2018-7

An Analysis of the Effects of Political Events on Oil Price Volatility and Consequential Spillover Effects on Selected GCC Stock Markets: An Emphasis on the Case of Kuwait

Yousef Abdulrazzaq
Technological University Dublin

An Analysis of the Effects of Political Events on Oil Price Volatility and Consequential Spillover Effects on Selected GCC Stock Markets:
An Emphasis on the Case of Kuwait

By

Yousef M. Abdulrazzaq

Supervisors

Dr. Lucia Morales
Prof. Joseph Coughlan

A dissertation submitted for the degree of
Doctor of Philosophy in Finance

July 2018

School of Accounting and Finance

Dublin Institute of Technology

Dublin-Ireland

****

Dedicated

to

My loving Parents, Wife and my kids with all my love,
gratitude and respect

****

Abstract

The purpose of this research is to identify how episodes of sustained market uncertainty due to political events can affect oil price behavior and potentially generate spillover effects to the stock markets of Kuwait, the Kingdom of Saudi Arabia (KSA) and the UAE. Three major events associated with significant levels of market uncertainty are examined: the Iraqi invasion of Kuwait in 2003, the Global Financial Crisis (GFC or the US Financial Crisis) in 2008, and the Arab Spring Revolution in 2011 – with the aim of identifying interlinkages between oil prices and the performance of the Kuwaiti, Saudi and the UAE stock markets. The study uses daily data collected from the Kuwait Stock Exchange (KSE), the Saudi Stock Exchange (TASI), the Abu Dhabi Securities Exchange (ADX), the Dubai Financial Market (DFM) and the United States Energy Information Administration (EIA) that were cross-checked with data available on DataStream. Well-known econometric models such as the Vector Autoregressive test, Cointegration tests (e.g. the Engle Granger and Johansen approaches), the Granger causality test and a more up to date model dealing with dynamic causality (frequency domain or spectral causality) were also implemented to help strengthen the research outcomes. The time period under study was conditioned to data availability issues and spanned between 1995 and 2016.

The key research findings did not find significant evidence on the existence of a long run association between Brent oil prices and all four major stock price indices. The outcomes in the context of short run dynamics offered richer insights on regional dynamics. In the case of Kuwait, Granger causal effects from Brent returns to stock returns are reported for all cases except for the period of the Arab Spring Revolution. The results in the case of the KSA are similar to those registered for Kuwait with the exception of unidirectional causality running from stock returns to Brent returns during the US Financial Crisis. Dubai and Abu Dhabi exhibit a mixed type of behavior, as for example, in the case of Dubai no causal relationship is found during the Iraqi invasion and the US Financial Crisis. However, in the case of Abu Dhabi there is evidence of unidirectional causality running from Brent to stock returns during the GFC, while stock market returns signal a causal effect on Brent returns during the Arab Spring revolution. The outcomes for dynamic causality indicate that there is evidence of causal effects between the Kuwaiti stock market and Brent during early stages of the analyzed sample that connected to the Iraqi invasion period, and short run dynamics between Brent and stock returns during the GFC.

In the case of the KSA, there is no evidence of dynamic causality running from Brent returns to stock returns. On the other hand, the dynamics are quite different when looking at stock returns causal effects on Brent returns, as evidence of a short run association is identified during the three shock events. In the case of the UAE, there is evidence of unidirectional causality from stock returns to Brent returns during the Iraqi invasion period. The outcomes for the volatility analysis (GARCH modeling) report stable results for the full sample period. However, when shock events are considered the GARCH model is not able to capture volatility effects and exhibits explosive behaviour for all countries and periods except for the case of Abu Dhabi, where the model remains stable during the Iraqi invasion and the Arab Spring revolution. The overall research findings indicate the existence of short-run dynamics between oil and the analysed stock markets in the Gulf Cooperation Council (GCC) region with lack of evidence on the existence of a long run relationship. The research outcomes from this thesis are significant for market players, governments and policy makers who should consider monitoring closely the relationship between oil and stock markets in the GCC region, as they are exhibiting dynamic behaviour in a context of oil dependent economies.

Key Words: Kuwait, KSA, UAE, Stock Markets, Oil prices, Market uncertainty, Dynamic Causality

Declaration

I, Yousef M. Abdulrazzaq, declare that this thesis and its content are the results of my own individual efforts and have been produced by me based on the results of my own original findings. This thesis is exclusively the work of the author and is submitted for the fulfilment of the requirements of Doctor of Philosophy at the Dublin Institute of Technology. I confirm that all material that has been utilized for the accomplishment of this thesis is presented in the references section.

Signature: ___________________________

Date: ________________________________

ACKNOWLEDGEMENTS

All the praises and admiration for ALLAH Almighty, without His blessings and guidance, I would never be able to complete my thesis. I am heartily thankful to my supervisors Dr. Lucia Morales and Prof. Joseph Coughlan, who guided and supported me on every step of my research. They actively facilitated my endeavors throughout the whole period of my work. I owe my deepest gratitude to my parents, who always had ambitions for me; without their help, encouragement and prayers, I could complete my thesis. In addition, thanks are due to my brothers and sisters who always prayed for my success and I cannot forget their cooperation through the study period. I would like to talk about my wife, who has been there for me since the PhD work started and who was always supporting and encouraging me and my work at every phase. She has provided endless support that was necessary to keep me on course at every stage. Finally, I would like to dedicate my PhD thesis to my lovely children who are the pride and joy of my entire life.

"The stock Market is a device for

transferring money from the

impatient to the patient"

--Warren Buffett--

List of Abbreviations

Words	Abbreviation
ABE	Abu Dhabi Stock Prices
ABER	Abu Dhabi Stock Returns
ACF	Autocorrelation Function
ADX	Abu Dhabi Securities Exchange
AIC	Akaike information criterion
AMF	Arab Monetary Fund
ARCH	Autoregressive Conditional Heteroscedasticity
ARMA	Autoregressive Moving Average
BP	Brent Prices
BPR	Brent Returns
CBK	Central Bank of Kuwait
CCFI	Consulting Centre for Finance and Investment
CMA	Capital Market Authority
CML	Capital Market Law
DBE	Dubai Stock Prices
DBER	Dubai Stock Returns
DFM	Dubai Financial Market
ECM	Error Correction Model
EG	Engle-Granger
EGX	Egyptian Exchange
EIA	Energy Information Administration
FDCM	Frequency Causality Domain Model
GARCH	Generalized Autoregressive Conditional Heteroscedasticity
GB	Gulf Bank
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GIC	Gulf Investment Corporation
HQC	Hannan-Quinn information criteria
IMF	International Monetary Fund
JJ	Johansen and Julius

KIA	Kuwait Investment Authority
KPSS	Kwiatkowski–Phillips–Schmidt–Shin
KSA	Kingdom of Saudi Arabia
KSE	Kuwait Stock Exchange
KWD	Kuwaiti Dinar
LM	Lagrange Multiplier
MENA	Middle East and North Africa region
NBK	National Bank of Kuwait
NCFEI	National Centre for Financial and Economic Information
OLS	Ordinary Least Square
OPEC	Organization of the Petroleum Exporting Countries
PP	Phillips-Perron
SAARC	South Asian Association for Regional Cooperation
SIC	Schwarz's Bayesian information criteria
SP	Stock Prices
SPC	Supreme Petroleum Council
SR	Stock Returns
STM	Saudi Stock Market
TASI	Tadawul All Share Index
UAE	United Arab Emirates
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
WB	World Bank
WDI	World Development Indicators

Table of Contents

List of Tables

CHAPTER 1

INTRODUCTION

1.0 Introduction

Oil is considered as the most global and important energy resource, because it plays such a significant role in the development of world economies. Existing research in the field has focused its attention on the analysis of energy prices and their implications for the performance of global growth (Alrezki et al., 2017; Al-Qudsi & Ali, 2016; Killian, 2007; Ahmed, 2003). For instance, Driespong, Jacobsen and Matt (2008) used stock market data from 48 countries, a world market index, and oil spot prices for three main indices - Oil-Brent, Dubai and West Texas Intermediate - and concluded that stock growth seem to underreact to oil price fluctuations. Narayan and Gupta (2015) implemented a least square estimator using over 150 years of monthly data and found evidence of nonlinear predictability, suggesting that negative oil prices have predictive power over the US stock returns. Jones and Kaul (1996) implemented Granger-Precedence testing on oil prices and the use of real cash flows to explore if the stock exchange markets in the US, Canada, Japan and the UK were rational or if they were found to overreact to new information. The study found that the response of the stock exchange market in the US and Canada to oil price changes reflected the influence of news on present and future cash flows. On the other hand, Jones and Kaul (1996) were unable to explain the reaction of the Japanese and the UK stock markets within the context of a rational asset-pricing model. Hamilton and Herrera (2002) found that the oil price shocks experienced in 1970s had a negative impact on stock returns. Malik's (1999) findings suggest that oil price shocks and stock returns are negatively correlated. He found that higher oil prices will raise production costs and eventually the returns will decline as any such positive change in oil prices will influence economic activities and will become a better element in explaining the forecast error variance of stock returns. Jones et al. (2004) found that oil prices could influence stock markets through numerous channels. The cost of equity leads to higher oil prices that enhance the rate of interest to restrict inflationary pressures and tighten business costs, resulting in lower potential gains.

The consensus is that asset prices are closely correlated to economic events (Jiang et al., 2016; Garima and Gauruama, 2013; Abdelbaki, 2013; Ansani, 2012; Filis et al., 2010; Paleari, 2005; Amihud and Wohl, 2004). It has been noted that crude oil is the most influential physical commodity in the globe and it is regarded as an essential macroeconomic variable that influences the stock market. It also affects real economic growth and aggregate supply in both developing and developed countries, as the fluctuations in oil prices play a fundamental role in respect of different economic activities and indicators such as inflation, aggregate demand, imports, exchange rates, exports, real economic development and employment. Consequently, it is expected that price shocks affecting oil markets will have major impact on stock markets (Schubert, 2014; Kisswani, 2011; Meager, Jiang and Drysdale, 2007; Hamilton, 2003).

Kuwait is a leading oil producer and is in the top eight listings of crude oil producers in 2016 (OPEC, 2017). Furthermore, its government revenues, earnings and aggregate demand are positively influenced by higher oil prices (Arouri and Rault, 2010). In addition, Kuwait possesses slightly more than 6% of the world's reserves (CIA, 2016). Petroleum accounts for nearly half of the country's GDP, approximately 95% of export revenues, and 95% of government income (CIA, 2017). The returns on Kuwaiti stock markets are very sensitive to oil price changes as it is the main source of revenue. In addition to this and in comparison with other stock markets, Kuwaiti stock markets are sensitive to political events and given the history of regional disturbance in the area. For example, the downfall of the old regime in Baghdad, in 2003, only served to prove that point, as it resulted in impacting on Kuwait's economy and the performance of its stock market. The regime changes in Iraq have had myriad effects on Kuwait, where one of the most prominent outcomes is a lowered risk premium in the market. This change greatly affected corporate profitability, as is reflected by how market movement improved by more than 100% during the first nine months of 2003 (Global Investment House Market Outlook, 2004). In addition, due to the Arab Spring that took place in 2011, the Kuwaiti price index dipped by 10.69% by the end of 2011 (Global Investment House Market report, 2011).

However, Kuwait has witnessed significant oil prices fluctuations during the 1995 and 2016 timeframe and oil prices also rose by up to 140% between 2003 and 2007 (Schubert, 2014). The price of oil increased to USD 40–USD 50 per barrel by the end of 2004 due to the Second Gulf War and the dependency of North East Asia on the Middle East for over three quarters of its crude oil imports (Bingbing et al., 2011; Meager, Jiang and Drysdale, 2007; Yetiv and Lu, 2007). For example, Japan was dependent on the Middle East for 89% of its crude oil needs, Korea for 78% and China for 45% (Meagher, Jiang and Drysdale, 2007). In June 2005, oil prices went above USD 60, reaching USD 77 in July 2006, and in October 2007, oil prices reached above USD 90 per barrel (Kisswani, 2011). The main causes behind the shocks registered during the period 2007–2008 are identified as follows: (1) failure of production to meet the global demand between 2005–2007; (2) growing oil demand particularly in China where consumption in 2007 was 870,000 barrels per day and (3) speculation by investors who buy oil not as a commodity to use but as a financial asset (Hamilton, 2009; Killian, 2008). As a consequence of the world economic crisis, early 2009 witnessed a global recession, which led to substantial decline in oil prices to around USD 40 per barrel. By spring 2011, the price reached USD 100 per barrel due to significant demand from emerging economies such as Brazil, China, India and Russia (Scuhbert, 2014). In June 2014, oil prices reached USD 115 and Gause (2015) showed that the drop in world oil prices was due to two main factors: (1) geopolitical issues: the struggle for regional influence between Saudi Arabia and Iran, which are heavily dependent on oil to support their economies, and Russia, which is trying to re-establish its regional influence two decades after the collapse of the Soviet Union, a country that also relies heavily on oil. Declining government revenues in these countries indicates the high cost of a competitive regional policy (Cubujcuoglu, 2017; Mitrova, 2015); for example, Iran's support for its allies Bashar al-Assad in Syria and Hezbollah in Lebanon, or the billions that Saudi Arabia and other Gulf countries committed to the Sisi government in Egypt. (2) However, the reason behind the collapse of oil prices in 2014 can be explained by the market glut created by Saudi Arabia (Khouli, and Ghafar, 2015; Abusaaq et al. 2015). Furthermore, Saudi Arabia is planning to use its financial reserves to put pressure on high-cost oil producers in North America, where the surge in production played a major role in the market collapse in the 2014 (Gause, 2015). The price collapse experienced by the sector in September 2014 cannot be explained by an increase in Saudi production levels. The amount of oil produced per day by Saudi Arabia in 2014 was equivalent to that of 2013, when prices closed for the year at above USD 100 per barrel. During the same year, US production levels rose above one million barrels per day and this was a significant increase (Ebinger, 2014).

The increase in oil prices between 2003 and 2007 brought more money to Kuwait, which positively affected the stock exchange (Hammoudeh & Alesia, 2004). Similarly, later in 2014 the dramatic drop in oil prices led to lower trading activities, and primary price levels in the Kuwaiti stock market (KSE) (Central Bank of Kuwait Annual Report, 2014). Therefore, the analysis and identification of changes in oil prices on the Kuwaiti stock market index can help investors make more educated investment decisions and offer new information to policy-makers on how to regulate stock markets in an efficient manner. By making industry-specific returns, the market may gain benefits such as risk management, performance attribution, and investment skill evaluation. Consequently, a study revolving around the Kuwait stock exchange market and stock index should be of great interest, considering the role of the KSE in the regional context.

The analysis proposed in this thesis aims to target the impact of political events on oil price volatility and potential spillover effects on to the Kuwait Stock Exchange (KSE) index. An initial point to highlight is that most of the existent research in the field is usually directed towards the developed economies of oil-importing countries, (for example Dreisprong, Jacobsen & Maat 2008, Basher & Sadorskey 2006, Jones & Kaul 1996).

The impact of oil price changes on oil-exporting economies varies greatly when compared to those of oil-importing countries. Moreover, increases in oil prices are strongly correlated to increases in national income. Furthermore, while previous studies were mainly concerned with oil-importing countries, there are few studies that analyze the interactions between oil prices fluctuations and their dynamics on economies of oil-exporting countries (Al-Fayoumi, 2009; Demirer et al. 2015; Akoum et al., 2012 and Arouri, et al., 2010). The majority of previous studies focus their attention on the Gulf Cooperation Council (GCC) countries as a whole (Azar and Basmajian, 2013; Mohanty et al., 2011; Arouri et al., 2010; Jouini, 2013; Naifar and Dohaiman, 2013; Sahu et al., 2014).

The main literature in the field focuses its attention on the analysis of oil price volatility and its implications for stock markets in the GCC. For example, a recent study looks at the GCC countries from the perspective of oil exporting countries (Jouini, 2013). Mohanty, Nandha, Turkistani and Alaitani (2011) examined the relationship between oil price changes and stock prices of GCC countries using country-level and industry-level stock returns. The study found that, at country level, a significant positive relationship exists between oil price changes and stock returns in GCC countries, except in the case of Kuwait. However, the reviewed studies do not offer sufficient evidence on the impact of political issues on oil price volatility and its spillover effects on the Kuwaiti stock market. Moreover, there is also a lack of analysis focusing on the case of small oil exporting countries, justifying the purpose of this research, which aims to examine the relationship between oil price volatility and the major stock markets in the Gulf Region, such as Saudi Arabia and the United Arab Emirates with special emphasis on the case of Kuwait. The occurrence of events related to market uncertainty, such as the repeated shocks affecting the supply of oil combined with quick changes in foreign oil markets, have left many economies badly affected. Such uncertainty can also affect the policies adopted by Kuwait, the KSA and the UAE since they are highly dependent on the oil sector as their main exported commodity, and as such, they are broadly exposed and susceptible to economic disruptions related to oil price fluctuations.

1.1 Main Research Question

This study will try to answer the following research questions:

Do Political events impact on the relationship between oil prices and the Gulf Region Stock markets? This question is broken into two main parts as follows:

Do oil price changes derived from the impact of political events affect the Kuwait, KSA and UAE stock markets indices?

What are the main factors explaining the effect of oil price changes on the Kuwait, KSA and UAE stock markets indices?

Oil is a dominant energy resource in the global context and as such, it is very important from the geostrategic point of view. According to the OPEC Annual Statistical Bulletin (2016), Saudi Arabia, Kuwait and the UAE together produce about 20% of the world oil production, and the account for 38% of proven world oil reserves, and control 54% of OPEC oil exports. Consequently, oil revenues are the main source of income for the region and their dictate government budget revenues, expenditures, and aggregate demand.

Historically, the Middle East and its Persian Gulf region have been considered as a volatile region due to many geopolitical issues, especially the Iraq invasion in 2003, the Global Financial Crisis 2008, and Arab Spring Revolution 2011 among many others (Cubukcuoglu, 2017). In 2003, the Iraq invasion generated an adverse psychological reaction in stock prices and consumer sentiment along with depressed consumer spending, particularly on consumer durables, and reduced business investment in Kuwait. The Iraq's invasion of Kuwait caused extensive physical damage to the territory and it resulted in large budgetary and balance of payments deficits. Moreover, it disordered the domestic and financial markets, halted foreign trade and disabled the labour market. Over 60 per cent of the existing oil bores were set on fire by Iraq, creating an automatic shutdown of production, which essentially halted all foreign trade and drove the economy to a halt. As the territory's oil bores were set on fire, water sources and the environment were severely damaged (Sab, 2014). The US financial crisis of 2008 has spillover effects towards the GCC region, impacting on its oil exports as global economic powers were facing significant restrictions on liquidity and capital flows. The Arab Spring of 2011 was of significant importance to Kuwait, as the KSE was hit hardest among the GCC countries' stock markets. The Kuwait price index fell by 10.69% by the end of the year, levelling out at 6,211.70 points (Abumustafa, 2016). Due to these geopolitical events the economies of Kuwait, KSA and UAE showed the high exposure to global and regional events and highlighted the urgency of diversifying their economies as disruptions in the oil sector are threating the region development and potential growth.

The coastal area of the Persian Gulf is the world's largest crude oil source and all industries related to this dominate the region. The Middle Eastern region remains an area of unresolved and dangerous conflicts with significant involvement of external powers and arms proliferation, where Kuwait, KSA and UAE are the countries located nearby this water basin as a such they are severely affected by continuous conflicts (Arouri and Fouquau (2009). The GCC region economic development is linked to the oil sector, and as such a rise in oil prices leads to increases on the inflation rate that creates pressures on these economies. Consequently, it might affect interest rates and as a result, it conditions investment levels. It is further noted that because of unused energy resources of this region, local authorities and key external players believe that if political conflicts are resolved, economic prosperity and cooperation could further transform the region.

Kuwait is broadly susceptible and sensitive to economic bumps such as unstable oil prices. Thus, the main research and the sub research questions will focus their attention on how political events affects oil price volatility and its spillover effects on the KSE index.

1.2 Objectives:

- Identify which political issues generate an effect on oil prices and stock markets
- Investigate the impact of oil price volatility on the Kuwaiti, Saudi and UAE stock markets.
- Study specific political events that generate a major impact on the performance of the KSE.
- To investigate the volatility transmission mechanism between oil prices and stock returns.
- Undertake a comparative analysis across all three countries and four stock markets.

The research will examine all three markets in depth and investigate the extent of the relevancy of shocks with respect to each specified market.

1.3 Outline of the Thesis

The remainder of this thesis is organized as follows:

Chapter 2: The Importance of Oil for Kuwait

Oil is considered as the most global and important energy resource because it plays a significant role in the development of the world economies. Existing research in the field has focused its attention on the analysis of energy prices and their implications for global economies performance. This chapter thoroughly examines existing studies to support the hypothesis being generated.

Chapter 3: The Importance of the Oil Market

This chapter discusses the importance of oil markets across all parts of the GCC countries.

Chapter 4: Data and Methodology

This chapter deals with the methodological research framework which develop with the aim of presenting a critical assessment of selected econometric models that could help get a better understanding of the interrelationship between oil and stock markets in the context of the selected GCC countries (Kuwait, Abu Dhabi, Dubai and the Kingdom of Saudi Arabia) stock markets.

Chapter 5: Empirical Findings

This chapter discusses how political events, oil price volatility and its spillover effects impact on the stock markets of Kuwait, the Kingdom of Saudi Arabia (KSA), the United Arab Emirates (Dubai and Abu Dhabi) during times of significant market uncertainty.

Chapter 6: Summary and Conclusion

In this chapter, the study’s key findings and critical insights are discussed for the Kuwaiti, Saudi, and UAE stock markets and an effective comparative analysis also drawn the contributions of the work are discussed. This chapter ends with future recommendations and some policy notes.

CHAPTER 2

THE IMPORTANCE FOR OIL OF KUWAIT

2.0 Introduction

Globally, oil is considered as the most important energy resource, since, it plays a significant role in the development of the world economy. This industry has both a direct and indirect impact on the economy, with oil prices directly affecting the health of the economy as a whole. Oil is incredibly important not only to individuals and businesses within the Kuwait, but also to the position of Kuwait in the world. Oil and gas combined provide over half of the world's energy. Consequently, these are indispensable resources. A lack of such resources would have the country (and the world) grinding to a halt. Without oil production in Kuwait, the country would quickly become dependent on foreign supply. Once that occurred, the domestic economy would be controlled directly through the price of oil exports to Kuwait. Due to its oil production importance, Kuwait is taken as a case study, to understand and identify the major factors that are affecting this type of economy and that would help develop a contextual analysis of the region. It would also help understand how different political events are affecting the economy. The cases of Saudi Arabia and the United Arab Emirates are also examined, as they are the key players in the GCC. The existing research in this field has focused on the analysis of energy prices and their implications for the performance of the world economy.

2.1 Oil and Kuwait

Since the Yom Kippur War in 1973, the price of crude oil has gone through different periods of instability, causing major disruptions to the economy of Kuwait. The diverse events associated with market instability due to repeated shocks influencing oil supply combined with a rapid change in foreign oil markets have left many economies badly affected, including Kuwait. Such events have also affected the policies adopted by Kuwait, as an economy that is highly dependent on oil exports. Due to the inconsistent and erratic nature of the global oil market, the economy of Kuwait is broadly susceptible and sensitive to economic bumps, for instance, unstable oil prices. However, this thesis focuses on how oil price inconsistencies affect the Kuwaiti Stock Exchange index.

According to the Organization of the Petroleum Exporting Countries (OPEC) (2017),[1] Kuwait is the eight largest producer of petroleum and related products. The economy of Kuwait largely relies on petroleum exports that account for 60% of its GDP (IMF, 2017). Kuwait has also been making constant attempts to enhance its oil-based economy by increasing the number of its natural resource fields. It raised its consumption from 34% (2009) to 58% (2016). Kuwait also has a self-owned active wealth fund[2], which has strong control over all its national and global financing activities (Kuwait Investment Authority, 2016). Although, Kuwait has imposed strict restrictions on international investors owning Kuwait's resources and exports, the government has adopted a series of steps to expand their oil markets by encouraging foreign investors to take part in the oil sector.

Deaton (2005) stated that the achievements of Kuwait are mostly evaluated in terms of its utilising its income from the oil sector to provide a high living standard for the citizens of the country as well as benefits to non-Kuwaiti residents to a certain extent, by offering facilities like free health care and education. The oil sector of Kuwait is owned and controlled by the

---

[1] Kuwait is a member of OPEC since 1960

Government of Kuwait (Driespronga, Jacobsen & Maat, 2008) where the Supreme Petroleum Council (SPC) of Kuwait, overseen by the Ministry of Petroleum and executed by the Kuwait Petroleum Corporation and its subsidiaries, is in charge of setting energy policy for the country. The Ministry of Petroleum supervises every aspect of implementing the policy in the upstream and downstream parts of the oil and natural gas sectors. Davis and Haltwanger (2001) claim that the achievements of the country are entirely due to an extensive distributive welfare state, formed over the decades since the discovery of oil in Kuwait in 1938.

2.1.1 Oil production and Kuwait

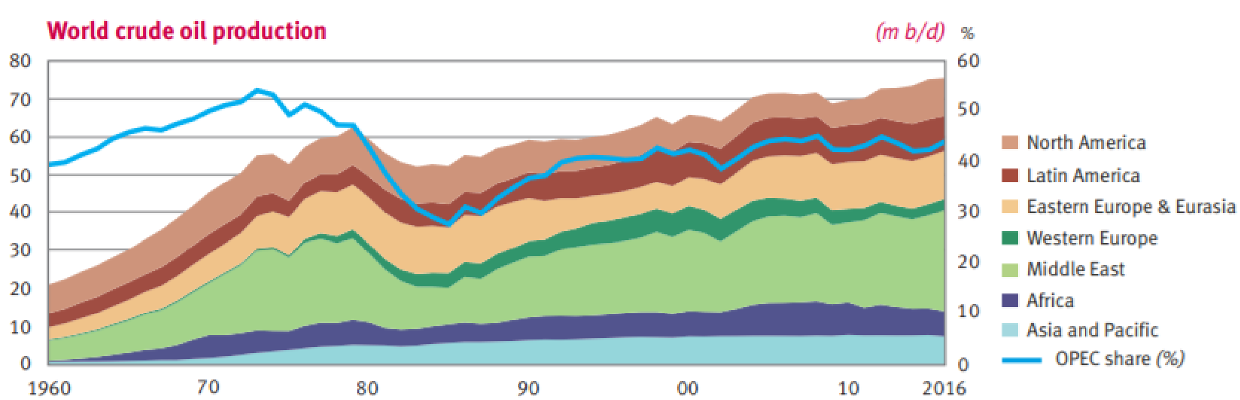
Table 2.1 highlights the high ranking role of Kuwait in the global oil production sector, and justifies the need for further research focus on this country (OPEC, 2017). Saudi Arabia, Kuwait and the UAE economies are largely dependent on oil exports, which determine their foreign earnings and their government's budget revenues and expenditures. The aggregate supply of oil affects their overall earnings as well as their stock markets performance.

Table 2.1: Top Ten Crude Oil Producing Countries (2016)

Ranking	**Country**	**Value**
1	Saudi Arabia	10,460.20
2	Russia	10,292.20
3	United States (U.S)	8,874.60
4	Iraq	4,647.80
5	China	3,981.80
6	Iran	3,651.30
7	United Arab Emirates (UAE)	3,088.30
8	Kuwait	2,954.30
9	Brazil	2,510.00
10	Venezuela	2,372.50

Note: Value is measured in 1,000 barrels/day.
Source: OPEC Annual Statistical Bulletin, 2017

Figure 2.1: World Crude Oil Production



Source: OPEC Annual Statistical Bulletin, 2017 (Page #: 28)

Figure 2.1 demonstrates that in 2016, world crude oil production edged up by 0.35 million barrels per day (m b/d) or 0.5 % as compared to 75.48 m b/d in 2015, and hence shows consistent output and marks a seventh successive growth year. Additionally, the non-OPEC nations showed considerable declines in their 2016 average crude production as compared to 2015. The largest decline was in U.S. –0.54 m b/d or –5.7 % and in China, –0.31m b/d or –7.2 % (OPEC, 2017).

2.1.2 Oil Revenues and Kuwait

Constant increases in oil prices recorded over the last half decade (particularly since 2016) have contributed to the budget surplus of the country, which serves as a financial achievement of the country. According to the Ministry of Finance of Kuwait (2017), oil revenues are estimated for the next fiscal year by the government to be USD 45 per barrel, which has been claimed to be significantly lower than global prices of oil recorded over the last five years. The oil prices obtained contributed to a budget surplus until 2010 and subsequently prices have fluctuated as outlined to date. However, it is necessary for the non-oil sectors to grow at a faster pace because of the high dependence of the country on oil income. The KIA functions as an investment arm and channels the revenues of the Government from the oil sector. Oil price volatility is causing problems, hence, the need for the diversification of economic activities, away from oil, has been clearly identified.

Table 2.2 shows how important oil revenues are for OPEC, especially for Kuwait and Saudi Arabia. For Kuwait, the value of oil revenues reached its peak in 2012 at nearly 112,933 million USD and dropped to 97,537 million USD in 2014. Cause (2015) relates this decline in oil revenue to geopolitical issues, for instance, the current struggle for regional influence between Saudi Arabia and Iran. The share of the oil sector in Kuwait's GDP is 60% (Kuwait's Central Bank, 2015-2016).

Table 2.2: Value of Petroleum Exports by Top Ten Producers from OPEC (m USD)

Country	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Algeria	40,113	52,883	49,993	44,462	40,639	21,742	18,638
Angola	49,379	65,634	69,954	66,652	57,609	31,929	25,936
Ecuador	9,685	12,925	13,750	14,103	11,401	6,660	5,442
Iran	72,228	114,751	101,468	61,923	53,625	27,308	41,123
Iraq	51,589	83,006	94,103	89,402	84,303	49,249	43,753
Kuwait	61,753	96,721	112,933	108,548	97,537	48,444	41,461
Libya	47,245	18,615	60,188	44,445	14,897	10,973	9,313
Nigeria	67,025	87,839	94,642	89,314	76,925	41,818	27,788
Qatar	43,369	62,680	65,065	62,519	56,912	28,513	22,958
Saudi	214,897	309,446	329,327	314,080	285,139	152,910	134,373
Total	794,238	1,104.24	1,204,977	1,104,024	964,643	508,518	441,486

Source: OPEC, 2017

The total volume exports of crude oil from OPEC Member Countries increased to 25.01 m b/d in 2016 from 23.49 m b/d in 2015. This upsurge represents a 6.5 % average growth. If we analyze previous years, crude oil from OPEC members exported to the Asia and Pacific region was 15.72 m b/d or 62.9 % of the total. Furthermore, a significant volume of crude oil was exported to North America that increased its imports from OPEC members from 2.81 m b/d in 2015 to 3.29 m b/d in 2016. Europe imported 4.21 m b/d of crude oil from OPEC members, 2.5 % less compared to 2015 volumes. The OPEC members' exports of petroleum products averaged 5.29 m b/d through 2016, up by 0.90 m b/d or 20.5 per cent compared to 2015.

Table 2.3: Top Ten OPEC Members Volume of Petroleum Exports (% of GDP) in 2016

Country	**Volume**	**GDP**	**% of GDP**
Algeria	18,638	161,104	12
Angola	25,936	95,821	27
Iran	41,123	409,823	10
Iraq	43,753	166,274	26
Kuwait	41,461	110,572	37
Nigeria	27,788	400,571	7
Qatar	22,958	152,509	15
Saudi Arabia	134,373	639,617	21
UAE	45,559	371,353	12
Venezuela	25,142	287,274	9

Source: OPEC, 2017

Table 2.3 represents a detailed picture of OPEC members volume of petroleum exports as a percentage of their GDP. It is clear that Kuwait, at 37%, is the highest in the OPEC block followed by Angola. Therefore, to investigate the role of oil in the Kuwait economy is interesting and the consequential impact on its stock market behavior is also worthwhile studying.

2.1.3 Oil Reserves and Kuwait

The OPEC Annual Statistical Bulletin (2017) shows crude oil reserves in oil producing countries for 2016 (see Table 2.4). Venezuela has the largest crude oil reserves in the world with 20% of the world reserves, and Saudi Arabia is in second position with 18%.

Table 2.4: Top Ten Countries with Crude Oil Reserves in 2016

Ranking	**Country**	**Value**	**Percent* (%)**
1	Venezuela	302,250	20
2	Saudi Arabia	266,208	18
3	Iran	157,200	11
4	Iraq	148,766	10
5	Kuwait	101,500	7
6	United Arab Emirates (UAE)	97,800	7
7	Russia	80,000	5
8	Libya	48,363	3
9	Nigeria	37,453	3
10	United States	32,318	2

Source: OPEC Annual Statistical Bulletin 2017.
* Percentages are calculated from the Total World Reserve Value.

Proven world crude oil reserves stood at 1,492,164 billion barrels at the end of 2016, that, is 0.3% higher than in 2015. The largest crude oil reserves recorded in non-OPEC countries are in Latin America (OPEC, 2017). Oil, as the key source of energy affects almost every sector or section of a country, from agriculture to manufacturing and services to industry, and hence, it plays a vital role in the development of any economy.

2.2 Historical development of the Kuwait stock market

Capital markets generally allow the general public to pool their savings and collectively benefit from a wide array of investment opportunities (Mohsin, 1995). It should be taken into consideration that most available studies have focused on analysing the relationship between oil price changes and stock markets in oil-importing countries; as a result, there is a lack of research looking at the specific case of oil-exporting countries such as GCC countries. Therefore, the current chapter will rely mostly on information available from GCC countries.

Almujamed, Fifield and Power (2013) found that the Kuwait Stock Exchange (KSE) experienced many changes in regulations in the past, and hence various operations in the business sectors were affected in different ways. Between 2002 and 2008, the number of registered companies in the KSE increased from 89 to 214. This recent increase in listings affected liquidity highlighting the existence of a major problem; as investors put cash into new listings, this decreases the liquidity available in the market (KSE Bulletins, 2008). Moreover, the overall capitalization of the KSE witnessed a significant development over the 17 year period ending in 2008. During 1998 to 2018, the market experienced a significant privatization programme. New regulations were introduced such as the right of international investors to purchase, sell and own up to 100% of quoted KSE companies for the first time. This new approach attracted international investors and shifted the KSE to an emerging market from a frontier grouping.

It is worth mentioning that the initial KSE was not formally set up until 1977 but share trading in Kuwait happened much earlier than the foundation of the KSE. It began in the mid-1950s after the IPO of National Bank of Kuwait shares. This was the first Kuwaiti organization to offer its shares to general investors. The National Cinema of Kuwait followed in 1954 and by a few financial services companies that joined the young informal business sector in the 1960s, for example, the Gulf Bank, the Kuwait Commercial Bank and the Kuwait Insurance Company. With the shares of these organizations owned by the general public, systems were created to encourage the exchange of securities among Kuwaiti financial specialists. The informal securities exchange movements were driven by oil costs.

In the late 1970s and early 1980s the informal trading of shares accrued on the Al-Manakh Market even before investors signed up to buy shares through the IPO process; the non-existence of a formal system of share ownership pushed security costs to more than ten times their face value (Al-Yaqout, 2006). In August 1982, this un-official market crashed and most speculators experienced significant losses (Mahmoud, 1986). The offer costs on the KSE declined by 20%-40% due to the Al-Manakh Crisis, while Gulf organizations' securities experienced losses. The total loss was equivalent to USD 90,000 for every resident of Kuwait; hence trades slowed to a trickle (Felix, 2000). In September 1982, the administration required that financial specialists in both markets report their open forward positions. At that time, the estimated value of exceptional post-dated checks in both markets was USD 93 billion (USD 17 billion in the official business sector and USD 76 billion in the informal business sector) with settlement dates of up to three years. After the Al-Manakh Crisis, the

Kuwaiti Government intervened and an official stock market was created (Butler and Malaikah, 1992).

The KSE opened its new stock exchange for investors in September 1984. The KSE is an autonomous monetary association, controlled by an official advisory group. In 1993, it reset the index to 1,000 basis points. The KSE was more affected by social communications, rivalry among opposing business groups, bits of gossip, the political circumstance in the Gulf area and the size and appropriation of government spending compared to the developed markets of the world in its business (Doronin, 2013). These distinctions are clear from KSE movements in the course of recent decades. For instance, the KSE faced an amazing period of development from 1985 to 2008; the yearly estimation of shares traded on the KSE grew by 3,000% during the said period.

The KSE index recorded another peak in 2007; it increased from 1,365 in 1995 to 12,558 in 2007; however, in 2008, the index declined by 38%. The Government of Kuwait assigned the authority to the Kuwait Investment Authority (KIA), to monitor the performance of the KSE in 2010. This government action increased business transactions and hence, during the second-half decade of the 1990s, almost 2,500 million shares of 30 firms were sold to investors for more than 900 million Kuwaiti Dinars. Furthermore, to enhance the business and to secure investments, new regulations were also initiated. The profits earned by remote speculators trading in the KSE, either straightforwardly using their buys and offers of shares or through venture assets, were tax exempted. Furthermore, lower transaction costs gave extra benefits to investors that made the KSE more attractive. The KSE has five markets: official, parallel, odd parcel, forward, and choice. Furthermore, there are various business sector creators, and additionally 14 brokers formally listed in the country (Bloomberg, 2018; Boursa Kuwait, 2018; Almujamed, Fifield and Power, 2013).

Table 2.5: Distribution of Listed Companies in the Kuwait Stock Exchange in 2017

Sector	**Number of Companies**	**% Market Share**
Oil and Gas	6	3.41
Basic Materials	4	2.27
Industrial	30	17.05
Consumer Goods	4	2.27
Health Care	3	1.70
Consumer Services	14	7.95
Telecommunications	5	2.84
Banks	12	6.82
Insurance	8	4.55
Real Estate	39	22.16
Financial Services	49	27.84
Technology	2	1.14
Total	176	100

Source: Kuwait Stock Market Historical Data (2018).

The figures shown in Table 2.5 represents a general composition of the Kuwait stock market in terms of sectors. Notwithstanding the relatively low percentage market share of the oil and gas sector in the KSE, the oil and gas sector is a key sector of the Kuwaiti economy, and drives activity across the KSE and the Kuwaiti economy.

2.3 Market Activity in the Kuwaiti Stock Market

This section presents an overview of KSE activity from 1995 to the 2015 where oil prices experienced substantial peaks and troughs, and significant levels of volatility. It is necessary to discuss this timeframe due to occurrence of diverse tumultuous events in this era such as, the Iraq invasion of 2003, the GFC of 2008 and the Arab Spring Revolution, 2011. It is important to research the Kuwait and other GCC countries' stock markets and their responsiveness during these times of fluctuations. Oil prices reached peaks of USD 96.94 in 2008 rising to USD 111.63 per barrel in 2012. Figure 2.2 shows how oil prices have fluctuated over time. Table 2.6 reports the summary statistics of the KSE during 1995-2015.

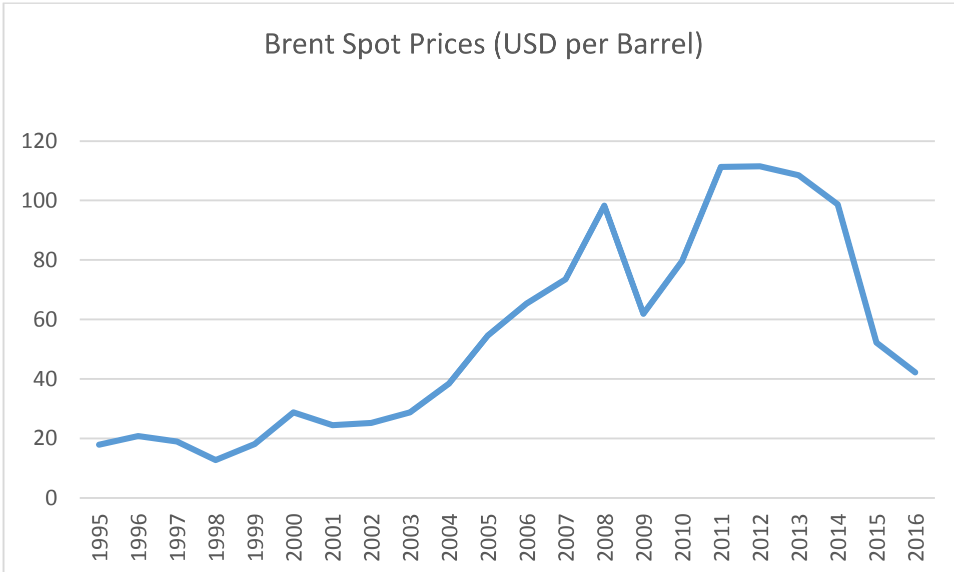


Figure 2.2: Brent Spot Prices (USD per Barrel), 1995 to 2016
Source: Energy Information Administration (2017).
Brent Prices are Yearly Averages.

Table 2.6: Market activity of the KSE until 2015

Date	Open	Close (Thousands KWD)	High	Low	Volume (Thousands)	Weighted Index	Value Traded (Millions KWD)	No of Trades
1995	-	1,365.70	-	-	18,990,000	0.00	4,902,720	174
1996	-	1,905.60	-	-	67,889,500	0.00	22,193,990	1,184
1997	-	2,651.81	-	-	79,283,000	0.00	31,173,510	1,119
1998	-	1,582.70	-	-	58,320,500	0.00	14,749,870	1,156
1999	-	1,442.00	-	-	27,925,000	0.00	5,168,845	571
2000	-	1,348.10	-	-	12,662,000	100.00	2,152,180	332
2001	1,710.80	1,709.40	1,711.20	1,703.50	128,614,500	131.60	25,372,250	1,188
2002	2,369.80	2,375.30	2,382.50	2,369.70	113,963,500	172.12	36,635,220	2,431
2003	-	4,790.20	n.a	n.a	217,275,000	291.34	84,358,640	5,245
2004	6,379.00	6,409.50	6,413.39	6,364.60	105,528,500	335.86	63,748,055	3,439
2005	11,423.00	11,445.10	10,578.12	11,377.70	203,543,000	562.24	111,421,690	6,404
2006	9,957.10	10,067.40	10,071,70	9,923.70	166,789,500	531.71	101,239,260	5,384
2007	12,504.70	12,558.90	12,560.70	12,451.50	273,116,000	715.00	108,514,570	5,546
2008	7,917.10	7,782.60	7,917.80	7,702.40	137,870,000	406.70	86,594,390	2,585
2009	6,971.90	7,005.30	6,975.60	6,905.60	179,237,500	385.75	36,475,720	3,613
2010	6,963.40	6,955.50	6,965.30	6,907.70	152,988,500	484.17	31,878,230	3,010
2011	5,785.00	5,814.20	5,814.50	5,773.10	133,737,500	405.62	31,237,080	2097
2012	5,946.74	5,934.28	5,951.00	5,919.64	159,051,002	417.65	25,789,496	3,399
2013	7,541.58	7,549.52	7,551.33	7,510.33	161,958,272	452.86	17,364,630	4,142
2014	6,510.11	6,535.72	6,535.85	6,484.20	303,132,142	438.88	27,917,035	8,439
2015	5,728.38	5,734.07	5,734.07	5,717.12	131,853,854	388.92	11,849,195	3,000

Source: Kuwait Stock Exchange Market: Historical data (2016)

Table 2.6 indicates that the volume of shares traded grew dramatically from 18,990 million KWD in 1995 to 237,116 million KWD in 2007 (KSE Bulletins, 2008).

However, the volume of traded shares experienced a notable increase to 303,123.03 million KWD worth of shares traded in 2014 as a consequence of oil prices decline (KSE Bulletins, 2014). In 2015, the Kuwaiti stock market experienced a sharp decline in the volume of traded shares. The value of traded shares significantly decreased to 2,152,180 KWD in 2000. However, the value of traded shares gradually increased to reach its peak in 2004. In the following years, the value of the traded shares declined.

2.4 Kuwait Exchange Market Breaks

This section examines six major shocks that affected the KSE and their political connections to provide the relevant context to the research and to highlight the importance of Kuwait in the region. There were three notable shocks; the Iraqi invasion of 2003, the US financial crisis of 2008, and the Arab Spring of 2011, which generated a significant impact on the whole economy of Kuwait; so, it is worthwhile to analyze the Kuwaiti economy (Ak & Bingül, 2018; Kandiyoti, 2012; Khatib, Barnes & Chalabi, 2000; Jaffe, 1997).

2.4.1 The First Market Break (1976)

Before the official inauguration of the KSE in 1984, a tracking mechanism for shares existed. Within this system, the first major market break occurred at the end of 1976; the annual index fell by 18.7% (dropping from 235.2 to 191.8), and the volume plummeted by 66% (Al-Sultan, 1989). In order to avoid a crisis, the government stepped in by halting the creation and establishment of new shareholding companies and by increases in the capital of companies already in the market. The theory behind this was that the frequency of new equity being issued was influencing liquidity domestically and was a major factor in the crisis. The government stepped in in an attempt to help the market by buying shares at a floor price. Between December 1977 and April 1978, the government bought shares worth 150 million KWD. The Central Bank of Kuwait (CBK) took action to avoid possible problems to the banking system by setting up a purchasing facility for bad debt that could arise due to the lending by banks to share dealers or against the security of shares. The market rebounded towards the end of 1978 and remained steady until 1981, when a strong bull market effectively started. The Kuwaiti share index increased from 331 in the first quarter of 1981 to 523 in the second quarter (Al-Sultan, 1989; Kuwait Central Bank, 1979). In the period from 1978 to 1981, the Middle East witnessed several political crises. Beginning in 1978, the Iranian revolution forced the Shah to leave the country, and the country was then transformed into an Islamic republic. Demonstrations and strikes swept Iran, and oil production dropped by six million barrels per day at the end of 1978, representing 10% of the world crude oil production. As a consequence of the fall in Iranian production, causing a hike in oil prices, Saudi Arabia, Iraq, Nigeria and Kuwait increased their production levels (Kesicki, 2010).

2.4.2 The Second Market Break 1982 (Al-Manakh crisis)

The Al-Manakh crisis saw outstanding debt in Kuwait reach USD 94 billion. Banks were subjected to high risk as businesses failed, went bankrupt, and this caused an economic crisis. Moreover, traders were unable to settle trading debts. The Al-Manakh crisis is considered Kuwait’s first stock market crash. It is generally agreed to have been caused by the dominance of speculative trading and the rise of post-dated cheques. As a response, Kuwait temporarily banned the creation of new shareholding companies and restricted the use of post-dated cheques. The bailout cost exceeded 150 million KWD (USD 525 million). A linear programming model was constructed to identify insolvent traders and to determine the fraction of debt insolvent traders could pay creditors by asset type. This model was the platform by which Court decisions were ultimately made (Eliman, Girgis and Kotob, 1997).

Forward trading used to be highly informal before the crisis. A ban by the government was not considered. Kuwaiti merchants had become used to futures trading in commodities and real estate, but only took notice and advantage of the ability to buy shares in the mid-1970s. During that time, sellers would deliver shares to the buyer only after either a post-dated cheque or a promissory note was exchanged. The crisis was highly affected by future trading agreements, particularly with regard to the liquidating of shares by dealers in an attempt to cover their positions in the market or their payments. In 1976, to pave the way for an official stock market, a stock market committee was organized. It designed the regulations for the futures market, but the legislation regarding this market did not pass until after the 1977 crisis. Based on previous experience, legislation for the new formal market required that the asset/security should be registered and have a maximum 12-months maturity for any future oriented trade.

In addition, buyers were given the option of either paying a deposit equal to 10 percent of the difference between the current and future values. However, since the new regulations could not be implemented without the presence of a clearing agent to monitor the deposit required, as prices fluctuated and to ensure transference, many traders ignored the new regulations. Without the presence of a clearing intermediary, investors persisted with their treatment of the sales as cash transactions with deferred payments. Cheques were also frequently used, as they were practical. After all, under Kuwaiti commercial law a cheque is treated as a cash instrument payable upon presentation. The significance of the cheque date was also only relevant if it had expired by more than a month. The future dates of the cheques were irrelevant and merchants were accepting cash instruments that were backed by the law within the allotted time. In other words, apart from trade registration, authorities were left without a way to supervise the agreements between buyers and sellers.

The futures trading laws were amended to necessitate contract signing through a broker and the need for it to be registered with the stock exchange in 1981 (Global Investment House Market Outlook, 2004). This contract was required to specify a maturity date, the underlying shares of the transaction, and a payment method. It created a positive effect in the market. The law specified that both buyers and sellers be protected, making what used to be an instrument of merchants who knew each other into an instrument that is determined by the price and reputation of the buyer. The supervisory role of the stock exchange only reached as far as handling the registration of the contract, and it had no role in the regulations or the mechanisms used in its clearing. Moreover, brokers ensured that both the cheque from the buyer and the shares from the seller would be delivered, continuing the tradition that trades were handled as cash trades. By 1981, premiums in the KSE reached between 50% and 100%, and were double the level in parallel markets.

Both individual and institutional investors preferred selling the shares forward instead of taking the risk, as by doing this they presumably locked in high premiums. Technically, this was a major development for the futures market. Before this development, trading was mostly undertaken between the dealers who could clear transactions with each other; however, after the entry of many general investors the dealers would have large open and unbalanced positions. After an analysis of 33 non-banking companies in the KSE, the financial involvement of Kuwaiti companies in the stock market became apparent (Institute of Banking Studies, 1987). In these firms, an increase in assets of around 92% was recorded between 1980 and 1982, increasing from 1.5 billion to nearly 3 billion KWD. This investment was partially financed by internal resources (39%) and with short, medium, and long-term loans (61%) being the major component. Moreover, profits managed to double in 1981 and 1982 compared to 1980 and in 1984 and in 1985 losses equalized these amounts. This pattern explains and parallels the rise and fall of the stock market. Bank lending to the sector also increased by 102 million KWD despite the fact that nine companies had invested around 176 million KWD during the same period. Also over a third of these companies assets were made up of market investments. Other sectors such as, the food and services invested 24% of their assets and the transport sector invested 40%. In addition, real estate firms invested approximately 26% of their assets in the market. In 1982, a sharp break in the parallel market plummeted the index to about 110 in August compared to 240 in March. This made it nearly impossible for dealers to liquidate their shares for cash. The Kuwaiti market however, only dropped by 6.5% in that period, mainly because of the government share purchase program. In September, outstanding, outdated or post-dated cheques totalled 94 billion, 83% of which was related to transactions in Gulf and Kuwaiti Shareholding Companies (KSCC) (Al-Sultan, 1989; Kuwait Central Bank, 1986). Figure 2.3 and 2.4 summarise the KSE index movements over this period.

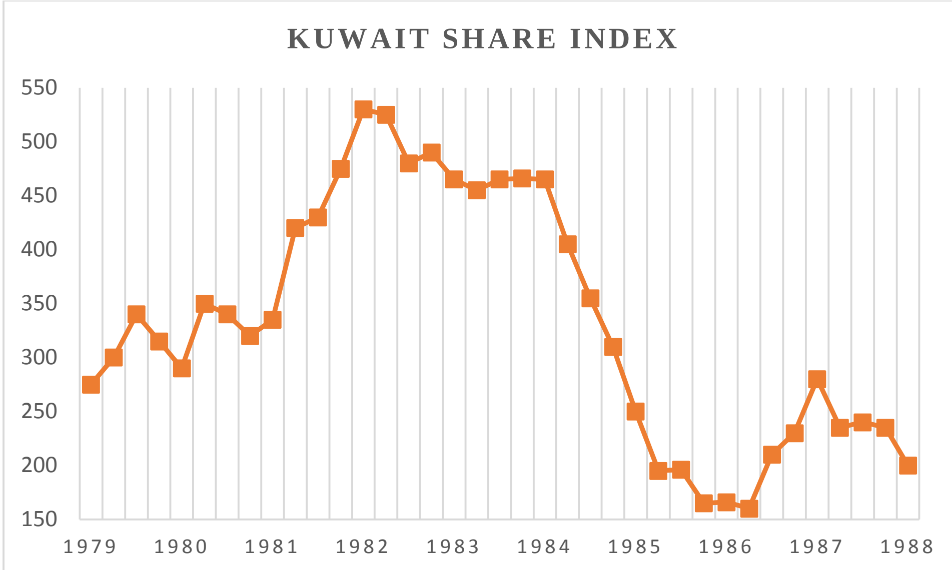


Figure 2.3: Kuwait share index from 1979 to 1988[3]
Source: Al-Amwal Co. WLL, Kuwait

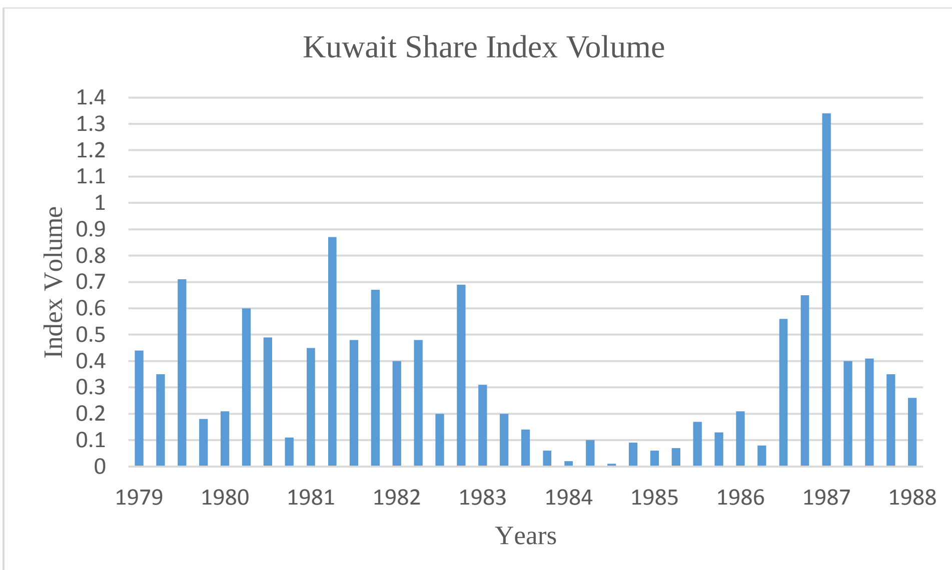


Figure 2.4: Kuwait Share Index Volume (in millions of shares) from 1979 to 1988[4]

2.4.3 The Third Market Break (2003)

---

[3] Unavailability of data for the year 1991 due to the Iraq war.
[4] Unavailability of data for the year 1991 due to the Iraq war.

Stable political and economic regions and environments have always been a target for investors; moreover, the removal of the old regime in Baghdad has only served to prove that point, where the price of oil jumped to USD 40-USD 50 per barrel by the end of 2004 (Meagher, Jiang and Drysdale, 2007). In addition, the KSE index reached its highest value in 2003, with market capitalization exceeding 100% of Kuwaiti GDP (World Bank, 2004). A more stable environment in Iraq resulted in a boom in the Kuwaiti economy, through the increase in trading and business activities resulted in added purchasing power being placed in the hands of Kuwaiti residents (IMF, 2005).

Over the last three decades, Kuwait has faced many important challenges. However, when ranking these events, 2003 will be marked as one of the most important. After all, 2003 witnessed the resurgence of investor confidence, making the threat of Saddam Hussein seem outdated. Moreover, during this time a new government was elected, replacing the old government with new, progressive, and proactive members. This government took many actions such as the development of foreign direct investment law, tax structure reforms, and new privatization efforts, which all contributed to the growth and strengthening of the economy. All of these steps resulted in improved stock trading and higher market capitalization by listed corporations. Moreover, the country witnessed increased consumer demand, which acted as further stimulus for the companies listed on the KSE. All of these factors had a positive effect on real estate and capital markets. In addition, as the overall perception of Kuwait shifted towards the view of it being a stable gateway for investments into Iraq, the local business environment boomed because of the image change. Moreover, as oil prices increased, interest rates dropped, liquidity rose, and corporate profitability increased, the KSE witnessed increased level of stock investment. It is well known that the

Kuwaiti economy is driven by oil. In 2003, the Kuwaiti government rejoiced as the KSE recorded another year of impressive growth, reaching an all-time high during the year and on the second last trading day reaching a fresh new high. Moreover, the KSE market doubled that gain in 2003 closing at an estimated 63.9% above its level in 2002 (Global Investment House Market Outlook, 2004).

The KSE had many things going for it in 2003 that allowed it to maintain its status both internationally, and within the GCC countries such as, low interest rates, improved corporate performance, exuberant economic growth, and the removal of the Iraqi regime. Furthermore, all the GCC countries' markets echoed these positive sentiments allowing them to post respectable gains during the period, during which the Saudi market, led the field. The gains made by the KSE's peers within the region were as follows Saudi Arabia (+76.2%), Qatar (+69.8%), Oman (+42.1%), UAE (+32.1%), and Bahrain (+28.8%). This resulted in heightened interest from both local and international investors towards these regional markets. Additionally, with increased attention on the KSE and its peers, the capital market gained high levels of importance among investors and corporate management. This led to a resurgence in the local primary equity market and the emergence of new listings on the stock market (Global Investment House Market Outlook, 2004).

In the period from 2002 to 2004, the GCC countries' stock market capitalization to GDP ratios increased. In addition, the currencies of the GCC countries are pegged to the U.S dollar. Decreasing interest rates in-line with U.S interest rates, caused improvement in trade and led to increases in nominal GDP in the GCC countries, and stimulated real economic activities in the non-oil sectors, especially in Kuwait and Saudi Arabia, where credit to the private sector showed a sharp rise. It has been shown that, except in Kuwait, stock prices of GCC countries' stock markets are lower. The KSE index increased by about 371% from the end of 2000 to the end of 2004 and market capitalization increased by 270%. The KSE displayed larger gains in the value of the market than the real increase in the value of the stocks. The trading volumes in the GCC countries' stock exchange markets experienced a sharp rise in their turnover ratio[5] during 2002-2004, especially in Kuwaiti and Saudi Arabian stock markets. This is a positive indicator of the increasing liquidity and rising of interest of investors in these markets. The market returns of the KSE (3.8%) was higher than the average returns of other GCC countries' markets (3.6%) (IMF, 2005).

The positive results throughout the year by the KSE was translated into all of the "Global" indices registering gains in excess of 35%, an unprecedented achievement for the KSE. Typical of a market rally, the more aggressive categories led the way. The services sector companies, with the aid of the regional expansion into Iraq that was achieved through sub-contracting and expansion into other GCC and MENA countries, achieved the only 3-digit gain in the market, recording an astonishing 116.32% increase. Within this sector, the sub-categories of telecommunications, logistics and warehousing, transportation, entertainment, and retail chains performed exceptionally well. With a substantial increase in economic liquidity, and lowered interest rates, the real estate sector saw an impressive increase in trading activity. The real estate sector rose by 93.70% compared to 42.8% in 2002, leaving it in second place by sector for 2003. Moreover, with GCC countries business environments showing great improvement, and prices being relatively cheap, an increased interest in non-Kuwaiti issues appeared. Moreover, there was another sectoral index that was capable of

[5] The ratio of value of stocks traded to market capitalization

outperforming the market; this was the “Global” investment index. This index increased approximately 71% from new investment opportunities in Iraq and other GCC countries as well as increased IPOs, and sizable local investment returns. On the other hand, the industrial, foods, insurance, and banking indices, underperformed in relation to the sectoral averages. However, they still managed to gain over 35% during 2003. The largest underperformer was the “Global” banking index, maintaining that status for two years in a row. It was affected by low interest rates, a regime that opposed banks profit growth, and as the sector was already near maturity, this greatly reduced the margin for growth. Furthermore, investors once again fed their desire for risk. The Table 2.7 shows that the “Global” index for small caps was 55% compared to 49.8% for large caps (Brune et al., 2015; Global Investment House Market Outlook, 2004; Wolfers and Zitzewitz, 2004).

Table 2.7: Stock Exchange Performance Indices of the KSE

	% change 2001	**% change 2002**	**% change 2003**
Banking	40.96%	17.91%	35.63%
Investment	17.25%	30.72%	70.86%
Insurance	13.66%	14.41%	39.40%
Real Estate	16.20%	42.79%	93.70%
Industry	29.22%	20.50%	55.73%
Services	23.81%	38.36%	116.32%
Food	33.98%	24.71%	48.50%
Non-Kuwaiti Issue	(3.93%)	.78%	92.44%
General Index	**28.83%**	**24.11%**	**63.91%**
Large Cap	31.53%	20.51%	49.76%
Small Cap	74.57%	67.46%	55.00%

Source: Global Investment House Market Outlook, January (2004).

With interest rates hitting an all-time low, liquidity soaring, and Iraqi expansion looking like a viable option, all the pieces were in place for an all-time high in trading activity. Between 2000 and the end of 2003, trading activity expanded 12.5 times, driven by factors such as improved investor interest and increased liquidity. Trading activity during 2003 grew significantly compared to 2002, reaching around 143.3% higher, and stabilizing at the level of 162.5 billion KWD. The investment sector was the leader during the year, leading the market in terms of both new listings and profitability growth. This resulted in a surge of new investors going into the sector. At the end of 2003, investment stocks accounted for slightly over one third of the market value traded, growing by an astonishing 205% over its 2002 value of 5.53 billion KWD. However, when comparing the value of shares traded, both the non-Kuwaiti sector, and the real estate sectors, managed to top the investment sector. The non-Kuwaiti sector grew by an unfathomable 429%, while real estate managed 211%. Moreover, apart from the banking and insurance sectors, sectors across the board achieved excellent growth rates, all managing a 3 digit growth. However, the banking sector grew by 43.5%, while insurance improved by 18.75% (see Table 2.8).

Table 2.8: Stock Exchange Activity (Value of Shares Traded at the KSE)

Sectors	**2000**	**2001**	**2002**	**2003**
Banking	365	1,139	1,619	2,323
Investment	279	710	1,814	5,527
Insurance	13	18	32	38
Real Estate	129	273	909	2,826
Industry	163	494	922	2,146
Services	280	790	1,111	2,462
Food	19	95	158	330
Non-Kuwaiti Issue	42	60	113	598
Total Market	**1,290**	**3,579**	**6,678**	**16,250**

Note: Figures are in Million KWD
Source: Global Investment House Market Outlook, (2004).

The value of shares traded was not the only thing that bloomed during the year, as the volume of shares also expanded greatly. Table 2.9 shows that by mid-2003 volumes reached 87.9% higher than 2002. Trading remained high for the last 6 months of 2003, and as a result, managed to blow its 2002 values out of the water with a 78% growth in the volume of shares traded. Among the Kuwaiti companies, a 100% increase was recorded in traded volume. Real estate also performed well, with the trading of 9.875 billion shares. The investment in real estate had the highest volume; the non-Kuwaiti sector secured the position of the highest growth in the volume of shares traded. After expanding by 69.4% in 2002, the non-Kuwaiti sector grew by 212.6% in 2003. Furthermore, in 2004, investment remained high, however the higher base was likely to result in a lower level of trading activity (Alfadli, 2015; Sab, 2014).

Table 2.9: Stock Exchange Activity (Value of Shares Traded at the KSE)

Sectors	**2000**	**2001**	**2002**	**2003**
Banking	1,157	3,326	3,631	4,088
Investment	2,134	5,063	11,030	21,380
Insurance	38	56	89	87
Real Estate	1,215	2,767	5,724	9,875
Industry	809	1,779	2,583	4,047
Services	724	1,734	2,266	3,359
Food	164	617	890	1,661
Non-Kuwaiti Issue	517	957	1,621	5,067
Total Market	**6,758**	**16,299**	**27,834**	**49,563**

Note: Figures are in Million KWD
Source: Global Investment House Annual Report, 2004.

2.4.4 The Fourth Market Break (2008)

There are many explanations for the financial crisis that erupted in the US leading to a collapse of the residential mortgage market and that then subsequently spread to rest of the world (Kling, 2010; Marshall, 2009; Baily and Elliot, 2009). Political priorities in the US were centred on assuring poorer citizens that the government would give its full support in helping them find housing, led to increases in lending. However, this was not the only factor, as the conversion of these mortgages to securities by many investment companies also played a significant role in the crisis. This was done since the process of turning mortgages into securities provides the highest benefit when dividing them into segments of complex derivatives. This process was, in this case carried out without a clear understanding of the risks involved with these products, and foreign investors invested in these securities (Swedber, 2009).

Additionally, these processes were not covered by capital market regulations. As housing prices fell in the US and borrowers were delaying and defaulting on their payments, the credit rating of securities went down too. This led to a deterioration in the money market, followed by the liquidation of the securities of many investment companies backed by assets and with the guarantees of banks to support them. This, coupled with the continued lending from banks, resulted in Lehman Brothers having to integrate the value of securities into their balance sheets and eventually having to announce their bankruptcy (Marshall, 2009). This resulted in decreased trust in US banks. Moreover, banks stopped lending through the interbank markets and instead stored liquidity in their possession, and began selling loans in the securities market to regain funds (Gorton, 2012; Edey, 2009;).

However, these loans faced difficulty in being sold, which forced banks to keep more loans on their books. This resulted in an unprecedented shortage of liquidity in the interbank markets, which quickly spread abroad. Furthermore, branches of international banks in emerging economies markets contributed to the spread of liquidity shortages in local markets. When the crisis broke out in the banks of developed countries, other economies faced a liquidity squeeze as companies transferred money from local interbank branches to their headquarters in developed countries. However, it was difficult for international banks located in these emerging economies to transfer the funds after the crisis had broken out (Andries and Ursu, 2016; Mashal, 2012; Wheelock, 2011; Anichshenko, 2009).

Due to the US crises the KSE index plummeted by 50%, with a large fall in the investment and real estate indices. By October, USD 1.4 billion was lost by the three largest banks of Kuwait, mainly due to derivative transactions. Moreover, in December, USD 3 billion of debts were defaulted on by the largest investment company in Kuwait and a large Islamic investment company was seeking refinancing of up to USD 1 billion of debt (IMF, 2009). This all began with the credit crunch and was finally inflamed by the bankruptcy of Lehman Brothers; the flames of these events triggered a series of problems that spread across the world. The negative effects spread so much that even countries that were thought as being immune from the world crises, such as Kuwait, were affected (Global Investment House Market report, 2009).

The KSE crisis of 2008 is widely regarded as one of the most detrimental to ever hit the exchange. After all, during the first quarter of 2008, the KSE price index had increased 13.7% and the value traded averaged 200 million KWD. In April, the price index increased by 403.10 points (2.82%), while the average value traded decreased by 160 million KWD and the performance of the KSE fell slightly. During the second quarter of the year, a plethora of decisions and measures were taken in an attempt to decrease lending and increase restrictions on banks lending. This was mainly due to the fact that inflation had become a major problem. Therefore, this affected the liquidity of the banking sector of the KSE. Hence, investors became uneasy about future profitability. Moreover, the parliament placed new limits on financial companies dealing with the private sector. This was widely regarded as a huge blow from the banks, which made up one of its principal segments.

In June 2008, the KSE performance remained strong in terms of market capitalization, which measured 62.60 billion KWD, which was an 8.95% increase from the beginning of the year. In June 24, 2008, the KSE price index peaked at an all-time high of 15,654.80 points. During the first half of the year, the exchange had been performing quite admirably, as the KSE price index increased 23.07% between Jan 1 and June 30. The average value traded was 184 million KWD per day. Compared to the previous year traded value increased 20.6% on a year-on-year basis from 152.8 KWD, while volume traded increased 63.1% from the same period a year before in 2007. During the same time span, the KSE general index increased by 2,897.30 points in 2008 when compared to 2,065.30 in 2007 (Global Investment House Market report, 2009).

After the KSE reached its peak in June 24, 2008, the market cracked under the immense pressure of this expansion. During July, the market plummeted significantly, as it decreased 521.70 points and the trading value average dropped to 113.3 million KWD, marking a 36.5% drop from the month before. Near the end of the third quarter of 2008, the index dropped 2,659.9 points to 12,839.3 points, or in other words, a 2.2% decrease from the all-time high.

The fourth quarter of 2008 was the most volatile of the year for the KSE. When Lehman Brothers filed for bankruptcy in the US, a ripple effect was witnessed within all the exchanges around the world, including in the GCC countries and Kuwait. A state of panic arose in all exchanges; small investors led the selling pressures in the KSE. The index plummeted

1,373.60 points in September; this dropped the market capitalization down to 53.1 billion KWD. The CBK put up a valiant effort to restore confidence in the market, even going as far as providing liquidity to the local banks. In October, investors faced even more bad news when one of the largest banks (Gulf Bank) lost around USD 1.4 billion due to being involved in a currency derivative loss. The CBK took action in an attempt to regain trust in the market and stop the panic, by guaranteeing all its deposits and stopping trading of its shares. Additionally, it guaranteed the deposits of all local banks to defend the reputation of the Kuwait financial system and put costumers at ease.

The Gulf bank crisis increased panic in the KSE and many investors started selling stocks at fire sale levels. The index during this time dropped 2,589.7 points, while market capitalization decreased by 42.6 billion KWD. The government stepped in by increasing its investment by more than 300 million KWD using local funds; however, this did little to stem the tide. In order to increase liquidity, the CBK reduced interest rates from 5.75% in January to 3.75% in December. Interbank rates were also reduced and new maturities were introduced. The 1-month facility rate was introduced at 3%, overnight at 1%, and 1 week at 2% after the rate cut in October 2008. In addition, the reserve requirement for banks decreased by 5% from 85% to 80%. Additional shore up of liquidity took place when the CBK deposited funds into the banking sector in an attempt to counter the cash outflow. The CBK also warned Kuwaiti banks that penalties would be enforced if they liquidated the stocks held as collateral. This was to save the stock market. The CBK governor stated that banks were only allowed to liquidate stocks on customer order, or in the case of a lack of cooperation from the debtor to the lender.

The government came up with a plan that aimed to rebuild trust in the KSE. The more than one billion-dollar fund relief which was used to create an influx of liquidity into the market, was funded by three entities: the Kuwait Awqaf Public Foundation (300 million KWD), the Public Institution for Social Security (300 million KWD), and the Kuwait Investment Authority (900 million KWD). The plan started in late October but underwent several changes; it was not until December 24 that liquidity started seeping back into the market. Nevertheless, this was not enough to stop further market losses. During the fourth quarter, losses reached 5,056.70 points, and at the end of year the index was at 7,782.60 points, down over 50% since its peak in June and down 38% since the beginning of 2008. The second half of the year witnessed an average of 258.9 million traded shares, significantly less than the 406.6 million in the first half (36.3% less). The value traded during this period also decreased, averaging around 110 million KWD compared to 183.9 million KWD (40.2% less). The fourth quarter recorded the lowest value traded of the year, reaching 23.8 million KWD in November, which would be considered as miniscule when compared to the highest value in 2008 of 357.9 million in January (Albawaba, 2018; Global Investment House Market report, 2009).

2.4.5 The Fifth Market Break (2011)

The KSE index fell 14.02% during the first half of 2011, closing at 192.19 points. Additionally, the index with respect to prices fell by 10.69%. Moreover, while Kuwait took the hardest hit, the political events that took place during the "Arab Spring" also influenced other exchanges. For example, most GCC countries saw declines in stock market performance including, for example, Oman which saw a 12.41% decrease. However, the Abu Dhabi securities exchange market managed to outperform its peers, decreasing only by

0.58%. On a similar note, the Saudi exchange also fell by only 0.68% (Al-Shuga and Masih, 2014; Global Investment House, 2011).

The GCC countries equity markets in the year of 2011 opened with a positive outlook as oil prices were rising and the global economy seemed to be recovering. However, after the Arab Spring occurred in early 2011, equity markets were shocked at its effect on the political landscape resulting in a feeling of distrust by investors and shaking their confidence. However, while changes were witnessed in the GCC countries' markets at the beginning of the crisis, a quick recovery was made following the measures taken by the regional governments, protecting the market from additional turmoil. This was also the result of the political situation keeping oil prices high and therefore, feeding the recovery of the market. However, this was short lived as anxiety set in due to the shortcomings of the European markets, which threatened the global economy. As the crisis spread, it began to impact oil prices and resulted in the petrochemical sector crashing. This resulted in investors shifting towards the defence sector and the industries sector, which outperformed the benchmarks in the later stages of the year (Gulf Investment Corporation (GIC) Outlook, 2012).

The political situation during 2011 resulted in the KSE's worst first half market performance since 1988. This was the result of selling pressure arising from political unrest within the region. However, in April the KSE scored its first monthly gain since 2010. Unfortunately, this trend did not last as the exchange fell again during May and June. During the first half of the year, a total of 22.22 billion shares with a value of 3.77 billion KWD were traded. The service sector was the most active in terms of the volume of shares traded. However, the banking sector was the leader in terms of the value of shares traded. The gains made in April posted significant results in banking sector. Further analysing the KSE, it was found that during the first half of 2011, the performance of all sectoral indices declined.

The global services index was the worst performer losing 23.72% of its value. Within this sector, Kuwait National Airways was the biggest loser, losing 76.25% of its share value. Therefore, the events of the "Arab Spring" produced clear anecdotal evidence that a negative relationship exists between political unrest within a region, and stock market performance. Moreover, it can be seen that this effect fluctuates in severity between different countries, and that Kuwait, and the KSE in particular, has a high sensitivity to this performance factor (Abumustafa, 2016; Abul and Hui, 2014; Global Investment House, 2011).

2.4.6 The Sixth Market Break (2014)

According to the Annual Report of the Central Bank of Kuwait (2014), there was a noticeable drop in trading indicators, and primary price levels in the KSE during 2014. The primary trading indicators (value and quantity of stocks being traded) scored a noticeable drop of 45.18% and 58.12% respectively compared to the levels recorded during 2013. Moreover, the general markers for transaction costs by the end of 2014 recorded a decrease of around 13.43%. The KSE Weighted Price Index (WI) recorded a considerable decrease of 3.09% at the end of 2014 compared with the closing value in 2013. The KSE-15 index recorded a slight decline of 0.79% at the end of 2014 compared to 2013. In light of that, the market value of capital for listed companies recorded a drop of around 297,330 million KWD and 6.7% by the end of 2013 compared to the previous year, see Table 2.10.

Table 2.10: Quarterly main Price Indices for the Period 2013-2014.

Period		**General Indicator**	**Weighted Indicator**
$2013Q_4$		7,549.52	452.86
$2014Q_1$		7,572.81	483.13
	%	+ 0.31	+ 6.68
$2014Q_2$		6,971.44	469.75
	%	-7.94	-2.77
$2014Q_3$		7,621.51	494.44
	%	+ 9.32	+ 5.26
$2014Q_4$		6,535.72	438.88
	%	-14.25	-11.24

Source: Central Bank of Kuwait Annual Report, (2014).
(%) Percentage change on Quarterly bases.

In terms of monthly performance of the KSE stock index, the value reached 7,361.61 points at the end of October 2014, and at the end of December 2014 the KSE index was 6,535.72 (KSE Market Summary, 2014), see Table 2.11.

Table 2.11: KSE Market Summary

	Oct-2014	**Nov-2014**	**Dec-2014**
Index (Point)	7,361,61	6,752.86	6,535.72
Number of shares Traded (million)	3,299.568	3,405.866	6,093.266
Volume Traded (KWD) (million)	383.384	386.286	696.715
Market Capitalization (KWD) (million)	305,852.881	30,099.812	29,387.878

Source: KSE Market Summary 20014.

Figure 2.5 and 2.6 shows the market pattern of October 2015, September, and October 2015 respectively.

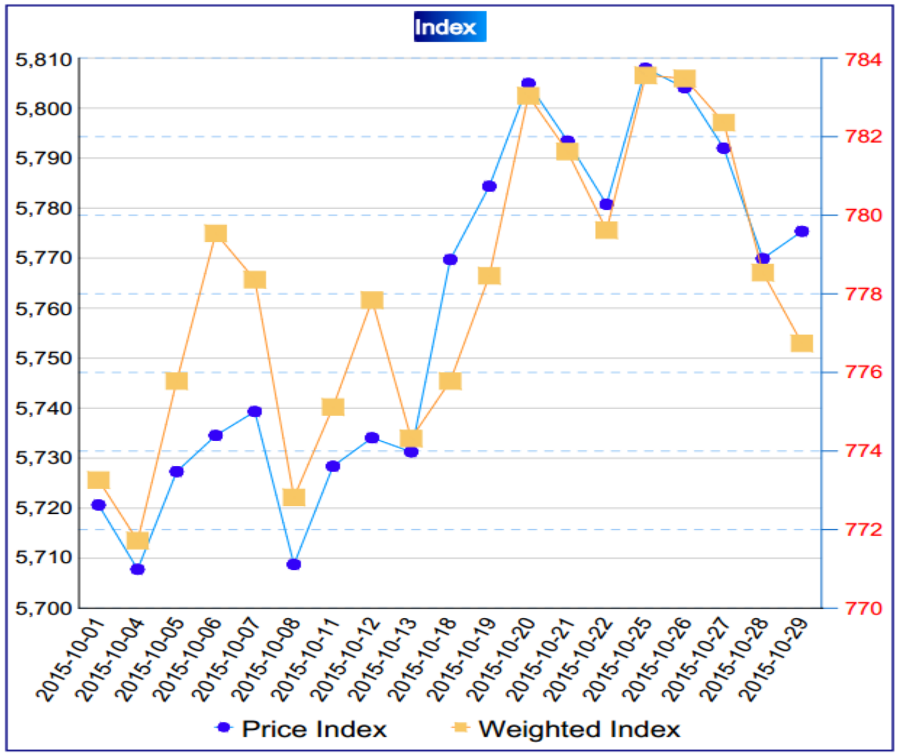


Figure 2.5: KSE Price index and weighted index in 2015
Source: KSE Market Summary2014.

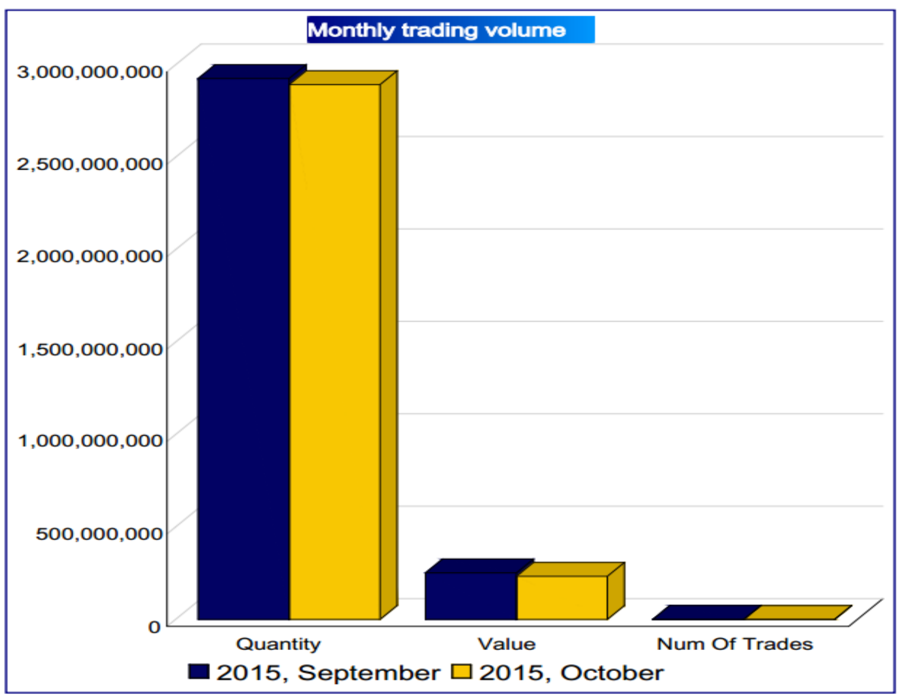


Figure: 2.6 KSE monthly trading volume in 2015
Source: KSE Market Summary 2014.

According to the Central Bank of Kuwait (Annual Report 2014), the Kuwaiti Stock Market went through three stages during 2014 as mentioned below:

2.4.6.1 The Primary Trading Indicators

The primary indicators for trading in the KSE headed towards a noticeable drop during 2014. The total value of traded stocks during 2014 reached around 24.96 million KWD/day compared to around 45.16 million KWD/day in 2013 (see Table 2.12). Furthermore, in terms of the value of sectoral based distribution for stocks being traded, the banking sector (which contains 12 banks, and makes up around 6.22% of the total number of listed companies in the market, and 30% of the total value of capital of the market by the end of 2014) had the highest value of stocks being traded of the sectors of the market. It should be mentioned that the value of stocks being traded during 2014, reached around 1828.8 million USD, in tandem with the around 30.04% of the total value of stocks being traded in the market for the specified year see Table 2.13.

Table 2.12: The primary Trading Indicator (KSE)

Period	**Value traded (Million Dinar)**	**Shares Traded (Million)**	**No. Of Contracts (in Thousands)**
2012	7,214.7	83,136.1	1,198.3
2013	11,102.6	126,507.2	2,136.1
2014	6,087	52,986.1	1,185.9
Q1	1,861	17,164.7	341.8
Q2	1,506	1,0990	263.1
Q3	1,279	12,593.3	277.4
Q4	1,441	12,292.1	303.6

Source: Central Bank of Kuwait Annual Report (2014).

Table 2.13: The Value of Sectoral Based Distribution of Traded Stocks (million KWD) in 2014

Sector	**No. company**	**Value**	**%**
Oil and Gas	8	180.1	2.96
Basic Material	4	72.5	1.19
Industrials	39	719.6	11.82
Consumer Goods	7	112.8	1.85
Health Care	3	15	0.25
Consumer Services	16	97.5	1.60
Telecommunication	4	400.4	6.58
Utilities	-	-	-
Banks	12	1,828.8	30.04
Insurance	7	14.4	0.24
Real Estate	39	1,006.1	16.53
Financial Services	50	1,618.4	26.59
Investment instrument	-	-	-
Technology	4	21.4	0.35
TOTAL	**193**	**6,087**	**100**

Source: Central Bank of Kuwait Annual Report (2014).

2.4.6.2 Price Movement

The KSE index recorded a noticeable drop in 2014, where trading closed for the year at 6,535.72 points compared to 7,549.52 points at the end of 2013, dropping around 1,013.80 points and by 13.43% (Central Bank of Kuwait, 2014). Keeping with that, the KSE 15 index of Kuwait dropped during the year to reach 1,059.95 compared to 1,068.42 at the end of 2013, equalling around 8.47 points or 0.79% drop.

2.4.6.3 The variables that affect market performance

A collection of variables negatively affected the performance of the market in 2014, the most important of which are as follows: the drop in oil prices and geopolitical issues.

The drop in oil prices: The major trading and price indicators witnessed a significant decline because of the decrease in crude oil prices in global markets during the last quarter of 2014. This decrease in oil prices affected most of the traded shares of companies listed in the local market as well as in the GCC countries money markets. Cause (2015) showed that the real reason behind the collapse of oil prices in 2014 was a market glut due to Saudi Arabia's production policy. In addition, Fattouh (2014) found that the collapse in oil prices related to the increase in the US oil production. This drop in oil prices resulted in a drop in most stocks being traded on exchanges in the local markets, in addition to the financial markets in the GCC countries (Central Bank of Kuwait, 2014).

Sharp increases in regional geopolitical problems: The year 2014 witnessed a sharp increase in the frequency and level of geopolitical problems. Cause (2015) suggested that the drop in world oil prices in 2014 was due to geopolitical issues. The struggle for regional influence between Saudi Arabia and Iran who are both heavily dependent on oil (trading/production) to support their economies affected investor perception. Additionally, Russia was trying to re-establish its regional influence after two decades since the collapse of Soviet Union and is also heavily reliant on oil. Declining revenues in Saudi Arabia and in Iran indicate the high costs of a competitive regional policy. Saudi Arabia, with over USD 700 billion in the bank, is more able to cope with a period of low oil prices than Iran and Russia. Furthermore, Saudi Arabia planned to use its financial reserves to put pressure on high-cost oil producers in North America, where the surge in production played a major role in collapsing the market in 2014. According to this plan, Saudi Arabia was hoping that the depressed market would reduce investment in North America, and thus reduce North American production levels. This geopolitical problem brought with it estimates about the possibility of a direct impact on the performance of companies listed on the KSE (Central Bank of Kuwait Annual Report, 2014).

On the other hand, the market also saw some positive factors that supported its performance during the year. The most important of which was quarterly results:

The quarterly earnings for companies in 2014: The net earnings (and losses) of listed companies are presented in Figure 2.7; they witnessed a drop of 5.5% and 6.5% for the first quarter of 2014 and first half of 2014 respectively compared to 2013 (Central Bank of Kuwait Annual Report, 2014).

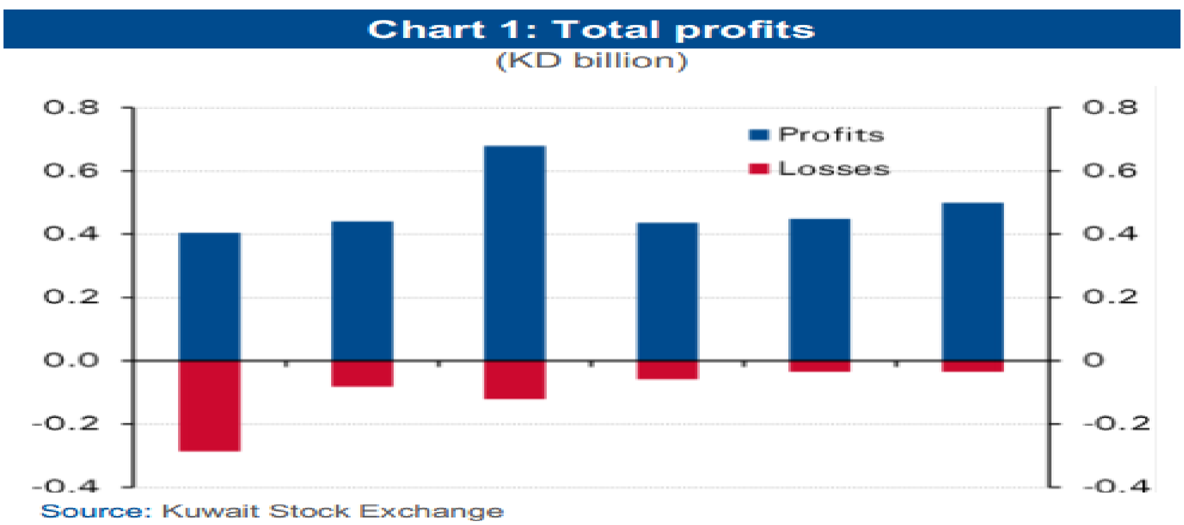


Figure 2.7: Quarterly Net profit by sector 2013-2014.

In terms of sectoral performance, in the first quarter of 2014, earnings gains were reported in most sectors and particularly in the real estate and non-bank financial sectors reflecting the improvement in the economic environment. Out of 191 listed companies, 173 had a total profit of 470 million KWD, and the 31 remaining companies' losses reached 34.5 million KWD. The banking and industrial sectors showed the highest growth. The total profit in the industrial sectors reached 53 million KWD with around 11% of total earnings and growth of 21%. The real estate sector achieved earnings increases of 18% equal to 50 million KWD, and this rise was backed up by growth in total sales. Non-banking financial services continued their recovery from the financial crisis in 2009 with profits growing by 32% to reach 29 million KWD, while the basic materials companies, especially those driven by the petrochemicals industry, achieved growth of 18% to 39 million KWD (see Table 2.14). The weakest sector was the consumer sector (Central Bank of Kuwait, 2014).

Table 2.14: Sectoral Profit of KSE Listed Companies

Sectors	**Net profit**		**Growth %**
	1Q13	1Q14	
Banks	149	166	11.4
Telecommunication	71	76	6.3
Industrials	44	53	21.1
Real Estate	43	50	17.9
Basic Materials	33	39	18.3
Financial Services	22	29	31.7
Consumer Goods	18	19	6.5
Insurance	9	12	30.7
Consumer Services	18	9	-50.4
Oil & Gas	5	7	45.4
Healthcare	3	3	-11.8
Technology	2	1	-9.0
Total	**417**	**464**	**11.4**

Source: Kuwait Stock Exchange (2014).

The third quarter of the year witnessed a slight earnings increase of 0.2% compared to the equivalent period in the previous year. Moreover, all listed companies also witnessed an increase of around 20.6% in total earnings during the fourth quarter of the year, and with that, the net earnings for companies in 2014 witnessed an increase of 66 million KWD or a 4% increase compared to net earnings during 2013 (Central Bank of Kuwait, 2014).

Improved commitment in disclosing financial information on time: The KSE recorded an improvement in the commitment of companies in disclosing financial information in 2014. This was in respect of the listed companies that are allowed to disclose information and a matter that reduce ceased stock for companies and it was not the case in previous year (Central Bank of Kuwait Annual Report, 2014).

2.5 Saudi Stock Market and Historical Perspective

The Saudi stock market came into being in 1935 when the shares of the Arab automobile company were sold to the public. The market has also gone through three stages since then:

2.5.1 Stage 1: Initial stage (1935 – 1982)

This initial stage of the market was studied by Abdeen and Shook (1984) and several conclusions were made regarding the characteristics of the market. The first was that there was no legal framework; rather three government agencies supervised the stock market: The Ministry of Finance and National Economy, the Saudi Arabian Monetary Agency and the Ministry of Commerce. Therefore, there was no official policy to supervise the market. Additionally, there were many unprofessional/unlicensed brokers operating within the market. They were allowed to set market prices based on what the market could handle at any given moment. Lastly, there was a great deal of ignorance surrounding the stock market by Saudi citizens. As a result, the majority of transactions were made with little attention given to the financial statements of firms.

2.5.2 Stage 2: Established stage (1983 – 2002)

With the creation of an economic strategy, the Saudi market went into the second stage of development, the establishment stage. During this stage, the government aimed to regulate the capital market in an attempt to ensure the safe and efficient functioning of the market, so as to help with the country's development goals. In addition, while this stage was officially launched in 1985, it began in 1983 when a ministerial committee was created to aid in the regulation of the stock market. As stated in the annual report (1997) of the Saudi Arabian Monetary Agency (SAMA), the Ministry of Commerce handled the majority of the responsibility for the regulation, supervision, and day-to-day operations of the market. On the other hand, the Ministry of Finance and National Economy worked as the government body in the regulation and development of the Saudi stock market (Dukheil, 2002).

During this second stage, significant improvements were seen within all aspects of the Saudi stock market including its structure, operation, and regulation. Additionally, in 1989, the National Centre for Financial and Economic Information (NCFEI) developed a general index to evaluate the performance of the market. The index is a capitalization-weighted index with a base value of 100, and was launched in February 1985. Later, another index was created in 1995, dubbed the Consulting Centre for Finance and Investment (CCFI) index, which was made by a private consulting centre in Riyadh (Dukhiel, 2002). Lastly, in 2001, the Electronic Securities Information System (ESIS) was altered and its name was changed to the Tadawul All Share Index (TASI). In comparison to its predecessor, it facilitates the full integration of trading, depository clearing, and settlement systems with T+0 settlements. It also has the ability to do online trading and contains increased capacity for electronic trading with the inclusion of instruments different from equities like various bonds, and mutual funds. TASI also allows listed companies to make various announcements and divulge their financial statements (Tadawul, 2002).

2.5.3 Stage 3: Modernization stage (2003-present day)

To overcome the shortcomings of the establishment stage, the Saudi government backed the stock market to accomplish the goals of the development plan. The start of the third stage coincided with the establishment of the Capital Market Law (CML) in 2003. To support the CML, the government also founded the Capital Market Authority (CMA), which reports directly to the prime minister. It serves many functions including regulating and developing the exchange while improving the methods and systems to improve security while trading and making transactions. On a broad level, good regulation authorizes the exploitation of any margin for the extraction of additional benefit in the interests of society (Ibrahim, 2008).The CMA preoccupies itself not only with the regulation of market players, but also with the adoption of policies that would allow capital markets to improve societal welfare. Through coordination and planning, it is possible for the CMA to play an important role in that regard, by the choice of right transactions to prioritized societal segments. The CMA plays a key role in regulating the issuing of securities as well monitoring dealings in securities. Protection of investors and citizens from various threats and misdealing information related to the exchange is one of the functions of the CMA. The CMA ensures fairness, efficiency, and transparency in transactions, and ensures maximum disclosure of information related to securities. Finally, the CMA regulates proxy and purchase requests and public offers of shares (CMA annual report, 2009).

In order to stimulate capital market transactions and to assist both issuers and investors in protecting their respective rights, the CMA has been encouraging the creation of securities firms. The CMA has imposed on securities firms, in the Authorized Persons Regulations of 2005, a number of requirements relating to the conduct of business (Part 5 of the Authorized Persons Regulations of 2005), on internal systems and controls (Part 6 of the Authorized Persons Regulations of 2005), and on the utilization of client money and assets (Part 7 of the Authorized Persons Regulations of 2005).

2.5.4 Market Activity of the Saudi Stock market

The Saudi stock market is a relatively young exchange having been established in 1935. However, from the very beginning it was the centre of a lot of attention due to its role in the reduction of dependence of Saudi Arabia on oil. It has also seen tremendous growth over the years, as in 1986 46 companies were listed while by 2010, that number reached 146. However, the annual increase in listed companies remained relatively low between 1986 and 2005. It also saw a reduction in 2002 because of a merger between electricity companies (SAMA annual report, 2010).

During 2005 a total of 69 new companies were listed making a grand total 146. This increase suggests that the CMA accomplished its goal of attracting funds for new investments, thus deepening the stock market (Arab Monetary Fund Annual Report, 2014). On February 25, 2006, the market had closed at its historic high of 20,634.86. The collapse began on the following day. By the end of 2006, the stock market's main index, the TASI, had lost approximately 65% of its value, and market capitalization had fallen by half, to USD 326.9

billion (AlKhaldi, 2015). In 2005, the year before the crash, Saudi Arabia was ranked 38th of 155 countries in the World Bank's Ease of Doing Business report (World Bank, 2006). The growing popularity of equity financing can be gauged from the fact that the total amount raised through the equity route increased to Saudi Arabian Riyal (SAR) 65.6 billion in 2008 from SAR 10.1 billion in 2001. With the establishment of the CMA, the Saudi capital market gradually started evolving in breadth, depth and complexity even as the financing needs of corporations, particularly SMEs, increased. The number of listed companies increased to 139 in March 2010 from 76 in 2001 as Saudi companies turned to capital markets to fund their future financing needs. This coupled with increasing investor participation expanded Tadawul's total market capitalization at a CAGR of 34.8% to SAR 1.9 trillion during 2003-2007. Tadawul's market capitalization declined thereafter to SAR 924.5 billion in 2008 before again rising to SAR 1.2 trillion in 2009 (Aljazira Capital, 2010). In 2012, the CMA announced the adoption of International Financial Reporting Standards, a set of accounting and disclosure rules developed by the International Accounting Standards Board designed to be used as a global standard for publicly-traded companies. Listed companies were required to have made the transition by January 2017, and all other companies by the start of 2018[6].

2.6 UAE Stock Market and Historical Development

The UAE market development can be classified in three stages:

2.6.1 Stage 1: 1959 – 1982

[6] Saudi Capital Markets Authority website, http://www.cma.org.sa/En/Pages/IFRS.aspx

The first public joint stock company in Dubai was the UAE Beverages Company, which was established in 1959, and was launched with around 2 million Arab Emirates Dirham (AED) in capital. After its establishment, other companies followed suit including Dubai National Bank, Oman Limited Bank, Abu Dhabi National Bank, and National Cement Company. The UAE Central Bank began the creation of a securities market. Moreover, in order to guide the country and its leader through this period, financial experts from the International Finance Corporation (IFC)[7] were employed. The creation of a securities market was first discussed in a report between April and May of 1982. Additionally, this was occurring during the Kuwaiti Al-Mmanakh crisis when companies and investors were losing billions of dollars (Al-Mohanna, 2015).

This triggered a light bulb moment in the leaders of the UAE as it was understood that a comprehensive regulatory framework was needed, in order to avoid a crisis similar to the one occurring in Kuwait. Moreover, the persistence of high oil prices at the time aided the UAE tremendously. This changed the once money-deprived economy to an economy awash with cash. It also became easier to create a securities market due to the abundance of joint ventures in the capital market (Al-Shayeb, 1999). The country's assessment of the need for a securities market was proved right. By 1982, the number of joint companies in the market was around 80 companies with a total capitalization value of USD 2.8 billion (Bin Sabt, 2000).

2.6.2 Stage 2: 1983-1992

[7] An institute of the World Bank group

The fall in gas prices from 36 USD per barrel to USD 8 per barrel greatly affected the economy and the securities market. With reduced money available, barriers to entry began to appear to the establishment of new companies. In this period, IPOs were only undertaken by five companies in the market with a capital of only 70 million USD (Bin Sabt, 2000). There was an urgent need to set up and implement regulations to ensure the future of the securities market. The Creation of Companies Act (1984) was an attempt at managing the securities market (Al-Khaleej, 1982).

Brokerage services under the Central Bank of the UAE (CBUAE) decision no. 6/88 were restricted by allowing trading activity to be conducted only by nationals of the country. During this time, the said five companies were listed and trading was limited, implying that investment opportunities were minimal. In other words, this showed that the stock market at the time was unattractive to investors. Additionally, the offering by banks of high saving interest rates, with rates exceeding the stock market returns, was also a factor (Al-Dabas, 1995).

2.6.3 Stage 3: 1993-2000

After facing setbacks in setting up and aligning regulatory requirements, 1993 to 2000 saw increasingly dynamic activity in the UAE capital market. New companies began popping up all over the UAE striving to achieve the IPO stage. The government approved 27 companies to proceed, with capital of 2.5 billion USD. This meant that the decision to organize and regulate brokerage was a correct one as it facilitated trading in varied stocks by investors who had no knowledge of business. The government limited their direct involvement in trading related to foreign securities. However, the availability of cash through banks and the lack of restrictions regarding fair share pricing resulted in an explosion of trade volume. This explosion was characterized as a weakness in its legal framework despite the successful and profitable transactions. The capital market was considered volatile at the time due to fluctuations in share value and trading volume. Furthermore, although a securities market boosts the protection of an economy, by definition, an integral part of its operation will be its dry periods. In other words, share prices and the volume of trading dip and rise. This can be seen in 1998 when the UAE share prices reached a high of 64 billion USD only to taper off to 34 billion later that year. The market then fell further to 28 billion in 1999 to the displeasure of investors.

However, the government recognised that this was due to a lack of legal and operational frameworks in the market. The uncontrollability of share prices is affected by speculation, but can be controlled by correct policies and systems. This led to the CBUAE announcing the formalization of the securities market in the UAE. It was generally agreed by the leaders of the nation that the official establishment of a securities market would mitigate volatility effects. This prompted the creation of a stock trading floor and clearing house for transactions between Dubai and Abu Dhabi. This was intended to protect the financial sector from any fraud or negative developments to aid the economy. This movement allowed for the creation of the Emirates Securities and Commodity Authority (ESCA), Dubai Financial Market (DFM), and Abu Dhabi Securities Exchange (ADX). In 2000 a decree was released which created the ESCA that functions as the securities and commodities authority. Its main task was to organise and regulate the UAE securities market to protect investors. Different trading floors that connect electronically and facilitate transactions were created. The Dubai financial market and Abu Dhabi securities markets were set up and at last, the age of unregulated stock market operations ended (Al-Mohana, 2015). The DIFX stock exchange opened in 2005 in the Dubai International Financial Centre (DIFC) to provide a stock market for international and local stock listings. Stocks are denominated in US$ rather than UAE dirhams.

In November 2007, DP World, a Dubai government company, announced it would hold an IPO and it was subsequently listed on the stock exchange later in the month. Interest and trading have picked up significantly since then, although the level of interest in DIFX listed stocks is still not comparable to the other UAE stock markets. That may improve as more companies list on the exchange. The Abu Dhabi Securities Market (ADSM) was renamed as the Abu Dhabi Securities Exchange (ADX) in May 2008. The ADX is the 3rd stock exchange in the UAE. The main trading floor is in Abu Dhabi (Sharewadi, 2008). Dubai's stock market capitalisation almost doubled in 2013 amid reignited investor interest anticipating the upgrade in its classification to emerging markets status. In the end, the 107.6 per cent gain for 2013 made Dubai the world's second-best-performing index in US dollar terms, behind only Venezuela (Al-Sayegh, 2014).

2.7 Comparison between Kuwait, KSA and UAE Stock Markets

Table 2.15 presents a summary of the key financial indicators in the stock markets of Kuwait, Saudi Arabia and United Arab Emirates (UAE) in 2014

Table 2.15: Key Financial Indicators

	Saudi Arabia	**Kuwait**	**Abu Dhabi**	**Dubai**
Date Founded	1984	1983	2000	2000
Number of Listed Corporations	175	204	84	63
Market Capitalization(US USD bn)	482.9	100.3	113.7	87.8
Traded Shares (mn)	15,631	12,798	10,646.8	28,376
Turnover ratio	27.1	5.0	5.0	20.5
Trading Value (US USD bn)	13,086.59	501.5	570.774	1,796.388
% Trading Value	75.34%	2.89%	3.29%	10.34%
GDP(current, US USD bn)	753.8	163.6	399.5	399.5
Market capitalization/ GDP	64.10%	61.30%	28.50%	22.00%

Source: Arab Monetary Fund (2014, 2016) and World Bank (2014)

The contribution of oil to GDP is 50.5% in the United Arab Emirates (UAE), 61.30% in Kuwait and more than 50% in Saudi Arabia in 2016 (OPEC, 2017). These are the three largest economies in the GCC countries. Their stock market capitalization/GDP are positively correlated with the importance of oil in their economies. It should be noted that Saudi Arabia leads the region in terms of market capitalization, in addition to the fact that stock market capitalization exceeds GDP for all three countries. In terms of listed companies, Kuwait is the leading market followed by Saudi Arabia and then the UAE.

Saudi Arabia, Kuwait and the UAE together produce about 20% of the world oil production, possess 38% of proven world oil reserves, and control 54% of OPEC oil exports (OPEC annual report, 2016). Oil revenues are the essential source of income, government budget revenues, expenditures, and aggregate demand. Therefore, oil price fluctuations can indirectly influence the three stock markets through their influence on the price of imported goods. A rise in oil prices increases the inflation rate and imposes pressure on these economies; consequently, it might affect interest rates and as a result, it conditions investment levels. Unlike oil-importing countries where the linkages between oil price changes and stock markets are negative, the relationship between the oil price changes and stock market in oil-exporting countries is still inconclusive, and the impact of oil price changes on stock markets depends on which of the positive and negative impacts outweighs the other.

2.8 Conclusion

This chapter concludes that the GCC region has faced many incidences of shocks and hence, the governments implemented diverse laws to enhance the investors' confidence. This is particularly the case with foreign investors, in order to bring foreign capital to their economies, and as a result, to bring their stock markets up to the world level. Oil price shocks and political turmoil have diverse effects on these GCC countries. However, in summary, the region tends to react positively to oil price shocks. The dependency of any country on oil exports and oil as key factor in national income are main factors that can be considered as the driving force for how much a country is affected.

Over the past 30 years, Kuwait had some important challenges, e.g., Iraq invasion, US financial crises and Arab Spring. The Iraqi invasion of Kuwait produced an adverse psychological reaction in stock prices and consumer sentiment. These factors depressed consumer spending, particularly on consumer durables, and reduced business investment while defence spending did not fill the gap. Iraq's invasion of Kuwait caused extensive physical damage to the territory and it resulted in large budgetary and balance of payments deficits. Moreover, it disordered the domestic and financial markets, halted foreign trade and disabled the labour market completely. Over 60 per cent of the existing oil bores were set on fire by Iraq. This automatically led to a total shutting down of production, which essentially halted all foreign trade. Furthermore, as the territory's oil bores were set on fire it had a major effect on water sources and the environment (Sab, 2014). In 2003, the return in confidence by investors in the KSE was notable as the Saddam Hussain threat could be considered a key event in the country's history. Additionally, during this period the government underwent significant changes; a new government was elected with a progressive and proactive set of members. The government took several actions during this time, such as tax structure realization, changes in foreign direct investment law, and privatization efforts, which all led to the growth of the economy for the future (Abdullah, 2012). Upon reflection, all these factors contributed to the KSE performance, which reported high increases in the value of the stocks of listed firms. Additionally, the country also saw an increase in spending and consumer demand, which stimulated the KSE to further improvement. All of these conditions had a positive effect on real estate and capital markets (IMF, 2005).

The US financial crisis (2008) continued to plague not only America, but the rest of the world as well. Countries like Kuwait and the KSA all had recessions. The effects of global recession are not only exclusive to the business community, but also affected Kuwait's workforce as well. A good number of companies had already shed jobs. However, the banking assets in Kuwait increased 10.6 percent in 2008 compared to the previous year. The increase in banking asset value was 3.2 billion Kuwait Dinars (about 11.52 billion U.S. dollars), shooting up from 35.5 billion dinars in 2007 to 39.3 billion dinars in 2008 (Essays, 2013).

The Arab Spring of 2011 also was of significant importance as the KSE was hit hardest among the GCC countries' stock markets. The Kuwait price index fell by 10.69% by the end of the year, levelling out at 6,211.70 points (Abumustafa, 2016). Lastly, seeing as these two events represent the largest losses in the KSE since its inception, they represent a prime opportunity to research the effects of oil price shocks on the KSE.

Naifar and Dohaiman (2013) tested the impact of oil price volatility on GCC countries stock markets returns by implementing Markov regime switching. The study reveals the exception that Oman investors ask for the lowest premium among the GCC countries markets during low volatility in oil prices. The studies, such as Demirer, Jategaonkar and Khalifa (2015), Akoum, Graham, Kivihaho, Nikkinen and Omran (2012), and Arouri, Lihiani and Bellalah (2010), focused their attention on the analysis of oil price volatility and its implication for stock markets in the GCC countries.

The reviewed studies do not seem to offer sufficient evidence on the impact of political issues on oil price volatility and its spillover effects towards the main stock markets in the region. Hence, this is a significant gap in the earlier studied that is filled in this thesis with the help of detailed analysis ahead. Moreover, there is also a lack of analysis focusing on the case of small oil exporting countries, justifying the purpose of this research. Extant literature focused on GCC countries as oil-exporting countries such as the study by Jouini (2013), indicated the existence of significant transmission between the oil price and Saudi Arabian stock market sectors, whereas the spillover impacts are unidirectional from oil to some sectors for returns, but bidirectional for volatility patterns with a more apparent link from the sectors to oil.

Mohanty, Nandha, Turkistani and Alaitani (2011) examined the relationship between oil price changes and stock prices of GCC countries using country-level and industry-level stock returns. The study found that at country level a significant positive relationship exists between oil price changes and stock returns in GCC countries, except for Kuwait. Kuwait was also found to have some significant importance within the region as it is one of the main oil producers in the Middle-East and its budget, government revenue, earnings and aggregate demand are greatly influenced by the volatility in oil prices.

The variation in the price of raw oil in the market worldwide has been significantly unsettling the economy of Kuwait (OPEC Annual Statistical Bulletin, 2015). Moreover, it is broadly susceptible to economic bumps like that of unstable oil prices. Thus, the proposed research will focus its attention on how political events cause oil price inconsistency and its spillover effects on the indices of the Kuwaiti stock exchange market (International Monetary Fund IMF, 2013; World Bank/IFC, 2010). Additionally, the share of the oil sector in Kuwaiti GDP is 59%. Because of this size, Kuwait could be taken as a case study due to the need of understanding the major factors affecting this type of economy and this would help develop a contextual analysis of the region, to understand the implications of oil price fluctuations and their effects on small oil export-oriented economies (Kuwait Central Bank Annual Report, 2012/2013).

The Gulf Cooperation Council (GCC) economies are also highly dependent on oil exports with energy export revenues as a percentage of total exports ranging between a low of 60% for Bahrain and a high of 95% for Kuwait. Lastly, the region possesses about 48.5% of the world's proved oil reserves and controls 33% of oil exports globally. With the oil sector accounting for a significant portion of their GDP, it can be argued that oil price fluctuations have a direct effect not only on macroeconomic variables in these economies, but also corporate profits and earnings growth projections which in turn affect stock prices (Demirer, Jategaonkar and Khalifa, 2015). Therefore, considering that all the research mentioned up to this point focused on the GCC region, that some of the research found Kuwait to have unique results when compared to its peers, and that it is an important country in the region, a study focusing on Kuwait would be beneficial.

CHAPTER 3

THE IMPORTANCE OF THE OIL MARKET

3.0 Introduction

The hypothesis of a negative relationships between oil prices and the stock market is based on the proposition that an increase in oil prices affects stock market negatively while an increase or change in stock market does not affect oil prices. This means that when oil prices increase, stock returns decrease but changes in stock market returns do not have any effect on oil prices. This is causality; changes in oil prices cause stock market changes but not the other way around. There are various studies supporting this argument e.g. Anoruo & Mustafa, 2007. These authors examined the relationship between oil and stock returns for the U.S, and their empirical testing reveals that there is a long-term linkage between oil and stock returns in the U.S and causality from stock returns to oil markets and not vice versa. From a microeconomic perspective, the rise in oil prices affects those companies dealing with oil directly or indirectly. If the companies cannot pass price increases to their consumers, then their profits and the dividends that play a key role in the stock market decrease. This effect is felt either immediately, or is sometimes lagged, depending on the efficiency of the stock market (Arouri, Lahiani and Bellalah, 2010).

Oil prices put upward pressure on oil-importing countries in terms of the domestic inflation rate and downward pressure on foreign exchange rate. As expected, a higher inflation rate raises the discount rates; hence, a rationale for the negative impact on stock market returns (Huang et al., 1996). Narayan and Seema (2010) investigated the relationship between oil prices and stock markets in Vietnam. He found that there is a long-run significant positive effect on stock prices. In addition, a rise in oil prices is expected to impact positively on the stock market of oil exporting countries through both income and wealth effects. This happens due to the increase in government revenue and public expenditure on infrastructure and other major projects as suggested by Al-Fayoumi (2009). Furthermore, high oil prices mean an exchange of net wealth from oil importers to oil exporters. The magnitude of the effects depends on where the oil exporting government places the additional income generated. If the income is used to purchase domestic goods and services, then there is an increase in the level of economic activities and an improvement in stock market returns in the exporting countries.

This chapter introduces a discussion on the international research that has been undertaken to-date on the relationship between stock prices and oil prices. This review is necessary to obtain a clear understanding of the studies that have been conducted in these areas to-date, and to identify clear gaps in the existing research. Significantly, there is a lack of analysis regarding stock prices and oil prices in Kuwait and GCC countries. Most of the research that has been undertaken has paid attention to developed markets. There is also insufficient research done on Kuwait and the GCC countries in terms of the influence of the oil price on the stock indexes. Furthermore, this analysis is of interest to academics and practitioners, because these variables play crucial roles in influencing the development of a country's economy.

For example, the hypothesis suggesting that the rise in oil prices is due to a booming economy that is reflected in strong business performance and that as a consequence, there is an increase in oil demand is of great significance. It is believed that such an increase in demand happens after recovery from recession. Global demands picks up and there is a rise in basic material prices. To meet the rising demand, factories require more resources such as labor and fuel energy. An increase in labor demand means a direct increase in wages and more spending that makes the economy look brighter (Akoum, Graham, Kivihaho, Nikkinen and Omran, 2012). Jones, Paul and Inja (2004) stated that the price of oil can influence stock markets through numerous channels. Firstly, the cost of shares being common to its discounted future of cash flow, increasing oil prices can enhance the interest rate to restrict inflationary pressure, tighten the costs of business, and apply pressure on output costs thus reducing profitability. Hence, this is important for those investors who are looking for substitutional choices to diversify their capital. As a consequence, they will be able to minimize their exposure to risk. Taking all these facts into account, this research pays close attention to the analysis of oil prices and the stock index in Kuwait and the GCC countries, which are representative of relevant emerging stock markets. In addition, the findings of this study could provide important information for building accurate pricing models, risk management, forecasting future sector returns volatility and making optimal portfolio allocations to reduce the transmission of shocks and volatility between oil prices and some of the examined market sectors.

3.1 Oil Importing Countries

This section provides an overview of the empirical evidence of the oil market and stock market nexus focusing on oil importing countries across the globe. It will help better understand the trend and hence to draw conclusions in respect of the patterns of most economies involved in oil trading. This section will also explain the econometric methodologies used by researchers for empirical analysis. The section is organized in chronological order with the most recent articles are discussed first; however, some similar studies are grouped together from different timeframes where appropriate.

Gencer and Killic (2014) explored the conjoint impact of oil and gold volatility on the Istanbul Stock Exchange (ISE). A multivariate M-GARCH model was used, and the empirical study was implemented using 27 industry-level return series along with the ISE 100 index and a constructed equally weighted portfolio of oil, gold and each sector index in turn. The data set covered the period from September 2002 to July 2012 using a daily interval of 5 days a week. The results show that the correlation coefficient between gold and holding basic metal and commercial indices are all negative. Oil has a high positive correlation coefficient on all indices. Arouri (2011) tested the response of the European sector stock market in each of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK. The weekly data sample covered from 1 January 1998 to 30 July 2010. The linear and asymmetric model suggests a strong significant relationship between oil price changes and stock markets for most European sectors, and the reaction of stock returns to oil price shocks changes considerably across sectors. The implementation of the outcomes can help investors who are interested in investing in oil in Europe, when oil prices are expected to rise, to select stocks from sectors such as oil and gas.

Degiannakis, Filis and Floros (2013) investigated the relationship between the equity returns from 10 European industrial indices and oil price fluctuations using monthly data from January 1992 to December 2010. The Diag-VECH GARCH model reveals that the relationship between the returns of oil prices and the industrial sector indices are significantly influenced by the origin of the oil price shocks. The findings are important for traders and stock market analysis, since, in the period of the world economic crisis in 2008, investors minimized their risk through diversifying their investments into other sectors such as health, telecommunications and technology. Martinez, Lepena and Sotos (2014) demonstrated the role of the aggregate demand-side oil price shocks associated with the global real economic activity in the link between oil price fluctuations and Spanish stock markets. The study examined the oil price exposure of Spanish industry from January 1993 to December 2010. The results from the Bai and Perron multiple structural break test reveal that the impact of oil price fluctuations on the Spanish stock market is quite modest. As a result, oil price fluctuations have no impact on a large portion of industries, such as consumer goods, technology and telecommunication, while the energy, construction, food and beverages, and banking industries experience greater exposure to oil price fluctuation.

Mohanty, Nandha, Habis and Juhabi (2014) investigated oil price risk exposure of the U.S. travel and leisure industry. The study found that oil price sensitivities vary across six subsectors: airlines, gambling hotels, recreational services, restaurants and bars, and travel & tourism. It also documents that oil price risk exposures varies over time. In particular, the 2007-2009 recession triggered by the U.S. subprime lending crisis has contributed to the oil price risk exposure of the airline industry. The historically high price of crude oil sheds light on the vulnerability of the United States travel and Leisure sector to oil price shocks. Industry analysts propose that the level of oil prices is very critical to almost every part of the leisure and tourism value chain. The test applied by Fama-French-Carhart’s (1997) four-factor asset pricing model was augmented with the oil price risk factor. The results provide evidence that an oil price risk exposure differs considerably over time and across subsectors. Li, Zhu and

Yu (2011) studied the relationship between oil prices and the Chinese stock market at the sector level. A Granger causality and a panel co-integration framework was applied. Data was collected from July 2001 to December 2010. The results suggest that there is some evidence of structural breaks in the interaction between oil prices and Chinese sectoral stocks. The long-run estimates indicate that the real oil price has a positive effect on sectoral stocks. The Granger causality tests illustrate a unidirectional, short-run Granger causality relationship running from oil prices and sectoral stocks to the interest rate.

Fang and You (2014) studied the role of oil price shocks in the newly industrialized economies of China and India. For China, the results suggest that oil price changes have a negative impact one stock market returns because China is largely oil-dependent. In the case of India, since increased consumption does not drive oil prices, a negative impact is found between oil prices and the Indian economy. Moreover, Masih, Peters and Mello (2011) assessed the impact of the Asian financial crisis of 1997 and oil price hikes in the 1990s after the Gulf War on the South Korean stock market, and the results suggest that the oil price has two negative impacts on firm profitability: (1) a direct negative impact because it increases the production costs of firms; (2) an indirect negative impact on the profit margin of firms and decisions that affect stock market indexes.

Gupta and Modise (2013) investigated the South African stock market and analysed oil price shocks to discover the existence or not of a dynamic relationship between the two. The empirical results show that increasing oil prices reduce stock returns. The relationship between energy prices and stock market returns of Central and Eastern European (CEECs) countries was investigated by Asteriou and Bashmakova (2013). The data set consisted of daily closing prices of the stock markets of the Czech Republic, Estonia, Hungary, Lithuania, Latvia, Romania, Poland, Russia, Slovakia and Slovenia. The results show that an increase in oil prices causes a decrease in stock market returns.

Nguyen and Bhatti (2012) investigated the relationship between oil prices and stock markets in Vietnam. The empirical results indicate that if the international oil price decreases, Vietnam's stock market will also decrease. Constantinos, Ektor and Dimitrios (2010) considered the dynamic linkage between oil prices and the stock market in Greece. VAR modelling was employed in conjunction with Granger causality tests. The empirical test used daily data from Bloomberg between 2004 and 2006. The results provide evidence that volatility of oil prices has a significant positive causal impact on stock market returns as well as on stock market volatility.

Elyasian, Mansur and Odusami (2011) studied thirteen U.S. industries using the GARCH (1, 1) technique and analyzed the impact of oil returns and oil returns volatility on excess stock returns and returns volatilities. Strong evidence is found in support of the view that oil price fluctuations constitute a systematic asset price risk at industry level as nine of the thirteen sectors analyzed manifest statistically significant relationships between oil-futures returns distribution and industry excess returns. These industries are influenced either by oil futures returns, oil futures returns volatility or both. Excess returns of the oil-user industries are more likely to be influenced by changes in the volatility of oil returns, than those of oil returns itself. Volatilities of industry excess returns are time varying, and returns volatility for a number of sectors, seems to have long memories.

Yilmaz (2009) studied the extent of the contagion and interdependence across the East Asian equity markets since the early 1990s and compares the financial crisis with earlier episodes. The data was collected using the forecast error variance decomposition from a vector auto regression. They derived return and spillover indices over the rolling sub-sample windows. The indices were collected from 1992 to 2009. The results reflected the systematic nature of the crisis, and its severity. Kang, Ratti, and Yoon (2015) examined the effects of structural shocks in oil prices on the covariance of the U.S, stock market returns, and stock market volatility. The data on returns and volatility is collected on a daily basis. The measures of volatility are realized at high frequency, with conditional volatility recovered from a stochastic volatility model, and implied volatility deduced from options prices. The main results revealed that the spillover index between the structural oil price shocks and covariance of stock returns and volatility is large and highly significant statistically. Zhu, Li and Yu (2011) investigated the relationship between crude oil shocks and stock markets for the OECD and non-OECD panel from January 1995 to December 2009. They used the threshold vector error correction models to investigate the presence of asymmetric dynamic adjustment. They found the existence of bidirectional long-run Granger causality between crude oil shocks and stock markets for these OCED and non-OCED countries. It also revealed that the short run Granger causality between them is bidirectional under positive changes in deviation and unidirectional under negative ones.

Lin, Wesseh and Appiah (2014) studied the dynamic volatility and volatility transmission between oil and the Ghanaian stock market returns in a multivariate setting. They used the VAR-GARCH, VAR-AGARCH, and DCC-GARCH frameworks to study the data. The results show that the assumptions of symmetric effects and constant conditional correlations are not supported empirically. Chen and Lv (2015) examined the asymptotic dependence between the Chinese stock market and the world crude oil market. They used the Extreme Value Theory (EVT), finding an external dependence between the Chinese stock market and the world crude oil market. Sadorsky (2015) studied the increased financial integration between countries and the financializing of commodity markets resulting in investors having more ways to diversify their investment portfolios. The study used the VARMA-AGARCH and DCC-AGARCH models to model volatilities and conditional correlations between emerging markets stock prices, copper prices, oil prices, and wheat prices. Their research findings showed that oil provides the cheapest hedge for emerging markets stock prices while on the other hand the most expensive hedge is copper but given hedge ratio variability, little emphasis should be probably placed on average hedge ratios.

Narayan and Sharma (2014) explored whether the oil price contributes to stock returns volatility. The empirical test used daily returns data for 560 companies listed on the New York Stock Exchange (NYSE), and the sample was from 5 January 2000 to 32 December 2008. The 560 companies were divided into 14 sectors. The findings show that the oil price affects firms' returns volatility differently depending on the sector to which they belong, in terms of both sign and magnitude. The impact of oil prices on firms' returns volatility is positive for firms in the banking sector, while for the other 13 sectors the link for the majority of firms is negative. Faff and Filis (2014) applied the scalar-BEKK model to test the impact of three oil shocks on the aggregate stock market returns of the Shanghai composite index (China) and the NYSE index (USA). They used the sample period from 1995 until 2013. The results show that the correlation between oil price shocks and stock returns is systematically time-varying, with oil shocks showing a substantial variation in their impact on stock market returns and the impact differing across industrial sectors.

Malik and Ewing (2009) examined the transmission of volatility and shocks between the oil price and five major market sectors in the US: financials, industrials, consumer, services, health care and technology. Weekly returns were calculated from daily price data from January 1992 to April 2008. Bivariate GARCH models were applied in the test and indicate the existence of significant transmission of shocks and volatility between oil prices and these sectors. For example, financial sector returns have the least volatile response to oil shocks and for the technology sector, the volatility of returns is indirectly affected by oil shocks. In term of consumer services and health care sectors, the outcomes suggest direct and indirect effects of oil price shocks on these two sectors. In addition, the results show that industrial sectors returns are influenced directly by oil shocks.

Market volatility is considered as an important measurement in the financial markets especially during periods of uncertainty, when volatility rises. The well know technique, the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model that is usually applied to get information about financial markets and which way volatility patterns change, meaning that returns behavior become more unstable during times of financial crises, political crises or wars and economic uncertainty. There are many recent studies, such as Falzon and Castillo (2013); Aye (2014); Hamma, Jarboui and Ghorbel (2014); Huang (2016) that have used a GARCH approach to examine the impact of oil returns on stock returns and they found that the GARCH model gave stable results throughout the data periods under study.

Dilip and Maheswaran (2013) tested the returns, and volatility between crude oil prices and the Indian stock market's industrial sectors indices (the automobile, financial, service, energy, metal and mining, and commodities sectors). The results from the empirical tests reveal that the impact of oil price changes differs across the Indian industrial sectors. Arouri, Jouini and Nguyen (2012) investigated the causality relationship between the oil price and seven sectors stock indices in Europe (automobiles and parts, financials, industrials, basic materials, technology, telecommunications and utilities). The data was collected from the Dow Jones (DJ), Stoxx Europe 600 index and seven DJ Stoxx sector indices for eighteen countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom). The VAR-GARCH of Ling and McAleer (2003) was employed. The empirical results show the existence of a causality relationship between the oil price and the stock market in Europe; the oil price has a greater impact on the stock market.

Industrialized countries are heavily dependent on oil, much of which is imported. Price setting on the part of the oil exporting nations can have drastic effects on these countries' economies. Even if oil prices are determined by demand and supply forces in the free market, substantial and sudden increases in oil prices can considerably influence the state of the global economy as they can cause inflationary trends, which result in serious economic slowdowns and lead to downturns in the world stock markets. Cifarelli and Paladino (2010) argue that the growing presence of financial operators in the oil markets caused the diffusion of trading techniques based on extrapolative expectations. Strong evidence suggests that oil price shifts are negatively related to stock prices and exchange rate changes.

Fattouh, Kilian and Mahadeva (2012) identified speculators as important players in the oil market, which is consistent with the observed large daily upward and downward shifts in prices is clear evidence that it is not a fundamental – driven market. Their study examines the relationship between oil prices, stock prices and the US dollar exchange rate using a behavioral ICAPM approach, where noise traders are allowed to affect asset demands. A nonlinear model of the rate of change of oil spot prices is developed in a univariate framework and in a multivariate context. This empirical work derives insights into recent oil price dynamics. The higher the volatility, the stronger the serial correlation of oil returns, consistent with a model where some traders follow feedback strategies. Strong evidence indicates that the serial correlation of oil returns is affected by the conditional covariance between oil returns and stock market returns. Furthermore, the conditional covariance between stock returns and oil returns is crucial for the feedback traders in the equity markets. These results pinpoint that traders hedge their portfolios, consider oil as a component of their wealth allocation strategy, and this may have some policy implications.

Narayan and Sharma (2011) investigated the relationship between oil prices and firm returns for 560 US firms listed on the NYSE and list a number of results. First, oil prices influence returns of firms differently depending on their sectoral location. Second, there is strong evidence illustrating a lagged effect of oil prices on firm returns. Third, by testing the influence of oil prices on firm returns it found that it affects 5 out of 14 sectors are affected. Finally, it unravels that the oil prices influence firm returns differently based on firm size, implying strong evidence of size effects. Several studies prove that oil prices have a negative effect on the macroeconomic environment (Chen, Hamori and Kinkyo, 2014; Hamilton, 1983, 2003, 2009; Hooker, 1996). Another branch of studies demonstrated that higher economic growth leads to a higher stock market (Demirer, Jategaonkar and Khalifa, 2015; Arouri, Lahiani and Bellalah, 2010). In other words, if a rise in oil prices reduces the gross domestic product (GDP), it will reduce earnings of those firms for whom oil is either a direct, or an indirect, factor in their cost of production. In this case, an increase in the oil price will reduce firm earnings which will cause a fall in the stock price. If the stock market is weak, the effect of oil prices on returns will occur with a lag. Jones and Kaul (1996) use a time series regression model to investigate the effect of real oil prices on real stock returns based on quarterly data for four developed countries, specifically the US, Canada, Japan, and the UK. They notice that oil prices have a negative effect on aggregate real returns for all four countries. The main results from this research are summarized as follows: Oil prices affect firm returns differently depending on the sector which firms belong. The findings suggest that firms belonging to the energy and transportation sectors experience an increase in returns when oil prices rise, whereas firms belonging to the other sectors experience a downturn in returns in response to a rise in the oil price. This implies that oil prices have a dissimilar effect on firm returns. For small-sized firms in the bulk of the cases the relationship between oil prices and firm returns is statistically significant and positive. The authors also find that as the firm size grows from small to large, the relationship between oil prices and firm returns becomes more negative and statistically significant.

3.2 Analysis of the Impact of Oil Reliance on Economic Performance

A large number of researchers have concentrated on the relationship between oil prices and economic activity. China has been the world's second largest oil consumer since 2003 and has played a crucial role in world oil markets. Moreover, China's economy has expanded at a rapid pace and will continue to grow, which may accelerate the development of financial markets and will attract global investors to the Chinese stock market. There is clear evidence that increased real oil prices have a positive impact on sectoral stocks in the long run, for instance, Malik and Ewing (2009) utilized bivariate GARCH models to estimate the mean and conditional variance between five different US sector indexes and oil prices. It is important for financial market participants to understand the volatility transmission mechanism over time and across these series in order to make optimal portfolio allocation decisions.

Albaity and Mustafa (2018) investigated the long and short-run interaction between oil prices and stock returns for the GCC countries. They performed a time series causality analysis comprising upon monthly data spanning from 2005 to 2015. Their findings indicate the existence of a co-movement among variables in long-run. The results of the causality test display bidirectional relationship among oil prices and stock returns. Arouri et al., (2012); Hammoudeh and Aleisa (2004) studied the linkages between oil and stock prices of Kuwait and found a general absence of a long-run equilibrium relationship between oil and stock prices, meaning that information contained in oil prices does not help to predict future movements in stock prices and vice versa. Arouri and Nguyen (2011) proved that oil price changes have a dominant effect on stock prices and shows country's exposure to oil price fluctuations. The effect of oil prices on stock markets in oil dependent economies is characterized by their strong association, however in the case of Saudi Arabia there was no evidence of such effect. This finding suggests that in the long-run stock market prices are not sensitive to oil price fluctuations in the KSA (Alqattan and Alhayky, 2016). Cointegration outcomes do not support a long run relationship between Brent and stock prices for the UAE markets indicating that in the long run stock market prices are not sensitive to oil price fluctuations (Alqattani and Alhayky, 2016; Arouri and Rault, 2012). Research in the field shows significant evidence of uni directional causality running from oil to stock markets (Li et al., 2012; Jouini, 2013; Arouri et al., 2012; Jones and Kaul, 1996; Ling and McAleer, 2003; Constantain et al., 2010). As such, fluctuations in oil prices appear to have an effect on stock markets through for example volatility that ends up affecting economic activities and assets prices (Huang et al., 1996; Basher et al., 2012 and Ciner et al., 2013).

Mollick and Assefa (2013) scrutinize the stability of the stock-oil relationship using GARCH and MGARCH-DCC models from 1986 to 2009. Prior to the financial crisis, stock returns are negatively influenced by oil prices and by the USD/Euro rate?. For the subsample of mid-2009 onwards however, stock returns are positively influenced by oil prices and a weaker USD/Euro. As with inflation expectations, the authors illustrate these findings as U.S. stocks respond positively to expectations of recovery worldwide. Stock returns depend particularly on expected cash flows discounted by interest rates. The market views on inflation expectations are significant domestic forces. Simultaneously, interest rate increases should make stocks fall by discounting more heavily expected cash flows. The volatility began to rise as stock prices go higher, reaching very high levels from 1998 onwards. When looking at the period since 1998, Engle (2004) found high volatility as the market went down. This re-examination of Chen et al. (1986) employing the very flexible GARCH (1, 1) and MGARCH-DCC models accommodates a wider range of domestic and international forces illustrating daily U.S. stock returns. The response of U.S. equities to the Euro is entirely plausible from the viewpoint of investors reacting to higher earnings due to a lower USD and increasing trade with the European Union. Investigating a time span with substantial changes in returns and risk, the results reported herein are very strong within the class of GARCH models used. Lee, Yang and Huang (2012) analyzed sector stock prices and G7 countries oil prices from 1991 to 2009 and found that oil price shocks do not significantly affect the composite index in each country. However, stock price changes in Germany, the UK and the US were found to cause oil price changes. As for the interaction between oil price changes and sector stock prices, a short-run negative causal relationship is found.

Analyzing the oil-stock relationships with Islamic elements, Badeeb and Lean (2018) explored the asymmetric impact of oil prices on Islamic stocks from a sectoral perspective using the non-linear Autoregressive Distributed Lag cointegration methodology. They found weak linkages between oil price changes and the Islamic composite index. However, the nature and sensitivity of the reaction of stock prices to oil price shocks vary considerably across different sectors. In the longer term, the relationships between the oil prices and many Islamic sectoral stocks tend to follow a nonlinear pattern. Furthermore, the behavior of the real economic sectors indices reflects the performance of the composite index that is oil price-resistant. After 2008, the response of the sectoral indices to oil price movements saw notable changes where the sectoral gains from oil price drops that have been observed during the study period, have been found to diminish after 2008.

In terms of causality from sector stock price changes to oil price changes, the G7 countries study found that stock price changes lead oil price changes in 8 of 9 sectors in Germany, mostly in the G7 countries followed by the UK, Italy, France, Canada and the US. There is no causal relationship found for Japan. With respect to specific sectors, stock price changes in consumer staples and materials sectors were most significantly influenced by oil price changes followed by transportation, financial, energy, health care, industrials, utilities, information technology and telecommunication sectors. Until late 2008, two features regarding stock prices and oil prices emerged. First, the stock markets had grown around the world. Second, oil prices had surged and hit a new record of US USD 147 per barrel in 2008. It appeared that the equity market was influenced by the high oil prices. i.e. the higher the oil price, the greater the production cost, which translates into lower profits. As a consequence, it is quite logical that increased oil prices could influence stock markets. Sector equity indexes may be more convenient for examining the impact of oil prices on equity markets because oil prices may influence different sectors in different ways (Lee, Yang and Huang, 2012).

Boyer and Filion (2007) assessed the financial determinants of Canadian oil and gas company stock returns. They found that the returns on Canadian energy stock is positively associated with Canadian stock market returns, with increases in crude oil and natural gas prices, with growth in internal cash flows and proven reserves, and negatively with interest rates. Production volume and a weakening of the Canadian dollar against the US dollar had a negative influence. This latter influence is more pronounced for oil producers than for integrated energy companies. The study finds that in the case of Canada, the impact of exchange rates, market returns and prices of natural gas on oil and gas stocks changes over the years 1995-1998 and 2000-2002. The main contributions to the literature are two-fold. Firstly, it included natural gas prices and industry specific factors to illustrate the stock returns of oil and gas firms. Secondly, it examined how the factors impact differently producers and integrated firms, and how they differently affect crude oil intensive versus natural gas intensive firms. It also analyzed how these returns depended on the price environment and on the operational decisions of oil and gas firms. Furthermore, it identifies a structural change that resulted from an important shift in natural gas and crude oil prices.

It also shows that the stock returns determinants of integrated energy companies are different from those of independent producers. The surprising result is that firms that increase their production of crude oil and/or of natural gas experience a lower stock return on the market. This result is surprising taking into consideration that more production should increase the firm's available cash flows. The final point is that the approach employed to investigate the stock returns of Canadian oil and gas firms offers interesting insights into hedging practices that one could use to isolate a particular risk. It seems that the price of the imported machinery fluctuates more with the exchange rate than does the price of exported oil.

Changes in the oil price and its volatility may have important effects on the economy and the financial markets. Financial market participants need to be acquainted with how shocks and volatility are transmitted across markets over time. There are two main lines of research in the context of transmission of shocks among financial time series and analysis of volatility or variance. Cointegration analysis is often employed to study the co-movements between different financial markets over a long period of time. The second line of research investigates the time path of volatility in financial variables, e.g. stock prices and stock returns.

In order to investigate the relationship between oil and each of these major sectors, the bivariate GARCH model is employed quite frequently. This methodology estimates the mean and conditional variance of returns on oil and each market sector. The results are crucial for building accurate asset pricing models, forecasting volatility in sector returns, and furthering the understanding of equity markets.

3.3 Oil Exporting Countries

Alana and Yaya (2014) found that in the short term the monthly changes in the price of a barrel of crude oil are expected to cause a greater influence on the stock market in Nigeria. The results reveal that the higher the crude oil price, the more revenue is generated in the country, and this is interpreted as more income for the citizens. As a result, they invest more in stocks. The paper applied the fractional cointegration framework to monthly data from January 2000 to December 2011. Oskenbayev, Yilmaz, and Chagirov (2011) studied the relationship between macroeconomic indicators and the Kazakhstan stock exchange index. Results were derived using the Auto Regressive Distributed Lag (ARDL) model. They found that cointegration existed between the two which supports the concept of violation of market efficiency hypothesis.

There are many studies pointing to the absence of a long-run equilibrium between oil and stock prices in Kuwait, the KSA and UAE, meaning that information contained in oil prices does not help to predict future movements in stock prices and also that stock market prices are not sensitive to oil price fluctuations. (Arouri et al., 2012, Monhanty et al., 2011, Bashar, 2006, Hammoudeh & Aleisa, 2004, Bakaert & Harvy, 2002, and Bruner et al., 2002).

Aliyan (2013) analyzed the relationship between oil prices and industrial production and price indices in Iran. The VAR model was utilized as the model for interpreting results. He found that oil price shocks increase the supplies of industries which have a high share of oil costs. However, he also found that in industries where the share is low, oil price shocks increase demand. Ftiti, Guesmi, Teulon, and Chouachi (2016) looked at the degree of independence between oil prices and economic growth for four major countries: Kuwait, Saudi Arabia, the UAE, and Venezuela. They used the frequency approach as their method of co-spectral analysis. They showed that oil price shocks in periods of fluctuation in global business cycles and/or financial turmoil affect the relationship between oil and economic growth in OPEC countries. Teulon and Guesmi (2014) researched the time varying correlations between stock market returns and oil prices in oil exporting countries. A variant of the GARCH-DCC model was used. The study found that time varying correlations between oil and stock markets exist in oil exporting countries.

For the GCC countries, Demirer, Jategaonkar and Khalifa (2015) explored whether oil price risk is systematically priced in the cross-section of stock returns in the GCC countries. Monthly data was utilized on all the listed firms in the GCC countries stock exchanges from 31 March 2004 to 31 March 2013. The findings show that stocks that are more sensitive to oil price fluctuations yield higher returns. In addition, it is the absolute exposure of a stock that drives returns, suggesting fluctuations in the oil price as a source of stock returns premium in these markets. Naifar and Dohaiman (2013) tested the impact of oil price volatility on GCC countries stock markets returns by implementing Markov regime switching. Data was collected on a daily basis from 7 July 2004 to 10 November 2011. The empirical study shows that the relationship between GCC countries stock markets returns and oil price volatility is regime-dependent, except for the Oman market, which is in a low volatility state. The study reveals this exception is due to the fact that Oman investors ask for the lowest premium among the GCC countries markets during the low volatility state of oil prices.

Akoum, Graham, Kivihaho, Nikkinen and Omran (2012) investigated the possible short-run and long-run changing relationship of the stock price and the oil price using six GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) in addition to two non-oil producing counties (Egypt and Jordan). The oil and stock data in the study was from January 2002 to May 2011. The analysis found a change in the co-movements of oil and stock prices in the GCC countries in the long term. In the short term, the dependencies are weak. Similar results were found for the co-movement between the stock market indexes of Egypt and Jordan and the oil price in the short term. In the long term, the dependence relationship between Egypt's stock returns and oil prices relative to Jordan is weak. Jouini (2013) indicated the existence of significant transmission between the oil price and Saudi Arabian stock market sectors, whereas the spillover impacts are unidirectional from oil to some sectors for returns, but bidirectional for volatility patterns with a more apparent link from the sectors to oil. Furthermore, the weight and hedge ratios outline that making oil part of a diversified portfolio of stocks increases its risk-adjusted performance.

Arouri, Lahiani and Bellalah (2010) evaluated the influence and effect of oil price fluctuation on GCC countries stock markets. Linear and non-linear models were employed to investigate the relationship between oil price fluctuation and stock market returns in GCC countries in the short term. In the linear model, the results show that the coefficients relating the returns series to oil price changes are significant for Oman, Qatar and the UAE and that this relationship is lacking in Bahrain, Kuwait and Saudi Arabia. The non-linear model result shows that the relationship is significantly positive in Oman in the two regimes, while in Qatar and the UAE it is negative in the first regime and positive in the second one (Sahu, Bandopadhyar, and Modal, 2014).

Mohanty, Nandha, Turkistani and Alaitani (2011) examined the relationship between oil price changes and stock prices of GCC countries using country-level and industry-level stock returns. The weekly data period began in June 2005 and ended in December 2009. The empirical test found that at country level a significant positive relationship exists between oil price changes and stock returns in GCC countries, except for Kuwait, which is consistent with the findings of prior studies (e.g., Bakaert and Harvy, 2002; Bruner, Conroy, Estrada, Kritzman and Li, 2002), suggesting that stock markets in emerging countries operate under a different set of market forces, competitive environments and government regulations. For industry level, the results show that 12 out of 20 industries in GCC countries experienced positive exposure to oil changes over the period from June 2005 to December 2009. Malik and Malik and Hammoudeh (2007) investigated the transmission of volatility and shocks among markets in oil, US equity and each of the three oil-rich Gulf countries. The data was collected daily from February 1994 to December 2001. The countries used for analysis were Bahrain, Kuwait, and Saudi Arabia. Results show significant interaction between second movements of the US equity and global oil markets. Oil is perhaps the most important element to study when attempting to gain a better understanding of the effects that oil related events have on the stock markets within the GCC countries (Arouri et al., 2011; Narayan, 2010; Hoyky and Naim, 2016; Huang et al., 1996; Ravichandran and Alkhathlan, 2010).

Al Janabi, Hatemi and Irandoust (2010) studied whether the GCC countries equity markets are efficient at attaining information with regard to oil and gold price shocks during the period 2006-2008. They used daily dollar-based stock market indexes datasets. The results reconciled previously contradictory results regarding the weak and semi-strong forms of efficiency of the GCC countries stock markets and its relationship vis-à-vis petrol and gas prices. Hammoudeh, McAleer and Yuan (2016) investigated own volatility dependency for the three major sectors, namely: service, industrial and banking, in four GCC economies (Kuwait, Qatar, Saudi Arabia and the UAE). The empirical findings propose that banking seems to be the least sensitive among the sectors to past own volatility, while industrial is the most volatile to the beginning of past shocks or news. Sector volatility spillovers show that Saudi Arabia has the least inter-sector spillovers, while tiny Qatar has the most. It seems that Saudi Arabia is the most sensitive to geopolitics, while Kuwait is the least influenced. The results advocate that past own volatility is the stronger driver in determining future volatility. This indicates that a sector's fundamentals have more impact on volatility than shocks or news.

In most of the GCC countries, there is significant unidirectional causality exists from oil to stock returns that further means that oil price changes affect stock markets in these countries but that changes in these markets do not significantly affect oil prices. (Jouini, 2013; Li et al., 2012; Ling and McAleer, 2003; Constantain et al., 2010).

In countries like the oil-rich GCC countries (the KSA, the UAE & Kuwait), changes in the basics for oil and natural gas, as well as for their products and energy-intensive goods, matter more when it comes to sector volatility. This is not surprising, due to these countries heavy dependence on oil and natural gas exports. The GCC countries markets differ in terms of optimal portfolio holdings that minimize risk without reducing expected returns, thereby permitting investors to hold more stocks in certain sectors than others and influencing some diversification between sectors and countries. Since the values for ratios of hedging long positions with short positions in the GCC countries sectors are smaller than those for the US equity sectors, which reflect the possibility of greater hedging efficiency in the GCC countries markets than in the US, the GCC countries should develop hedging strategies and techniques, such as futures, options and swaps that lower volatility.

Sanusi and Ahmad (2015) argue that oil and gas, is one of the most important sectors in every economy, and the valuation of oil and gas companies becomes quite challenging which is due to the volatility of crude oil prices. The results manifest that market risk, oil price risk, size and book-to-market related factors are all consistent in the determination of asset returns of the oil and gas companies quoted on the London stock exchange. Oil price increases and decreases, decomposed separately, have more impact on the oil companies' stock returns than the normal log changes of the price; this shows the presence of asymmetric effects. The shock of crude oil prices and its effects on stock returns in the oil and gas sector have been researched largely due to its significance to the overall economy. The authors' main interest is the analysis of the determinants of stock returns in the UK oil and gas sector and to explore the possibility of utilizing fundamentals and company specific information in asset pricing. The results obtained proposed that oil price changes, market risk and firms' size illustrate the variation of stock returns in the oil and gas sector. The book to market ratio and momentum effect were not found to be clearly affecting the stock returns in the oil and gas sector.

Bouri, Awartani and Maghyereh (2016) performed mean and variance causality in tests between world oil prices and sectoral equity returns in Jordan before and after the Arab Uprising that started in 2010. The results manifest that the impact is not uniform across the sectors. The oil returns shocks affect the financials and the services sector, while their impact is minimal on the industrials sector. The result is more noticeable in the period that follows the Arab Spring. In terms of risk transfer, it found that oil is a negligible risk factor. Yet, there is still evidence of risk transmission to the industrials equity sector during the Arab Spring period. The study concentrates on Jordan as a model country in the MENA region that has a well-diversified equity market and an economy that is sensitive to oil.

The nature of the oil-equity relationship has been examined in two samples that cover the critical time periods surrounding the Arab uprisings that started in Tunisia in December 18, 2010. CCF tests between oil and sectoral indices were computed. These tests are conducted at alternating scales for both the mean and the variance association tests of oil, with each of the three sectors composing the Jordanian stock exchange market. These sectors are the financial sector, the industrials sector, and the services sector. The impact of oil shocks is significant on the returns of the financials and services sectors, while it is insignificant on the industrial sector. This holds true in both of the periods that surround the Arab Uprising. However, it is worth mentioning here that the impact is more apparent and it occurs at a faster scale in the second period that follows the Arab Spring. In terms of risk transfer, the effect of oil volatility is negligible and it can be ignored in assessing the volatility of the financials and the services sectors. However, there is evidence of risk transfers from the oil market to the industrial sector in the period following the Arab Spring. The analysis based on GARCH confirms these results. The parameters of the mean equation are all negative pinpointing the depressing influence of oil shocks on the performance of the three sectors. The loading of the parameters display that the influence is even stronger in the period that followed the Arab Spring. In addition, the evidence on volatility transmission is weak. Oil is a factor that affects the returns and the volatility of the three sectors; therefore, oil risk and returns should be accounted for in developing performance expectations for the purpose of investment and asset allocation in either domestic portfolios or in global portfolios that include Jordanian equities. The risk transfer information from oil to industrials can be also useful in managing the portfolio risk. The industrials sector is the least exposed to oil returns shocks while it is the most exposed to oil volatility information spills, specifically following the Arab Uprising. The industrials provide another source of returns exposure, and the services and the financials provide a different source of volatility exposures.

The existent studies on GCC countries focused their attention on the analysis of oil price volatility and its implication for stock markets in the GCC countries. However, the reviewed studies do not seem to offer sufficient evidence on the impact of a variety of political issues on oil price volatility and spillover effects towards the main stock markets in the region. Moreover, there is also a lack of analysis focusing on the case of small oil exporting countries.

3.4 Conclusion

Oil is one of the most important sectors in every economy, and it has a significant effect on the stock markets of both oil importing and oil exporting countries, which can be attributed to the volatility of the crude oil price. Oil prices put upward pressure on oil-importing countries in terms of the domestic inflation rate and downward pressure on foreign exchange rates. In terms of the influence of the oil price on stock indices, a significant set of studies were reviewed in this chapter. These studies employed different econometric techniques for their empirical analysis. However, in the case of Kuwait and other GCC countries there is limited research. Summarizing the results of extant studies, some common results can be extracted. The literature has found a significant relationship between oil prices changes and stock markets as the whole, as well as some sectoral variations, for most of the countries. However the picture is not entirely clear and there is still some issues outstanding particularly with relation to how geopolitical shocks might affect the relationship between oil prices and stock market indices.

During 1995 to 2015 oil market, activity was subject to considerable peaks and troughs, and significant levels of volatility. A situation that derived from the occurrence of tumultuous events in the GCC region a regional and global scale such as, the Iraq invasion of 2003, the GFC of 2008 and the Arab Spring Revolution, 2011. The study of GCC countries' stock markets and their responsiveness during this period brings significant insights with regard to the region exposure to global and regional events and subsequent spillover effects running from the oil sector towards regional stock exchanges. Oil is considered as the most global and important energy resource worldwide, as it plays a significant role in the development of the world economies. Until now, existing research in the field has focused its attention on the analysis of energy prices and its implications for global economic performance (Oskenbayev et al., 2011; Arouri et al. 2010; Amoruo & Mustafa 2007) with a dearth of research exploring dynamics on small oil exporting economies. Many researchers believe that oil is one of the leading physical commodities in the world and is regarded as an essential macroeconomic variable that influences the stock market, real economic development and aggregate demand in both developing and developed countries (Al-Shami and Ibrahim, 2013 and Elder and Serletis, 2010). Therefore, considering the significance and importance of these factors to small oil exporting economies that are heavily exposed to oil shocks driven by political and economic events is an area worthy of attention.

CHAPTER 4
METHODOLOGY

4.0 Introduction

The methodological research framework is described in this chapter, with the aim of offering a critical assessment on selected econometric models that would help in getting a better understanding of the interrelationship between oil and stock markets in the context of the selected GCC countries (Kuwait, Abu Dhabi, Dubai and the Kingdom of Saudi Arabia) stock markets. The chapter is structured around two main sections. The first is the presentation and analysis of informal techniques that are commonly used in the analysis of time series. For example, graphical analysis and basic descriptive statistics are commonly used by researchers, as they offer initial and valuable insights on the basic properties of the series under study and help identify potential formal techniques and models that would be used to analyze the series under consideration. The second section considers formal econometric models and tests that are identified. A critical assessment on their contribution to the empirical study is offered. The empirical models and research strategies used to assess the effects that Brent prices have on stock returns have been carefully considered in the context of the extant literature to ensure that a robust research framework is developed to support this study. The selected research framework is then well-founded on the extant literature as the presented models have been identified by economists and financial analysts as powerful tools that are used to understand time series dynamics in the economic and financial context (see Mills, 1924; Spanos, 2006: 2013; Lopez, Sanchez and Spanos, 2011). Hence, selected econometric models assist in the analysis of potential association and interconnections between Brent oil prices and stock exchanges in Middle-East representative markets.

4.1 Pre-Analysis Tools

Before starting the formal empirical analysis by implementing a diverse range of econometric techniques to check the short-run and long-run association between dependent and independent variables such as Brent oil prices and stock exchange returns, it is necessary to check the data in order to apply the most suitable econometric techniques. In this regard, this study starts with the use of the graphical analysis approach and descriptive statistics approach.

4.1.1 Graphical Analysis

It is quite common to start time series analysis by having an overview of the nature of the data used that helps check the suitability of the proposed methodologies. Graphical presentation methods are often quite clear and simple to implement, being an appropriate tool to analyze data patterns and to identify shocks, changes of trend and highlight periods of uncertainty. The graphical illustration will help identify the existence of potential trends prices of Brent oil in any period for any economy and at the time patterns of stock returns are also identified. For the selection of a suitable empirical methodology, it is worth looking at the temporal patterns of the data. This study uses the simple line graph approach to check the initial patterns of the data. A line graph will show how the values of Brent oil prices and stock prices change. Similarly, it can show how functions change. The most common type of data that can be found on a line graph is how variables change over time. When looking at time-series data, it is helpful to know the nature or fluctuations, such as breaks or seasons via line graph. Unlike regular sampling data, time-series data is ordered to ensure that appropriate patterns are identified.

The autocorrelation function (ACF) is another tool used to find patterns in the data. Specifically, it describes the correlation between points separated by various time lags. ACF plots are frequently used in time-series analysis. Such plots summarize the strength of a relationship with an observation in a time series with observations at prior time steps. They are also helpful when determining the existence of seasonality. The ACF can show an oscillation, indicative of a seasonal series. In stationary time-series the ACF also gives a measure of dependency of a time-series to its lagged version. It is a measure of how much the current value is influenced by the previous values in a time series. Therefore, in our case we can know the relationship of the oil prices with the previous ones.

Let x_t denote the value of a time series at time t. The ACF of the series gives correlations between x_t and x_{t-h} for h = 1, 2, 3, etc. Theoretically, the autocorrelation between x_t and x_{t-h} equals

$$\frac{Covariance\ (x_t, x_{t-h})}{SD(x_t)SD(x_{t-h})} = \frac{Covariance(x_t, x_{t-h})}{Variance(x_t)}$$

Where SD is the standard deviation.

The denominator of the right hand side occurs because the standard deviation of a stationary series is the same at all times.

4.1.2 Descriptive Statistics

Descriptive statistics identify the basic structure of the data. They provide simple summaries of the data and their measures. When descriptive statistics are joined to graphical analysis, they provide the basis and starting point of the quantitative analysis that will follow. In time series data, the descriptive statistics help to confirm the trend or pattern identified by the use of diagrams. This helps to identify cyclical patterns, overall trends, turning points and outliers. Descriptive statistics in the context of time series are mainly based on statistics such as mean, standard deviation, skewness, kurtosis, and the Jarque-Bera test for normality.

4.1.2.1 Mean

The mean is probably the simplest tool in statistics; it accounts for the central tendency of the data. In the context of this study, the mean value helps to recognize the average oil price and average stock returns for the sampled countries. In our case the daily data of stock returns and Brent prices are used, which can be considered as ungrouped data. The mean of an ungrouped data can be calculated by the following formula

$$\overline{x_\iota} = \frac{\sum x_i}{n_i}$$

Where $\overline{x_\iota}$ is the mean value of stock returns or Brent price for each country, $\sum x_i$ is the sum of stock returns or Brent price of each country, and n_i is number of total observations of each country.

$\overline{x_\iota} = \overline{x_1}, \ldots \overline{x_4},$

4.1.2.2 Standard Deviation

The standard deviation is a measure of dispersion that will help to compare the variation in the data with respect to the mean. The mean value does not express the whole data. It gives the central value, but it does not provide information on the spread of the data. Therefore, to measure the spread and variation of data, standard deviation is a commonly used tool. The standard deviation is considered as an initial measure of volatility levels, as it identifies which variables are affected by major variations and consequently more levels of uncertainty. It measures the deviation from the mean, which is a very important statistic to show the central tendency. In the current case it will help us to see which is the more volatile stock market among from the four markets reviewed. It is considered as an initial metric for volatility. The standard deviation can be considered a more accurate measure of dispersion, as an outlier can strongly affect the dispersion. Standard deviation can be found by the following formula

$$SD = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$$

Where SD is the standard deviation, *x* is the value of stock returns or Brent oil price, $\bar{x}$ is the mean value of stock returns or Brent oil price, *n* is total observations.

4.1.2.3 Maximum and Minimum

Maximum and minimum ranges the data, for example the lowest and highest Brent oil price and stock returns for selected periods for selected economies. It also shows the volatility of oil prices and stock returns; the higher the difference between minimum and maximum leads towards higher volatility levels. In time series data, it will express the most notable years or months (with the highest and lowest prices of stocks and oil).

4.1.2.4 Skewness

Skewness usually defines the symmetry – or lack of symmetry of a dataset. A true symmetrical data set will have a skewness of 0 and a normal distribution also has a skewness of 0. While a value greater than zero shows the distribution is positively skewed, less than zero shows it to be negatively skewed. Skewness of any dataset can be obtained by the following formula

$$Sk = \sqrt{\frac{\sum_{i-1}^{n}(x-\bar{x})^3}{(n-1)\sigma^3}}$$

Where *Sk* is skewness and σ is variance of the data.

4.1.2.5 Kurtosis

Kurtosis tells the shape of data and how it is different from a normal distribution. Kurtosis is the degree of peakness of a distribution. Kurtosis just explains about the shape of the peak and its only explicit interpretation is in terms of tail extremity (Westfall, 2014). Kurtosis has three distribution levels, e.g. a kurtosis equal to 3 indicates a normal bellshaped distribution (mesokurtic), kurtosis less than 3 indicates a platykurtic distribution (flatter than a normal distribution with shorter tails) and kurtosis greater than 3 indicates a leptokurtic distribution (more peaked than a normal distribution with longer tails). Kurtosis of any dataset can be calculated by the following formula

$$K = \frac{n(n+1)(n-1)}{(n-2)(n-3)} \frac{\sum_{i=1}^{n}(x_i - \bar{x})^4}{(\sum_{i=1}^{n}(x_i - \bar{x})^2)^2}$$

Where K is kurtosis.

4.1.2.6 Jarque-Bera

The Jarque-Bera test is a good guide regarding the normality of data, especially as it portraits better results in large data sets compared to other tests; in our case the data has a large number of observations. These tests will help understand the shape of the data and in the selection of empirical approaches, as time series are commonly associated with non-normal distributions that will determine the kind of research testing that can be implemented. The Jarque-Bera of any dataset can be calculated by the following formula

$$JB = \frac{n-k+1}{6}\left(Sk^2 + \frac{1}{4}(K-3)^2\right)$$

Where *k* is the number of parameters, *Sk* is the skewness, and *K* is the sample kurtosis.

The complete process that will be followed in this study is summarized in the flow chart below.

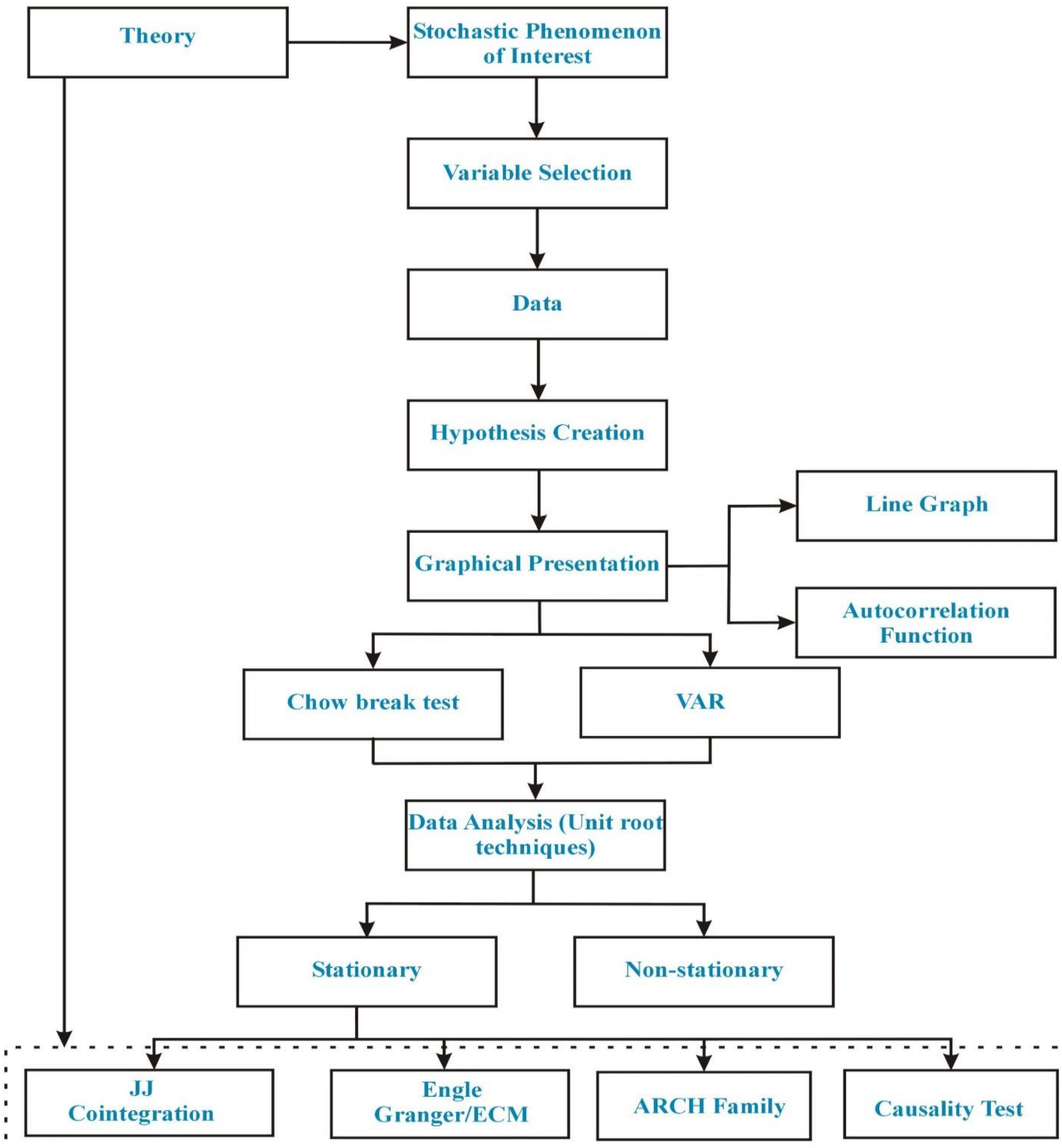


Figure 4.1: Flow Chart from Theory to Empirical Analysis

4.2 Formal Analysis

In order to examine the interlinkages between Brent prices and stock exchanges the study will be supported by a main regression (see Equation 4.1) that will explore key research findings as per the reviewed literature, and that represents the starting point of the econometric modelling in this study.

$$SR_t = \alpha + \beta BP_t + \varepsilon_t \qquad (4.1)$$

Where:

SR_t is the overall stock market returns for each one of the stock exchanges under consideration.

BP_t is the Brent price,

and ε_t represents an error term.

Equation 4.1 portrays a basic and linear relationship between Brent oil prices and stock returns that will be adjusted accordingly to consider each one of the four stock exchanges under consideration (the selected GCC countries markets). The study starts with the presentation of a basic linear regression, as this kind of approach is extensively used in the analysis of market relationships due to its simplicity and because it is relatively easy to implement, allowing for the identification of the series initial relationship.

4.2.1 Chow break test

The Chow break test in time series studies is used to test for the presence of a structural break over the period of study, which can be assumed to be known a priori (for instance, a war, a crisis or a natural disaster). These tests were considered relevant to this study, due to the fact that the conducted literature review identified the existence of three main structural breaks that influenced the economy of Kuwait over the period of study (see Table 4.1).

Table 4.1: Structural Breaks of Kuwait Economy

No.	***Break (period)***	***Market Shock***	***Effects***
1	19-March-2003	Iraq invasion	Adversely affected the economy of Kuwait
2	15-September-2008	US financial crisis	Affected the world economies
3	25-January-2011	Arab Spring	Affected the whole Arab region

The identified shocks, i.e. Iraqi invasion, the US financial crisis, and the Arab Spring are recognized by researchers as shocks that generated a significant impact on the whole economy of Kuwait, Abu Dhabi, Dubai and KSA (Jaffe, 1997; Khatib, Barnes, and Chalabi, 2000; Kandiyoti, 2012; Ak and Bingül, 2018). For instance, oil prices experienced a significant decrease and regional stock markets were disturbed leading to a number of subsequent events that created substantial levels of uncertainty in the region. Therefore, it is expected that the association/relationship between oil returns and stock exchange returns should be different when each one of the macroeconomic events is analyzed. The Chow break test is perhaps the most widely used for this purpose, as it requires strictly exogenous regressors and a break-point/s that should be specified in advance (Nielsen and Whitby, 2015). As Table 4.1 depicts, the breaks for the economies under study were identified in advance, as they have been well documented in the extant literature. As such, the Chow break test is applied to help examine the difference of association between the Brent oil price and stock exchange returns before and after the breaks. The main idea behind the Chow breakpoint test is to separately fit the equation for each subsample and to check whether there are any meaningful differences in the estimated equations. The Chow break test compares the sum of squared residuals obtained by fitting a single equation to the total sample with the sum of squared residuals obtained when each equation is fitted to every subsample of the data (Chow, 1960). The hypotheses of the Chow test are as follows:

H_0: There is no significant evidence of existence of breakpoints

H_1: There is significance evidence of existence of breakpoints.

The test statistic is computed as:

$$F = \frac{(\bar{u}'\bar{u} - (u_1'u_1 + u_2'u_2))/k}{(u_1'u_1 + u_2'u_2)(T - 2k)} \tag{4.2}$$

where:

$\boldsymbol{\bar{u}'\bar{u}}$ is the restricted sum of squared residuals.

$\boldsymbol{u_i'u_i}$ is the sum of squared residuals from the subsample

$\boldsymbol{k}$ is the number of parameters in the equation

and $\boldsymbol{T}$ is the total number of observations.

The Chow break test is better than other approaches like the bootstrap procedure (Diebold and Chen, 1996), co-integration approaches (Campos et al., 1996), the comparison of slopes alone (Wilcox, 1997) and Bayesian techniques (Kozumi and Hasegawa, 2000). The Chow test does not lose the degrees of freedom, so for current study, we will be able to hold complete data for analysis as the lost data of oil prices or stock prices might be more important to consider and losing it may affect the results. Most importantly, the chow test assumes that there is a known break-point in the series. If this point is not known, this test is not appropriate. In the current thesis, the breakpoints are already known in our data samples of the four economies, so the Chow test would be appropriate to confirm their existence. The Chow break test requires that the number of observations in all sub-samples should be nearly the same, a requirement that is met in this thesis as the selected data sets show almost the same pattern. In the current sample economies, the breaks are known and the number of observations in each data set is not significantly different; thus, the Chow break test is more appropriate and would give accurate results as compared to other tests and hence we rely only on the Chow break test.

4.2.2 Vector Autoregression Models

Vector autoregressive (VAR) models are generally used in forecasting and to analyze the effects of structural shocks, and also for the selection of the optimal number of lags that should be considered in econometric modelling. Sims (1980) introduced the VAR models to analyze the association between economic variables, which are also of interest to this study as the VAR model can be considered as an equational system in which all the variables are considered as endogenous. Hence, each variable is given as a linear combination of its lag values and the lag values of the remaining variables of the system (Baltagi, 2003).

Generally, a VAR of order *p* (*p* represents the number of lags) in consideration to a set of *K*-time series variables can be stated as:

$$\lambda_t = A_1\lambda_{t-1} + \cdots A_p\lambda_{t-p} + \mu_t \tag{4.3}$$

Where $\lambda_t = [\lambda_{1t} \ldots \lambda_{kt}]$ is a column vector of past observations of all the variables of the model, A_t are K X K matrices of the coefficients, and $\mu_t = (\mu_{1t}, \ldots, \mu_{Kt})$ is a column vector of unobservable error-terms. The error term is supposed to be an independent, time-invariant white-noise process with a zero mean and positive definite covariance matrix. Although, the μ*'s* might be contemporaneously correlated, they are however uncorrelated (Baltagi, 2003). The model has only lag values on the right side of the equation and as such, the OLS estimation gives consistent results that can be seen as an advantage. In addition, the OLS results would be efficient even if the μ_t are contemporaneously correlated (QMS, 2007).

The most notable advantage of the VAR approach is its speed to react to unexpected movements or change in market dynamics (Trenca, Mutu, and Dezsi, 2011). Daily time series frequencies are identified as being more sensitive in terms of market shocks. Therefore, in the presence of such shocks, VAR models are best suited if forecasting testing is to be implemented and also in the lag selection process. Furthermore, in the presence of large data sets, VARs OLS estimators are consistent and asymptotically normally distributed. A number of studies have adopted the VAR method to study the association between oil prices and stock returns that were helpful when identifying the research techniques needed to develop a robust analysis (for example, Masulis, Huang, and Stoll, 1996; Sadorsky, 1999; Cong et al., 2008).

4.2.3 Lag length selection criteria

One of the challenges in utilizing VAR models is in the selection of the optimal lag length, since it requires precision, as the addition of lags to time series models has a direct impact on the estimation process. For example, a very short lag length can be a cause of autocorrelation that can lead to inefficient estimators. Moreover, a longer lag length enhances the parameter size, which in turn reduces the degree of freedom and it infers large standard errors and confidence intervals for the coefficients of the model (Füss, 2007).

Among researchers, there are three main approaches that can be followed when selecting the optimum lag length, e.g. t the Akaike information criterion (AIC), Schwarz's Bayesian information criteria (SIC) and the Hannan-Quinn information criteria (HQC) (Ivanov and Kilian, 2005). Among them, SIC and HQC are more suitable in the selection of appropriate lag length, especially in the case of large data sets (Verbeek, 2008; Scott and Abdulnasser, 2008).

The AIC value can be found by the following formula

$$AIC = 2k - 2\ln(\hat{L})$$

Where k is the number of estimated parameters, and $\hat{L}\ is\ the$ maximum value of the likelihood function. The decision rule is based on the selection of the lag length that minimizes the value of the information criteria, as it will prevent potential misspecification of the model. The values of the lag length of SIC and HQC tend to be lower than the AIC for large samples. The SIC can be obtained by using the formula:

$$SIC = \ln(n)k - 2\ln(\hat{L})$$

Whereas HQC can be calculated by the following formula

$$HQC = -2\hat{L} + 2kln(\ln(n))$$

According to Ivanov and Kilian (2005), it can be shown that $\hat{p}^{SIC} \leq \hat{p}^{AIC}$ for $N \geq 8$, $\hat{p}^{SIC} \leq \hat{p}^{HQC}$ for all N, and $\hat{p}^{HQC} \leq \hat{p}^{AIC}$ for $N \geq 16$. As noted by Granger, King and White (1995), any one of these three information criteria may be interpreted as a sequence of LR tests with the critical value being implicitly determined by the penalty function. Thus, this approach will be utilized in this study when identifying the optimal number of lags that would be considered in the implementation of the econometric framework.

4.2.4 Unit Root Tests

Unit root tests are used to check the stationarity of the time series data. The stationarity of a series can strongly influence its behavior and properties e.g. perseverance of shocks will be infinite for non-stationary series. A non-stationary series can cause spurious regression. If the variables in the regression model are not stationary, then it can be proved that the standard assumptions for asymptotic analysis will not be valid. In other words, the usual *t*-ratios will not follow a *t*-distribution, so one cannot validly undertake hypothesis tests about the regression parameters (Giles, 2006). The subject of unit roots in macroeconomic time series has been given considerable attention by theoretical and applied research over the last two decades. The existence of unit roots in time series has significant implications (Libanio, 2005; Nielsen, 2005). As in our case, when we have shocks or breaks in the data, such shocks can disturb the data's stationarity properties, so it is beneficial to check the stationarity of data in the presence of these shocks. Secondly, the unit roots tests show any trends or seasonality in the data. This kind of initial evaluation paves the way for further analysis in a suitable way. For consistency and robustness purposes, two tests are used to check the existence of unit roots in the dataset under study and its suitability is reviewed in the literature.

4.2.4.1 Phillips-Perron Test

The Phillips-Perron (PP) test is similar to the ADF test, but it incorporates an automatic correction of the DF procedure to allow for auto-correlated residuals. The PP test normally draws the same conclusions as the ADF test, though the calculation of the test statistics is more complicated. The PP test is most frequently used as an alternative to the ADF test. This test alters the test statistic so that no additional lags of the dependent variable are needed in the presence of serially correlated errors (Mahadeva, and Robinson, 2004). The Dicky-Fuller test is concerned with fitting the regression model:

$$\Delta y_t = \rho y_{t-1} + (constant,\ time\ trend) + u_t \qquad (4.4)$$

By the application of OLS, a problem of serial correlation is arrived at and in order to deal with this, the ADF test uses lags of the first differences of y_t. The Phillips–Perron (PP) test deals with fitting (4.6) and the results are utilized in calculating the test statistics. However, they do not estimate (4.4) but rather (4.5):

$$y_t = \pi y_{t-1} + (constant,\ time\ trend) + u_t \qquad (4.5)$$

In (4.4), u_t may be heteroskedastic and is I(0). The PP test can correct heteroscedasticity and any serial correlation in errors (u_t) non-parametrically using the Dicky Fuller statistics. The PP test statistics can be regarded as Dicky–Fuller statistics that have been made robust to serial correlation by using the Newey–West (1987) heteroscedasticity and autocorrelation consistent covariance matrix estimator. With regard to the null hypothesis that $\rho = 0$, the asymptotic distributions of the ADF t-statistic are the same as those of the PP Z_t and Z_π and normalized bias statistics. An advantage that the PP tests have over the ADF tests is that the PP tests are robust to general forms of heteroscedasticity in the error term u_t and another advantage is that the user does not have to choose a lag length for the test regression since one does not deal with it and the Dicky Fuller test produces two test statistics (Maddala and Wu, 1999). The Normalized Bias $T(\pi - 1)$ has a well-defined limiting distribution which is not dependent on nuisance parameters and as such, it can be used as a test statistic for the null hypothesis $H_0: \pi = 1$. This is the second test of DF and it is related to Z_π in the PP test.

The PP test is a non-parametric test that is applicable to a significantly wider set of problems. The test is based on asymptotic theory, so in large data sets its performance is considered to be better when compared to other tests (Mahadeva, and Robinson, 2004). Since the current thesis has a larger sample size, the PP test can give better results. Following Muhammad and Rasheed (2002), Mahadeva and Robinson (2004) and Khan and Khan (2016), who used this test in stock prices/returns to support their studies, this thesis also uses the PP test for stationarity purposes and to ensure that appropriate cross-checking on results was done. Furthermore, Sosa-Escudero (1997) also confirmed PP tests is also appropriate tests in the context of structural breaks, and taking into account that this thesis is also using structural breaks, the use of PP tests is justified.

4.2.4.2 Kwiatkowski–Phillips–Schmidt–Shin Test

In econometrics, the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test is employed in testing a null hypothesis which claims that an observable time series is stationary around a deterministic trend. The series is given as the sum of a random walk, a deterministic trend and a stationary error, and a Lagrange multiplier test checks the hypothesis that the random walk has zero variance. KPSS type tests are designed to support the unit root tests, such as PP tests. By testing both the unit root hypothesis and the stationarity hypothesis, one can identify series that appear to be stationary, series that appear to have a unit root and series whose data (or tests) are not sufficient to decide whether they are stationary or integrated.

The test for KPSS begins with the model:

$$y_t = \beta' D_t + \mu_t + u_t \quad (4.6)$$

where

$\mu_t = \mu_{t-1} + \varepsilon_t, \varepsilon_t \sim WN\ (0, \sigma_\varepsilon^2)$

Where u_t is *I(0)* and may be heteroskedastic, and D_t contains deterministic components (constant or constant with time trend), *WN* is white noise. It is important to note that μ_t is a pure random walk with innovation variance σ_ε^2. In addition, the null hypothesis that y_t is *I(0)* is given as H_0: $\sigma_\varepsilon^2 = 0$, which implies that μ_t is a constant. Although not quite apparent, the null hypothesis also suggests a unit moving average root in the autoregressive moving average (ARMA) representation of Δy_t.

The KPSS test statistic, that is the Lagrange multiplier (LM) or score statistic, is used for testing the null hypothesis that an observable time series is stationary around a deterministic trend (i.e. trend-stationary) against the alternative of a unit root and it is given by:

$$KPSS = \frac{\left(T^{-2}\sum_{t=1}^{T}\hat{S}_t^2\right)}{\hat{\lambda}^2} \tag{4.7}$$

where $\hat{S}_t = \sum_{j=1}^{t}\hat{u}_j$, $\hat{u}_t$ is the residual of the regression of y_t on D_t and $\hat{\lambda}^2$ is the consistent estimate of the long-run variance of u_t using $\hat{u}_t$. Under the null that y_t is *I(0)*, KPSS tends to a function of standard Brownian motion which depends on the nature of the deterministic terms D_t but not on their coefficient values β. In other words, if $D_t = 1$ then

$$KPSS \xrightarrow{d} \int_0^1 V_1(r)dr \tag{4.8}$$

where $V_1(r) = W(r) - rW(1)$ and $W(r)$ is a standard Brownian motion for r ∈ [0, 1].
Again, if $D_t = (1, t)$, then

$$KPSS \xrightarrow{d} \int_0^1 V_2(r)dr \tag{4.9}$$

Where $V_2(r) = W(r) + r(2-3r)W(1) + 6r(r^2-1)\int_0^1 W(s)ds$. Critical values from the asymptotic distributions in (4.10) and (4.11) must be calculated using methods of simulation. The stationary test is a one-sided right-tailed test and as such, the null hypothesis of stationarity is rejected at 100 · α% level if the KPSS test statistic (4.7) is greater than the 100-(1 − α%) quintile from the appropriate asymptotic distribution in (4.7) or (4.8).

However, with this test, there are still size and power issues as is the case for PP tests. It is a useful alternative hypothesis, but it may conflict with tests that assume non-stationarity as the null, and thus indicating that there may be real doubt as to the properties of the data (Mahadeva, and Robinson, 2004). Another problem with this test is that it has a high rate of Type-I errors (that leads to the frequent rejection of the null hypothesis). If attempts are made to control these errors (by having larger p-values), then that negatively influences the test's power. Fukuta (2002) and Mahadeva, and Robinson (2004) have used the KPSS test in the case of daily stock prices/returns studies, and considering that every unit root test has a few pros and cons, it was considered necessary to use more than one test with the aim of verifying consistency among results, and also ensuring that the stationarity outcomes are robust. The table that follows compares the properties of the above-mentioned unit root tests.

Table 4.2: Comparison of different unit root tests

Test Properties	***PP***	***KPSS***
Null hypothesis	A unit root is present in a time series sample	An observable time series is stationary around a deterministic trend
Applicable	Large data set	Large data set
Type	Non-Parametric	Parametric

The following section describes the econometric tests to validate the relationship between dependent and independent variables. Firstly, cointegration tests are used to find the long-run relationship between the variables. Furthermore, it permits the use of non-stationary data to avoid spurious results.

4.2.5 Cointegration Tests

A noteworthy breakthrough in time series came with the concept of ‘cointegration’ in the early 1980s. Cointegration is a statistical property of a collection of time series variables. Time series data often has trends; either deterministic or stochastic. Hence, conventional econometric theory methods do not apply to them (Nelson and Plosser, 1982). The concept was developed by Granger (1981). Cointegration analysis permits the use non-stationary data to avoid spurious results. It also offers applied econometricians an active formal framework to verify and estimate long-run models from actual time series data. A number of tests that empirically investigate cointegration in time series are famous, such as Engle-Granger (1987), Johansen and Julius (JJ) (1988), and Phillips–Ouliaris (1990) tests. Tests for cointegration undertake that the cointegration vector is constant during the study period. In reality, it is likely that the long-run relationship between the underlying variables change. For robustness purposes, this thesis uses two cointegration techniques e.g. Engle-Granger and Johansen-Julius that are well established methodologies used in the field. A number of studies such as Granger, Huangb, and Yang (2000), Arouri and Fouquau (2009), Miller and Ratti (2009), Imarhiagbe (2010), and Muhtaseb and Al-Assaf (2016) used these approaches to find the long-run relationship between oil prices and stock markets for various economies including GCC, offering up to date evidence of the value and significance of the selected econometric models.

4.2.5.1 Engle and Granger Test

In their influential paper, Engle and Granger (1987) provided a firm theoretical base for representation, testing, estimating and modeling of cointegrated non-stationary time series data. Since then, there has been significant research on cointegration and related fields. Among various cointegration approaches, the Engle-Granger approach has become a popular and extensively applied technique since it was introduced by Engle and Granger (1987). Engle and Granger (1987) recommend a two-step procedure for cointegration analysis.

First step: Estimate the base-line equation as follows:

$$y_t = \beta_0 + \beta_1 x_t + \mu_t \quad (4.10)$$

The OLS residuals from (Equation 4.10) are a measure of disequilibrium

$$\hat{\mu}_t = y_t - \hat{\beta}_0 - \hat{\beta}_1 x_t \quad (4.11)$$

A test of cointegration is a test of whether $\hat{\mu}_t$ is stationary. This is obtained by ADF tests on the residuals, with the MacKinnon (1991) critical values adjusted for the number of variables.

If cointegration persists, the OLS estimator (Equation 4.10) is said to be super-consistent. As T →∞ there is no need to include I(0) variables in the cointegrating equation. The traditional diagnostic tests from Equation (4.10) are not important as the only key question is the stationarity of the residuals.

Second step: In the case that a cointegration relationship is identified, the next step is to implement an Error Correction Model (ECM) model to check for the existence of a short-term relationship. The ECM can be obtained by the following regression

$$\Delta y_t = \emptyset_0 + \sum_{j=1} \emptyset_j \Delta y_{t-j} + \sum_{h=0} \theta_h \Delta x_{t-h} + \alpha \hat{\mu}_{t-1} + \varepsilon_t \quad (4.12)$$

By OLS as Equation 4.12 has only I(0) variables, standard hypotheses testing using *t* ratios and diagnostic testing of the error term are appropriate. The adjustment coefficient α must be negative. The negative coefficient permits arrival at an equilibrium position, as otherwise, it depicts that errors will keep growing and there would not be possibility of equilibrium in the model (Narayan, and Smyth, 2006). ECM defines how *y* and *x* behave in the short-run, consistent with a long-run cointegrating relationship.

The estimates from OLS in equation 4.10, although consistent, can be substantially biased in small samples, partly because the existence of serial correlation in the residuals (Banerjee, Dolado, Hendry, and Smith, 1986). However, in our case we have a large data set so this bias may be avoided. For robustness purposes, the bias can be overcome by permitting some dynamics. Additionally, it is necessary to consider that the analysis is developed in the context of structural breaks as three major shocks have been identified, and as a result, the sample would be divided into three subsamples that will constrain the number observations under consideration.

Firstly, with OLS, an Autoregressive Distributed Lag (ADL) model should estimate:

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \gamma y_{t-1} + \varepsilon_t \qquad (4.13)$$

then solve for the long run equation

$$y_t = \frac{\alpha}{1-\gamma} + \left[\frac{\beta_0+\beta_1}{1-\gamma}\right] x_t + \mu_t \qquad (4.14)$$

The residuals from Equation 4.13

$$\hat{\mu}_t = y_t - \frac{\alpha}{1-\gamma} + \left[\frac{\beta_0+\beta_1}{1-\gamma}\right] x_t \qquad (4.15)$$

are a measure of disequilibrium and a test of cointegration is a test of whether $\hat{\mu}_t$ is stationary. As an alternative to the two-step Engle and Granger procedure, the ECM model can be estimated using the residuals from Equation 4.14. If cointegration is persistent, the OLS estimator of Equation 4.14 is super-consistent (Stock, 1987). A number of studies have used this test to find the cointegration between stock prices and oil prices, or stock prices with other indicators, for instance, Bahmani-Oskooee and Saha (2015), Muhtaseb, and Al-Assaf (2017) and Ahmed and Islam (n.d).

4.2.5.2 Error Correction Model

The error correction model (ECM) is related to a class of multiple time series models and most often used for data where the underlying variables have a long run stochastic trend (cointegration). The ECM is a theoretically driven approach that is suitable for estimating both short-term and long-term effects of one time series to another. The term error-correction is related to the fact that last-periods deviation from a long-run equilibrium, the error, affects its short-run dynamics. Consequently, the ECM directly estimates the speed at which a dependent variable returns to equilibrium after a change in other variables (Sargan, 1964).

4.2.5.3 Johansen Cointegration Test

The Johansen and Julius (JJ) (1990) test is another co-integration approach that will be employed within this thesis. The JJ test suggests that the existence of a co-integrating vector implies that a long-run equilibrium relationship exists between these variables.

The below model can be transformed into a JJ model as follows:

$$\Delta Z_i = \alpha + \tau_1 \Delta Z_{t-1} + \tau_2 \Delta Z_{t-2} + \cdots + \tau_{k-1} \Delta Z_{t-k-1} + \pi_k Z_{t-k} + \mu_t \quad \ldots\ldots..(4.16)$$

Where Z_t and μ_t are ($n \times 1$) vectors.

The Johansen (1988) methodology requires estimating the system of Equation 4.16 and examining the rank of matrix P_k. Specifically, if rank (P_k) equals to zero, then there is not any stationary linear combination of the variables in Z_t, that is, the variables are not cointegrated. Since the rank of a matrix is the number of non-zero Eigen values (r), the number of $\rho > 0$ represents the number of co-integrating vectors among the variables.

Two Likelihood Ratio (LR) test statistics are usually conducted to test for non-zero Eigen values:

$$P_{trace} = -F \sum_{i=r+1}^{d} \ln(1- \delta_i) \quad \ldots\ldots\ldots(4.17)$$

$$P_{max} = -F\ln(1- \delta_{r+1}) \quad \ldots\ldots\ldots(4.18)$$

Where F is the sample size and δ_i is the *i*th largest canonical correlation. The null hypothesis of the trace statistic test is that the number of different co-integrating vectors is less than or equal to r against a general alternative whereas the null of λ-max statistic is that, there are r co-integrating vectors, against the alternative of $r+1$ co-integrating vectors. Critical values for both tests are tabulated in Osterwald - Lenum (1992).

Nejada, Jahantighb, and Rahbari (2016) have used this technique to analyze the long run relationship between oil price risk and stock exchange returns in the presence of structural breaks in the case of Iran, offering evidence of recent research that supports the validity of this test when analyzing the long run relationship between oil and stock exchanges in the context of the GCC. Bhuvaneshwari and Ramya (2017) used this approach for stock prices cointegration for the Indian economy.

The above mentioned approaches are used to analyze the long-run relationship between oil prices and stock exchange returns. The study of long-run relationship is important because it helps to determine if there are connections between time series such as Brent oil prices and stock market prices. Economic theory suggests that economic time series vectors should move jointly, that is, economic time series should be characterized by means of a long-run equilibrium relationship. Cointegration implies that these pairs of variables have similar stochastic trends.

4.2.6 Granger Causality Test

Granger causality deals with linear prediction and it only comes into play if some event happens before another. Granger causality is focused on measuring whether something happens (an event takes place) before another and helps predict it and nothing else. It can be said that a variable X that evolves over time Granger-causes another evolving variable Y if predictions of the value of Y based on its own past values and on the past values of X are better than predictions of Y based only on its own past values (Granger, 1969; Eichler, 2007). In economics, it is often found that all economic variables are affected by some unknown factors and if the responses of x_t and y_t are staggered in time, it is easy to observe that Granger causality is the same even though the real causality is different.

Based on above-mentioned two assumptions about causality, Granger proposed testing the following hypothesis for identification of a causal effect of X on Y:

$$BP_t = \sum_{j=1}^{m} \alpha_j \, BP_{t-j} + \sum_{j=1}^{n} \beta_j \, SP_{t-j} + \varepsilon_t \qquad (4.19\ a)$$

$$SP_t = \sum_{j=1}^{m} c_j \, BP_{j-1} + \sum_{j=1}^{n} d_j SP_{t-j} + \mu_t \qquad (4.19\ b)$$

Where BP is the Brent oil price; SP = the stock price; and ε_t, μ_t are assumed to be serially uncorrelated with zero mean and finite covariance matrix.

Although the traditional Granger-causality test has some limitations such as a bi-variate causality test not being taken into account, can be a cause of specification bias. The results may be sensitive to the model specification (Ito and Krueger, 2007). However, the bias is inversely associated with the sample size (Nickell, 1981). In the case of the current thesis, as daily data is considered for the analysis there is not such concern about specification bias. As explained by Stern (2011) better results can be obtained by using a larger sample sizes when running causality analysis. In VAR models, Granger causality is very easy to handle. This model is a general VAR-model, in which only the data vectors are divided in 3 sub vectors, z_t is the vector (which may be empty) which we impose condition on, and *yt* and *xt* are the vectors between which we test for causality.

Several studies including that of Huang, Masulis, and Stoll (1996) and Lee, Yang and Huang (2012) employed Granger causality to analyze the association between oil returns and stock returns. So, results of this test would help us to find out whether Brent oil returns can be a source of changes in stock returns in the GCC economies in the short run. Since the results of cointegration indicate the long run association between dependent and independent variable(s), and in the same way both tests would verify the outcome. So, employing both approaches (for instance, conintegration and Granger causality), will give a clear picture of association between dependent and independent variables.

4.2.7 Frequency Causality Domain Model

Volatility spillovers were analyzed by using the frequency domain causality test developed by Breitung and Candelon (2006). The framework of Geweke (1982), Granger (1989) and Hosoya (1991) suggest a number of empirical tests to access the predictive power for some given frequencies. Geweke (1982) and Hosoya (1991) constructed a measure for causality at a specific frequency consisting of decomposition of the spectral density. Later, Yao and Hosoya (2000) built a Wald method for causality of some given frequencies. That consists of some non-linear restrictions upon the autoregressive parameters. In order to overcome such difficulties, Yao and Hosoya (2000) used the delta method consisting of numerical derivatives. There are many studies that have used this technique and obtained fruitful results (Ozer and Kamisli, 2016; Gradejeric, 2013; Tiwari et al., 2007; Mermod et al., 2010)

First consider $A_t = [b_t, c_t]'$ as a two dimensional vector of time varying observation, where $t = 1, \dots, T$. It is presumed that A_t has a limited finite order vector autoregressive such as:

$\vartheta\ (L)A_t = \mu_t$ …………………………. (4.20)

Whereas $\vartheta\ (L) = 1 - \vartheta\ (L), - \cdots - \ \vartheta_{\ p} L^p$ defined as 2 x 2 lag polynomial along with $L^k A_t = A_{t-k}$. Therefore, it is assumed that the error vector is considered as a white noise term with E (μ_t) = 0 and E$(\mu_t, \mu_t{}') = \sum.$, where $\sum.$ is absolutely positive definite. For ease of explanation, we disregard any deterministic terms in (1) that are designed although in empirical applications, the model typically includes constant, trend or dummy variables.

Let H be considered as lowest triangle matrix of a Cholesky decomposition $H'H = \sum.^{-1}$ such that that $E\ (\gamma\gamma_t') = J$ and $\gamma_t = H\mu_{\ t}$. In addition, if this system is assumed to be stationary then, the classification of the system can be written as:

$$A_t = \vartheta(L)\mu_t = \begin{bmatrix} \sigma_{11}(L) & \sigma_{12}(L) \\ \sigma_{13}(L) & \sigma_{14}(L) \end{bmatrix} \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \end{bmatrix}$$

$$A_t = \vartheta(L)\gamma_t = \begin{bmatrix} \delta_{11}(L) & \delta_{12}(L) \\ \delta_{13}(L) & \delta_{14}(L) \end{bmatrix} \begin{bmatrix} \gamma_{1t} \\ \gamma_{2t} \end{bmatrix} \text{…………… (4.21)}$$

Where $\sigma(L) = \vartheta(L)^{-1}$ and $\delta(L) = \sigma(L)H'$. Based on this classification the spectral density of x_t can be elaborated as follows:

$$f_x(\omega) = \frac{1}{2\pi}\left\{\left|\delta_{11}(e^{-i\omega})\right|^2 + \left|\delta_{12}(e^{-i\omega}\right|^2\right\}$$

Furthermore, the causality measure proposed by Geweke (1982) and Hosoya (1991) are explained as:

$$M_{c\rightarrow b}(\omega) = \log\left[\frac{2\pi f_x\ (\omega)}{\left|\delta_{11}(e^{-i\omega})\right|^2}\right] \text{………………….. (4.22)}$$

$$M_{c\rightarrow b}(\omega) = \log\left[1 + \frac{\left|\delta_{12}(e^{-i\omega})\right|^2}{\left|\delta_{11}(e^{-i\omega})\right|^2}\right] \text{…………….. (4.23)}$$

The measurement stands at zero if $\delta_{12}(e^{-i\omega}) = 0$, in that case we may explain that c is not causing b at a frequency ω. Subsequently, if components of A_t are integrated at order one and also co-integrated that shows that the autoregressive polynomial $\vartheta(L)$ contains the unit root and the rest of the roots are outside of the unit circle. By subtracting A_{t-1} from equation 4.20 the relationship below is obtained:

$$A_t - A_{t-1} = (\vartheta_1 - I)A_{t-1} + \vartheta_2 A_{t-2} + \cdots + \vartheta_p A_{t-p} + \mu_t$$

$$= \tilde{\vartheta}(L)A_{t-1} + \mu_t \text{ ....(4.24)}$$

Where $\tilde{\vartheta}(L) = \vartheta_1 - I + \vartheta_2 L + \cdots + \vartheta_p A_{t-p} + \mu_t$. In the case that variable c is not causing b in a normal Granger sense, then the element $\tilde{\vartheta}(L)$ is zero (Toda and Phillips, 1993). When we are measuring the causality in frequency domain, it can be elaborated using an orthogonalized moving average representation.

$$A_t - A_{t-1} = \tilde{\vartheta}(L)\mu_t$$

$$= \tilde{\delta}(L)\gamma_t \text{.............................. (4.25)}$$

Where $\tilde{\delta}(L) = \tilde{\vartheta}(L)H^{-1}$, $\gamma_t = H\mu_t$, and H represents a lowest triangular matrix such as $E(\gamma_t \gamma_t{}') = 1$. In addition to this explanation in the bivariate co-integrated system $\beta' \tilde{\delta}(1) = 0$, where β is stands as the co-integrated vector and $\beta' \tilde{\delta}(1) = 0$ is stationary (Engle and Granger, 1987). In the case of stationarity, the resulting measure for causality is:

$$M_{c \to b}(\omega) = \log\left[1 + \frac{|\widetilde{\delta_{12}}(e^{-i\omega})|^2}{|\widetilde{\delta_{11}}(e^{-i\omega})|^2}\right] \text{.................... .(4.26)}$$

For the hypothesis where b does not cause c at frequency ω, the null hypothesis can be written as follows:

$$M_{c\to b}(\omega) = 0 \ldots\ldots\ldots\ldots\ldots\ldots\ (4.27)$$

In the bivariate conceptual framework, Yao and Hosoya (2000) proposed estimating $M_{c\to b}(\omega)$ by replacing $\left|\widetilde{\delta_{11}}(e^{-i\omega})\right|$ and $\left|\widetilde{\delta_{12}}(e^{-i\omega})\right|$ in Equation (4.23) along with the output retrieved from the fitted VAR. Let $\varphi = vec\,(\vartheta_1, \dots, \vartheta_p, \sum.)$ represents the vector for parameter. Then the method named as delta gives upsurge to the expansion.

$$\widetilde{M}_{c\to b}(\omega) = M_{c\to b}(\omega) + D_\varphi(\varphi)'(\tilde{\varphi} - \varphi) + O_p(T^{-\frac{1}{2}}) \ldots\ldots\ldots\ldots\ldots\ldots\ (4.28)$$

Where $\widetilde{M}_{c\to b}(\omega)$ represents the measure of estimated causality that consists on estimated VAR parameters and $D_\varphi(\varphi)$ denotes that the vector of derivatives for $M_{c\to b}(\omega)$ with respect to φ (Yao and Hosoya, 2000). In addition, under the asymptotic distributed conditions the Wald test for Equation (4.27) is as explained as

$$W = T\left[\widetilde{M}_{c\to b}(\omega)\right]^2 / J(\hat{\varphi}) \to Chi^2$$

Where $J(\hat{\varphi}) = D_\varphi(\hat{\varphi})'V(\hat{\varphi})D_\varphi(\hat{\varphi})$ and $V(\hat{\varphi})$ represent an asymptotic covariance matrix of $\hat{\varphi}$.

A simple technique to test the null hypothesis is taken from equation (4.27). From equation (4.27) it follows that $M_{c\to b}(\omega) = 0$ if $\left|\delta_{12}(e^{-i\omega})\right| = 0$.

While using $\delta(L) = \vartheta(L)^{-1}H^{-1}$ and

$$\delta_{12}(L) = -\frac{g^{22}\vartheta_{12}(L)}{|\vartheta(L)|},$$

Where g^{22} stands as a lower diagonal element of H^{-1} and $|\vartheta(L)|$ represents a determinant of $\vartheta(L)$. Subsequently it follows if c does not cause b at the frequency ω, if and only if,

$$\left|\vartheta_{12}(e^{-i\omega})\right| = \left|\sum_{k=1}^{p} \theta_{12,k} Cos(k\omega) - \sum_{k=1}^{p} \theta_{12,k} Sin(k\omega)\right| = 0$$

Where $\theta_{12,k}$ is the component of ϑ_k. So based on that the necessary conditions to set for $\left|\vartheta_{12}(e^{-i\omega})\right| = 0$ is as follows

$$\sum_{k=1}^{p} \theta_{12,k} Cos(k\omega) = 0 \text{ ...... (4.29)}$$

$$\sum_{k=1}^{p} \theta_{12,k} Sin(k\omega) = 0 \text{ ..... (4.30)}$$

Meanwhile $Sin(k\omega) = 0$ for $\omega = 0$ and $\omega = \pi$. Our aim is to check Equation (4.29) and (4.30) as restrictions. In order to simplify the scenario let $\alpha_j = \theta_{11j}$ and $\beta_j = \theta_{12j}$ so based on that the Vector Autoregressive equation for b_t can be written as:

$$b_t = \alpha_1 b_{t-1} + \cdots + \alpha_p b_{p-1} + \beta_1 c_{t-1} + \cdots + \beta_p c_{t-p} + \mu_{1t} \text{ .... (4.31)}$$

Later on the hypothesis $M_{c\to b}(\omega) = 0$ is equal to the linear restriction

$$H_0: R(\omega)\beta = 0 \text{.................. (4.32)}$$

Where

$$\beta = [\beta_1, \dots, \beta_p]' \text{ and}$$

$$R(\omega) = \begin{bmatrix} Cos(\omega) & Cos(2\omega) & \dots & Cos(p\omega) \\ Sin(\omega) & Sin(2\omega) & \dots & Sin(p\omega) \end{bmatrix}$$

The normal F statistics for Equation (4.29) are almost spread as $F\,(2, T-2p)$ for $\omega \in (0, \pi)$.

A number of studies have investigated the relationship between the oil price and stock market movements, however in the case of emerging markets comparatively less literature is available (Halac, Taskin and Cagli, 2013). The available literature shows diverse results, however most of them found significant relationships between both. For instance, Hammoudeh and Alesia (2004) claim the changes in oil prices have significant impact on the stock market in Saudi Arabia. Zarour's (2006) study also shows that in the 2003 to 2005 period, oil prices were a good determinant of stock markets prices in GCC except for the Abu Dhabi stock market. Onour (2007) also considers the GCC stock markets and suggests that in the long run the effects of oil price changes are transmitted to fundamental macroeconomic indicators which in turn affect the long run equilibrium linkages across markets. Maghyereh (2004) inspects the linkages between crude oil price shocks and stock market returns in twenty-two emerging economies for 1998 to 2004. His results contradicted the literature by showing no significant impact of oil price shocks on the stock index returns.

In the long run all factors of production and costs are variable, so firms can change their way of production and enhance their profitability and value. However, in the short run firms are only able to influence prices through adjustments made to production levels. So, in long run and in short run their strategies and limitations can affect their returns in the stock market. Similarly, these timeframes also effect oil exploration activity and thus available supply. So, it is useful to understand the relationship between both in the short run and in the long run.

Therefore, in the presence of the available literature it is worthwhile finding the long run relationship between oil prices and stock exchange returns by using the latest data set that would lead a recent pattern as well and indicate the difference with available results, if any. For the long run relationship between variables, the cointegration tests are more suitable (Sjo, 2008). Similarly, the causality test will guide the direction of oil price-stock returns causality, whether it is one way or two ways for the GCC countries, or if it has a mixed trend for said economies. In addition, the traditional Granger causality test is considered as a static approach for causality; while the causality approach brings a dynamic approach that helps this research through cross checking outcomes regarding short-term relationships for the three shocks under consideration.

4.3 Volatility Research Framework

Variation in prices and stock trading is known as volatility of financial markets. The most significant volatility concern is declines of trading in the market (Ibbotson, 2011). Understanding volatility is very important to understanding market risk. The current thesis uses stock exchange returns data that is considered more volatile and sensitive to any economic shock, so it is worthwhile considering a volatility framework. In addition, to understand which country from our sample has the more volatile market is also beneficial as it will help get a better understanding of the dynamics exhibited by the Kuwaiti stock exchange. Low volatility is generally associated with steady or predictable conditions. Another way of observing the low volatility of markets is by looking at the daily changes in stock markets (Barnes, 2017). To understand possible volatile variance a well-mannered Autoregressive Conditionally Heteroscedasticity (ARCH) technique is usually used to explain gradual increments in variance over time.

4.3.1 Autoregressive Conditional Heteroscedasticity Model

AutoRegressive Conditional Heteroscedasticity (ARCH) models are generally used in modeling financial time series that reveal time-varying volatility clustering. The ARCH model comes into play because these models are autoregressive models in squared returns and in these models, the next period's volatility is dependent on information from that period. There are two parts to the understanding of these types of models (Agung, 2009). The first part is the conditional mean equation that looks like a conventional regression equation. The second part is the conditional variance equation where the emphasis is to model the time-dependent variance of the mean equation. Data in which the variances of the error terms are not equal, in which the error terms may reasonably expected to be larger for some points or ranges of the data than for others, are said to suffer from heteroscedasticity (Paul, 2006). A standard linear regression, i.e. $y_i = \alpha + \beta x_i + \varepsilon_i$, where the variance of the residuals, ε_i is constant, is said to be homoscedastic and in such a case, the ordinary least squares method is used to estimate α and β. On the other hand, if the variance of the residuals is not constant, then the regression is said to be heteroscedastic and as such, we can use weighted least squares to estimate the regression coefficients.

Let us assume that the return on an asset is given as:

$$r_t = \mu + \sigma_t \epsilon_t \qquad (4.33)$$

where ϵ_t is a sequence of N(0, 1) *i.i.d*. random variables. Then, we define the residual return at time t, $rt - \mu$, as:

$$\alpha_t = \sigma_t \epsilon_t$$

In an ARCH(1) model, which was first developed by Engle (1982), we have:

$$\sigma_t^2 = \alpha_0 + \alpha_{1+} \alpha_{t-1}^2 \qquad (4.34)$$

where $\alpha_0 > 0$ and $\alpha_1 \geq 0$ in order to have a positive variance and $\alpha_1 < 1$ for stationarity. For an ARCH(1) model, the forecast for next period's conditional volatility, σ_t+1 will be large if the residual return α_t is large in magnitude. Thus, we conclude that the returns are conditionally normal (conditional on all information up to time $t-1$, the one period returns are normally distributed) and we can relax this assumption of conditional normality. Also, it is important to note that the returns, r_t are uncorrelated but are not independent and identically distributed (i.i.d).

Thus, it is easy to observe that a time varying σ_t^2 results in large tails in the unconditional distribution of α_t, relative to a normal distribution, (see Campbell, Lo, and Mackinlay, 1997). The definition of the kurtosis of α_t is given as:

$$kurt(\alpha_t) = \frac{E[\alpha_t^4]}{(E[\alpha_t^2])^2}$$

If α_t were normally distributed, then it should have a kurtosis of 3. In such an instance, we have:

$$kurt(\alpha_t) = \frac{E[\sigma_t^4]E[\epsilon_t^2]}{(E[\sigma_t^2)^2(E[\epsilon_t^2])^2}$$

Furthermore, from Jensen's inequality (for a convex function, $f(x), E[f(x)] > f(E[x])$), we have $E[\sigma_t^4] > (E[\sigma_t^2])^2$. Hence, kurt($\alpha_t$) > 3.

Another way of confirming that models with time-varying σ_t result in large tails is to think of these models as a mixture of normal variance. In particular, this research work discusses some properties of an ARCH(1) model. The unconditional variance of α_t is given as:

$$Var(\alpha_t) = E[\alpha_t^2] - (E[\alpha_t])^2 \tag{4.35}$$

$$= E[\alpha_t^2]$$

$$= E[\sigma_t^2 \epsilon_t^2]$$

$$= E[\sigma_t^2]$$

$$= \alpha_0 + \alpha_1 E[\alpha_{t-1}^2]$$

and since α_1 is a stationary process, Var(α_1) = Var(α_1−1) = $E[\alpha_{t-1}^2]$

Thus, Var(α_1) $= \frac{\alpha_0}{1-\alpha_1}$

ARCH(1) is similar to an AR(1) model on squared residuals, α_t^2. This is easily seen in the definition of the conditional forecast error, or the difference between squared residual return and conditional expectation of the squared residual return, given as:

$$v_t = \alpha_t^2 - E[\alpha_t^2 | I_{t-1}]$$

$$= \alpha_t^2 - \sigma_t^2$$

where I_{t-1} is the information at time $t - 1$ and v_t is an uncorrelated zero-mean series. Hence, the ARCH (1) equation becomes:

$$\alpha_t^2 = \alpha_0 + \alpha_1 \alpha_{t-1}^2$$

$$\alpha_t^2 - v_t = \alpha_0 + \alpha_1 \alpha_{t-1}^2$$

.
.
.

$$\alpha_t^2 = \alpha_0 + \alpha_1 \alpha_{t-1}^2 + v_t$$

This is an AR(1) process on squared residuals. The current thesis is based on stock returns data that is based on daily frequency, so ARCH would give deep insights to analyze relationships between Brent oil returns and stock returns. The ARCH family of parametric nonlinear time-series models has been introduced over the last two decades to deal specifically with volatility patterns of data (Paul, 2006). Studies such as Falzon and Castillo (2013), Aye (2014), Hamma, Jarboui and Ghorbel (2014) and Huang (2016) used an ARCH approach to see the impact of oil returns on stock returns in the case of the USA and the UK and found it suitable for such kinds of data.

4.3.2 Generalized Autoregressive Conditional Heteroscedasticity

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models help to define financial markets in which volatility patterns can change. For example, returns behavior becomes more unstable during times of financial crises, political crises or war, economic uncertainty, and so on, and have lower volatility levels during times of relative calm and steady economic times. The typical GARCH model is outlined by the following equation:

$$SRy_{i,t} = c_0 + \sum_{i-1}^{m} a_i \, SRx_{t-i} + \varepsilon_{yt} \tag{4.36}$$

Where, *SRy* is the stock return of asset Y and *SRx* is the stock return of asset X, and the serially correlated errors ε_{yt} are characterized by a Moving Average (1) process, which is given as:

$$\varepsilon_{yt} = \mu_{yt} - \theta\mu_{yt-1} \tag{4.37}$$

The typical GARCH model is modified in this analysis in order to introduce stock returns volatility.

Diagnostic tests on the standardized residuals are carried out for GARCH models, which entails the Bollerslev-Wooldridge robust t-statistics and the Jarque-Bera test for normality (Zivot, 2008).

Among other advantages of GARCH techniques, their flexibility and accuracy have a unique value that fulfills a number of practitioners' requirements. Yet, the use of such techniques is constrained by long time series. GARCH models involve several years of daily data to be trustworthy (Matei, 2009). In the case of the current thesis, we have long series of data (more than 3,000 observations), so in seeking accuracy in the estimation of parameters the data requirements are fulfilled.

The study by Lucey and Voronkova (2008) stated that the computations of correlations between international asset markets is a key factor for determining the short-term interdependencies existing between the market and its diverse benefits. The study indicates that the examination of time-varying conditional correlation between secondary markets employing the multivariate GARCH dynamic conditional correlation (DCC) analysis serves as an enriched research repository (Engle, 2002). Thus, estimating DCC-GARCH should be viewed as an alternative methodology to that used in the current thesis, since it is widely used in analyzing issues pertaining to markets integration.

4.3.3 Diagnostic Tests

To run various diagnostic tests is an important step toward time series modeling. In the current thesis, three types of diagnostic tests are performed to verify the model and analysis stability. The Correlogram of standard residual test will be used to analyze serial correlation among residuals. The Jarque Bera test will be applied to check the normality of residuals and lastly the LM test will be applied to check the ARCH effect.

4.3.3.1 Engle's Lagrange Multiplier test for the ARCH effect

Since the ARCH approach is a form of an autoregressive model, Engle (1982) proposed the Lagrange Multiplier (LM) test, to test for the existence of ARCH behavior based on regression. The test statistic is given by TR^2, where R is the sample multiple correlation coefficient computed from the regression of ε_t^2 on a constant and $\varepsilon_{t-1}^2, \ldots, \varepsilon_{t-q}^2$, and T is the sample size. Under the null hypothesis, that there is no ARCH effect, the test statistic is asymptotically distributed as chi-square distribution with q degrees of freedom (Greene, 2003). This test is used to investigate whether the standardized residuals exhibit ARCH behavior. If the variance equation of the ARCH model is correctly specified, there should be no ARCH effect left in the standardized residuals (Engle, 2001). The LM test is also used frequently in GARCH studies. This test has an advantage over some other tests such as Ljung- Box and Ling and Li tests because of its efficiency in the case of the correctness of the alternative.

The current thesis revolves around the GARCH[8] framework, since GARCH has many advantages, among them its flexibility and accuracy which place them in a unique position to be able to fulfill many of the requirements of scholars and practitioners. However, its implications are restricted to the larger time series (1,000 observations proved to be a small sample, and fewer than this does not provide any signal) (Matei, 2009). The GARCH models involve several years of daily data in order to be trustworthy. In the case of the current thesis, this condition is fulfilled, so GARCH is expected to give the credible results.

The current thesis uses a number of appropriate empirical methodologies, which are rarely combined in the literature especially in the case of GCC economies. It will check long-run and short-run associations between Brent oil prices and stock market returns. Further, the structural breaks are also take into account which enhances the benefit of this study. The current study also uses the latest available data in the case of four GCC countries and with the help of diverse econometric techniques draws the empirical results. Ultimately, it will significantly contribute to the existing literature.

---

[8] The current thesis has also used T-GARCH and E-GARCH however; both methods were not stable in variance and showed evidence of explosive behaviour.

4.4 Research Sample

4.5 Data Description

The current thesis investigates the impact of long run, short run and volatility in Brent oil prices on the returns of stock exchanges of three GCC countries with four exchanges namely, Kuwait, Saudi Arabia, Abu Dhabi and Dubai. All the above-mentioned economies have a significant share in global oil production and exports and oil is a significant part of their GDP. Notably, the time span for available data is different for all said economies.

Table 4.3 gives the description of the variables.

Table 4.3: Description of Variables

Variable	Description	Measure
SR	Stock market returns under consideration (Kuwait, KSA, Abu Dhabi and Dubai)	Daily stock prices
BP	Brent price	Daily Brent prices

Source: Author's own description.

The stock market returns are the gain that an investor generates from the stock exchange or the secondary market and it may be in the form of dividends to shareholders. For the current thesis, the stock returns are taken as the dependent variable and it represents the returns of the entire stock exchange markets of the four exchanges. Following common practice when dealing with financial time series analysis (Kanas, 2000; Mishra, 2004; Yau and Nieh, 2008; Walid, Chaker, Masoodb, and Fry, 2011), returns are calculated as the first difference of the natural logarithm of the daily stock price. The stock returns give a clearer picture of what an investor earns from his/her investment and specifically in the case of any shock, to what extent s/he gets disturbed in real terms. The following formula is used to transform the stock prices into stock returns:

$$SR_t = ln\ (SP_t)\text{-}ln\ (SP_{t\text{-}1})$$

Similarly, using same formula the Brent oil price is converted into returns, i.e.

$$BR_t = ln\ (BP_t)\text{-}ln\ (BP_{t\text{-}1})$$

Where

SR is the stock return, *SP* is the stock price, *BR* is Brent oil returns and the *BP* Brent oil price.

To use stock returns is a common approach and it is common place in the financial literature and used by a number of studies, for instance, Kanas (2000); Mishra (2004); Yau and Nieh, (2008); Walid et al., (2011). However, in the case of cointegration tests the prices are used as these are required for the analysis. Sources of stock prices data are different for all four countries, however a single source is used for the oil prices data. Moreover, stock exchange data covers only non-financial listed firms at their respective stock markets. The stock prices data was obtained on a daily basis. Unlike, weekly or monthly data the daily data can deal with holidays and their lead/lag relationships. Days of the week have diverse patterns that can be recognized at this level. Long weekends, Fridays before the holidays on Monday, and Mondays following Friday holidays are often identified as significant.

No data was taken during holidays or weekends. Stock exchange markets normally stop their operations on weekends and on public holidays like other public sector departments, so usually, trading is held 5 days a week unless any holiday comes. Therefore, available data from the stock exchange market excludes weekends and other holidays. The data for Brent prices was collected from the U.S. Energy Information Administration (EIA), which is an independent organization that accumulates, analyzes, and publishes energy-related information in order to facilitate good policymaking, public understanding of energy and its interaction with the economy and the environment. The collected data and its time period for each of the countries and the oil variable is presented in Table 4.4 below.

Table 4.4: Data Spans for the Four Exchanges

	Brent oil price			*Stock exchange price*		
Country	Time Span	No. of observations	Source	Time Span	No. of observations	Source
Kuwait	1995-2016	3475	EIA	1995-2016	3475	KSA
KSA	October-1998 - October-2016	2725	EIA	October-1998 to October-2016	2725	TASI
Abu Dhabi	October-2001 to October-2016	2616	EIA		2616	ADX
Dubai	December-2003 to October-2016	2266	EIA		2266	DFM

Note: KSE-Kuwait Stock Exchange, TASI-Tadawul All Share Index, ADX-Abu Dhabi Securities Exchange, DFM-Dubai Financial Market, EIA- Energy Information Administration of the United States
Source: Author's own compilation

Table 4.4 shows that the sample size ranges from 2,266 to 3,475 observations from Dubai to Kuwait. The data time span is different for all the economies. The data availability is depends upon relevant stock exchanges. The Brent oil prices data is adjusted according to available stock data. For Brent prices a single source, namely, the EIA has been used for all four economies. However, due to compilated strategy of each country, the stock prices records are different. Hence, this study tries to use the longest available data from the relevant stock exchanges, so the EIA data also matches with the available stock prices data.

4.6 Definition and Construction of Variables

The current thesis investigates the impact of the volatility of Brent oil prices on the stock returns in three Arab economies across four exchanges. These countries play key roles in global oil production and exports. Hence, in order to develop an empirical analysis a bi-variate model is employed, with only one independent variable. The bi-variate linear regression model is a simpler linear regression process. This model discovers the predictive or explanatory association for only two variables. Such regression analysis aims to define how, and to what extent, the dependent variable varies as a function of changes in the predictor variable. The dependent variable is easily identifiable. It is the variable of primary interest, the one we want to clarify or predict (Khelifa, 2014). Details about the variables are given below.

4.6.1 Dependent Variable

Stock returns: The stock market returns are the gains that an investor generates from the stock or the secondary market. For this research work, the stock return is taken as a dependent variable and it represents the returns of the entire stock exchange markets of Kuwait, Saudi Arabia, Abu Dhabi and Dubai. Kuwait produces a significant amount of oil in the context of the world economy (2.75 million barrels per day), and it is listed in the top 10 world oil supplier ranking. Similarly, the KSA (11.75 million barrels per day) and Dubai (3.23 million barrels per day) are the largest producers of oil in the world as well as in Arab region (www.financeonline.com[9]). These three economies also have significant stock trading activities, so it is worthwhile analyzing their Brent prices and stock returns association. In the view of Kanas (2000), compounded stock returns were to be adopted and it is computed by the first difference of natural logarithm of the daily stock price Later Walid et al. (2011) and Walid, and Nguyen (2014) also validated the formula, which can be written as:

Stock return = natural log of current stock price – natural logarithm of last stock price

$$SR_t = ln(SP_t) - ln(SP_{t-1})$$

Where *SR* represents the stock return, SP_t stands for the current stock price and SP_{t-1} is the stock price of the previous day.

This thesis focuses understanding of oil and stock returns dynamics in context of oil dependent countries as such other macroeconomic variables might add noise to this specific study.

4.6.2 Independent Variable

Brent price: A rise in the price of Brent oil is expected to diminish the economic growth rate, which consequently causes an increase in inflation in the short run. Consequently, this decline in economic growth prospects reduces the expected earnings of companies, which has a detrimental effect on stock prices. In addition, the Brent price is strongly affected by

[9] visit for more details https://financesonline.com/top-10-oil-producing-countries-in-the-world-wheres-the-greatest-petroleum-dominion/

political events and political decisions, and as such, in the case of GCC countries, in the era of previously-mentioned shocks an inverse relationship is expected to exist between the Brent price and stock exchange returns. Numerous studies such as those done by Jones and Kaul (1996), Hayo and Kutan (2005), Lis et al. (2012) have studied the relationship connecting Brent returns and stock exchange returns for various economies, and combining those, it can be concluded that the Brent the oil price has an inverse association with exchange returns. For instance, according to Cong, Wei, Jiao and Fan (2008), shocks in oil prices can generate uncertainty in the entire market and as a result, these shocks act as a key risk factor.

The present study is different from the existing literature as it considers modern econometric tools, which specifically include frequency domain causality analysis. This study considers three significant breaks and their impact on stock markets. Furthermore, the situation in Kuwait is compared to two other significant oil producing countries in the region and their three markets.

CHAPTER 5

EMPIRICAL FINDINGS

5.0 Introduction

This chapter focuses on the discussion of political events, oil price volatility and its spillover effects on the stock markets of Kuwait, the Kingdom of Saudi Arabia (KSA) and the United Arab Emirates (Dubai and Abu Dhabi) during times of significant market uncertainty. These events are associated with market instability due to repeated shocks impacting on the supply of oil, which combined with a rapid change in the foreign oil markets have left many economies badly affected. Such variations can also influence the implementation of policies adopted by the economies of Kuwait, the KSA and the UAE markets since they are highly dependent on the oil sector as being their main export commodity, and as such, they are broadly exposed and susceptible and to economic disruptions related to oil price fluctuations. According to the Organization of the Petroleum Exporting Countries (OPEC, 2016), the KSA is the 1st, Kuwait is the 8th and the UAE is 7th largest producer of petroleum products. In terms of reliance, the Kuwaiti economy is largely dependent on oil exports, accounting for about 60% of the country's GDP (IMF, 2014). In the case of the KSA 42% of the country's GDP comes from oil exports and in the UAE it accounts for 33% (Forbes, 2017). The purpose of this chapter is to present the main research outcomes and outline their implications in respect of the markets under study. The discussions start by looking at the presentation of an individual analysis to ensure that a clear understanding of each country's dynamics and their connection to the oil market is outlined. Afterwards, the discussions are followed by a comparative analysis that seeks to identify and contextualize the importance of Kuwait in the region. The study of oil exporting countries and responsiveness and connections between the oil sector and their major stock markets is of interest, as understanding the capability of the stock exchanges to react to oil shocks can bring early signs of market distress to those countries that heavily rely upon oil. This enabled the governments to take appropriate measures and implement policies that seek to stabilize their economies and to consider the importance of making efforts that lead to economic diversification. Therefore, it becomes indispensable to undertake a detailed data analysis in order to address the main research question. This question seeks to understand how stock markets in the outlined countries react to the selected shocks (i.e. the Iraqi invasion 2003, the US Financial Crisis 2008, and the Arab Spring 2011) that generated a significant impact on the whole economy of Kuwait, the KSA, Abu Dhabi and Dubai. The research hypothesis under consideration is as follows:

Ho: "There is no significant effect of political events impacting on the relationship between oil prices and the GCC stock markets".

The chapter is divided into two main sections. The first part is focused on the empirical discussions looking at the association between stock market returns and oil returns for each country (Kuwait, the KSA and the UAE) with the consideration of the three core political events that may affect their stock markets, and that have been considered in detail as part of the literature review and methodology chapters (i.e. Iraq invasion-2003, US financial crisis-2008 and Arab Spring-2011). The second part of the chapter is developed on the basis of a comparative analysis between Kuwait, the KSA and the UAE stock markets with a close analysis of the mentioned shocks that provide further insight on Kuwait's performance in the region and the markets overall reaction to the outlined shocks. To support the study, and in line with discussions presented in the data and methodology chapter, two core aspects are covered: i) The analysis starts with the presentation of basic descriptive statistics and graphical representations (to check the basic nature of the data) that are considered as the informal side of the study. ii) The formal part of the analysis presents the econometric models, their core outcomes and the interpretation of the main research findings. The analysis seeks to understand oil price dynamics around the three major events, issues such as long run and short run relationships and volatility dynamics are considered in the context of a rich econometric framework that helps to offer insight on the reliability of the findings.

The study's motivation is based on core research findings from the conducted literature review and on the author's own interest in examining and getting a better understanding of the relationship between oil price volatility and major stock markets in the Gulf Region with special emphasis in the case of Kuwait, as this country is considered as a leading oil producer. Kuwait has been listed in the top ten ranking of crude oil production in 2014 (OPEC, 2015). Government income and aggregate demand are positively affected by higher oil costs, and fluctuations in oil prices may adversely affect regional stock markets. There are three political events that played a significant role in the region and because of them the Kuwaiti economy and other GCC economies suffered negative shocks over a relatively short period. The first shock under consideration is linked to the Iraqi Invasion in 2003 that led to the country's lowered risk premium and to serious effects on corporate profitability (Global Investment House Market Outlook, 2004). The second shock took place around 2007/08, due to the US Global Financial Crisis, with the KSE index plummeting from 14,157.50 to 1,373.60 points in September 2008 and this dropped market capitalization 53.1bn KWD (Global Investment House Market Report, February 2009). The third shock relates to the Arab Spring Revolution (2011) that caused the Kuwait price index to drop by 10.69 percent by the end of 2011, reaching 6,211.70 points (Global Investment House Market Report, 2011).

5.1 Flow of Empirical Findings

The flow chart below in figure 5.1 summarizes the stages that were followed in the implementation of the econometric framework, where the basic stages of the study were identified as per a close analysis of the relevant literature, looking at time series techniques that are commonly used to analyse stock and oil markets.

Flow of Econometric Tests

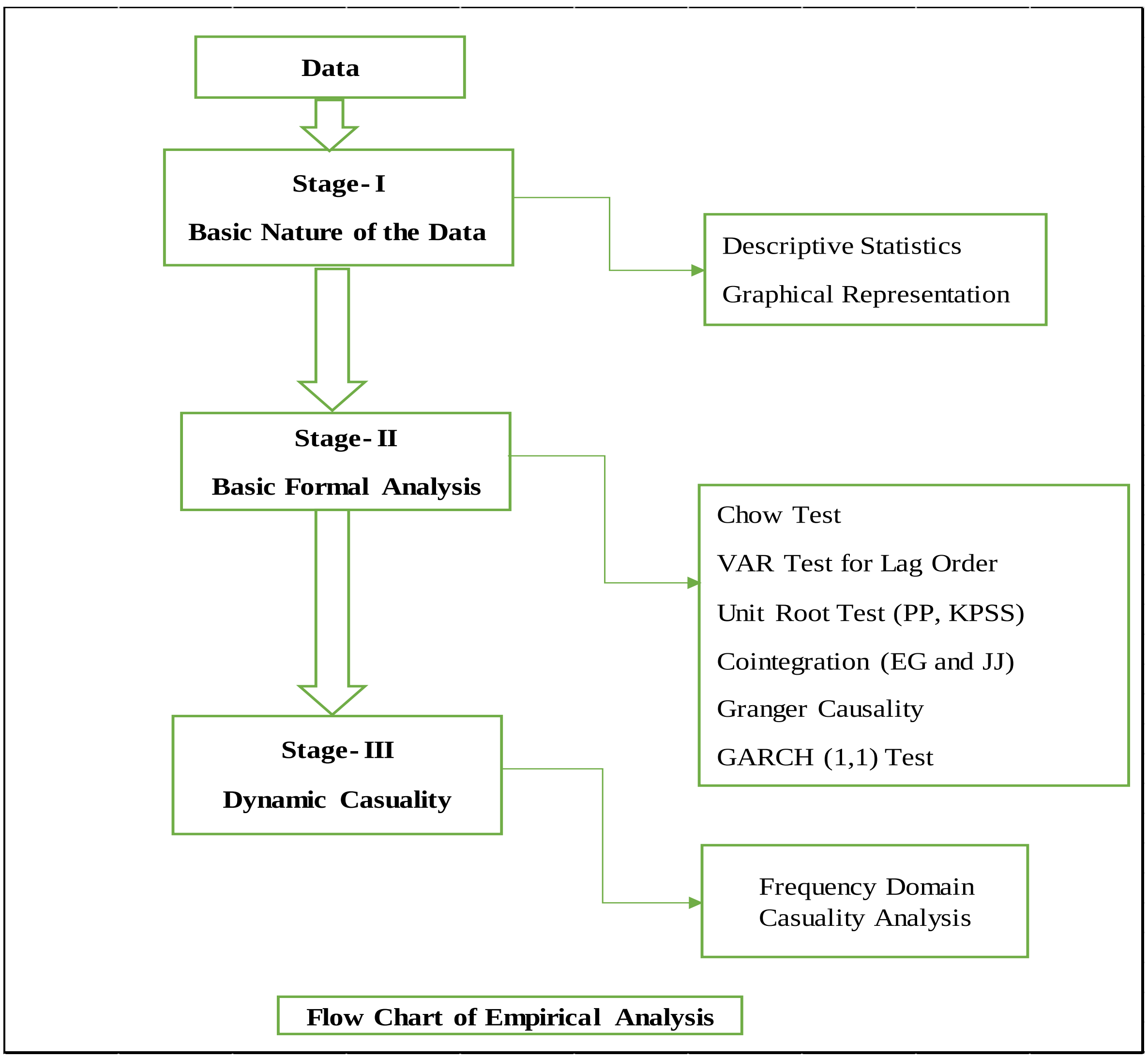


Figure 5.1: Flow Chart of Econometric Test

The empirical analysis is based on three major stages that begin with a graphical representation and is followed by descriptive statistics of the series under consideration that will offer basic insight about the dataset. The second stage is based on the formal analysis of the series that starts with the implementation of the Chow Break point test to observe the stability of the data over the period of the study. The Vector Autoregressive Model was adopted to identify the optimal number of lags for each one of the variables under study. The selection criteria was based on the Schwarz information criteria as it gives more suitable results compared with others in the selection of appropriate lag length, especially in the case of large data sets (Verbeek, 2008; Hacker and Abdulnasser, 2008). In order to get insight about the series stationarity properties, the PP (Phillips-Perron) and KPSS (Kwiatkowski–Phillips–Schmidt–Shin) techniques were applied. The analysis progressed with the implementation of the Engle-Granger and Johansen cointegration tests to observe the potential existence of long run relationships between the variables. Once the cointegration testing was done, the analysis proceeded with the examination of causal relationships through the implementation of the Granger causality test. Furthermore, the study looks into the volatility research framework that includes the analysis of volatility spillovers between stock returns and Brent returns over the defined period through the implementation of the very well-known and established GARCH (1, 1) model. The last part of this section analyzed the dynamic causality with the help of frequency domain (spectral) causality test developed by Breitung and Candelon (2006) bringing a new dimension to the study as it allows for the consideration of static and dynamic causal relationships.

This research study makes a clear contribution to the field, as previous studies are characterized by lack of evidence analyzing the impact of political events on oil price volatility and its spillover effects on the major stock exchange markets in the GCC region.

By using such a comprehensive modelling approach the researcher is able to offer clear insights into short-term, long-term and volatility dynamics on oil prices in the region. The discussions follow with the empirical findings of the outcomes for each country, starting with the analysis of Kuwait, and followed by the outcomes for the Kingdom of Saudi Arabia and the United Arab Emirates, with the final part of the chapter looking at the comparative analysis, as already noted.

5.2 Empirical Findings for Kuwait

The case of Kuwait is essential to this research as this country is considered a leading producer of oil. Kuwait was listed in the top ten ranking of crude oil production in 2014 (OPEC, 2015). Government earnings and aggregate demand are positively influenced by higher oil costs. Moreover, Kuwait is identified as one of the major oil suppliers in the world with crude oil reserves of about 102 billion barrels, that account for more than 6% of the world's oil reserves. Petroleum earnings represent almost half of the country's GDP, that is, 95% of export revenues and 95% of the government income (CIA World Fact book, 2016). Therefore, research findings analyzing the case of Kuwait are crucial as they can help to highlight key issues and areas of concern for the country's authorities, such as how to overcome negative impacts derived from oil price fluctuations which can spillover to the stock markets and to the real economy.

5.2.1 Basic Nature of the Data and its Examination

This section offers some initial insight into the behavior of the data through the presentation of time series graphs for Brent oil prices, stock prices, Brent returns and stock returns respectively. Descriptive statistics are also presented to analyze the initial data dynamics over the periods of the study.

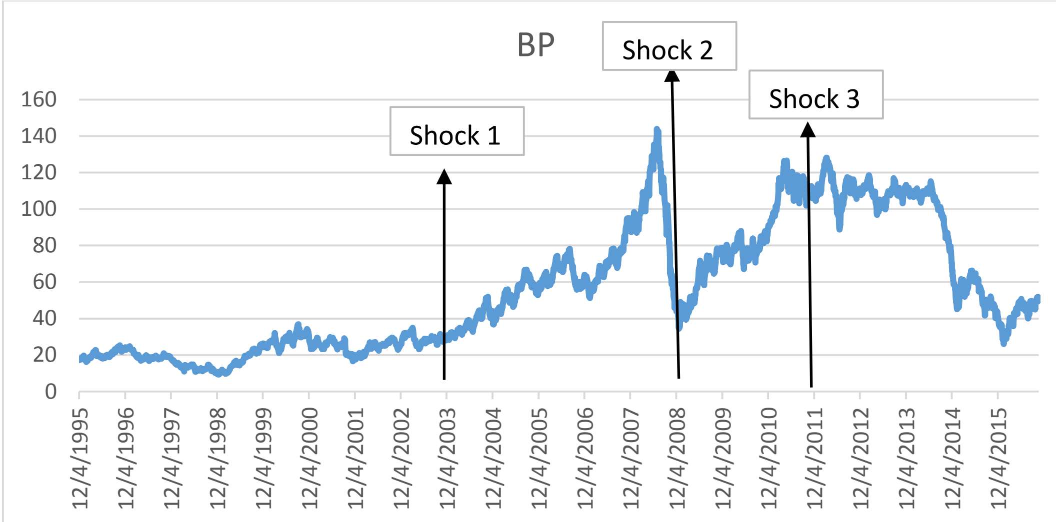


Figure 5.2: Brent Prices. Shock 1: 19th March, 2003 US Military Strikes Iraq, Shock 2: 15th September, 2008 US Financial Crises, Shock 3: 25th January, 2011 Arab Spring.

Figure 5.2 presents Brent prices for the entire sample size (1995 to 2016) with shocks included. The graph shows how Brent prices until 2003 are quite stable and afterwards they exhibited an upward trend though that came to a halt during the second half of 2008 when prices suffered a severe adjustment. The disruption in Iraqi and Kuwaiti oil production associated with the Iraq invasion played an important role in causing this spike in the oil price (Kilian and Murphy, 2014). Brent prices rose again after 2008 and reached 120 US dollars and remained stable over the 2010-2014 period, with prices remaining well below the levels reached during 2008 and 2009. After the Iraqi invasion in 2003, a persistent increase in price was experienced up to 2008 and then a sudden drop in price took place. This situation can be explained by the hit of the US financial crisis. Uncertainty over oil supply associated with the Arab Spring Revolution in 2011 helped oil prices to return to previous levels and prices remained stable over the next three years (Bchir and Pedrosa-Gorcia, 2015).

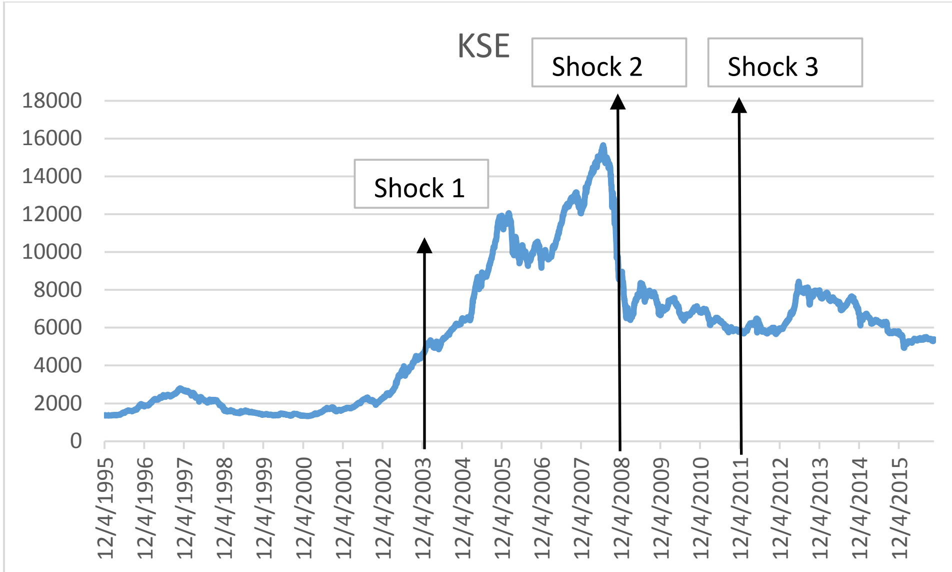


Figure 5.3: Kuwait Stock Prices

Figure 5.3 displays Kuwait stock prices for the entire sample period with shocks included. Before the invasion of Iraq in 2003, stock prices remained quite low during the years 1995 to 2002 and they rose dramatically to a peak in 2008. However, after the US financial crisis in 2008, stock prices declined gradually until 2012 and a slight upward movement can be seen, late 2012 that lasted until late 2013 and that was followed by a gradual decline for the rest of the sample period. All these movements are clearly connected to significant levels of uncertainty associated with each event affecting market performance over the period. Oil prices went through different stages of increasing and decreasing prices, where the price of oil rose by up to 140% between 2003 and 2007 (Schubert, 2014). By comparing stock prices with oil prices, it can be observed that the trend is the same in both cases, i.e. the upward movement of both prices started in 2003 and later declined in 2008, and hence the trend was similar for the entire sample period. Furthermore, it can be seen that there are certain fluctuations between the three shocks that requires careful examination due to the potential existence of structural breaks in the data and to consider the existence of non-stationarity patterns, as they are a major aspect that needs to be taken into account before any econometric testing can be done.

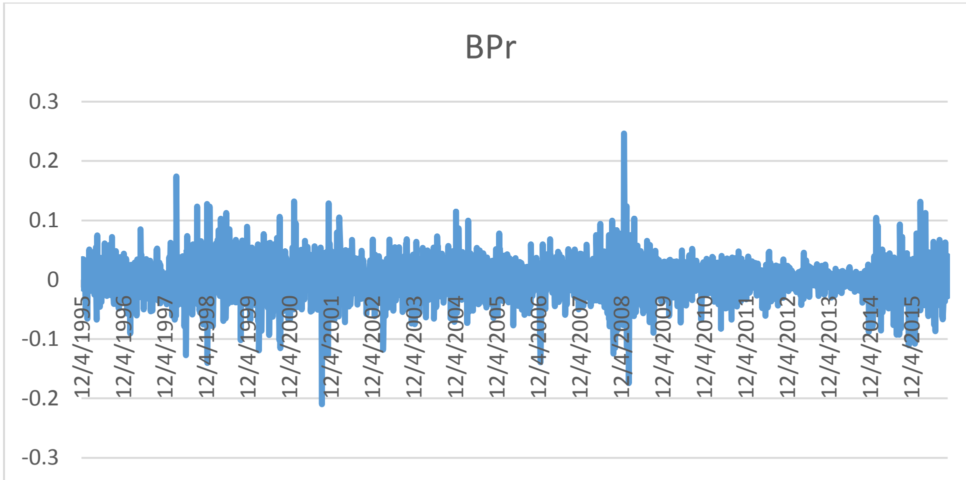


Figure 5.4: Brent Returns

Figure 5.4 (Brent returns) exhibit a consistent trend over the whole sample period, however during 1997 to 1998 returns are above 0.1 and a similar case exist in 2001, 2004 and from 2014 to 2015. In 2003 prices suffered a significant drop, a situation that could be explained by the involvement of some Arab countries regarding US interests to lower oil prices in 2003. Under normal circumstances, 2003 would be considered a time where the oil price was relatively stable. By 2008, oil returns reached around 0.3. Patterns show increasing oil prices in 2008. This year is also known for the US financial crisis that hit the world economies and financial systems. The Brent price spike in this crisis period validates the claim of 'The Oil Drum' which demonstrates that periods of economic hardship are followed by oil price increases, as growing oil prices lead to higher Brent returns. However, with regard to the other two shocks under consideration, the trend in oil prices changed and this time the market experienced significant declines in prices. This situation could be explained by the involvement of some Arab countries regarding US interests to lower oil prices in 2003.

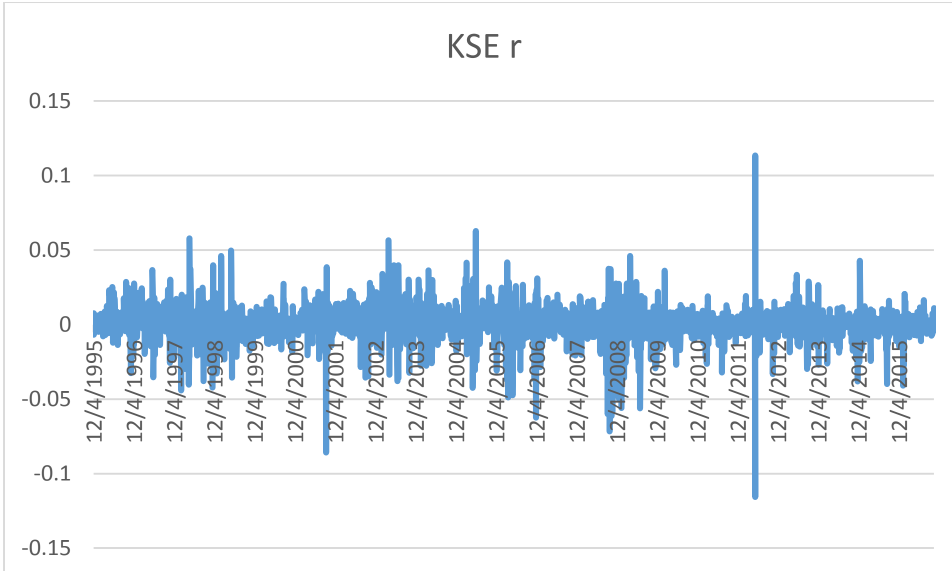


Figure 5.5: Kuwait Stock Prices Returns

Similar to the previous figure, returns are steady over most of the period under study. However, before 2001 significant negative returns are observed. After 2011 significant positive and negative movements are observed, which can be interpreted as an initial sign of market uncertainty that ended before 2012. The main reason behind this fluctuation is widespread political unrest and instability that undermined business confidence of international investors in the region and that led to panic on the stock market (Chau et al., 2014). The initial insight from the chart analysis suggests that the markets were subject to significant market uncertainty over the period.

The autocorrelation function is another tool to find patterns in the data. It tells especially the correlation between points separated by various time lags. The autocorrelation function in the case of Kuwait is decreasing continuously as the number of lags are increasing which clearly indicates that prices have non-stationary properties, as commonly shown by research in the field analyzing oil prices behavior. To overcome this issue, prices have been converted into returns that represent a stationary trend and that shows patterns that are in line with extensive research in the field (see correlogram graphs A1.1-A1.16 in Appendix A).

Table 5.1: Descriptive Statistics

Shocks	***Variables***	***Descriptive Statistics***					
		Mean	**SD**	**SK**	**KT**	**JB**	**Obs**
Full Sample	BP	59.2603	35.1698	0.38531	1.79876	294.834	3,474
	KSE	5,870.77	3445.66	0.5622	2.92203	183.883	3,474
	BPR	0.0003	0.02898	0.01605	8.18432	3890.62	3,474
	KSER	0.0004	0.01062	-0.679	17.0627	2,8892.5	3,474
Iraq Invasion 2003	BP	62.5287	27.8587	0.81762	3.13606	96.3686	859
	KSE	9,280.23	3,567.38	-0.0657	1.8199	50.4621	859
	BPR	0.00129	0.02664	-0.0939	4.64717	98.372	859
	KSER	0.00173	0.01157	-0.4703	8.40668	1077.94	859
US Financial Crisis 2008	BP	70.4957	14.8011	-0.5043	2.59435	22.3084	453
	KSE	7,507.77	1,164.49	2.73036	11.3321	1873.2	453
	BPR	0.00013	0.0339	0.3727	11.2777	1,303.81	453
	KSER	-0.0013	0.01271	-1.3619	9.33294	897.041	453
Arab Spring 2011	BP	88.4355	29.8372	-0.6418	1.72301	150.669	1,103
	KSE	6,429.59	831.234	0.50092	2.13633	80.41	1,103
	BPR	-0.0006	0.02305	-0.0052	7.43786	905.136	1,103
	KSER	-0.0002	0.00862	-0.4892	61.0279	154,797	1,103

BP: Brent Prices, KSE: Stock Prices, BPR: Brent Returns, KSER: Stock Returns. Author has used longest data to ensure maximum efficacy of output. However, in comparison with other markets sample periods, the longest is the Kuwait sample period. However, the author could not use more observations because of unavailability of data.

For the entire sample period which is based on 3,474 daily observations, the mean value for all variables remains positive. Moreover, the highest mean value belongs to the Kuwait stock price (5,870.77) and the smallest value is linked to the Brent price returns (0.0003). Additionally, the mean for Brent prices is 59.2603 and the Kuwait stock return is 0.0004. It has been noted that during the entire sample the mean of Brent prices remained around 60, whereas the mean of stock prices was 5,900. The standard deviation for all variables ranges from 0.01062 to 3,445.66. The smallest standard deviation i.e. 0.01062 stands with Kuwaiti stock returns and the highest 3,445.66 goes with Kuwaiti stock prices. Furthermore, the standard deviation of Brent prices is 35.1698 and the returns of Brent prices stand at 0.02898. In addition, Kuwaiti stock returns have the smallest standard deviation, which means that it has smaller variation whereas, on the contrary Kuwaiti stock prices have the highest standard deviation that indicates a high level of variation over the defined sample period.

The descriptive statistics offer significant insight on the nature of data during the political events under study and highlight significant patterns in terms of price variations and their behavior. The mean of Brent prices registered with the Iraq Invasion is 62.5287, 70.4957 with the US financial crisis and 88.4355 for the Arab Spring. It is significant that during the Arab Spring the mean value is high for Brent prices. However, during the Iraq Invasion it stood at its lowest. The mean of stock prices is 9,280.23 during the Iraq Invasion, 7,507.77 during the US financial crisis and 6,429.59 is recorded during the Arab Spring. It is noted that the lowest mean value relates to the Arab Spring event and the highest was registered during the Iraq Invasion. Furthermore, the average of Brent returns during Iraq the Invasion is 0.00129, during the US financial crisis 0.00013 and during the Arab Spring 0.0006. If we compare all averages across shocks, the highest value is associated with the Iraq Invasion, then with US Financial crisis and smallest during Arab Spring event. The mean value of stock returns during the Iraq Invasion is 0.00173, during the US financial crisis 0.0013 and during the Arab Spring 0.0002. Among all three shocks the lowest mean value was cited during the Arab Spring and the highest during the Iraq Invasion.

The standard deviation for Brent prices during Iraq Invasion is 27.8587 whereas during the US financial crisis it is 14.8011 and during the Arab Spring it is 29.8372. If we compare the values of standard deviation for all three shocks, the lowest value relates to the US financial crisis and the highest to the Arab Spring which means that during the US financial crisis Brent prices experienced less variation, whereas during the Arab Spring it experienced high variation. In the case of the KSE the value of the standard deviation remained lowest during the Arab Spring (831.234) and highest during the Iraq Invasion (3567.38). As for Brent prices, the highest standard deviation occurred during the US financial crisis (0.0339) and the lowest during the Arab Spring (0.02305). The lowest variation for stock returns relates to the Arab Spring (0.00862) and the highest SD value relates to the US financial crisis (0.01217). As for as skewness and Kurtosis, it is noted that the value of skewness for the all shocks and for all variables is close to zero except in the case of Brent returns and Kuwait stock market returns for the US financial crisis where it varied from negative one to positive two. The kurtosis and skewness show that stock returns for all shocks are leptokurtic, a finding that is considered to be quite common in the study of financial time series. Furthermore, the coefficients of skewness and kurtosis (lower than 3) show that stock prices and Brent prices are platykurtic. Furthermore, the value for the Jarque-Bera test is very high for all variables across all samples not allowing rejection of the null hypothesis[10] and indicating that the series are non-normal. This is a common finding in the analysis of financial time series.

[10]Residuals are normally distributed, an aspect that is not relevant in the context of large research samples, as it is the case of this thesis sample.

Comparing the mean of stock and Brent returns for the sub samples (three shock periods), the stock and Brent returns exhibit a positive trend because the government took many actions such as, the development of the foreign direct investment law, tax structure realization, and new privatization initiatives, which all contributed to the growth and strength of the economy. Therefore, government actions resulted in the positive KSE performance which showed great improvement on the performance of stocks of listed corporations and the removal of the old regime in Baghdad only served to prove that point when the oil price jumped to USD 40-USD 50 per barrel by the end of 2004 (Meagher, Jiang and Drysdale, 2007). The KSE index also reached its highest value in 2003, with market capitalization exceeding 100% of GDP (World Bank, 2004) which resulted in a significant difference in Kuwait's economy and stock market.

During June 2008, the Kuwait stock market suffered under the immense pressure of the US financial crisis. During July, the market plummeted significantly and both volume averages and value traded fell significantly from the previous month. During this month, the market decreased 521.70 points and the trading value average dropped to 113.3mn KWD, marking a 36.5% drop in less than a month. By the end of the third quarter of 2008, the index had dropped 2,659.90 points to 12,839.30 points marking a 2.2% decrease from the all-time high. The fourth quarter of 2008 was the most volatile of the year. When Lehman Brothers filed for bankruptcy in the US, a ripple effect occurred in all the exchanges around the world with the Kuwait stock market also reacting (Global Investment House Market report, February 2009). Due to the Arab Spring, the Kuwait stock index fell 14.02% during the first half of

2011, closing at 192.19 points and its price index fell by 10.69% reaching 6,211.70 points during the same time period. The political situation during 2011 resulted in the KSE's worst first half market performance since 1988. During this political unrest, performance in all sectors was negative (Gulf Investment Corporation (GIC) Outlook, 2012).

5.2.2 Interlinkages between the Kuwait stock market and Brent Oil Prices

This section offers an analysis and interpretation of the research findings by seeking to offer further evidence of the relationship between the Kuwaiti stock market and Brent oil prices. The discussions starts with the analysis of long run relationships, the presentation of causal dynamics and insight on the volatility behavior of the series.

Table 5.2.: Combined Outputs

Sampling	**Lags**	**Unit Root**	**Cointegration**				**Granger Causality**		**GARCH (1,1)**
			EG		**JJ**				
			BP	KSE	BP	KSE	BPR → KSER	KSER → BPR	$\alpha + \beta$
Full Sample	3	I (1)	0.6165	0.7626	0.9537	0.7426	0.00001*	0.3446	0.9629 (Stable)
Iraq Invasion 2003	1	I(1)	0.1864	0.173	0.051	0.073***	0.0056*	0.6037	1.0188 (Not Stable)
US Financial Crisis 2008	2	I(1)	0.8607	0.000*	0.000*	0.298	0.0005*	0.7262	1.0031 (Not Stable)
Arab Spring 2011	1	I(1)	0.8865	0.82	0.902	0.911	0.121	0.1197	1.0005 (Not Stable)

*Cointegration and Granger causality columns represents p values, however the GARCH model represents alpha measures for spikes on volatility and beta is the coefficient for persistence. The values under the GARCH heading show the addition of both coefficients that help identifying is the model is stationary in variance and account for volatility persistence. *, **, ***: Levels of Significance at 1%, 5% and 10% respectively. BP is Brent prices, KSE (Kuwait) is stock prices, BPR is Brent returns and KSER stands for stock returns. The notation I (1) is an order of integration at first differences. This table includes the outcomes of Lags that calculated based on the implemented VAR (Vector autoregressive model). The PP and KPSS unit root tests were implemented, and the results are consistent across variables and sample periods. EG and JJ stands for Engle-Granger and Johansen cointegration test respectively. In the JJ Column only, the trace p value is reported, and results are similar to Max-Eigen statistics. The results of all these tests are available on appendix A for a detailed reference.*

The outcomes of the SIC criterion indicate that in the case of Kuwait the optimal number of lags is equal to three. The study has taken 1 lag for the first shock - Iraq invasion, 2003 -, 2 lags for the second shock – the US financial crisis, and 1 lag for the third shock – the Arab Spring revolution, 2011 respectively. In shock, 1 and 3 only one lag is suggested by the SC method, however during the US financial crisis two lags were suggested by the same approach. The core purpose of these estimations of lags is to ensure that the econometric models are properly presented to minimize potential issues regarding misspecification of the model. In the case of wrong lag selection, the model estimations can lead towards spurious research outcomes. For example, a very short lag length can be a cause of autocorrelation that can lead to inefficient estimators. On the other hand a large lag length enhances the parameter size, which in turn reduces the degrees of freedom and it infers large standard errors and confidence intervals for the coefficients of the model at the time that variables dynamics could not be properly captured by the model under consideration (Füss, 2007).

After the selection of the optimal lag length, the next step consists of testing for stationarity issues through PP methods. The results show that at all levels, the null hypothesis of non-stationary cannot be rejected, which means that all variables are non-stationary at all levels. Therefore, it becomes essential to apply certain modifications to the data, which means applying first difference on the data and running these tests again. In response to this analysis, all variables under study are now an integrated process of order one I(1), indicating that the series are all stationary at the same order. For comparison purposes and robustness, it was decided to run KPSS unit root technique. The results KPSS methods are completely in line with the PP test, meaning that all series are stationary in first differences and are consequently and I(1) process. In a nutshell, the study concluded that all methods (PP and KPSS) agree that all variables are integrated in order one which is a desirable outcome when checking for cointegration (long run relationships) among the variables. It is a pre-condition before moving to find the long run relationship that all variables should be integrated in the same order when looking at the selected models.

It is noted from the table above that the Engle Granger results do not permit the rejection of the null hypothesis of no cointegration between the variables under study. It means that there is no evidence of the existence of a long-run relationship between Kuwait's stock prices and Brent prices for the entire period. In either case we can say that the variables do not have a long link with each other. After conducting analysis of cointegration through the Engle Granger, the Johansen test was applied, and it is noted that the results are consistent with the Engle-Granger results. Moreover, both methodologies failed to yield an association between stock and Brent prices in the case of Kuwait. The research outcomes indicate that there is no significant evidence that supports the existence of a long run relationship between Brent and stock prices except in case of shock 2 where a long run relationship was reported by the Engle and Granger (EG) test. Furthermore, for the comparative analysis, the Johansen test was also applied and the results are aligned with the outcomes reported by the Engle and Granger model. In addition to this, during the second shock the EG indicates the existence of a long run relationship, however the Johansen technique does not support this outcome and as a result the use of the VECM model was not considered, as the outcomes of the Johansen test were robust, because the Engle-Granger methodology depends on a two-step estimator. The first step is to generate the residuals and the second step uses these generated residuals to estimate a regression of first-differenced residuals on lagged residuals. Therefore, any error occurring in the first step will be carried into the second step. However, this does not happen in the case of the Johansen cointegration test, and as such, the Johansen approach is considered more powerful in situations of conflict between the EG and the Johansen technique (Billgili, 1998).

These results point to the general absence of a long-run equilibrium between oil and stock prices in Kuwait, meaning that information contained in oil prices does not help to predict future movements in stock prices and inversely (Arouri et al., 2012; Hammoudeh and Aleisa, 2004). It was an expected outcome in the case of Kuwait, since oil price changes transmit their effects to GCC stock markets and it seems more appropriate to estimate the linkages between stock and oil prices. However, this approach is not reliable in the case of GCC countries because most GCC markets were regulated after 2004 and the possible implications on relationship of long run association could be different if we were able to get more observations for analysis. Thus, investigation of long-run relationships based on reliable time series models can be constrained by sample size problems (Ravichandran and Alkhatlan, 2010).

As the cointegration analysis is finalized, the study proceeds with the examination of causal links between the variables. The causality test intends to find out whether Brent returns have an influence on Kuwait stock returns (KSER) and vice versa in the short-term. This test is important because its outcomes would help us to find out whether Brent oil returns (BPR) can be a source of changes in stock returns as the Kuwait stock exchange seems to be highly sensitive in response to changes in oil prices. The results for the Granger causality test reveal that KSER does not Granger cause BPR as the p value shows 0.3446 which does not allow us to reject the null hypothesis that KSER does Granger cause BPR. On the other hand, the outcomes from the test reject the null hypothesis that BPR does not Granger cause KSER, meaning that Brent causes KSE and evidence of unidirectional causality was confirmed for the full length of the sample. The overall results indicate that in the case of Kuwait, Brent returns are causing stock returns.

During shock one, KSER does not Granger cause BPR as the probability value is quite high and does not allow us to reject the null hypothesis. However, during the same shock, evidence of uni-directional causality was found as Brent causes the KSE. Similarly, during shock two KSER does not Granger-cause BPR. However, unidirectional causality was found between BPR and KSER with oil returns having a causal effect on stock returns. If we compare all three shocks, we find that Brent returns appear to have a significant effect on the KSE during the Iraq Invasion and the US financial crisis and remain insignificant during the Arab Spring revolution. Furthermore, oil price changes exert a critical and wide prominent impact on most economic activities where the stock market acts as a barometer of an economy. Hence, oil price changes have a dominant influence on stock prices (Arouri and Nguyen, 2011) a result that is confirmed by the study of the Kuwaiti stock market and that clearly shows the country's exposure to oil price fluctuations.

Volatility is an up-and-down movement of the financial market, and as such, volatility is considered as an important measure in financial markets. Volatility is an important tool in understanding market risk, as low volatility levels are generally associated with steady or predictable conditions. Another way of observing the low volatility of markets is by looking at the daily changes in stock markets (Barnes, 2017). In the case of the full sample, the GARCH model is stable as the addition of alpha and beta coefficients is less than one, with values being closer to one showing evidence of persistence effects. However, for all shocks, the GARCH (1, 1) model is not stable as the addition of alpha and beta coefficients is greater than, indicating that the model is not stable in variance and leads towards potential explosive behaviour. As a result, no conclusions can be drawn from the GARCH model with regard to volatility around events. The possible causes of unstable models may include a lower number of observations and uncertainty associated with each political event and additional breakpoints that do not allow the model to perform and capture volatility over the period under study. The main outcome of the GARCH (1,1) method shows stability for the model of the full sample, indicating a high level of persistence in terms of volatility. However, in case of subsamples, the series are affected by structural breaks, potential lower number of observations and sustained instability that may cause problems during the estimation of the model. The residual diagnostic tests (results available in Table 7.0.1 of appendix A) indicate that the Jarque-Bera test has rejected the hypothesis of normally distributed residuals for the full sample of Kuwait. The Correlogram of the standard residual also applied and its results indicate there is no significant evidence of serial correlation in the residuals. Furthermore, heteroskedastic patterns are tested, with results indicating that there is no evidence of ARCH effects in the model.

5.2.3 Frequency Domain Causality Test

The frequency domain causality test was applied to understand the dynamic relationship between the variables under consideration. This test was developed by Breitung and Candelon (2006), and to the best of the author's knowledge, it is the first time that this test is used to examine causality dynamics in the context of oil market dynamics in the GCC region.

There are many studies that have used this technique and obtained fruitful results (Ozer and Kamisli, 2016; Gradojevic, 2013; Tiwari et al., 2007; Mermod et al., 2010). Furthermore, this test offers further insight to the static outcomes that found unidirectional causality from oil to market returns and not vice versa. The dynamic test has found bidirectional causality at different time periods. As we know, conventional causality tests yield a single test statistic for the interaction between variables, while frequency domain methodology generates test statistics at different frequencies across the spectrum. This is contrary to the implicit assumption of the conventional causality analysis that a single test statistic summarizes the relationship between variables, which is expected to be valid at all points in the frequency distribution. The frequency domain approach to causality permits us to explore causality dynamics at different frequencies (Ciner, 2011). Hence, it would be worthwhile to carry out frequency domain causality for the better understanding of temporary and permanent connections between Brent and stock returns in the case of Kuwait.

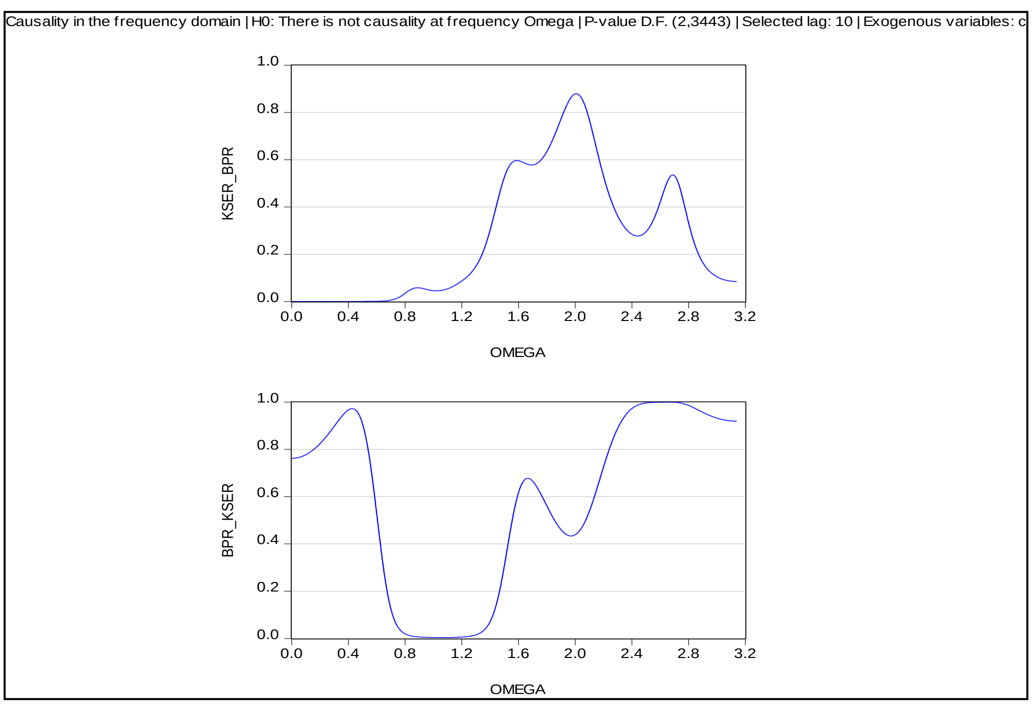


Figure 5.6: Frequency Domain Causality (FDC) Test

The outcomes show evidence of dynamic causality between the KSE and Brent during the Iraq Invasion (2003), while from oil to the KSE there is a causal effect during the Iraq Invasion (2003) which further highlights that this event was important for the impact of oil price fluctuations to the Kuwait stock market. However, there is no effect found during the US Financial Crisis (2008) and the Arab Spring (2011). If we look at the first part of the Figure where dynamic causality is estimated between stock to Brent returns and its outcomes indicates a causality till angular frequency 0.8. However, for the remaining frequencies there is no causal relationship between stock to Brent returns. While the second part of the figure represents dynamic causality from Brent to stock returns and is only able to establish a casual effect early in the sample. If we compare these results with the outcomes of the static causality test where we found causality running from Brent to stock returns for the full sample, during the Iraq invasion and during the US Financial Crisis, while the results for the dynamic causality only support the existence of causal effects in the case of the Iraq invasion. In addition, the results for dynamic causality also established a causality link between stock returns to Brent returns during the Iraq invasion. Therefore, the overall comparison revealed that the first event is quite sensitive to the fluctuations of oil prices in the Kuwait stock market.

5.2.4 Key Insights from the Kuwait Stock Market

The study sheds light on key issues related to cointegration between variables, causality patterns, volatility behavior and their implications for the Kuwaiti stock market. The findings of cointegration analysis shows that there is no long run relationship between Brent and stock prices for the full sample period and during political events except in the case of the US Financial Crisis of 2008, where there was evidence of a long run relationship between stock and Brent prices. These cointegration outcomes are consistent with Monhanty et al., (2010), Bakaert and Harvy (2002), and Bruner et al., (2002). The findings from the Granger causality test supports evidence of unidirectional causality running from Brent returns to stock returns for all cases except during the Arab Spring. Similar findings outside of Kuwait are cited by researchers such as Asterious and Bashmakora (2013), Bhar and Hikolova (2010), Constantinos et al., (2010), Alana and Yaya (2014) and Adrangi et al., (2014). The GARCH model reveals that the model is stable for the full sample period but not during the political events. These results are consistent with Bouri et al., (2016), Akoom et al. (2012), Arouri et al., (2010), and Demirer (2015). In addition, the results from the dynamic causality test indicate a causality from stock to Brent returns in the early stages of the sample period, while on the other hand a casual effect is found from Brent to stock returns. The results for the frequency domain causality test show evidence of dynamic causality from the KSE to Brent early in the sample period, while from oil to the KSE there is a causal effect around the first break.

Kuwait has about a tenth of the global proven oil reserves and at current production levels, these are more than sufficient for at least 150 years. Kuwait is the 8th largest producer of petroleum and related products, the country's economy is largely reliant on the proceeds coming from the export of petroleum, which represent more than 60% of its GDP. Kuwait has also been making constant attempts to enhance its oil-based economy by increasing the number of its natural resource fields and has also raised the percentage of its consumption from 34% to 42% in 2009 and 2012 respectively (OPEC annual statistical reports, 2014; International Monetary Fund records, (2014). Deaton (2005) stated that the achievement of

Kuwait is mostly evaluated in terms of having used its income from the oil sector to provide a high living standard for the citizens of the country as well as to benefit non-Kuwaitis to a certain extent, by offering services like free health care and education. Considering this scenario, oil price fluctuations could adversely affect the country's overall economy.

5.3 Empirical Findings for the KSA

This section reports on the core research outcomes for the Kingdom of Saudi Arabia (KSA). The section is structured in the same way as the analysis conducted for the case of Kuwait to ensure consistency across discussions and to facilitate the comparative analysis between the different economies. It is very important to study the KSA market as it plays a vital role in the region. The country is the second largest oil producer and also holds the second largest oil reserves in the world. The contribution of oil to GDP is more than 64% in Saudi Arabia, with the country leading the region in terms of market capitalization, with its stock market capitalization exceeding GDP.

5.3.1 Basic Nature of the Data and its Examination

This section offers some initial insight on the behavior of the data through the presentation of time series graphs for Brent prices, stock prices, Brent returns and stock returns respectively. Descriptive statistics are presented to analyze initial data dynamics of the series over the periods of study. Although Brent prices have already been presented in the Kuwaiti analysis, they will be represented here as the timeframe of the analysis is different.

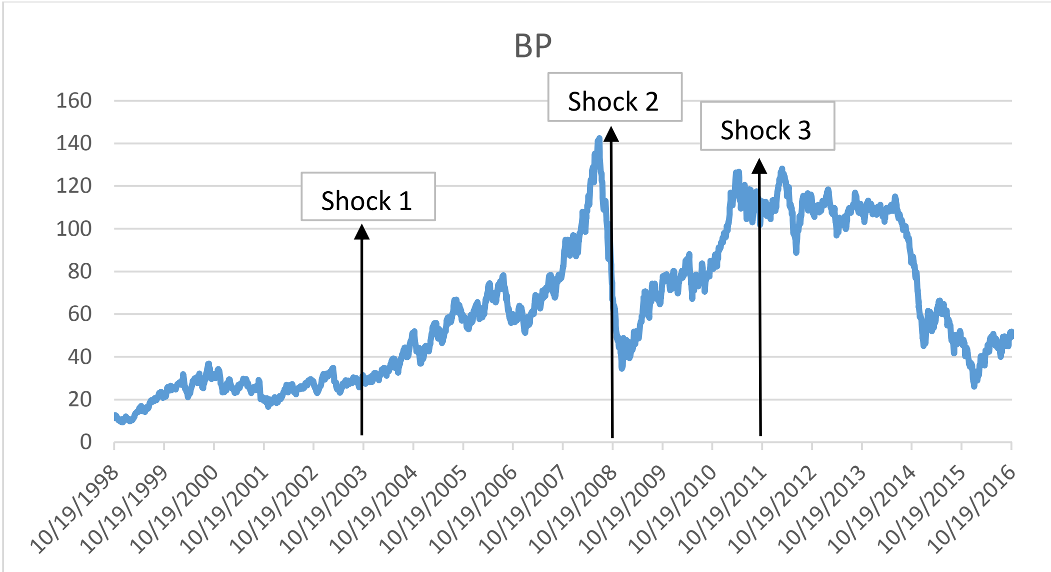


Figure 5.7: Brent Price. Shock 1: 19th March, 2003 US Military Strike in Iraq, Shock 2: 15th September, 2008 US Financial Crisis, Shock 3: 25th January, 2011 Arab Spring.

From Figure 5.7 a smooth movement can be seen from 1998 to 2006 and then a significant spike is observed during 2008 that is followed by a sudden decline afterwards. Brent prices rose over the period of 2008-2011 and remained steady until 2014 before falling again. Brent prices increased in 2003, later declined in 2008 and again an increasing trend is shown for the remaining period that indicates the fluctuations between the three shock periods, allowing us to examine carefully the structural breaks in the data and to identify non-stationarity issues.

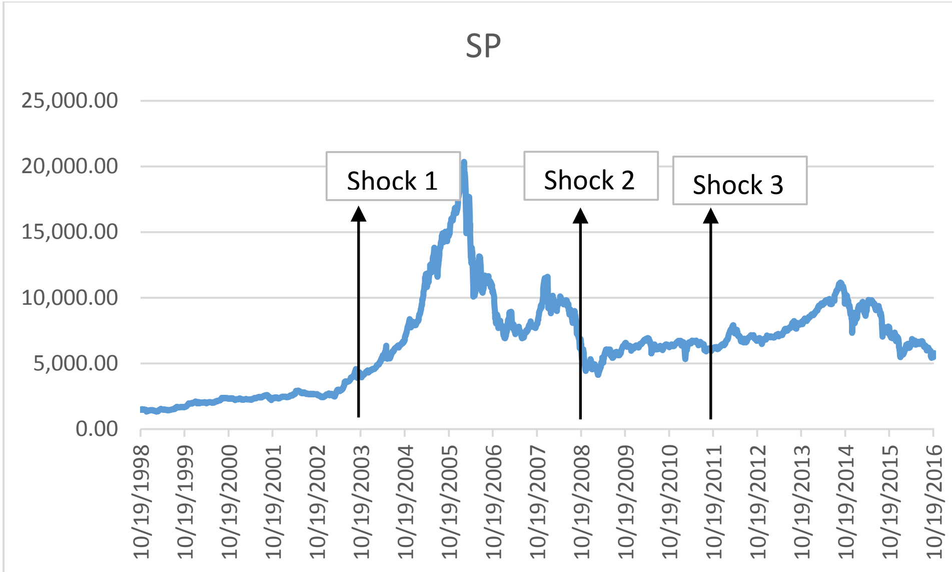


Figure 5.8: the KSA Stock Prices

Figure 5.8 shows the basic behavior of stock prices for the full sample period and it is noted that from 1998 until 2003 there is no significant movement on prices. However, after 2003 stock prices are increasing rapidly between 2003 to mid-2005. During this time, the KSA government established the Capital Market Law (CML) in 2003. To support the CML the government also founded the CMA – Capital Market Authority. The CMA serves many functions such as, regulating and developing the stock exchange, while improving the methods of the systems to improve security while trading and making transactions. After reaching a peak in mid-2005, a declining trend started. From 2008 to 2016 there is no significant movement. The graph shows that after the Iraq Invasion, the KSA stock prices increased suddenly and then declined in 2005. After this period, stock prices remained smooth and at a low level for the remaining period. The correlogram exhibits non-stationary trends in prices and subsequently their returns present stationary trends. The results are available in Appendix B from figure B1.1-B1.12.

Table 5.3: Descriptive Statistics

Shocks	Variables	Descriptive Statistics					
		Mean	**SD**	**SK**	**KT**	**JB**	**Obs**
Full Sample	BP	62.2387	33.3043	0.3612	1.8497	209.407	2,724
	KSAE	6,589.06	3,415.96	0.7003	4.0401	345.446	2,724
	BPR	0.0005	0.0306	0.0337	8.4864	3,416.87	2,724
	KSAER	0.0005	0.0196	-1.322	18.6312	28,525.4	2,724
Iraq Invasion 2003	BP	60.0907	26.4527	0.9286	3.5647	125.611	800
	KSAE	8911.3	3,853.78	0.6538	3.0149	56.9986	800
	BPR	0.0014	0.027	-0.0317	4.5895	84.3553	800
	KSAER	0.0013	0.0268	-1.3287	13.855	4163.1	800
US Financial Crisis 2008	BP	69.9242	14.8677	-0.5169	2.5303	18.0508	336
	KSAE	5,975.9	680.938	-0.8568	3.0541	41.1488	336
	BPR	0.0002	0.0401	0.7047	10.2311	759.857	336
	KSAER	-0.0002	0.0228	-0.9284	9.7295	682.274	336
Arab Spring 2011	BP	85.7898	30.3429	-0.4856	1.5309	125.484	971
	KSAE	7,706.11	1,390.1	0.5452	2.1609	76.5895	971
	BPR	-0.0007	0.0246	-0.0706	6.8844	611.273	971
	KSAER	-0.0002	0.0151	-1.1571	19.0265	10,608.4	971

BP: Brent Prices, KSAE: Stock Prices, BPR: Brent Returns, KSAER: Stock Returns. The author has used the longest data to ensure maximum efficacy of output. However, the author could not use more observations because of the unavailability of data.

Descriptive statistics are presented for the entire sample period accounting for 2,724 observations. It is interesting to note that mean values for all variables remain positive. The highest mean belongs to KSAE whereas the lowest stands with BPR and KSAER. According to the standard deviation the most volatile variable is KSAE and it may be due to political uncertainty arising from the events under study. On the other hand, KSAER represents the lowest volatility. The skewness and Kurtosis coefficients for all KSAE, BPR and KSAER are leptokurtic with respect to the normal distribution except in the case of BP where it is platykurtic. Furthermore, the Jarque Bera values for all variables are very high, implying that the null hypothesis of normal distribution of residuals is rejected. During the Iraq invasion period the mean of all variables remains positive with the highest mean reported by the KSAE and the lowest by KSAER. The standard deviation shows that highest volatility exists in KSAE where the lowest volatile variable is BPR.

During the US Financial Crisis, the KSAE has the highest average value; however KSAER has the lowest. A similar result was found for volatility in variables. During the Arab Spring the highest mean value belongs to KSAE and the lowest to BPR. If we look at the behavior of the variables during the US Financial Crisis and the Arab Spring, the mean of stock returns is negative and this may be because of instability in the region. On the other hand, the KSAE is much more volatile when compared with KSAER where the lowest volatility was recorded. The value of skewness and kurtosis during the Iraq Invasion shows that all variables are leptokurtic with respect to the normal distribution. Similarly, during the US Financial Crisis all variables show leptokurtic patterns with the exception of BP which appears to be platykurtic. Moreover, during the Arab Spring BPR and KSAER are leptokurtic, while BP and KSAE are platykurtic in relation with normal distribution. The Jarque Bera value for all variables in all political events are very high, meaning that null hypothesis is rejected and that the residuals are normally distributed. If we compare mean stock returns during the US Financial Crisis and the Arab Spring, they are negative which clearly indicates that stock prices are significantly affected during these events.

5.3.2 Interlinkages between the KSA stock market and Brent Oil Prices

This section of the study represents a comprehensive detailed review of the empirical findings looking at long-run and short-run relationships between the Saudi stock market and Brent.

Table 5.4: Overall Outcomes

Sampling	Lags	Unit Root	Cointegration				Granger Causality		GARCH (1,1)
			EG		JJ				
			BP	KSAE	BP	KSAE	BPR → KSAER	KSAER → BPR	$\alpha + \beta$
Full Sample	1	I(1)	0.6252	0.6238	0.899	0.519	0.00004*	0.7442	0.9977 (Stable)
Iraq Invasion 2003	1	I(1)	0.9452	0.8128	0.9340	0.7656	0.0453*	0.6222	1.01824 (Not Stable)
US Financial Crisis 2008	1	I(1)	0.0067	0.0025	0.0437*	0.8177	0.0604***	0.0447*	1.01684 (Not Stable)
Arab Spring 2011	1	I(1)	0.948	0.9063	0.5767	0.3476	0.002*	0.0936	1.02609 (Not Stable)

*Cointegration and Granger causality columns represent p values, however the GARCH model represents, alpha measures for spikes on volatility and beta is the coefficient for persistence. The values under the GARCH heading show the addition of both coefficients that help identifying is the model is stationary in variance and account for volatility persistence. *, **, ***: Levels of Significance at 1%, 5% and 10% respectively. BP is Brent prices, KSAE (Kingdom of Saudi Arabia) is stock prices, BPR is Brent returns and KSAER stands for stock returns. The notation I (1) is an order of integration at first difference. This table includes outcomes of lags estimations based on the VAR (Vector autoregressive model). Unit root tests used are the PP and KPSS confirming that variables are stationary in first differences. EG and JJ stand for Engle-Granger and Johansen cointegration test. In the JJ Column only, the trace p value is reported, and the results are similar with the Max-Eigen statistics. The results of all these tests are available in appendix B for a detailed reference.*

The table above summarizes the main research outcomes for the case of KSA. The study has used one lag for full and sub sample by use of the Schwarz Information criteria. The results for the stationary tests (PP and KPSS) reveal that the series for the full and sub samples are stationary in first differences, aligning with the patterns that were identified in the analysis of Kuwait. Furthermore, cointegration results from both methods indicate that there exists no cointegration between Brent and stock prices for the full sample data. During the Iraq invasion and the Arab Spring there is no evidence of a long run relationship between the variables. However, during the US Financial Crisis the Engle Granger test indicates a long run relationship, while the Johansen cointegration test does not find any long run relationship between variables.

The effect of oil prices and its turbulence is obvious in stock prices in general since there exists a strong link between both, however in case of Saudi Arabia no such evidence is found. These findings suggest that in the long run stock market prices are not sensitive to oil price fluctuations in the KSA (Alqattan and Alhayky, 2016). The Granger causality test finds evidence of a unidirectional causality between Brent to stock returns under the full sample period. Furthermore, evidence of unidirectional causality exists from BPR to KSAER during the Iraq Invasion and the Arab Spring. Oil prices significantly affect stock prices in KSA and it is not surprising given the role played by oil revenues. In addition, oil price increases raise national and corporate revenues (Arouri and Rault, 2010). However, during the US Financial Crisis unidirectional causality exists from KSAER to BPR. The changes in the Saudi stock markets reflect changes in the economy of KSA that are significantly caused by changes in oil prices. In fact, KSA plays an important role in international energy markets and estimates demonstrate that the country has around 260 billion barrels of oil reserves and some 24 % of the world's proven total. Hence, Saudi Arabia is the world's largest exporter of total petroleum liquids and is currently the world's second largest crude oil producer behind Russia. The political and economic progression in KSA may have implications for the stability of oil prices in the region and the same findings may not exist in the other GCC countries (Hammoudeh and Aleisa, 2004; Basher, 2006; Arouri and Rault, 2013). In addition the GARCH (1,1) model remains stable throughout the full sample period, while it is not stable for all political events. The Jarque Bera test indicates that the null hypothesis of normally distributed residuals is rejected. The Correlogram of standard residuals indicates that there exists serial correlation in the residuals. Furthermore, the heteroskedasticity test was applied to test for the ARCH effects and the results indicate there are no ARCH effects present.

5.3.3 Frequency Domain Causality Test

The results of dynamic causality show that there is no evidence of causality running from Brent to stock returns, however significant evidence of causality was found from stock to Brent returns across the data studied. If we compare these results with the static causality outcomes, there we found causality running from Brent to stock returns for the full sample period, during the Iraq invasion and around Arab Spring.

Causality in the frequency domain | H0: There is not causality at frequency Omega | P-value D.F. (2,2694) | Selected lag: 10 | Exogenous variables: c

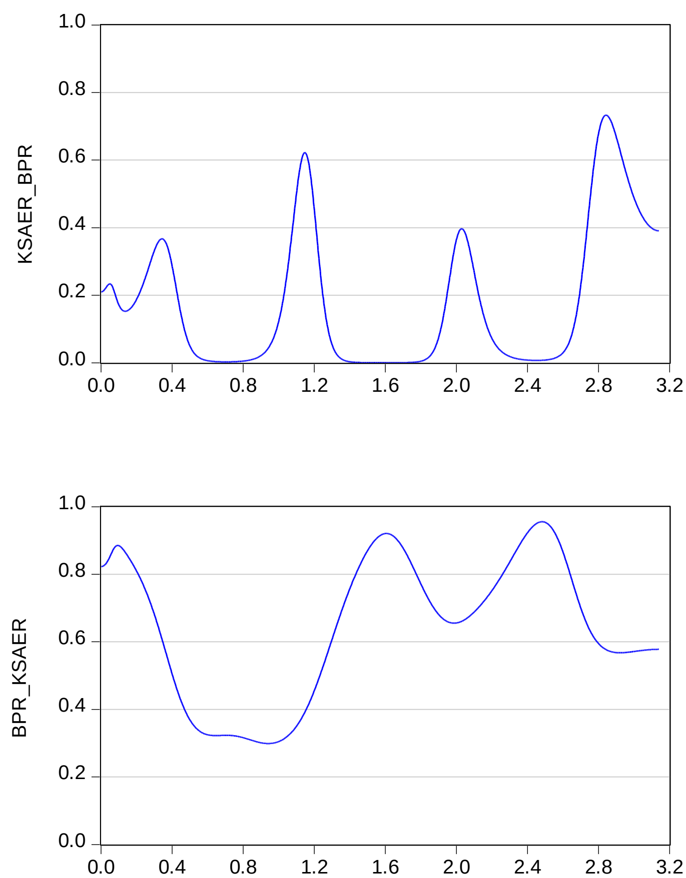


Figure 5.9: Frequency Domain Causality Analysis

The results of the dynamic causality test partially supports the static results in the case where causality exists from the KSE to Brent. If we compare the results of dynamic causality with the Kuwait results, the outcomes are similar only during the Iraq invasion with no evidence of causality found for the remaining events. In line with the Kuwait study, a causal impact from Brent to stock returns was found during the Iraq invasion only. The results of KSA stock market are quite surprising. The possible reason behind these results is that most of the GCC economies have clear differences with the Saudi stock market. Stock markets of the KSA are highly concentrated and most of its parts are dominated by financial sectors that are closely linked with European and American financial markets. This lack of diversification and sensitivity to western financial markets may explain the weak association between oil prices and the KSA stock market. Moreover, KSA is the largest GCC market, but its economy is excessively dependent on oil importing countries and it hurts more than other GCC countries from imported inflation and also economic pressures (Arouri and Rault, 2004). The two stock markets of KSA and Kuwait have different dynamics and respond differently to oil price shocks; the differential effect is surprising and there is a contrast between the response of the Kuwaiti and Saudi stock markets to oil price shocks (Azar and Basmajian, 2013)

5.3.4 Key Insights from the KSA Stock Market

This section outlines the key findings in the case of Saudi Arabia for the full sample period and for all three political events. The results from the cointegration analysis do not show a long run relationship between Brent and stock prices in full and under all political events. The results are in line with Monhanty et al., (2011). The findings from the Granger causality for all cases indicates a unidirectional causality running from BPR to KSAER except in the case of the US financial crisis, where unidirectional causality runs from KSAER to BPR. These findings are in line with the results of Anoruo and Mustafa (2007), Gupta and Modise (2013), Kang et al. (2015), Jones and Kanl (1996), Ling and McAleer (2003), and Li et al. (2012). The frequency domain causality test clearly supports the existence of significant evidence of causality from stock returns to Brent returns over the entire period, whereas no evidence is found from Brent to stock returns. In terms of volatility, the GARCH model is only stable for the full sample period, but not during the Iraq Invasion, the US financial crisis and the Arab Spring. According to Ng and Lam (2002) high frequency financial market data plays an important role in volatility analysis by enhancing its effectiveness. These findings are in line with the studies of Narayan and Sharma (2014), Faff and Filis (2014), and Elyasiani et al. (2011) that align with the results reported for KSA.

5.4 Empirical Findings for UAE

This section reports the research outcomes for two states of the United Arab Emirates (UAE), namely Dubai and Abu Dhabi. The United Arab Emirates is the second largest economy in the Arab world (after Saudi Arabia), with a gross domestic product (GDP) of USD 403.2 billion (AED 1.46 trillion) in 2014. The United Arab Emirates has been successfully diversifying its economy since 2011. Although the UAE has the most diversified economy in the GCC, the UAE's economy remains reliant on petroleum earnings that contribute more than 50% to the country’s GDP.

5.4.1 Basic Nature of the Data and its Examination

This section offers some initial insight on the behavior of the data through the presentation of time series graphs for Brent prices, stock prices, Brent returns and stock returns respectively. Descriptive statistics are also presented to analyze the initial data dynamics of the series over the periods of study.

Dubai

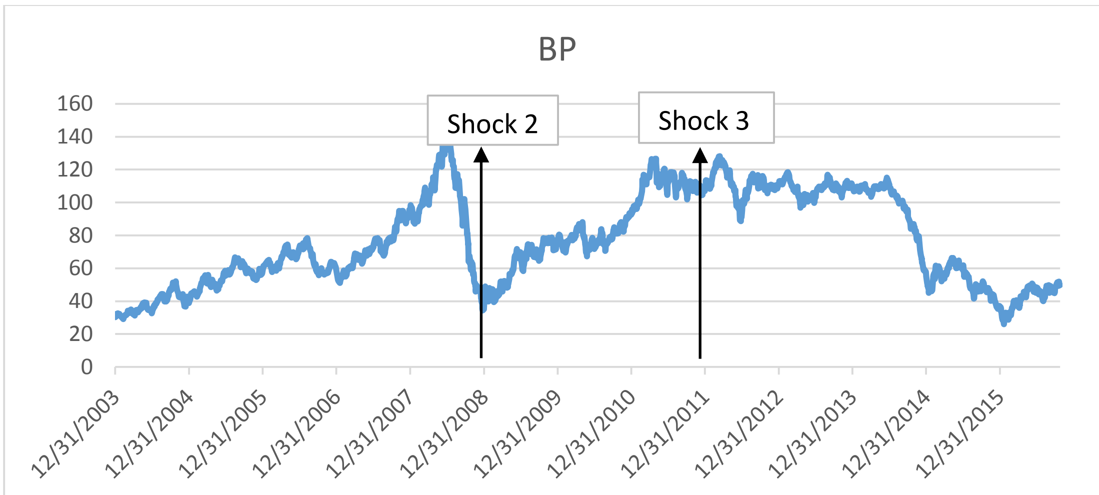


Figure 5.10: Brent Price Dubai, Shock 1: 19th March, 2003 US Military Strike in Iraq, Shock 2: 15th September, 2008 the US Financial Crisis, Shock 3: 25th January, 2011, the Arab Spring.

The above Figure represents Dubai Brent prices and shows an increasing trend from 2003 to mid-2007. However, an increase in prices is found after 2007 that reached around 140 USD per barrel and a sudden decrease in 2008. After 2008, prices are gradually increasing and suddenly a decline can be observed that reaches 40 dollar per barrel. From 2008 to 2011 a slight upward trend in the data can be seen that remains unchanged up to mid-2013 when a drop occurs. Uncertainty over oil supply associated with the Arab Spring revolution helped oil prices to return to previous levels and prices remained stable thereafter over the next three years (Bchir and Pedrosa-Gorcia, 2015).

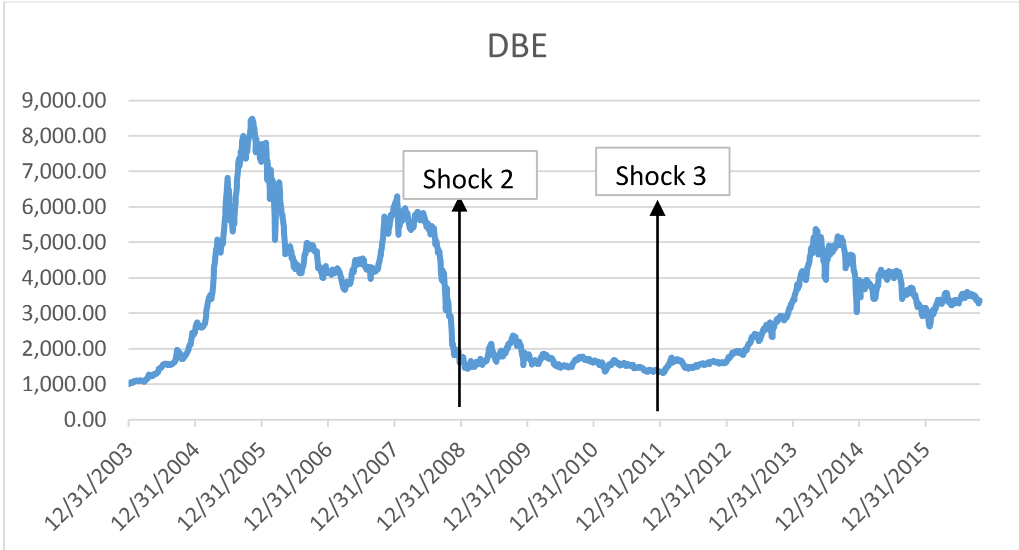


Figure 5.11: Dubai Stock Prices

Figure 5.11 represents the stock prices of Dubai, which shows an increasing trend on stock prices that yielded a tremendous improvement in stock prices to over 8,000 points. However, it dropped back to around 4,000 points during 2006 and remained stable until 2007. From 2008 onwards, there is no consistent trend with very low stock prices registered. After the Iraq invasion, stock prices started to increase and grew steadily, a trend that lasted until 2008. It seems that during the US Financial Crisis there was no effect on stock prices; however a slight increase can be seen after the Arab Spring. Due to the unavailability of data, the effect of shock 1 could not be tested in this market. As a result, the Abu Dhabi stock market was included in the analysis.

Abu Dhabi

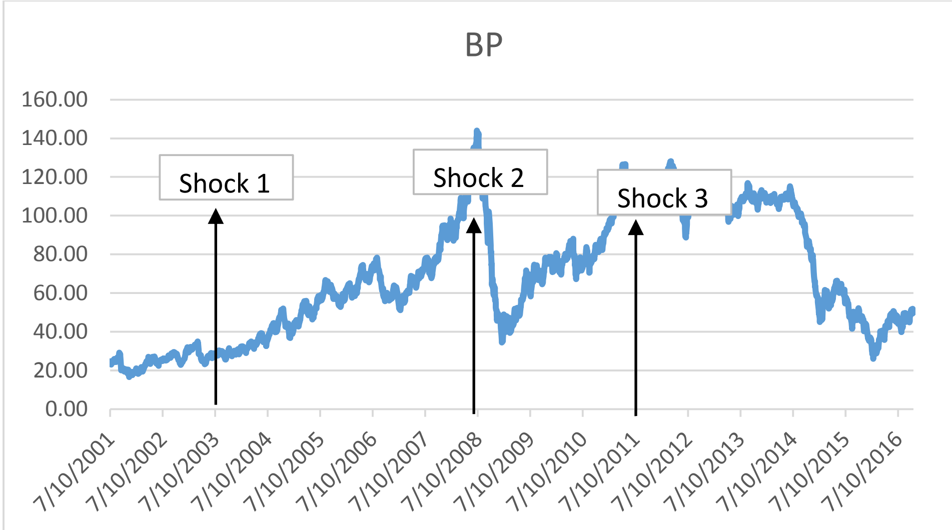


Figure 5.12: Brent Abu Dhabi, Shock 1: 19th March, 2003 US Military Strike in Iraq, Shock 2: 15th Sep, 2008 US Financial Crisis, Shock 3: 25th Jan, 2011 Arab Spring.

Figure 5.12 represents Brent prices of Abu Dhabi and shows an increasing trend from 2001 to 2008 and a decline after that for a short time. From mid-2008 onwards, an upward trend is identified until 2014 and afterwards a decline in prices is registered. During the US Financial Crisis a significant drop in oil prices is shown and on the other hand during the Arab Spring, stock prices are not affected and are found to even be slightly increasing.

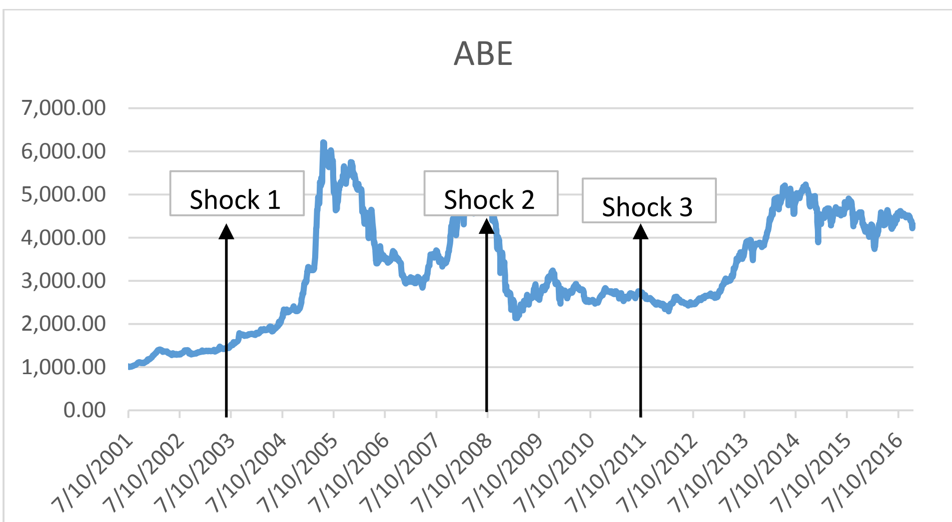


Figure 5.13: Abu Dhabi Stock Prices

Figure 5.13 represents Abu Dhabi stock prices and it shows that during 2004 to 2008 and 2014 to 2016 stock prices are quite high. There is an incremental trend after the Iraq invasion but it lasts only until 2005 when prices stared to decline. Before the US Financial Crisis, stock prices are quite high but after the crisis there is no significant impact until 2013 and later, a slight increase is found.

After the basic representation of the data under study, the correlograms (Available in Appendix C from C1.1-C1.32) for both markets noted that in the Dubai market, all correlograms for Brent and stock prices are downward sloping for the full sample period and for all presented shocks. This trend indicates that the series under study shows non-stationary behavior, and as such, returns should be considered as part of the study to ensure that econometric testing is properly implemented.

Table 5.5: Descriptive Statistics

UAE	Shocks	Variables	Mean	SD	SK	KT	JB	Obs
Dubai	*Full Sample*	BP	78.4078	28.0618	0.0788	1.71206	158.894	2265
		DBE	3,151.78	1,646.5	0.7672	2.88705	223.401	2265
		BPR	0.00022	0.02679	0.11884	9.36022	3,823.03	2265
		DBER	0.00054	0.02208	-0.4568	10.4682	5,342.47	2265
	Iraq Invasion 2003	BP	67.9994	26.1929	0.8949	3.2182	98.6166	728
		DBE	4,420.32	1,858.15	-0.2191	2.4572	14.761	728
		BPR	0.0015	0.0265	-0.0687	4.9753	118.933	728
		DBER	0.0019	0.0238	-0.1579	9.4695	1,272.62	728
	US Financial Crisis 2008	BP	70.5096	14.6711	-0.5175	2.6295	22.4083	445
		DBE	1,851.97	479.263	2.8685	11.8478	2,061.78	445
		BPR	0.0002	0.0342	0.3644	11.0571	1,213.53	445
		DBER	-0.0021	0.0275	-0.8244	8.6153	635.053	445
	Arab Spring 2011	BP	88.5654	29.8051	-0.6517	1.738	149.758	1092
		DBE	2,835.78	1,169.89	0.2399	1.7542	81.0851	1092
		BPR	-0.0006	0.0233	-0.0567	7.4799	913.759	1092
		DBER	0.0007	0.0179	-0.188	10.0774	2,285.48	1092
Abu Dhabi	*Full Sample*	BP	71.4203	31.6485	0.10581	1.74879	175.457	2615
		ABE	3,278.19	1,217.74	0.07858	2.00437	110.699	2615
		BPR	0.00027	0.02777	-0.0752	9.33238	4,371.58	2615
		ABER	0.00055	0.01482	-0.3386	15.4791	17,017.8	2615
	Iraq Invasion 2003	BP	62.6944	27.9411	0.82	3.1278	94.8112	841
		ABE	3,538.01	1,328.34	-0.027	1.7994	50.6115	841
		BPR	0.0014	0.0268	-0.0135	4.7647	109.152	841
		ABER	0.0012	0.018	-0.1245	11.3872	2,467.21	841
	US Financial Crisis 2008	BP	70.4505	14.6345	-0.5235	2.6299	22.8127	444
		ABE	2,747.07	296.697	1.3499	6.2619	331.685	444
		BPR	0.0002	0.0343	0.364	11.0323	1,203.38	444
		ABER	-0.0008	0.0187	-0.6269	14.4249	2,443.86	444
	Arab Spring 2011	BP	88.5654	29.8051	-0.6517	1.738	149.758	1092
		ABE	3,729.99	953.765	-0.1517	1.385	122.865	1092
		BPR	-0.0006	0.0233	-0.0567	7.4799	913.759	1092
		ABER	0.0004	0.0109	-0.2399	9.0102	1,654.03	1092

BP: Brent Prices, DBE/ABE: Stock Prices, BPR: Brent Returns, DBER/ABER: Stock Returns. The author has used the longest data to ensure maximum efficacy of output. However, the author could not use more observations because of the unavailability of data.

The descriptive statistics show that in Dubai, the highest mean value belongs to DBE and the lowest to BPR. The volatility analysis shows that DBE has the highest variation and the lowest is associated with DBER. In Abu Dhabi, ABE has the highest average whereas BPR has the lowest. The highest variance belongs to the ABE and the lowest to the ABER. Furthermore, skewness and kurtosis represent that in the case of Brent and stock prices, they are platykurtic. They are however, found to be leptokurtic in the case of returns. The Jarque Bera values for both countries are quite high, rejecting the null hypothesis of the normal distribution of residuals. During the Iraq invasion the highest mean value belongs to the stock price and the lowest to the BPR.

During the US Financial crisis the ABE/DBE has the highest value with the lowest registered for ABER/DBER. While in the case of the Arab Spring, DBE/ABE has the highest mean and the lowest data is by ABER/DBER. In the case of volatility trends, the results are the same for both. Including Dubai and Abu Dhabi the highest standard deviation belongs to DBE/ABE and lowest belongs to ABER/DBER. The Iraq invasion, skewness and kurtosis shows that BP is leptokurtic, and DBE is platykurtic, BPR and DBER are leptokurtic in relation to normal distribution. During the US Financial Crisis, BP is platykurtic and the rest of the variables are found to be leptokurtic. During the Arab Spring, BP and DBE are platykurtic, whereas both returns are leptokurtic in relation to the normal distribution. The Jarque Bera value for all variables under all political events is very high and allows rejection of the null hypothesis that residuals are normally distributed. In the case of the Abu Dhabi shock 1, the skewness and kurtosis values indicate that BP is leptokurtic, ABE is platykurtic and both returns in the Iraq invasion are leptokurtic in relation to the normal distribution. During the US Financial Crisis, BP is platykurtic while the remaining variables ABE, BPR and ABER are leptokurtic with relation to the normal distribution. During the Arab Spring BP and ABE are platykurtic and both returns are leptokurtic with relation to the normal distribution. If we compare stock returns between Dubai and Abu Dhabi, they are both adversely affected by the US Financial crisis. For both Dubai and Abu Dhabi the mean value for Brent and stock returns remains positive for the entire sample period and during the Iraq invasion of 2003. In addition to this, the mean of Brent returns also shows a positive value during the US financial crisis, however stock returns are negative. Alongside this, during the US financial crisis, the mean of stock returns are positive, however Brent returns are negative. The stock market indicators fell down in the Arab markets in 2008, where the GCC countries fell to the lowest values in the Dubai stock market, which dropped by 60% in 2007. This is due to the degree of openness and interdependence between the capital markets and the U.S. In addition to the case of financial panic that swept the global financial markets in the beginning of September 2008, the market indices of the UAE markets declined by 17.7 percent and witnessed negative output (Soufan et al., 2012). Furthermore, stock returns are found to be much more volatile during the Iraq invasion 2003 and less volatile during the US financial crisis.

5.4.2 Interlinkages between the UAE stock market and Brent Oil Prices

The analysis of long and short run relationships in the case of the UAE is reported in this section. Table 5.6 below highlights the main outcomes from the implemented tests.

Table 5.6: Overall Outcome

UAE	Sampling	Lags	Unit Root	Cointegration				Granger Causality		GARCH (1,1)
				EG		JJ				
				BP	**DBE/ABE**	**BP**	**DBE/ABE**	**BPR → ABER/DBER**	**ABER/DBER → BPR**	$\alpha + \beta$
Dubai	Full Sample	1	I(1)	0.5638	0.6796	0.8997	0.8766	0.0221*	0.3997	0.98244 (Stable)
	Iraq Invasion 2003	1	I(1)	0.8945	0.796	0.8281	0.7814	0.3069	0.4731	1.0405 (Not Stable)
	US Financial Crisis 2008	1	I(1)	0.9139	0.0001*	0.0022*	0.6462	0.067***	0.8449	1.0113 (Not Stable)
	Arab Spring 2011	1	I(1)	0.8959	0.7526	0.7498	0.6918	0.002*	0.7509	1.0027 (Not Stable)
Abu Dhabi	Full Sample	1	I(1)	0.7819	0.7249	0.878	0.7891	0.0248*	0.7855	0.99349 (Stable)
	Iraq Invasion 2003	1	I(1)	0.8726	0.7693	0.8628	0.6625	0.2996	0.8996	0.9779 Stable)
	US Financial Crisis 2008	2	I(1)	0.8991	0.0342*	0.0813	0.8735	0.0093*	0.8756	1.0676 (Not Stable)
	Arab Spring 2011	1	I(1)	0.8812	0.7163	0.769	0.6913	0.4237	0.0023*	0.9698 Stable)

*Cointegration and Granger causality columns represent p values, however the GARCH model represents, alpha measures for spikes on volatility and beta is the coefficient for persistence. The values under the GARCH heading show the addition of both coefficients that help identifying is the model is stationary in variance and account for volatility persistence. *, **, ***: Levels of Significance at 1%, 5% and 10% respectively. The BP is Brent prices, DBE/ABE (Dubai/Abu Dhabi) are stock prices of Dubai, Abu Dhabi respectively, BPR is Brent returns, and ABER/DBER stands for stock returns of Dubai and Abu Dhabi respectively. The notation I (1) is an order of integration at first differences. This table includes outcomes of Lags that were calculated based on the VAR (Vector autoregressive model). Unit root tests used are the PP and KPSS showing that the series are stationary at first differences. EG and JJ stand for Engle-Granger and Johansen cointegration. In the JJ Column only, the trace p value is reported, and the results are similar with the Max-Eigen statistics. Results of all these tests are available in appendix C for a detailed reference.*

The study has used one lag for Dubai and Abu Dhabi throughout the full sample period and most of the sub samples dealing with the three different shocks under study. In the case of the US Financial Crisis for Abu Dhabi two lags were identified as optimal. The unit root tests (PP and KPSS) confirm that the series are stationary in first differences, outcomes that are consistent with the results obtained for Kuwait and KSA. The results analyzed for cointegration show no evidence of a long relationship between variables in both the Dubai and Abu Dhabi markets for the entire period. In the case of political events, no cointegration was found indicating the nonexistence of a long run association between the series, with the exception of Dubai during the US Financial Crisis. The outcome is confirmed by the Engle and Granger test but it is not supported by the Johansen test. Therefore, based on the robustness of the Johansen test, the use of the VECM model was not considered in this part of this study. The outcomes for the Granger causality test identify unidirectional causality running from BPR to DBER/ABER in the case of Dubai and Abu Dhabi for the full sample period. The Granger causality test shows that in Dubai there is no evidence of causality during the first two shocks. However, during the Arab Spring a unidirectional causality running from BPR to DBER exists. Contrary to the case of Dubai, in Abu Dhabi a mixed causality trend exists. During the Iraq invasion there was no evidence of causality found. During the US Financial Crisis an unidirectional causality exists from BPR to ABER. However, during the Arab Spring unidirectional causality exists from ABER to BPR.

During the full sample case the GARCH (1, 1) model is stable, as the addition of alpha and beta coefficients is less than one; nevertheless, close to one means evidence of persistence effects was found. However, in the case of Dubai under all political events, the model is not stable, as the addition of alpha and beta coefficients is greater than one, indicating that the model is not stable in variance. In connection to these outcomes no conclusion could be drawn in the context of the GARCH model. Contrary to Dubai, in Abu Dhabi, the model remains stable during the Iraq invasion and Arab Spring, however it remains unstable during the US financial crisis. The overall outcomes of the GARCH (1, 1) model denote stability for the model of the full sample period indicating high levels of volatility persistence. However, the subsamples for the case of Dubai were affected by structural breaks, potential lower numbers of observations and sustained instability that may cause problems during the estimation of the model. The Jarque-Bera test results indicate that the null hypothesis of normally distributed residuals is rejected for both Dubai and Abu Dhabi. The correlogram of standard residuals test also applies and its results designate that in both states there is no serial correlation for the entire period of the sample. Likewise, the heteroscedasticity test indicates that there is no ARCH effect in the model for the full sample period in respect of shock 1 and shock 2. In the case where the GARCH model represents stable results, diagnostic tests indicate that the results are robust and reliable.

5.4.3 Frequency Domain Causality Test

Figures of frequency domain causality for Dubai indicate clear evidence of causality running from stock to Brent returns until frequency 1.60 which shows that during the first two political events, namely the Iraq invasion and the US financial crisis, that causality exists. However, after this, no causal evidence for the remaining period is found. On the other hand, there is no evidence of causality from Brent to stock returns over the entire period.

Causality in the frequency domain | H0: There is not causality at frequency Omega | P-value D.F. (2,2255) | Selected lag: 3 | Exogenous variables: c

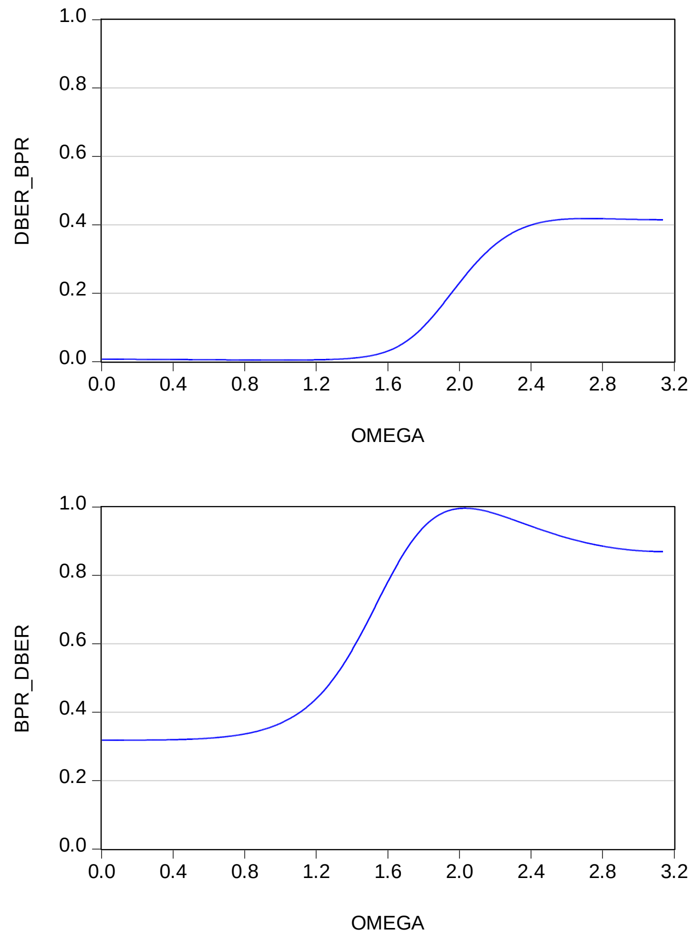


Figure 5.13: Dubai Frequency Domain Causality Test

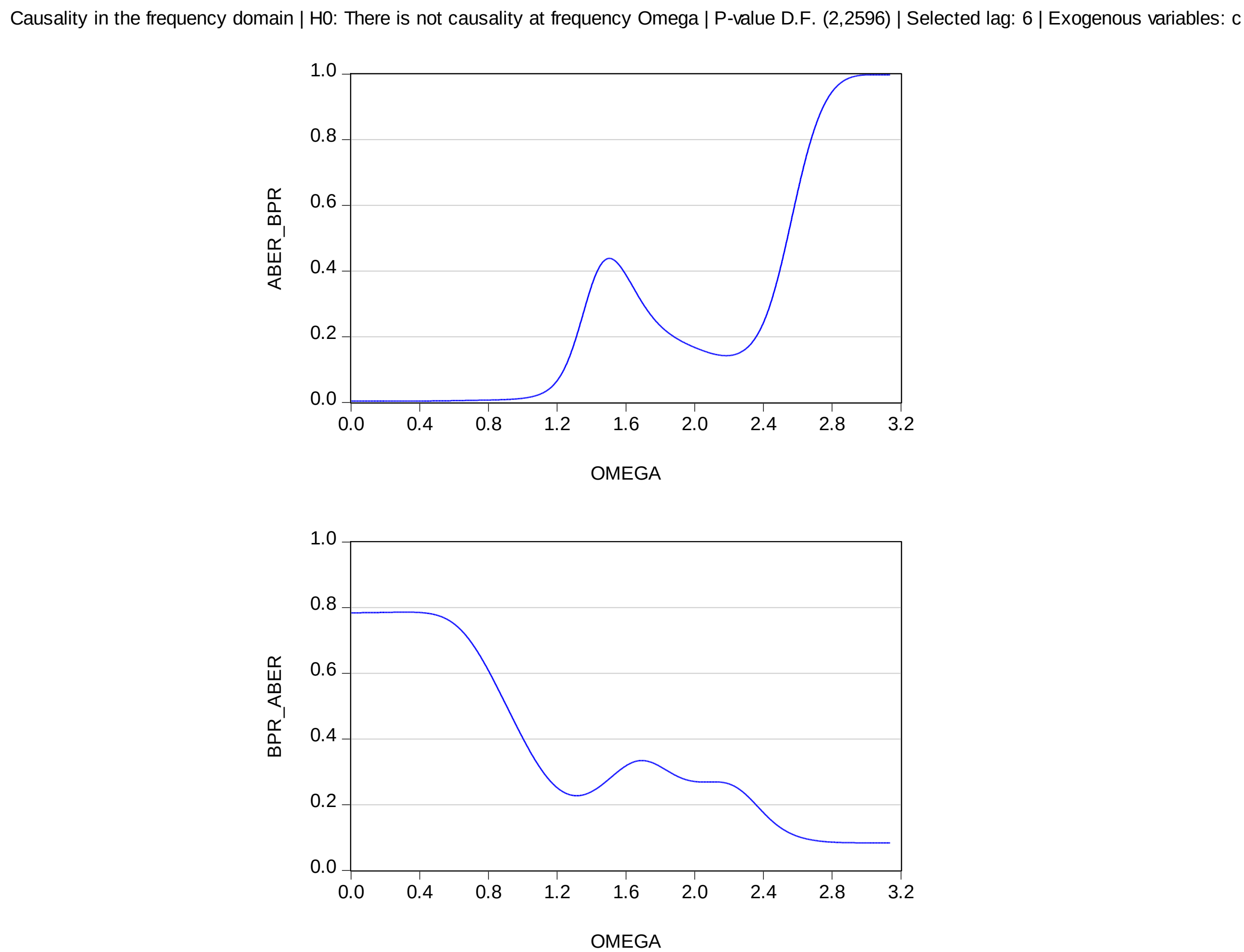


Figure 5.14: Abu Dhabi Frequency Domain Causality Test

Similar to the case of Dubai, causality exits from stock to Brent returns during the Iraq invasion and on the other side no evidence is found from Brent to stock returns. The overall results of the frequency domain causality test are in line with Degiannakis and Filis (2017).

5.4.4 Key Insight from UAE Stock Markets

The results of cointegration do not support a long run relationship between Brent and stock prices for the entire sample period and under all political events. In addition to this, there is no evidence of a long run relationship between oil prices and the stock prices of the UAE markets which suggests that in the long run stock market prices are not sensitive to oil price fluctuations (Alqattani and Alhayky, 2016; Arouri and Rault, 2012). The outcomes for the Granger causality test shows a unidirectional causal relationship running from Brent to stock returns during the entire period in the case of Dubai and during the Arab Spring. A similar causal link is established for Abu Dhabi during the full sample period and during the US Financial Crisis. In addition, during the Arab Spring, a unidirectional causality exists between stock returns to Brent returns. The reported research outcomes are aligned with Hammoudeh and Aleisa (2004), and Zarour (2006) providing empirical evidence to suggest that oil price changes significantly affect stock returns in the UAE stock market. Additionally, the current outcomes are also supported by Arouri (2010), Hasan and Mahbobi (2013), Alhayki (2014). In addition to these results, the frequency domain causality analysis shows for Dubai and Abu Dhabi that causality exists from stock to Brent returns at early stages of the research sample period indicating that during the Iraq invasion no evidence of causality was found from Brent to stock returns.

The GARCH model indicates that in Dubai it is stable for the full sample period, but not for all shocks and it may be because of political uncertainty and market disruptions. On the other hand, the Abu Dhabi stock market, is only stable during the US Financial crisis. The overall outcomes of GARCH (1,1) models denote stability for the full sample model indicating a high level of persistence in terms of volatility. However, for the subsamples in the case of Dubai, the GARCH model was not stable. The results are supported by Eltyeb et al., (2017), Stavros et al. (2017), Jones et al. (2004), Narayan and Gupta (2014) and Hamilton and Herrera (2014). The diagnostic tests for normality (Jarque-Bera) reject the null hypothesis of normally distributed residuals. The Correlogram of standard residuals discloses that there exists no serial correlation in Dubai and Abu Dhabi for the full sample period. However, the results for shocks are relatively different as in Abu Dubai, only shock I and III show no serial correlation.

5.5 Comparative Analysis

This section summarizes the key findings and their similarities and differences among Kuwait, the KSA and the UAE respectively. Kuwait is considered as a small petroleum-based economy and the Kuwaiti dinar is the highest valued currency in the world. As per the World Bank, Kuwait stands as the fourth richest country in the world in terms of GDP per capita, however it stands the second in the GCC countries after Qatar. Considering the case of Kuwait, it is necessary to consider that the country is a leading producer of oil and its government revenues, earnings and aggregate demand are influenced positively by high oil prices. Kuwait is one of the major oil suppliers in the world energy markets with crude oil reserves of about 102 billion barrels, more than 6% of the world’s reserves. Petroleum products account for nearly half of the country’s GDP, representing around 95% of export revenues, and 95% of government income (CIA World Fact book, 2016). In addition to this, the economy of Saudi Arabia is highly dependent on oil resources, and there is strong government control over all major economic activities across the country. The economy of the KSA is the largest in the Arab world and has the world's second-largest proven petroleum reserves. Furthermore, the country is the biggest exporter of petroleum products and also has the fifth-largest proven natural gas reserves. Saudi Arabia is an "energy superpower" in the world and it has the third highest total estimated value of natural resources, valued at USD

34.4 trillion in 2016 (Anthony, 2016). The economy of the UAE is the second largest in the Arab world after KSA with a GDP of USD 403.2 billion (AED 1.46 trillion) in 2014.

In the GCC countries the UAE has the most diversified economy, however it remains highly dependent on oil. More than 85% of the UAE's economy was based on oil exports in 2009. In 2011, oil exports accounted for 77% of the UAE's state budget and this clearly highlights the significance of oil for the UAE economy. If we look at the significance of oil and its contribution towards GDP, it is 50.05% for the UAE, 61.30% for Kuwait and 64.10% for the KSA. These three largest economies in the GCC countries, have market capitalization/GDP which is positively correlated with the importance of oil in their economies. In terms of listed companies, Kuwait is the leading market followed by Saudi Arabia, then the UAE. Saudi Arabia, Kuwait and the UAE together produce about 20% of all world oil, and between them they possess 30% of proven world oil reserves as well as controlling 54% of OPEC oil exports (OPEC annual report, 2015). Oil revenue is the essential source of income for these countries, government budget revenues, expenditures, and aggregate demand. Therefore, oil price fluctuations can impact and spillover on the three stock markets through their influence on the price of imported goods. A rise in oil prices increases the inflation rate and imposes pressure on these economies; as a consequence it might impact the interest rates and investment levels.

Additionally, these markets are found to be quite sensitive to market disruptions, with events like the Iraq invasion 2003 and the removal of the old regime in Baghdad lowering risk premium in the market. These changes greatly affected corporate profitability (Global

Investment House Market Outlook, January, 2004). During the US financial crisis 2008, the KSE index plummeted 1,373.60 points in September, which dropped the market capitalization down 53.1bn KWD (Global Investment House Market Report February, 2009) and finally, during the Arab Spring 2011, the Kuwaiti price index dipped by 10.69 percent by the end of 2011, reaching 6,211.70 points (Global Investment House Market Report February, 2011). The relationship between oil and stock exchanges has significance in the GCC countries markets. Oil is their main exported resource, accounting for the majority of their income (Arouri and Fouquau, 2009; Alturki and Khan, 2015; Anouruo and Mustafa, 2007; Al-Fayoumi, 2009). When a country's main export activity is affected, the effect has a significant impact on various elements within the country, especially on its stock market (Azar and Basajian, 2013; Demirer et al., 2015; Jouini, 2003).

Oil is perhaps the most important element to study when attempting to gain a better understanding of the effects that oil related events have in the stock markets within the GCC countries (Arouri et al. 2011; Narayan, 2010; Hoyky and Naim, 2016; Huang et al., 1996; Ravichandran and Alkhathlan, 2010). The stock markets becomes important for international investors and trade partners, and play a crucial role in the world energy markets. In fact, these countries are major exporters of oil in global energy markets, so their stock markets may be susceptible to changes in oil prices. However, the transmission mechanisms of oil price shocks to stock returns in these markets should be different from those in net oil-importing countries. Secondly, these markets differ from those of developed and from those of major emerging countries, in that they are largely isolated from the international markets and are overly sensitive to regional political events. Lastly, these stock markets are very promising areas for international portfolio diversification. Studying the influence of oil prices on these markets stock exchanges can help investors to make necessary investment decisions and for policy-makers to regulate stock markets more effectively.

The fact that these economies are important is the reason why they are analyzed in detail and it is noted that there is no long run association between oil and stock prices across all three countries under study, reflecting an independent relationship between stock and Brent prices. Arouri et al., (2013) studied the long run association between oil and stock markets of Kuwait, the KSA and the UAE, and their findings indicate an absence of long-run equilibrium between the evolution of oil and stock prices in these countries which means information contained in oil prices does not help to predict future movements in stock prices. These findings are important for researchers, regulators, and market participants. In particular, policy makers in the GCC countries should keep an eye on the effects of oil price fluctuations on their own economies and stock markets. For investors, the significant relationship between oil prices and stock markets implies some degree of predictability in the GCC stock markets. These findings are also supported by Alqattan and Alhayky (2016) and Arouri and Fouquau (2011).

A comprehensive detail Granger causality test has been applied across the markets under study and in most cases evidence of unidirectional causality running from oil to stock prices was found. However, Kónya (2006) found strong statistical evidence of the causal relationship that is consistently bi-directional for the case of Saudi Arabia however in other GCC countries, stock market price changes do not Granger cause oil price changes, whereas oil price changes Granger cause stock prices. Additionally this research thesis is different from the former studies, as they did not consider all three events together as this thesis does. Investors and policy makers in the GCC countries stock markets should keep an eye on changes in oil prices because these changes significantly affect stock returns. On the other hand, investors in world oil markets should look at changes in the Saudi stock market, because these changes significantly affect oil prices. Similar findings were reported by Hammoudeh and Eleisa (2004) which show that there is a bidirectional relationship between the Saudi stock returns and oil price changes. Their findings also suggest that the other GCC countries markets are not directly linked to oil prices, are less dependent on oil exports and are more influenced by domestic factors.

Bashar (2006) uses VAR analysis to study the effect of oil price changes on the six GCC stock markets and shows that only the Saudi and Omani markets have the power to predict increases in the price of oil. If we look at the full sample period and shocks, evidence of unidirectional causality running from oil to stock prices except in the case of the KSA, a unidirectional causality exists between KSAER to BPR. Hammoudeh and Aleisa (2004) find bidirectional causality between Saudi stock markets and oil. However, a unidirectional causality exists between ABER to BPR in the case of Abu Dhabi in this research. Arouri and Rault (2010) found evidence of one-way direct Granger causality from the Saudi stock to oil prices. In fact, the null hypothesis of the absence of causality is strongly rejected based on both weekly and monthly data. For the other GCC countries, changes in national stock indices do not significantly cause changes in oil prices. These findings are not totally unexpected for at least two reasons. Firstly, the Saudi market is the biggest stock market in the region and it makes up more than 40% of all GCC markets and one third of all Arab markets. Secondly, as already noted, Saudi Arabia plays a leading role in worldwide energy markets. Indeed, estimates show that Saudi Arabia has about 260 billion barrels of oil reserves, some 24% of the world's proven total. The greater their reserves, the more they can produce. Hence, Saudi Arabia is the world's largest exporter of total petroleum liquids and is currently the world's second largest crude oil producer behind Russia.

In 2016, International Monetary Fund statistics showed that oil export revenues accounted for around 90% of total Saudi export earnings and state revenues and more than 43% of the country's GDP. Findings from this research suggest that changes in the Saudi stock markets, which should reflect changes in the Saudi economy, significantly cause changes in oil prices. In addition to this, for the rest of the GCC countries, oil price changes significantly affect stock market returns. These findings are not surprising given the role played by oil revenues in all GCC economies. In fact, oil price increases raise national and corporate revenues. In short, there is strong bidirectional Granger causality between oil price changes and Saudi stock market returns. The Saudi market has a close link to the price of oil and as such, there is a predictable component associated with it. In other words, oil prices affect stock prices in Saudi Arabia and political and economic shocks that influence Saudi Arabia can have an impact on oil prices and have implications for the regional economies. For the other GCC countries, significant Granger causality was identified from oil price changes to stock market returns and their results suggest that oil price changes affect stock markets in these countries but that changes in these markets do not significantly affect oil prices. In conclusion, traders in the GCC stock markets should look at the changes in oil prices, whereas investors in oil markets should look at changes in the Saudi stock market.

In view of the analysis, this research concludes that for the full sample period a unidirectional causality exists for all markets, a research outcome that is supported by other literature (Li et al., 2012; Jouini, 2013; Arouri et al., 2012; Jones and Kaul, 1996; Ling and McAleer, 2003; Constantain et al., 2010). The frequency domain causality analysis in the case of Kuwait indicates the existence of causality early in the sample, running from stock to Brent returns; in the case of the KSA significant evidence is found for causality running from stock to Brent returns and in the UAE markets, the causality runs from stock to Brent returns up to around the second break. On the other hand, none of the countries witnessed a causal link from Brent to stock returns except in the case of Kuwait where a casual effect was found around the first break (Bouoiyour and Selmi, 2016). The comparative analysis reveals that for the full sample period the GARCH model is stable in all countries, however the outcomes of this model need to be taken with care, as there is evidence of structural breaks that could impact on the model outcomes. On the other hand, under all shocks the GARCH model is not stable, a situation that might be explained by the limitation on the number of observations used to support the estimation. The outcome for the Abu Dhabi market showed slightly different results with others as the GARCH model is stable for the Iraq invasion and Arab Spring respectively. These results are supported by Elysdian et al. (2011), Martinez et al. (2014), Deigiannkis and Floros, (2014), Kang et al. (2015), Narayan and Sharma (2014), Dilip and Maheshwaran (2013), Nguyen and Bhatti (2012), Fang and You (2014), Direspong et al. (2008).

The oil sector plays a major role in the GCC region that heavily depends on oil exports in the context of non-diversified economies that are significantly exposed to shocks in the oil sector. Oil plays a major role in the global context, as there is no cost-efficient alternative that can be used as a substitute. In a global context, the oil sector is considered as an essential macroeconomic variable due to its impact on the real economy and its effect on aggregate demand in both developing and developed countries (Schubert, 2014; Hamilton, 2003; Narayan, 2010). As the GCC region economic future is tight to its oil reserves, it is of paramount importance to examine the short and long run dynamics between Brent and stock prices. Well-known techniques like the Johansen cointegration test and the Granger Causality test were selected to study the association between the selected markets and the oil sector.

Cointegration methods are established research tools that are widely used in applied economic analysis, as they help policy markets understanding interlinkages between variables in the long-term that could offer valuable insights on policy making decisions. The term of cointegration was first introduced by Engle and Granger (1987) that followed the work of Granger and Newbold (1974) on spurious regressions. Cointegration identifies a situation where two or more non-stationary time series are bound together in such a way that they cannot deviate from an equilibrium relationship in the long term. In other words, there exists one or more linear combinations of I (1) time series (or integrated processes of order 1) that are stationary or I (0). The stationary combinations are called cointegrating equations or vectors that indicate that the variables have a long-run association. In the context of this study, it is important to consider that stock markets are associated with significant levels of variability that makes quite difficult to understand and predict markets behavior. Therefore, it is crucial to analyze if stock markets and the oil sector do share an equilibrium relationship in the long-run as it would allow predicting market dynamics on oil dependent economies. On the other hand, Granger causality testing allows examining the short-term association and identifying if there are causal effects between variables. The Granger (1969) method is based on a probabilistic account of causal effects that are considered as a fundamental concept for studying dynamic relationships between economic variables. In the context of this thesis, the examination of causal relationships would help determining if the GCC region is exposed to short-term effects derived from the oil sector. By combining cointegration and causal analysis, policy makers would have a better understanding of the association between oil and stock markets and would be better prepared when designing policies that seek to minimize their country exposure to oil global and regional shocks derived from political uncertainty.

The main research outcomes reveal a general absence of a long-run equilibrium between oil and stock prices in the GCC region, meaning that information contained in oil prices does not help to predict future movements in stock prices and vice versa (Arouri et al., 2013; Hammoudeh and Aleisa, 2004; Bashar, 2005; Ravichandran and Alkhatlan, 2010), results that aligns with Arouri et al., (2013), Alqattan and Alhayky (2016), Arouri and Fouquau (2011), Monhanty et al., (2010), Bakaert and Harvy (2002), and Bruner et al., (2002). that also show an absence of long-run equilibrium between oil and stock prices in the region.
The results for Granger causality test show evidence of unidirectional causal effects running from oil prices changes to stock market returns and suggests oil price changes affects stock markets in the region countries (Jouini, 2013; Arouri et al., 2012; Constantain et al., 2010; Asterious and Bashmakora, 2013; Bhar and Hikolova, 2010; Constantinos et al., 2010; Alana and Yaya, 2014 and Adrangi et al., 2014). The findings indicate that GCC countries should monitor the effects of oil price fluctuations on their own economies and stock markets, as there is some degree of predictability in the GCC stock markets derived from shocks in the oil sector in the short-run.

5.6 Conclusions

The purpose of this study is to examine the impact of Brent prices on stock prices for three GCC countries, Kuwait, the KSA and the UAE. The study is supported by a combination of econometric models that examine interlinkages between the selected stock markets and Brent oil prices. The overall findings show that cointegration does not exist between stock and Brent prices across all countries and through all political events. In addition to these results, the Granger causality test in most of the cases is quite consistent, revealing the existence of unidirectional causality running from Brent to stock returns and some evidence of causality from stock to Brent returns in the case of the KSA during the financial crisis and in Abu Dhabi during the Arab revolution. Furthermore, the frequency domain test shows dynamic causal effects between Brent and the Kuwaiti stock market during early stages of the sample period (Iraqi invasion period). In the case of the KSA the dynamic causality shows that there is no evidence of causality running from Brent to stock returns, however significant evidence of causality was found from stock to Brent returns. As for Dubai, the trend is little different and causality runs from stock to Brent returns and it remains for the Iraq invasion and US financial crisis. On the other hand, in Abu Dhabi, causality exits from stocks to Brent returns during the Iraq invasion only. This study clearly concludes that no long run relationship exists between Brent and stock prices across all shocks for all countries, which means that oil prices do not have sufficient information to explain stock prices. On the other hand, in the short run, oil has a significant influence on stock returns in most situations.

CHAPTER 6

SUMMARY AND CONCLUSION

6.0 Introduction

The final chapter of this thesis offers a general overview of the research work undertaken, starting with the summary of the core research purpose, the main motivation and the specific objectives. The analysis of different events associated with significant levels of uncertainty and its implications for oil price volatility and potential spillover effects for the stock markets of selected GCC countries (KSA, UAE and Kuwait) was at the centre point of this research study. Oil is considered as the most global and important energy resource worldwide, as it plays a significant role in the development of the world economies. Until now, existing research in the field has focused its attention on the analysis of energy prices and its implications for global economic performance (Amoruo & Mustafa 2007, Arouri, Lahiani & Bellalah 2010). Researchers such as Al-shami and Ibrahim (2013), Elder and Serletis (2010) believe that oil is one of the leading physical commodities in the world and is regarded as an essential macroeconomic variable that influences the stock market, real economic development and aggregate demand in both developing and developed countries.

Variations in the price of oil play an important role in different economic activities, namely inflation, imports, exchange rates, exports, real economic development and employment. Therefore, it is expected that shocks on oil prices will have an impact on stock markets as higher oil prices will lead to rising production costs and ultimately declining returns (Asteriou and Bashmakora, 2013; Degiannakis and Floros, 2011; Masih et al., 2011; Dibooglu and Aleisa, 2004). In the case of the GCC countries, where their economies are largely dependent on oil exports, government income and aggregate demand are positively affected by the higher oil prices. Furthermore, fluctuations in oil prices may adversely affect regional stock markets as is noted in the case of the GCC countries. Very few empirical research studies (Azar and Basmajian, 2013; Mohanty et al., 2011; Naifar and Dohaiman, 2013; Sahu et al., 2014) have focused on examining the link between oil price changes and stock market performance. The existing literature in this field seems to be concentrated on the analysis of oil price volatility and its implications for stock markets. However, reviewed studies do not seem to offer sufficient evidence on the impact of political issues on oil price volatility and spillover effects towards the main stock markets in the GCC region. Moreover, there is also a lack of analysis focusing on the case of small oil exporting countries (Demirer, Jategaonkar & Khalifa, 2015; Akoom, Nikkinen & Omran, 2012; Akoum, Graham, Kivihaho, Nikkinen & Omran, 2012 and Arouri, Lihiani and Bellalah, 2010).

Current studies do not seem to offer sufficient evidence on the impact of political issues on oil price volatility and spillover effects towards the main stock markets in the region. There are three political events that have played a significant role and because of them, the economy of Kuwait and other GCC economies were affected by negative shocks over a relatively short time period. The first shock under consideration is linked to the Iraq Invasion in 2003 that led to the country's lowered risk premium and to serious effects on corporate profitability (Global Investment House Market Outlook, January 2004). The second shock took place around 2007/08, due to the US Global Financial Crisis, with the KSE index plummeting from 14,157.50 to 1,373.60 points in September 2008, leading to a drop in market capitalization of 53.1bn KWD (Global Investment House Market Report, February 2009). The third shock relates to the Arab Spring Revolution (2011) that caused the Kuwaiti price index to decrease by 10.69 percent by the end of 2011, reaching 6,211.70 points (Global Investment House Market Report, February 2011).

6.1 Research Framework

This section offers a brief outline of the main research framework while explaining the motivation of the research, and outlining the basic research objectives that were essential to support the research questions.

6.1.1 Research Motivation

Recently, oil is playing a vital role in the economic development of every country and especially if the country is an oil exporter. Oil exporter economies are heavily dependent upon oil and any fluctuation because of domestic and international events directly influence oil prices and spreads towards the stock markets. In this research and based on historical findings, it is important and quite relevant to examine the relationship between oil price volatility and its effects on major stock markets in the GCC countries. The study concludes that political events have significant impact on stock markets. This study clearly contributes to the existing literature, as previous studies do not seem to offer sufficient evidence analyzing the impact of political events in oil price volatility and its spillover effects on the major stock exchanges in the GCC.

6.1.2 Research Objectives

This study examines the relationship between oil price volatility and major stock markets in the Gulf Region with a special emphasis on the case of Kuwait. The objectives are as to establish a comparative analysis among the Kuwait, KSA and UAE stock markets. It is also indispensable to identify if political related issues generated an effect on oil prices and stock markets and to investigate the impact of oil price changes on the Kuwait stock exchange and three other major stock markets in the region (Saudi Arabia and the two UAE stock markets). It is also important to investigate volatility transmission between stock prices and stock markets.

6.1.3 Research Question and Hypothesis

This study has used a straightforward research question and hypothesis:

Do Political events affect the relationship between oil prices and the stock markets of the Gulf Region (Kuwait, KSA and UAE)?

The case of Kuwait is considered as a special case, as this country is broadly susceptible and sensitive to economic bumps like that of unstable oil prices. The research hypothesis that was tested is outlined as follows:

Ho: "There is no significant effect of political events impacting on the relationship between oil prices and the GCC stock markets".

6.2 Methodological Issues

Based on the conducted literature review and to fill the gap in existing research studies, a detailed and comprehensive econometric methodology was adopted with the aim of enhancing the value of the thesis at the same time helping provide evidence that contributes towards insight that could be used for policy making at government level. A research framework was used that was substantially backed by prior research studies in the area. The selected research methods are highly important in order to facilitate the theoretical contribution of this thesis.

Research methods were organized to start with the analysis of informal techniques that include graphical analysis and basic descriptive statistics that give us basic insight on the data and their patterns. Afterwards, formal econometric models and tests were identified and a critical assessment on their contribution to the empirical study was offered. Initially, the Chow break test (1969) is used to test for the presence of a structural break over the period of study. In order to select the optimal lag length - a pre-requisite condition to fit the best model - a VAR approach was followed, as it plays a vital role in order to get results that are not spurious (Masulis, Huang, and Stoll, 1996; Sadorsky, 1999; Cong et al., 2008). The unit root tests are used to check the stationarity properties of the time series data, as non-stationarity series can influence models' behavior and properties, for example, whether the perseverance of shocks will be infinite for non-stationary series. For this reason, two tests were performed: i) the Phillips-Perron (PP) and ii) the Kwiatkowski–Phillips–Schmidt–Shin test, which claims that an observable time series is stationary around a deterministic trend. These techniques are widely used by many researchers across many countries and are considered to be standard research tests that should be conducted to verify time series stationary properties (for example, Muhammad and Rasheed, 2002; Kavalerchik, 2010; Khan and Khan, 2016; Fukuta, 2002; and Mahadeva, and Robinson, 2004).

Cointegration is a statistical property of a collection of time series variables that are often associated with trends, either deterministic or stochastic. In this thesis, the Engle-Granger approach was applied to observe the existence of a long run association between the variables and for comparison purposes, the Johansen cointegration test was also applied. A number of studies such as Granger, Huangb, and Yang (2000), Arouri and Fouquau (2009), Miller and Ratti (2009), Imarhiagbe (2010), and Muhtaseb and Al-Assaf (2016) used these approaches to test for long-run relationships between oil prices and stock markets for various economies including the GCC. These studies help offer up to date evidence on the value and significance of the selected econometric models. Granger causality testing was applied to deal with linear prediction and it only comes into play if some event happens before another and in economics, it is often found that all economic variables are affected by some unknown factors. Several studies including that of Huang, Masulis, and Stoll (1996) and Lee, Yang and Huang (2012) employed Granger causality to analyze the association between oil returns and stock returns. In addition to this, frequency domain causality was applied to judge the dynamic dimension between stock and Brent returns. There are many studies that have used this technique and obtained useful results (Ozer and Kamisli, 2016; Gradojevic, 2013; Tiwari et al., 2007; Mermoud et al., 2010). However, there is limited evidence available in the context of the GCC. Market volatility is considered as an imperative measurement in financial markets, especially during periods of uncertainty, when volatility rises. In this thesis, the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model was applied to review financial markets in which volatility patterns change, meaning that returns behavior become more unstable during times of financial crises, political crises or wars and economic uncertainty. There are many recent studies, such as Falzon and Castillo (2013); Aye (2014); Hamma, Jarboui and Ghorbel (2014); Huang (2016) that have used a GARCH approach to examine the impact of oil returns on stock returns. The study is also supported by a range of diagnostic tests that help to ensure that the research outcomes were robust.

6.3 Key Findings

This section summarises the main empirical findings for all three markets and their critical role in their respective stock markets. It also shows how these findings contribute to the current literature.

6.3.1 Cointegration Analysis

The overall results of cointegration are similar in each case, where it is not possible to offer significant evidence of a long run association in either country. In the case of Kuwait, there was no evidence of the existence of a long-run relationship between Kuwait's stock prices and Brent prices for the entire period. In either way, we can say that the variables do not reflect a long term link between each other. These results point to the general absence of a long-run equilibrium between oil and stock prices in Kuwait, meaning that information contained in oil prices does not help to predict future movements in stock prices and inversely (Arouri et al., 2013; Hammoudeh and Aleisa, 2004). In addition to this, in the case of the KSA, cointegration results indicates that there is no evidence of cointegration between Brent and stock prices. These findings suggest that in the long-run, stock market prices in KSA are not sensitive to oil price fluctuations (Alqattan and Alhayky, 2016). Furthermore, if we talk about the UAE stock markets, the results are quite similar to those of Kuwait and KSA and no evidence of a long relationship between variables was found, either in the case of Dubai or in the Abu Dhabi markets. The lack of evidence of a long run association between oil and stock prices across all three countries under study reflects an independent relationship between stock and Brent prices.

6.3.2 Causality Analysis

In the case of Kuwait, a one-way causality relationship was found running from Brent to stock returns for the full-time period. The same findings for structural breaks are observed and consistent over the whole sample and during the analyzed shocks. Moreover, oil price changes exert a critical and prominent impact on most economic activities where the stock market acts as an indicator of an economy. Hence, oil price changes have a dominant influence on stock prices (Arouri and Nguyen, 2011) a result that is confirmed by the study of the Kuwaiti stock market which clearly shows the country's economy exposure to oil price fluctuations. In addition, the results for the Granger causality test for the KSA are not different from those found for Kuwait, reporting evidence of unidirectional causality running from Brent to stock returns in the case of the full sample. Similar findings were reported in the case of the Iraqi invasion and during the Arab Spring Revolution. Oil prices were found to significantly affect stock prices in the KSA, a result that is not surprising given the role played by oil revenues in the country.

In addition, oil price increases raise national and corporate revenues (Arouri and Rault, 2010). However, during the US Financial Crisis a unidirectional causality exist running from stock to Brent returns. The changes in the Saudi stock markets reflect changes in the economy of the KSA that are significantly caused by changes in oil prices. In fact, the KSA plays an important role in international energy markets, and estimates demonstrates that the country has around 260 billion barrels of oil reserves and some 24 percent of the world's proven reserves. It was noticed that the political and economic progression in KSA may have implications for the stability of oil prices in the region, findings that are not confirmed for other GCC countries (Hammoudeh and Aleisa, 2004; Baher, 2006; Arouri and Rault, 2010).

Moreover, in the case of the UAE markets, the results also aligned with research outcomes for Kuwait and the KSA for the full sample period, results that are consistent for both Dubai and Abu Dhabi, showing evidence of unidirectional causality running from Brent to stock returns. Dubai did not show significant evidence of causal relationships during the Iraqi invasion and the US financial crisis. However, during the Arab Spring Revolution evidence of unidirectional causality exists from Brent to stock returns. The outcomes are slightly different in the case of Abu Dhabi. During the Iraqi invasion, there was no evidence of causality, while during the US Financial Crisis a unidirectional causality exists from Brent to stock returns. However, during the Arab Spring Revolution, unidirectional causality exists from stock to Brent returns.

To sum up, for all three countries under study, a significant Granger causality was identified running from oil price changes to stock market returns, results that suggest that oil price changes affect stock markets in these countries, but that changes in these markets do not significantly affect oil prices (Jouini, 2013; Arouri et al., 2012; Constantain et al., 2010). Therefore, investors and policy makers in the GCC stock markets should keep an eye on changes in oil prices because these changes significantly affect stock returns. On the other hand, investors in world oil markets should look at changes in the Saudi stock market, because these changes appear to have a significant effect on oil prices. Their findings also suggest that the other GCC markets are not directly linked to oil prices and are less dependent on oil exports and are more influenced by domestic factors.

6.3.3 Volatility Analysis

The measurement of volatility is an integral part of financial markets; this study has used a GARCH (1,1) model to measure for it, and it is witnessed in all cases that the GARCH model shows stable results for the full sample for all three countries under study. However, the model is not stable under all political events, with the exception being Abu Dhabi, where the model gives stable results during the Iraqi invasion and the Arab Spring Revolution. In case of an unstable model, that indicates instability in variance and leads towards potential explosive behaviour. Conversely, in the case where the model presented stable results, it was possible to appreciate high levels of volatility persistence. The possible causes of unstable models could be due to a small sample that did not allow for sufficient number of observations and uncertainty associated with each political event and additional breakpoints that do not allow the model to perform and capture volatility over the period under study. Thus, overall no conclusion can be extracted from the GARCH model.

6.3.4 Dynamic Causality

The frequency domain causality test helped to measure dynamic causality between stock and Brent returns across Kuwait, the KSA and UAE. In the case of Kuwait, there is evidence of dynamic causality between stock to Brent returns during the Iraq Invasion (2003), while from Brent to stock returns there is a causal effect found during the Iraqi Invasion (2003), which further highlight that this event remained quite sensitive for oil price fluctuations to the Kuwait stock market. However, there is no effect found during the US Financial crisis (2008) and the Arab Spring Revolution (2011). On the other hand, the outcomes for the KSA reveals no evidence of causality running from Brent to stock returns. However, significant evidence of causality was found from stock to Brent returns across the data. In addition to this, the results of frequency domain causality testing for the UAE indicates evidence of causality running from stock to Brent returns during the first two political events.

6.4 Justification and Insight of Two Methodologies

This study is supported by two cointegration tests that have statistical properties that allow the examination of time series variables that are associated with trends, either deterministic or stochastic. The thesis implemented the well-known Engle-Granger approach that helped examining the existence of a long run association between the variables and for robustness purposes; the Johansen cointegration test was also applied. A number of studies such as Granger et al., (2000); Arouri and Fouquau (2009); Miller and Ratti (2009); Imarhiagbe (2010); and Muhtaseb and Al-Assaf (2016) used these approaches to test for long-run relationships between oil prices and stock markets for various economies including the GCC region. These studies offer up to date evidence on the value and significance of the selected econometric models and their suitability when examining long-run associations between the oil sector and stock markets in the context of this thesis. The Granger causality test was also applied to examine short-term dynamics with significant evidence of research studies used to analyze the association between oil returns and stock returns (Huang et al., 1996; Lee et al., 2012; Yu, 2011; Masih, 2011 and Zarour, 2006). The overall research outcomes show significant evidence on the presence of short-run dynamics between oil and the examined stock markets in the GCC region with a lack of evidence of long-run dynamics. Research outcomes that are noteworthy for governments, market players, and policy makers who should contemplate monitoring carefully the connection between oil and stock markets in the short-run, as the region is unveiling dynamic behaviour and significant exposure to oil shocks in a framework of oil dependent economies.

6.5 Macroeconomic Insights

The importance of oil as a main source of energy for the world economies has attracted the attention of academics, practitioners, policy markets and relevant market players in the energy context. Several studies have focused on the analysis of oil price impacts on macroeconomic performance. There is no doubt that fluctuation in oil prices play impact on economic activities and indicators such as inflation, aggregate demand, import, exchange rates, exports, real economic development and employment are variables that need to be monitored, especially in the context of oil dependent economies. Consequently, it is expected that price shocks affecting oil markets will have a major impact on stock markets (Kisswani, 2011; Meager et al., 2007). Ferderer (1996) suggests that shocks in oil prices lead towards an adverse impact on the macro economy due to the raise on market uncertainty. Dogrul and Soytas (2010) argued that raises in oil prices may lead to an increase of production costs in various sectors and this might lead to adverse effects on productivity, competitiveness unemployment, and inflation. An increase in oil prices can severely undermine economic growth. In this regard, there is agreement in the literature that sharp increases in oil prices have larger negative impacts on economic development than positive effects of oil prices fall (Davis and Haltiwanger, 2001; Hamilton, 2003; Hooker, 1996, 2002; Jones and Leiby, 1996). Rafiq et al., (2009) findings suggest that, in most of the cases, oil price volatility has an impact in the short run only and most notably on investment and unemployment rates. Ahmed and Wadud (2011) suggests that oil price shocks have an asymmetric effect on industrial production and inflation. Their variance decomposition analysis confirms that volatility of oil prices is the second most important factor explaining the variance of industrial production after its own shocks. These finding are consistent with Mehrara (2008), who report a nonlinear and asymmetric relationship between oil prices and economic growth of oil exporting countries. Birini et al., (2016) explained that oil price shocks does not explain any significant portion of inflation fluctuation. Research outcomes that should be considered carefully in the context of the GCC region, as oil is the main driver force and it has significant spillover effects to macroeconomic fundamentals.

6.6 Summary of Contribution

This study has played an important role in terms of its contribution to this field in the larger context and its unique outcome will help different stakeholders in this field. During the extensive literature review, it was identified that none of the existing research focused on political uncertainties and their potential roles on stock markets. In addition, it was observed that there was a lack of advanced methodologies that could contribute in a more vital way. After the completion of this thesis, the findings make a significant contribution to this field as explained below.

I. This study is the first one to study political uncertainties that could have a severe impact of stock markets, which includes the effects of the Iraq invasion in 2003, the US financial Crisis of 2008 and the Arab Spring Revolution of 2011 in the context of the GCC. The Iraq Invasion (2003) caused the country's lowered risk premium and had serious effects on corporate profitability. The US Financial Crisis, (2008) seriously affected the GCC countries financial markets and caused in dropped market capitalization of 53.1bn KWD. The third shock relates to the Arab Spring Revolution (2011) that made also a significant impact on stock markets in the GCC region.

II. This study has used various advance methodologies to analyze the daily data in an effective way.

In addition, the Frequency Domain Causality Analysis supported the study and is a major contribution to the study and offered a dynamic approach to the studied variables and their linkages.

III. This research has confirmed a short run relationship between stock and Brent oil prices across the countries. However, it failed to confirm an existence of a long run association between Brent oil prices and the three major stock price indexes. This relationship is a clear contribution as other studies have a mix of relationships or no relationship, however, in this case, a short run relationship occurred across all countries.

The extensive study of oil exporting countries and the responsiveness and connections between the oil sector and their major stock markets is of interest, as understanding the capability of the stock exchanges to react to oil shocks brings early signs of market distress to these countries that heavily rely upon oil. This enables governments to take appropriate measures and implement policies that seek to stabilize their economies and to consider the importance of making efforts that lead to economic diversification.

The implications of these outcomes are significant and much important for researchers, regulators, and market participants. In particular, policy makers in GCC countries should keep an eye on the effects of oil price fluctuations on their own economies and stock markets as the movement in oil price fluctuations could lead towards turbulence in stock markets (Alqattan and Alhayky, 2016; Arouri and Fouquau 2011).

6.7 Policy Implications

The outcomes of this thesis revealed short-run dynamics between oil and the analysed stock markets in GCC region with lack of evidence on the existence of a long run relationship. The implications of these outcomes are significant and much important for researchers, regulators, and market participants. In particular, policy makers in GCC countries should monitor closely the effects of oil price fluctuations as oil market uncertainty has significant spillover effects towards regional stock markets (Alqattan and Alhayky, 2016; Arouri and Fouquau 2011). Furthermore, the relationship between oil and stock markets in the GCC region exhibit dynamic patterns bringing further uncertainty to the region and adding further difficulties to government and policy makers strategies to counteract their exposure to oil shocks. In addition, GCC states needs to address the lack of diversification on their economies and uplift non-oil sectors to increase economic growth and ensure that the region exposure to the oil sector and associated risks is addressed.

6.8 Suggestions for Future Research

Based on the existing findings it is important to investigate all domestic factors that adversely affect the stock markets of GCC economies. It would be interesting to explain key factors and their role in the studied countries. Additionally, it would be of interest to look at the connection between stock prices with other indexes that are more regional and their effect on the GCC countries stock markets. In addition to this, the possible extension of this study could include other GCC countries that could contribute to the better understanding of the overall impact of oil price volatility. Future research could expand by the analysis of regional and international events, with the aim of measuring which kind of events are associated with higher levels of uncertainty and that cause the most distress in the region.

References

Abul, B. S. Salem, N. and Hui, Z. (2014). Dependence Patterns across Gulf Arab Stock Markets: A Copula Approach. *MPRA: Munich Personal RePEc Archive*.

Abdeen and Shook (1984)." The Saudi financial system, in the context of Western and Islamic". *Journal of Banking and Finance*. Vol.9. Issue. 4 p.597-600.

Adrangi, B,. Chatrath, A,. and Raffiee, K. (2014). Volatility Spillovers across Major Equity Markets of Americas. *International Journal of Business*. Vol. 19, Issue. 3, 255-274.

Abumustafa, N, I. (2016). Instigating the Arab Stock Markets during Arab Spring. *Journal of Assets Management*. Vol. 17, Issue, 5. pp: 313-318.

Abdullah,. A. (2012). Repercussions of the Arab Spring on GCC States. *Arab Centre for Research and Policy Studies*.

Abdelbaki, H. H. (2013). The Impact of Arab Spring on Stock Market Performance. *British Journal of Economics, Management and Trade*. 3(3): 169-185.

Abusaaq, H., Alfi, A., Alghahtani, G., Alsadoun, N., Callen, T., Khandelwal, P., Miyajima, K.,Muir, D., Pant, M., Piven, B., & Author Shbaikat, G. (2015). Saudi Arabia Selected Issues. Retrieved from http://www.imf.org/external/pubs/ft/scr/2015/ cr15286.pdf.

Agung, I. (2009). *Time Series Data Analysis Using EViews*. Singapore: John Wiley & Sons.

Ahmed, S. (2003). Global and Regional Economic Developments: Implications and Prospects for the Escap region. http://www.unescap.org/sites/default/files/Bulletin02-ch1.pdf.

Ahmed, S. M. and Anisul M. Islam, A. M. (n.d). A Long Run Cointegration Analysis between Oil price and U.S. Inflation. https://www.bradley.edu/dotAsset/b5c1e6d1-c9e8-4e23-a5ea-c92719e44368.pdf.

Ahmed, H. J. A., & Wadud, I. M. (2011). Role of oil price shocks on macroeconomic activities: An SVAR approach to the Malaysian economy and monetary responses. *Energy Policy*. 39 (12), 8062-8069.

Akoum, I., Graham, M., Kivihaho, J., Nikkinen, J. and Omran, M. (2012). Co-movement of oil and stock prices in the GCC region: A wavelet analysis. *Quarterly Review of Economics and Finance,* 52 (1), 385–394.

Akram, Q.F. (2009), Commodity prices, interest rates and the dollar. Energy Economics, 31(6), 838-851.

Akoum, I., Graham, M., Kivihaho, J., Nikkinen, J. and Omran, M. (2012). Co-movement of oil and stock prices in the GCC region: A wavelet analysis. *Quarterly Review of Economics and Finance,* 52 (1), 385–394.

Ak, R., & Bingül, B. A. (2018). Kuwait. In Handbook of Research on Sociopolitical Factors Impacting Economic Growth in Islamic Nations (pp. 276-292). *IGI Global*.

Aljazira Capital (2010). The Financing Role of the Saudi Capital Market. Research Department, Aljazira Capital, Saudi Arabia.

Al-Sayegh, H. (2014). UAE Stock Market Gains Take on the World. Retrieved from https://www.thenational.ae/business/uae-stock-market-gains-take-on-the-world-1.313441.

AlKhaldi, B. A. (2015). The Saudi Capital Market: The Crash of 2006 and Lessons to Be Learned, International Journal of Business. *Economics and Law*, 8(4): 136.

Alturki,F, M,. and Khan, A,. (2015). Oil Prices and the Saudi Stock Exchange (Tadawul).

AL-Mohana, S.M. (2015). "An Empirical Investigation of the UAE Stock Markets" (2015).*Theses*. Paper 237. Available at: http://scholarworks.uaeu.ac.ae/cgi/viewcontent.cgi?article=1237&context=all_these .

Alana. L.G and Yaya, O.S (2014). “The relationship between oil prices and the Nigerian stock Market. An analysis based on fractional integration and cointegration”. *Energy Economics*. Vol, 46. 328-333.

Albaity, M,. and Mustafa, H. (2018). International and Macroeconomic Determinants of Oil Price:Evidence from Gulf Cooperation Council Countries. International Journal of Energy Economics and Policy. 8(1), 69-81.

Al-Dabas, Z. (1995). The Development of the UAE Securities Market-Part One. *Journal of Economic Affairs*, 2, 29-30.

Aliyan, A. M. (2013). “Effect of oil prices fluctuation on industrial productions in Iran”. *European Online Journal of Natural and Social Science*. Vol.2, No.4 PP. 572-583.

Aljanabi, M. Hatemi.J, A. Irandoust, M. (2010). An empirical investigation of the informational efficiency of the GCC equity markets: Evidence from bootstrap simulation. *International Review of Financial Analysis*. 19, 47-54.

Al-Khaleej Newspaper. (1982). The Minister of Economy and Commerce: The Establishment of an Official Securities Market Conditioned to Executing the Companies Act. Al-Khaleej Newspaper.

Almujamed, H. Filfield, S. and Power.D (2013). An investigation of the role of technical analysis in Kuwait. *Qualitative Research in Financial Markets*. 5 (1), 43-64.

Al-Shayeb, A. (1999). The Emergence of the United Arab Emirates Official Securities Market. Unpublished Thesis (PhD). Department of Accounting, Finance, and Management, School of Social Science University of Essex, UK.

Al-Sultan, Fawzi H. (1989). Kuwait - Averting financial crisis. Policy, Planning and Research Department working papers; no. WPS 243. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/1989/07/700490/kuwait-averting-financial-crisis.

Al-Yaqout, A. (2006), "The usefulness of quarterly financial reports", unpublished PhD thesis, University of Loughborough, Loughborough.

Al-Shami, H, A,. and Ibrahim, Y. (2013). The Effects of Macro-economic Indicators on Stock Returns: Evidence from Kuwait Stock Market. *American Journal of Economics*. 3(C): 57-66. doi:10.5923/c.economics.201301.11.

Alqattan, A.A. and Alhayky, A. (2016). Impact of Oil Prices on Stock Markets: Evidence from GCC Financial Markets. *Amity Journal of Finance*. 1(1), (1-8).

Al-Qudsi, S. and Ali, M. (2016). Economic Growth Implications of Oil Prices Fluctuations: The GCC Context. Available: https://www.dohainstitute.edu.qa/MEEA2016/Downloads/Sulayman%20Al-Qudsi.pdf.

Alhayki, Z. (2014). The dynamic co-movements between oil and stock market returns in the case of GCC countries. Journal of Applied Finance & Banking, 4(3), 103-113.

Albawaba (2018). Kuwait Stock Exchange market performance for the month of November 2008. Retrieved from https://www.albawaba.com/business/kuwait-stock-exchange-market-performance-month-november-2008.

Altarturi, B.H., Alshammri, A.A., Hussin, T., Taufik, T.M., Saiti, B. (2016), Oil price and exchange rates: A wavelet analysis for organisation of oil exporting countries members. International Journal of Energy Economics and Policy, 6(3), 421-430.

Al-Shugaa, A. and Masih, M. (2014). Uncertainty and Volatility in MENA Stock Markets during the Arab Spring. *MPRA: Munich Personal RePEc Archive*.

Alfadli, D. A. (2015). Monetary Union and Stock Markets Integration in GCC. MS Thesis. *California State Polytechnic University, Pomona.*

Al-Fayoumi, N. (2009). Oil Prices and Stock Market Returns in Oil Importing Countries: The Case of Turkey, Tunisia and Jordan. *European Journal of Economics, Finance and Administrative Sciences*. 16(16).

Amihud, Y. and Wohi, A. (2004). Political News and Stock Prices: The Case of Saddam Hussein Contracts. Journal of Banking and Finance. Vol, 28. 1185-1200.

Anichshenko, V. (2009). The Impact of the Financial Crisis on the Banking System of Kazakhstan. *Central Asia Business Journal*. Vol.2. 66-70.

Anoruo, E., & Mustafa, M. (2007). An empiric al investigation into the relation of oil to stock market prices. *North American Journal of Finance and Banking Research*. 1(1), 22-36.

Ansani, A. (2012). About the Revolution. The Economic Motivation of the Arab Spring. International Journal of Development and Conflict. Vol. 3(3). DOI: 10.1142/S2010269012500135.

Andries, A. M. and Ursu, S, G. (2016). Financial Crisis and Bank Efficiency: An Empirical Study of European Banks. *Economic Research*. Pages. 485-497.

Arouri, M. E. H., & Fouquau, J. (2009). How do oil prices affect stock returns in GCC markets? An asymmetric cointegration approach. Orleans Economic Laboratory, University of Orleans, Working Paper. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.504.8861&rep=rep1&type=pdf

Arouri, M, E, H,. Jouini, J,. and Nguyen, D, C. (2013). On the relationship Between World Oil Prices and GCC Stock Markets. HAL ID: hal-00798037.

Arouri M.E.H. (2011). Does Crude Oil Move Stock Markets in Europe? A Sector Investigation. *Economic Modelling*, 28(4): 1716-1725.

Arouri M.E.H. and Nguyen D.K. (2010). Oil prices, stock markets and portfolio investment: Evidence from sector analysis in Europe over the last decade. *Energy Policy*, 38(8): 4528-4539.

Arab Monetary Fund Annual Report (2014). *Comprehensive Report.*

Arouri, M. (2011). Does crude oil move stock markets in Europe? A sector investigation. *Economic Modelling*, 28, 1716–1725.

Arouri, M., Bellalah, M. and Nguyen, D. (2011). Further evidence on the responses of stock prices in GCC countries to oil price shocks. *International Journal of Business*, 16 (1), 90–102.

Arouri, M., Jouini, J. and Nguyen, D. (2012). On the impact of oil price fluctuations on European equity markets: Volatility spillover and hedging effectiveness. *Energy Economics*, 34, 611–617.

Arouri, M., Lahiani, A. and Bellalah, M. (2010). Oil price shocks and stock market returns in oil-exporting countries: The case of GCC countries. *International Journal of Economics and Finance*, 2 (5), 132–140.

Arouri, M. E. H. Lahiani, A. and Bellaleh, M. (2010). Oil Prices Shocks and Stock Markets

Returns in Oil Exporting Countries: The Case of GCC Countries. *International Journal of Economics and Finance*. Vol.2, No. 5.

Arouri, M. and Nguyen, D., (2010). "Oil price, stock markets and portfolio investment: Evidence from sector analysis in Europe over the last decade", Energy Policy 38, 2010, 4528-4539.

Arouri, M. E. H and Rault, C. (2004). Casual Relationship between Oil and Stock Prices from Gulf Oil-Exporting Countries. *International Economics*. Vol.122, pp:41-56.

Arezki, R. Jakab, Z. Laxton, D. Matsumoto, A. Nurbekyan, A. Wang, H. and Yao,J. (2017). Oil Prices and Global Economy. IMF Working Paper. WO/17/15.

Arfaoui, M., Ben, R.A. (2016), Oil, Gold, US Dollar and Stock Market Interdependencies: A Global Analytical Insight. Germany: University Library of Munich.

Asteriou, D. and Bashmakova, Y. (2013). Assessing the impact of oil returns on emerging stock markets: A panel data approach for ten Central and Eastern European Countries. *Energy Economics*, 38, 204–211.

Aye, G. C. (2014). Does oil price uncertainty matter for stock returns in South Africa? (No. 201484).

Azar, S. and Basmajian, L. (2013). Oil price and the Kuwaiti and the Saudi stock markets: The contrast. *International Journal of Economics and Financial Issues*, 3 (2), 294–304.

Badeeb, R. A. and Lean, H. H. (2018). Asymmetric Impact Of Oil Price On Islamic Sectoral Stocks. *Energy Economics*, 71: 128-139.

Barsky, R. and Kilian, L. (2004). Oil and the Macro economy since the 1970s. *The Journal of Economic Perspectives*, Vol. 18, No. 4, 115-134.

Based on figures from the Institution f Banking Studies. Financial Index for Kuwait Stock Exchange Listed Companies 80-86. Kuwait. 1987.

Basher, S. A. and Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal*, 17, 224-251.

Bahmani-Oskooee, M. and Saha, S. (2015). On the relation between stock prices and exchange rates: a review article. *Journal of Economic Studies*, 42(4): 707-732.

Baltagi, B. H. (2003). *Companion to theoretical econometrics*. Wiley-Blackwell, Oxford.

Banerjee, A., Dolado, J., Hendry, D. F. and Smith, G. (1986). Exploring Equilibrium Relationships in Econometrics Through Static Models. *Oxford Bulletin of Economics and Statistics*, 48: 253-77.

Basher, S.A., Haug, A.A., Sadorsky, P. (2012), Oil prices, exchange rates and emerging stock markets. Energy Economics, 34(1), 227-240.

Barnes, I. (2017). *Managing market volatility*. Retrieved from http://www.cityam.com/266791/managing-stock-market-volatility.

Bashar, Z., (2006). Wild oil prices, but brave stock markets! The case of Gulf Cooperation Council (GCC) stock markets, *Operational Research: an International Journal*, 6(2), 145-162.

Basher, S. A., Sadorsky, P., (2006). Oil Price Risk and Emerging Stock Markets", *Global Finance Journal*, 17, 224-251.

Bashar, Z. (2006). Wild oil prices, but brave stock markets! The case of Gulf Cooperation Council (GCC) stock markets. *Middle East Economic Association Conference*, Dubai, United Arab Emirates.

Baily, M. N. and Elliot,D. J. (2009). The US Financial and Economic Crisis: Where Does It Stand and Where Do We Go From Here?. Initiative on Business and Public Policy at Brookings. https://www.brookings.edu/wp-ontent/uploads/2016/06/0615_economic_crisis_baily_elliott.pdf.

Bchir, M. H and Pedrosa-Garcia, J. A. (2015). The impact of the 2014 oil shocks on Arab Economies. *Chapter 3 in ESCWA's Survey of Economics and Social Development*.

Beckmann, J., Berger, T., Czudaj, R. (2016), Oil price and FX-rates dependency. Quantitative Finance, 16(3), 477-488.

Bénassy-Quéré, A., Mignon, V., Penot, A. (2007), China and the relationship between the oil price and the dollar. Energy Policy, 35(11), 5795-5805.

Bhuvaneshwari, D. and Ramya, K. (2017). Cointegration and Causality between Stock Prices and Exchange Rate: Empirical Evidence from India. *SDMIMD Journal of Management*, 8(1): 31-38.

Bhar, R, and Hikolova, B. (2010). Oil Prices and Equity Returns in the BRIC Countries. *The World Economy*.

Bin Sabt, S. (2000). Development Stages of UAE Securities Market. Forum of the UAE Securities Market.

Birini, R,. Jemmali, H,. and Farroukh, A. (2016). he Impact of Oil Price Changes on the Economic Growth and Development in the MENA Countries. *Fifth International Conference Middle East Economic Association (MEEA).*

Bilgilli, F. (1998). Stationarity and cointegration tests: Comparison of Engle - Granger and Johansen methodologies. Munich Personal RePeC Archive. Paper No, 75967.

Bingbing, W. Alterman, J.B. Hokayem, E. Molavi, A. Seznec, J. F. and Downs, E. (2011). China and the Persian Gulf: Implications for the United States. Woodrow Wilson International Centre for Scholars, Washington D.C. https://www.wilsoncenter.org/sites/default/files/ASIA%20Program_China%20and%20the%20PG.pdf.

Bloomberg (2018). Kuwait implements latest phase of stock exchange revamp. Retrieved Fromhttps://www.thenational.ae/business/kuwait-implements-latest-phase-of-stock-exchange-revamp-1.717736.

Bollerslev, T., Engle, R., and Wooldridge, J. (1988). A Capital Asset Pricing Model with Time Varying Covariance. *Journal of Political Economy*, Vol. 96, No. 1, 116-131.

Bouri, E. and Yahchouchi, G. (2014). Do return and volatility traverse the Middle Eastern and North Africa (MENA) stock market borders? *Journal of Economic Studies*, 41 (2), 317–344..

Bouri, E. Awartani, B. and Maghyereh, K. (2016). Crude oil prices and Sectoral stock returns in Jordan around the Arab Uprisings of 2010. Energy Economics, 56, 205-2014.

Boyer, M.M. and Filion, D. (2007). Common and fundamental factors in stock returns of Canadian oil and gas companies. *Energy Economics*. 29, 428-453.

Boursa Kuwait (2018). Brokerage Companies. Retrieved from https://www.boursakuwait.com.kw/market-participants/brokerage-firms

Bouoiyour, J. and Selmi, R. (2016). How Differently Does Oil Prices Influence BRICS Stock Markets.? .*Journal of Economic Integration*. Vol,31. No, 3. 547-568.

Bruner.R, Conroy R and Estrada J. (2002). Introduction to Valuation in Emerging Markets. *Emerging Market Review*. 3 (1), 310-324.

Breitung, J., and Candelon, B. (2006). Testing for short and long run causality: A frequency domain approach. *Journal of Econometrics*. 132: 363-378.

Brune,. A. Hens, T,. Rieger,.M,. M. and Wang,. M. (2015). The War Puzzle: Contra dictionary Effects of International Conflicts on Stock Markets. Zurich Open Repository and Archive. University of Zurich.

BTF Livenet (2013),. Dubai Financial Market, (pp. 2-20). Abu Dhabi, UAE, : BTFLivenet, Available from: http://www.btflive.net/.[Accessed on July 3rd,2013].

Butler, K.C. and Malaikah, S.J. (1992), "Efficiency and inefficiency in thinly traded stock markets: Kuwait and Saudi Arabia", *Journal of Banking & Finance,* Vol. 16 No. 1, pp. 197-210.

Campbell, J. Y., Lo, A. W., and MacKinlay, A. C. (1997). *The Econometrics of Financial Markets*. Princeton University Press.

Campos, J., Ericsson, N. R. and Hendry, D. F., 1996. Cointegration tests in the presence of structural breaks. *Journal of Econometrics*, 70:187-220.

Central Bank of Kuwait. "Annual Report for the Fiscal year 2014"http://www.cbk.gov.kw/en/statistics-and-publication/publications/annual-reports.jsp.

Central Bank of Kuwait. The Economic Report. 1986.

Central Bank of Kuwait. The Kuwaiti Economy 1969-1979.

Central Bank of Kuwait (2014). Economic Report 2014. Published by Central Bank of Kuwait, retrieved from file:///C:/Users/kashif.imran/Downloads/Econ2014EN-10-119515-11.pdf.

Chang, K. and Yu, S. (2013). Does crude oil price play an important role in explaining stock return behaviour? *Energy Economics*, 39, 159–168.

Chen, N., Roll, R., and Ross, S. (1986). Economic Forces and the stock market. *The Journal of Business*, Vol. 59, No. 3, 383-403.

Chen, Q. Lv, X. (2015). The Extreme-Value dependence between the crude oil price and Chinese stock market. *International Review of Economic and Finance*. 39,121-132.

Chen, W. Hamori and Kinkyo, T (2014). "Macroeconomic impact of oil prices and underlying financial shock". *Journal of International Financial Markets*, Institutions and Money. Vol.29, page 1-12.

Chow, G. C. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica*, *28*(3): 591-605.

Chau, F. and Deesomsak, R. and Wang, J. (2014) 'Political uncertainty and Stock Market volatility in the Middle East and North African (MENA) countries.', *Journal of international financial markets, institutions and money*., 28 . pp. 1-19.

CIA World Fact book and other sources 2016 "Kuwait economy 2016" Availablehttp://www.theodora.com/wfbcurrent/kuwait/kuwait_economy.html.

CIA-Central Intelligence Agency (2017). The Fact Book. https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html.

Cifarelli, C. and Paladino, G. (2010). Oil Price dynamics and speculation a multivariate financial Markets. Working Paper N. 15/2008

Ciner, C., (2011), "Eurocurrency Interest Rate Linkages: A Frequency Domain Analysis", *International Review of Economics and Finance*. 20, p. 498-505.

Ciner, C., Gurdgiev, C., Lucey, B.M. (2013), Hedges and safe havens: An examination of stocks, bonds, gold, oil and exchange rates. International Review of Financial Analysis, 29, 202-211.

Constantinos, K., Ektor, L. and Dimitrios, M. (2010). Oil price and stock market linkages in a small and oil dependent economy: The case of Greece. *Journal of Applied Business Research*, 26 (4), 55–63.

Cologni, A., & Manera, M. (2008). Oil prices, inflation and interest rates in a structural cointegrated VAR model for the G-7 countries. Energy Economics Journal, 30, 856-888.

Cong, R. G., Wei, Y. M., Jiao, J. L., and Fan, Y. (2008). Relationships between oil price shocks and stock market: an empirical analysis from China. *Energy Policy, 36:* 3544-3553.

Cunado, J. and Gracia, F. (2014). Oil price shocks and stock market returns: Evidence for some European countries. *Energy Economics*, 42, 365–377.

Cubujcuoglu, S, S. (2017). Energy Geopolitics in the Middle East after the OPEC Summit.

Energy Policy Turkey. PP: 46-51.

CMA annual report, (2009).

CMA annual report, (2010).

Davis, S.J. and Haltwanger, J. (2001). Sectoral job creation and destruction responses to oil price changes. *Journal of Monetary Economics*, 48 (3), 465–512.

Deaton, A. (2005). Measuring poverty in a growing world (or measuring growth in a poor world). *Review of Economics and Statistics*, 87 (1), 1–19.

Demirer, R., Jategaonkar, S. and Khalifa, A. (2015). Oil price risk exposure and the cross-section of stock returns: The case of net exporting countries. *Energy Economics*, 49, 132–140.

Degiannakis, S. Filis, G. and Arora, V. (2017). Oil Prices and Stock Markets. *Working Paper, US Energy Information Administration.*

Degiannakis, S., & Filis, G. (2017). Forecasting oil prices. https://mpra.ub.unimeenchen.de/77531/ /1/MPRA_paper_77531.pdf.

Dilip Kumar, S. Maheswaran (2013) "Correlation transmission between crude oil and Indian markets", *South Asian Journal of Global Business Research*, Vol. 2 Iss: 2, pp.211 – 229.

Dibooglu, S.and Aleisa, E. (2004). Relationship among US oil Prices and Oil Industry Equity Indices. *International Review of Economic and Finance.* Vol, 13 (4). 427-453.

Diebold, F. X. and Chen, C., (1996). Testing structural stability with endogenous breakpoint – A size comparison of analytic and bootstrap procedures. Journal of Econometrics, 70:221-241.

Dimitrios, A. and Stephen, H. G. (2011). *The Breusch–Godfrey LM test for serial correlation*. Applied Econometrics (Second ed.). New York: Palgrave Macmillan. pp. 159–61.

Doronin, D. (2013). Macro-level Market Analysis of Kuwait. Unpublished master thesis, Centria University of Applied Science. Retrieved from https://www.theseus.fi/bitstream/handle/10024/55142/Kuwait.pdf.

Dorgul, G, H. and Soytas, U. (2010). Relationship between oil prices, interest rate, and unemployment: Evidence from an emerging market. *Energy Economics*. vol. 32, Issue 6, 1523-1528.

Driesprong, G. Jacobsen, B. and Maat, B. (2008). Striking oil: Another puzzle? *Journal of Financial Economics,* 89, 307-327.

Drysdale, P., Jiang, K. and Meagher (2007). China and East Asian Energy: Prospects and Issues, *Asia Pacific Economic Paper* NO.361.

Dukheil, A.M. (2002). "Country profile: Saudi Arabia, 2001-2002". London: *Economist Intelligence* Unit 2003.

Ebinger, C, K. (2014). World Oil Demand: And Then There Was None. *Brooking Papers on Economic Activity*. 1 (1), 1-6.

Edey, M. (2009). The Global Financial Crisis and Its Effects. *Economic Papers.* Vol. 28. No.3. 186-195.

Eichler, M. (2007). Granger causality and path diagrams for multivariate time series. *Journal of Econometrics*, 137: 334–353.

Eliman, A.A, Girgis, M and KOTOB, S (1997). "A solution to post crash debt entanglement in Kuwait's al-Manakh stock market" *Institution for operations research and the management sciences*. 0092-2102/97/008USD0500. Available at http://classes.engineering.wustl.edu/2010/fall/ese403/software/Informs%20Articles/Ch3%20A%20Solution%20to%20Post%20Crash%20Debt%20Entanglements%20in%20Kuwait's%20al-Manakh%20Stock%20Market.pdf.

Elyasiani E., Mansur I. and Odusami B. (2011). Oil Price Shocks and Industry Stock Returns. *Energy Economics*, 33(5): 966-974.

Eltyeb, F. B. Mahmoud, A. M. and Shaharon, A. M. (2017). Effect of Oil Prices Volatility on Construction Budget in UAE. *International Journal of Engineering Research and Review*. Vol.5, Issue.1, PP: (22-31).

Elder, J,. and Serletis, A,. (2006). Oil Price Uncertainty. Journal of Money, Credit and Banking. University of Calgary.

Energy Information Administration (2014). Available at http//www.eia.doe.gov.

Engle, R. F. (2001). GARCH 101: The use of ARCH/GARCH models in applied econometrics. The Journal of Economic Perspectives, 15(4), 157-168.

Engle, R. F. (2002). Dynamic conditional correlation: a simple class of multivariate GARCH models. *Journal of Business and Economic Statistics, 20:* 339-350.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica, 50*: 987-1007.

Engle, R. F., and Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation and testing. *Econometrica*, 55(2): 251–276.

Essays, UK. (2013). The Global Financial Crisis Impact On Kuwait Economics Essay. Retrieved from https://www.ukessays.com/essays/economics/the-global-financial-crisis-impact-on-kuwait-economics-essay.php?vref=1.

Fan, Q. and Parvar, MR. J. (2012). U.S. industry-level returns and oil prices. *International Review of Economics and Finance*. 22, 112-128.

Fama, E.F., French, K.R. (1997), Size and book-to-market factors in earnings and returns. *The Journal of Finance*. 50(1), 131-155.

Fang, C. and You, S. (2014). The impact of oil price shocks on the large emerging countries' stock prices: Evidence from China, India and Russia. *International Review of Economics and Finance*, 29, 330–338.

Fattouh, B., Kilian, L. and Mahadeva, L. (2012). The Role Of Speculation In Oil Markets: What Have We Learned So Far? WPM 45, The Oxford Institute for Energy Studies.

Falzon, J. and Castillo, D. (2013). The Impact of Oil Prices on Sectoral Equity Returns: Evidence from UK and US Stock Market Data. *Journal of Financial Management, Markets and Institutions*, 1(2): 247-268.

Felix, P. (2000). The Collapse of the Souk al-Manakh: A Chronicle. Islamic-Finance.net. November 25, 2000. Islamic Finance. 20 October 2006. http://islamic-finance.net/islamic-ethics/article-13/article13-2.html.

Ferderer, P. (1996). Oil Price Volatility and the Macroeconomy. *Journal of Macroeconomics.* Vol, 18. Issue. Page: 1-26.

Ftiti, Z. Guesmi, K. and Teulon, F. and Chouachi, S. (2016). “Relationship between crude oil prices and economic growth in selected OPEC countries”. *The Journal of Applied Business Research*. Vol.32 (1). PP 11-22.

Filis, G. Degiannakis, S. and Floros, C. (2010). Dynamic Correlation between Stock Market and Oil Prices: The Case of Oil-Importing and Oil-Exporting Countries. International Review and Financial Analysis. No, 20. 152-164.

Fukuta, Y. (2002). A test for rational bubbles in stock prices. *Empirical Economics*, 27(4): 587–600.

Füss, R. (2007). Chapter 4: *Vector autoregressive models.* Uni Freiburg, viewed 28. May 2011, <http://www.empiwifo.uni-freiburg.de/lehre-teaching-1/winterterm/dateien-financial-data-analysis/chapter4.pdf/view>.

Cause, F. G. (2015). Sultans of Swings? The Geopolitics of Falling Oil Prices. Policy Briefing. Brooking Doha Centre. https://www.brookings.edu/wp-content/uploads/2016/06/Falling-Oil-Prices-English.pdf.

Gencer, H. and Demiralay, S. (2014). Shock and volatility spillover between oil prices and Turkish sector returns. *International Journal of Economics and Finance*, 6 (2), 174–180.

Gencer, H. and Kilic, E. (2014). Conditional correlation and volatility links among gold, oil and Istanbul stock exchange sector returns. *International Journal of Economics and Financial Issues*, 4 (1), 170–182.

Geweke, J. (1982). Measurement of linear dependence and feedback between multiple time series. *Journal of the American Statistical Association*, 77: 304–324.

Global investment House (2011).” GCC Market performance 2011” available at http://content.argaam.com.s3-eu-west-1.amazonaws.com/f72a5bc3-7b47-413d-a6f3-3bed259ed77f.pdf.

Global Investment House February 2009. “Kuwait Stock ExchangePerformance”http://www.globalinv.net/research/KSE-Performance-2008.pdf.

Global Investment House Market Outlook (2004).

Grosvenor, T. and Greenidge, K. (2013). Stock Market Volatility Spill over from Developed Markets to Regional Markets. *Business, Finance, and Economics in Emerging Economies*, Vol. 8, No. 2, 43-60.

Godfrey, L. G. (1978). Testing Against General Autoregressive and Moving Average Error Models when the Regressors Include Lagged Dependent Variables. *Econometrica*, 46: 1293–1301.

Gorton, G. B. (2012). Some Reflections on the Recent Financial Crisis. *NBER Working Paper Series*. Working Paper 18397.

Granger C. and Newbold P. (1974). Spurious regressions in econometrics. *Journal of econometrics*. 2(2), pp.111-120.

Gradejeric,. N. (2013). Causality between regional stock markets: A frequency domain approach. *Panoeconomius*. 5: 633-647.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37: 424–438.

Granger, C.W.J., (1981). Some Properties of Time Seriese Data and their Use in Econometric Model Specification. *Journal of Econometric*. Vol, 1. Page, 121-130.

Granger, C.W.J., M.L. King, and H. White (1995). Comments on Testing Economic Theories and the Use of Model Selection Criteria. *Journal of Econometrics*, 67, 173-187.

Granger, C. W., Huangb, B. N., & Yang, C. W. (2000). A bivariate causality between stock prices and exchange rates: evidence from recent Asianflu. The Quarterly Review of Economics and Finance, 40(3), 337-354.

Greene, W. H. (2003). *Econometric analysis*. Fifth edition. Prentice Hall Publishers.

Grima, S. and Garuana, L. (2013). The Effect of the Financial Crisis on Emerging Markets. A Comparative Analysis of the Stock Market Situation before and After. DIEM. Original Scientific Paper.

Gulf Investment Corporation Outlook (2012). The World is a different Place. *GCC Research Division* January 2012. Available at https://www.gic.com.kw/site_media/uploads/gic_2012_outlook.pdf.

Gupta, R. and Modise, M. (2013). Does the source of oil price shocks matter for South African stock returns? *Energy Economics*, 40, 825–831.

Hamilton JD. (1983). Understanding crude oil prices. *Energy Journal*. 30: 179–206.

Hamilton, J. (1996). This is What Happened to the Oil Price-Macroeconomy Relationship. *Journal of Monetary Economics* 38, 215-220.

Hamilton, J. D. (2003). What is an oil shock? *Journal of Econometrics*.113 (2), 363 - 398.

Hassan, S and M. Mohbobi (2013). The increasing influence of oil prices on the Canadian Stock market. *The Journal of Business and Finance Research.* vol. 7(3), p.27-39.

Hamilton, J. D. (2003). Oil and macro-economy since World War ll. *Journal of Political Economy*, 91-228-248.

Hamilton, J., Herrera,A. (2002). Oil Shocks and Aggregate Macroeconomic Behavior. *Journal of Money*. 36 (2), 265-286.

Hammoudeh, S. Yuan, Y. and McAleer, M. (2009). Shocks and Volatility spill over among equity sectors of the Gulf Arab stock markets. *The Quarterly Review of Economics and Finance*. 49, 829-842.

Hammoudeh, S., and Aleisa, E. (2004), Dynamic relationship among GCC stock markets and NYMEX oil futures, *Contemporary Economic Policy*, 22, 250-269.

Hamma, W., Jarboui, A., & Ghorbel, A. (2014). Effect of oil price volatility on Tunisian stock market at sector-level and effectiveness of hedging strategy. Procedia Economics and Finance, 13, 109-127.

Halaç, U., Taskin, F. D. and Cagli, E. C. (2013). The Turkish Stock Market Integration with Oil Prices: Cointegration Analysis with Unknown Regime Shifts. Panoeconomicus, 4: 499-513.

Hayo, B., and Kutan, A. M. (2005). The impact of news, oil prices, and global market developments on Russian financial markets. *Economics of Transition*, *13*: 373-393.

Hammoudeh, S., Aleisa, E., 2004. Dynamic relationship among GCC stock markets and NYMEX oil futures', *Contemporary Economic Policy*, 22, 250-269.

Hammami, F. (2017). Merchant Families in Kuwait. Economy. Retrieved from https://www.thebusinessyear.com/kuwait-2017/merchant-families-in-kuwait/focus.

Hooker, M. (1996). What happened to the oil price-macro economy relationship? *Journal of Monetary* Economics, 38, 195-213. http://www.amf.org.ae/sites/default/files/econ/annual%20reports/en/Annual%20Report%202014.pdf .https://www.tadawul.com.sa/wps/portal/tadawul/home/.

Hosoya, Y. (1991). The decomposition and measurement of the interdependence between second-order stationary processes. *Probability Theory and Related Fields*, 88: 429–444.

Hooker, M. A. (1996). What happened to the oil price - macroeconomy relationship? *Journal of monetary Economics*. 38 (2), 195 - 213.

Hooker, M. A. (2002). Are oil shocks inflationary?: Asymmetric and nonlinear specifications versus changes in regime. *Journal of Money, Credit, and Banking.* 34(2), 540 - 561.

Hosoya, Y. (2001). Elimination of third-series effect and defining partial measures of causality. *Journal of Time Series Analysis*, 22: 537–554.

Huang, R. D., Masulis, R. W., and Stoll, H. R. (1996). Energy shocks and financial markets. *Journal of Futures Markets, 16:* 1-27.

Huang, R.D., Masulis, R.W., Stoll, H.R. (1996), Energy shocks and financial markets. Journal of Futures Markets, 16(1), 1-27.

Huang, J. I. (2016). The relationship between oil prices and bond/stock market: A sectoral analysis (Doctoral dissertation, Temple University).

Ibrahim, S. (2008). The Oil Boom in the GCC Countries 2002-2008: Old Challenge and Old Dynamics. Carnegie Papers 15.

IMF (2005). "Kuwait: Selected issues and Statistical Appendix". IMF Country Report NO.05/234. Available at http://www.imf.org/external/pubs/ft/scr/2005/cr05234.pdf.

IMF (2009). "Kuwait: 2009 IV Consultation- Staff Report; Staff Statement; and Public Information Notice On the Executive Board Discussion". *IMF Country report* NO. 09/152, Available at http://www.imf.org/external/pubs/ft/scr/2009/cr09152.pdf.

International Monetary Fund (2017).

Imarhiagbe, S. (2010). Impact of oil prices on stock markets: Empirical evidence from selected major oil producing and consuming countries. Global Journal of Finance and Banking Issues, 4(4), 15.

Institute of Banking Studies, (1987).

Ito, T. and Krueger, A. O. (2007). *The Role of Foreign Direct Investment in East Asian Economic Development.* University of Chicago Press.

Ivanov, V. and Kilian, L. (2005). A Practitioner's Guide to Lag Order Selection for VAR Impulse Response Analysis. *Studies in Nonlinear Dynamics & Econometrics*, 9(1): 1-34.

Jaffe, A. (1997). The Political, Economic, Social, Cultural, and Religious Trends in the Middle East and the Gulf and Their Impact on Energy Supply, Security and Pricing. The Center for International Political Economy. The James A. Baker III Institute for Public Policy of Rice University.

Jin, X., Lin, S. X. and Tamvakis, M. (2012). Volatility transmission and volatility impulse response functions in crude oil markets. *Energy Economics*, 34(6): 2125–2134.

Jiang, Y. Yu, M. and Hashmi, S.S. (2017). The Financial Crisis and Co-Movement of Global Stock Markets. A Case of Six Major Economies. Sustainability. 9.260.

Jones, C. and Kaul, G. (1996). Oil and the Stock Markets. *The Journal of Finance*, Vol. 51, No. 2, 463-491.

Jones, D. W., & Leiby, P. N. (1996). The macroeconomic impacts of oil price shocks: a review of the literature and issues. *Oak Ridge National Laboratory*.

Jones, D. W., Paul N. L, & Inja K. P. (2004), Oil Price Shocks and the Macro economy: What Has Been Learned Since 1996? *The Energy Journal* 25(2), 1-32.

Jouini, J. (2013). Return and volatility interaction between oil prices and stock markets in Saudi Arabia. *Journal of Policy Modelling*, 35, 1124–1144.

Johansen, S. (1988) Statistical Analysis of Cointegration Vectors, *Journal of Economics*. Volume 12, Issues 2-3, Page 231-254.

Jones, C. M., and Kaul, G. (1996). Oil and the stock markets. *The Journal of Finance, 51:* 463-491.

Kang, w., Ratti, R.A and Yoon, K.H. (2015). The impact of oil price shocks on the stock market return and volatility relationship. *Journal of international Finance markets, Institution and Money*. 34, 41-54.

Kandiyoti, R. (2012). Pipelines: flowing oil and crude politics. IB Tauris. I.B. Tauris London New York. ISBN: 978-1-84885-839-8

Kanas, A. (2000). Volatility spillovers between stock returns and exchange rate changes: international evidence. *Journal of Business Finance and Accounting, 27*(3/4): 447-467.

Kavalerchik, R. L. (2010). An Analysis of the Random Walk Hypothesis based on Stock Prices, Dividends, and Earnings. *Vanderbilt Undergraduate Research Journal.* 6(1): 1-14.

Khalifa, A. A. A. Demirer, R., & Jategaonkar, S. P. (2015). Oil price risk exposure and the cross-section of stock returns: The case of net exporting countries. *Energy Economics.* 49, 132–140.

Khouli, R, A. and Ghafar, A, A. (2015). Repercussions of Oil Price Drop in Saudi Arabia. Honors Freshman Seminar (HONS 100).

Kesicki, F. (2010). The third oil price surge-what's different this time? *Energy Policy*. 38 (1): 1596–1605.

Khan, N. U. and Khan, S. (2016). Weak Form of Efficient Market Hypothesis – Evidence from Pakistan. Business & Economic Review. 8(special edition): 1-18.

Khatib, H., Barnes, A., & Chalabi, I. (2000). Energy security. World energy assessment: energy and the challenge of sustainability, 111-134.

Kilian, L. (2008). The Economic Effects of Energy Price Changes. *Journal of Economic Literature*, Vol. 46, No. 4, 871-909.

Kilian, L. (2009). Not All Oil Price Changes Are Alike: Disentangling Demand and Supply Changes in the Crude Oil Market. *The American Economic Review*, Vol. 99, No. 3, 10531069.

Kisswani, K. (2011). OPEC and political consideration when deciding on oil extraction. *Journal of Economics and Finance*. 38 (1): 96–118.

Kling, A. (2010). The Financial Crisis: Moral and Failure OR Cognitive Failure?. *Harvard Journal of Law and Public Policy*.Vol.33.pp: 507-518.

Kilian, L. (2007). The Economic Effects of Energy Prices Shocks. Department of Economics. University of Michigan and CEPR.

Kilian, Lutz, and Daniel P. Murphy (2014), "The Role of Inventories and Speculative Trading in the Global Market for Crude Oil," *Journal of Applied Econometrics*, 29(3), 454-478.

Kozumi, H. and Hasegawa, H., (2000). A Bayesian analysis of structural chances with an application to the displacement effect. The Manchester School of Economic and Social Studies, 68:476-490.

Kónya, L, (2006). Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Econ. Model* . 23(6), 978-992.

KSE Market Report (2014). Available at http://downloads.kuwaitse.com//Portal/KSEReports//12102015125728255l4DecSummaryE.pdf

KSE Summary Report (2014). Available at http://www.kuwaitse.com/KSE/Downloads.aspx.

Kuwait Stock Exchange Bulletins (2008), "Several bulletins from the Kuwait Stock Exchange", available at: http://kuwaitse.com/PORTAL/A/KSE/Downloads.aspx (accessed 24 December 2008).

Kuwait Stock Exchange Market, Historical Data. Available at http://www.kse.com.kw.

Kuwait Investment Authority (2016).

Kuwait Central Bank, (1986).

Kuwait Central Bank Annual Report, (2012/2013).

Lee, B.J. Yang, C.W. and Huang, B.N. (2012). Oil price movements, and stock markets revisited: A case of sector stock price indexes in the G-7 countries. *Energy Economics*. 34-, 1284-1300.

Li, S.F. Zhu, H.M. and Yu, K. (2012). Oil prices and stock market in China: A sector analysis using Panel Cointegration with multiple breaks. *Energy Economics*. 34, 1951-1958.

Ling, S,. and McAleer, M. (2003). Asymptotic Theory for a Vector ARMA-GARCH Model. *Econometric Theory*. V, 19 (2). P: 280-310.

Lin, B. Wesseh jr.P.K. And Appiah, M.O. (2014). Oil Price fluctuation, volatility spillover and the Ghanaian equity market: Implication for portfolio management and hedging effectiveness. *Energy Economics*. 42, 172-182.

Libanio, G. A. (2005). Unit roots in macroeconomic time series: theory, implications, and evidence. *Nova Economia*, 15(3): 145-176.

Lis, B., Nebler, C., and Retzmann, J. (2012). Oil and cars: the impact of crude oil prices on the stock returns of automotive companies. *International Journal of Economics and Financial Issues, 2*(2): 190-200.

Ling, S., and McAleer, M. (2003). Asymptotic theory for a vector ARMA–GARCH model. *Econometric Theory*. 19, 280–310.

Lopez, J., Sanchez, A., and Spanos, A. (2011). Macroeconomic linkages in Mexico. *Metroeconomica*. 62(2): 356–385.

Lucey, B., and Voronkova, S. (2008). Russian equity market linkages before and after the 1998 crisis: evidence from stochastic and regime-switching cointegration tests. *Journal of International Money and Finance, 27*(8): 1303-1324.

Maghyereh, A. (2004). Oil Price Shocks and Emerging Stock Markets: A Generalized VAR Approach. *International Journal of Applied Econometrics and Quantitative Studies*, 1(2): 27-40.

Mahadeva, L. and Robinson, P. (2004). *Unit root testing to help model building*. Handbooks in Central Banking # 22. Bank of England.

Matei, M. (2009). Assessing volatility-forecasting models: why GARCH models take the lead. *Romanian Journal of Economic Forecasting*, 4: 42-65.

Maghyereh, A. and Al-Kandari, A. (2007). Oil prices and stock markets in GCC countries: New evidence from nonlinear cointegration analysis. *Managerial Finance*, 33 (7), 449–460.

Mahmoud, A.S. (1986), National burden of the crisis of the stock market in Kuwait. *Social Sciences Journal*. Vol. 14 No. 1, pp. 13-34.

Malik, F. and Ewing, B. (2009). Volatility transmission between oil prices and equity sector returns. *International Review of Financial Analysis*. 18, 95-100.

Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics*, 61 (S1), 631-652.

Malik, F. and Hammoudeh, S. (2007). Shock and Volatility transmission in the oil, US and Gulf equity markets. *International Review of Economics and Finance*. 16, 357-368.

MacKinnon, J. G. (1991), 'Critical values for cointegration tests', in Long-run Relationships: Readings in Cointegration, eds. R. F. Engle and C. W. J. Granger, Oxford: Oxford University Press, 267–276.

Martinez, P., Lapena, R. and Sotos, F. (2014). Oil price risk in the Spanish stock market: An industry perspective. *Economic Modelling*, 37, 280–290.

Mashal, A.M. (2012). "The financial crisis of 2008-2009 and the Arabs latest economies". *International Journal of Business and Management*. Vol.7, NO. 4, 96-111.

Masih, R., Peter, S. and Mello, L. (2011). Oil price volatility and stock price fluctuations in an emerging market: Evidence from South Korea. *Energy Economics*, 33 (1), 975–986.

Marshall, J. (2009). The Financial Crisis in the US: Key Events, Causes and Responses. *House of Common Library*. Research Paper 09/34.

Mermod,. A,. Y. Celik,. S and Gunes,. H, (2010). Frequency domain analysis of consumers' confidence, industrial production and retail sale for selected European countries. *6th Colloquium on Modern Tools for Business Cycle Analysis*: The Lessons from the Global Economic Crisis Luxembourg, September 26-29.

Mehrara, M. (2008). The asymmetric relationship between oil revenues and economic activities: The case of oil - exporting countries. *Energy Policy*. 36 (3), 1164 - 1168.

Ministry of Finance of Kuwait (2010, 2017). Statistics. Retrieved on 5 February 2015 from www.mof.kw.gov/mof.

Miller, J. I., & Ratti, R. A. (2009). Crude oil and stock markets: Stability, instability, and bubbles. Energy Economics, 31(4), 559-568.

Mitrova, T. (2015). GCC Oil in World Energy Markets. *The Emirates Center for Strategic Studies and Research*. 24-25.

Mills, F. C. (1924). *Statistical Methods,* Henry Holt, New York, USA.

Mishra, A. K. (2004). Stock Market and Foreign Exchange Market in India: Are they Related? South Asia Economic Journal, 5(2): 209 – 232.

Mohanty, S. Nandha, M. Habis, E. and Juhabi, E. (2014). Oil Price risk exposure: The case of the U.S. Travel and Leisure Industry. *Energy Economics*. 41, 117-124.

Mohanty, S., Nandha, M., Turkistani, A. and Alaitani, M. (2011). Oil price movements and stock market returns: Evidence from Gulf Cooperation Council (GCC) countries. *Global Finance Journal*, 22, 42–55.

Mollick, A.V. and Assefa, T.A. (2013). U.S. stock returns and oil prices: The tale from daily data and the 2008-2009 financial crisis. Energy *Economics*. 36, 1-18.

Mohsin, M. (1995). Economics of Small Business in Islam (Visiting Scholar Research Series No. 2, Islamic Research and Training Institute 1995).

Muhammad, N. and Rasheed, A. (2002). Stock Prices and Exchange Rates: Are they Related? Evidence from South Asian Countries. *The Pakistan Development Review,* 41(4): 535-550.

Muhtaseb, B. M. A. and Al-Assaf (2017). Oil Price Fluctuations and their Impact on Stock Market Returns in Jordan: Evidence from an Asymmetric Cointegration Analysis. *International Journal of Financial Research*, 8(1): 172-176.

Naifar, N. and Dohaiman, M. (2013). Nonlinear analysis among crude oil prices, stock markets' return and macroeconomic variables. *International Review of Economics and Finance*, 17, 416–431.

Nandha, M. and Faff, R. (2008). Does oil move equity prices? A global view. *Energy Economics,* 30, 986-997.

Narayan, P. and Sharma, S. (2014). Firm return volatility and economic gains: The role of oil prices. *Economic Modelling*, 38, 142–151.

Narayan, P.K. and Sharma, S.S. (2011). New evidence on oil price and firm returns. *Journal of Banking& Finance*. 35, 3253-3262.

Narayan, p. Gupta, R. (2015). Has oil price predicted stock returns for over a century. *Energy Economic*, 48 (1), 18-23.

Narayan, P.K. and Smyth, R. (2006). What determines migration flows from low income to high income countries? An empirical investigation of Fiji- US migration 1972-2001. *Contemporary Economic Policy*, 24(2): 332- 342.

NBK (2014). "Kuwait: Robust Profit growth on the back of a healthier economy". Available at

http://www.kuwait.nbk.com/InvestmentAndBrokerage/ResearchandReports/USDDocument/MonthlyBriefs/en-gb/MainCopy/USDUserFiles/EUKSEProfits20140603E.pdf.

Nelson, D. (1991). Conditional heteroscedasticity in assets returns: A new approach, *Econometrica*, 59, 347-370.

Nejada, M. K., Jahantighb, F., and Rahbari, H. (2016). The long run relationship between oil price risk and Tehran stock exchange returns in presence of structural breaks. *Procedia Economics and Finance*, 36: 201 – 209.

Nelson, C. R., and Plosser, C. R. (1982). Trends and random walks in macroeconmic time series. *Journal of Monetary Economics*, 10 (2): 139.

Newey, W. K., and West, K. D. (1978). A simple, positive semidefinite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, *55*: 703-708.

Nguyen, C. and Bhatti, M. (2012). Copula model dependence between oil prices and stock markets: Evidence from China and Vietnam. *Journal of International Financial Markets, Institutions & Money*, 22, 758–773.

Ng, H.S. and Lam, K. P. (2003). How Does the Sample Size Affect GARCH Model? Department of System Engineering and Engineering Management, The Chinese University of Hong Kong, Shatin, N. T., Hong Kong. https://www.atlantis-press.com/php/download_paper.php?id=139.

Nickell. S. (1981). Biases in dynamic models with fixed effects. *Econometrica*, 49: 1417-1426.

Nielsen, H. B. (2005). Non-Stationary Time Series and Unit Root Tests. Retrieved from www.econ.ku.dk/metrics/econometrics2_05_ii/slides/08_unitroottests_2pp.pdf.

Nielsen, H. B. and Whitby, A. (2015). A Joint Chow Test for Structural Instability. *Econometrics*, 3, 156-186.

Onour, I. A. (2007). Impact of Oil Price Volatility on Gulf Cooperation Council Stock Markets' Return. *OPEC Review*, 31(3): 171-189.

OPEC Annual Statistical Bulletin 2015.

OPEC Annual Statistical Bulletin 2017.

Osterwald-Lenum, M. (1992). A Note with Quantities of the Asymptotic Distribution of the Maximum Likelihood Cointegration Rank Test Statistics, *Oxford Bulletin of Economics and Statistics*, 54, 461-472.

Oskenbayev, Y. Yilmaz, M. and Chagirov, D. (2011). "The impact of macroeconomic indicators on stock exchange performance in Kazakhstan". *African Journal of Business Management*. Vol. 5 (7), PP. 2985-2991.

Ozer,. M., and Kamisli,. M. (2016). Frequency domain analysis of interaction between financial markets of Turkey. *International Business Research*. Vol,9. No,1. 176-186.

Park, J. and Ratti, R. A. (2008). Oil price shocks and stock market in the U.S, and 13 European countries. *Energy Economics*, 30, 2587-2608.

Palm, F., and Zellner, A. (1974). Time Series Analysis and Simultaneous Equation Econometric Models. *Journal of Econometrics*, 2(1): 17-54.

Paul, R.K. (2006). *Autoregressive Conditional Heteroscedasticity (ARCH) Family of Models for describing Volatility*. University of Delhi Discussion Paper series.

Paleari, S. Redondi, R. and Vismara, S. (2005). Stock Market Interdepence During Iraq War. Investment Management and Financial Innovations. 2(3).

Phillips, P. C. B. and Ouliaris, S. (1990). Asymptotic Properties of Residual Based Tests for Cointegration. *Econometrica*, 58 (1): 165–193.

PK, Narayan and Seema, N. (2010). Modeling the impact of oil prices on Vietnam's stock prices. *Applied Energy*.Vol.87 (1), 356-361.

QMS-Quantitative Micro Software (2007). *EViews 6. Quantitative Micro Software,* Irvine, CA. Retrieved from: http://www.EViews.com.

Ratti, R. and Hasan, M. (2013). Oil Price Change and Volatility in Australian Stock Returns. *Economic Record*, Vol. 89, 67-83.

Rafiq, S., Salim, R., & Bloch, H. (2009). Impact of crude oil price volatility on economic activities: An empirical investigation in the Thai economy. *Resources Policy*. 34 (3), 121 – 132.

Ravichandran and Alkhatlan (2010). Impact of Oil Prices on GCC Stock Market. *Research in Applied Economics*. Vol. 2, No. 1: E4.

Roger G. Ibbotson, R. G. (2011). Why does market volatility matter? Retrieved from http://insights.som.yale.edu/insights/why-does-market-volatility-matter.

Sab, R. (2014). *Economic Impact of Selected Conflicts in the Middle East: What Can We Learn from the Past*? IMF Working Paper WP/14/100. International Monetary Fund.

Sadorsky, P. (1999). Oil price shocks and Stock Market activity. *Energy Economics*. 2 449-469.

Sadrosky, P. (2015). Forecasting Canadian mortgage rates. Page, 822-825.

Sargan, J. D. (1964), Wages and prices in the United Kingdom , in Hart, P. E., Mills, G. and Whitaker, J. K. (eds.) *Econometric Analysis for National Economic Planning* (London: Butterworths).

Sanusi, M.S. and Ahmad, F. (2016). Modelling oil and gas stock returns using multi factor asset pricing model including oil price exposure. *Finance Research Letters*. Vol 18, Pages 89-99.

Saudi Arabian Monetary Agency (SAMA), Data Base available at: www.sama.gov.sa.

Sab, R. (2014). Economic Impact of Selected Conflicts in the Middle East: What Can We Learn From the Past? *IMF Working Paper WP/14/100*. International Monetary Fund.

Sahu, T, N., Bandopadhyay, K, Mondal, D. (2014). An empirical study on the dynamic relationship between oil prices and Indian stock market. *Managerial Finance*. Vol. 40 Issue: 2, pp.200-215, https://doi.org/10.1108/MF-06-2013-0131.

Scott, H. R. and Abdulnasser H-J (2008). Optimal lag-length choice in stable and unstable VAR models under situations of homoscedasticity and ARCH. *Journal of Applied Statistics*, 35(6):601-615.

Shawkat, H. and Alesia, E. (2004). Links and Volatility Transmission between NYMEX Oil Futures and the GCC Stock Market Indices. *Contemporary Economic Policy*, 22(2): 250-269.

Sharewadi (2008). Dubai Financial Market and Abu Dhabi Securities Information.

Sims, C. (1980). Macroeconomics and reality. *Econometrica*, 48(1): 1-48.

Sosa-Escudero, W. (1997). Testing for unit-roots and trend-breaks in Argentina real GDP. *Economica*, 43: 123-142.

Soufan, T. Khaliq.S.A and Shihab, R. A. (2012). Causes of the Global Financial Crisis and Its Effects on the Arab Countries. *Canadian Social Science*. Vol. 8, No. 6, 2012, pp. 153-159.

Spanos, A. (2006). *Where Do Statistical Models Come from? Revisiting the Problem of Specification*. Lecture Notes-Monograph Series, Vol. 49, Optimality: The Second Erich L. Lehmann Symposium (2006), pp. 98-119.

Spanos, A. (2013). A frequentist interpretation of probability for model-based inductive inference. *Synthese*, 190(9): 1555–1585.

Stern, D. I. (2011). *From Correlation to Granger Causality*. Retrieved from www.sterndavidi.com/Publications/AIJOS.pdf .

Stavros, A, D. Filis, G,. and Kizys, R,. (2014). The Effects of Oil Price Shocks on Stock Market Volatility: Evidence from European Data. *The Energy Journals*. 35(1). 35-56. DOI: 10.5547/01956574.35.1.3.

Stock, J. H. (1987). Asymptotic Properties of Least Squares Estimators of Cointegrating Vectors. *Econometrica*, 56: 1035-56.

Swedber, R. (2009). The Structure of Confidence and the Collapse of Lehman Brothers. Research in the Sociology of Organizations.

Tadawul Annual Report (2002).

Teulon, F. and Guesmi, K. (2014).”Dynamic spillover between the oil and stock markets of emerging oil-exporting countries”. *The Journal of Applied Business Research*. VOL.30 (1). PP 51-58.

The Capital Market Authority (CMA) on the Internet. Saudi Arabian government organization, available at: <http://www.cma.org.sa/en>.

Tiwari,. A. Mustacus,. M. Albulescu,. C,. T and Kyophillarong,. P. (2015). Frequency domain causality analysis of stock market and Economic activity in India. Vol 39, Pages 224-238.

Trenca, I., Mutu, S., and Dezsi, E. (2011). Advantages and limitations of VAR models used in managing market risk in banks. *Finance – Challenges of the Future*, 13: 32-43.

Toda, H. Y., Phillips, P.C.B., (1993). Vector Autoregressive and Causality. Econometrica. 61. 1367-1394.

Verbeek, M. (2008). *A guide to modern econometrics*. 3. ed., John Wiley & Sons, Ltd. Rotterdam.

Wanga, Y., Wua, C., and Yang, L. (2013). Oil price changes and stock market activities: evidence from oil-importing and exporting countries. *Journal of Comparative Economics*, 41, 1220-1239.

Walid, C. and Nguyen, K. (2014). Exchange rate movements and stock market returns in a regime-switching environment: Evidence for BRICS. *Research in International Business and Finance,* 31: 46-56.

Walid, C., Chaker, A., Masoodb, O., and Fry, J. (2011). Stock market volatility and exchange rates in emerging countries: A Markov-state switching approach. *Emerging Markets Review*, 12(3): 272-292.

Wang, Y., Wo, C. and Yang, L. (2013). Oil Price Shocks and Stock Market Activities: Evidence from Oil-Importing and Oil-Exporting Countries. *Journal of Comparative Economics*, 41(4): 1220-1239.

Wang, Y., Wu, C., Yang, L. (2013), Oil price shocks and stock market activities: Evidence from oil-importing and oil-exporting countries. Journal of Comparative Economics, 41(4), 1220-1239.

Wei, C. and Chen, C. (2014). Does WTI oil price returns volatility spill over to the exchange rate and stock index in the US? *International Journal of Energy Economics and Policy*, 4 (2), 189–197.

Westfall, P. H. (2014). Kurtosis as Peakedness, 1905 – 2014. R.I.P. *The American Statistician*, 68, 191–195.

Wheelock, D. C. (2011). Banking Industry Consolidation and Market Structure: Impact of the Financial Crisis and Recession. *Federal Reserve Bank of St. Louis Review*. 93 (6). Pp.419-438.

Wilcox, R. R., (1997). Comparing the slopes of two independent regression lines when there is complete heteroscedasticity. British Journal of Mathematical and Statistical Psychology, 50:309-317.

World Bank (2006). *Ease of Doing Business: 2006*. World Bank, Washington DC, USA. Retrieved from http://www.doingbusiness.org/~/media/ WBG/Doing Business/ Documents/ Annual-Reports/ English/DB06-FullReport.pdf.

World Bank/IFC (2010). Doing Business 2010: Kuwait. Retrieved on 5 February 2015 from www.doingbusiness.org/Documents/CountryProfiles/KWT.pdf.www.opec.org/opec_web/static_files_project/media/downloads/publications/ASB2015.pdf.

World Bank, (2004).

Wolfers, J. and Zitzewitz. (2004). Using Markets to Inform Policy: The Case of the Iraq War. ftp://www.cemfi.es/pdf/papers/Seminar/J.Wolfers_Paper.pdf.

Yao, F., and Hosoya, Y. (2000). Inference on one-way effect and evidence in Japanese macroeconomic data. *Journal of Econometrics*, 98: 225–255.

Yau, H-Y. and Nieh, C-C. (2008). Testing for cointegration with threshold effect between stock prices and exchange rates in Japan and Taiwan. Japan and the World Economy, 21(3): 292-300.

Yetiv, S.A and Lu, C. (2007). China, Global Energy, and the Middle East. The Middle East Journal. 61. 2. Page. 199.

Yilmaz, K. (2009). Return and Volatility Spillover among the East Asian Equity Markets. Journal Of Asian Economic, Forthcoming. Available at SSRN: // ss.com/abstract=1479522.

Yousefi, A., Wirjanto, T.S. (2003), Exchange rate of the US dollar and the J curve: The case of oil exporting countries. Energy Economics, 25(6), 741-765.

Yousefi, A., Wirjanto, T.S. (2005), A stylized exchange rate pass-through model of crude oil price formation. OPEC Review, 29(3), 177-197.

Zarour, B. A. (2006). Wild Oil Prices, but Brave Stock Markets! The Case of GCC Stock Markets. *Operational Research*, 6(2): 145-162.

Zhu, H.M. Li, S.F. and Yu, K. (2011). Crude Oil Shocks and Stock Markets: A Panel threshold Cointegration approach. *Energy Economics*. 33, 987-994.

Zhang, Y.J., Wei, Y.M. (2010), The crude oil market and the gold market: Evidence for cointegration, causality and price discovery. Resources Policy, 35(3), 168-177.

Zivot, E., (2008). Practical Issues in the Analysis of Univariate GARCH Some Stylized Facts of Asset Returns. *Time*. pp.1–41.

Appendices

Appendix A

STATE of KUWAIT
Detailed Empirical Findings

1.0 Graphical Representation

The purpose of this section is to analyze our data with respect to the defined full sample period and for the three shocks.

Full Sample

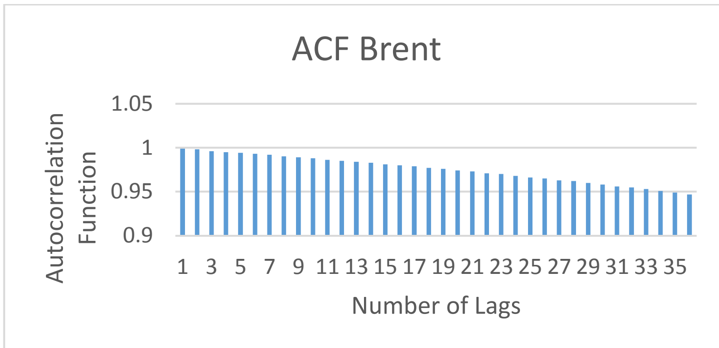


Figure A1.1: Brent Autocorrelation Function

The above figure shows the autocorrelation function of Brent oil price of Kuwait with thirty-six lags. With growing lags, the pattern is decreasing continuously and in a slow manner, confirming that the series are non-stationary.

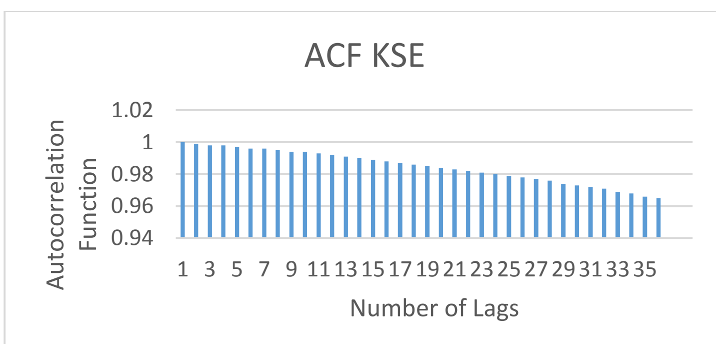


Figure A1.2: KSE Autocorrelation Function

The figure depicts the autocorrelation function of Kuwait stock prices with thirty-six lags. The ACF is decreasing continuously as the number of lags are increasing which clearly indicates that stock prices have non-stationary properties as commonly show by research in the field analyzing oil prices behavior. To overcome this issue, prices have been converted into returns that represent a stationary trend.

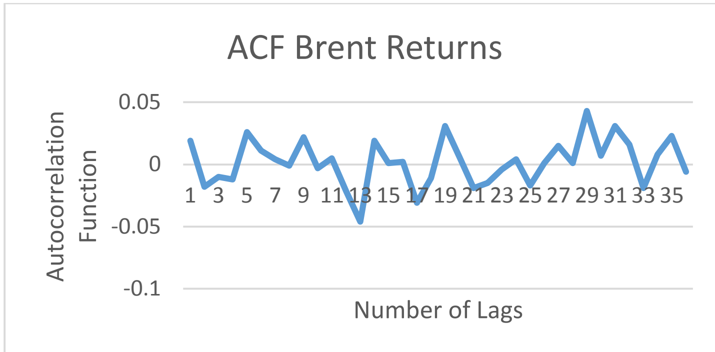


Figure A1.3: Brent Returns Autocorrelation

It can be noted from the above figure, that by taking the returns of the Brent oil, returns become smoother to some extent and the fluctuations are in narrow boundary now. That is a key reason to convert the time series data into returns to minimize the fluctuations associated with time series data and make it stationary. Hence, the use of non-stationary data violated many assumptions of the model. This leads to the estimators no longer having the correct properties, such as asymptotic normality and sometimes even consistency (Lin and Brannigan, 2003).

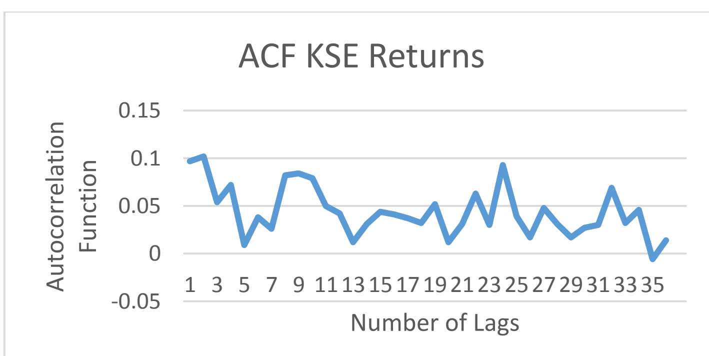


Figure A1.4: KSE Returns Autocorrelation Function

The above figure shows the autocorrelation function of Kuwait stock returns with thirty-six lags. In all lags length the stock returns show a positive values except the 35th lag.

Shock-I

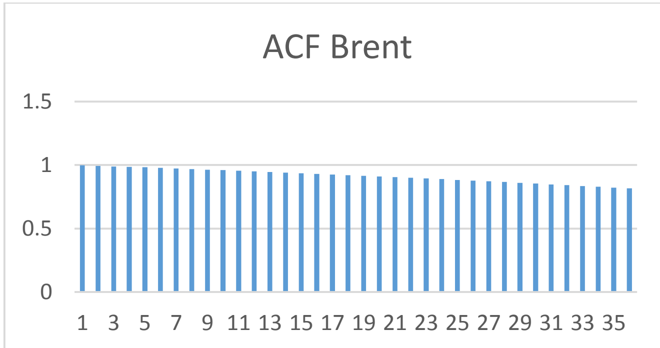


Figure A1.5: Brent Prices Autocorrelation Function

The above shows the autocorrelation function of Kuwait stock prices with thirty-six lags. As the number of lags increase, the pattern of the ACF is decreasing continuously.

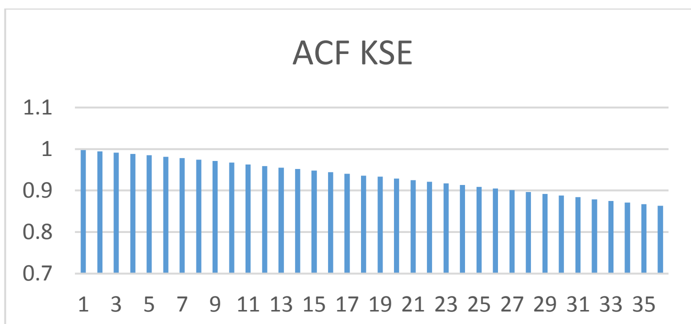


Figure A1.6: KSE Autocorrelation Function

The above Figure represents the autocorrelation function and one can see a straight downward trend over the 36 lags.

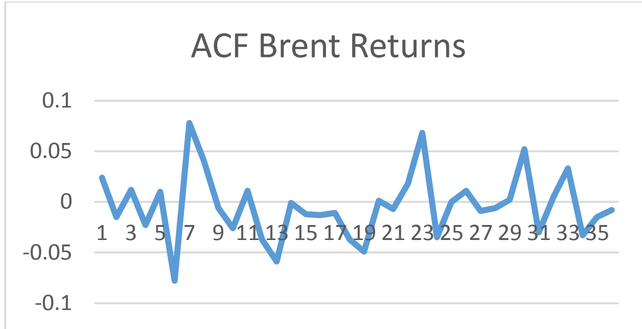


Figure A1.7: Brent Returns Autocorrelation function

The above figure shows the autocorrelation function of Brent returns with thirty-five lags. In all lags length, the Brent returns show positive values except the35th lag.

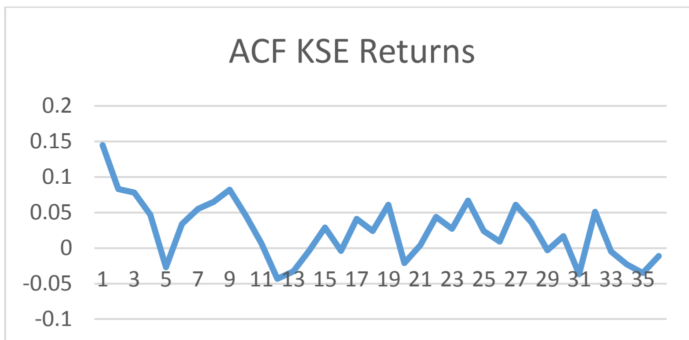


Figure A1.8: Stock Returns Autocorrelation Function

The above figure shows the autocorrelation function of stock returns with thirty five lags. In all lags stock returns remain positive except at lag 4, 11, 13, 31 and 35 where they show negative trends.

Shock-2

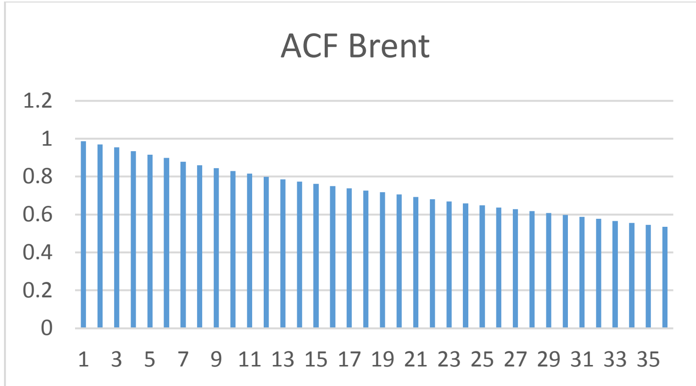


Figure A1.9: Brent Autocorrelation Function

The above figure shows that the autocorrelation function of Brent prices with thirty-six lags. As the number of lags increases the pattern of the ACF is decreasing continuously.

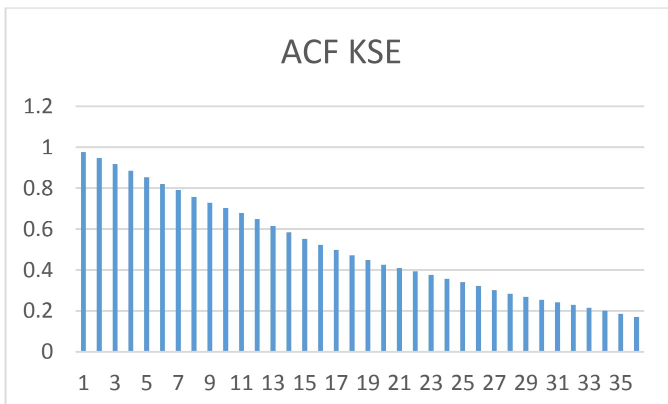


Figure A1.10: KSE Autocorrelation Function

The above Figure shows the the autocorrelation function of Kuwait stock prices with thirty-six lags. As the number of lags increase, the pattern of the ACF for stock prices decreases rapidly which is notable.

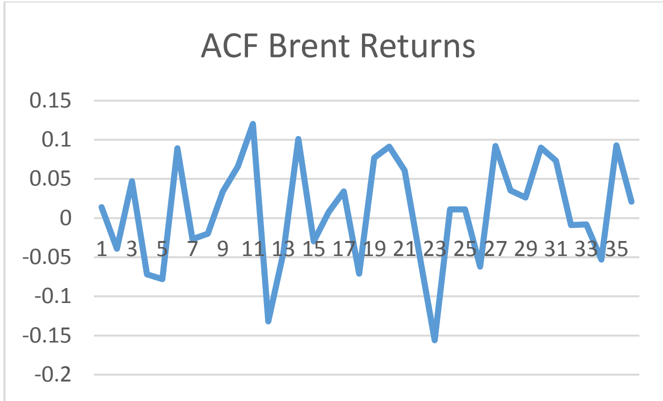


Figure A1.11: Brent Returns Autocorrelation Function

The above Figure illustrates the autocorrelation function of Brent returns with thirty-five lags. In most of the lags, the Brent returns shows positive values except in a few. The ACF is negative between lag 3 and lag 5, between lag 11 and 13 and between 21 and 25.

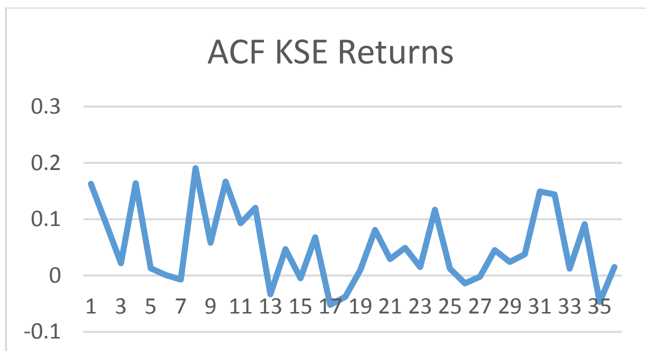


Figure A1.12: KSE Returns Autocorrelation Function

The above Figure shows the autocorrelation function of KSE returns with thirty-five lags. In all lags length, the Brent returns shows a positive values except at lag17 and 35.

Shock-3

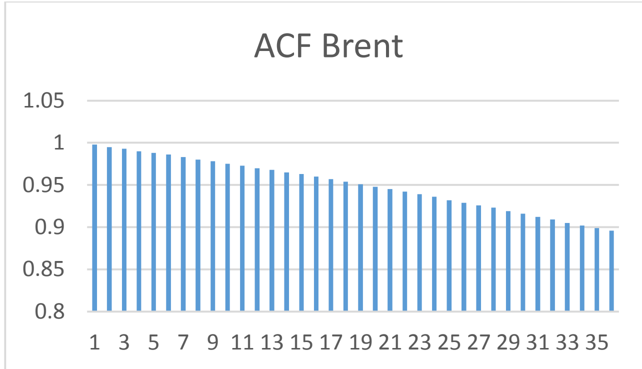


Figure A1.13: Brent Autocorrelation Function

The above figure shows the autocorrelation function of Brent for shock three and it is noted that the figure shows a declining trend as the number of lags increase.

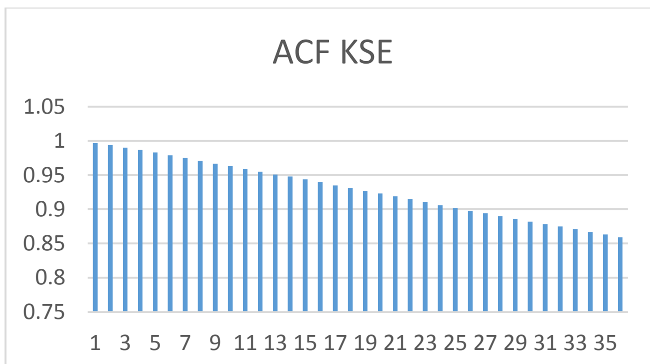


Figure A 1.14: KSE Autocorrelation Function

The above Figure represents the autocorrelation function of KSE stock prices and it shows a straight downward trend as the number of lags increase.

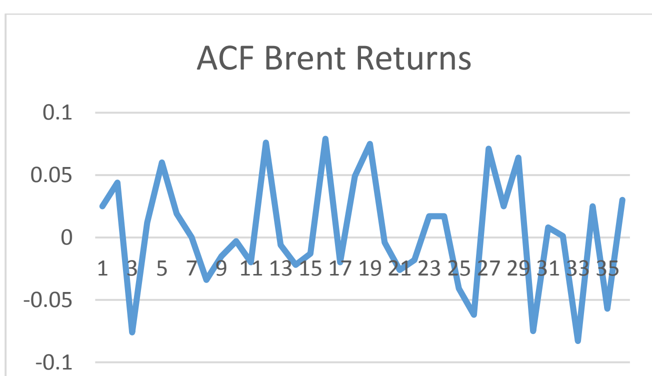


Figure A1.15: Brent Returns Autocorrelation Function

The above Figure demonstrates the autocorrelation function of Brent returns and a mix of positive and negative trends are observed. The ACF function remains positive is most of the cases, except at lags 3, 7, 9, and 25 to 35 .

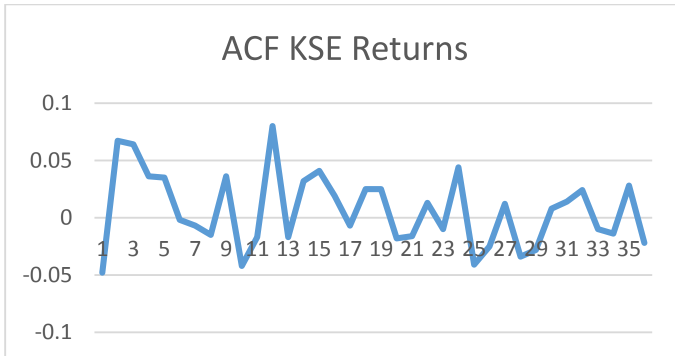


Figure A1.16: KSE Returns Autocorrelation Function

The above Figure exhibit the autocorrelation function of KSE returns and a mix of positive and negative trends are recorded. The ACF function remain positive is most of the cases except at lag 1, 7 to 11, 19 to 21, 25 to 29 and then at the last lag.

2.0 VAR Lag Order Selection

Table: 2.0.1: Lag Selection

VAR Lag Order Selection		
Country	**Sample**	**SIC Criteria**
Kuwait	Full Sample	3
	Shock-I	1
	Shock-II	2
	Shock-III	1

VAR Lag Order Selection Criteria (Full Sample Kuwait)

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSE						
Included observations:3474						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-49,144.87	NA	7.77E+09	28.4497	28.45327	28.45098
1	-26,150.52	45,948.77	12,906.68	15.1413	15.15193	15.14507
2	-26,120.67	59.61195	12,714.99	15.1263	15.14408	15.13265
3	-26,100.55	40.14812	12,596.93	15.117	15.14187*	15.12586
4	-26,097.82	5.455017	12,606.16	15.1177	15.14972	15.12913
5	-26,081.1	33.3236	12,513.71	15.1103	15.14948	15.12431*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

VAR Lag Order Selection Criteria (Shock-1)

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSE						
Included observations: 839						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-11,193	NA	1.33E+09	26.6863	26.6976	26.6906
1	-6,747.1	8,859.87	33,596.14	16.0979	16.13176*	16.1109
2	-6,737.8	18.3796	33,178.72	16.0854	16.1418	16.10704*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

VAR Lag Order Selection Criteria (Shock-II)

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSE						
Included observations: 433						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-5,184.2	NA	8,6774,398	23.9546	23.9734	23.962
1	-3,433.1	3,477.86	27,153.05	15.885	15.9414	15.90727
2	-3,418.8	28.3655	25,885.74	15.8372	15.93121*	15.87431*
3	-3,417.4	2.61075	26,207.43	15.8496	15.9812	15.9015
4	-3,415.6	3.52438	26,475.32	15.8597	16.0289	15.92651
5	-3,402.1	26.3678	25,335.73	15.8157	16.0225	15.89735
6	-3,399.8	4.50829	25,533	15.8234	16.0679	15.91994
7	-3,393.5	12.1285	25,265.79	15.8129	16.0949	15.92424
8	-3,392.8	1.30848	25,656.75	15.8282	16.1479	15.95442
9	-3,382.7	19.2773	24,946.94	15.8002	16.1574	15.94117
10	-3,380.8	3.72059	25,184.68	15.8096	16.2045	15.96546
11	-3,379.6	2.14332	25,521.77	15.8228	16.2553	15.99356
12	-3,374.9	8.99115	25,432.49	15.8193	16.2893	16.00484
13	-3,364.9	18.70168*	24,742.12*	15.79169*	16.2994	15.9921
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

VAR Lag Order Selection Criteria (Shock-III)

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSE						
Included observations: 1083						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-13,895	NA	4.80E+08	25.6648	25.674	25.6683
1	-7,954.4	11849.2	8,307.426	14.7007	14.72829*	14.71112*
2	-7,951.7	5.45829	8,326.752	14.703	14.749	14.7204
3	-7,947.1	9.14762	8,317.478	14.7019	14.7663	14.7263
4	-7,942	10.0636	8,301.002*	14.69988*	14.7828	14.7313
5	-7,941.3	1.26333	8,352.703	14.7061	14.8074	14.7445
6	-7,939.8	3.06896	8,390.54	14.7106	14.8304	14.7559
7	-7,938.5	2.54706	8,432.625	14.7156	14.8538	14.7679
8	-7,934.5	7.89501	8,432.475	14.7156	14.8722	14.7749
9	-7,933	2.84025	8,472.367	14.7203	14.8953	14.7866
10	-7,931.7	2.68923	8,513.619	14.7252	14.9186	14.7984
11	-7,929.8	3.61102	8,547.599	14.7292	14.941	14.8094
12	-7,928.6	2.43259	8,591.228	14.7342	14.9645	14.8214
13	-7921	14.83342*	8,534.238	14.7276	14.9763	14.8217
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

3.0 Unit Root Test

Table 3.0.1: Stationary Test (Full Sample)

Variables	**PP**		**KPSS**	
	Level	**1st Diff**	**Level**	**1st Diff**
BP	-1.6005	-57.258*	4.71025	0.169**
KSE	-1.4528	-58.653*	0.62267	0.294**
BPR	-57.775	-1,097.713*	0.16461	0.036**
KSER	-58.268	-820.767*	2.97475	0.190**

-: SC: Schwarz information criterion for lag selection, PP: Phillips- Perron test. KPSS: Kwiatkowski-Phillips-Schmidt-Shin Test. **: 1% level of significance, **: Null Hypothesis (H0: Series is Stationary) accepted at 1% Level of significance.* Shock-I: 19th March, 2003 US Military Strike in Iraq, Shock-II: 15th Sep, 2008 US Financial Crisis, Shock-III: 25th Jan, 2011, Arab Spring.

Table 3.0.2 : Unit Root Test (All Shocks)

Shocks	**SC**	**Variables**	**PP**		**KPSS**	
			Level	**1st Diff**	**Level**	**1st Diff**
I	1	BP	-1.150	-28.401*	3.119	0.083**
		KSE	-1.637	-26.573*	3.416	0.225**
		BPR	-28.484	-212.390*	0.074	0.093**
		KSER	-25.759	-233.647*	0.792	0.211**
II	2	BP	-1.293	-20.429*	1.752	0.264**
		KSE	-5.127	-19.082*	1.077	0.642**
		BPR	-20.965	-149.534*	0.283	0.103**
		KSER	-18.452	-99.760*	0.523	0.186**
III	1	BP	-0.512	-32.298*	3.515	0.197**
		KSE	-1.032	-34.087*	0.917	0.189**
		BPR	-32.350	-269.028*	0.160	0.081**
		KSER	-34.884	-387.573*	0.196	0.217**

-: SC: Schwarz information criterion for lag selection, PP: Phillips- Perron test. KPSS: Kwiatkowski-Phillips-Schmidt-Shin Test. **: 1% level of significance, **: Null Hypothesis (H0: Series is Stationary) accepted at 1% Level of significance.* Shock-I: 19th March, 2003 US Military Strike in Iraq, Shock-II: 15th Sep, 2008 US Financial Crisis, Shock-III: 25th Jan, 2011, Arab Spring.

4.0 Cointegration Tests

Table 4.0.1: Engle Granger Cointegration (Full Sample)

Variable	**tau-statistic**	**P-Value**
BP	-1.827992	0.6165
KSE	-1.501631	0.7626

Table 4.0.2: Engle Granger Cointegration Test

Shocks	Variable	tau-statistic	P-Value
1	BP	-2.740574	0.1864
	KSE	-2.780635	0.1730
2	BP	-1.191709	0.8607
	KSE	-5.554836	0.0000
3	BP	-1.078088	0.8865
	KSE	-1.337117	0.8200

Table 4.0.3 : Johansen Cointegration (Full Sample)

Hypothesis No of CE (s)	Trace Statistics	P-Value	Maximum Eigen Statistics	P-Value
None	5.907	0.9537	3.731	0.970
At Most 1	2.176	0.7426	2.176	0.743

Table 4.0.4 : Johansen Cointegration Test

Shocks	Hypothesis No of CE (s)	Trace Statistics	P-Value	Maximum Eigen Statistics	P-Value
1	None	20.275	0.050	11.993	0.186
	At Most 1	8.282	0.073	8.282	0.073
2	None	41.808	0.000	36.937	0.000
	At Most 1	4.871	0.298	4.871	0.298
3	None	6.924	0.902	5.645	0.826
	At Most 1	1.279	0.911	1.279	0.911

5.0 Granger Causality Test

Table 5.0.1: Granger Causality Results (Full Sample)

Granger Causality Test		
Null Hypothesis	**F-Test**	**p-value**
KSER does not Granger Cause BPR	1.10766	0.3446
BPR does not Granger Cause KSER	8.44281	1.00E-05

Table 5.0.2: Granger Causality Test (All Shocks)

Shock	**Null Hypothesis**	**F- Stat**	**P-Value**
1	KSER does not Granger Cause BPR	0.604	0.6037
	BPR does not Granger Cause KSER	0.006	5.60E-03
2	KSER does not Granger Cause BPR	0.322	0.7262
	BPR does not Granger Cause KSER	7.724	5.00E-04
3	KSER does not Granger Cause BPR	2.426	0.1197
	BPR does not Granger Cause KSER	2.411	1.21E-01

6.0 Volatility Analysis
6.1 GARCH (1,1) Model

Table 6.0.1: GARCH (1, 1) Model (Full Sample)

Coefficients	**No lags**	**p-value**
Alpha(α)	0.142158	0.00
Beta (β)	0.820803	0.00
Alpha (α) + Beta (β)	0.962961	

Table 6.0.2: GARCH (1, 1) Model (All Shocks)

Shock	Coefficients	No lags	p-value
1	Alpha(α)	0.9067	0.0000
	Beta (β)	0.1122	0.0000
	Alpha (α) + Beta (β)	1.0188	
2	Alpha(α)	0.5171	0.0000
	Beta (β)	0.4860	0.0000
	Alpha (α) + Beta (β)	1.0031	
3	Alpha(α)	0.9961	0.0000
	Beta (β)	0.0044	0.0000
	Alpha (α) + Beta (β)	1.0005	

6.2 Conditional Variance

Conditional Variance (Full Sample)

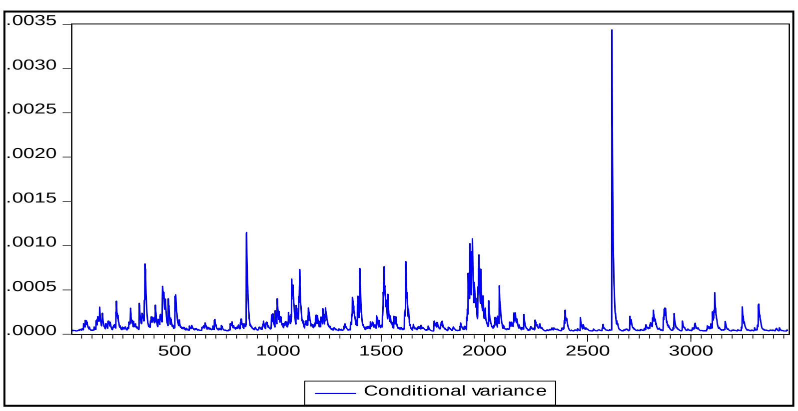


Figure: Conditional Variance

The Figure for conditional variance shows that the variation in the data remains at the same pace until observation 300 and an increase can seen between observation 300 and 500. Then again, the same trend carries until 800 and a spike can be seen at 900. Similarly, a slight variation is seen until 2,700, however a significant spike is observed on 2,800 and then a low level variation is monitored. The overall variation suggests that for the sample till 2,700 observations, the pattern is not more volatile which ensures that there is no effect of the Iraq invasion and the financial crisis over the Kuwait stock market, however a significant spike at around 2,800 observations may exist because of the Arab Spring. The index for the KSE fell 14.02% during the first half of 2011, closing at 192.19 points. Additionally, the KSE price index fell by 10.69% reaching 6,211.70 points during the same time period. Moreover, while Kuwait took the hardest hit, the political events that took place during the "Arab Spring" also impacted various other stock markets in the region. The Arab Spring has a negative impact on most of Arab countries stock markets and also expectations are relatively high from the GCC countries. (Abumustaf, 2016).

Conditional Variance (Iraq Invasion 2003)

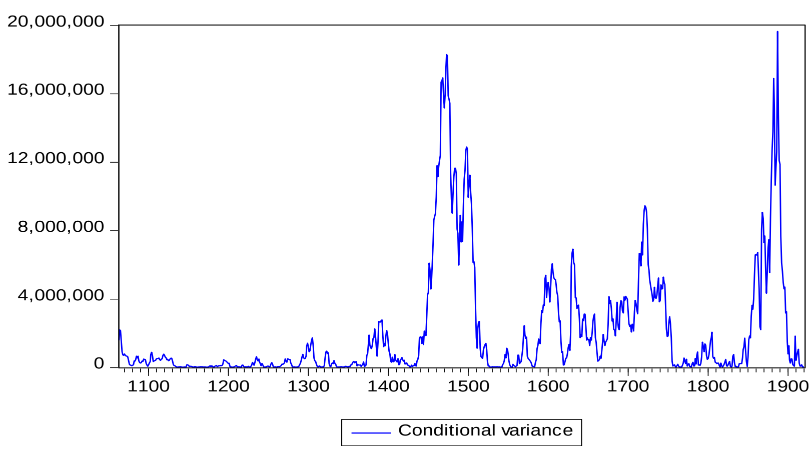


Figure: Conditional Variance Shock-I

Conditional Variance (Shock-II)

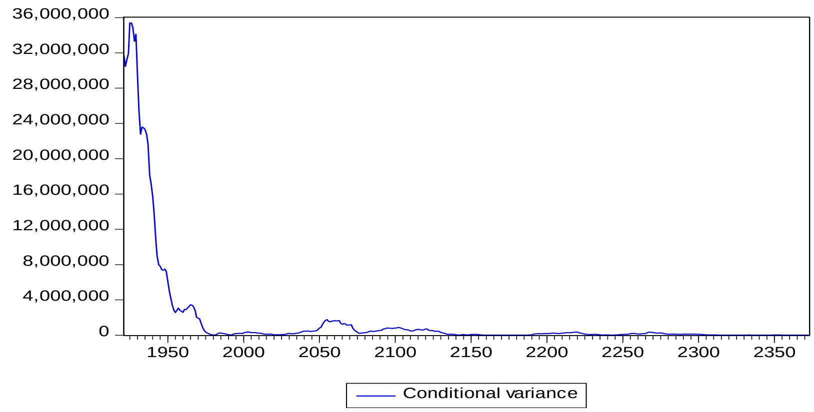


Figure: Conditional Variance Shock-II

Conditional Variance (Shock-III)

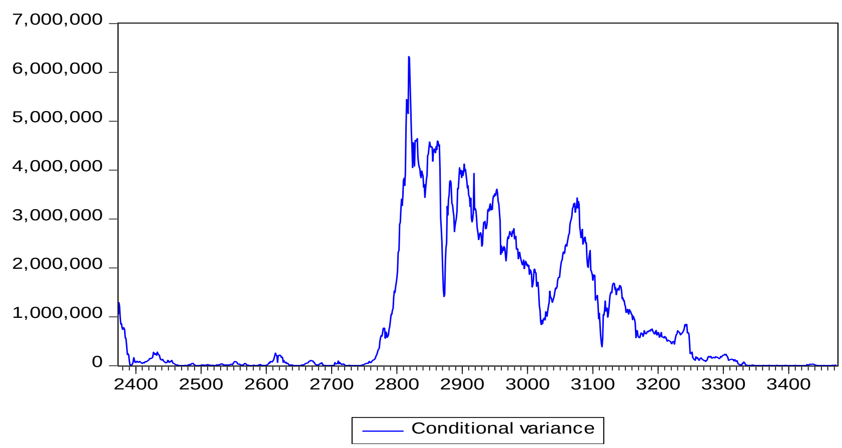


Figure: Conditional Variance Shock-III

6.3 Diagnostic Tests

Table 7.0.1: Diagnostic Tests

Diagnostic Methods	Results	P-Value	Comment
Correlogram of Standard Residuals	Insignificant	P>5%	No Serial Correlation in Residuals
Jarque Bera	134,658.4	0	Residual are not Normal
Heteroskedasticity Test: ARCH	0.429273	0.5123	No ARCH Effect

Appendix B

Saudi Arabia
Detailed Empirical Findings

Table of Contents

7.0 Graphical Representation

The purpose of this section is to analyze our data with respect to the defined full sample and for the three shocks.

Shock-I

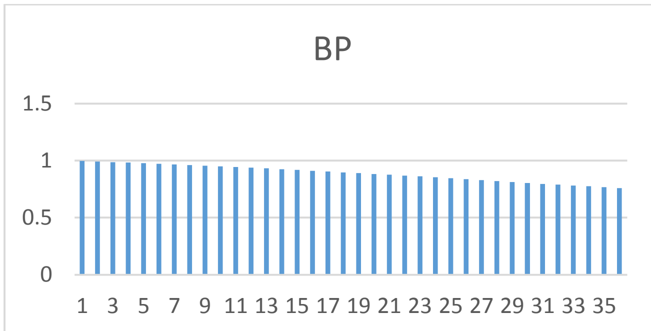


Figure B 2.1: Brent

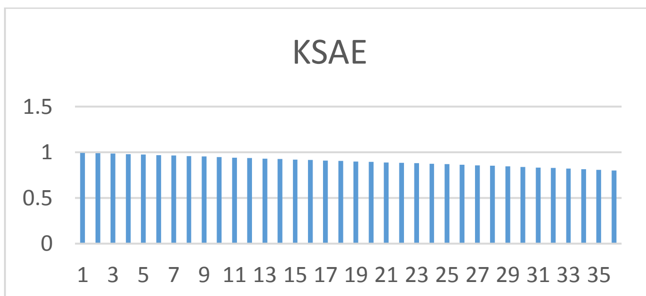


Figure B 2.2: KSAE

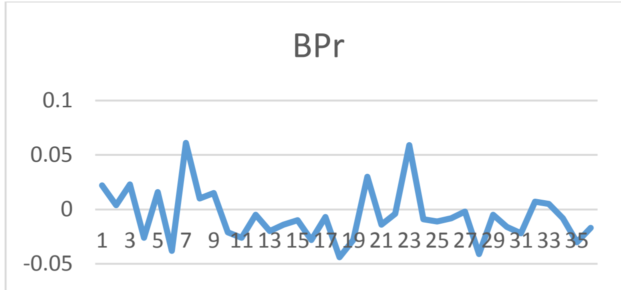


Figure B2.3: BPR

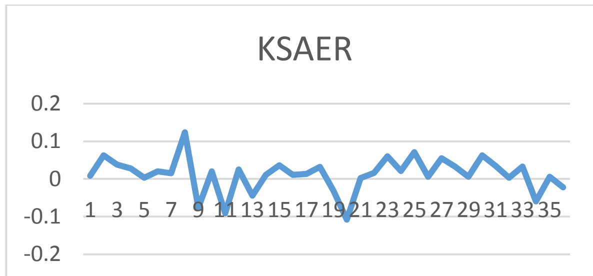


Figure B2.4: KSAER

Shock-II

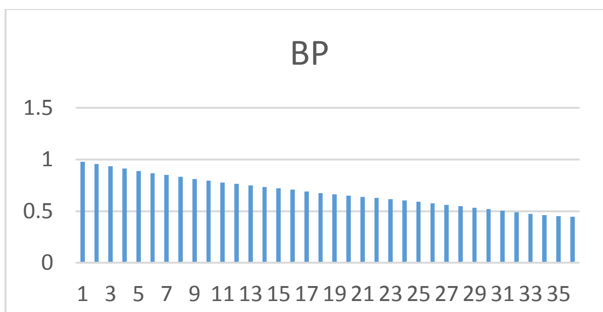


Figure B2.5: BP

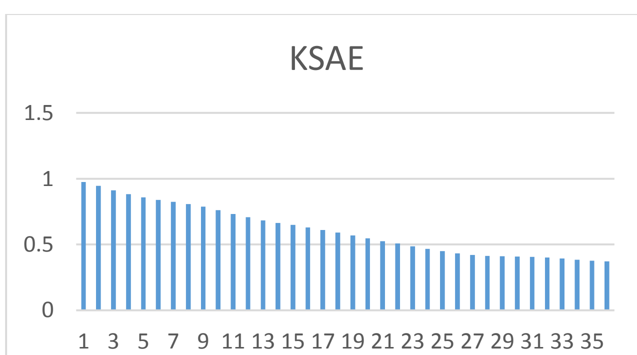


Figure B2.6: KSAE

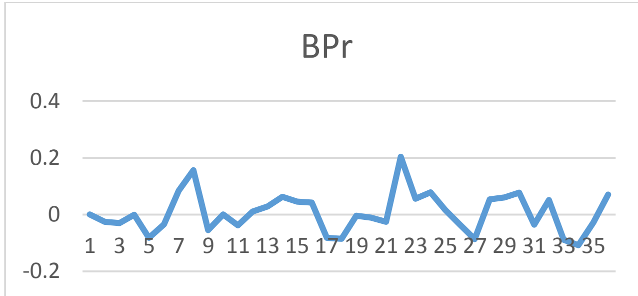


Figure B2.7: BPR

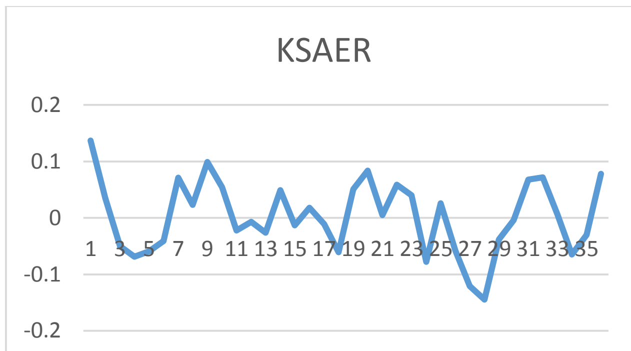


Figure B2.8: KSAER

Shock-III

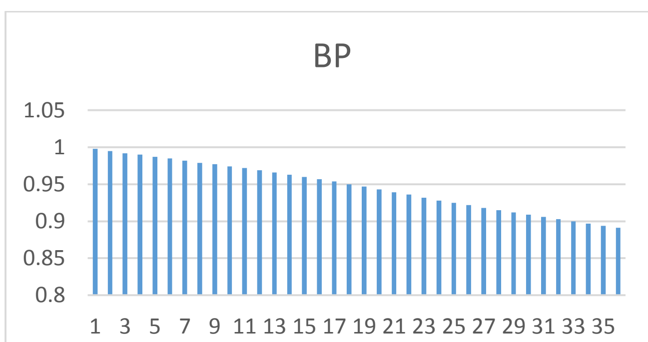


Figure B2.9: BP

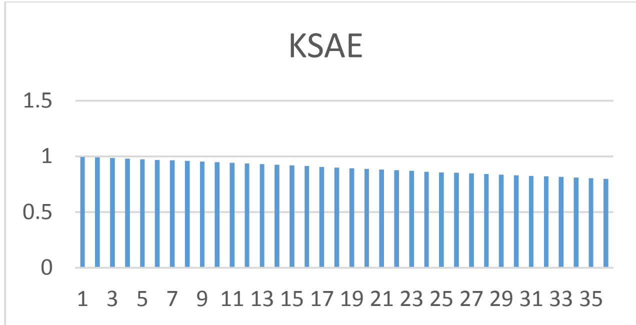


Figure B2.10: KSAE

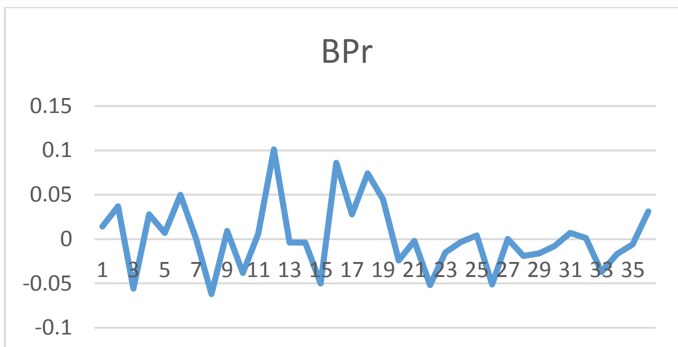


Figure B2.11: BPR

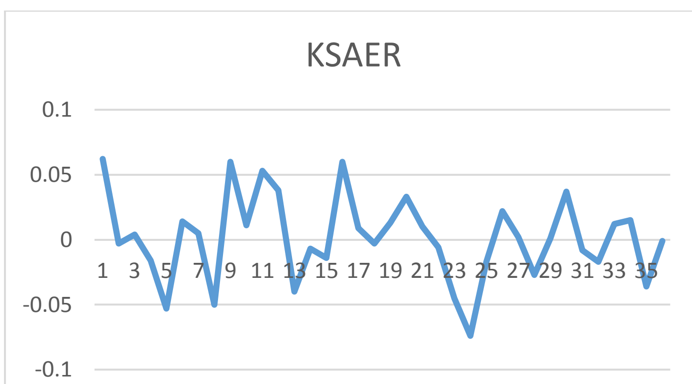


Figure B2.12: KSAER

8.0 VAR Lag Order Selection

Table 8.0.1: Lag Selection

VAR Lag Order Selection		
Country	**Sample**	**SIC Criteria**
Kuwait	Full Sample	1
	Shock-I	1
	Shock-II	1
	Shock-III	1

Full Sample

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSAE						
Included observations: 2705						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-38,697.47	NA	9.15E+09	28.61329	28.61765	28.61487
1	-23,170.25	31020	94,855.42	17.13586	17.14896*	17.1406
2	-23,159.05	22.36668	94,351.52	17.13054	17.15236	17.13843*
3	-23,151.85	14.37216	94,128.22	17.12817	17.15872	17.13921
4	-23,151.62	0.450199	94,391.25	17.13096	17.17024	17.14516
5	-23,150.28	2.679248	94,576.72	17.13292	17.18093	17.15028
6	-23,148.39	3.756754	94,724.57	17.13448	17.19122	17.155
7	-23,147.13	2.505149	94,916.7	17.13651	17.20197	17.16018
8	-23,142.42	9.360626	94,866.9	17.13598	17.21018	17.16281
9	-23,129.32	26.01885	94,230.67	17.12925	17.21218	17.15924
10	-23,115.58	27.25989	93,554.76	17.12206	17.21371	17.1552
11	-23,112.98	5.153381	93,651.75	17.12309	17.22347	17.15939
12	-23,109.16	7.569171	93,664.24	17.12322	17.23233	17.16268
13	-23,104.44	9.348469	93,614.33	17.12269	17.24053	17.1653
14	-23,099.97	8.843242	93,581.86	17.12234	17.24891	17.16811
15	-23,096.69	6.478641	93,631.94	17.12288	17.25818	17.1718
16	-23,094.17	4.989122	93,734.12	17.12397	17.26799	17.17605
17	-23,087.5	13.17290*	93,549.12*	17.12199*	17.27475	17.17723
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-I

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSAE						
Included observations: 780						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-1,1128.11	NA	8.50E+09	28.53873	28.55068	28.54333
1	-7,088.605	8047.928	272,539.9*	18.19129*	18.22714*	18.20508*
2	-7,085.876	5.423192	273,429.6	18.19455	18.25429	18.21753
3	-7,081.103	9.46004	272,888.4	18.19257	18.2762	18.22474
4	-7,079.626	2.918825	274,660.2	18.19904	18.30656	18.2404
5	-7,077.714	3.770668	276,134.9	18.2044	18.33581	18.25494
6	-7,076.243	2.89417	277,931.6	18.21088	18.36619	18.27061
7	-7,073.973	4.451239	279,168.7	18.21532	18.39452	18.28424
8	-7,070.763	6.280815	279,735.7	18.21734	18.42044	18.29545
9	-7,063.733	13.71745	277,572.3	18.20957	18.43656	18.29688
10	-7,055.656	15.71844*	274,687.8	18.19912	18.45	18.29561
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-II

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSAE						
Included observations: 316						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-3,527.554	NA	17,247,795	22.33895	22.36272	22.34845
1	-2,573.505	1,889.983	42,202.22	16.32598	16.39729*	16.35447*
2	-2,567.101	12.60545	41,565.12	16.31077	16.42962	16.35825
3	-2,562.285	9.418558	41,351.40*	16.30560*	16.47199	16.37207
4	-2,562.191	0.182916	42,387.06	16.33032	16.54426	16.41579
5	-2,560.178	3.885767	42,924.59	16.3429	16.60437	16.44736
6	-2,553.69	12.44286	42,255.41	16.32715	16.63617	16.4506
7	-2,551.247	4.653888	42,676.03	16.337	16.69356	16.47945
8	-2,549.86	2.623378	43,390.7	16.35355	16.75765	16.51498
9	-2,545.047	9.04705	43,171.59	16.3484	16.80004	16.52883
10	-2,538.543	12.14430*	42,497.02	16.33255	16.83173	16.53197
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-III

VAR Lag Order Selection Criteria						
Endogenous variables: BP KSAE						
Included observations: 951						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-12,822.2	NA	1.77E+09	26.96992	26.98014	26.97381
1	-7,629.084	10,353.46	32,247.82	16.05696	16.08761*	16.06864
2	-7,620.689	16.70282	31,951.10*	16.04772*	16.09879	16.06718*
3	-7,619.528	2.304071	32,142.47	16.05369	16.1252	16.08093
4	-7,614.818	9.330606	32,094.54	16.05219	16.14413	16.08722
5	-7,614.034	1.551044	32,312.34	16.05896	16.17133	16.10177
6	-7,610.93	6.121992	32,373.36	16.06084	16.19364	16.11144
7	-7,609.736	2.350702	32,565.02	16.06674	16.21998	16.12512
8	-7,608.377	2.669154	32,746.48	16.0723	16.24596	16.13846
9	-7,605.793	5.066087	32,844.19	16.07527	16.26937	16.14922
10	-7,597.54	16.14091	32,551.88	16.06633	16.28086	16.14806
11	-7,596.723	1.594189	32,770.67	16.07302	16.30798	16.16254
12	-7,593.654	5.976116	32,835.09	16.07498	16.33037	16.17229
13	-7,592.256	2.717357	33,015.44	16.08045	16.35628	16.18554
14	-7,588.944	6.421318	33,063.51	16.0819	16.37815	16.19477
15	-7,588.186	1.467738	33,289.95	16.08872	16.4054	16.20937
16	-7,586.089	4.048372	33,423.77	16.09272	16.42984	16.22116
17	-7,576.656	18.17107*	33,044.42	16.0813	16.43884	16.21752
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

9.0 Unit Root Test

Table 9.0.1 Unit Root Test (Full sample)

Variables	PP		KPSS	
	Level	First Diff	Level	First Diff
KSAE	-1.917	-50.119*	1.980	0.155**
Brent	-1.830	-51.643*	3.443	0.192**
KSAER	-50.059	-513.701*	0.453	0.015**
Brent R	-51.944	-625.826*	0.299	0.060**

-: SC: Schwarz information criterion for lag selection, PP: Phillips- Perron Test. KPSS: Kwiatkowski-Phillips-Schmidt-Shin Test. *: 1% level of significance, **: Null Hypothesis (H0: Series is Stationary) accepted at 1% Level of significance

Table 9.0.2: Unit Root Test (Sub Sample)

Shocks	SC	Variables	PP		KPSS	
			Level	1st Diff	Level	1st Diff
1	1	BP	-1.048	-27.653*	2.831	0.053**
		KSAE	-1.727	-27.326*	1.126	0.341**
		BPR	-27.548	-221.050*	0.059	0.101**
		KSAER	-28.332	-244.964*	0.767	0.242**
2	1	BP	-1.330	-18.330*	1.476	0.338**
		KSAE	-2.211	-15.306*	1.126	0.252**
		BPR	-1.330	-141.686*	1.476	0.152**
		KSAER	-15.797	-122.571*	0.233	0.186**
3	1	BP	-0.590	-30.953*	3.368	0.170**
		KSAE	-1.013	-28.512*	0.927	0.333**
		BPR	-30.679	-233.086*	0.147	0.037**
		KSAER	-29.154	-265.039*	0.306	0.162**

-: SC: Schwarz information criterion for lag selection, PP: Phillips- Perron test. KPSS: Kwiatkowski-Phillips-Schmidt-Shin Test. *: 1% level of significance, **: Null Hypothesis (H0: Series is Stationary) accepted at 1% Level of significance. Shock-I: 19th March, 2003 US Military Strike in Iraq, Shock-II: 15th Sep, 2008 US Financial Crisis, Shock-III: 25th Jan, 2011, Arab Spring.

10.0 Cointegration Test

Table 10.0.1: Engle Granger Cointegration (Full sample)

Variable	tau statistic	P-Value
BP	-1.810376	0.6252
KSAE	-1.813297	0.6238

Table 10.0.2 Engle Granger Cointegration (Sub Samples)

Shocks	Variable	tau-statistics	P-Value
1	BP	-0.689203	0.9452
	KSAE	-1.359739	0.8128
2	BP	-4.056509*	0.0067
	KSAE	-4.346341*	0.0025
3	BP	-0.662749	0.9480
	KSAE	-0.973718	0.9063

*: 1% level of Significance

Table 10.0.3: Johansen Cointegration (Full Sample)

Hypothesis No of CE (s)	Trace Statistics	P-Value	Maximum Eigen Statistics	P-Value
None	6.972737	0.899	3.631897	0.9735
At Most 1	3.34084	0.519	3.34084	0.519

Table 10.0.4: Johansen Cointegration (Sub Samples)

Shocks	Hypothesis No of CE (s)	Trace Statistics	P-Value	Maximum Eigen Statistics	P-Value
1	None	6.348709	0.9340	4.288226	0.9411
	At Most 1	2.060483	0.7656	2.060483	0.7656
2	None	20.68874*	0.0437	18.89188*	0.0164
	At Most 1	1.796864	0.8177	1.796864	0.8177
3	None	10.64726	0.5763	6.184682	0.5763
	At Most 1	4.462573	0.3476	4.462573	0.3476

11.0 Granger Causality Test (Full Sample)

Table 11.0.1: Granger Causality Test

Null Hypothesis	**F-Test**	**p-value**
KSAER does not Granger Cause BPR	0.10646	0.7442
BPR does not Granger Cause KSAER	17.0156	4.00E-05

Table 10.0.2: Granger Causality Test (Sub Sample)

Shock	**Null Hypothesis**	**F- Stat**	**P-Value**
1	KSAER does not Granger Cause BPR	0.2430	0.6222
	BPR does not Granger Cause KSAER	4.0218	0.0453
2	KSAER does not Granger Cause BPR	4.0609	0.0447
	BPR does not Granger Cause KSAER	3.5494	0.0604
3	KSAER does not Granger Cause BPR	2.8165	0.0936
	BPR does not Granger Cause KSAER	9.5875	0.0020

12.0 Volatility Analysis

12.1 GARCH (1,1) Modeling

Table 12.1.1: GARCH Model (Full Sample)

Coefficients	No lags	P-Value
Alpha (α)	0.17421	0.00
Beta (β)	0.82357	0.00
Alpha (α) + Beta (β)	0.99777	

Table 12.1.2: GARCH Model (Sub Sample)

Shocks	Coefficients	No lags	P-Value
1	Alpha (α)	0.974022	0.00
	Beta (β)	0.044221	0.61
	Alpha (α) + Beta (β)	1.018243	
2	Alpha (α)	0.995766	0.00
	Beta (β)	0.021074	0.57
	Alpha (α) + Beta (β)	1.01684	
3	Alpha (α)	0.994011	0.00
	Beta (β)	0.03208	0.66
	Alpha (α) + Beta (β)	1.026091	

12.2 Conditional Variance

Full Sample

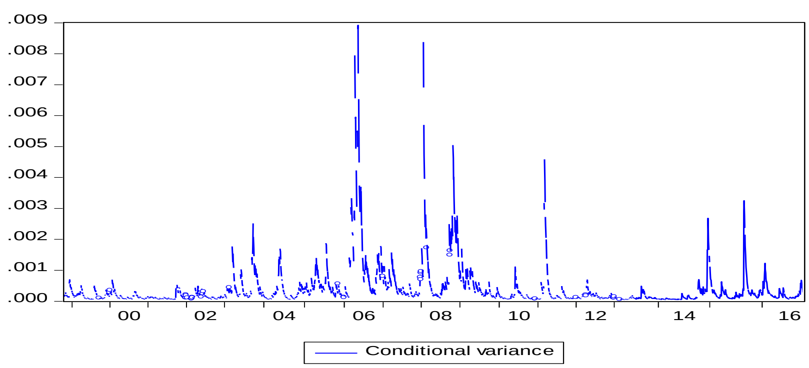


Figure: Conditional Variance

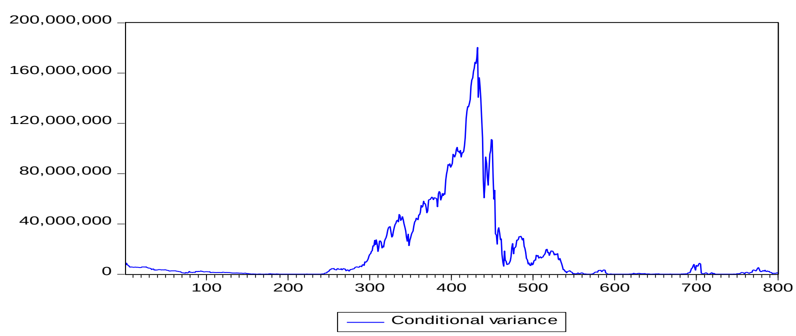


Figure: Conditional Variance

Shock-I

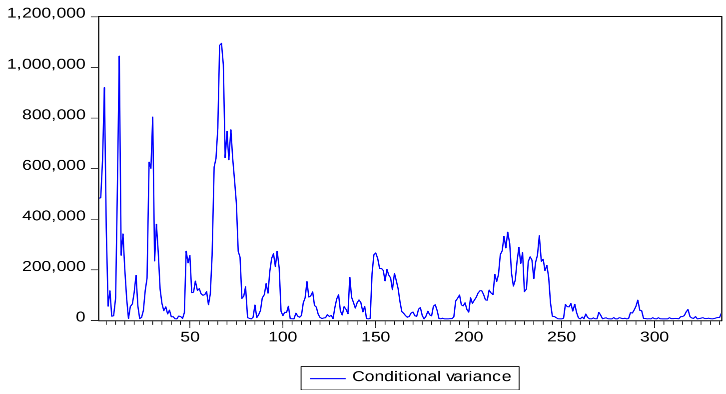


Figure: Conditional Variance

Shock-II

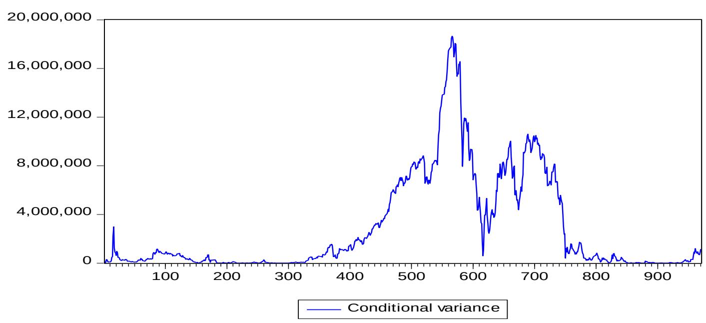


Figure: Conditional Variance Shock-III

12.3 Diagnostic Results for Full Sample (KSA)

Table 12.3.1: Diagnostic Results

Diagnostic Methods	Results	P-Value	Comment
Correlogram of Standard Residuals	Significant	At few lags it is more than 5%	There is serial correlation in the residuals
Jarque-Bera	5,321.39	0.00	Residuals are not Normal
Heteroskedasticity Test: ARCH	1.081826	0.2983	No ARCH Effect

Appendix C

UAE
Detailed Empirical Findings

Table of Contents

13.0 Graphical Representation

Dubai

Full Sample

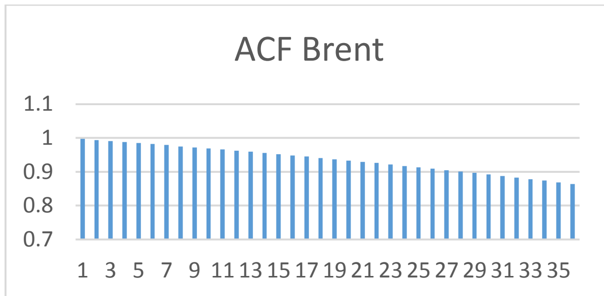


Figure C1.1: Brent Autocorrelation Function

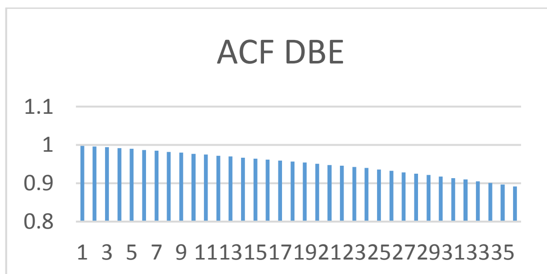


Figure C1.2: DBE Autocorrelation Function

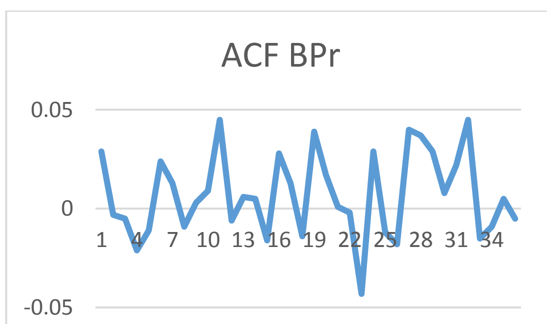


Figure C1.3: Autocorrelation Function BPR

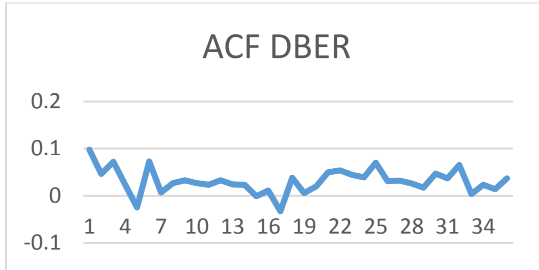


Figure C1.4: DBER Autocorrelation Function

Shock-1 Dubai

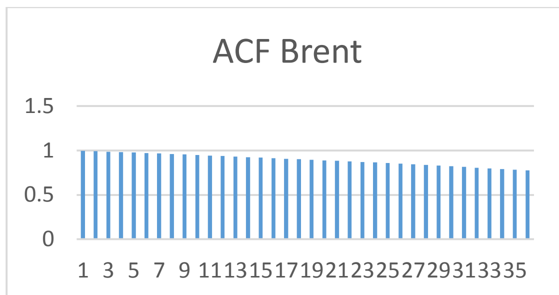


Figure C1.5: Brent Autocorrelation Function

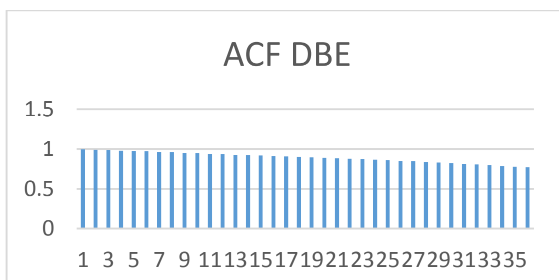


Figure C1.6: DBE Autocorrelation Function

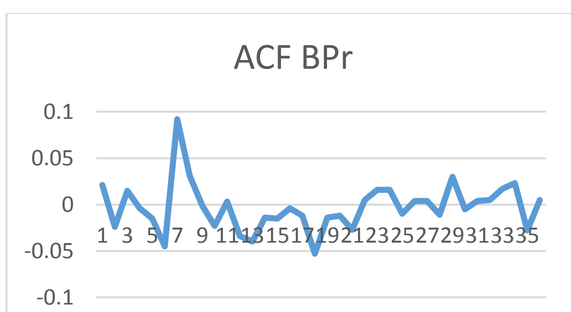


Figure C1.7: Brent ACF

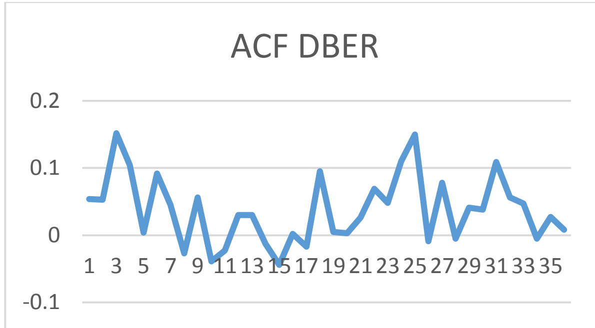


Figure C1.8: DBER ACF

Shock-II Dubai

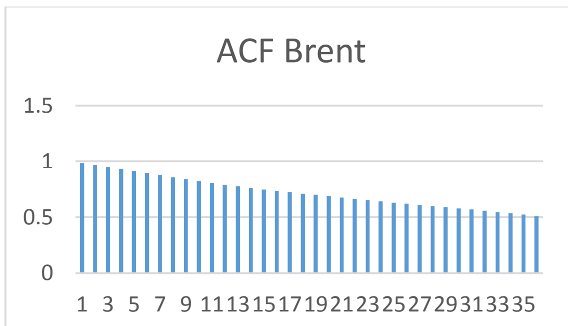


Figure C1.9: Brent ACF

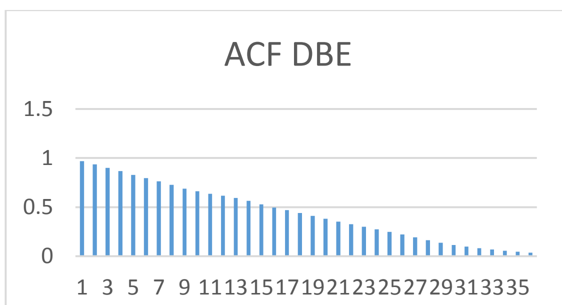


Figure C1.10: DBE ACF

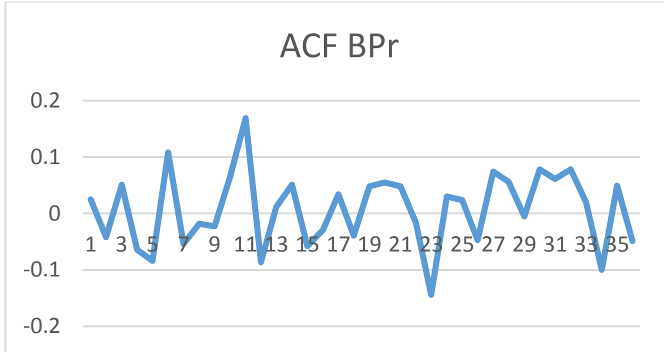


Figure C1.11: BPR ACF

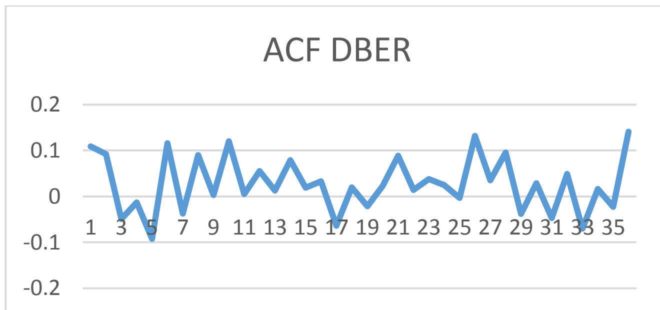


Figure C1.12: DBER ACF

Shock-III Dubai

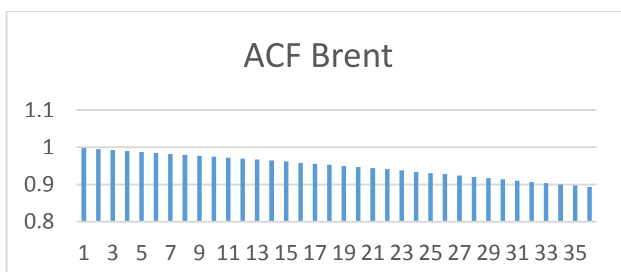


Figure C1.13: Brent ACF

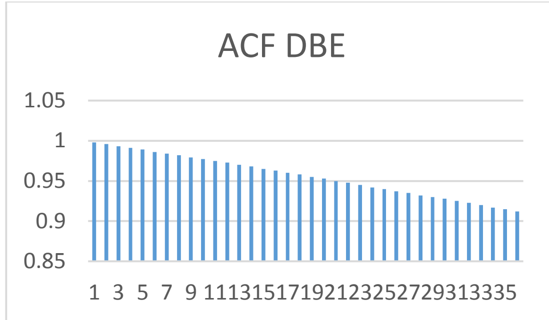


Figure C1.14: DBE ACF

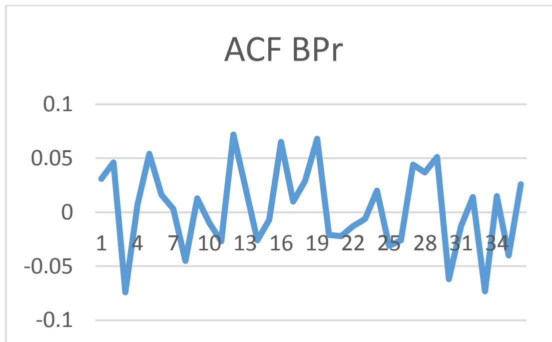


Figure C1.15: BPR ACF

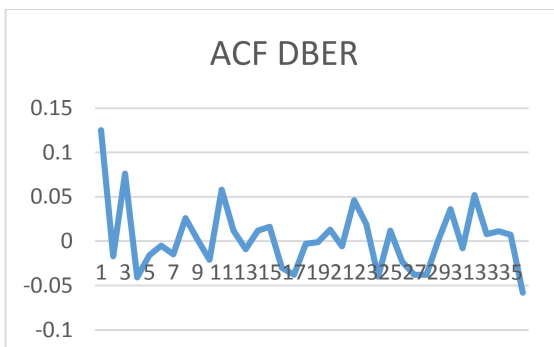


Figure C1.16: DBER ACF

Abu Dhabi

Full Sample

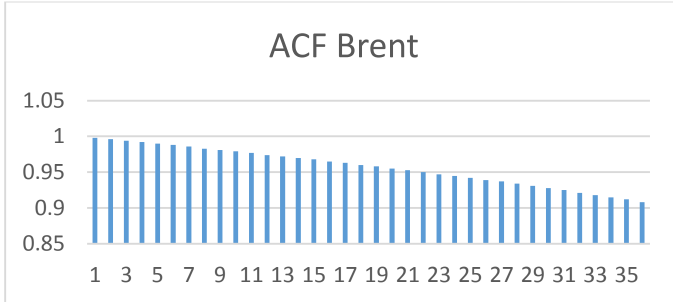


Figure C1.17: Brent ACF

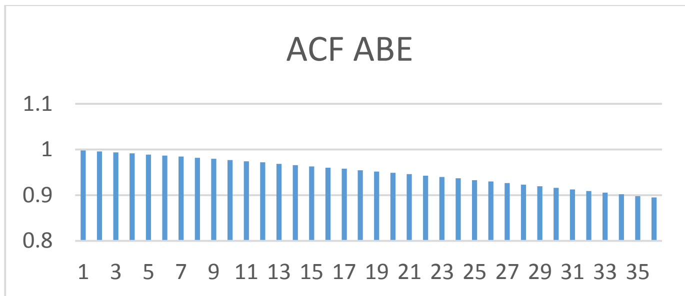


Figure C1.18: ABE ACF

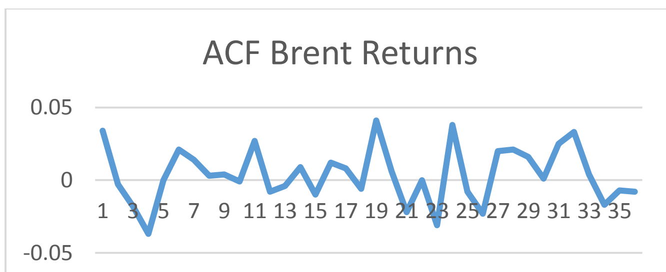


Figure C1.19: Brent Returns ACF

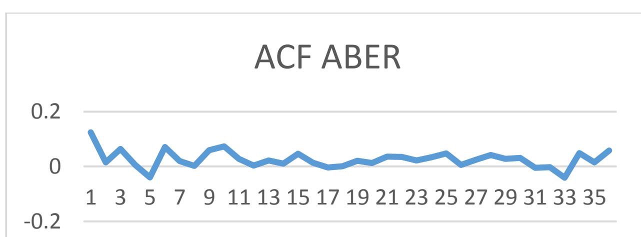


Figure C1.20: ABER ACF

Shock-I Abu Dhabi

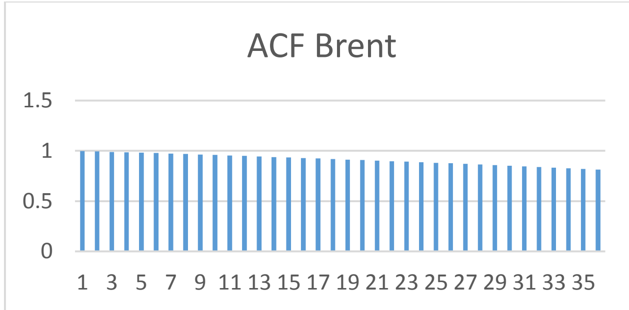


Figure C1.21: Brent ACF

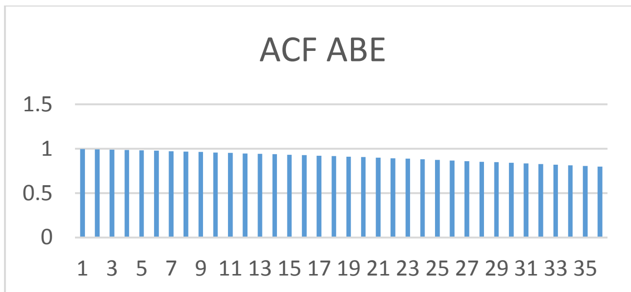


Figure C1.22: ABE ACF

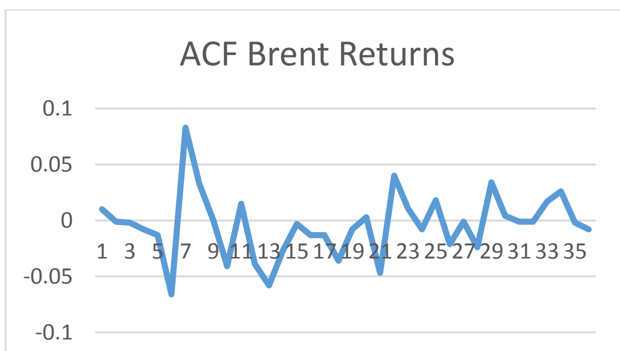


Figure C1.23: BPR ACF

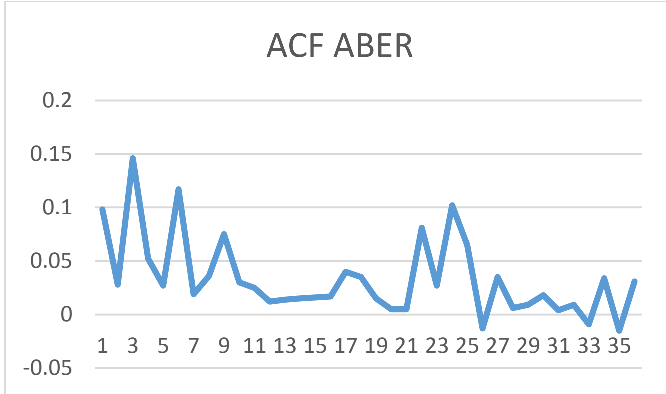


Figure C1.24: ABER ACF

Shock-II Abu Dhabi

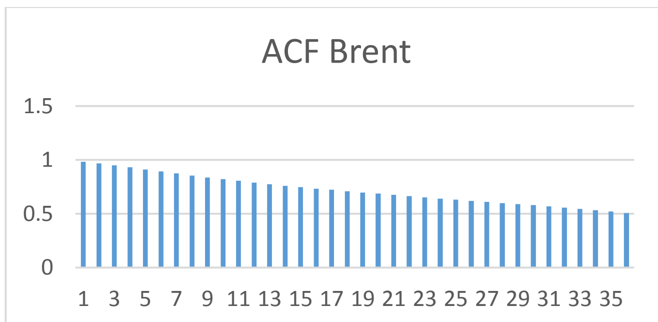


Figure C1.25: Brent ACF

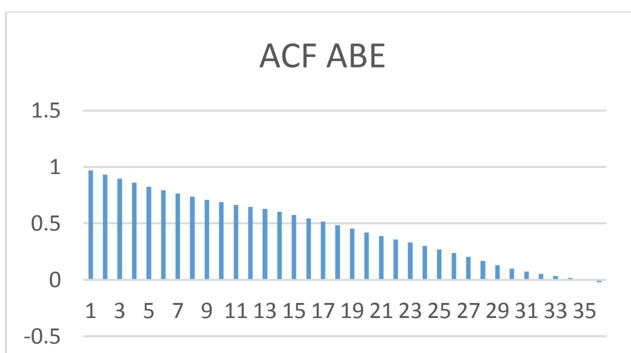


Figure C1.26: ABE ACF

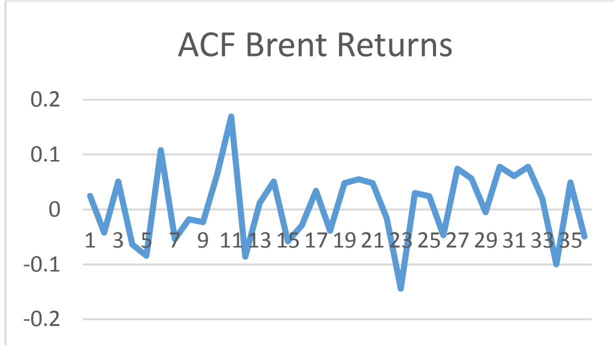


Figure C1.27: BPR ACF

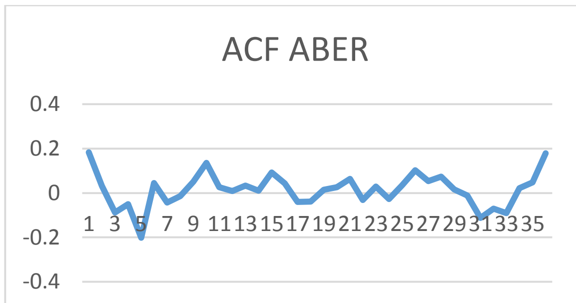


Figure C1.28: ABER ACF

Shock-III Abu Dhabi

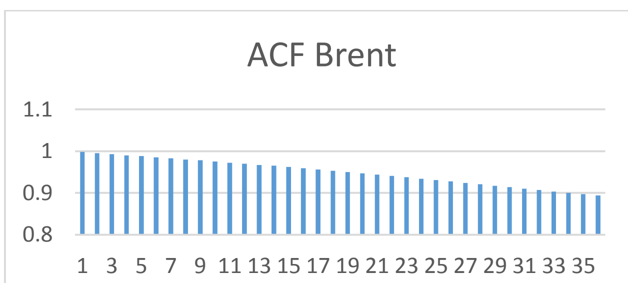


Figure C1.29: Brent AFC

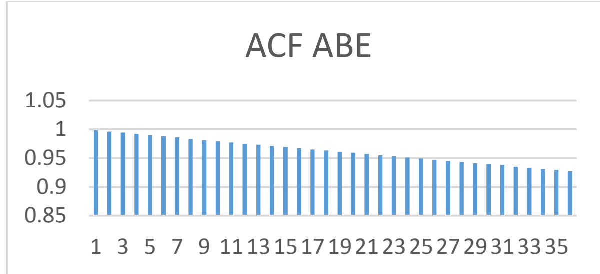


Figure C1.30: ABE ACF

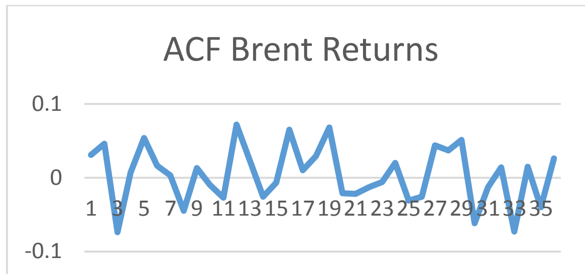


Figure C1.31: BPR ACF

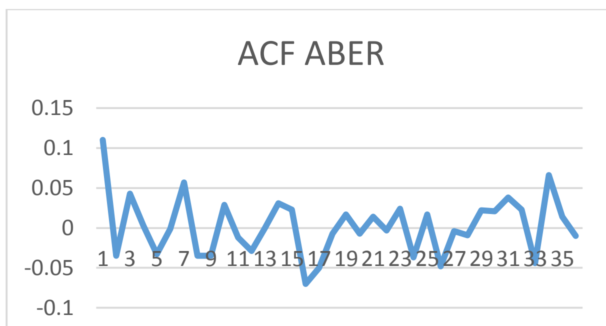


Figure C1.32: ABER ACF

14.0 VAR Lag Order Selection Criteria

Table 14.0.1: Lag Selection

VAR Lag Order Selection		
Country	**Sample**	**SC Criteria**
Dubai	Full Sample	1
	Shock-I	1
	Shock-II	1
	Shock-III	1
Abu Dhabi	Full Sample	1
	Shock-I	1
	Shock-II	2
	Shock-III	1

Dubai

Full Sample

VAR Lag Order Selection Criteria						
Endogenous variables: BP DBE						
Included observations: 2246						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-30,461.81	NA	2.07E+09	27.12717	27.13226	27.12903
1	-17,793.78	25,302.22	26,224.51	15.8502	15.86548*	15.85578*
2	-17,790.72	6.108925	26,246.44	15.85104	15.87649	15.86033
3	-17,786.17	9.064336	26,233.68	15.85055	15.88619	15.86356
4	-17,778.69	14.89832	26,152.53	15.84746	15.89327	15.86418
5	-17,772.46	12.4078	26,100.55	15.84547	15.90146	15.86591
6	-17,769.31	6.249496	26,120.48	15.84623	15.91241	15.87039
7	-17,763.36	11.82397	26,075.12*	15.84449*	15.92085	15.87236
8	-17,762.44	1.836208	26,146.62	15.84723	15.93377	15.87882
9	-17,760.01	4.814217	26,183.26	15.84863	15.94535	15.88394
10	-17,758.99	2.022628	26,252.82	15.85128	15.95819	15.89031
11	-17,752.69	12.46319	26,199.21	15.84924	15.96632	15.89198
12	-17,750.1	5.124765	26,232.11	15.85049	15.97776	15.89695
13	-17,746.78	6.559855	26,248.01	15.8511	15.98855	15.90127
14	-17,745.36	2.804578	26,308.39	15.85339	16.00103	15.90728
15	-17,744.62	1.463883	26,384.83	15.8563	16.01411	15.9139
16	-17,740.48	8.15492	26,381.6	15.85617	16.02417	15.91749
17	-17,736.24	8.348584	26,375.98	15.85596	16.03413	15.921
18	-17,732.07	8.199782	26,372.05	15.85581	16.04417	15.92456
19	-17,723.7	16.45193*	26,269.62	15.85192	16.05045	15.92439
20	-17,721.14	5.021418	26,303.41	15.8532	16.06192	15.92939
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-1

VAR Lag Order Selection Criteria						
Endogenous variables: BP DBE						
Included observations: 709						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-9,526.487	NA	1.62E+09	26.87867	26.89154	26.88364
1	-5,898.169	7225.931	58,639.59	16.65492	16.69354*	16.66984*
2	-5,897.451	1.426416	59,184.98	16.66418	16.72855	16.68904
3	-5,894.14	6.556231	59,300.2	16.66612	16.75624	16.70094
4	-5,888.974	10.20095	59,105.55	16.66283	16.7787	16.70759
5	-5,882.043	13.64693	58,619.01*	16.65456*	16.79618	16.70927
6	-5,879.904	4.199889	58,927.72	16.65981	16.82718	16.72447
7	-5,877.194	5.304413	59,142.88	16.66345	16.85656	16.73806
8	-5,873.866	6.49672	59,255.41	16.66535	16.88421	16.7499
9	-5,868.521	10.40242	59,031.54	16.66156	16.90616	16.75605
10	-5,867.749	1.498421	59,572.05	16.67066	16.94102	16.77511
11	-5,861.635	11.83184	59,218.46	16.6647	16.9608	16.77909
12	-5,857.874	7.256276	59,259.21	16.66537	16.98722	16.78971
13	-5,856.215	3.193287	59,652.59	16.67197	17.01957	16.80626
14	-5,854.715	2.876573	60,075.88	16.67903	17.05237	16.82326
15	-5,853.616	2.100871	60,570.84	16.68721	17.08631	16.84139
16	-5,850.982	5.024393	60,805.95	16.69106	17.11591	16.85519
17	-5,848.514	4.691919	61,070.92	16.69538	17.14598	16.86946
18	-5,846.804	3.241479	61,468.5	16.70184	17.17818	16.88587
19	-5,841.088	10.80297*	61,173.68	16.697	17.19909	16.89098
20	-5,838.621	4.647868	61,441.08	16.70133	17.22917	16.90525
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-II

VAR Lag Order Selection Criteria						
Endogenous variables: BP DBE						
Included observations: 426						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-4738.5	NA	15,872,764	22.25587	22.2749	22.26339
1	-3,106.614	3,240.788	7,611.816	14.61321	14.67032*	14.63577
2	-3,102.438	8.253178	7,605.557	14.61239	14.70756	14.64998
3	-3,091.581	21.35789	7,364.629	14.58019	14.71344	14.63283*
4	-3,089.933	3.22555	7,446.466	14.59124	14.76255	14.65891
5	-3,085.739	8.172877	7,439.738	14.59032	14.79971	14.67303
6	-3,080.986	9.214743	7,413.615	14.58679	14.83424	14.68454
7	-3,071.439	18.42231	7,223.176*	14.56075*	14.84627	14.67353
8	-3,068.134	6.345424	7,246.99	14.56401	14.8876	14.69184
9	-3,063.919	8.05549	7,239.896	14.563	14.92466	14.70586
10	-3,061.976	3.69405	7,310.462	14.57266	14.97239	14.73056
11	-3,058.636	6.317937	7,333.544	14.57576	15.01356	14.7487
12	-3,056.224	4.541435	7,388.855	14.58321	15.05909	14.77119
13	-3,049.069	13.40297	7,280.729	14.5684	15.08234	14.77142
14	-3,048.177	1.662028	7,388.357	14.58299	15.13501	14.80105
15	-3,045.408	5.136318	7,431.851	14.58877	15.17885	14.82186
16	-3,039.66	10.60599*	7,371.887	14.58056	15.20871	14.82869
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-III

VAR Lag Order Selection Criteria						
Endogenous variables: BP DBE						
Included observations: 1073						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-14,132.43	NA	9.48E+08	26.34563	26.35491	26.34914
1	-8,008.879	12,212.86	10,545.37	14.9392	14.96703*	14.94974
2	-8,000.112	17.45241	10,452.08*	14.93031*	14.97671	14.94788*
3	-7,998.022	4.152763	10,489.36	14.93387	14.99882	14.95847
4	-7,993.554	8.860088	10,480.23	14.933	15.01651	14.96463
5	-7,991.308	4.445595	10,514.56	14.93627	15.03834	14.97493
6	-7,990.13	2.327607	10,570.02	14.94153	15.06216	14.98722
7	-7,989.587	1.071368	10,638.36	14.94797	15.08716	15.00069
8	-7,988.674	1.796861	10,699.77	14.95373	15.11147	15.01347
9	-7,987.935	1.452375	10,765.02	14.9598	15.13611	15.02658
10	-7,987.551	0.751924	10,837.86	14.96654	15.1614	15.04035
11	-7,985.313	4.380773	10,873.54	14.96983	15.18325	15.05066
12	-7,980.134	10.11701*	10,849.7	14.96763	15.19961	15.0555
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Abu Dhabi

Full Sample

VAR Lag Order Selection Criteria						
Endogenous variables: BP ABE						
Included observations: 2596						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-34,611.27	NA	1.31E+09	26.66662	26.67114	26.66826
1	-19291	30,605.15	9,808.063	14.86671	14.88026*	14.87162
2	-19,277.19	27.54887	9,734.283	14.85916	14.88174	14.86735*
3	-19,273.45	7.469012	9,736.199	14.85936	14.89097	14.87081
4	-19,263.74	19.3478	9,693.481	14.85496	14.89561	14.86969
5	-19,263.06	1.349018	9,718.327	14.85752	14.9072	14.87552
6	-19,260.08	5.933554	9,725.954	14.85831	14.91701	14.87958
7	-19,249.88	20.29204	9,679.572*	14.85353*	14.92127	14.87807
8	-19,248.05	3.622088	9,695.822	14.8552	14.93198	14.88302
9	-19,244.91	6.248667	9,702.194	14.85586	14.94166	14.88695
10	-19,243.12	3.541333	9,718.766	14.85757	14.9524	14.89193
11	-19,235.89	14.32672	9,694.633	14.85508	14.95895	14.89272
12	-19,233.85	4.060322	9,709.211	14.85658	14.96948	14.89749
13	-19,231.41	4.814985	9,720.944	14.85779	14.97972	14.90197
14	-19,230.3	2.208285	9,742.566	14.86001	14.99098	14.90747
15	-19,230.01	0.56185	9,770.499	14.86287	15.00287	14.9136
16	-19,228.64	2.706591	9,790.315	14.8649	15.01393	14.9189
17	-19,223.18	10.76487*	9,779.345	14.86378	15.02184	14.92105
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-I

VAR Lag Order Selection Criteria						
Endogenous variables: BP ABE						
Included observations: 822						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-10,723.89	NA	7.39E+08	26.09705	26.10851	26.10145
1	-6,379.702	8,656.662	19,172.53	15.53699	15.57138*	15.55018*
2	-6377.709	3.961631	19,266.39	15.54187	15.59919	15.56386
3	-6,374.8	5.768905	19,317.6	15.54452	15.62477	15.57531
4	-6,366.372	16.67089	19,110.62*	15.53375*	15.63693	15.57334
5	-6,364.327	4.035503	19,201.76	15.53851	15.66461	15.58689
6	-6,361.961	4.656511	19,278.31	15.54248	15.69152	15.59966
7	-6,357.444	8.870044	19,254.11	15.54123	15.71319	15.6072
8	-6,352.43	9.821075	19,206.72	15.53876	15.73365	15.61353
9	-6,348.776	7.13834	19,223.01	15.5396	15.75742	15.62317
10	-6,347.784	1.933473	19,364.32	15.54692	15.78767	15.63928
11	-6,342.876	9.540970*	19,321.73	15.54471	15.80838	15.64587
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-II

VAR Lag Order Selection Criteria						
Endogenous variables: BP ABE						
Included observations: 425						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-4,609.182	NA	9,101,268	21.69968	21.71875	21.70721
1	-3,075.074	3,046.557	6,791.449	14.49917	14.55638	14.52177
2	-3,061.061	27.6961	6,478.872	14.45205	14.54740*	14.48972*
3	-3,058.406	5.223279	6,520.023	14.45838	14.59186	14.51111
4	-3,055.385	5.914199	6,550.172	14.46299	14.63461	14.53079
5	-3,053.42	3.827895	6,613.276	14.47257	14.68232	14.55543
6	-3,045.732	14.90672	6,499.572	14.45521	14.7031	14.55314
7	-3,040.719	9.672257	6,468.793*	14.45044*	14.73647	14.56344
8	-3,037.917	5.379349	6,505.546	14.45608	14.78025	14.58414
9	-3,033.964	7.551895	6,507.216	14.4563	14.81861	14.59943
10	-3,030.943	5.743491	6,537.537	14.46091	14.86135	14.61911
11	-3,028.02	5.528999	6,571.098	14.46598	14.90456	14.63924
12	-3,024.976	5.730574	6,601.113	14.47048	14.94719	14.65881
13	-3,017.737	13.55799	6,501.724	14.45523	14.97009	14.65863
14	-3,017.433	0.567848	6,616.318	14.47262	15.02561	14.69109
15	-3,015.587	3.421424	6,684.377	14.48276	15.07389	14.71629
16	-3,007.422	15.06268*	6,555.331	14.46316	15.09243	14.71176
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Shock-III

VAR Lag Order Selection Criteria						
Endogenous variables: BP ABE						
Included observations: 1073						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-13830.52	NA	5.40E+08	25.78289	25.79217	25.78641
1	-7,665.506	12295.56	5,560.364	14.29917	14.32701*	14.30972
2	-7,656.9	17.133	5,512.825*	14.29059*	14.33698	14.30816*
3	-7,653.705	6.347761	5,521.108	14.29209	14.35704	14.31669
4	-7,649.894	7.557778	5,523.057	14.29244	14.37595	14.32407
5	-7,649.623	0.537324	5,561.578	14.29939	14.40146	14.33805
6	-7,647.445	4.302948	5,580.505	14.30279	14.42341	14.34848
7	-7,647.302	0.28191	5,620.776	14.30998	14.44916	14.36269
8	-7,643.916	6.665079	5,627.22	14.31112	14.46886	14.37087
9	-7,642.159	3.450184	5,650.816	14.3153	14.4916	14.38208
10	-7,640.908	2.453007	5,679.859	14.32043	14.51529	14.39423
11	-7,640.13	1.523999	5,714.084	14.32643	14.53985	14.40727
12	-7,637.825	4.502063	5,732.189	14.32959	14.56157	14.41746
13	-7,637.099	1.415872	5,767.3	14.33569	14.58623	14.43059
14	-7,634.022	5.986905	5,777.264	14.33741	14.60651	14.43934
15	-7,631.083	5.708526	5,788.733	14.33939	14.62704	14.44834
16	-7,630.55	1.033421	5,826.3	14.34585	14.65206	14.46183
17	-7,623.285	14.05654*	5,790.991	14.33977	14.66453	14.46278
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

15.0 Unit Root Test

Unit Root Test (Full Sample)

Table 15.0.1 : Unit Root Test (Dubai and Abu Dhabi)

UAE	Variables	PP		KPSS	
		Level	1st Diff	Level	1st Diff
Dubai	BP	-1.9199	-45.9818*	1.0719	0.2714**
	DBE	-1.7939	-47.0794*	0.7457	0.1802**
	BPR	-46.2721	-973.2147*	0.3269	0.1387**
	DBER	-44.2161	-760.9002*	0.3176	0.1203**
Abu Dhabi	BP	-1.7594	-49.3663*	2.2881	0.2362**
	ABE	-1.9416	-47.5128*	1.7272	0.1221**
	BPR	-49.3780	-966.8015*	0.2658	0.3492**
	ABER	-45.7118	-506.5354*	0.3076	0.0262**

-: SC: Schwarz information criterion for lag selection, PP: Phillips-Perron Test. KPSS: Kwiatkowski-Phillips-Schmidt-Shin Test. *: 1% level of significance, **: Null Hypothesis (H0: Series is Stationary) accepted at 1% Level of significance

15.0.2: Unit Root Test (Sub Samples)

UAE	Shock	SC Lag	Variables	PP		KPSS	
				Level	1st Diff	Level	1st Diff**
Dubai	I	1	BP	-1.3097	-26.2828*	2.6640	0.0870
			DBE	-1.8582	-27.6595*	1.1762	0.3724
			BPR	-26.3745	-203.2844*	0.1028	0.0854
			DBER	-26.4557	-193.0395*	0.8472	0.0684
	II	1	BP	-1.3976	-20.2774*	1.6781	0.3271
			DBE	-5.2122	-20.0878*	0.7181	0.6248
			BPR	-20.5627	-141.0034*	0.2843	0.0842
			DBER	-18.9428	-135.5500*	0.4401	0.0584
	III	1	BP	-0.5222	-31.9658*	3.4711	0.1907
			DBE	-1.1293	-29.7849*	2.9754	0.1818
			BPR	-32.0229	-269.0068*	0.1586	0.1132
			DBER	-29.1115	-467.2845*	0.2347	0.1120
Abu Dhabi	I	1	BP	-1.0531	-28.3426*	3.0611	0.0708
			ABE	-1.7076	-27.9013*	1.6416	0.2372
			BPR	-28.5664	-223.4665*	0.0614	0.1029
			ABER	-27.3657	-155.4015*	0.4219	0.0553
	II	2	BP	-1.4008	-20.2531*	1.6702	0.3279
			ABE	-3.4854	-17.9653*	0.2010	0.2528
			BPR	-20.5388	-140.4878*	0.2850	0.0807
			ABER	-17.3611	-112.6664*	0.2176	0.0424
	III	1	BP	-0.5222	-31.9658*	3.4711	0.1907
			ABE	-1.0962	-29.9939*	3.4408	0.1811
			BPR	-32.0229	-269.0068*	0.1586	0.1132
			ABER	-29.5078	-311.4079*	0.2503	0.0430

SC: Schwarz information criterion for lag selection, PP: Phillips-Perron Test. KPSS: Kwiatkowski-Phillips-Schmidt-Shin Test. *: 1% level of significance, **: Null Hypothesis (H0: Series is Stationary) accepted at 1% Level of significance

16.0 Cointegration Test

Table 16.0.1: Engle Granger Co Integration Test (Full Sample)

UAE	Variable	tau-statistic	P-Value
Dubai	BP	-1.931455	0.5638
	DBE	-1.697123	0.6796
Abu Dhabi	BP	-1.450115	0.7819
	ABE	-1.594963	0.7249

Table 16.0.2: Engle Granger Cointegration Test (Sub Sample)

Shock	UAE	Variables	tau-statistic	P-Value
1	Dubai	BP	-1.038281	0.8945
		DBE	-1.410176	0.796
	Abu Dhabi	BP	-1.141956	0.8726
		ABE	-1.484369	0.7693
2	Dubai	BP	-0.928204	0.9139
		DBE	-5.058563	0.0001
	Abu Dhabi	BP	-1.01419	0.8991
		ABE	-3.497131	0.0342
3	Dubai	BP	-1.031359	0.8958
		DBE	-1.527452	0.7526
	Abu Dhabi	BP	-1.103158	0.8812
		ABE	-1.615086	0.7163

Johansen Cointegration Test (Full Sample)

Table 16.0.3 : Johansen Cointegration test

UAE	Hypothesis No of CE (s)	Trace Statistics	P-Value	Maximum Eigen Statistics	P-Value
Dubai	None	6.9616	0.8997	5.4794	0.8434
	At Most 1	1.4822	0.8766	1.4822	0.8766
Abu Dhabi	None	7.2908	0.8780	5.3483	0.8563
	At Most 1	1.9425	0.7891	1.9425	0.7891

Table 16.0.4: Johansen Cointegration Test (Sub Sample)

Shock	UAE	Hypothesis No of CE (s)	Trace Statistics	P-Value	Maximum Eigen Statistics	P-Value
1	Dubai	None	7.9542	0.8281	5.9731	0.791
		At Most 1	1.9812	0.7814	1.9812	0.7814
	Abu Dhabi	None	7.5033	0.8628	4.9276	0.8945
		At Most 1	2.5757	0.6625	2.5757	0.6625
2	Dubai	None	29.2678	0.0022	26.6089	0.0007
		At Most 1	2.6589	0.6462	2.6589	0.6462
	Abu Dhabi	None	18.6817	0.0813	17.1825	0.0312
		At Most 1	1.4992	0.8735	1.4992	0.8735
3	Dubai	None	8.8538	0.7498	6.4252	0.7389
		At Most 1	2.4286	0.6918	2.4286	0.6918
	Abu Dhabi	None	8.6442	0.769	6.2131	0.7637
		At Most 1	2.4311	0.6913	2.4311	0.6913

17.0 Granger Causality Test

Granger Causality Test (Full Sample)

Table 17.0.1: Granger Causality Test

UAE	Null Hypothesis	F- Statistics	P-Value
Dubai	DBER does not Granger Cause BPR	0.70962	0.3997
	BPR does not Granger Cause DBER	5.24365	2.21E-02
Abu Dhabi	ABER does not Granger Cause BPR	0.07412	0.7855
	BPR does not Granger Cause ABER	5.04276	2.48E-02

Table 17.0.2: Granger Causality Test (Sub Sample)

Shock	UAE	Null Hypothesis	F- Statistics	P-Value
1	Dubai	DBER does not Granger Cause BPR	0.5152	0.4731
		BPR does not Granger Cause DBER	1.0454	0.3069
	Abu Dhabi	ABER does not Granger Cause BPR	0.0159	0.8996
		BPR does not Granger Cause ABER	1.0773	0.2996
2	Dubai	DBER does not Granger Cause BPR	0.0383	0.8449
		BPR does not Granger Cause DBER	3.3709	0.0670
	Abu Dhabi	ABER does not Granger Cause BPR	0.1329	0.8756
		BPR does not Granger Cause ABER	4.7321	0.0093
3	Dubai	DBER does not Granger Cause BPR	0.1008	0.7509
		BPR does not Granger Cause DBER	9.5909	0.0020
	Abu Dhabi	ABER does not Granger Cause BPR	9.3018	0.0023
		BPR does not Granger Cause ABER	0.6406	0.4237

18.0 Volatility Analysis

18.1 GARCH (1,1) Model

Table 18.1.1: GARCH Model (Full Sample)

UAE	Coefficients	No lags	p-value
Dubai	Alpha (α)	0.14307	0.00
	Beta (β)	0.83937	0.00
	Alpha (α) + Beta (β)	0.98244	
Abu Dhabi	Alpha (α)	0.1485	0.00
	Beta (β)	0.845	0.00
	Alpha (α) + Beta (β)	0.99349	

Table 18.1.2: GARCH Model (Sub Sample)

Shock	UAE	Coefficients	No lags	p-value
1	Dubai	Alpha	1.0076	0.00
		Beta	0.0329	0.00
		Alpha+Beta	1.0405	
	Abu Dhabi	Alpha	0.9084	0.00
		Beta	0.0695	0.36
		Alpha+Beta	0.9779	
2	Dubai	Alpha	0.8068	0.00
		Beta	0.2045	0.02
		Alpha+Beta	1.0113	
	Abu Dhabi	Alpha	0.9890	0.00
		Beta	0.0786	0.32
		Alpha+Beta	1.0676	
3	Dubai	Alpha	1.0232	0.00
		Beta	-0.0205	0.71
		Alpha+Beta	1.0027	
	Abu Dhabi	Alpha	0.9393	0.00
		Beta	0.0305	0.50
		Alpha+Beta	0.9698	

18.2 Conditional Variance

Full Sample

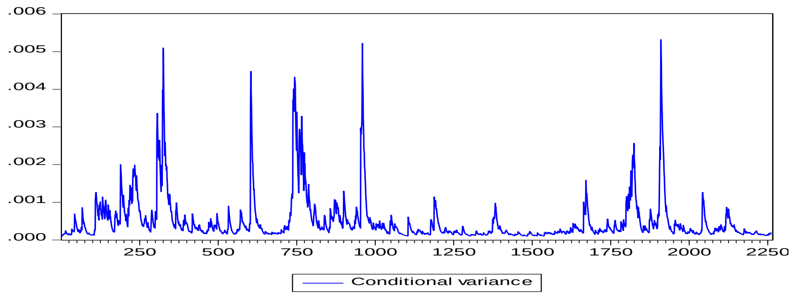


Figure: Conditional Variance Dubai

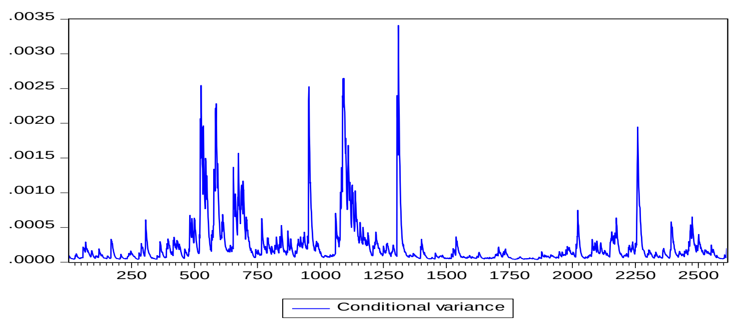


Figure 2: Conditional Variance Abu Dhabi

Dubai

Shock-I

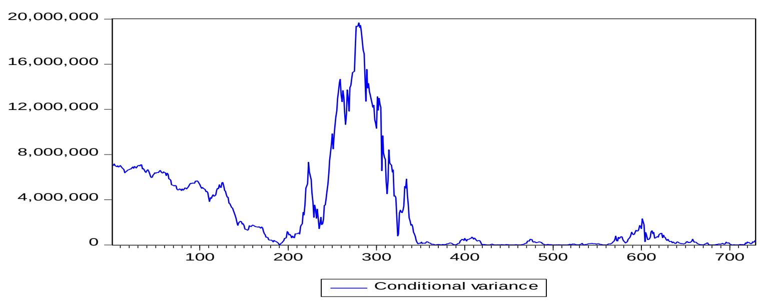


Figure: Conditional Variance

Shock-II

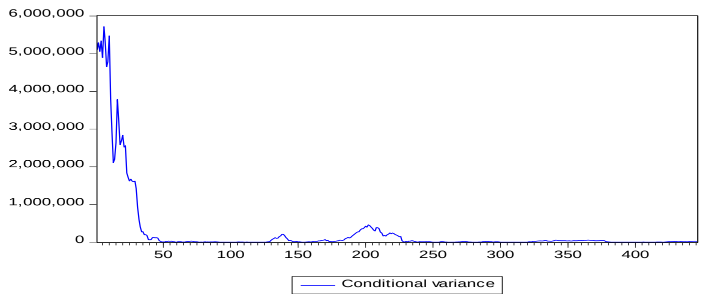


Figure: Conditional Variance

Shock-III

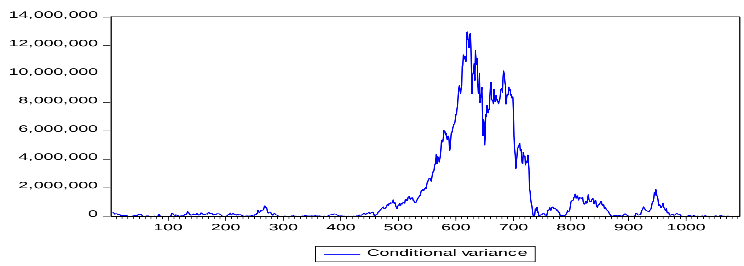


Figure: Conditional Variance

Abu Dhabi

Shock-I

Figure: Conditional Variance

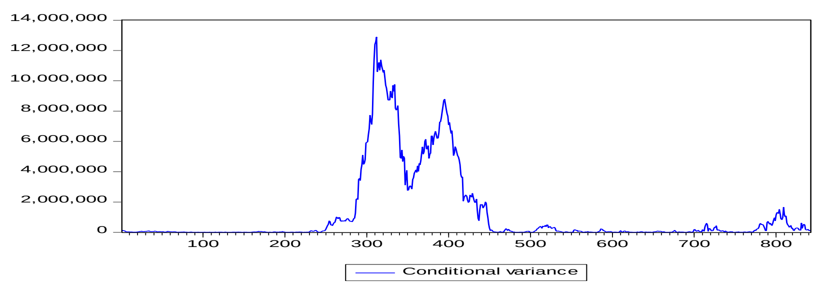


Figure: Conditional Variance

Shock-II

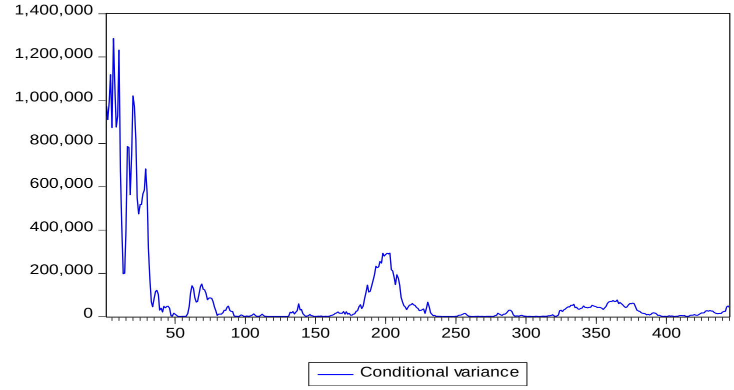


Figure: Conditional Variance

Shock-III

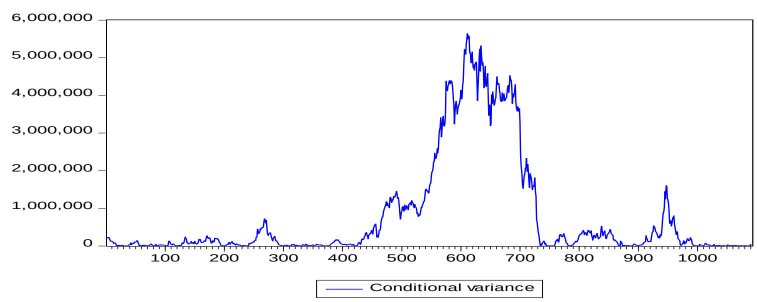


Figure: Conditional Variance

18.3 Diagnostic Tests

Table 18.3.1: Diagnostic Test (Full Sample)

UAE	Diagnostic Methods	Results	P-Value	Comment
Dubai	Correlogram of Standard Residuals	Insignificant	P>5%	No Serial Correlation
	Jarque Bera	3279.891	0	Residuals are not Normal
	Heteroskedasticity Test: ARCH	0.004787	0.9448	No ARCH Effect
Abu Dhabi	Correlogram of Standard Residuals	Insignificant	P>5%	No Serial Correlation
	Jarque Bera	36270.41	0	Residuals are not Normal
	Heteroskedasticity Test: ARCH	0.102853	0.7484	No ARCH Effect

Table 18.3.2: Diagnostic Test (Sub Sample)

UAE	Shock	Diagnostic Methods	Results	P-Value	Comment
Abu Dhabi	I	Correlogram of Standard Residuals	Insignificant	P>5%	No Serial Correlation
		Jarque Bera	6.307595	0.042	Residuals are not Normal
		Heteroskedasticity Test: ARCH	0.419138	0.5174	No ARCH Effect
	III	Correlogram of Standard Residuals	Insignificant	P>5%	No Serial Correlation
		Jarque-Bera	65.3874	0.00	Residuals are not Normal
		Heteroskedasticity Test: ARCH	0.04308	0.8356	No ARCH Effect