-0.02286	0.00996	-0.01549	0.00619
November-20-06	Positive	-0.01559	-0.00184	-0.0017	0.00231	0.0022	-0.02207	-0.03606	-0.01545	0.00609	-0.00426	-0.02104	0.02924	-0.00136	0.01155	-0.01221
November-23-06	Positive	-0.00407	0.00179	0.00244	-0.00211	-0.01583	-0.01148	-0.0238	-0.00425	-0.00245	-0.00607	-0.00239	0.01784	-0.01177	-0.01332	-0.00425
December-26-06	Violent	0.00107	-0.01836	0.00131	0.01087	-0.00466	0.01003	-0.05539	0.00734	0.01553	-0.00655	-0.03887	-0.0735	0.00207	0.00944	0.00037
April-15-07	Miscellaneous Negative	0.01703	0.03325	0.00467	0.01222	0.00052	0.03255	0.04825	0.0191	0.00679	0.00761	-0.00923	0.0041	-0.00294	0.01003	0.00029

April-23-07	Miscellaneous Neutral	0.00247	0.01099	-0.00118	-0.00228	0.01036	0.00296	0.03709	0.00273	-0.0054	0.01499	-0.01743	-0.01538	-0.01403	-0.00801	0.01314
May-09-07	Kidnap	-0.01454	-0.01359	0.00186	-0.0172	0.00776	-0.04739	-0.00572	-0.01778	-0.02846	0.00866	-0.01414	-0.01942	-0.00839	-0.0237	0.01902
May-25-07	Kidnap	0.01469	-0.01472	0.00493	0.00076	0.00322	0.008694	0.02428	0.00648	-0.01686	0.0032	0.01467	-0.01679	0.012	-0.0085	0.01657
June-19-07	Miscellaneous Negative	-0.03078	-0.02352	-0.00542	-0.01271	0.00493	-0.01182	0.02594	-0.00418	-0.00629	0.0177	-0.01415	0.00312	-0.00297	-0.02972	0.02145
June-23-07	Positive	-0.01095	-0.00073	-0.00997	-0.00704	-0.00325	-0.01136	0.03112	-0.01508	-0.00412	-0.00857	0.00976	0.04474	-0.01704	0.01633	-0.00436
July-03-07	Miscellaneous Negative	-0.00526	0.01482	0.00355	-9.1E-05	0.0043	-0.00738	-0.0255	0.01051	-0.01501	0.0187	0.04168	0.0629	0.01322	0.00191	0.01219
July-05-07	Kidnap	-0.00437	0.00576	-0.00016	0.00413	0.00222	-0.02154	-0.04476	-0.01578	0.01793	0.00073	0.04482	0.06531	0.00159	0.01146	0.01956
July-05-07	Kidnap	-0.00437	0.00576	-0.00016	0.00413	0.00222	-0.02154	-0.04476	-0.01578	0.01793	0.00073	0.04482	0.06531	0.00159	0.01146	0.01956
October-07-07	Miscellaneous Neutral	0.00222	-0.01408	0.00846	-0.00737	0.00712	0.00807	0.0334	-0.00052	-0.01644	0.02083	-0.03278	-0.04188	0.00024	-0.0121	0.00833
November-01-07	Miscellaneous Neutral	-0.04878	-0.04783	-0.02698	0.0036	-0.01143	-0.04265	-0.09883	-0.03367	0.00907	-0.01202	-0.04397	-0.06013	-0.0272	-0.00608	-0.00021
November-01-14	Miscellaneous Neutral	0.02843	0.0081	-0.00165	-0.00411	0.01674	0.00452	-0.00671	-0.01018	-0.00415	0.01698	0.04891	0.07446	0.0033	-0.0056	0.02706
January-03-08	Miscellaneous Negative	-0.02033	-0.04513	0.00376	-0.02173	0.00312	0.01345	-0.06918	0.02039	-0.01532	0.02493	-0.01432	-0.08652	0.01125	-0.01395	-0.01412
April-22-08	Violent	0.00512	0.01677	-0.01001	0.00271	0.00276	0.00201	0.05414	-0.00922	0.02116	-0.02096	-0.00799	0.01959	0.01319	0.00355	-0.02317
April-25-08	Violent	0.01850	0.02367	0.00886	0.00104	-0.00533	0.05471	0.06052	0.02054	-0.00787	0.04902	0.02525	0.05095	0.00289	-0.00325	0.02397
May-02-08	Positive	-0.01045	-0.00312	0.00549	-0.00554	0.005	-0.01319	-0.03671	0.00728	-0.00256	0.00465	0.01572	0.01705	0.00212	0.00026	0.01119
May-03-08	Violent	-0.01045	-0.00312	0.00549	-0.00554	0.005	-0.01319	-0.03671	0.00728	-0.00256	0.00465	0.01572	0.01705	0.00212	0.00026	0.01119
June-19-08	Violent	-0.02239	-0.06467	-0.00015	-0.01791	0.00205	-0.01360	-0.02604	-0.01365	-0.01432	0.01152	-0.00769	-0.03569	-0.02595	-0.00412	0.02348
June-21-08	Violent	-0.04517	-0.06081	-0.01789	0.00299	-0.01267	-0.00955	-0.02173	-0.0157	0.01014	-0.00788	-0.00918	-0.01186	-0.00551	0.0225	-0.00727
June-22-08	Positive	-0.04517	-0.06081	-0.01789	0.00299	-0.01267	-0.00955	-0.02173	-0.0157	0.01014	-0.00788	-0.00918	-0.01186	-0.00551	0.0225	-0.00727
May-13-09	Miscellaneous Negative	-0.01676	-0.04062	-0.03796	0.01225	-0.01709	0.02369	0.04562	-0.00669	-0.00024	-0.00875	-0.05001	-0.07152	-0.01638	-0.00313	-0.02966
May-15-09	Miscellaneous Negative	-0.01899	-0.01066	-0.01826	0.02904	-0.00411	0.03493	0.06898	-0.01154	0.03355	0.00071	-0.05008	-0.01773	-0.02905	0.00204	-0.00259
May-17-09	Positive	-0.01899	-0.01066	-0.01826	0.02904	-0.00411	0.03493	0.06898	-0.01154	0.03355	0.00071	-0.05008	-0.01773	-0.02905	0.00204	-0.00259

May-26-09	Violent	0.03202	-0.00756	0.01076	-0.01948	0.00738	0.07386	0.0304	0.02805	-0.02942	0.02713	0.07055	0.07451	0.0186	-0.01851	0.01887
June-09-09	Positive	-0.03107	-0.08456	0.00271	-0.00601	0.00891	-0.07453	-0.1495	0.0011	0.00676	-0.00454	0.02810	-0.04166	0.01025	0.00092	0.02541
June-10-09	Violent	-0.05051	-0.0994	-0.00631	0.00854	-0.0077	-0.09408	-0.15889	0.00536	-0.00594	-0.02689	-0.00338	-0.05834	0.00063	0.02416	0.01091
June-21-09	Violent	-0.02901	-0.07036	0.00079	-0.03911	-0.00623	-0.06512	-0.14082	0.01044	-0.04898	0.00318	-0.03232	-0.07764	-0.00751	-0.03513	0.00093
July-08-09	Violent	0.03022	0.09411	-0.00253	0.00497	-0.00484	0.00599	0.06829	-0.00244	0.00627	-0.00623	0.01015	0.06738	0.00225	0.00624	-0.02566
July-10-09	Violent	0.06240	0.09947	-0.00652	0.01893	0.01085	0.06241	0.081	-0.00505	0.00467	0.00611	0.03405	0.08673	-0.02573	0.01856	0.00987
July-14-09	Miscellaneous Negative	0.06421	0.09604	0.01093	0.03126	0.00768	0.07400	0.09619	0.0055	0.03953	0.01502	0.04947	0.09916	0.00867	0.02441	0.00466
July-15-09	Positive	0.05689	0.08517	0.03132	0.00753	-0.00096	0.06946	0.09485	0.04039	0.01589	-0.00789	0.04880	0.07997	0.02456	0.00372	0.00319
July-29-09	Violent	0.04173	0.0313	-0.00641	0.01553	0.00851	0.03222	0.00938	0.00387	0.00197	0.00235	0.04066	0.0144	-0.01583	0.01066	0.02816
October-07-09	Miscellaneous Negative	0.00972	0.0185	-0.00074	0.00976	0.00159	-0.00184	0.05548	-0.01051	0.0039	0.00062	0.04314	0.07753	-0.00207	0.01241	0.01697
October-15-09	Miscellaneous Negative	-0.01353	-0.06478	0.00197	-0.01018	0.01178	0.04379	0.02352	0.00957	0.01285	0.01632	0.01941	0.00484	0.01625	0.0012	0.01101
October-25-09	Positive	-0.03822	-0.04585	-0.01708	-0.01636	-0.00598	-0.02918	-0.0544	-0.01527	-0.00642	0.01655	0.00233	-0.01309	-0.00916	-0.01716	0.01384
December-19-09	Violent	0.02045	0.03087	0.00255	0.00855	0.00465	0.05347	0.08857	-0.00401	0.02283	0.018	0.00601	0.02498	0.00113	0.00708	-0.00056
January-30-10	Miscellaneous Negative	-0.03020	-0.01778	-0.01697	0.01906	0.01219	-0.03655	-0.01367	-0.01812	0.02182	0.01513	-0.02570	-0.02131	-0.0154	0.0205	0.01172
November-08-10	Kidnap	-0.02771	-0.03231	-0.00256	-0.00894	0.00154	-0.04229	-0.06626	-0.01447	-0.02429	0.00717	-0.00613	-0.0351	-0.00448	-0.01673	0.01691
December-05-10	Violent	-0.00083	0.00517	0.00376	-0.00246	0.00149	0.00059	0.00401	0.00212	-0.00309	0.00258	0.02427	0.05154	0.00438	0.00049	0.01566

Table A4.Abnormal returns results (from expected value of 0) for each event for Exxon, Total and BP

Date	Event type	Exxon					Total					BP				
		CAR5	CAR10	AR0	AR1	AR2	CAR5	CAR10	AR0	AR1	AR2	CAR5	CAR10	AR0	AR1	AR2
January-11-06	Violent	0.01400	0.00660	0.00694	-0.01051	0.02239	0.00222	-0.00069	0.00745	-0.00623	0.01405	0.02078	0.03154	-0.00387	0.00148	0.02628
January-11-06	Kidnap	0.01400	0.00660	0.00694	-0.01051	0.02239	0.00222	-0.00069	0.00745	-0.00623	0.01405	0.02078	0.03154	-0.00387	0.00148	0.02628
January-15-06	Violent	0.01506	0.02824	0.02239	0.00914	-0.01389	0.00477	0.02617	0.01468	0.00562	-0.01752	0.03413	0.04868	0.02649	0.00939	-0.01276
January-30-06	Positive	-0.00841	-0.04960	0.02771	-0.00785	-0.01473	-0.04046	-0.08636	0.00649	-0.00229	-0.01969	-0.03688	-0.07199	0.01549	-0.00124	-0.01871
February-18-06	Kidnap	-0.00879	-0.01090	0.00271	0.00092	-0.01050	-0.00876	-0.02731	0.01155	-0.00517	-0.01000	-0.02388	-0.04225	-0.00100	0.00770	-0.02254
February-20-06	Violent	-0.00879	-0.01090	0.00271	0.00092	-0.01050	-0.00876	-0.02731	0.01155	-0.00517	-0.01000	-0.02388	-0.04225	-0.00100	0.00770	-0.02254
March-01-06	Positive	-0.00158	0.00387	0.01424	0.00722	0.00004	-0.01344	0.02497	0.00633	0.00348	-0.00724	-0.01295	0.01669	0.00989	-0.00479	0.00203
March-09-06	Kidnap	0.02072	0.01933	-0.01360	0.00470	0.00740	0.04878	0.03856	0.00018	0.00938	0.01478	0.05842	0.04053	-0.00147	0.00632	0.01781
March-10-06	Positive	0.04627	0.04025	0.00453	0.00741	0.01973	0.05823	0.04225	0.00957	0.01477	0.01876	0.06058	0.04117	0.00656	0.01778	0.01426
March-17-06	Violent	-0.00286	-0.00127	-0.00883	-0.00587	0.00173	-0.01037	0.04139	-0.00245	-0.00980	-0.00884	-0.01080	0.01689	-0.00344	-0.00930	-0.00542
April-20-06	Miscellaneous Negative	-0.02358	-0.01813	-0.00691	0.01589	-0.01008	-0.01495	-0.02085	-0.01003	0.01963	-0.00227	-0.03303	-0.02232	-0.01267	0.01745	-0.00761
June-02-06	Kidnap	-0.02146	-0.02480	0.00967	-0.02547	0.00666	-0.06135	-0.05548	0.00801	-0.01818	-0.01568	-0.04137	-0.05697	0.01154	-0.01561	-0.01073
June-04-06	Positive	-0.02146	-0.02480	0.00967	-0.02547	0.00666	-0.06135	-0.05548	0.00801	-0.01818	-0.01568	-0.04137	-0.05697	0.01154	-0.01561	-0.01073
October-04-06	Violent	0.03741	0.08268	0.02043	0.01210	0.00506	0.02424	0.04949	0.01744	0.00012	-0.00063	0.02176	0.08316	0.02280	-0.00229	-0.00008
November-06-06	Kidnap	0.01861	-0.01194	0.00809	-0.00804	0.01962	0.04790	0.01188	0.02006	-0.00054	0.00885	0.00722	-0.03158	0.01252	-0.00473	0.00781
November-20-06	Positive	-0.02490	0.02814	-0.01246	0.01077	-0.01011	-0.01410	-0.02024	-0.00544	0.00988	-0.00710	-0.00701	0.00224	-0.00381	0.01036	-0.00752
November-23-06	Positive	0.01874	0.00489	-0.01001	-0.01026	-0.00223	0.00193	-0.02679	-0.00732	-0.00186	-0.00961	0.01018	0.00290	-0.00709	-0.00274	-0.00233
December-26-06	Violent	-0.02832	-0.07934	0.00632	0.00932	0.00264	-0.00064	-0.07519	0.00463	0.01737	-0.00632	-0.00941	-0.07770	0.00213	0.00909	-0.00205
April-15-07	Miscellaneous Negative	0.00070	0.04054	0.00024	0.00968	0.00293	0.00683	0.02421	0.00869	0.00298	0.00598	0.01271	-0.00191	0.01377	0.00374	0.00257

April-23-07	Miscellaneous Neutral	0.00246	-0.00057	-0.00810	-0.00831	0.01572	0.00740	0.02030	-0.00425	-0.00196	0.01772	-0.02042	-0.01596	-0.00039	-0.01528	0.01689
May-09-07	Kidnap	-0.02531	-0.02832	-0.00414	-0.02892	0.01855	-0.03260	-0.02832	-0.00007	-0.01763	0.00904	-0.05295	-0.04370	-0.01521	-0.02761	0.00485
May-25-07	Kidnap	0.01210	-0.01689	0.01284	-0.01352	0.01459	0.00286	-0.02965	0.01134	-0.01553	0.00173	0.00198	-0.01012	0.00721	-0.00892	0.00364
June-19-07	Miscellaneous Negative	-0.05486	-0.03546	-0.00783	-0.03698	0.01606	-0.01447	0.03435	0.00201	-0.00923	0.00889	0.01597	0.06694	0.00725	-0.01156	0.00584
June-23-07	Positive	-0.01286	0.01562	-0.02216	-0.00222	-0.00772	0.00395	0.06031	-0.00983	-0.00467	-0.00792	0.03847	0.06487	0.00800	0.00496	0.00448
July-03-07	Miscellaneous Negative	0.01543	0.04131	0.00549	-0.00317	0.01439	0.00152	0.00956	-0.00170	-0.00547	0.02608	0.00322	0.00649	0.00268	-0.00842	0.00777
July-05-07	Kidnap	0.01650	0.05500	-0.00357	0.01417	0.01011	0.00371	-0.00082	-0.00584	0.02567	0.00765	0.00425	0.00910	-0.00849	0.00741	0.00743
July-05-07	Kidnap	0.01650	0.05500	-0.00357	0.01417	0.01011	0.00371	-0.00082	-0.00584	0.02567	0.00765	0.00425	0.00910	-0.00849	0.00741	0.00743
October-07-07	Miscellaneous Neutral	0.00373	0.01376	0.00173	-0.01026	0.01883	-0.01508	0.00353	-0.00353	-0.01543	0.01271	0.02333	0.06856	0.01188	-0.01114	0.01910
November-01-07	Miscellaneous Neutral	-0.05981	-0.07753	-0.03969	-0.00755	-0.00482	0.02069	-0.03505	-0.04170	0.02383	-0.00643	-0.01872	-0.08582	-0.02342	0.02370	0.00207
November-01-14	Miscellaneous Neutral	0.03883	0.04820	-0.00098	-0.00593	0.02292	0.02000	-0.02286	-0.00287	-0.00095	0.01756	0.03493	0.01682	0.00801	-0.01425	0.01814
January-03-08	Miscellaneous Negative	-0.02751	-0.08810	0.00187	-0.01926	-0.01089	0.03218	-0.04746	0.02161	-0.01228	0.02390	-0.00925	-0.07850	0.02161	-0.01238	0.02044
April-22-08	Violent	-0.02081	-0.05373	0.00100	-0.00193	-0.01757	-0.01206	0.00621	0.00069	0.00756	-0.02453	0.01211	0.06735	0.00676	0.00563	-0.01875
April-25-08	Violent	-0.03349	-0.03239	-0.00180	-0.00119	-0.00743	0.01824	0.01511	0.00925	-0.00372	0.01699	0.05970	0.07195	0.02032	-0.00406	0.04650
May-02-08	Positive	-0.01632	-0.01950	-0.00468	-0.00541	0.00258	-0.01935	-0.01001	0.00755	-0.00340	0.00802	-0.00113	-0.00550	0.00190	0.00104	0.00269
May-03-08	Violent	-0.01632	-0.01950	-0.00468	-0.00541	0.00258	-0.01935	-0.01001	0.00755	-0.00340	0.00802	-0.00113	-0.00550	0.00190	0.00104	0.00269
June-19-08	Violent	0.01019	0.02082	-0.02070	-0.00761	0.03539	0.02210	0.00309	-0.00505	0.00399	0.02511	0.00366	-0.04435	-0.01678	-0.00114	0.01068
June-21-08	Violent	0.01315	0.04079	-0.00913	0.03423	-0.00777	0.01396	-0.00700	0.00336	0.02410	-0.01126	0.00137	-0.02941	-0.00248	0.00998	-0.01319
June-22-08	Positive	0.01315	0.04079	-0.00913	0.03423	-0.00777	0.01396	-0.00700	0.00336	0.02410	-0.01126	0.00137	-0.02941	-0.00248	0.00998	-0.01319
May-13-09	Miscellaneous Negative	0.00103	-0.02580	-0.01387	0.00130	-0.00836	-0.02007	-0.02456	-0.01733	-0.03133	-0.01261	-0.02892	-0.02193	-0.04232	0.00308	-0.01567
May-15-09	Miscellaneous Negative	-0.02102	-0.00795	-0.00945	0.01923	0.00015	0.02157	0.06110	-0.01355	0.04157	-0.00125	0.00586	0.03003	-0.01689	0.03194	-0.00729
May-17-09	Positive	-0.02102	-0.00795	-0.00945	0.01923	0.00015	0.02157	0.06110	-0.01355	0.04157	-0.00125	0.00586	0.03003	-0.01689	0.03194	-0.00729

May-26-09	Violent	0.03880	0.05652	0.01373	-0.02321	0.01311	0.05902	0.00767	0.01481	-0.02250	0.01460	0.05972	0.02100	0.01459	-0.01668	0.01003
June-09-09	Positive	-0.00630	-0.06168	-0.00094	0.00947	0.00259	-0.06939	-0.12864	0.00664	-0.00466	-0.00016	-0.06008	-0.14425	0.00563	-0.00317	-0.00529
June-10-09	Violent	-0.02460	-0.06508	0.00900	0.00192	-0.00449	-0.09195	-0.13353	-0.00504	-0.00155	-0.02676	-0.08564	-0.15814	-0.00349	-0.00615	-0.02668
June-21-09	Violent	-0.03865	-0.07465	-0.00905	-0.03398	-0.00200	-0.03658	-0.08332	-0.00250	-0.04161	0.01254	-0.04301	-0.08620	0.01563	-0.04773	-0.00208
July-08-09	Violent	-0.00281	0.06269	-0.00422	-0.00323	-0.01260	0.02576	0.12809	0.00027	0.01293	-0.01867	0.02335	0.10066	-0.00062	0.00556	-0.00721
July-10-09	Violent	0.03940	0.08852	-0.01264	0.00955	0.00816	0.06654	0.12732	-0.01895	0.03522	-0.00442	0.06977	0.10273	-0.00803	0.02105	0.00333
July-14-09	Miscellaneous Negative	0.04727	0.10257	0.00744	0.03346	-0.00018	0.07289	0.09976	-0.00614	0.03819	0.01416	0.07810	0.09493	0.00273	0.04107	0.01102
July-15-09	Positive	0.06239	0.08313	0.03340	-0.00090	0.00075	0.09252	0.08899	0.03750	0.01386	0.00473	0.07163	0.06930	0.04096	0.01056	-0.00513
July-29-09	Violent	-0.00858	-0.03389	-0.00446	-0.00823	-0.00273	0.00030	-0.02619	-0.01264	0.01349	-0.00576	0.04387	0.03625	-0.00460	0.00521	0.00541
October-07-09	Miscellaneous Negative	0.02153	0.05934	-0.00030	0.00557	0.00274	0.01098	0.04406	-0.00834	0.00631	0.00333	-0.00451	0.05346	-0.00671	0.00846	-0.01085
October-15-09	Miscellaneous Negative	0.02341	0.03403	0.01594	0.00286	0.00746	0.00721	-0.04230	0.00273	0.00145	0.00792	0.05026	0.05686	0.02034	0.00407	0.02511
October-25-09	Positive	-0.00500	-0.02324	-0.01140	-0.00431	0.02323	-0.03006	-0.03512	-0.01008	-0.02239	0.00527	0.02718	0.02829	-0.02211	0.00129	0.04161
December-19-09	Violent	0.00716	0.01544	0.00007	0.00424	0.00109	0.04585	0.06554	-0.01397	0.02598	0.01606	0.03588	0.04684	0.00401	0.01705	0.00320
January-30-10	Miscellaneous Negative	0.01156	0.03520	-0.00513	0.03025	0.01482	-0.01904	-0.01014	-0.00743	0.02447	0.00829	-0.07447	-0.05962	-0.02281	0.01885	-0.03263
November-08-10	Kidnap	-0.00014	-0.02048	0.00174	0.00153	0.00425	-0.06781	-0.09159	-0.00929	-0.03319	-0.00283	-0.02727	-0.05831	-0.01475	-0.00666	0.01037
December-05-10	Violent	-0.00854	-0.02163	-0.00732	-0.00108	-0.00116	0.03630	0.05198	0.01921	0.00308	0.00403	0.03328	0.05391	0.00363	0.03152	0.00138

Table A.5. All abnormal returns data with corresponding dummy variables as inputted into Stata for analysis

CAR5	CAR10	AR0	AR1	AR2	NYSE	BP ctrl	Shell	Chevron	Exxon	Total SA	Violent	Kidnap	Positive	misc neut	misc bad (misc negative)	Shell neg	Chev neg	Shell pos	Event ID
-0.00157	-0.00373	0.00241	-0.00724	0.00889	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1
-0.00157	-0.00373	0.00241	-0.00724	0.00889	0	0	1	0	0	0	0	1	0	0	0	1	0	0	2
0.00066	0.02165	0.00904	0.00691	-0.01207	0	0	1	0	0	0	1	0	0	0	0	1	0	0	3
-0.03559	-0.07753	0.01555	0.00737	-0.01765	0	0	1	0	0	0	0	0	1	0	0	0	0	1	4
-0.03276	-0.02993	-0.00072	-0.00622	-0.01346	0	0	1	0	0	0	0	1	0	0	0	1	0	0	5
-0.03276	-0.02993	-0.00072	-0.00622	-0.01346	0	0	1	0	0	0	1	0	0	0	0	1	0	0	6
0.00051	0.03443	0.02504	-0.00591	0.00542	0	0	1	0	0	0	0	0	1	0	0	0	0	1	7
0.03642	0.01905	0.00010	0.01237	0.00697	0	0	1	0	0	0	0	1	0	0	0	1	0	0	8
0.04786	0.01842	0.01255	0.00715	0.01534	0	0	1	0	0	0	0	0	1	0	0	0	0	1	9
-0.02830	0.02422	-0.01186	-0.01114	-0.00632	0	0	1	0	0	0	1	0	0	0	0	0	0	0	10
-0.00665	-0.01791	-0.01314	0.02933	-0.00993	0	0	1	0	0	0	0	0	0	0	1	0	0	0	11
-0.04115	-0.04270	0.00793	-0.01514	-0.01346	0	0	1	0	0	0	0	1	0	0	0	0	0	0	12
-0.04115	-0.04270	0.00793	-0.01514	-0.01346	0	0	1	0	0	0	0	0	1	0	0	0	0	0	13
0.01831	0.06116	0.01338	-0.00126	-0.00381	0	0	1	0	0	0	1	0	0	0	0	0	0	0	14
0.03558	0.01032	0.01151	0.00069	0.01066	0	0	1	0	0	0	0	1	0	0	0	0	0	0	15
-0.02208	-0.03606	-0.01545	0.00609	-0.00426	0	0	1	0	0	0	0	0	1	0	0	0	0	0	16
-0.01149	-0.02380	-0.00425	-0.00245	-0.00607	0	0	1	0	0	0	0	0	1	0	0	0	0	0	17
0.01004	-0.05539	0.00734	0.01553	-0.00655	0	0	1	0	0	0	1	0	0	0	0	0	0	0	18
0.03256	0.04825	0.01910	0.00679	0.00761	0	0	1	0	0	0	0	0	0	0	1	0	0	0	19
0.00297	0.03709	0.00273	-0.00540	0.01499	0	0	1	0	0	0	0	0	0	1	0	1	0	0	20
-0.04739	-0.00572	-0.01778	-0.02846	0.00866	0	0	1	0	0	0	0	1	0	0	0	0	1	0	21
0.00869	0.02428	0.00648	-0.01686	0.00320	0	0	1	0	0	0	0	1	0	0	0	0	0	0	22
-0.01183	0.02594	-0.00418	-0.00629	0.01770	0	0	1	0	0	0	0	0	0	0	1	0	0	0	23
-0.01136	0.03112	-0.01508	-0.00412	-0.00857	0	0	1	0	0	0	0	0	1	0	0	0	0	0	24
-0.00738	-0.02550	0.01051	-0.01501	0.01870	0	0	1	0	0	0	0	0	0	0	1	0	0	0	25
-0.02154	-0.04476	-0.01578	0.01793	0.00073	0	0	1	0	0	0	0	1	0	0	0	0	0	0	26

-0.02154	-0.04476	-0.01578	0.01793	0.00073	0	0	1	0	0	0	0	1	0	0	0	0	0	0	27
0.00807	0.03340	-0.00052	-0.01644	0.02083	0	0	1	0	0	0	0	0	0	1	0	1	0	0	28
-0.04266	-0.09883	-0.03367	0.00907	-0.01202	0	0	1	0	0	0	0	0	0	1	0	1	0	0	29
0.00453	-0.00671	-0.01018	-0.00415	0.01698	0	0	1	0	0	0	0	0	0	1	0	1	0	0	30
0.01346	-0.06918	0.02039	-0.01532	0.02493	0	0	1	0	0	0	0	0	0	0	1	0	0	0	31
0.00201	0.05414	-0.00922	0.02116	-0.02096	0	0	1	0	0	0	1	0	0	0	0	1	0	0	32
0.05471	0.06052	0.02054	-0.00787	0.04902	0	0	1	0	0	0	1	0	0	0	0	0	0	0	33
-0.01319	-0.03671	0.00728	-0.00256	0.00465	0	0	1	0	0	0	0	0	1	0	0	0	0	0	34
-0.01319	-0.03671	0.00728	-0.00256	0.00465	0	0	1	0	0	0	1	0	0	0	0	1	0	0	35
-0.01361	-0.02604	-0.01365	-0.01432	0.01152	0	0	1	0	0	0	1	0	0	0	0	1	0	0	36
-0.00956	-0.02173	-0.01570	0.01014	-0.00788	0	0	1	0	0	0	1	0	0	0	0	0	1	0	37
-0.00956	-0.02173	-0.01570	0.01014	-0.00788	0	0	1	0	0	0	0	0	1	0	0	0	0	0	38
0.02370	0.04562	-0.00669	-0.00024	-0.00875	0	0	1	0	0	0	0	0	0	0	1	0	0	0	39
0.03493	0.06898	-0.01154	0.03355	0.00071	0	0	1	0	0	0	0	0	0	0	1	0	0	0	40
0.03493	0.06898	-0.01154	0.03355	0.00071	0	0	1	0	0	0	0	0	1	0	0	0	0	0	41
0.07387	0.03040	0.02805	-0.02942	0.02713	0	0	1	0	0	0	1	0	0	0	0	0	1	0	42
-0.07454	-0.14950	0.00110	0.00676	-0.00454	0	0	1	0	0	0	0	0	1	0	0	0	0	1	43
-0.09409	-0.15889	0.00536	-0.00594	-0.02689	0	0	1	0	0	0	1	0	0	0	0	0	1	0	44
-0.06513	-0.14082	0.01044	-0.04898	0.00318	0	0	1	0	0	0	1	0	0	0	0	1	0	0	45
0.00599	0.06829	-0.00244	0.00627	-0.00623	0	0	1	0	0	0	1	0	0	0	0	1	0	0	46
0.06242	0.08100	-0.00505	0.00467	0.00611	0	0	1	0	0	0	1	0	0	0	0	0	1	0	47
0.07400	0.09619	0.00550	0.03953	0.01502	0	0	1	0	0	0	0	0	0	0	1	0	0	0	48
0.06947	0.09485	0.04039	0.01589	-0.00789	0	0	1	0	0	0	0	0	1	0	0	0	0	0	49
0.03222	0.00938	0.00387	0.00197	0.00235	0	0	1	0	0	0	1	0	0	0	0	1	0	0	50
-0.00185	0.05548	-0.01051	0.00390	0.00062	0	0	1	0	0	0	0	0	0	0	1	0	0	0	51
0.04379	0.02352	0.00957	0.01285	0.01632	0	0	1	0	0	0	0	0	0	0	1	0	0	0	52
-0.02918	-0.05440	-0.01527	-0.00642	0.01655	0	0	1	0	0	0	0	0	1	0	0	0	0	0	53
0.05348	0.08857	-0.00401	0.02283	0.01800	0	0	1	0	0	0	1	0	0	0	0	1	1	0	54

-0.03656	-0.01367	-0.01812	0.02182	0.01513	0	0	1	0	0	0	0	0	0	0	1	0	0	0	55
-0.04229	-0.06626	-0.01447	-0.02429	0.00717	0	0	1	0	0	0	0	1	0	0	0	0	0	0	56
0.00059	0.00401	0.00212	-0.00309	0.00258	0	0	1	0	0	0	1	0	0	0	0	0	0	0	57
0.02714	0.03267	0.01002	0.00039	0.00774	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1
0.02714	0.03267	0.01002	0.00039	0.00774	0	0	0	1	0	0	0	1	0	0	0	1	0	0	2
0.01998	0.00707	0.00774	0.02475	-0.01563	0	0	0	1	0	0	1	0	0	0	0	1	0	0	3
-0.05930	-0.08570	0.00357	-0.02444	-0.01401	0	0	0	1	0	0	0	0	1	0	0	0	0	1	4
0.01749	-0.00055	0.01425	0.01119	-0.01260	0	0	0	1	0	0	0	1	0	0	0	1	0	0	5
0.01749	-0.00055	0.01425	0.01119	-0.01260	0	0	0	1	0	0	1	0	0	0	0	1	0	0	6
-0.01793	0.00214	0.01381	-0.00279	-0.00034	0	0	0	1	0	0	0	0	1	0	0	0	0	1	7
0.02981	0.03373	-0.01136	-0.00531	0.02114	0	0	0	1	0	0	0	1	0	0	0	1	0	0	8
0.06814	0.05515	-0.00537	0.02197	0.02263	0	0	0	1	0	0	0	0	1	0	0	0	0	1	9
-0.00399	0.04494	-0.00661	-0.00447	-0.00009	0	0	0	1	0	0	1	0	0	0	0	0	0	0	10
-0.01868	0.00240	-0.01732	0.02340	-0.00923	0	0	0	1	0	0	0	0	0	0	1	0	0	0	11
-0.03354	-0.00500	0.01331	-0.02305	-0.00661	0	0	0	1	0	0	0	1	0	0	0	0	0	0	12
-0.03354	-0.00500	0.01331	-0.02305	-0.00661	0	0	0	1	0	0	0	0	1	0	0	0	0	0	13
0.02751	0.05702	0.01455	0.00497	-0.00097	0	0	0	1	0	0	1	0	0	0	0	0	0	0	14
-0.00414	-0.02286	0.00996	-0.01549	0.00619	0	0	0	1	0	0	0	1	0	0	0	0	0	0	15
-0.02105	0.02924	-0.00136	0.01155	-0.01221	0	0	0	1	0	0	0	0	1	0	0	0	0	0	16
-0.00240	0.01784	-0.01177	-0.01332	-0.00425	0	0	0	1	0	0	0	0	1	0	0	0	0	0	17
-0.03887	-0.07350	0.00207	0.00944	0.00037	0	0	0	1	0	0	1	0	0	0	0	0	0	0	18
-0.00924	0.00410	-0.00294	0.01003	0.00029	0	0	0	1	0	0	0	0	0	0	1	0	0	0	19
-0.01743	-0.01538	-0.01403	-0.00801	0.01314	0	0	0	1	0	0	0	0	0	1	0	1	0	0	20
-0.01414	-0.01942	-0.00839	-0.02370	0.01902	0	0	0	1	0	0	0	1	0	0	0	0	1	0	21
0.01467	-0.01679	0.01200	-0.00850	0.01657	0	0	0	1	0	0	0	1	0	0	0	0	0	0	22
-0.01415	0.00312	-0.00297	-0.02972	0.02145	0	0	0	1	0	0	0	0	0	0	1	0	0	0	23
0.00976	0.04474	-0.01704	0.01633	-0.00436	0	0	0	1	0	0	0	0	1	0	0	0	0	0	24
0.04169	0.06290	0.01322	0.00191	0.01219	0	0	0	1	0	0	0	0	0	0	1	0	0	0	25

0.04483	0.06531	0.00159	0.01146	0.01956	0	0	0	1	0	0	0	1	0	0	0	0	0	0	26
0.04483	0.06531	0.00159	0.01146	0.01956	0	0	0	1	0	0	0	1	0	0	0	0	0	0	27
-0.03278	-0.04188	0.00024	-0.01210	0.00833	0	0	0	1	0	0	0	0	0	1	0	1	0	0	28
-0.04398	-0.06013	-0.02720	-0.00608	-0.00021	0	0	0	1	0	0	0	0	0	1	0	1	0	0	29
0.04891	0.07446	0.00330	-0.00560	0.02706	0	0	0	1	0	0	0	0	0	1	0	1	0	0	30
-0.01432	-0.08652	0.01125	-0.01395	-0.01412	0	0	0	1	0	0	0	0	0	0	1	0	0	0	31
-0.00799	0.01959	0.01319	0.00355	-0.02317	0	0	0	1	0	0	1	0	0	0	0	1	0	0	32
0.02525	0.05095	0.00289	-0.00325	0.02397	0	0	0	1	0	0	1	0	0	0	0	0	0	0	33
0.01573	0.01705	0.00212	0.00026	0.01119	0	0	0	1	0	0	0	0	1	0	0	0	0	0	34
0.01573	0.01705	0.00212	0.00026	0.01119	0	0	0	1	0	0	1	0	0	0	0	1	0	0	35
-0.00770	-0.03569	-0.02595	-0.00412	0.02348	0	0	0	1	0	0	1	0	0	0	0	1	0	0	36
-0.00919	-0.01186	-0.00551	0.02250	-0.00727	0	0	0	1	0	0	1	0	0	0	0	0	1	0	37
-0.00919	-0.01186	-0.00551	0.02250	-0.00727	0	0	0	1	0	0	0	0	1	0	0	0	0	0	38
-0.05001	-0.07152	-0.01638	-0.00313	-0.02966	0	0	0	1	0	0	0	0	0	0	1	0	0	0	39
-0.05009	-0.01773	-0.02905	0.00204	-0.00259	0	0	0	1	0	0	0	0	0	0	1	0	0	0	40
-0.05009	-0.01773	-0.02905	0.00204	-0.00259	0	0	0	1	0	0	0	0	1	0	0	0	0	0	41
0.07055	0.07451	0.01860	-0.01851	0.01887	0	0	0	1	0	0	1	0	0	0	0	0	1	0	42
0.02810	-0.04166	0.01025	0.00092	0.02541	0	0	0	1	0	0	0	0	1	0	0	0	0	1	43
-0.00338	-0.05834	0.00063	0.02416	0.01091	0	0	0	1	0	0	1	0	0	0	0	0	1	0	44
-0.03233	-0.07764	-0.00751	-0.03513	0.00093	0	0	0	1	0	0	1	0	0	0	0	1	0	0	45
0.01016	0.06738	0.00225	0.00624	-0.02566	0	0	0	1	0	0	1	0	0	0	0	1	0	0	46
0.03406	0.08673	-0.02573	0.01856	0.00987	0	0	0	1	0	0	1	0	0	0	0	0	1	0	47
0.04948	0.09916	0.00867	0.02441	0.00466	0	0	0	1	0	0	0	0	0	0	1	0	0	0	48
0.04881	0.07997	0.02456	0.00372	0.00319	0	0	0	1	0	0	0	0	1	0	0	0	0	0	49
0.04066	0.01440	-0.01583	0.01066	0.02816	0	0	0	1	0	0	1	0	0	0	0	1	0	0	50
0.04315	0.07753	-0.00207	0.01241	0.01697	0	0	0	1	0	0	0	0	0	0	1	0	0	0	51
0.01942	0.00484	0.01625	0.00120	0.01101	0	0	0	1	0	0	0	0	0	0	1	0	0	0	52
0.00233	-0.01309	-0.00916	-0.01716	0.01384	0	0	0	1	0	0	0	0	1	0	0	0	0	0	53

0.00600	0.02498	0.00113	0.00708	-0.00056	0	0	0	1	0	0	1	0	0	0	0	1	1	0	54
-0.02571	-0.02131	-0.01540	0.02050	0.01172	0	0	0	1	0	0	0	0	0	0	1	0	0	0	55
-0.00614	-0.03510	-0.00448	-0.01673	0.01691	0	0	0	1	0	0	0	1	0	0	0	0	0	0	56
0.02427	0.05154	0.00438	0.00049	0.01566	0	0	0	1	0	0	1	0	0	0	0	0	0	0	57
0.01400	0.00660	0.00694	-0.01051	0.02239	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1
0.01400	0.00660	0.00694	-0.01051	0.02239	0	0	0	0	1	0	0	1	0	0	0	1	0	0	2
0.01506	0.02824	0.02239	0.00914	-0.01389	0	0	0	0	1	0	1	0	0	0	0	1	0	0	3
-0.00841	-0.04960	0.02771	-0.00785	-0.01473	0	0	0	0	1	0	0	0	1	0	0	0	0	1	4
-0.00879	-0.01090	0.00271	0.00092	-0.01050	0	0	0	0	1	0	0	1	0	0	0	1	0	0	5
-0.00879	-0.01090	0.00271	0.00092	-0.01050	0	0	0	0	1	0	1	0	0	0	0	1	0	0	6
-0.00158	0.00387	0.01424	0.00722	0.00004	0	0	0	0	1	0	0	0	1	0	0	0	0	1	7
0.02072	0.01933	-0.01360	0.00470	0.00740	0	0	0	0	1	0	0	1	0	0	0	1	0	0	8
0.04627	0.04025	0.00453	0.00741	0.01973	0	0	0	0	1	0	0	0	1	0	0	0	0	1	9
-0.00286	-0.00127	-0.00883	-0.00587	0.00173	0	0	0	0	1	0	1	0	0	0	0	0	0	0	10
-0.02358	-0.01813	-0.00691	0.01589	-0.01008	0	0	0	0	1	0	0	0	0	0	1	0	0	0	11
-0.02146	-0.02480	0.00967	-0.02547	0.00666	0	0	0	0	1	0	0	1	0	0	0	0	0	0	12
-0.02146	-0.02480	0.00967	-0.02547	0.00666	0	0	0	0	1	0	0	0	1	0	0	0	0	0	13
0.03741	0.08268	0.02043	0.01210	0.00506	0	0	0	0	1	0	1	0	0	0	0	0	0	0	14
0.01861	-0.01194	0.00809	-0.00804	0.01962	0	0	0	0	1	0	0	1	0	0	0	0	0	0	15
-0.02490	0.02814	-0.01246	0.01077	-0.01011	0	0	0	0	1	0	0	0	1	0	0	0	0	0	16
0.01874	0.00489	-0.01001	-0.01026	-0.00223	0	0	0	0	1	0	0	0	1	0	0	0	0	0	17
-0.02832	-0.07934	0.00632	0.00932	0.00264	0	0	0	0	1	0	1	0	0	0	0	0	0	0	18
0.00070	0.04054	0.00024	0.00968	0.00293	0	0	0	0	1	0	0	0	0	0	1	0	0	0	19
0.00246	-0.00057	-0.00810	-0.00831	0.01572	0	0	0	0	1	0	0	0	0	1	0	1	0	0	20
-0.02531	-0.02832	-0.00414	-0.02892	0.01855	0	0	0	0	1	0	0	1	0	0	0	0	1	0	21
0.01210	-0.01689	0.01284	-0.01352	0.01459	0	0	0	0	1	0	0	1	0	0	0	0	0	0	22
-0.05486	-0.03546	-0.00783	-0.03698	0.01606	0	0	0	0	1	0	0	0	0	0	1	0	0	0	23
-0.01286	0.01562	-0.02216	-0.00222	-0.00772	0	0	0	0	1	0	0	0	1	0	0	0	0	0	24

0.01543	0.04131	0.00549	-0.00317	0.01439	0	0	0	0	1	0	0	0	0	0	1	0	0	0	25
0.01650	0.05500	-0.00357	0.01417	0.01011	0	0	0	0	1	0	0	1	0	0	0	0	0	0	26
0.01650	0.05500	-0.00357	0.01417	0.01011	0	0	0	0	1	0	0	1	0	0	0	0	0	0	27
0.00373	0.01376	0.00173	-0.01026	0.01883	0	0	0	0	1	0	0	0	0	1	0	1	0	0	28
-0.05981	-0.07753	-0.03969	-0.00755	-0.00482	0	0	0	0	1	0	0	0	0	1	0	1	0	0	29
0.03883	0.04820	-0.00098	-0.00593	0.02292	0	0	0	0	1	0	0	0	0	1	0	1	0	0	30
-0.02751	-0.08810	0.00187	-0.01926	-0.01089	0	0	0	0	1	0	0	0	0	0	1	0	0	0	31
-0.02081	-0.05373	0.00100	-0.00193	-0.01757	0	0	0	0	1	0	1	0	0	0	0	1	0	0	32
-0.03349	-0.03239	-0.00180	-0.00119	-0.00743	0	0	0	0	1	0	1	0	0	0	0	0	0	0	33
-0.01632	-0.01950	-0.00468	-0.00541	0.00258	0	0	0	0	1	0	0	0	1	0	0	0	0	0	34
-0.01632	-0.01950	-0.00468	-0.00541	0.00258	0	0	0	0	1	0	1	0	0	0	0	1	0	0	35
0.01019	0.02082	-0.02070	-0.00761	0.03539	0	0	0	0	1	0	1	0	0	0	0	1	0	0	36
0.01315	0.04079	-0.00913	0.03423	-0.00777	0	0	0	0	1	0	1	0	0	0	0	0	1	0	37
0.01315	0.04079	-0.00913	0.03423	-0.00777	0	0	0	0	1	0	0	0	1	0	0	0	0	0	38
0.00103	-0.02580	-0.01387	0.00130	-0.00836	0	0	0	0	1	0	0	0	0	0	1	0	0	0	39
-0.02102	-0.00795	-0.00945	0.01923	0.00015	0	0	0	0	1	0	0	0	0	0	1	0	0	0	40
-0.02102	-0.00795	-0.00945	0.01923	0.00015	0	0	0	0	1	0	0	0	1	0	0	0	0	0	41
0.03880	0.05652	0.01373	-0.02321	0.01311	0	0	0	0	1	0	1	0	0	0	0	0	1	0	42
-0.00630	-0.06168	-0.00094	0.00947	0.00259	0	0	0	0	1	0	0	0	1	0	0	0	0	1	43
-0.02460	-0.06508	0.00900	0.00192	-0.00449	0	0	0	0	1	0	1	0	0	0	0	0	1	0	44
-0.03865	-0.07465	-0.00905	-0.03398	-0.00200	0	0	0	0	1	0	1	0	0	0	0	1	0	0	45
-0.00281	0.06269	-0.00422	-0.00323	-0.01260	0	0	0	0	1	0	1	0	0	0	0	1	0	0	46
0.03940	0.08852	-0.01264	0.00955	0.00816	0	0	0	0	1	0	1	0	0	0	0	0	1	0	47
0.04727	0.10257	0.00744	0.03346	-0.00018	0	0	0	0	1	0	0	0	0	0	1	0	0	0	48
0.06239	0.08313	0.03340	-0.00090	0.00075	0	0	0	0	1	0	0	0	1	0	0	0	0	0	49
-0.00858	-0.03389	-0.00446	-0.00823	-0.00273	0	0	0	0	1	0	1	0	0	0	0	1	0	0	50
0.02153	0.05934	-0.00030	0.00557	0.00274	0	0	0	0	1	0	0	0	0	0	1	0	0	0	51
0.02341	0.03403	0.01594	0.00286	0.00746	0	0	0	0	1	0	0	0	0	0	1	0	0	0	52

-0.00500	-0.02324	-0.01140	-0.00431	0.02323	0	0	0	0	1	0	0	0	1	0	0	0	0	0	53
0.00716	0.01544	0.00007	0.00424	0.00109	0	0	0	0	1	0	1	0	0	0	0	1	1	0	54
0.01156	0.03520	-0.00513	0.03025	0.01482	0	0	0	0	1	0	0	0	0	0	1	0	0	0	55
-0.00014	-0.02048	0.00174	0.00153	0.00425	0	0	0	0	1	0	0	1	0	0	0	0	0	0	56
-0.00854	-0.02163	-0.00732	-0.00108	-0.00116	0	0	0	0	1	0	1	0	0	0	0	0	0	0	57
0.00222	-0.00069	0.00745	-0.00623	0.01405	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1
0.00222	-0.00069	0.00745	-0.00623	0.01405	0	0	0	0	0	1	0	1	0	0	0	1	0	0	2
0.00477	0.02617	0.01468	0.00562	-0.01752	0	0	0	0	0	1	1	0	0	0	0	1	0	0	3
-0.04046	-0.08636	0.00649	-0.00229	-0.01969	0	0	0	0	0	1	0	0	1	0	0	0	0	1	4
-0.00876	-0.02731	0.01155	-0.00517	-0.01000	0	0	0	0	0	1	0	1	0	0	0	1	0	0	5
-0.00876	-0.02731	0.01155	-0.00517	-0.01000	0	0	0	0	0	1	1	0	0	0	0	1	0	0	6
-0.01344	0.02497	0.00633	0.00348	-0.00724	0	0	0	0	0	1	0	0	1	0	0	0	0	1	7
0.04878	0.03856	0.00018	0.00938	0.01478	0	0	0	0	0	1	0	1	0	0	0	1	0	0	8
0.05823	0.04225	0.00957	0.01477	0.01876	0	0	0	0	0	1	0	0	1	0	0	0	0	1	9
-0.01037	0.04139	-0.00245	-0.00980	-0.00884	0	0	0	0	0	1	1	0	0	0	0	0	0	0	10
-0.01495	-0.02085	-0.01003	0.01963	-0.00227	0	0	0	0	0	1	0	0	0	0	1	0	0	0	11
-0.06135	-0.05548	0.00801	-0.01818	-0.01568	0	0	0	0	0	1	0	1	0	0	0	0	0	0	12
-0.06135	-0.05548	0.00801	-0.01818	-0.01568	0	0	0	0	0	1	0	0	1	0	0	0	0	0	13
0.02424	0.04949	0.01744	0.00012	-0.00063	0	0	0	0	0	1	1	0	0	0	0	0	0	0	14
0.04790	0.01188	0.02006	-0.00054	0.00885	0	0	0	0	0	1	0	1	0	0	0	0	0	0	15
-0.01410	-0.02024	-0.00544	0.00988	-0.00710	0	0	0	0	0	1	0	0	1	0	0	0	0	0	16
0.00193	-0.02679	-0.00732	-0.00186	-0.00961	0	0	0	0	0	1	0	0	1	0	0	0	0	0	17
-0.00064	-0.07519	0.00463	0.01737	-0.00632	0	0	0	0	0	1	1	0	0	0	0	0	0	0	18
0.00683	0.02421	0.00869	0.00298	0.00598	0	0	0	0	0	1	0	0	0	0	1	0	0	0	19
0.00740	0.02030	-0.00425	-0.00196	0.01772	0	0	0	0	0	1	0	0	0	1	0	1	0	0	20
-0.03260	-0.02832	-0.00007	-0.01763	0.00904	0	0	0	0	0	1	0	1	0	0	0	0	1	0	21
0.00286	-0.02965	0.01134	-0.01553	0.00173	0	0	0	0	0	1	0	1	0	0	0	0	0	0	22
-0.01447	0.03435	0.00201	-0.00923	0.00889	0	0	0	0	0	1	0	0	0	0	1	0	0	0	23

0.00395	0.06031	-0.00983	-0.00467	-0.00792	0	0	0	0	0	1	0	0	1	0	0	0	0	0	24
0.00152	0.00956	-0.00170	-0.00547	0.02608	0	0	0	0	0	1	0	0	0	0	1	0	0	0	25
0.00371	-0.00082	-0.00584	0.02567	0.00765	0	0	0	0	0	1	0	1	0	0	0	0	0	0	26
0.00371	-0.00082	-0.00584	0.02567	0.00765	0	0	0	0	0	1	0	1	0	0	0	0	0	0	27
-0.01508	0.00353	-0.00353	-0.01543	0.01271	0	0	0	0	0	1	0	0	0	1	0	1	0	0	28
0.02069	-0.03505	-0.04170	0.02383	-0.00643	0	0	0	0	0	1	0	0	0	1	0	1	0	0	29
0.02000	-0.02286	-0.00287	-0.00095	0.01756	0	0	0	0	0	1	0	0	0	1	0	1	0	0	30
0.03218	-0.04746	0.02161	-0.01228	0.02390	0	0	0	0	0	1	0	0	0	0	1	0	0	0	31
-0.01206	0.00621	0.00069	0.00756	-0.02453	0	0	0	0	0	1	1	0	0	0	0	1	0	0	32
0.01824	0.01511	0.00925	-0.00372	0.01699	0	0	0	0	0	1	1	0	0	0	0	0	0	0	33
-0.01935	-0.01001	0.00755	-0.00340	0.00802	0	0	0	0	0	1	0	0	1	0	0	0	0	0	34
-0.01935	-0.01001	0.00755	-0.00340	0.00802	0	0	0	0	0	1	1	0	0	0	0	1	0	0	35
0.02210	0.00309	-0.00505	0.00399	0.02511	0	0	0	0	0	1	1	0	0	0	0	1	0	0	36
0.01396	-0.00700	0.00336	0.02410	-0.01126	0	0	0	0	0	1	1	0	0	0	0	0	1	0	37
0.01396	-0.00700	0.00336	0.02410	-0.01126	0	0	0	0	0	1	0	0	1	0	0	0	0	0	38
-0.02007	-0.02456	-0.01733	-0.03133	-0.01261	0	0	0	0	0	1	0	0	0	0	1	0	0	0	39
0.02157	0.06110	-0.01355	0.04157	-0.00125	0	0	0	0	0	1	0	0	0	0	1	0	0	0	40
0.02157	0.06110	-0.01355	0.04157	-0.00125	0	0	0	0	0	1	0	0	1	0	0	0	0	0	41
0.05902	0.00767	0.01481	-0.02250	0.01460	0	0	0	0	0	1	1	0	0	0	0	0	1	0	42
-0.06939	-0.12864	0.00664	-0.00466	-0.00016	0	0	0	0	0	1	0	0	1	0	0	0	0	1	43
-0.09195	-0.13353	-0.00504	-0.00155	-0.02676	0	0	0	0	0	1	1	0	0	0	0	0	1	0	44
-0.03658	-0.08332	-0.00250	-0.04161	0.01254	0	0	0	0	0	1	1	0	0	0	0	1	0	0	45
0.02576	0.12809	0.00027	0.01293	-0.01867	0	0	0	0	0	1	1	0	0	0	0	1	0	0	46
0.06654	0.12732	-0.01895	0.03522	-0.00442	0	0	0	0	0	1	1	0	0	0	0	0	1	0	47
0.07289	0.09976	-0.00614	0.03819	0.01416	0	0	0	0	0	1	0	0	0	0	1	0	0	0	48
0.09252	0.08899	0.03750	0.01386	0.00473	0	0	0	0	0	1	0	0	1	0	0	0	0	0	49
0.00030	-0.02619	-0.01264	0.01349	-0.00576	0	0	0	0	0	1	1	0	0	0	0	1	0	0	50
0.01098	0.04406	-0.00834	0.00631	0.00333	0	0	0	0	0	1	0	0	0	0	1	0	0	0	51

0.00721	-0.04230	0.00273	0.00145	0.00792	0	0	0	0	0	1	0	0	0	0	1	0	0	0	52
-0.03006	-0.03512	-0.01008	-0.02239	0.00527	0	0	0	0	0	1	0	0	1	0	0	0	0	0	53
0.04585	0.06554	-0.01397	0.02598	0.01606	0	0	0	0	0	1	1	0	0	0	0	1	1	0	54
-0.01904	-0.01014	-0.00743	0.02447	0.00829	0	0	0	0	0	1	0	0	0	0	1	0	0	0	55
-0.06781	-0.09159	-0.00929	-0.03319	-0.00283	0	0	0	0	0	1	0	1	0	0	0	0	0	0	56
0.03630	0.05198	0.01921	0.00308	0.00403	0	0	0	0	0	1	1	0	0	0	0	0	0	0	57
-0.01332	-0.01524	0.00509	-0.00777	0.00086	1	0	0	0	0	0	1	0	0	0	0	1	0	0	1
-0.01332	-0.01524	0.00509	-0.00777	0.00086	1	0	0	0	0	0	0	1	0	0	0	1	0	0	2
-0.01869	0.00028	0.00095	-0.00563	-0.00575	1	0	0	0	0	0	1	0	0	0	0	1	0	0	3
-0.01669	-0.02587	0.00108	-0.00215	-0.00041	1	0	0	0	0	0	0	0	1	0	0	0	0	1	4
0.00192	-0.00500	-0.00028	-0.00140	0.00471	1	0	0	0	0	0	0	1	0	0	0	1	0	0	5
0.00192	-0.00500	-0.00028	-0.00140	0.00471	1	0	0	0	0	0	1	0	0	0	0	1	0	0	6
-0.01057	0.00664	0.00604	-0.00109	-0.00140	1	0	0	0	0	0	0	0	1	0	0	0	0	1	7
0.02281	0.02169	-0.00260	0.00720	0.00484	1	0	0	0	0	0	0	1	0	0	0	1	0	0	8
0.02798	0.02268	0.00706	0.00453	0.01005	1	0	0	0	0	0	0	0	1	0	0	0	0	1	9
-0.00498	-0.00456	0.00156	-0.00331	-0.00610	1	0	0	0	0	0	1	0	0	0	0	0	0	0	10
-0.00298	0.00082	-0.00159	0.00351	-0.00223	1	0	0	0	0	0	0	0	0	0	1	0	0	0	11
-0.03087	-0.03040	0.00466	-0.01796	-0.00741	1	0	0	0	0	0	0	1	0	0	0	0	0	0	12
-0.03087	-0.03040	0.00466	-0.01796	-0.00741	1	0	0	0	0	0	0	0	1	0	0	0	0	0	13
0.00996	0.01623	0.00897	0.00415	-0.00478	1	0	0	0	0	0	1	0	0	0	0	0	0	0	14
0.00382	0.00355	0.01089	0.00158	-0.00163	1	0	0	0	0	0	0	1	0	0	0	0	0	0	15
-0.01559	-0.00184	-0.00170	0.00231	0.00220	1	0	0	0	0	0	0	0	1	0	0	0	0	0	16
-0.00407	0.00179	0.00244	-0.00211	-0.01583	1	0	0	0	0	0	0	0	1	0	0	0	0	0	17
0.00107	-0.01836	0.00131	0.01087	-0.00466	1	0	0	0	0	0	1	0	0	0	0	0	0	0	18
0.01703	0.03325	0.00467	0.01222	0.00052	1	0	0	0	0	0	0	0	0	0	1	0	0	0	19
0.00247	0.01099	-0.00118	-0.00228	0.01036	1	0	0	0	0	0	0	0	0	1	0	1	0	0	20
-0.01454	-0.01359	0.00186	-0.01720	0.00776	1	0	0	0	0	0	0	1	0	0	0	0	1	0	21
0.01470	-0.01472	0.00493	0.00076	0.00322	1	0	0	0	0	0	0	1	0	0	0	0	0	0	22

-0.03078	-0.02352	-0.00542	-0.01271	0.00493	1	0	0	0	0	0	0	0	0	0	1	0	0	0	23
-0.01095	-0.00073	-0.00997	-0.00704	-0.00325	1	0	0	0	0	0	0	0	1	0	0	0	0	0	24
-0.00527	0.01482	0.00355	-0.00009	0.00430	1	0	0	0	0	0	0	0	0	0	1	0	0	0	25
-0.00437	0.00576	-0.00016	0.00413	0.00222	1	0	0	0	0	0	0	1	0	0	0	0	0	0	26
-0.00437	0.00576	-0.00016	0.00413	0.00222	1	0	0	0	0	0	0	1	0	0	0	0	0	0	27
0.00222	-0.01408	0.00846	-0.00737	0.00712	1	0	0	0	0	0	0	0	0	1	0	1	0	0	28
-0.04878	-0.04783	-0.02698	0.00360	-0.01143	1	0	0	0	0	0	0	0	0	1	0	1	0	0	29
0.02844	0.00810	-0.00165	-0.00411	0.01674	1	0	0	0	0	0	0	0	0	1	0	1	0	0	30
-0.02034	-0.04513	0.00376	-0.02173	0.00312	1	0	0	0	0	0	0	0	0	0	1	0	0	0	31
0.00512	0.01677	-0.01001	0.00271	0.00276	1	0	0	0	0	0	1	0	0	0	0	1	0	0	32
0.01850	0.02367	0.00886	0.00104	-0.00533	1	0	0	0	0	0	1	0	0	0	0	0	0	0	33
-0.01046	-0.00312	0.00549	-0.00554	0.00500	1	0	0	0	0	0	0	0	1	0	0	0	0	0	34
-0.01046	-0.00312	0.00549	-0.00554	0.00500	1	0	0	0	0	0	1	0	0	0	0	1	0	0	35
-0.02239	-0.06467	-0.00015	-0.01791	0.00205	1	0	0	0	0	0	1	0	0	0	0	1	0	0	36
-0.04518	-0.06081	-0.01789	0.00299	-0.01267	1	0	0	0	0	0	1	0	0	0	0	0	1	0	37
-0.04518	-0.06081	-0.01789	0.00299	-0.01267	1	0	0	0	0	0	0	0	1	0	0	0	0	0	38
-0.01676	-0.04062	-0.03796	0.01225	-0.01709	1	0	0	0	0	0	0	0	0	0	1	0	0	0	39
-0.01899	-0.01066	-0.01826	0.02904	-0.00411	1	0	0	0	0	0	0	0	0	0	1	0	0	0	40
-0.01899	-0.01066	-0.01826	0.02904	-0.00411	1	0	0	0	0	0	0	0	1	0	0	0	0	0	41
0.03203	-0.00756	0.01076	-0.01948	0.00738	1	0	0	0	0	0	1	0	0	0	0	0	1	0	42
-0.03108	-0.08456	0.00271	-0.00601	0.00891	1	0	0	0	0	0	0	0	1	0	0	0	0	1	43
-0.05052	-0.09940	-0.00631	0.00854	-0.00770	1	0	0	0	0	0	1	0	0	0	0	0	1	0	44
-0.02902	-0.07036	0.00079	-0.03911	-0.00623	1	0	0	0	0	0	1	0	0	0	0	1	0	0	45
0.03022	0.09411	-0.00253	0.00497	-0.00484	1	0	0	0	0	0	1	0	0	0	0	1	0	0	46
0.06241	0.09947	-0.00652	0.01893	0.01085	1	0	0	0	0	0	1	0	0	0	0	0	1	0	47
0.06422	0.09604	0.01093	0.03126	0.00768	1	0	0	0	0	0	0	0	0	0	1	0	0	0	48
0.05689	0.08517	0.03132	0.00753	-0.00096	1	0	0	0	0	0	0	0	1	0	0	0	0	0	49
0.04173	0.03130	-0.00641	0.01553	0.00851	1	0	0	0	0	0	1	0	0	0	0	1	0	0	50

0.00972	0.01850	-0.00074	0.00976	0.00159	1	0	0	0	0	0	0	0	0	0	1	0	0	0	51
-0.01353	-0.06478	0.00197	-0.01018	0.01178	1	0	0	0	0	0	0	0	0	0	1	0	0	0	52
-0.03822	-0.04585	-0.01708	-0.01636	-0.00598	1	0	0	0	0	0	0	0	1	0	0	0	0	0	53
0.02045	0.03087	0.00255	0.00855	0.00465	1	0	0	0	0	0	1	0	0	0	0	1	1	0	54
-0.03021	-0.01778	-0.01697	0.01906	0.01219	1	0	0	0	0	0	0	0	0	0	1	0	0	0	55
-0.02771	-0.03231	-0.00256	-0.00894	0.00154	1	0	0	0	0	0	0	1	0	0	0	0	0	0	56
-0.00084	0.00517	0.00376	-0.00246	0.00149	1	0	0	0	0	0	1	0	0	0	0	0	0	0	57
0.02078	0.03154	-0.00387	0.00148	0.02628	0	1	0	0	0	0	1	0	0	0	0	1	0	0	1
0.02078	0.03154	-0.00387	0.00148	0.02628	0	1	0	0	0	0	0	1	0	0	0	1	0	0	2
0.03413	0.04868	0.02649	0.00939	-0.01276	0	1	0	0	0	0	1	0	0	0	0	1	0	0	3
-0.03688	-0.07199	0.01549	-0.00124	-0.01871	0	1	0	0	0	0	0	0	1	0	0	0	0	1	4
-0.02388	-0.04225	-0.00100	0.00770	-0.02254	0	1	0	0	0	0	0	1	0	0	0	1	0	0	5
-0.02388	-0.04225	-0.00100	0.00770	-0.02254	0	1	0	0	0	0	1	0	0	0	0	1	0	0	6
-0.01295	0.01669	0.00989	-0.00479	0.00203	0	1	0	0	0	0	0	0	1	0	0	0	0	1	7
0.05842	0.04053	-0.00147	0.00632	0.01781	0	1	0	0	0	0	0	1	0	0	0	1	0	0	8
0.06058	0.04117	0.00656	0.01778	0.01426	0	1	0	0	0	0	0	0	1	0	0	0	0	1	9
-0.01080	0.01689	-0.00344	-0.00930	-0.00542	0	1	0	0	0	0	1	0	0	0	0	0	0	0	10
-0.03303	-0.02232	-0.01267	0.01745	-0.00761	0	1	0	0	0	0	0	0	0	0	1	0	0	0	11
-0.04137	-0.05697	0.01154	-0.01561	-0.01073	0	1	0	0	0	0	0	1	0	0	0	0	0	0	12
-0.04137	-0.05697	0.01154	-0.01561	-0.01073	0	1	0	0	0	0	0	0	1	0	0	0	0	0	13
0.02176	0.08316	0.02280	-0.00229	-0.00008	0	1	0	0	0	0	1	0	0	0	0	0	0	0	14
0.00722	-0.03158	0.01252	-0.00473	0.00781	0	1	0	0	0	0	0	1	0	0	0	0	0	0	15
-0.00701	0.00224	-0.00381	0.01036	-0.00752	0	1	0	0	0	0	0	0	1	0	0	0	0	0	16
0.01018	0.00290	-0.00709	-0.00274	-0.00233	0	1	0	0	0	0	0	0	1	0	0	0	0	0	17
-0.00941	-0.07770	0.00213	0.00909	-0.00205	0	1	0	0	0	0	1	0	0	0	0	0	0	0	18
0.01271	-0.00191	0.01377	0.00374	0.00257	0	1	0	0	0	0	0	0	0	0	1	0	0	0	19
-0.02042	-0.01596	-0.00039	-0.01528	0.01689	0	1	0	0	0	0	0	0	0	1	0	1	0	0	20
-0.05295	-0.04370	-0.01521	-0.02761	0.00485	0	1	0	0	0	0	0	1	0	0	0	0	1	0	21

0.00198	-0.01012	0.00721	-0.00892	0.00364	0	1	0	0	0	0	0	1	0	0	0	0	0	0	22
0.01597	0.06694	0.00725	-0.01156	0.00584	0	1	0	0	0	0	0	0	0	0	1	0	0	0	23
0.03847	0.06487	0.00800	0.00496	0.00448	0	1	0	0	0	0	0	0	1	0	0	0	0	0	24
0.00322	0.00649	0.00268	-0.00842	0.00777	0	1	0	0	0	0	0	0	0	0	1	0	0	0	25
0.00425	0.00910	-0.00849	0.00741	0.00743	0	1	0	0	0	0	0	1	0	0	0	0	0	0	26
0.00425	0.00910	-0.00849	0.00741	0.00743	0	1	0	0	0	0	0	1	0	0	0	0	0	0	27
0.02333	0.06856	0.01188	-0.01114	0.01910	0	1	0	0	0	0	0	0	0	1	0	1	0	0	28
-0.01872	-0.08582	-0.02342	0.02370	0.00207	0	1	0	0	0	0	0	0	0	1	0	1	0	0	29
0.03493	0.01682	0.00801	-0.01425	0.01814	0	1	0	0	0	0	0	0	0	1	0	1	0	0	30
-0.00925	-0.07850	0.02161	-0.01238	0.02044	0	1	0	0	0	0	0	0	0	0	1	0	0	0	31
0.01211	0.06735	0.00676	0.00563	-0.01875	0	1	0	0	0	0	1	0	0	0	0	1	0	0	32
0.05970	0.07195	0.02032	-0.00406	0.04650	0	1	0	0	0	0	1	0	0	0	0	0	0	0	33
-0.00113	-0.00550	0.00190	0.00104	0.00269	0	1	0	0	0	0	0	0	1	0	0	0	0	0	34
-0.00113	-0.00550	0.00190	0.00104	0.00269	0	1	0	0	0	0	1	0	0	0	0	1	0	0	35
0.00366	-0.04435	-0.01678	-0.00114	0.01068	0	1	0	0	0	0	1	0	0	0	0	1	0	0	36
0.00137	-0.02941	-0.00248	0.00998	-0.01319	0	1	0	0	0	0	1	0	0	0	0	0	1	0	37
0.00137	-0.02941	-0.00248	0.00998	-0.01319	0	1	0	0	0	0	0	0	1	0	0	0	0	0	38
-0.02892	-0.02193	-0.04232	0.00308	-0.01567	0	1	0	0	0	0	0	0	0	0	1	0	0	0	39
0.00586	0.03003	-0.01689	0.03194	-0.00729	0	1	0	0	0	0	0	0	0	0	1	0	0	0	40
0.00586	0.03003	-0.01689	0.03194	-0.00729	0	1	0	0	0	0	0	0	1	0	0	0	0	0	41
0.05972	0.02100	0.01459	-0.01668	0.01003	0	1	0	0	0	0	1	0	0	0	0	0	1	0	42
-0.06008	-0.14425	0.00563	-0.00317	-0.00529	0	1	0	0	0	0	0	0	1	0	0	0	0	1	43
-0.08564	-0.15814	-0.00349	-0.00615	-0.02668	0	1	0	0	0	0	1	0	0	0	0	0	1	0	44
-0.04301	-0.08620	0.01563	-0.04773	-0.00208	0	1	0	0	0	0	1	0	0	0	0	1	0	0	45
0.02335	0.10066	-0.00062	0.00556	-0.00721	0	1	0	0	0	0	1	0	0	0	0	1	0	0	46
0.06977	0.10273	-0.00803	0.02105	0.00333	0	1	0	0	0	0	1	0	0	0	0	0	1	0	47
0.07810	0.09493	0.00273	0.04107	0.01102	0	1	0	0	0	0	0	0	0	0	1	0	0	0	48
0.07163	0.06930	0.04096	0.01056	-0.00513	0	1	0	0	0	0	0	0	1	0	0	0	0	0	49

0.04387	0.03625	-0.00460	0.00521	0.00541	0	1	0	0	0	0	1	0	0	0	0	1	0	0	50
-0.00451	0.05346	-0.00671	0.00846	-0.01085	0	1	0	0	0	0	0	0	0	0	1	0	0	0	51
0.05026	0.05686	0.02034	0.00407	0.02511	0	1	0	0	0	0	0	0	0	0	1	0	0	0	52
0.02718	0.02829	-0.02211	0.00129	0.04161	0	1	0	0	0	0	0	0	1	0	0	0	0	0	53
0.03588	0.04684	0.00401	0.01705	0.00320	0	1	0	0	0	0	1	0	0	0	0	1	1	0	54
-0.07447	-0.05962	-0.02281	0.01885	-0.03263	0	1	0	0	0	0	0	0	0	0	1	0	0	0	55
-0.02727	-0.05831	-0.01475	-0.00666	0.01037	0	1	0	0	0	0	0	1	0	0	0	0	0	0	56
0.03328	0.05391	0.00363	0.03152	0.00138	0	1	0	0	0	0	1	0	0	0	0	0	0	0	57