

2015

THE IMPACT OF EXCHANGE RATE, INTEREST RATE AND OIL PRICE FLUCTUATIONS ON STOCK RETURNS OF GCC LISTED COMPANIES

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<http://hdl.handle.net/10026.1/3658>

<http://dx.doi.org/10.24382/3853>

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**THE IMPACT OF EXCHANGE RATE, INTEREST RATE AND OIL
PRICE FLUCTUATIONS ON STOCK RETURNS OF GCC LISTED
COMPANIES**

by

Marim Alenezi

A thesis submitted to the University of Plymouth
In partial fulfilment for the degree of

DOCTOR OF PHILOSOPHY

School of Management
Faculty of Business
2015

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ABSTRACT

Exchange rate risk, interest rate risk and oil price fluctuations are the most demonstrated risks in the GCC (Gulf Cooperation Council) countries (Arouri and Nguyen, 2010). Research, however, in this area is still underdeveloped. The importance of this study is to contribute to this research gap. This research aims to show how these three risks affect firms' market values by examining 473 listed firms in Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates for the period January 2007 to June 2012. The research further examines the determinants of these risks. The study uses the AR (1) EGARCH-M model.

The results indicate that stock returns in GCC countries are influenced by the exchange rate risk, interest rate risk and oil price risk. However, the exposure was highest for exchange rate risk and lowest for interest rate risk. While the effects of these risks were mixed, overall, exchange rate risk and oil price risk showed more positive significance as compared to the interest rate risk that showed more negatively significant effect on firm values. The level of the effect of these risk also differed from country to country. However, firms in United Arab Emirates revealed the highest exposure to all the three risks while those in Saudi Arabia showed the least exposed to the three risks. Oman firms also showed high exposure to exchange rate and interest rate risks. The segregated results overall showed lower exposure of financial firms as compared to non-financial firms. However, the non-financial firms in Bahrain were more exposed to the risks than the financial firms. In Saudi Arabia, the financial firms revealed the least exposure to the risk suggesting effective risk management practices.

In addition, foreign operations and firm size had a significant influence on the extent of the firms' exposure to all the three risks. Leverage also influenced the level of exposure to interest rate risk. Profitability, growth and liquidity did not reveal a significant influence on the level of exposure. Further, increasing the risk does not lead to increased returns in most of the GCC countries. The risk-return parameters were largely negative. However, positive news increases return volatility more than negative news in most countries. Also, the current volatility of most GCC firms' returns are time varying, are a function of past innovation and past volatility. The volatility of stock returns, which is affected by changes in the risk factors, could demonstrate the non-prioritisation of risk management by firms.

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Abbreviations and Acronyms

AED	- United Arab Emirates Dirham
ARIMA	- Autoregressive Integrated Moving Average
BHA	- Bahrain index
BHD	- Bahraini Dinar
BHD	- Bahraini Dinar
EUR	- Euro
CAPM	- Capital Asset Pricing Model
CNY	- Chinese Yuan Renminbi
GCC	- Gulf Cooperation Council
GBP	- British Pound
KWD	- Kuwaiti Dinar
GNP	- Gross National Product
IMF	- International Monetary Fund
INR	- Indian Rupee
JPY	- Japanese Yen
LIBOR	- London Interbank Offer Rate
MSCI	- Morgan Stanley Capital International index
NCBC	- National Commercial Bank Capital
OECD	- Organisation for Economic Co-operation and Development
OLS	- Ordinary Least Square
OMR	- Omani Riyal
OPEC	- Organization of the Petroleum Exporting Countries
SDR	- Special drawing rights
KRW	- South Korean Won.
UAE	- United Arab Emirates
USA	- United States of America
USD	- US Dollar

Acknowledgements

I would like to thank God for enabling me to do my PhD.

First and foremost, I would like to express my sincere gratitude and appreciation to my supervisor, Dr. Ahmed El-Masry, for his support during my thesis, for his patience, time and guidance. I could not wish for a better or friendlier supervisor. I am grateful to my second supervisor, Dr. Ibrahim Elbeltagi. This work would not have been possible without the support of Dr. Moji Olugbode. I would like to thank her for the support she has given me during collecting and analysing my data. In my daily work, I was surrounded with a friendly group, too many to count, but I will mention those who have had the greatest influence on me: Dr. Jefri, El-ergawe, Emad, Abo-Shoge, Omima and Dan. I am thankful to know them, and to have obtained my inspiration with their patience, support and assistance. I was not without support here and am great thankful to my Mum and Dad for their support. I wish to dedicate my work as a gift to them. My thanks also go to Dr. Simon Ashby for giving me the chance to teach and be part of the Finance department.

CHAPTER ONE: INTRODUCTION

1.1 Background

Classical economic theory suggests a relationship between exchange rate and stock prices. The theory is linked to the concept that society is organized around a system where individuals seek their (monetary) gain and that the free market can regulate them. Currency movements affect the international competitiveness and the balance of trade position, which in turn affects the real output of the country. This could have an effect on the current and future cashflows of companies and their stock prices (Muller and Verschoor 2006). Dornbusch and Fisher (1980) and Bustaman (2014) explained the two views on the direction of the relationship between exchange rates and stock prices (the flow oriented model and stock oriented model). A positive relationship occurs when the direction of causality runs from exchange rates to stock prices under the goods market model or flow oriented model (Caporale *et al.*, 2014). The exporting firms in time of depreciation of domestic currency may increase profits, which in turn raises stock price; and vice versa. This is the case in Japan, for instance, where Yoshida (2009) showed that the depreciation of the Japanese Yen raises the prices on the Stock market in Tokyo. Choi and Prasad (1995) point out that fluctuations in exchange rates affect firms' operating cash flows and value through translation, transaction and economic effects of exchange risk exposure. On the other hand, currency depreciation for importing firms would reduce profit (Bustaman, 2014).

Financial theory states that an exposure to changes in the exchange rates and interest rates could affect the value of the firm. The relationship between interest rate and stock price is attributed to changes in the discount rate, a denominator effect in a valuation model (Nissim and Penman 2003). On the other hand, there could also be a numerator effect on the expected payoffs that are discounted. Unexpected changes in the interest rates could affect pricing as a result of the effect on the value of the future cash flow which in turn influence stock returns. To exemplify, the discount rate (or interest rate) used in the discounted cash flow (DCF) analysis has an effect on the present value of the future cash flows. This discount rate takes into account risk or uncertainty. The risk or uncertainty in the market could be represented by a risk premium, where unexpected changes in the market affects the risk premium which in turn affect the market returns. The greater the uncertainty of future cash flows, the higher the discount rate. In addition, both nominal and real factors are responsible for the changes in expected cash flows (Chen *et al.*, 1986).

There is generally an inverse relationship between interest rates (short or long term) and the stock prices. The long term interest rates can be seen as forward looking indicators which reflect the financial market's assessment of underlying economic conditions or market risk (Brooks *et al.*, 2000). Thus, variations will be effected by how financial markets assess the prospects in terms of inflation, soundness of public finances, exchange rate stability and economic growth.

Bartram (2005) argues that oil price risk is more volatile than exchange rates and interest rates. Therefore, commodity prices present a higher risk to firms. Oil price risk has an impact on stock price returns (Basher and Sadorsky 2006). The commodity prices affect firm value through their effect on firm's cash flows as input and output factors of the firm's production process. In addition, indirect effects on the value of the firm results from the impact of commodity price changes on customers, suppliers or competitors and consequently the competitive position of firms (Bartram, 2005).

The Gulf Cooperation Council (GCC) countries, which comprise Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (see section 1.7 below), have a great endowment in oil reserves and this makes them solely dependent on this commodity. Oil remains their main trade commodity and source of revenue (Hvidt, 2013). As it is important to these countries, it is vital to examine the variables associated with it. Oil, being a commodity that is traded around the world, is associated with various issues including the currencies of different countries, the prices of the stocks of companies and other entities that are linked to its trade and also the interest rates that have to be paid for when seeking to buy or sell oil. These are key macro-economic variables that must be examined alongside oil (Lee *et al.*, 2007; Marcel 2006).

As an important commodity, oil has seen a spiral in its prices over the years, making it a most sought after commodity by all the countries around the world.

The quest to develop an economy and the competition that comes from other economies that are well placed to develop, like China and India, means that oil prices will continue to rise and fall (even during the study period) depending on the changes in other variables like exchange rate and interest rate (Lee *et al.*, 2007). An intriguing question would be to find out if there is a relationship that exists between these variables with a view to examining the best ways of positing a relationship framework that policymakers can use to manage their economies.

The four variables, exchange rate, interest rate, oil price and market risk, mentioned above are very important and cannot be overlooked. These must be carefully understood, probably through the variables that affect them with a view to presenting a guide for understanding the relationship (if one exists) between the exchange rates, interest rates, oil prices and firm value. Therefore, the determinants of risk exposure are examined in this study. The determinants are very important for the firm to know as they assist in determining the level of hedging needed to manage the risk since each firm is exposed to different risks at different levels. Al-Qaisi (2011) study, for example, used size, financial leverage, government deficit and inflation rate as determinants and found that these determinants significantly affect the systematic risk value of firms. Thus, firms could use hedging to overcome these risks (foreign exchange, interest-rate or oil price). Hedging is used to minimise the risk on stock returns. The value of hedging is known when the determinants of the risk is known (Smith and Stulz, 1985). In financial markets, a wide range of risk management tools can be used to

eliminate or reduce risk exposure. The risk, of interest to this study, is exchange rate, interest rate and oil price risks. The risk defined in the business market is the volatility of the firm's cash flows which subsequently affects the firm's value. Hedging is used to reduce the risk exposure through capturing the unexpected losses in cash flow (Buckley, 2000). Bartram (2007) illustrated, in a study of a large number of non-financial firms, that the insignificance of foreign exchange rate exposures of comprehensive performance measures such as total cash flow can be explained by hedging at the firm level. Tufano (1996) study showed how an increasing number of firms are managing risk. In the study almost three quarters of firms implemented one of the financial engineering techniques (for example, call and put options) aiming to reduce exchange rate, interest rate, and commodity price exposure. The degree to which firms are exposed to risk determines the financial hedging instrument. Firms that were exposed highly to the risk (either exchange, interest, commodity risk), used hedging intensively. Thus, firms that hedge should be less influenced by changes in exchange rate risk, interest rate risk and commodity price risk. To measure hedging and its correlation with exposure, the full picture is not fully examined, as it is rare that firms announce their hedging process and techniques. Thus, lack of full information about hedging behaviour and acts makes it difficult to test the effectiveness of hedging to manage risk. Raddatz (2011) for instance, studied the hedging of exchange rate risk using sectoral trade data. In practise, exporting companies pricing internationally move negatively with volatility in nominal exchange rate. These firms are naturally hedging and they are protected against

exchange rate risk and less affected by exchange rate movement. Other studies (for example, McKenzie, 1998) show that exchange rate volatility has a positive effect on exports.

In this research, a pilot study was conducted to gain some knowledge and understanding on the subject. The pilot study was in Kuwait, as a sample of the GCC countries, because of the difficulty of getting access to risk managers and it was easier for the researcher to have a pilot study in Kuwait. Interviews were conducted with eight risk managers in firms in Kuwait. The pilot study showed that the Kuwaiti firms are not using hedging intensively to manage either exchange rate risk, interest rate risk or oil price risk. However, hedging is practiced worldwide. Jin and Jorion (2006) showed that hedging reduces the firm's sensitivity to oil and gas prices and should increase the firm's market value. On the other hand, Guay and Kothari (2003) carried out a test to measure market value (cash flow) sensitivities of interest rate derivatives to interest rate movements. They (Guay and Kothari) found that a 3.4 percent point change in the 6-month yield on the Treasury bills was associated with commodity derivatives' sensitivities with respect to 37 percent change in the underlying commodity price. Firm value improves in two ways. Hedging allows a firm to protect its capital expenditure from variation in operating cash flow to mitigate underinvestment. It also increases the foreign debt capacity of the firm if domestic capital is insufficient by increasing investment cash flows (Froot *et al.*, 1993). The determinants of this study are size of firms, profitability, cost of external finance,

degree of international operation, growth, and leverage. The determinants of financial risk are wide but this study is only concerned with the three risks, exchange rate, interest rate and oil price risks and the selected determinants. The determinant may have a positive or negative relationship to risk exposures. Therefore, the key aspect of the study is to establish the effect of changes in every variable. This is accomplished through establishing a cause and effect relationship between exchange rate returns, interest rate returns, oil price returns and stock returns. For instance, if the oil price falls, the question would be what triggered the fall and how will this affect the value of the firm. Also, suppose the exchange rate falls or rises, what happens to the value of the firm, does it increase, decrease or remain unaffected? A research framework for understanding the relationships is developed. Foremost, it is imperative that independent variables are defined and the determinants identified.

The remainder of this chapter is structured as follows. Section 1.2 discusses the exchange rate risk while 1.3 the interest rate risk. Section 1.4 presents oil price risks while section 1.5 highlights the research questions and objective. In section 1.6, the contributions of the research are outlined. A background of the GCC countries is presented in section 1.7. Lastly section 1.8 gives an overall structure of the thesis.

1.2 Exchange rate risk

Madura (1989) defines exchange rate risk as the effect of unexpected exchange rate changes on the firm's value. Dornbusch (1980) summarised the theories of determination of the exchange rate, purchasing power parity and monetary models. The exchange rate is determined by the purchasing power parity (PPP). PPP asserts that the exchange rate between two currencies over any period of time is determined by the change in the two countries price levels (Mussa, 1984). In addition, PPP and interest rate parity theorems are used in the monetary models to define the equilibrium conditions. In short, the exchange rate of home currency is affected by demand and supply of foreign currencies.

For a very long time, currencies were pegged on the gold standard. In that case, the currency was issued by the central bank to represent the amount of gold that country had at their disposal. Around the 1930s, the USA set the Dollar as a value at a single unchangeable rate of 1 ounce of \$35 Dollar value (Lee *et al.*, 2007; Norges Bank, 2007).

After the war in 1945, many currencies pegged to the USA Dollar which emerged as the uncontested leader among international currencies. This meant then, that the value of the currencies of other countries would be based on the amount of gold that they hold. If a currency was worth twice as much in gold as the Dollar

was, then it was worth 2 US Dollars. This system was however, quickly outpaced by economic circumstances around the world (Lee *et al.*, 2007).

The USA went through a period of major inflation. Its currency's value to purchase other goods went down and this meant that other currencies became more stable than the Dollar; and therefore it was not possible to state that the Dollar's value in gold is what needs to be used. This led to the reduction in the value of the dollar and the value of gold then became \$70, meaning that it was cut in half (Marcel, 2006).

Around 1970-71, the US Dollar standard was removed. This meant that the Dollar was not a standard representative value of the gold hence the market was left to determine the value. Currently, the US Dollar is used as the standard exchange globally. The US Dollar and the Euro are the most traded currency in the world. The other major currencies around the world include the British Pound, the Canadian Dollar, the Australian Dollar, and the Japanese Yen.

1.2.1 The exchange rate mechanisms

Oil exporting countries were faced with a transformation at the close of the 1990s. At the beginning of the 1990s, there was a general fall in the price of oil to \$20, which left many countries on the verge of bankruptcy. The situation was worsened by a further fall to \$10 in 1998. This threw the economies into further jeopardy. However, the situation began to improve a few years later. Currently, a

price of \$40 is sufficient to cover the costs of importing, which includes labour. The prices have now risen to \$90 a barrel, which leaves the economies with sufficient surplus to expand their investment in the trade of the valuable commodity. The oil market is characterized by its tendency to peg to the US Dollar (Setser, 2007).

However, some significant producers have shifted from pegging to the US Dollar. For instance, on May 19th, 2007, Kuwait, which is one of the leading producers, shifted from the Dollar peg back to its currency, the Kuwaiti Dinar. This was done through a series of measures against the Dollar (Cevic, 2007; Marcel, 2006).

The strategy seemed to pay off, considering the appreciation of the Dinar by approximately 4 per cent. However most of the other producers remain pegged to the US Dollar and in some cases the Euro. This, to some economists, appears as a policy blunder because the rationale of pegging relies on the flexibility of currency which allows the rate to fall when price of oil falls and to rise when the price rises (Setser, 2007). Since most currencies lack such flexibility, it would be better if such economies pegged directly to the price of oil. Therefore, as things stand currently, there are significant diseconomies faced by these economies due to the importation of a policy framework that is not well suited to their needs.

1.2.2 The nominal exchange rate regime and macroeconomic performance

The exchange rate regimes have placed much emphasis on the issue of flexibility and credibility of the same. There are two key extreme cases of exchange rate systems; flexible and fixed nominal exchange rates. Through the bipolar view, the flexible rate regime allows a country's rate to move according to forces of demand and supply while the fixed regime allows a country to maintain a standard rate over a period of time.

According to Lee *et al.*, (2007) while a flexible regime allows the country to have some degree of independence and hence being able to accommodate various kinds of shocks, it is often chosen at a cost because it might lose its credibility and that is often linked to higher rates of inflation. On the other hand, the fixed rate regime has lower flexibility, but a higher credibility in policymaking. This credibility often comes because the general public often believe that the policy makers are concerned with maintaining exchange rate parity. Hence, wages, earnings and expectations in prices and values will always be aimed at making the rate of inflation lower. In such cases, there is no need for devaluation of the currency.

However, according to Kilian and Lewis (2009) such discipline is theoretical and never real in practice because the fixed rate regime has historically been shown to be less effective. Thus, for many scholars, the fixed rate regimes are not considered important. Hence, there is much favour for credibility rather than

flexibility. Lee *et al.*, (2007) argue that having a fixed rate regime is important but it is not sufficiently important to provide stability of the economy.

Although, as it was noted, the two models given above are the main exchange rates regimes, there are many others that are shown in the table in Appendix One.

Chit and Judge (2011) argue that pegging to one currency leads the economy to be exposed to fluctuation in other macroeconomic variables at special price level. Hence, pegging leaves the currency exposed to other countries' currencies (Clark *et al.*, 2004). Thus, in pegging to the US Dollar, these economies are influenced by the US monetary policy which is bringing significant gains to the US, but sadly not replicating the same benefits for them. For instance, when the Dollar gained strength in the 1990s, such economies experienced economic difficulties due to competitiveness of their commodity. This led to falling revenues which in turn forced governments to cut down on their expenditure, diminish their external assets, and incur significant levels of debt and other obligations. Other economies experienced severe deflation and increased interest rates. Sadly, even after the US Dollar weakened, the economies were thrown into even further jeopardy since they could not adjust to the rise in the price of oil. In a panic, the economies responded by instituting vigorous fiscal measures such as heavy Government expenditure in mega projects. This catapulted them into a sudden inflation. A case in point is some Gulf countries, which are now suffering an annual inflation of 10 per cent. Thus, it is prudent to say at this point that greater exchange rate

flexibility would be advantageous to oil producing countries in particular and to the global economy in general (Setser, 2007).

For a long time, oil-exporting economies have had a misguided perspective of where their surpluses arose from. It has been thought that the current account surpluses arose from undervaluing their currency, but the truth of the matter is that such gains are directly pinned to the high oil prices. One of their greatest mistakes was pegging to the US Dollar at a time when the US was facing a large current account deficit (Setser, 2007). As long as they were tied to the Dollar, it was difficult for such economies to exercise currency adjustments. The next section attempts to answer the question of why pegging to the US Dollar

1.2.3 Why peg to the US Dollar?

It is vital to ask the question, why has the US Dollar become a crucial currency and what is the effect on the exchange rate mechanism? According to Halim *et al.*, (2006) the US Dollar is an important currency around the world for even the countries that are not at amity with the USA. They must consider using the US Dollar as it presents a valuable way to improve the economies of their countries.

For oil rich countries, for example, pegging to the US Dollar helps build stable trade relations as the US is a major oil importer. In addition, because the US

Dollar is the reserve currency of the world, its price is not prone to sudden fluctuations (Frankel, 1999). All the global entities, like the IMF, use the US Dollar for their financial calculations (Imamura and Kazumi, 2000).

However, as mentioned above, the volatility of the exchange rate mechanism might be caused or affected by, among others, the interest rates and the oil prices from time to time (Hooker, 2002). Thus, Frankel (1999) argues that no single currency is right for all countries or at all times.

1.2.4 Disadvantages of pegging to the US Dollar

Even though pegging to the US Dollar supposedly allows a weak economy to benefit from a more stable US monetary policy, there are some disadvantages to the practice (Setser, 2007). First, economies are faced with the risk of importing a monetary policy not well suited to their needs. The policy mismatch especially arises when we take into consideration that the US is an oil-importing country while the economies pegging to the Dollar are oil exporting. This poses a particular challenge since the dynamics of supply and demand are fundamentally different. For instance, when faced with a temporary shock, adjustments are not necessary. The best policy path for the oil exporter would be to save the oil windfall as opposed to increasing consumption and investment. On the other hand, the oil importer should use available savings to cater for the temporary rise in oil price as opposed to cutting down on consumption. However, if the rise in oil

price in relatively permanent, exporters would consume and invest more while importers consume less. Thus pegging to an economy whose economic responses are opposite to yours might be misleading, since supply shocks call for different policy responses.

However, differentiating between transitory (temporary) and permanent shocks is not easy. For instance, even though the fall in oil prices in 1998 and 1999 were considered temporary, this still led to a significant cut in production by oil exporting countries due to additional problems of lack of access to finance to implement any form of adjustments. This gave the shock a permanent outlook. The point of emphasis here is that oil-exporting countries that peg to the Dollar would benefit only if the US adopted the same line of policy thinking and responses, which, sadly, is rarely the case.

More often than not, the end product of such a practice is increased gains by the US from the economic calamities of such countries. For instance, the Asian crisis of 1997/1998 produced a demand shock that drove the price of oil down. This, in turn created increased capital inflows to the US resulting in an increase in the value of US equities and the Dollar. Such mixed fortunes show the incompatibility of policy directions.

Secondly, a study by the IMF has shown that pegging to the Dollar might imply higher levels of deflation. According to Lee *et al.*, (2007) a 100 percent rise in the

real price of oil leads to a 50 percent real appreciation of the currency of oil exporting economies. Frankel (2006) seems to concur with the view. He holds that countries that exercise a floating exchange rate regime are likely to experience a nominal appreciation when oil is strong and nominal depreciation when otherwise.

However, if the exchange rate is fixed, a rise in oil price implies inflation while a fall inevitably leads to deflation. The exchange rate being fixed, such economies would move to adjusting domestic prices, which would be pressured, by both a rise and a fall in the Dollar. Such economies are exposed to constant inflationary and deflationary gaps, which gain their own momentum with time, making domestic prices very unstable.

Therefore, the practice of pegging to the Dollar has made it harder for economies to adjust to large swings in the price of oil. In some extreme cases, inflationary momentum pushes up the real exchange rate even after oil prices fall. For instance, in Saudi Arabia the inflation rate in 1999 stood at 1.3 per cent while that of the US was 2 per cent. The real interest rates in the former were nearing 7 percent at a time when the economy was contracting (Setser, 2007).

The impact has been most severe in the oil-exporting states in the Gulf region. Enticed by the need of a stable exchange rate anchor, these countries pegged to the Dollar in hopes that the readily available imported labour would help alleviate inflationary pressures. Contrary to their expectations, these economies now have

the highest inflation rates and the most negative real interest rates. For instance, nominal interest rates now stand at an average of 1 per cent in United Arab Emirates (UAE) and 4.5% in Qatar while inflation rates averaged 2.18 percent in UAE in 1990 to 2015 and highest in Qatar at 16.9% (Tradingeconomics, 2015). The fall of the Dollar has instead increased the cost of imported labour by placing pressure on rents and prices of services. This has increased their cost of pegging to a Dollar in decline. The reverse is also true. A fall in oil price has led to a fall in revenue, expenditure, deflation and a rise in real interest rates.

Thirdly, while many economies have fallen into the enticement of being paid in the Dollar, there are evidences that this is not always a beneficial exercise. The rationale fails at forecasting the fiscal problems that may arise due to the practice. These problems may arise due to large fluctuations in the Dollar price of oil. Though there might be large revenues as a result of the practice, doubts have been cast as to whether these revenues are sustainable (Lee *et al.*, 2007). Pegging to the Dollar clearly does not guarantee stability in oil revenues. They still remain at the very best volatile (Norges Bank, 2007). For instance, Saudi Arabia has for a long time had a conservative practice of pegging to the Dollar, unlike Kuwait. The oil revenues are volatile from Saudi Arabia's national oil company, Aramco (which transfers 93 per cent of its profits to the government through dividends and royalties and only retains 7 percent). The Kuwait government, on the other hand, retains almost 100 per cent of its direct oil revenues (Marcel, 2006). The revenues

of Saudi Arabia would have been less volatile if it had a flexible exchange rate regime.

Fourthly, it is normally argued that pegging to the Dollar would stop resources from being diverted from other sectors of the economy. However, upon close examination, this would not be so. If it were true that a strong real value of oil would be damaging to the economy, then a weak real value would be more catastrophic.

The reason why oil exporting countries would be able to save in Dollars is because they peg to the Dollar and not because oil is priced in Dollars. Oil exporters that pegged to the Dollar were not better off than any other economy in the late 1990s when there was an oil crisis (Frankel, 2003). There is evidence that even recently Dollar pegs had led to the depreciation of oil-exporting economies, even when oil value rose (Buetzer *et al.*, 2012). In order to avoid the diversion of resources from other sectors, there is a phenomenon commonly known as the Dutch disease-any country can direct its oil revenues into an oil fund and not necessarily into the budget. Norway, for instance, uses this strategy where only real income from oil fund's financial assets is available to support current expenditure (Norges Bank, 2007). Thus any country that channels its oil revenues to an endowment fund can avoid the Dutch disease, regardless of its currency regime.

Fifth, flexibility in the exchange rate regime could better facilitate global adjustment. As mentioned earlier, if oil exporters viewed increase in oil prices as temporary and not increase consumption or investment, oil importers would run a deficit.

Thus, surpluses in one market would be offset by deficits in another. Such a zero sum game would not be experienced if the regimes were fixed. For instance, even though East Asia imports more oil than the US, a rise in oil price increased its deficit without cutting into the surplus of leading exporters (Lee *et al.*, 2007). Even when such offsetting occurs, it is steered by government spending and not market forces. Therefore, to some extent fixed exchange rate regimes distort the normal economic behaviour of markets. In some oil exporting countries, high savings rates have arisen from government savings, as opposed to private savings (IMF 2006a, 2006b).

Efforts have been made to deter rapid increase in spending with claims that such a move would be as a result of maintaining pegs, as this would encourage oil exporters to use fiscal policy to neutralize oil windfall by building the country's external assets. More often than not, a fact that is ignored is that most oil-exporting economies' populations expect to share in the oil windfall and thus the pegging policies are difficult to sustain. Therefore, rather than adjusting expenditure as oil prices change, it is better to permit the external purchasing power of a country's current expenditure to change with the price of oil.

The speed of economic responses to an increase in the price of oil is a function of the gap between the rise in oil export revenues and the increase in the expenditure on imported goods and services. Most oil exporters, for instance Russia and the Gulf countries, are more willing to purchase American financial assets than American goods (ECB, 2007). American imports account for 5 percent of the total imports of Russia and 10 percent of the Gulf's total imports. At the same time, recent studies (see, for instance, Setser, 2009) suggest that the Dollar dominated assets account for as much as 60 percent of the Gulf's investment portfolio. As a result of this, a rise in savings in oil exporting economies would consequently lead to a rise in demand for Dollar-dominated assets. This would in turn lead to the expansion of the US current account deficit. Oil exporters have a tendency to save in Dollars because they peg to the Dollar and not because oil is priced in Dollars.

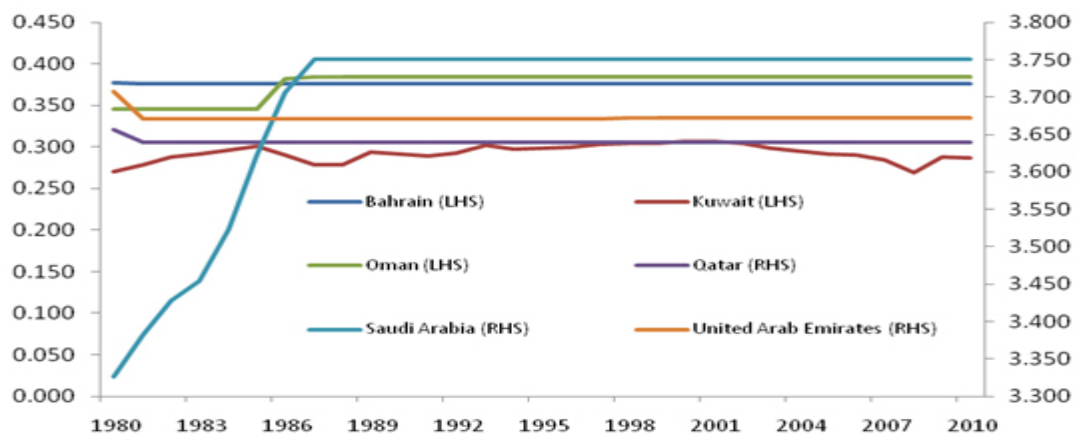
Oil exporters that maintain flexibility in exchange rates such as Norway and Russia have lower Dollar shares in their investment portfolios than countries that peg to the Dollar. As long as countries peg to the Dollar, they run the risk of pushing down their own exchange rates (Setser, 2007). This would be a more severe problem in large oil-exporting economies than for the smaller economies.

The extent to which the US can use petrodollars towards settling its large external deficits depends on the willingness to maintain Dollar pegs than on the continuation of the market practice of pricing in Dollars. This, however, does not in any way imply that the US has an interest in encouraging oil exporters to

maintain their Dollar pegs. In fact, the US stands at risk should these economies suddenly shift their investment portfolios.

Figure 1.1 below shows the exchange rates of the GCC countries for the period 1980 to 2010. A discussion of the exchange regimes for each country is provided thereafter.

Figure 1. 1: Exchange rates in the GCC countries



Source: Adapted from Bleaney (2014)

Buiter (2007) provides a summary of the exchange regime status in the GCC countries which have been updated up to May 2015. In Bahrain, the Bahraini Dinar has been pegged to the US Dollar since 1980. For Kuwait, the Kuwaiti Dinar was pegged to the weighted currency basket from March 1975 to January 2003. Then from January 2003 till May 2007, Kuwaiti Dinar was pegged to the US Dollar with margin of +3.5 and -3.5. After May 2007, Kuwaiti Dinar is pegged to a basket of currencies. That basket, however, was not available to the

public. According to the Central Bank of Kuwait, the determinant of the exchange rate between Kuwaiti Dinar and US Dollar is based on a basket of major currencies of foreign trade (countries which had a financial and political relations with Kuwait) applied before 5th of January 2003.

For Oman, the Omani Riyal has been pegged to US Dollar since 1973. A single devaluation of the Riyal was done in 1986. The Qatar Riyal, on the other hand, has been pegged to the IMF's Special drawing rights (SDR) since March 1975. In practice, it is pegged to US Dollar with a fixed rate since 1980. Similarly, Saudi Arabia officially pegged its Riyal to IMF's SDR in June 1986 while the United Arab Emirates officially pegged its Emirati Dirham to the IMF's SDR in January 1978. In practice, however, these are pegged to the US Dollar. Since November 1997, there has been no change in the Emirati Dirham pegged to the Dollar (Bustaman, 2014).

The effect of financial crises on different exchange rate regimes has been studied (see, for instance, IMF, 2014; Ghosh *et al.*, 2014). Ghosh *et al.*, (2014) argue that the effects of the financial crises on less flexible exchange rate regimes were worse than it would have been if the exchange rate regime were floating. Most of the GCC countries, following the fixed rate regime, are more negatively affected by crises when they happen. They (Ghosh *et al.*, 2014) justify their argument with many reasons, such as a limited adjustment of exchange rate which makes it

harder to correct the external imbalances. The real exchange rate count is overvalued resulting in not resolving the effect of crises very quickly. Secondly, this puts the economy under deflationary pressure because of being in a less competitive position, where nominal exchange rate is not flexible. Thirdly, this encourages foreign borrowing by banks with pegged currency, especially with interest rate preference (Ghosh *et al.*, 2014).

1.2.5 Alternatives to pegging to the Dollar

It is important to note that US Dollar pegs do not necessarily imply dependence on Dollars for pricing. Other regimes are possible. For instance, countries such as Norway, Australia, New Zealand and Canada allow their currencies to float. Another policy option normally fronted, in this case, is revaluation, which would help to address current concerns about imported inflation without changing anything else. The monetary policies of oil exporters would go on being tied to the US and thus exposure to changes in the US Dollar (Norges Bank, 2007).

Firstly, the economies should consider other alternatives, such as the Euro. However, the Euro-zone is not ideal, especially for major oil exporters. However, the Euro peg is not believed to be able to do much, owing to the fact that the Euro is now overvalued against the Dollar. Therefore, if the oil stays high, oil exporters would not peg to the Euro just when the Euro starts to depreciate against the Dollar.

Australia, for instance, has preferred this route. Even though the country does not export oil, the same forces that push up the price of oil consequently push up the price of other commodities (Lee *et al.*, 2007). The Australian Dollar has moved together with the price of oil more frequently than the US Dollar. Australia also has a substantial current account deficit. In view of this, the Canadian Dollar seems to be a better fit. The problem that arises is that the Canadian manufacturing industry is heavily integrated into the US economy. Therefore, it is bound to face the same economic cycles that plague the US economy. Norway is also closely integrated with Europe as Canada is integrated with US. Therefore, no single currency seems to be the ideal option (Frankel, 1999).

Secondly, many oil exporters currently peg to a basket. For instance, Russia pegs to the Euro-Dollar basket while Libya pegs to the SDR, which is a basket of Dollars, Euros, Pounds and Yen.

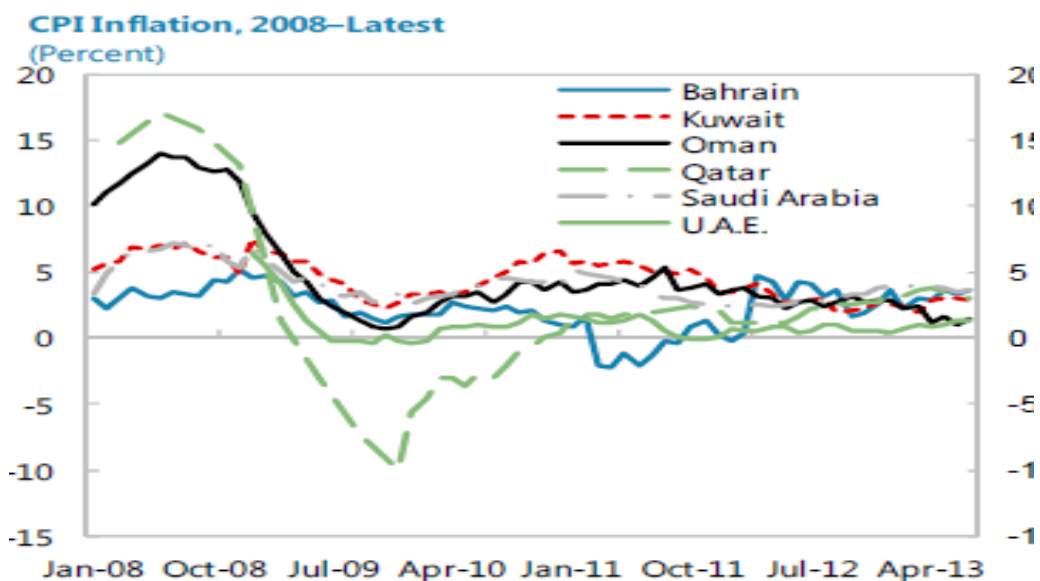
The GCC countries has considered shifting to the basket peg after its planned monetary union (initially planned for 2010, but still not established). For instance, Kuwait recently decided to revert back to a basket peg. Linear logic holds that shifting from the Dollar peg to a basket peg would reduce the exposure to further falls in the Euro-Dollar war. Pegging to a broad basket would reduce an oil exporter's exposure to the fluctuations of any one currency. This is due to the fact that the real price of oil has increased relative to a basket of Euros, Dollars, Yuan, and Yen and not just relative to the Dollar.

According to Frankel (2003), oil-exporting economies should peg their currencies to the price of oil. As long as the price of oil remains volatile, a direct peg to the price of oil would result in greater impact in the exchange rate. A less stringent option would be to peg to a basket that includes the price of oil. This would assure that the currency of an oil exporter generally moves with the price of oil while dampening the volatility associated with a pure oil peg.

Another option to US pegging would be to maintain a managed float. This float may either be pure or managed. However, the effects are more or less the same. Exchange rate flexibility has helped exporting economies in managing commodity price fluctuations (Frankel, 2003).

Figure 1.2 below shows the various inflation rates of the GCC countries over the period 2008 to 2013.

Figure 1. 2: GCC inflation rates



Sources: IMF, International Financial Statistics, 2014.

From the diagram above, Dollar pegs could be argued as both inflationary and an impediment to effective balance of payments adjustment. The currencies of the countries with huge surpluses need to appreciate compared to the currency of a country with a huge deficit. However, it is rare to see, for instance, the Saudi Riyal appreciate against other currencies (when the US Dollar has not appreciated) as it is pegged to the US Dollar. The next section discusses interest rate risk.

1.3 Interest rate risk

Interest rates play a key role in determining various micro and macro-economic issues. Policy makers have to take a keen interest in ensuring that the interest rates that they set are such that they will benefit the economy (Oertmann *et al.*, 2000).

Accordingly, it is crucial to understand how the interest rates mechanism works, especially in sectors of the economy that are crucial to the success or development of the economy.

According to Kilian (2009), when examining the relationship between the interest rates and oil prices, it is crucial to examine such in the light of recent events in the global trade arena. The policy makers often face various challenges when the interest rates have increased, and especially where such changes affect other macroeconomic variables.

There is a constant change and fluctuations in the interest rates. A number of factors determine this. According to Halim *et al.*, 2006, interest rates are a result of issues like price levels, borrowings, supply of money. Other factors that determine the rates include the value or price levels of capital goods. In order to ensure that the interest rates are well maintained or controlled, it is normally the expectation that banks in a country belong to or remain on a par with the Central Bank of the economy.

The central bank will often provide policies for managing these rates. Both high and low-interest rates have consequences. Classical economists argue that interest rates are a key to balancing savings and investment (Isard and Faruqee, 1998). On the other hand, the marxists believe that interest rates are a key to benefiting the rich members of the society at the expense of other groups (Kilian, 2009).

Still other scholars view interest rates as beneficial to those who save their money and not just spend it (Kilian, 2009; Oertmann *et al.*, 2000). In various countries, interest rates are different, and it is this difference that often determines how much a country might pay for acquiring a particular product.

According to Kilian and Lewis (2009), when the country has a high-interest rate, it might have to spend more to acquire a product. For instance in the oil market, if a country seeks to buy oil, it will have to spend more money if it has a high-interest rate per unit of oil. This is from the assumption that if the money has been borrowed from the market, the country (buyer) will have to pay a higher rate per unit. According to Lee *et al.*, (2007) in the case of interest rates and oil prices, there are two key players in this trade (buyer and seller). From the buyer's point of view, high-interest rates in the country will imply that the buyer may limit the amount of oil bought or will have to seek cheaper prices, which is increasingly becoming difficult.

1.3.1 Source of interest rate risks

While most studies on interest rate exposure have focussed primarily on financial institutions (for example, Bartram, 2002; Choi *et al.*, 1992; Hahm, 2004; Wetmore and Brick, 1994), this study on the GCC countries applies to both financial and

non-financial firms. The following are the sources of interest rate risks, which are discussed relative to the financial firms followed by the non-financial:

- a) Re-pricing the risks: this arises when there is a timing difference between maturity or re-pricing of the assets and liabilities of the banks. These often leave the bank's income for the value to be less stable; and this might affect the value of its income that comes from the borrowers.
- b) Yield Curve risks: This is the exposure that the bank will be in, which changes the slope of the curve. It comes up when the unexpected shifts of the yield curve have bigger impacts on the income of the bank or underlying economic value. For example, economic value of a long position in about 10 years for a government hedged by a short position in five years government can result in sharp decline if the yield curve becomes steeper although the position of the hedged versus parallel movements in the yield curve. The insurance firm interprets the yield curve differently. The upward sloping is the most occurrences and it represents greater returns in short duration of the securities.
- c) Basis risks: this is another source. In this case, the basis risks will arise from imperfect correlation in the adjustments of the rates that have been earned and paid on various instruments that have similar pricing features.
- d) Optionality: various options are now held on assets, liabilities and other instruments on the banks and these might come about as a result of options that have been attached to the bank assets. Options allow the holder a right

but not necessarily an obligation to buy or sell. There are various types of options, for instance, the exchange traded and over the counter options.

- e) In terms of interest rate fluctuations for a loan that was borrowed. This might imply that the borrower might end up failing to pay the higher rate of interest.
- f) When the rate has been reset on the entity loans from the bank of other lenders.
- g) When the interest rate has been reset on the short term investment i.e., bank deposit.
- h) Derivatives like interest rate swaps, in this case, the value of the instrument might change, and this might be followed by loss or profit.
- i) In the case where the discount has been given for early payment for the loan or during a purchase: In this case, the payer may have to pay less, otherwise, the opposite might happen, where the late payment rate applies making the chances of default to be high (Oertmann *et al.*, 2000).

While the above may apply to non-financial firms as well, Gerich and Karjalainen (2006) observed that the scope for interest rate risk in non-financial firms was largely on liquid assets, interest rate investments, loans/bonds and leasing contracts. The primary goal for non-financial firms was noted as minimising fluctuations in income, followed by minimising interest rate expenses or maximising interest rate income (*ibid*).

Bartram (2001) argued that the interest rate risk theoretically affects the value of non-financial firms due to changes in the cashflows and the value of their financial assets and liabilities. Further, the interest rate movements have an influence on the cost of capital which then affects the investment behaviour of firms. These interest rate movements are closely related to changes in the business cycle of the economy. Indirect effects of interest rate risk may include the competitive position of the firm which could then have an impact on the size of the future cashflows and thus firm value. Helliar *et al.*, (2005) stated that interest rate risk may impinge on the firms' performance in several ways and could possibly be the most important of the financial risks that a firm may be exposed to.

The source of exposure for non-financial firms is thus related to operating (interest rate) expenses, financial assets and financial liabilities (Gerich and Karjalainen, 2006). Helliar *et al.*, (2005) pointed out that firms are sometimes financed by debt or overdraft which is associated with the market interest rates such as the base rate or London Interbank Offer Rate (LIBOR). As these rate of interest varies, effectively so will the interest payable on the debt. The incidence of financial distress would then be more likely if there is an unprecedented rise in the interest rates (Olugbode, 2010). If the debt affects the riskness of share returns, then the variability in returns will increase. As most non-financial firms are net borrowers (Al-Abadi and Sabbagh, 2006), they are thus susceptible to interest rate risk through the debt service. Neale and McElroy (2004) support that

the risk of interest rate exposure is high for highly geared firms but greater for firms who have variable interest rate rather than fixed interest rate, for most of the debt, since risk might be further exacerbated with increases in interest rates.

Another source of interest rate risk for non-financial firms, especially the cash-rich firms, relates to the marketable securities or term deposits. A decrease in interest rates reduces the potential earnings or interest inflows to the firm (Eiteman *et al.*, 2001). Thus, firms with interest bearing investments will have their yields increase on these investments when interest rates rise and decrease when interest rates fall, effectively affecting the stock returns (Dhanani *et al.*, 2008)

From the information given above, interest rate risks are caused by a number of factors and the onus is for the management to know how to deal with the same. Helliar *et al.*, (2005) noted that the magnitude of the exposure to interest rate risk will be different for most firms. According to Kilian and Lewis (2009), interest rate risks are faced by both individuals and organisations alike. This calls for an examination of how this situation arises with a view to finding out the best way for dealing with it.

There is still a need to ensure that an internal mechanism for identifying, ranking and dealing with the risks is in place within the organization. It is important for

the management to consider using the right mechanisms or methodologies to deal clearly with the risks that might arise involving all the parties concerned.

1.4 Oil price risk

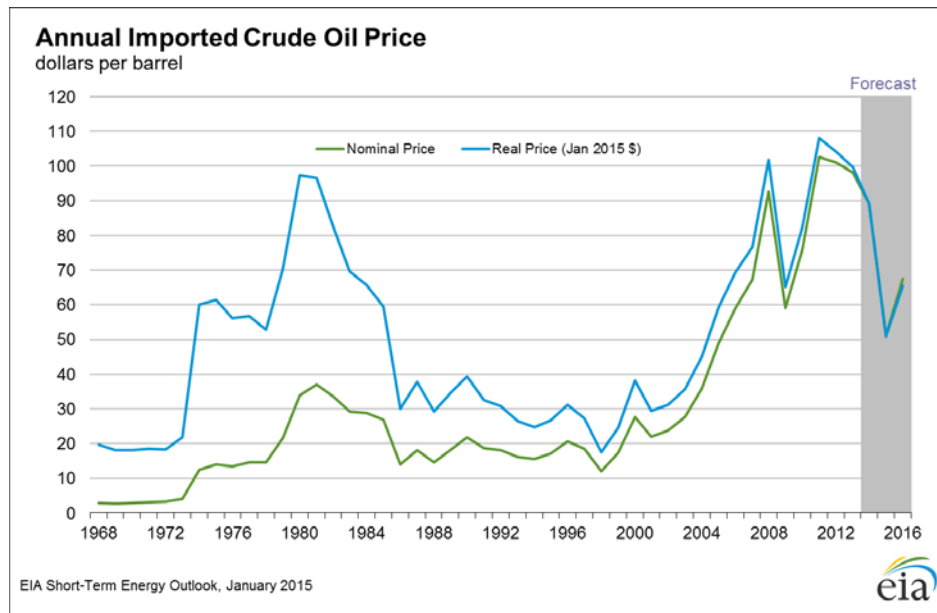
Over the past 40 years, the prices of crude oil have experienced volatility of unprecedented magnitude. These have occurred at different times, including during the first and second oil crises. In 1986 there was a huge dip in the oil prices and also during the crisis in the Persian Gulf in the 1990s (Kilian and Lewis, 2009).

Other instances were during the Asian crisis, and most recently during the global economic crisis (Halim *et al.*, 2006). At a time when the global economy was growing at an average of 3% per year, between 1971 and 2002, the global demand for this precious commodity stood at 1.5%, but this growth varied between regions.

In particular, in some of the Organisation for Economic Co-operation and Development (OECD) economies the demand is still huge (above 60% of the global demand for oil). In these OECDs, the average annual growth was just 0.9% in this period. On the other hand, the developing economies, excluding the former USSR satellite states, were growing at an average of 4.1%. Figure 1.3 below

shows the demand of oil over a 59 years period. The study period (2007 to 2012) shows an increase in demand of oil as well.

Figure 1.3: Trend of oil demand over a period of about 50 years.

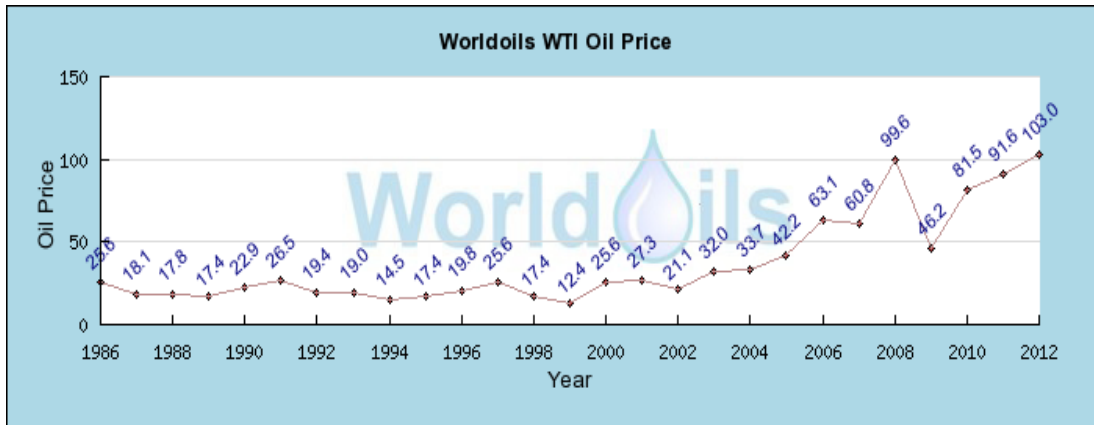


Source: Eia.gov (2015)

According to Lee *et al.*, (2007), while the growth in demand increased in some of the developing economies, the trend has shown a gradual reduction in other more developed economies, where the governments are keen to promote other methods of energy consumption and to reduce their dependence on oil. To some extent, the prices of oil and hence its volatility can also be examined from the point of view of production. According to Hatemi and Roca (2005), the non-OPEC (Organization of the Petroleum Exporting Countries) countries continued to increase their production from 17.42 million barrels a day in 1965 to about 46.39

million by 2003. This was due to the increase in activities in the oil sector in areas like Alaska. The changes in oil production levels are shown in figure 1.4 below.

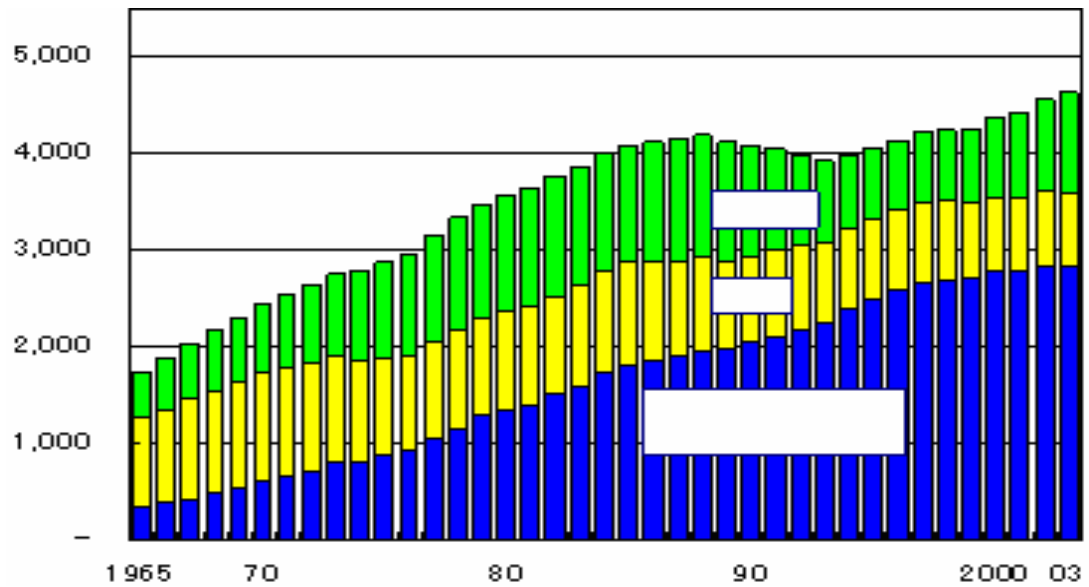
Figure 1.4: World oils WTI Oil Price



Source: www.oil-price.net, 2014

Figure 1.5 below analyses production levels further by comparing oil producing groups.

Figure 1.5: changes to oil production



Source: www.oil-price.net

Figure 1.5 above shows the changes to oil production by different economies. From this diagram, the blue region at the bottom of the diagram shows the Non-OPEC countries excluding the USA and former Soviet Republics. The yellow region represents the production in the USA and the green region shows the situation in former Soviet states. OPEC has continued to show inconsistencies in its production in the bid to control oil prices over the years. The organisation keeps fluctuating its production according to demand, with the view to continue making profit. OPEC used to produce a total of 30.9 million barrels a day in early 1973 (Yanagisawa, 2010). This level has been changing, depending on competition and according to different political situations in various parts of the world. In April 2014, for example, production was at 29.72 million barrels a day (Platts, 2015)

1.5 Study questions and objectives

As discussed above, the study focuses on exchange rates, interest rates and oil prices as the macro-economic variables which could have an effect on the firm value reflected in the share prices. This study attempts to answer the following questions:

- a) What is the impact of changes in exchange rates, interest rates and oil prices on stock returns in the GCC countries?
- b) Of the three risks given above, which one provides the greatest impact on the stocks returns of GCC listed firms?
- c) What are the determinants of exchange rate risk, interest rate risk and oil price risk in the GCC listed firms?
- d) Are these determinants different from country to country?

Thus, the objectives of the study are to examine the following:

1. The relationship between exchange rate risk and firm value.
2. The relationship between interest rate risk and firm value.
3. The relationship between oil price fluctuations and firm value.
4. The determinant of exchange rate, interest rate, and oil price risks.

1.6 Contribution of the thesis

This study attempts to fill the gap in the literature, in that there is no similar study that covers the Gulf countries as one economic unit. The study is unique in that it focuses on oil-exporting countries. This study is, to the knowledge of the researcher, the first that tries to investigate the impact of changes in exchange rates, interest rates and oil prices on share prices in the GCC countries. This is the first study in the emerging markets with a net-oil export economy and that makes this study unique. The study covers a long period, from 2007 to 2012, on a daily basis. However, the study starts in 2007 because of data availability and observed exchange rates started to actively fluctuate at the end of 2006. This study uses different methodologies and gives a comprehensive understanding of the three risks and their effect on stock returns of GCC listed companies. In the methodology part, the study comes up with a comparison between Ordinary Least Square (OLS) and GARCH models of daily data, which detects more fluctuations than is apparent in weekly or monthly data. In addition, the study examines exchange rate exposure, interest rate exposure and oil price fluctuation of the GCC listed companies which has not been done before. Further, the study examines the determinants of risk exposure in GCC firms. To the knowledge of the researcher, there is no such research that sheds light on these risks facing GCC firms. Finally, this study has significance for the investors, managers, and governments through the predictive relationship that it will highlight on share price and firm value from the exchange rate, interest rate and oil price exposures.

1.7 GCC background

Arouri *et al.*, (2011) gave a brief explanation of GCC countries' establishment in 1981, giving the name, Gulf Corporation Council Index with six countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. They have similarities at different levels. They do have the same financial infrastructure and economic structure. They account for around 20% of the world's oil production, 36% of world oil exports and 47% of world petroleum reserves. In all, they determine their earnings, domestic price level and share prices by oil price changes. The rise in oil price affects their economy indicated by inflation, thus affecting interest rates and investments (Arouri *et al.*, 2011).

In 2003, GCC countries produced about 16 per cent of the total world oil production (Maghyereh and AL-Kandarim, 2007) and had 47 per cent of world's oil reserves (Hammoudeh and Li, 2008). It can be logically said that GCC countries are oil dependent countries. Any shock affecting the oil market can have an influence on their markets (Hammoudeh and Li, 2008). Their expenditures and government budget are based on the revenue from oil exports. The demand for oil affects directly corporate output and domestic price, indirectly affects stock prices, influences expected inflation and expected interest rate (Maghyereh and AL-Kandari, 2007). In the GCC countries, an increase in oil prices positively affects earnings, government revenues and expenditures (Arouri and Rault, 2010).

In terms of the stock markets, Arouri *et al.*, (2011) argue that Saudi Arabia is leading in the GCC countries by 40% of the total capital market, and the smallest market is the Oman market. Saudi Arabia's stock market accounts for one third of the total market capitalisation in the GCC countries. In terms of the number of listed firms in the group, ranked from the highest, there is Kuwait, Oman, UAE, and Saudi Arabia respectively. In spite of Qatar having a small number of listed firms on the stock market, it leads the region according to aggregate market capitalization. Generally, the GCC stock markets have several weaknesses which include a small number of listed firms, low sector of diversification and large institutional holding. To increase market transparency, a board for legal, regulatory, and supervisory activities was recently formed. In addition, the markets started to improve their liquidity and opening their market to foreign investors (Arouri *et al.*, 2011).

The GCC countries' stock market presents an opportunity for a comparative case study for examining sudden changes or any change in market variables (Hammoudeh and Li, 2008). The interest of this study emanates from this perspective. These countries are a major oil supplier hence their markets are susceptible to follow oil price changes. The GCC countries are not developed countries but are an emerging market. They are identified as largely segmented from international markets and sensitive to political events. In addition, they are a very promising area for international portfolio diversification (Arouri and Rault, 2009) and lastly provide a fascinating area for research.

1.8 Structure of the thesis

The study structure is as follows: Chapter two reviews previous studies in this area. Then Chapter three will discuss the data collection and methodology of this study. Chapter four presents the descriptive data and the result of the OLS regressions. Chapter five examines the GARCH model and the result. Then next, Chapter six, discusses the determinant of the exposure and the result obtained. Finally, Chapter seven summarises the findings, outlines the limitations of the study and its implications; and finally discusses potential future research that can be done in this area.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covers the main literature of exchange rate exposure, interest rate exposure and oil price fluctuations and their effects on firm value. The reviewed studies when separated into those examining the exposure to exchange rate, interest rate and oil price risk on financial and non-financial firms reveal that when exchange rate exposure is investigated, most of the studies focus on non-financial firms. When interest rate exposure is considered however, the studies have focused primarily on financial firms. For oil price exposure, most studies reviewed concentrated on non-financial firms. Further, when the combination of exchange rate and interest rate risk exposure has been examined, this has been mostly on financial firms (for example, Hahm, 2004; Joseph, 2003; Joseph and Vezos, 2006). The chapter will also discuss the determinants of foreign exchange rate, interest rate and oil prices at firm level to justify the research objectives.

This chapter is structured as follows: Section 2.2 covers foreign exchange rate exposure, section 2.3 examines interest rate exposure and section 2.4 discusses oil price exposure. Section 2.5 describes the determinants of exchange rate, interest rate and oil price exposures while section 2.6 presents the relationship between exchange rate, interest rate and oil price. Risk management of exchange rate,

interest rate and oil price is presented in section 2.7 and a summary of the chapter is given in section 2.8.

2.2 Foreign exchange rate exposure

Exchange rate exposure results from changes in operational cash flows caused by unexpected changes in exchange rate (Eiteman *et al.*, 2012). Bodnar and Gebhardt (1999) characterise the exposure as value of changes in future cash flows due to changes in exchange rate effectively affecting the value of the firm.

Studies have sought to find out the impact of exchange rates and interest rates on share prices. Chow *et al.*, (1997) contend that the empirical study fails to explain the association between exchange rate changes and stock returns. This was explained largely because stocks reflect the conjunction of interest rate and cash flows over more than one period and using the short horizon will not capture exchange rate exposure (*ibid*).

Prasad and Rajan (1995) examined the impact of exchange rate fluctuations and interest rate risk on equity valuation in Germany, Japan, the United Kingdom, and the United States. Fluctuations in exchange rates could:

1. affect the future cash flows by altering the firm's economic and competitive conditions in the product and factor markets.

2. change the domestic currency value of cash flows from foreign operations,
and
3. result in translation gains or losses when assets and liabilities of foreign subsidiaries are converted into domestic currency terms.

(Prasad and Rajan, 1995, p. 1)

The relationship between exchange rate changes and stock returns is one that has interested many researchers in recent times. But, the findings regarding the relationships are mixed. Some researchers found that there is a positive relationship such that an appreciation of the local currency causes increases in stock values (see, for instance, Richards and Simpson, 2009), while some found that there is a negative relationship (see, for example, Joseph, 2002). Other researchers did not find any relationships (see, for instance, Bartov and Bodnar, 1994; Chow *et al.*, 1997; Franck and Young, 1997; Solnik, 1987) while some studies show a mix of relationships (see, for example, Joseph and Vezos, 2006).

In the common concept, firm value is affected by the movement in exchange rates. Bartov and Bodnar (1994) point out that they did not find a significant link between the changes in US Dollar and international activities with abnormal stock returns. The failure to find any link is referred as mispricing. An evaluation of other studies that employ contemporaneous change in exchange rate shows no significant result. However, lagged changes in US Dollar exchange rate were negatively significant with abnormal stock return. Hence, the difficulty in

establishing the relationship between the firm's asset and liability performance with currency changes. There is a delay in response to past information and it is reflected in the firm value.

Aggarwal (1981) investigated the relationship between changes in the US Dollar exchange rates and changes in indices of stock prices during the period 1974 to 1978. Monthly US stock prices, measured in different ways including the NYSE and S&P500, were correlated against the trade weighted value of the US Dollar in addition to a one month lag. Aggarwal finds a positive correlation between the stock prices and the US Dollar. This implies that when the US Dollar depreciates, the value of the stocks declined also. His study however, showed stronger significance when the US dollar was not lagged. Contrary to Aggarwal (1981) study, Soenen and Hanniger (1988) using monthly data on stock prices and effective exchange rates from 1980 to 1986 found a strong negative relationship between the value of the US Dollar and the changes in the stock prices.

Choi and Kim (2003) examined Asian currency exposure of US multinational firms with Asian operations. The study had a big sample of 1,052 multinational firms covering the period 1992 to 1997. They found that the contemporaneous and lagged changes in real exchange rate explain the exposure of 30% changes in the stock market with different signs of the exposure being positive and negative

Choi and Prasad (1995) argue that nearly 60 percent of firms in the sample of 409 US companies during the period 1987-90 have a significant exchange rate risk exposure. Firms effectively benefited from the Dollar depreciations during the period. However, this depended on firm operational level like foreign operation profit, sales and assets. There was a limited support at industry level. In general, they observed that firms are more exchange risk sensitive during a weak period of the Dollar than during a period of a strong Dollar.

Griffin and Stulz (2001) investigated the impact of a country's exchange rate and industry shocks on the same and another industry. Also, at the industry-level study, they stated that industry returns explain the absolute value of the exposure. That value has on each other a neutral position within the industry as the negative exposure neutralizes the positive. Thus, support at the firm level is important to build to overall industry level. According to Griffin and Stulz (2001), exchange rate shocks have a significant impact on profit margins of firm exports and an economically trivial effect on shareholder wealth.

Abdallah and Murinde (1997) examined the causality relationship between exchange rate and stock market in the emerging markets of India, Korea, Pakistan and the Philippines from January 1985 to July 1994. Their result suggests that all the countries have an unidirectional causality relation from exchange rate to stock prices, except in the Philippines. Import market stock market is positively

impacted by the exchange rate appreciations. However, the appreciation of the exchange rate reduces the competitiveness of the export market.

Zia and Rahman (2011) studied the dynamic causal relation between the exchange rate and stock market return in Pakistan from January 1st, 1995 to January 1st, 2010. The data includes 181 data points of month end closing value of two variables. The result indicated that there was no long relation between exchange rate (Pakistani Rupee/US Dollar) and stock return. This study tests the relation from both directions. They studied the causal relationship from exchange rate to stock return and from stock return to exchange rate. They found the same result, that there was no relationship.

Muller and Verschoor (2006) explained the relations between how US multinational firms react to the changes in exchange rate. In a sample of 935 US firms, 29 per cent involved in operational foreign countries between 1990 and 2001 has a significant effect on currency fluctuations, whereas there is a nonlinear increase in the pricing and the significance of exposure. There were 41.67% of firms facing asymmetric significant exposure during appreciations and depreciations. In a different way, currency sensitivity increases to be 75% asymmetric over large and small movement. For that, the size of asymmetric is more important than the sign asymmetric in estimating the relation between exchange rate changes and stock returns.

El-Masry (2006) investigates the exchange rate exposure in 364 nonfinancial companies in the UK. The study points to a higher percentage of the companies exposed to contemporaneous exchange rate, rather than indifference with the earlier study. Although he commented that there is a lagged exposure to exchange rate exposure in firms and industry level.

Doukas *et al.*, (2003) examined the relation between Japanese stock returns and unanticipated Japanese Yen to US Dollar exchange rate changes for 1,079 firms traded on the Tokyo stock exchange over the 1975-1995 period. Their study found a significant relation between contemporaneous stock returns and unanticipated Yen fluctuations. The lagged change was however, found to have no predictive power on stock returns. The results further revealed that the exposure effect on multinationals and high-exporting firms was found to be greater in comparison to low-exporting and domestic firms. The findings of insignificant lagged exchange rate exposure coefficients suggested that Japanese investors are able to assess the impact of exchange-rate changes on firm value with no significant delay. Thus, investors utilised all accessible information inherent in exchange rate changes to envisage changes in the value of the firms.

In a bigger number of samples containing 37 countries, Bartram and Bodnar (2012) investigate the exchange rate exposure significance in non-financial companies. They argue that there is a significant and conditional impact on firm level. They found that the impact on return is between 1.2% and 3.3% per unit of

currency exposure. They could not find an unconditional relation between stock return and exposure. But, conditional relation suggests that the exchange rate exposure is realized in returns. In conditional relation, there is a significant relation to exchange changes at 3.3% in depreciations and 1.2% for currency appreciations for all firms in all countries.

Another study in Japanese multinational firms found that 25 percent of 171 companies show a significant positive exposure (Zhang, 2008). Cash flow of the firm and the discount rate that are used in valuing cash flows are the main factors affected by exchange rate change. The exchange rate fluctuation is described by the level of its export ratio and variables that need hedging.

In contrast, Joseph (2002) fails to find a significant relation between nonfinancial firms and foreign exchange rate changes. Consistent with previous studies, Chow and Chen (1998) found that the firm with high leverage and low liquidity has high exposures. Also, those with high cash dividends have high exposures. While a small firm has small exposure in the short term, the large firm has small exposure in the long term. In addition, Chow and Chen (1998) found that equity return of Japanese firms decreases if the Yen depreciates. Furthermore, high import and non-traded industries are more adversely affected by Yen depreciation and higher export industry is less affected.

There is a significant relation between firms which are exposed to exchange rate movements with scarce indication of a systematic link between exposure and trade (Dominguez and Tesar, 2001). Exchange rate exposure is determined by the rank of international operations of the firm where more foreign activity leads to more exchange rate exposure (Afshar *et al.*, 2008). Firms with minor involvement in trade have a short degree of exposure (Dominguez and Tesar, 2001).

The study by Aabo (1999) used the GARCH (1,1) regression analysis to look at the exchange rate exposure measure. It looked at the Danish non-financial companies. The study concluded that there was significant exchange risk exposure when effective Danish exchange rates were used in the ordinary least square regression analysis. They further stated that there was significant exposure of the companies to the five main exchange rates. The context of the region made it easier to do the analysis in comparison to the context of US studies. Di Iorio and Faff (2000) explored the general exchange rate exposure of the Australian stock market. The data used for the study was a 10 year period, from 1988 to 1998. They concluded that the Australian stocks are more influenced by the lagged response and not the exchange rate exposure. The cross-sectional determinants do not show significant exchange rate exposure. Also, Muller and Verschoor (2006) found that there was a significant exchange rate exposure based on the study of 817 European companies.

Therefore, it can be said that the exchange rate in the economy might have an effect on the value of the (mainly) international firms. These firms trade with the outside world making them susceptible to exchange rate fluctuations. Therefore, these firms cannot determine their future operating cash flows without considering other variables.

Further, Jayasinghe *et al.*, (2011) utilised the bivariate GJR-GARCH-M model to investigate aspects of exchange rate exposure by using data of the daily industrial indexes of ten sectors in Japan during the period from 1992 to 2000. Their results showed cases which are not exposed to exchange rate risk under the conventional measure (exposure coefficient) but significantly exposed to exchange rate risk through the four alternative routes identified. These four alternative routes pertain to how a firm's returns are exposed to foreign exchange risk when the variances are time variant. Jayasinghe *et al.*, (2011) found significant evidence of exchange rate exposure which was not captured by the conventional measures.

Other studies assign a more active role to the GARCH structure when compared to those that employ GARCH-type models to augment the mean equation with a time-varying variance structure in order to improve the precision of parameters (for example, Patro *et al.*, 2002). Kanas (2000), Apergis and Reztis (2001) and Yang and Doong (2004), for instance, employ bivariate asymmetric GARCH models to analyse the mutual impact of volatilities between equity and exchange rate markets. Kanas (2000) investigated the interdependence between stock

returns and exchange rate changes by testing for volatility spillovers using a bivariate EGARCH model in six industrialised countries namely the US, the UK, Japan, Germany, France and Canada. The study found volatility spillovers from stock returns to exchange rate changes in all countries except Germany. However, no evidence was found of volatility spillovers from exchange rate changes to stock returns for any country. Yang and Doong (2004) explored the nature of the mean and volatility transmission mechanism between stock and foreign exchange markets for the G-7 countries. Their study showed that movements of stock prices will affect future exchange rate movements, but that changes in exchange rates have less direct impact on future changes of stock prices. Thus, both Kanas (2000) and Yang and Doong (2004) find unidirectional volatility spillovers from stock market returns to exchange rate changes. However, while Kanas (2000) study found the volatility spillovers to be symmetric in nature, the empirical evidence in Yang and Doong (2004) study supported the asymmetric volatility spillover effect.

Contrary, Apergis and Reztis (2001) study of cross-market volatility spillover effects across New York and London foreign exchange and equity markets revealed volatility spillover effects from the foreign exchange market in London and New York to the equity market in New York and London, respectively. The results, however, did not show volatility spillover effects from the equity markets to the foreign exchange markets across New York and London.

Most of the studies observed take the country as the unit of analysis. However, Jayasinghe *et al.*, (2011) argued that there is a defect of a country study which is that exchange rate exposure could be averaged out when a highly aggregated index is used. This is largely because various industries or sectors may be exposed negatively/positively to the exchange rate changes depending on whether they are import/export dominant. Similarly, the asymmetries associated with the exchange rate exposure of both first and second moments of stock returns are also likely to be averaged out when highly aggregated indexes are used (Jayasinghe *et al.*, 2011). Thus, there are instances where estimation of overall market's exchange rate exposure may not largely help in hedging and investment decisions, hence the need to consider sectoral level exposure as well. This study thus segregates exchange rate exposure of financial and non-financial sectors as a way to overcome this possible limitation.

Doidge *et al.*, (2006) examined the nature and the economic significance of the exchange rate to firm value relation using a database of non-financial firms from over 18 countries including the UK and the USA during the period 1975 to 1999. In their study of the lagged exchange exposure, they found that for most of the countries, apart from the USA, the lagged exchange rate effect was insignificant. Mispricing, they argued, was the most likely main rationale behind the low magnitude of exposure found in earlier studies. On the other hand, Krishnamoorthy (2002) study found no evidence that lagged changes in exchange rates influenced returns of US industries.

Studies have also sought to examine the effect of the introduction of the Euro on the exchange rate exposure in the Euro zone. This is because the introduction of the Euro has been considered as an important economic landmark achievement in Euro-land (Guttman, 2001). Thus, even for the UK which has not adopted the Euro, it is expected to benefit from the monetary union through reduced volatility of exchange rates and reduction of long-term interest rates. However, Joseph (2002) study found that the introduction of the Euro had no impact on the returns of the four UK non-financial portfolios in the study despite the possibility that the results might have been unfavourably influenced by the very short duration of the post-Euro data in the sample. Bartram and Karolyi (2006) also examined whether the introduction of the Euro in 1999 was associated with lower stock return volatility, market risk exposures and foreign exchange rate risk exposure for 12,821 non-financial firms in Europe, the USA and Japan. The study found that though the Euro led to a significant decrease in the volatility of trade-weighted exchange rates of European countries, stock return variances of non-financial firms increased after its introduction. The Euro was also found to have a positive effect on the incremental foreign exchange rate exposures.

Using industry data for Japan, Tai (2010) investigated the exchange rate exposure of 12 industries (six from non-traded goods and six from traded goods) employing the generalized methods of moments (GMM) and multivariate GARCH-in mean (MGARCH-M) models. The exchange rate exposure results were similar for both models as significant negative coefficients were found for 83 per cent of the

industries suggesting these industries are affected by unexpected changes in the Japanese Yen. Nonetheless, MGARCH-M results revealed strong evidence of time-varying foreign exchange risk premium, which was totally ignored using the GMM as this was assumed to be constant.

Using a sample of 269 UK non-financial firms, Agyei-Ampomah *et al.*, (2012) investigated the sensitivity of foreign exchange exposure using the OLS and GARCH (1,1) models. Their study found comparable exchange rate exposure results for the two model used but the GARCH model also provided evidence of time-varying exchange rate exposure, which the OLS had assumed to be constant.

Using Jorion's two-factor model, Chue and Cook (2008) estimated the exchange rate exposure of 15 emerging markets over eight years, from 1999 to 2006. Their results showed that although Chile, Colombia, India, Pakistan and Philippines showed a low or no significant exchange rate exposure, other 10 countries had a higher proportion of significant exchange exposure. In addition, the exchange rate exposures were mostly negatively correlated with stock returns especially in the middle-income countries of East Asia and Latin America. Choi (2010) study, on the other hand, finds that 50 per cent of the Korean oil-refining and petrochemical firms are significantly exposed to exchange rate changes when the changes are sizeable especially in the years 1997 and 2008. These periods correspond to the known Asian Crisis and recent global financial crisis periods. Another study by Cho and Song (2011) revealed that 44 per cent of Korean non-financial firms

listed on the Korea Exchange from the year 2007 to 2008 had significant exchange rate exposure. The results showed that a small number of firms benefited from the depreciation of the Korean Won while the majority of firms are harmed. In addition, as firms' export increases, the foreign exchange exposure increased up to a certain level.

Al-Shboul and Alison (2009) investigated the exchange rate risk exposure of 62 Australian multinational firms. Their study showed that 8 per cent of the Australian multinational firms had significant exposure coefficients. On the other hand, Aggarwal and Harper (2010) studied 1,047 US domestic firms and found that domestic firms also experienced significant foreign exchange risks which were not different from firms involved in international operations. Aggarwal and Harper (2010) argued that domestic firms faced international competition because of foreign suppliers, competitors as well as the macro-economic factors.

Zhou and Wang (2012) examine the exchange rate exposure using a sample of FT UK 500 non-financial firms for 1999 using the trade weighted index. Of the 148 non-financial firms, they found that only 9.46 per cent of the firms exhibited statistically significant exchange rate exposure coefficient. The majority of the stock returns increase (decrease) with the appreciation (depreciation) of the market index. However, when compared to other studies, the incidence of significant exchange rate exposure coefficients is very low. Similar to Joseph

(2002) study, this could be as a result of the limited time frame of one year employed for the study

The reviewed literature shows that most empirical exposure studies have focussed on US firms. Further, while some recent studies show evidence of exchange exposure outside the US, these have been either in Europe or other developed countries. Some of the research have focussed on emerging countries. However, the GCC countries have rarely been a focus of study. It is the motivation of this research to contribute to the exchange rate exposure literature by providing empirical evidence from the GCC countries.

2.3 Interest rate exposure

Interest rate changes are an important variable in monetary and fiscal policy measures of many countries because interest rates determine the cost of borrowing and consequently, the level of trade or spending by firms and individuals. By exploring variables surrounding the level of interest rates, it is possible to understand how interest rates affect the stock exchange (Afshar *et al.*, 2008).

Many studies have used Stone's (1974) index model of capital asset pricing model (CAPM) that consists of two factors. First, the traditional equity market index and secondly, the debt market index. Stone argued that the individual equity securities display different degrees of sensitivity to interest rate. Stone's model has been

used in a number of studies (see, for example, Faff and Chan, 2010; Lynges and Zumwalt, 1980; Lloyd and Shick, 1977). Interest rate effects on stock return have been studied in many research studies (see, for instance, Afshar *et al.*, 2008; Oertmann *et al.*, 2000). Studies (for, instance, Brewer *et al.*, 2007; Dinenis and Staikouras, 1998; Flannery and James, 1984) have assessed the impact of interest rate on financial institutions and have used a two-index model. Different studies have contended different determinants of the interest rate effect. For instance, Scott and Peterson (1986) claim that hedging against interest rate movements affects the stock market. The size of the maturity difference between the banks' nominal assets and liabilities was found to be positively related to the interest rate. In addition, the effect of interest rate on the equity return for a bank, for instance, depends on the maturity of assets and liabilities and their correlation to interest rate movement (Eun and Shim, 1989). Chow and Chen (1998), contrary to Eun and Sim (1989), found a significant negative relation is obtained from common stock returns and the changes in interest rate, but there is a significant opposite relationship between stock return and variability of interest rate.

Joseph (2002) employed the generalized autoregressive conditionally heteroskedastic in the mean (GARCH-M) model to investigate the sensitivity of equity of life insurance companies and found it to be sensitive to long-term interest rates. Life insurance companies' equity was found to be sensitive to long-term interest rates and the sensitivity also varied through sub-periods and cross risk and size based risk (see, also, Willett, 2003). Other studies have used either

current, anticipated and unanticipated interest rate changes to assess the effect on stock returns. Taylor (2001), for instance, estimates and employs unanticipated interest rate while Scott and Peterson, 1986 (see, also, Dinenis and Staikouras, 1998) used unexpected interest rates.

Elyasiani and Mansur (1998) also employed the GARCH-M methodology to investigate the sensitivity of 56 commercial bank stocks, compressed into 3 portfolios, to interest rate changes for the period 1970 to 1992. Their study used the 10 year Treasury composite yield as the interest rate measure. Their study found significant negative interest rate coefficients for 2 of the 3 portfolio. In addition, Elyasiani and Mansur (1998) found that volatility had an adverse effect on the risk-return premium and shocks to the banking sector were persistent. Employing a GARCH-M methodology also, Brewer *et al.*, (2007) examined the interest rate exposure of 60 US insurance companies compounded into portfolios during the period 1975 to 2000. Their study used the 20 year US government bond to measure the long term interest rates. Their study revealed a significant positive coefficient between the long term interest rate changes and the portfolio returns.

Interest rate changes create effects at different levels and differently in each industry. Kanas (2008) point out that the contemporaneous interest rate has a weak effect, but it has a strong effect during a high volatile period. The study

examined the relationship between stock returns, real activity and interest rates using a multivariate regime switching approach.

In a study on the interest rate effect, Nissim and Penman (2003) point out that stock market value involves discounting expected payoffs while the interest rates affect the discount rates. Nissim and Penman (2003) found that there is a negative impact on discount rate defined as a denominator effect in a valuation model. They (Nissim and Penman) investigated the relationship between interest rate and subsequent earnings. They found that in a year of changes in the interest rate and subsequent years, the unexpected changes in interest rate are positively related to unexpected earnings as a result of a positive relationship between interest rate and net interest expense.

In addition, Nissim and Penman (2003) study found a positive effect to the change in interest rate on unexpected earnings, revenue, operating expenses and net interest while there is a negative effect on required return. Increase in interest rate resulted into an increase in profitability while the change in interest rate impacts negatively on subsequent excess profitability and residual earning.

Flannery and James (1984) studied the path that the relationship takes between interest rate and stock return related to compositions of nominal assets and liabilities in commercial banks, stock saving and loan associations. They found a high correlation between interest rate changes and common stock returns. Positive

impact is found between interest rate changes on stock return which is also affected by the size of the maturity nominal assets and liabilities. Similarly, Bodnar *et al.*, (2003) found that the mismatch of the bank assets and liabilities cause a significant effect on common stock returns.

Staikouras (2005) studied the interest rate risk and whether stock returns included the unexpected changes in interest rate. He found that the risk premium included the interest rate risk exposure of the financial institutions' equity returns. The market risk was found as significantly negative. In the study, Staikouras (2005) assumed that the portfolio is hedged against the unexpected interest rate changes.

Lim *et al.*, (2012) examined the effect of unanticipated interest rate changes on bank stock returns of 14 US largest bank holding companies. The study used 3-month Treasury bills to measure interest rates changes and applied the autoregressive (AR) model to extract the white noise processes of the interest rate changes. The results of their study indicated that fluctuations in commercial bank stock prices are significantly associated with unanticipated interest rate changes and that the bank stock return interest rate sensitivity is related to the balance sheet composition. Another study which examined the interest rate sensitivity in the financial sector was that of Wetmore and Brick (1994). They examined the interest rate sensitivity of 79 largest banks in the US to actual changes in interest rates for the period 1986 to 1991. Their study found that the sensitivity to interest rates was significant.

Al-Abadi and Al-Sabbagh (2006) study examined the impact of interest rate changes on stock returns of 13 Jordanians commercial and investment banks for the period 1990 – 2003. Their study applied the CAPM, as a single index model, two-factor model and multi-factor model in order to test market risk, interest rate risk and the additional macroeconomic factor of inflation respectively. Their study revealed that market risk has a positively significant association with stock returns while interest rate changes negatively significantly impacted stock returns. Inflation was observed as having a negative insignificant effect on the stock returns.

Overall, most studies on interest rate exposure have mainly focussed on the financial firms. However, there have been other studies which have focussed on the non-financial firms also (see, for example, Bartram, 2004; Booth and Officer, 1985; Bae, 1990; Olugbode, 2010; Sweeney and Warga (1986). Bartram (2004) noted that despite the fact that interest rates are not less volatile than exchange rates, and also embody an important source of risk for non-financial firms, the impact of interest rate risk on the value of non-financial firms has received little attention in the literature.

Faulkender (2005) summarised that most firms are exposed to interest rate risks from two sources which are the interest rate sensitivity of their assets and the sensitivity of their debt. For the non-financial firms, the interest rate risk theoretically impinges on the firm value due to variations in their cash flows and

the value of their financial assets and liabilities. Similarly to financial firms, most studies on the interest rate exposure have reported a negative relationship between stock returns and changes in the interest rates (Lobo, 2000). Sweeney and Warga (1986), for example, in their examination of the sensitivity of regulated industries stock returns (particularly those of electric utilities) to unanticipated changes in interest rates for the period 1960 to 1979 found negative interest rate coefficients. These results are consistent with Lynge and Zumwalt (1980) study that found a significant negative effect of current changes in the interest rates on the stock returns of non-financial firms.

Booth and Officer (1985) study however, did not find a statistically insignificant coefficient for the interest rate risk for non-financial firms but found significant negative effect for financial firms. Their study compared the interest rate risk exposure of 66 US non-financial firms and 66 US commercial banks using the contemporaneous changes in the 3 month Treasury bill. Similarly, Bae (1990) study found that the stock returns of non-financial firms were not sensitive to the unanticipated changes in the interest rates. Bae (1990) explained that the composition of the non-financial firms' assets was mainly real assets whose values were largely invariant to changes in interest rates hence the results. Contrary, Oertmann *et al.*, (2000) found positive significant interest rate exposures for most non-financial corporations in France, Germany, Switzerland and U.K, but these were attributable to variations in the long-term interest rates and global interest rate index. Similarly, Bartram (2002) found positive significant

exposure of long term interest rates which were higher than the short term interest rate exposure for all the Germany non-financial firms studied for the period 1987 to 1995. Bartram used the three-month Eurocurrency as a proxy for the short-term interest rate index and the 10-year government bond was used as a benchmark for the long term.

The study by Thorbecke (1997) on the impact of interest rate changes on stock returns adopted the vector autoregression (VAR) methodology and found that interest rates significantly influenced stock returns. Further, the evidence suggested that expansionary policy increases ex-post stock returns.

Similar to Booth and Officer (1985) study, Dinenis and Staikouras (1998) extracted the unexpected changes in interest rates using ARIMA models to then investigate the effect of unanticipated changes in the interest rates on stock returns of portfolios of financial institutions in the UK. Five groups of financial institutions examined included banks, insurance companies, investment trusts, property investment companies and finance firms. A wide sample of non-financial firms were also considered for comparative purposes. Their study found significant negative relationship between stock returns and changes in interest rates. Further, higher average sensitivity was reported for the financial firms as compared to the non-financial firms.

Other studies on the interest rate exposure concentrated on the industry or sectoral exposure. For instance, Joseph (2002) investigated the interest rate exposure in the UK pharmaceutical industry while Loudon (2004) examined the airline industry. González *et al.*, (2006) investigated the interest rate exposure in the Spanish banking, construction, chemicals, communications, electrical, food, investment trust, primary metal, utilities and others in the period 1993 to 2001. An early study by Ceglowski (1989) revealed that most US industries were not sensitive to changes in interest rates but that construction and some construction related manufacturing (lumber and wood products and furniture and fixtures) are highly sensitive while the sensitivity was moderate for the industries that produce transportation equipment, chemicals, textiles, and rubber and plastics. Jensen *et al.*, (1997) examined the short term and long term stock market returns of 16 industries during the period 1968 to 1991. Higher short term and long term stock returns were observed to follow a decline in interest rates. In addition, their study identified significant cross-industry variations which suggested that monetary conditions may be used by investors to estimate different expected returns across industries.

Whilst this study on the exposure of the firms in the GCC countries is not focussed on an industry analysis, a distinction, nonetheless is made between financial and non-financial firms' exposure to the interest rate risk.

Similar to studies that examined the effect of the introduction of the Euro on the exchange rate exposure, Korkeamäki (2011) examined the impact of the Euro on interest rate risk of 12 EU countries. The study focussed on stock market indices. However, the use of country level stock returns leads to data compression and consequently loss of information. Korkeamäki avoids this problem in the study by using industry level returns instead. He found that while stock returns in most countries in the Western Europe were negatively correlated with interest rate changes prior to the Euro, the negative correlation has disappeared since the Euro was introduced. He further suggests that the growth in the European corporate bond markets contributed significantly to firms managing their interest rate risk. This agrees to Rajan and Zingales (2003) suggestion that the reduction in the interest rate risk exposure corresponds to interest rate risks corresponds to the significant growth in fixed income related markets attributable to the introduction of the Euro.

Ferrer *et al.*, (2010) examined the influence of interest rate risk on Spanish firms at the industry level. Their findings revealed that interest rate exposure is not homogeneous for all Spanish industries. In particular, when compared to other industries, highly leveraged industries (construction and real estate), regulated industries (electrical and utilities), and banking industry are the most interest rate sensitive. Further, they observed that the introduction of the Euro seems to have weakened the degree of interest rate risk. This observation is somewhat similar to the findings of Korkeamäki (2011). Ferrer *et al.*, (2010) study further showed that

exposure to long-term interest rate was more than the short term interest rate exposure.

Park and Choi (2011) examined the interest rate sensitivity of the US property/liability (P/L) insurers stock returns using various return generating process models incorporating different interest rate changes. Their study found that US P/L insurers' stock returns are sensitive to interest rate changes. The interest rate sensitivity of insurers' stock returns were also found as time varying consistent with extant studies of financial institution's interest rate sensitivity. Similar to Ferrer *et al.*, (2010) study, their study revealed that interest rate exposure coefficients were negatively significant. In addition, the industries were significantly exposed to the long-term interest rate more than the short-term interest rate.

Further, Ballester *et al.*, (2011) investigated the interest rate sensitivity of 23 commercial banks listed on the Madrid Stock Exchange for the period 1994 to 2006. Their study find significant negative interest rate exposure coefficients for both the short-term and the long-term interest rate. In addition, their results showed that the interest rate exposure is systematically related to some bank specific characteristics, for instance, bank size which showed a significant positive relation to interest rate exposure.

Unlike other studies that have used either the OLS or GARCH model, Lobo (2000) investigated the asymmetric effects of changes in interest rates on the returns of the S&P index for the period 1990 to 1998 using the AR-EGARCH model. The study results showed that the 3 month Treasury bill had a significant negative effect on the returns of the index.

In addition, he found evidence of overreactions in the wake of bad news and point to a shift in volatility from before to after the interest rate change announcement. Thus, his study observed high persistence of volatility and leverage effects, implying that past negative innovations had a greater impact on current volatility in the stock market than past positive innovations.

As noted above, most of these studies have focussed on financial firms. This study examine both the exposure on the financial and non-financial firms separately and also in aggregate. A comparison would be made on the level of exposure to the two sectors. Further, the existing literature has concentrated mostly on the US and EU. Studies focussing in the GCC countries are scarce. In addition, while studies have utilised the OLS and GARCH model, this study goes further by employing the EGARCH-M model besides presenting the OLS results.

The next section discusses oil price exposure.

2.4 The oil price exposure

When there is anticipation that oil prices will increase, this should benefit the GCC countries. However, such high prices and benefits often bring about the challenge of inflation in the region (Huang *et al.*, 1996). When the prices increase, there is the risk of focusing on public spending to grow the economy, which makes private sector recovery very difficult (Frankel, 2003; Hammoudeh and Li, 2005). Recently, the OPEC stated that it could increase the amount of crude oil pumped to maintain the price at \$80 a barrel. However, a report commissioned by an NCBC noted;

“The projected resilience and gradual increase of the oil price are broadly speaking a welcome development from the perspective of Gulf economies. It should make for a backdrop of relative macroeconomic stability and a strong fiscal position. However, the forecast also involves risks, especially in two key areas. Firstly, the recurrent volatility of the oil price may have adverse implications for economic sentiment, thereby potentially further delaying and subduing recovery in the private sector. This risks making economic growth more heavily dependent on government spending than should be ideal. Secondly, positive news on the oil price will push up liquidity levels and complicate further the efforts of especially the Saudi authorities to contain inflation”
(Emirates, 24/7/2010)

Appreciatively, a large body of literature has developed to identify the impact of the oil price changes on the real economic activity with results showing significant influence of oil price shocks on macroeconomic activities (such as, Cunado and Perez de Gracia, 2005; Cologni and Manera, 2008; Hamilton, 1983; Kilian, 2009). As argued by Eksi *et al.*, (2012), oil constitutes a substantial input for many industries and thus the increase in oil price leads to economic crisis by

creating significant cost-push inflation and higher unemployment. Whilst this argument is true for oil importing countries, this is not the case for oil exporting countries. Despite the significant body of literature which has examined the effect of oil price shocks on macroeconomic activities, few studies however, have paid attention to examine how the changes in oil prices could influence or impact stock market returns. These studies have given evidence of the impact of oil prices on stock returns (see, for example, Jones and Kaul, 1996; Nguyen and Bhatti, 2012). To support the impact of oil price shocks on stock prices, the Wall Street Journal, for example, noted that '*Crude oil futures settled higher, bouncing back from four straight sessions of losses as rising U.S. Equities boosted optimism about the economic outlook*' (September 20th, 2010) and that '*Crude oil prices rose, spurred by advancing U.S. stock prices and a slumping Dollar*' (September 24th, 2010).

Dhaoui and Khraief (2014) gives more evidence about the link between crude oil and stock prices. They used monthly data for eight developed countries from January 1991 to September 2013. They used an EGARCH-M model to investigate the effect on both returns and volatility of the stock market returns. They found that there is a strong negative connection between oil prices and stock market returns in seven of the selected countries. They further state that it is only in Singapore that the stock market returns are not affected by the changes in oil prices. The other six countries' stock market returns were significantly affected by the changes in oil prices. These results are consistent with a large body of literature that suggest that oil price variations have strong and negative

consequences for oil importing countries (see, for example, Papapetrou, 2001; Sadorsky, 1999)

The International Energy Agency, in its Oil Market Report, stated that *'benchmark crude prices traded in a \$71 to \$79 billion per barrel range in June; Financial and equity markets remained the focus of attention (June, 2010) and that 'by early August, oil prices shot up to three monthly highs A strong recovery in equity markets on the back of positive second-quarter earnings and a sharp downturn in the US Dollar were reportedly behind the rebound (August, 2010).*

According to Hatemi and Roca (2005) the share prices that are seen today often reflect the current or future economic position. If the prices are high, then this might refer to an expectation of expansion and hence also of the demand and hence prices of oil. Basher and Sadorsky (2006) argued that a rise in oil prices acts as inflation tax which could lead to consumers looking for alternative energy sources, increasing risk and uncertainty, which could then affect the stock prices. Employing a multifactorial model, Basher and Sadorsky (2006) found strong evidence that oil price risk impacts the performance of stock markets in emerging countries.

Huang *et al.*, (1996) pointed out the importance of oil prices in the US economy and its effect on stock returns. They use daily data for oil future returns and daily stock returns in the vector autoregressions model (VAR). They investigate the

contemporaneous and lead-lag links between oil future contract and stock returns. Huang *et al.*, (1996) found that in the 1980s period, there was no correlation between oil futures and stock returns in the US. But, there was a contemporaneous significant one-day lead to oil future returns. Their results are consistent with those of Chen *et al.*, (1986) that showed that returns generated by oil futures have insignificant effect on stock market indices such as S&P 500. Thus, there is no advantage in considering the risk caused by the excessive volatility of oil prices on stock markets.

Similarly to Huang *et al.*, (1996) and Chen *et al.*, (1986), Apergis and Miller (2009) investigated how explicit structural shocks that characterise the endogenous character of oil price changes affect stock-market returns in eight countries, Australia, Canada, France, Germany, Italy, Japan, the US and the UK. Employing a vector autoregressive model, their findings do not support a large effect of structural oil market shocks on stock price in the eight countries studied.

Jones and Kaul (1996), on the other hand, investigated the effect of oil shocks' impact on stock returns, whether through current and future real cash flow or in expected returns, in Canada, Japan, the UK and the US. They used quarterly data based on a standard cash-flow dividend valuations model and employed the Producer Price Index for fuel to proxy the oil price index. They used a Vector Autoregressive model on the quarterly data over the period 1947 to 1991. In their study, they found that oil price shocks affect real cash flows only in America and

Canada, while the United Kingdom and Japan adapted on stock prices more than justified by changes in real cash flows or expected changes returns. These results are inconsistent with Huang *et al.*, (1996) and Chen *et al.*, (1986) findings.

Battermann *et al.*, (2006) argued that if the oil future market and stock market are efficient markets, then any information known will affect these two markets. Therefore, oil future prices and stock returns will be contemporaneously correlated and in the case since real GNP is affected by oil price changes, the companies' earnings will also be affected. Either it has a direct or indirect effect on the cost of a company's operations. Thus, a decline in earnings as a result of increased oil price will decrease the stock prices at the same time. The delayed capitalization of future cash flow reflect an inefficient market.

Hammoudeh and Li (2005) examined the oil sensitivity of equity returns in Mexico, Norway and US oil and transportations industries. They used daily based data from 1986-2003. They found oil price growth for all individual oil exporting countries and US oil and transport industry guide stock markets returns. Only Norway and the world capital market have a lead relation to oil price. Where Norway has a positive one-day lead, and MSCI (Morgan Stanley Capital International index) has a negative one-day lead which meant that high price for oil is bad for the world capital market

Bjørnstad (2009) studied the effect of oil price shocks on stock returns in Norway. Stock returns were found to be influenced by oil price changes. At the same time, it was observed that for an increase by 10% of oil prices, stock prices would follow by a 2.5% increase and then the effect will vanish over time. Moreover, an increase in oil price increased total wealth and demand. Bjørnstad (2009) argues that in oil importing countries, if high oil prices go into the economy then increased oil prices lead to a high level of economic activity. For this reason, oil price affects the asset prices through its effect on the macroeconomic factors. Besides the cause of aggregation of wealth and demand, oil price shocks also affect inflation. He studied the effect of the increase of oil price from two positions in importing countries and exporting countries. In the case of importing countries, owing to an increase in oil price, the input of production becomes more costly. This is why there is less production and less income, as well as decrease in consumption, investment and decrease in demand. Moreover, an increase in oil price leads to an increase in inflation. During this time, the Federal Reserve, for instance, increases interest rate to avoid a recession. On the other hand, in exporting countries, there are two phases. First, a higher oil price has a positive impact on income and wealth. Second, there is a negative impact on trade in oil-exporting countries as they import wealth from oil importing countries. If that income is used to purchase goods and services in the export country, then the economy will increase. At the same time, investment and business opportunity will increase. So, wealth and demand will increase as well. What is more, the higher level of activity will push up the inflation and domestic currency. In order

to handle increased oil price in an exporting country, there will be a negative effect on trade.

Since the oil importing countries are negatively affected by the oil price increases, their demand will be less for traditional goods and services from oil exporting countries. Bjørnstad (2009) investigated the relations between different proxy measures of oil. He used increase and decrease and general changes. He found that asset prices react to oil movement, either low or high. In addition, assets price respond to actual (log) level rather than to changes in oil price.

Huang *et al.*, (2005) investigated the impact of oil price changes and volatility of the stock market returns. They used a multivariate threshold model on monthly data from 1970 to 2002. They apply this model to the US, Canada, and Japan. They claim that the level of threshold depends on how the economy depends on imported oil and how much saving is done through energy saving. If the changes in oil price are under threshold levels, then there is a limited impact on stock returns. In the case of changes in oil price above threshold levels, then changes in oil price explain macroeconomic variables rather than volatility, although if the changes exceed the threshold level, oil price or volatility explain the model better than interest.

Hammoudeh and Aleisa (2004) examined the oil sensitivity without systematic risk on five members of the GCC countries, Bahrain, Kuwait, Oman, Saudi Arabia

and UAE on a daily basis. These five countries are all oil exporters except Bahrain. They found that only Saudi stock return has a relation with oil price growth and it is bi-directional. Kuwait and Oman stock markets have causal relationships with oil price fluctuations. They summarize that this result may come from the fact that the GCC economies are very small and their stock markets are relatively unknown.

Cong *et al.*, (2008) investigate the Chinese stock market correlation with oil price shocks. In China, the second world consumer, oil shocks do not show a significant impact on stock return, except on manufacturing and some oil companies. Although, increases in oil volatility increase speculation in mining and petrochemicals index, thus raising their stock returns. Oil price shocks explained manufacturing stock movements more than interest rate changes.

Sadorsky (2001) study the impact of oil prices and interest rates in stock returns in the oil and gas industry in Canada. By using a multifactor market model, he argues that there are significant effects of oil price and interest rates in stock price returns. He found that an increase in oil prices was followed by an increase in oil and gas industry stock returns in the Canadian Market. He assumes that the oil sector is less risky than the market, and it is pro-cyclical. For that, the oil and gas sector in Canada is not good in hedging against inflations.

In an earlier study, Sadorsky (1999) investigated the reflections of oil price volatility on real stock returns. He argued that there is an effect on stock returns from oil price and oil price volatility. By using vector autoregression, he explored oil price movement after 1986, and found that real stock returns were clarified more by oil price shocks than interest rates changes. In addition, he shows that oil price shocks have unequal outcomes in the economy. He contends that oil price fluctuations suggest the future interest rates and investment.

Park and Ratti (2008) investigated the effects of oil price shocks and oil price volatility on real stock returns in the US and 13 European countries over the period 1986 to 2005. The study employed a multivariate VAR model and found that for many European countries, but not for the US, increased volatility of oil prices significantly depresses real stock returns. In addition, Norway as an oil exporter shows a statistically positive response of real stock returns to an oil price increase. In this study on the GCC countries, it is expected that the results might be similar to those found by Park and Ratti (2008) for Norway as these are oil exporting countries.

Naifar and Al-Dohaiman (2013) studied the impact of oil price change and volatility on stock market returns in the GCC countries. They employ a Markov regime-switching model to generate regime probabilities for oil market variables in the crisis regime and non-crisis regime. Further, they investigated the non-linear connection between oil price, interest rates and inflation rates before and

during the subprime crisis. The study found evidence that the relationship between GCC stock market returns and OPEC oil market volatility is regime dependent (excluding Oman in the low volatility state). In addition, they found that the dependence structure between inflation rates and crude oil prices is asymmetric and orients towards the upper side during the 2007 financial crisis. The study also finds evidence of significant symmetric dependence between crude oil prices and the short term interest rate during the financial crisis.

Similar to Naifar and Al-Dohaiman (2013) who examined the pre and post financial crisis period, Reboredo and Rivera-Castro (2013) examined the connection between oil prices and stock market return in US and European industrial sectors (automobile and parts, banks, chemical, oil and gas, industrial goods, utilities, telecommunications, and technologies) over the period 2000 to 2011. They used daily data for the aggregate S&P 500 and Dow Jones Stoxx Europe 600. Reboredo and Rivera-Castro (2013) results of the wavelet multi-resolution analysis revealed that oil price changes have an insignificant effect on stock market return in the pre-crisis period at either the aggregate as well as the sectoral level. Contrary, in the post financial crisis, their study revealed a positive interdependence between oil price shocks and the stock returns at both the aggregate and the sectoral level. Whilst the current research covers the period from 2007 to 2012, it does not make a comparative analysis between the pre and post financial crisis.

In another study, Aloui and Jammazi (2009) developed a two regime Markov-switching EGARCH model to examine the relationship between crude oil shocks and stock markets in UK, France and Japan over the period 1989 to 2007. Their results supports that net oil prices play a pivotal role in determining firstly the volatility of real returns and secondly the probability of transition across regime. Similarly, Isaac and Ratti (2009) investigated the long-run relationship between the world price of crude oil and international stock markets using a Vector Error Correction model for six OECD countries over the period 1971 to 2008. They found that there is long-run connection between oil price and real stock market returns. The real stock prices were negatively affected by increases in oil prices. Other studies have sought to investigate whether past oil price changes could serve to predict future stock market returns. Driesprong *et al.*, (2008), for instance, examined whether stock market returns could be predicted based on monthly oil price evolutions. They used data from 18 developed and 30 emerging countries and found significant predictability in 12 developed markets and in all emerging markets studied. Consistent with these results, Papapetrou (2001) found that oil price forms an important component in explaining stock price movements and that increases in oil price shocks induces serious depressions in real stock returns in the study of Greek stock market for the period 1989-1999. Hong *et al.*, (2002) also found significant negative connections between the lagged petroleum industry returns and the US stock markets.

In summary, it has been observed that most studies on oil price risk have examined the impact on macroeconomic activities as compared to stock market returns. Further, the studies that have examined the impact of oil price changes on stock market returns have concentrated on the oil importing countries. This mostly explains the negative significant effects observed in the studies. Few studies have investigated the oil price shocks in oil exporting countries which include the GCC countries.

It is important that an investigation of the impact of oil price changes on stock markets in the GCC countries is carried out because it adds to the literature which is currently scanty. Further, it should assist in investors' decisions in oil related activities, portfolio allocations and risk management. If a relationship could be established, then future oil price shocks would be responded to accordingly. Thus, the ability to accurately forecast oil price change is very important in financial decision making. As summarised by Arouri *et al.*, (2012, p. 284),

“aggregate output dynamics and corporate earnings can be also severely affected, and policymakers should consider the volatility impacts of oil price when conducting economic policies. Moreover, to the extent that oil price volatility provides information about risk levels and how financial asset returns should behave in response to oil shocks, accurately modelling and forecasting oil price volatility are crucial for financial decisions involving oil investments and portfolio risk management particularly with regard to the valuation issues of oil-related products and energy derivative instruments”.

The next section discusses the determinants of exchange rate, interest rate and oil price exposures.

2.5 The determinant of the exchange rate exposure, interest rate exposure, and oil price exposure

Another important facet of this study is the examination of the determinants of exchange rate exposure, interest rate exposure and the oil price exposure in various economies with specific reference to the GCC countries.

Exchange rate exposure is determined by the rank of international operations of the firm where more foreign activity leads to more exchange rate exposure (Jia and Lilian, 1998). Firms with minor involvement in trade have a short degree of exposure (Dominguez and Tesar, 2001). In their study of the relationship between exchange rate movement and firm value in eight (non-US) industrialised and emerging countries, Dominguez and Tesar (2001) found that exposure was more prevalent in small rather than large and medium sized firms. They used firm-level market capitalisation to sort each country's sample of firms into thirds in order to capture firm size. Their findings are consistent to other studies (for example, Chow and Chen, 1998) that found that larger firms are more likely to hedge exchange rate risk as compared to smaller firms.

The firms engaged in more trade are aware of exchange rate risk since they are affected by exchange rate movements. Those firms with a high international involvement are influenced by exchange rate changes (Dominguez and Tesar, 2001; Chow *et al.*, 1997). However, firms without foreign operations also tend to

be exposed to foreign exchange changes (Lardic and Mignon, 2008). Jorion (1990) found that the U.S stocks are affected differently by exchange changes. The exchange rate has a negative effect on earnings over the short-term but is positive in the long horizon. In addition, Jorion (1990) found that the effect of the exchange rate volatility is more than interest rate and inflation rates on stock returns.

Jesswein *et al.*, (1995) investigated the exchange risk management of US based corporations using mail questionnaires for 173 firms. These 173 firms were part of the Fortune 500 firms with sales exceeding USD750 million. The sample was divided into seven industry groups. Their results showed that the manufacturing industry had the highest percentage of derivative use after the finance, insurance and real estate industries. The wholesale and retail trade industry ranked behind the mining and construction industry which followed the manufacturing industry. The study further revealed that firm size, using total amount of corporate assets as a proxy, had an insignificant relationship to derivative usage. The degree of internationalisation, proxied by foreign assets, foreign sales and foreign income, had a significant positive relationship to derivative use, on the other hand. Of all the determinants, the degree of internalisation was the most significant. However, Al-Shboul and Alison (2009) found no evidence that foreign operations had any influence on exchange rate exposure. Firm size, nonetheless, was positively associated with exposure suggesting that larger firms might be more exposed to foreign exchange rate risk. Mallin *et al.*, (2001) also found a significant positive

relationship for company size and derivative usage. Company size was proxied by turnover in their study of 231 non-financial firms in the UK. Bailly *et al.*, (2003) also found a significant positive relationship between firm size and the use of interest rate derivatives in their study of derivative usage of 234 UK corporate firms listed on the London Stock Exchange. In addition, they found that interest rate derivative usage across the industries was quite similar. However, foreign exchange exposure was the most managed followed by interest rate exposure.

Chiang and Lin (2006) examined the determinants of exchange rate exposure for Taiwanese non-financial firms during the period 1998 to 2002. The study examined the use of two financial hedge strategies to reduce exchange rate exposure. They found a significant negative coefficient for firm size contrary to Mallin *et al.*, (2001) results. In addition, the study revealed a positive significant coefficient for the foreign sale to total sales ratio. With respect to foreign debt, Booth and Rotenberg (1990) used foreign assets and foreign debt ratio besides foreign sales to determine the sensitivity of Canadian stocks to changes in the US Dollar. Their results showed that firms with a higher proportion of foreign debt had a more negative foreign exchange rate exposure while those firms with higher foreign sales had more positive exchange rate exposure.

Doidge *et al.*, (2006) examined the economic significance of the exchange rate to non-financial firms' value from 18 countries and concluded that during depreciation periods, firms with high international sales outperform non-

international by 0.72 per cent per month but in the large appreciation period, they underperform by 1.1% per month.

Sales distribution among domestic and foreign countries is the major factor that affects the exchange risk for multinational firms. On the other hand, it has been observed that domestic companies face import-oriented competition and a level of substitutability between home and imported product (Shapiro, 1975). Judge (2006) in the study of 441 UK non-financial firms from the 1995 UK 500 (FT500) found that foreign sales had a significant and positive relationship with the decision to hedge. Judge, further examined the determinants of the choice of hedging method distinguishing between non-derivative and derivative hedging and found that larger firms, firms with more cash, firms with a greater probability of financial distress, firms with exports or imports and firms with more short term debt were more likely to hedge with derivatives.

Faseruk and Mishra (2009) in examining the impact of US Dollar exchange rate risk on the value of Canadian non-financial firms found that firms with higher levels of US sales were more likely to use derivatives since they showed higher level of exposure to the US Dollar.

Jorion (1990) examined the effect of exchange rate fluctuations in multinational firms in the U.S between 1971 and 1978 and found that only some firms showed statistically significant foreign exchange exposure. Furthermore, the exposure was

positively and reliably correlated with foreign involvement. Hence, if there were no foreign operations, then the exposure should not vary across domestic firms. Contrary, Nguyen and Faff (2003) examined the factors that influenced exchange rate exposure to the Australian trade weighted index and found that the degree of international operations had no significant effect on exchange rate exposure for 144 non-financial firms. The 144 firms were obtained from the Connect4 database consisting of over 500 Australian companies. Kim *et al.*, (2006) also found no evidence that foreign activity and size had an impact on the level of exchange rate exposure. In their study, they used the ratio of foreign sales as proxy for foreign activity and log of total assets as proxy for firm size in their investigation of 424 US firms.

Chow and Chen (1998) explored two determinant factors of the exchange rate exposure. First, they compare the competitive prices for the products to another producer by changing input and resale prices that is in a different industry with different competitors; secondly, high hedging level with smaller exposure once an effective hedging is activated. Here, there is significant positive relation to fractional of foreign sales and negative relation to currency derivative (see, also, Afshar *et al.*, 2008).

Choi and Kim (2003) study covered the US multinational firms in Asian countries. One of the most common determinants to exchange rate exposure is the international operational and risk management variables, whereas in an inefficient

market, there will be lags in response to changes in oil price. Their result was that there is a significant correlation only for oil companies and that there was a lack of correlation between stock returns and oil future returns.

Mark (2009) studied exchange rate determination by different macroeconomic variables by using the Taylor rule and claimed that exchange rate is priced by uncovered interest rate parity with nominal interest rate from the banks. He argues that real exchange rate is determined by inflation and output gap or the unemployment gap between home and foreign countries.

Muller and Verschoor (2006) study on the determinants of exchange exposure to the Japanese Yen, British Pound and US Dollar for 817 European multinational firms revealed significant effects consistent with optimal hedging theories for financial distress, dividend policy and size of the US Dollar exposure. Optimal hedging theories postulate that the extent of financial risk exposures (such as exchange rate, interest rate and commodity prices) sometimes influences the intensity of hedging instruments adopted. Their study found that the bigger the firm, the lower the relative cost of financial distress and the less motivation to hedge and the higher the exchange rate exposure. The size effect of exchange rate exposure to Japanese Yen and British Pound was, however, weak and only positively significant at the 52 week horizon. With respect to dividend payout, a significant negative coefficient was found. In terms of quick ratio, leverage and

book value per share, Muller and Verschoor (2006) found weaker significance and for leverage it was negatively insignificant.

Judge (2006) investigated why and how UK non-financial firms hedge. The study examined the largest 441 non-financial firms based on market capitalisation that were more likely to be affected by exchange rate and interest rate risks. Firms, the results showed, that had higher gearing and lower interest cover had the greatest probability of financial distress and more inclined to hedge. The results are consistent with others that found a positive relationship between hedging and leverage (such as Graham and Rogers, 2002). However, Clark and Judge (2008) argued that leverage may not be an indication of the firm's financial health. According to their argument, if firms which use foreign currency debts but not foreign currency derivatives to hedge were classified as non-hedging firms, there would be a distortion of the distinction between the 2 groups as regards financial distress. Thus, the inclusion of foreign currency debt in a sample of foreign currency hedgers had the possibility of influencing the results regarding leverage.

Bartram *et al.*, (2004) study on 7,263 firms from 48 countries in the period 2000 and 2001 on the motivation for financial derivative usage found a significant negative relationship between use of foreign exchange rate derivatives and interest cover, quick ratio and market to book value for the UK. Significant positive coefficients, however, were revealed between foreign exchange derivative usage and size, dividend payout, foreign exchange exposure. Leverage, on the other

hand, had a positively insignificant effect on derivative usage. With respect to motivation for interest rate derivative usage, Bartram *et al.*, (2004) found that leverage, size and dividend payout had a negative significant relationship with interest rate derivative usage. Quick ratio, however, had an insignificant negative coefficient.

Block and Gallagher investigated the use of interest rate futures and option of Fortune 500 largest US firms using a questionnaire survey in 1985. Firms were divided into two groups, those with debt ratios less than 50 per cent and those with debt ratios greater than 50%, in order to test the correlation between high debt exposure and use of interest rate futures. Their study found no relationship between debt exposure and use of interest rate futures.

Also, according to Ibrahim (2006), if the firm value increases through increased activities that are attached to its involvement with other firms, for instance, when a new contract has been signed or a new market found, production should increase. This might imply that the firm will seek to continue this trend of increasing its value and in so doing, there might be risky options being considered or even taken. At such a time, it will be difficult to envision the effects of such risks (Ihrig and Prior, 2005). Exposure might be caused by among other things, the failure to secure good deals from the market or increased demands by the creditors of the firm or a sudden collapse of a particular market negatively affecting the firm's value and its operations. In considering the oil prices, there

are many determinants of its exposure. These might range from the challenges in the international political environment, for instance, lack of peace, to the demands by some of the big buyers of the oil that is produced in the country.

According to Ibrahim (2006) there are a number of factors that determine oil price exposures. Firstly, the volatility of the local currency against major international currencies which might mean that the price can rise and or fall at any time. Secondly, the interest rates that prevail in the country or internationally, which might imply that the prices might be affected in various ways, and thirdly, their cost of investments in the capital goods for mining the commodity might be limiting and hence an increase in the price. Other reasons include the bargaining power of the buyers like China, who take millions of barrels a day and the problem of global peace and or threats of war as is the current situation between Iran and other western powers (Ihrig and Prior, 2005)

Faff and Brailsford (1999) argued that oil prices are likely to have an important potential impact on the costs of factor inputs for many companies and thus the potential for a negative oil price sensitivity would be greatest in industries with a relatively high proportion of their costs devoted to oil bases inputs such as the transport industry. While this might be expected, the detection of any impact (whether direct or indirect) is usually complicated by the ability for companies to pass on their sensitivity to oil price changes to customers through changing goods prices or by the extent to which firms hedge against oil price risk. Thus, in their

study of 24 Australian industry portfolios based on the Australian Stock Exchange industry groupings for the period 1983 to 1996, Faff and Brailsford (1999) investigated the sensitivity of Australian industry equity returns to an oil price factor. They found a significant positive oil price sensitivity in the Oil and Gas and Diversified Resources industries and significant negative oil price sensitivity in the Paper and Packaging, and the Transport industries. In addition, long term effects persist although it was observed that some firms have been able to pass on oil price changes to customers or hedge the risk.

Hakkio (1986) sought to explain changes in the relationship between interest rates and exchange rates over the 1974-86 period. They found that inflation shocks dominated interest rates and exchange rate movements. In addition, positive relationships between interest rates and the US Dollar were observed in the 1980s period which is consistent with the view that changes in real interest rates were the dominant influence on nominal interest rates and the US Dollar.

Adedeji and Baker (2002) examined the influence of interest cover and financial leverage on the interest rate exposure in 140 UK firms. Their study used a mixed methodology of survey questionnaire and accounting data from DataStream database and their dependent variable was a dummy variable that measured the use or non-usage of interest rate derivatives. Adedeji and Baker (2002) found that both interest cover and financial leverage had a positive impact on derivative usage. Schiozer and Saito (2009) study of Latin American non-financial firms also

found that firms with high interest cover had high possibility of using currency derivatives. In addition, Adedeji and Baker (2002) investigated other determinants that influenced the use of interest rate derivatives. Among these were economies of scale represented by size, managerial risk aversion measured as the proportion of ordinary shares owned by its directors, and the existence of other derivatives. Their study showed that size had a positive influence on the use of interest rate derivatives while managerial risk aversion has a negative impact on derivative use. These results are in contrast to the study by Tufano (1996) that showed that the proportion of shares held by managers or directors may have a positive effect on the use of derivatives. The argument is that share acquisition may motivate managers to take risks and subsequently hedge those risks with derivatives.

Other studies have examined the effect of tax on derivative usage. Nance *et al.*, (1993) found that progressive tax has a positive relationship with derivative usage. In their study, they used a dummy variable to represent progressive tax and argued that firms whose expected incomes will fall within the progressive tax range are most likely to use derivatives. Berkman and Bradbury (1996) investigated tax losses and the derivative usage postulating that firms faced with tax losses are motivated to use derivatives in order to protect the amount of tax loss carried forward and reduce their expected taxes. They found a positive relationship between tax losses and derivative usage. These results are contrary to Shu and Chen (2003) study that found a negative relationship between derivative usage

and tax loss and a positive relationship for tax investment credits and derivative use.

With respect to investment opportunities, Froot *et al.*, (1993) found that firms with higher investment opportunities were more likely to hedge in order to reduce the volatility of their cash flows and effectively reduce the cost of debt issuance. This is because the level of cash available for investment opportunities is inversely related to the need for external financing. Choi and Kim (2003) study also revealed that US firms with higher leverage levels, lower liquidity and greater growth opportunities were more likely to hedge and reduce their risk exposure.

Some of the key factors that determine exposure to all the four variables include the level of trade, the level of the global economy and the proportionate activities of the financial institutions that often underwrite financial instruments as and when needed among others. The logical is that, if the level of global economic trade expands as is the case now with India and China leading the trend, financial institutions might be willing to lend more money to these countries or others that are particularly keen to trade. This might imply that the activity on foreign currencies might expand and therefore as this expands there might be an increase in some of the currencies. This could leave the local currencies very weak. With such a situation, either import will suffer or exports will expand within the country. If this trend continues, then the interest rates is likely to increase due to

inflationary forces. Eventually, this might imply that the economy will have to seek to institute more measures to leverage this challenge (Ihrig and Prior, 2005).

With this strengthened understanding of the determinant of the exposures, I shall explore the determinant specific to the GCC countries in Chapter six.

2.6 The relationship between interest rate, exchange rate and oil price

Akram (2008) investigates the relations between commodity prices (oil, food, raw materials) and interest rates in US. He tries to understand whether the commodity price goes up because of a decline in real interest rate and the rate of the US Dollar or only because of real interest rates. He uses US data starting from the first quarter of 1990 to the fourth quarter in 2007. He argues that oil prices increase significantly as a result of the decrease in the real interest rate. Besides, oil price response to real interest rate changes, metal prices also tends to respond to real interest rate changes. Because of the fall in US Dollar value, the commodity prices increase. Akram (2008) points out that exchange rate and real interest rate are accounted for in commodity prices. He posits that, firstly, investors would not be interested in investing in bonds in case of lower interest rates and invest more in commodities whose prices go up.

The study by Murtagh and Bessler (2003) revealed that UK industries were more susceptible to interest rate exposure than exchange rate exposure. In their study,

they investigated the exchange rate and interest rate exposure of some UK industries using the Bank of England trade weighted exchange rate, one to three-year bond for the short-term interest rate and 10-year government bond for the long-term interest rate. The results further showed more statistically significant exposure coefficients for the long-term interest rate measure (same number of negative and positive coefficients) than for the short-term interest rate. On the other hand, Ryan and Worthington (2004), using a first-order autoregressive (AR(1))-GARCH-M model, found that banks' returns were only affected by the short-term and medium-term interest rate but not influenced by the long-term interest rate and the trade-weighted exchange rate.

Further, Joseph (2002) examined the impact of foreign exchange and interest rate changes on UK firms in the chemical, electrical, engineering and pharmaceutical industries for the period 1998 to 2000. Joseph used the UK one-month Treasury bill as a proxy for interest rates and the trade weighted sterling for exchange rates. He investigated initially using the OLS model and detected autocorrelation and ARCH effects in the residuals. He then proceeded to use GARCH type models, EGARCH and EGARCH-M models. The results indicated that interest rates had a stronger influence on portfolio returns than exchange rates (only significant for the electrical sector) and there was no indication of asymmetric effects (positive and negative news seemed to have similar effects on the volatility of stock prices). My research agrees with the reasoning by Joseph (2002), for instance, in employing the OLS and EGARCH-M models.

In terms of the relationship that exists between the exchange rates and the interest rates, having examined these two variables separately, it can be argued that they appear to have a relationship since they are two variables that affect the oil prices (Lardy and Mignon, 2008; Mishra, 2004).

As stated in the previous section, the exchange rate of a country is dependent on many factors including the level of debts of the country, its level of trade and the behaviour of investors in the country (Joseph, 2002; Willett, 2003). These two variables are important in examining the level of domestic inflation, outputs, imports and exports; and therefore, for GCC countries, these are crucial variables that should be examined.

Many countries have set their exchange rates against the US Dollar at a fixed rate with the aim of reducing shocks that might be caused to the local economy should other variables that affect the economy be destabilized (Nydahl, 1999). For some countries, having a floating rate has been considered to be very important (Abdalla and Murinde, 1997). Various scholars have continued to question the existence of a 'bipolar' exchange rate mechanism at global level (Shambaugh, 2004). However, the defendants of these systems have always had very good reasons for having the same.

The International Monetary fund (IMF) for a very long time used member country reporting mechanisms to examine the exchange rate or decide how they are

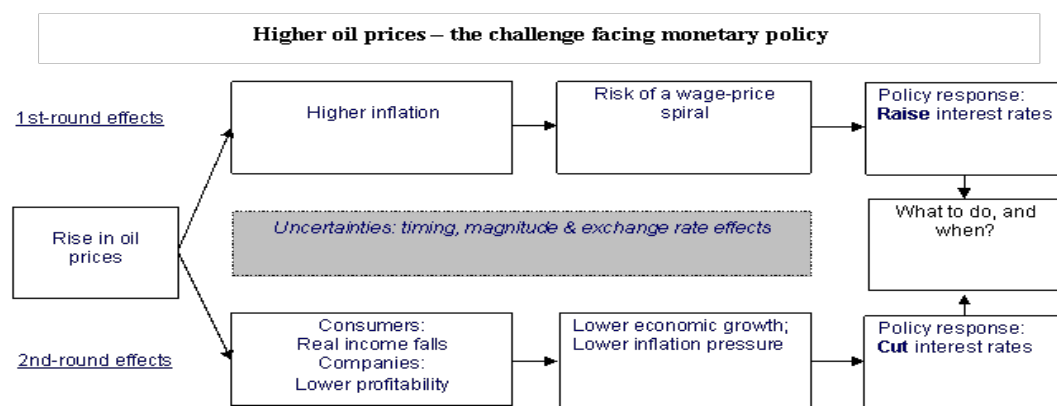
determined (Lardic and Mignon, 2008). In the past couple of years, however, this classification has seen an increase by countries seeking to have a floating rate system (Mishra, 2004). One of the ways that many scholars have used to examine this relationship has been the use of a model that stipulates that the expectations and money supply determine the exchange rates in a particular place. An example with reference to the emerging market is that as the currency depreciates, the policy makers will have an uphill task of either increasing money supply, causing bad expectations or the policy maker might have to contend with the increases in interest rates, which will cause shocks to the financial sector. According to Berkowitz *et al.*, (2001) the policymaker might be inclined to choose stable external pricing. Also, Betts and Devereux (2000) noted that the other way of examining this relationship is to use the Mundell Fleming approach which can be used to describe the relationship in a small or a large economy.

Another explanation of this relationship has been that when there is a decrease in the interest rates in the home country, this will make the demand for money to rise, increasing aggregate demand in the economy. An increase in aggregate demand will cause a corresponding increase in prices (Mishra, 2004). With increased aggregate demand, then there will be an increase in exchange rate causing the currency of the home country to fall (Lardic and Mignon, 2008). However, there is also another perspective to this which is that if there is same actual and expected inflation in the home country, an increase in inflation will

result in an increase in interest rates and exchange rate because of the purchasing power parity.

To illustrate the policy dilemma of oil exporting countries with regard to the effects of increase in oil prices, figure 2.1 below summarises the options.

Figure 2.1: The policy response model to oil price rises.



Source: adapted from Mishra (2004) and Lardic and Mignon (2008)

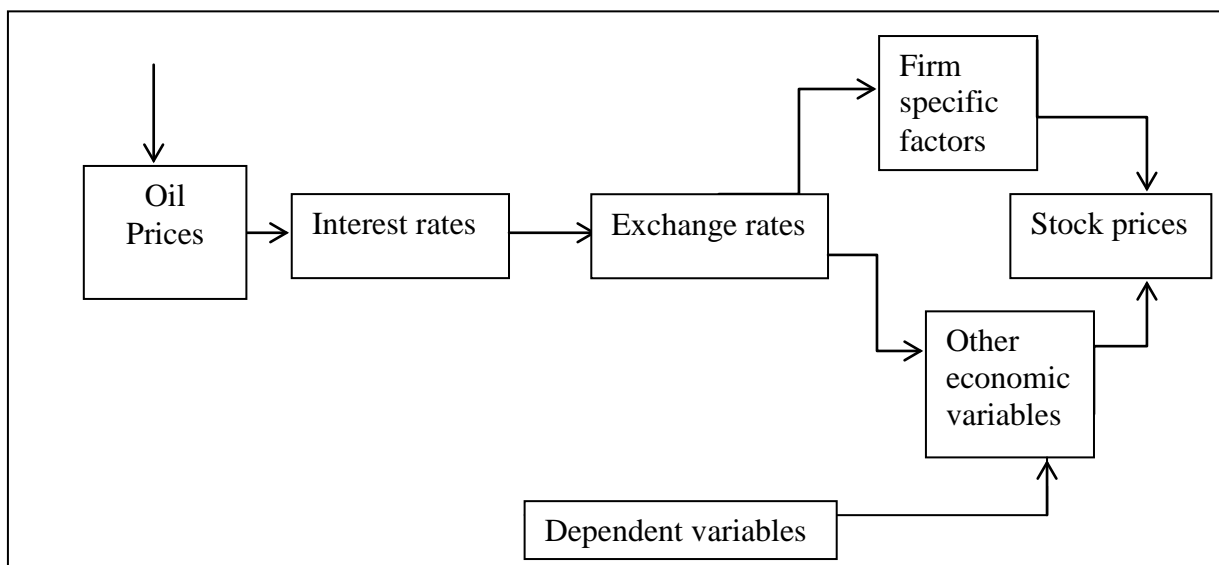
In the model above, it can be seen that there are two kinds of effects to oil price increases, the first round and second round effects. The first round effects are during high inflation when the risk of wage-price spiralling is high. The response to this by policy makers will be to raise the interest rates (Lardic and Mignon, 2008) to counter the increase in inflation.

The second round effects are when real income falls for the customers and companies' profitability decrease. The economic growth slows and there is less

inflationary pressure as a result. In this instance, the policymakers' response would be to cut interest rates.

Figure 2.2 below helps put the discussion on the relationship between the three risks, exchange rate, interest rate and oil prices and their effect on stock prices, into perspective.

Figure 2.2: the proposed model



Source: adapted from Kilian (2009)

The model given above is the proposed model of this research. In this model, the four key variables (exchange rate, interest rate, oil prices and stock prices) that are the subject of this discussion have been provided. The independent variables being the exchange rate, interest rate and oil price. These variables, as discussed above, can directly or indirectly affect one another and could also be determined by policy regimes or policy makers.

From the random walk theory, the stock price variable, unlike the other three, is assumed to function on its own. It is affected by many other variables. Its movement, and hence the movement of the value of the firm, is affected among others by, signalling or clientele effects, cultural and political effects, economic and technological effects (Halim *et al.*, 2006). In this model, this variable comes out as one that can chalk its path unlike the others.

The relationship between the three variables can be shown, for instance, when oil prices increase, buyers will have to borrow more to secure the same quantity of oil. This will imply pressure on the funding bodies and cause interest rates to rise (Halim *et al.*, 2006). On the same note, an increase in oil prices means higher payments and this, if done using the US Dollar should cause a change in the exchange rate. As an independent variable, it can show different movements per day, and this volatility may be good or bad for the entire economy.

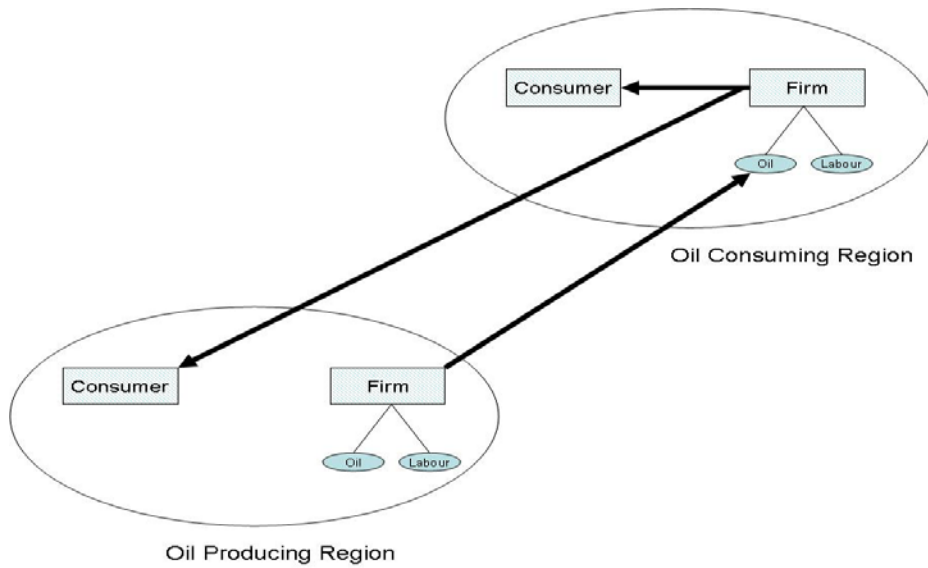
From another argument, low-interest rate reduces the financing cost and increases demand for the commodity. This should cause the commodity price to rise from the increased demand. In addition, low-interest rate should cause an increased in economic activity, which in turn causes an increase in the commodity prices. Using this argument, Halim *et al.*, (2006) showed how the US Dollar declined as a result of reductions in interest rates. Using the VAR model, they (Halim *et al.*, 2006) found that there are negative relations between real interest rate and commodity price. Their study observed that 20 per cent fluctuations in oil prices

was as a result of real interest rate shocks while exchange rate shocks had a higher effect at 50%. This is similar to Akram (2008) findings that oil price was affected little by interest rate and exchange rate shocks.

Engel and West (2005) argued that there is a real and nominal exchange rate and that the exchange rate correlated with output and inflations. Arora (2011) argued that interest rates will affect oil prices in what is called the extraction by the producer, if the oil that is found is in the ground. The reasons that make the oil in the ground gain value is because, in most cases, it is very scarce (Akram, 2008).

One of the models developed by Arora (2011) is on how the producer reacts to changes in the rates of interest. This model has two segments, the oil consuming and oil producing segment, effectively representing the assets market and the demand shocks. This model is shown below:

Figure 2.3: the proposed model



Source: Arora (2011)

In this model, each segment shows one representative consumer and one representative producer. The assumption is that the producer depends solely on oil production and the firm depends solely on oil that is in the ground for its operations. In this case, the situation remains that the oil price changes might affect the firm that depends on oil in different ways. First, should the changes be negative, the firm may see a fall in its share capitalization; and this might affect its ability to secure more funding to engage in expansion (Attanasio *et al.*, 1999). It must be noted that the oil sector relies on huge investments and failure to do this might mean that the entire process might fail. This in itself is a risk for the organisation.

If the interest rates are high, this will also affect the firm. If the interest rates increase, making the buyers have to pay more to secure the funding for the oil, the outcome will be that the buyers might resort to agreements with the oil production firms and at the same time, engage the banks to enter into agreements to buy the oil and pay the debts later. Such a scenario might mean that the firms might have to either reduce their purchases, which does not seem to be an option or increase the price which may also not be a good option, since the clients will seek other sources of supply, other than the firm (Hamoudah and Li, 2004). There are, thus, three key entities involved in the process, these are, the oil producing firms, the buyers and the financiers.

However, Attanasio *et al.*, (1999) noted that the assumption by Arora (2011) is that the buyers will always depend on funding, which might in itself be wrong. But such a possibility cannot be ruled out since, as noted earlier, this is a very expensive venture and might require huge investments. In terms of the exchange rates, when the oil producers have to borrow from the international market or when the buyers have to do the same, it means that the local currency will be under no pressure. In other words, the local currency will not be under any pressure to support the needs of the borrowers and this can be beneficial to the local economy since the interest rates might be kept low. It must, however, be noted that there are various forms of borrowings that have interests payments attached to them.

Depending on the source of borrowing that has been chosen by an organization or by a country, the effects on interest rates and hence pricing may or may not change. For instance, if a country (buyer) decides to borrow from the seller of oil, or from another international source, this might suggest that the local donors are not under pressure that might warrant an increase in their interest rates. On the other hand, the exchange rate might be affected, depending on the amount of money borrowed and the time frame or the securities that have been attached to the loan amounts. Akram (2008) has noted that there is an increasing tendency for countries to borrow from the oil producing countries through various arrangements with the aim of limiting the effects on interest rates or exchange rates in the borrower's country.

2.7 Management of the exchange rate risk, interest rate risk, oil price risk

Risks that face an organisation cannot be fully appreciated nor understood without undertaking an audit of the same with a view to ensuring that all aspects of a particular risks are understood. It is vital for the risk managers to conduct an audit of the risks that are known and estimate the unknown risks. It is important to have a risk profile where the risks are estimated with a view to knowing which ones are higher on the scale and the amount of attention to be afforded them and even the immediacy of the action to be undertaken (Hamoudah and Li, 2004).

This will allow the policy makers to lay firm ground for dealing with these challenges. This process has four key stages: first is the risk list where all risks are written down and their sources, the second step is to categorise these risks, third, the risks are analysed to determine the level of exposure of each of them. Lastly, finding alternatives to each of these risks with a view to positioning the organisation to exit from these risks if possible, so they are not affected.

Sadorsky (2001) studied risk management in the Canadian's oil and gas industry. He claims that many oil industries do not understand the benefit of energy risk management. Here, hedging oil price, interest rate, and exchange rate risk will add more flexibility to the oil and gas industry through cash flow management.

Choi and Kim (2003) point out that firms that engage in aggressive hedging show lower or insignificant exchange exposure coefficient compared with those with a less effective hedging. Bartram *et al.*, (2010) investigated the exchange rate exposure in 1,150 manufacturing firms in 16 countries and global cross-sectionals. They study the mitigation of exchange rate risk from different mechanisms. In the first phase, they investigate if the firm passes the risk to the customer in varying degrees to decline the cost of exchange rate fluctuations. Second, how choosing the location and currency of cost for the firm limits the exchange exposure and in the third phase, how firms use exchange risk management tools (such as denominated foreign currency (FC) debt and foreign currency derivatives). There study finds that these phases are important in mitigating observed exchange rate

exposure and at the same time, they account for the vast majority of the difference in previous theoretical forecasts and observed exposures.

Badnor *et al.*, (2002) also examined the exchange rate exposure. In a sample of 1,150 manufacturing firms from 16 countries, they found that the firms that use pass-through and operational hedging tools are successful in reducing their exchange rate exposure. Thus, a firm that is highly theoretically exposed to risk is most likely using foreign currency debt and mostly using foreign exchange derivatives. For those that are depending on their product sustainability, a pass-through and operational hedging technique reduces the exposure to 10-15% where foreign currency debt and foreign exchange derivatives accounts reduce the exposure to 40%.

Rampini *et al.*, (2014) studied risk management in the airline industry in 23 airlines, from 1996 to 2009. They found that there is no 100% hedging in an airline of its jet fuel price risk. The important note they made is that 30 per cent of airlines do not hedge and on average, hedging accounted for 20 per cent of the expected jet oil expenses in airline without the pass-through agreement.

As mentioned earlier, interest bearing assets (or liabilities) like bonds or loans often lead to interest rate risks, which might change, depending on the changes to the value of the assets. It is, therefore, vital not to ignore the importance of

managing interest rate risks. Risk management always carries the option of doing nothing (Frankel, 2003). This is where the managers decide that there is no need to manage the risks that arise from the instruments. However, it is always dangerous to do nothing and expect that the risks will not affect an organization. It is important to learn from the past, where doing nothing in financial risk management terms led to organization failures.

There are various methods that can be put in place to ensure that these risks are effectively managed and these include;

- a. Forward Contracts: This is a popular method involving making an agreement today for something that is to be done later. This agreement can be carried out using the Forward rate agreements where the factor that determines gain or losses is the interest rate. The agreement may involve the payment of a fixed interest rate by one person and reception of a floating interest rate by another. In reaching the figure, the parties might have a nominal amount that should be paid at certain intervals to the parties or by the parties to one another. This agreement is often made by borrowers or lenders who have a common future date that they wish to conduct their transactions on.
- b. Futures: In these contracts there are many similarities with the Forward Contract, but this is a less risky option where default chances are reduced

and it involves fewer liquid risks, because, in this case, there is an intermediary that is involved (Frankel, 2003; Hamoudah and Li, 2004).

- c. Swaps: This involves an exchange of the amount where the counterparties exchange certain future cash flows. One example is the Plain Vanilla swap that involves the payment of a single fixed rate by one party and reception of a floating rate by another.
- d. Options: It has also gained much popularity; and it involves the debt obligation. This is used as a protective measure by the parties involved and, in this case, the agreement is that either the rate will be paid for a certain duration, or the parties to the contract will agree to put a cap on a token interest rate for a certain duration or the parties might wish to hold a certain rate with which to exchange their liabilities over a certain duration of time (Madura, 2006).

While the methods given above are relevant to ensuring that the oil prices exchange rates, interest rates and firm value are effectively managed, it is vital to note that in such a situation, activities that are aimed at the management of the same are multifaceted and that the firm engages in activities on many fronts (Afshar *et al.*, 2008). This might call for the firm or the country to consider not only one of the options given above, but more than one and there might be a need for other activities that are not listed above.

2.8 Exchange rate Overshooting

To show how exchange rate overshooting can occur, I will consider a very simple example. While many of the assumptions I will use might sound very artificial, they are introduced solely to keep everything as simple as possible. Our starting point is an economy which is in equilibrium with a constant inflation rate of 10 per cent per annum. The growth rate of the money supply and the world inflation rate are also equal to 10 per cent per annum. The exchange rate is constant and is not expected to change. At time t_0 the government suddenly announces a new policy: that for the next t years it is going to reduce the growth rate of the money supply to 6 per cent per annum, after which it will return to 10 per cent. Assume that this will reduce the inflation rate by the same amount for this period.

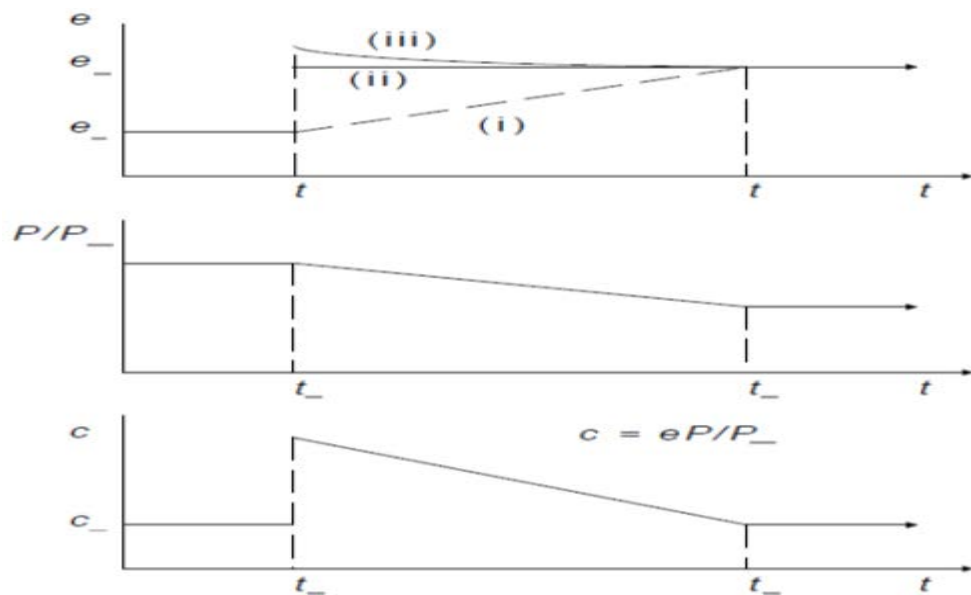
In this artificially simplified economy, there is no reason for competitiveness to change at all. If the competitiveness is to remain constant, we must have

$$De/e = DPW/PW = DP/P$$

Where e is the exchange rate (defined as units of foreign currency per unit of domestic currency as in £1 = \$2), PW is the world price level and P the domestic price level. For the competitiveness to remain constant for the t years after t_0 , the exchange rate must appreciate at 4 percent per annum. At this stage, we introduce two crucial assumptions; that capital markets are perfect so that interest rate parity

holds, and that investors in financial markets have rational expectations, which in this simple model means that their expectations must be correct. If the competitiveness is to remain unchanged, the exchange rate must appreciate at 4 percent per annum. The exchange rate would follow the path labeled in (i) figure 2.4 below. If investors anticipate this correctly, interest rate parity requires that domestic interest rates fall by 4 per cent. There is no reason for this to happen. Indeed, we would expect a monetary contraction to *raise* but not lower interest rates.

Figure 2.4: Exchange rate overshooting



Source: Backhouse (1991)

If interest rates are to stay the same, interest rate parity will hold only if the exchange rate immediately rises to a level such that investors no longer expect it

to appreciate: in other words, if the Money and Finance Exchange rate follows the path labeled (ii) in figure 2.4 above. Even if the exchange rate jumps in this way at time t_0 , however, there is no reason to think that prices will do the same. Prices are likely to follow a path such as that shown in figure 2.4 above. If so, we find that competitiveness jumps up at time t_0 and then falls steadily, returning to its original level after t years.

If the reduction in the growth rate of the money supply were to raise interest rates, interest rate parity would require the exchange rate to rise to a level high enough for investors to expect it to depreciate. The expected capital loss caused by the depreciation would cancel out the rise in the rate of interest. In this case, the exchange rate would follow a path such as (iii) in figure 2.4. This is *exchange rate overshooting*, where the exchange rate overshoots its new equilibrium level (Backhouse, 1991).

2.9 Summary

From the information presented above, it is evident that in different countries, the effects of exchange rate, interest rate and oil price risks at the firm level, industry level and country level and the determinants of these three risks show varied outcomes (Afshar *et al.*, 2008; Lardy and Mignon, 2008; Mishra, 2004). There are many factors that are at play in one country that are not necessarily in the other country. Therefore, when one country is facing certain challenges or is highly

exposed to certain variables, in another country such variables might not be significant to expose a level of relationship.

In summary, most studies on the previous studies have rarely examined a combination of the three risks (exchange rate, interest rate and oil price risk). The studies have either focussed on exchange rate risk only (for example, Aabo, 1999; Bartram, 2007) interest rate risk only (for example, Kilian and Lewis, 2009; Mark, 2009), oil price risk only (for example, Hammoudeh and Li, 2005). The studies which have considered all the risks, however, have focused on specific sector or portfolios (such as, El-Masry *et al.*, 2010; Ramos and Veiga, 2011; Rostamy *et al.*, 2013). Further, the results of the exposure to the three risks have largely been mixed. Some studies have reported positive while others negative significant exposure and still others have reported insignificant exposure to the changes in either the exchange rates, interest rates or oil price changes.

The exposure to the three risks have largely been influenced by different factors such as firm size, leverage, foreign operations, liquidity, competitiveness, investment opportunities among others. Among these, the factor of firm size and those contributing to the degree of internationalisation (foreign sales, foreign assets, foreign debt and diversification) were the most important sources of exchange rate and oil price exposures. As summarised by Dominguez and Tesar (2001) a firm's level of exposure is highly correlated to its size and the degree of its foreign operations. The results, however, have generally been mixed. For

instance, while some studies have found positive coefficients for firm size (such as, Block and Gallagher, 1986; Mallin *et al.*, 2001) others have found negative coefficient (such as, Chiang and Lin, 2006; Choi and Prasad, 1995; Jesswein *et al.*, 1995) Leverage or debt levels and liquidity were examined in most research on interest rate exposure.

This provides a motivation to reveal the effect of the risks on firm values in the GCC countries and further what drives or influences the level of exposure. The GCC countries are net oil exports and hence might exhibit unique characteristics. Oil prices are affected by the forces of demand and supply, which in turn either triggers exchange rate movements or is influenced by such movements. It is vital to examine the relationship that exists between them and to determine their significance.

Thus, this study seeks to make contribution in several ways. Firstly, the study looks at the GCC countries which have rarely been studied. Further, unlike studies that have focussed on oil importing countries to investigate oil price shocks, this study examines the exposure on oil exporting countries providing an additional insight. Secondly, the study makes a contribution to the literature by examining the three risks in one study. As noted above, studies have mainly concentrated on only one or two of the risk exposures but rarely three of the risks. Thirdly, while some studies have focussed on either the financial sector or the non-financial sector, this study gives insights on both and makes a segregated analysis to reveal

the unique characteristics of each sector for each of the GCC countries. Fourthly, in addition to making an empirical contribution, this study makes a methodological contribution by using the EGARCH-M model and makes comparison to the OLS models. This is different to most studies and consistent to a few (such as Joseph 2002). Joseph and Vezos (2006), for instance, used both the OLS and EGARCH estimation models to examine the exchange rate and interest rate (short term) exposure of 50 US banks and their constituent portfolios. Their results showed that using the EGARCH model gave a higher number of significantly exposed firms (40 per cent compared to 30 per cent for OLS) to exchange rate exposure. However, the results were similar under both models for interest rate exposure. Joseph (2003) also found a slight increase in the incidence of significant exchange rate exposure coefficients when using the GARCH and GARCH-M models as compared to the OLS model. Kasman *et al.*, (2011) also observed higher incidence of interest rate exposure in Turkish banks when using the GARCH model as compared to the OLS model. Similarly, in this study, the results from using the OLS model and EGARCH-M model will be compared.

This research, thus makes empirical and methodological contributions by adding to the extant literature and addresses the existing lacuna in the GCC countries. In addition, through providing empirical evidence, investment and policy decision making could be enhanced (Arouri *et al.*, 2012)

In the next chapter, I shall present the methodology of the thesis and data collection with a description of the variables.

CHAPTER THREE: RESEARCH METHODOLOGY AND RESEARCH METHODS

3.1 Introduction

In this Chapter, the hypotheses of the study will be discussed and the research questions highlighted. A discussion on how the research attempts to answer the individual research questions will be presented. Data sources and the sampling process that is used to sample the data will be discussed. The data analysis method will be covered and how the hypotheses will be tested is discussed. The model that will be used based on the literature review will be highlighted and justification for its usage presented.

Thus, section 3.2 outlines the research questions of the study. Then in section 3.3, the hypothesis is presented followed by section 3.4 which explains the source of data and the sampling method. Further, section 3.5 describes the dependant and independent variables with their measurement basis. Then in section 3.6, actual and unexpected changes in exchange rates, interest rates, and oil price are examined while in section 3.7, the contemporaneous and lagged changes in independent variables are shown while in section 3.8, the correlation between the independent variables is discussed. Further, section 3.9 outlines the method that will be used and the reasons for choosing the model. A summary of the methodology and methods of the study is given in section 3.9. In section 3.11, the

pilot study conducted is discussed before the conclusion of the chapter in section 3.12 is given.

3.2 Research questions

Chapter two reviewed the studies that explored the link between the oil price changes with share prices, though most of this literature is from oil importing countries. In addition, the literature on the effect of interest rates changes on firm performance was reviewed. Most of the studies that examined interest rate risk covered the financial firms (Choi *et al.*, 1992). However, this risk does apply to both financial and non-financial firms. Further, studies that examined exchange rate risk and its effect on firm value or performance were reviewed. The exchange rate exposure is a key risk that both exporting and importing firms should consider.

Limited attention has been given to how the stock markets in developing countries are affected by exchange rate, interest rate and oil price shocks, whether discretely or combined. This study examines how the three variables influence share prices of listed firms, whether financial and non-financial. Thus, the research attempts to answer the following research questions:

- a) What is the impact of changes in exchange rates, interest rates and oil prices on stock returns in the GCC countries?

- b) Of the three risks examined, which one provides the greatest impact on the stocks returns of GCC total firms?
- c) What are the determinants of these risks in the GCC firms and are these determinants different from country to country?

3.3 Research hypotheses

This study aims to examine the influence of exchange rate risk, interest rate risk and oil price risk on stock returns of GCC listed firms. The study tests the following hypotheses:

Hypothesis 1: GCC listed firms are highly exposed to exchange rate changes than interest rate and oil price changes.

Exchange rate exposure has been researched in many studies and shown to be a very important element that influences the firm's value. The effect of exchange rate and interest rate exposures was the main focus in several studies (for instance, Beirne *et al.*, 2009; El-Masry, 2006; Olugbode, 2010; Prasad and Rajan, 1995). As reviewed above (see, section 2.2 and 2.3) interest rates and exchange rates are the most managed financial risks in many firms, with exchange rate relatively managed better than interest rate. This also shows that firms are more concerned about exchange rate exposure than the interest rate exposure.

With particular reference to the GCC countries, no referenced studies have been done in the GCC countries about exchange rate and interest rate exposure to the researcher's knowledge. Thus, hypothesis 1 is tested and results presented in Chapter four.

Hypothesis 2: Oil price fluctuations are managed more than exchange rate and interest rate risk exposure.

The GCC countries are oil exporting countries and face oil price risk as the commodity is internationally traded. Despite oil price being volatile, it is not the most influential factor on the share prices. The effect of oil price changes on the stock market has been studied by several scholars (see, for instance, Aloui *et al.*, 2012; Apergis and Miller, 2009; Jones and Kaul, 1996; Sadorsky, 2008). Oil price changes can impact the expected cash flow at firm level and affect the economy at a macro level (Hamilton, 2008; Hooker, 2002; Killian, 2009; Mork, 1989). At the same time, oil price changes can impact the discount rate used in the valuation of equity through effecting inflationary pressure (Ihrig and Prior, 2005). In the Gulf countries, studies found that industry returns are significantly responsive to oil shocks (see, for example, Ciner, 2013; Mohanty *et al.*, 2011).

Hypothesis 3: GCC listed firms have little exposure to interest rate changes.

The argument is that because the GCC countries are surplus economies, the money is readily available in the market which makes interest rate changes less important. At the same time, the Gulf region's strengthened fiscal and economic characteristics have made the sovereign bonds in the GCC countries stable and attractive to investors. The economies of the GCC countries have experienced strong growth, improved finances and low debt.

Besides this logic, several studies have attempted to examine the relationship between interest rate and stock values as discussed in section 2.3. Studies (for example, Brewer and Lee, 1990) have shown that the exposure to interest rate risk is time varying, the interest rate sensitivity shifting according to economic conditions and monetary policy strategies. However, other studies have shown no relationship of interest rate changes on stock exchanges (Chance and Lane, 1980) while others find a low significance influence of long term interest rates (Ryan and Worthington 2004). Maher (1997) argues however, that the time varying interest rate sensitivity renders tests over long period inconclusive. When studied with other risks (such as exchange rate risk), interest rate risk exposure was low as compared to exchange rate risk in Choi and Elyasiani (1997) and Joseph and Vezos (2006) studies leading to this hypothesis that the firms in the GCC countries might be less exposed to this financial risk.

Hypothesis 4: The determinants of exchange rate, interest rate and oil price risks are the same.

As discussed in section 2.5, there are several determinants of exchange rate, interest rate and oil price risk. This study will seek to examine whether these determinants are the same in the GCC countries.

Choi and Kim (2003) study on US firms found that firms with higher leverage positions, lower liquidity and higher growth opportunities were usually more inclined to hedge and therefore reduce their risk exposure. Similarly, Froot *et al.* (1993) revealed that firms with higher growth opportunities should have lower exposure to changes in exchange rates. This is because firms with higher investment opportunities were more likely to hedge because of the need to reduce the volatility of their cash flows, and consequently reduce the cost of debt issuance, since the level of cash available for investment opportunities is inversely related to the need for external financing. Further, firms with high international involvement should be exposed to exchange rate changes more than those with mainly domestic involvement (Chow *et al.*, 1997; Dominguez and Tesar, 2001). Thus, firms with a higher percentage of foreign sales and foreign assets would be more inclined to hedge their exposure to fluctuations in exchange rates (El-Masry, 2005). Chow and Chen's (1998) study also noted that dividend payout had an effect on the level of exposure to exchange rate changes. El-Masry (2005) suggested that firms with lower dividend ratio and higher quick ratio were less

likely to hedge and may be more susceptible to exchange exposure supporting the finding of negative relationship of dividend payout and a positive relationship for quick ratio in his study.

Joehnk and Nielsen (1976) also suggested that firms with high leverage are more susceptible to interest rate risk as they exhibit a higher cost of financial distress. This is also supported by Mayers and Smith (1987) who demonstrated that hedging lowers the probability of incurring financial distress costs by reducing cashflow variability and thus firm value. For oil price risk exposure in particular, Ibrahim (2006) noted that the volatility of the local currency against major international currencies and the interest rates that prevail in the country or internationally have a significant impact on the level of exposure.

In addition, Dominguez and Tesar (2001) study suggested that a firm's level of exposure (to all the three risks) was highly correlated to its size and the degree of its foreign operations such as foreign assets, foreign sales and any other international activity. Similarly, Mallin *et al.*, (2001) study found a significant positive relationship for company size.

The next section continues with a discussion of the methodology.

3.4 The methodology

Choosing an appropriate research methodology and methods governed by the research questions is imperative to any study (Draper, 2004). The research design is presented so as to build an understanding of the research philosophy and approach. The research design, including the time horizon of the study, is thus elaborated. The data collection method will be presented in section 3.7 below. The research methodology and methods adopted are appropriate to the research objectives and designed to answer the research questions. Thus, the data used and the sample selection criteria, including the description of the data, to test the hypotheses described in section 3.3 above will be discussed.

The main purpose of this thesis is to investigate the impact of interest rate risk, exchange rate risk and oil price risk on firm values of listed firms in the GCC countries. This will involve assessing the impact on firm values of each risk separately for each GCC country.

The research adopts a positivist approach and involves quantitative analysis. Based on the research objective, the positivist perspective is designed to predict and explain causal relationships, and assumes a priori causal relationship between observable phenomena. In this case, the exchange rate, interest rate and oil price relationship to firm values is examined. The quantitative method used in the data analysis is multiple regression method.

In order to gain an understanding of the risk management of these financial risks (exchange rate, interest rate and oil price risks), a pilot study was conducted. This was conducted in order to explore to what extent risk management might be a limitation to the observation of the risk variables on share prices and also to determine the main characteristics of the risk management techniques used by firms in the region. The pilot study used questionnaires to gather information on risk management techniques employed by risk managers in the region. The pilot study was conducted from February 1st 2012 to March 1st 2012, a one month period. The details and results of the pilot study are discussed in section 3.12 below.

3.5 Description of the variables that are used in the estimations

3.5.1 Stock returns

Stock return is defined as the percentage change of the returns in a given period which includes capital changes and adjustments for dividend. In this study, daily returns are captured to represent stock return. The stock return is a good indicator of the firm's value. For instance, Chamberlain *et al.*, (1997) argued that the daily returns can generate strong evidence of foreign exchange rate sensitivity. Stock returns are used in most studies as a proxy for firm's performance to investigate the effect of exchange rate and interest rate exposure (see, for example, Allayannis and Ofek, 2001; Nydahl, 1999).

The log return (RI_t) is used to find the return index for all companies. The prices used in this study are daily closing prices. The equation of RI_t is:

$$RI_t = RI_{t-1} * \frac{PI_t}{PI_{t-1}} * (1 + \frac{DY_t}{100} * \frac{1}{N}) \quad 3.1$$

where, RI_t is the return of the index on day t, RI_{t-1} is the return of the day before, PI_t is the price index on day t, PI_{t-1} is the previous day price index, DY_t is the per cent of the dividend yield on day t and N is the number of working days in the whole year (260).

Then, RI_t is calculated as:

$$RI_t = RI_{t-1} * \frac{P_t}{P_{t-1}} \quad 3.2$$

Where P_t is the price for the day and P_{t-1} is the previous day price.

Daily stock returns (RI_t) are computed using the following model:

$$RI_t = \ln \left(\frac{RI_t}{RI_{t-1}} \right) \quad 3.3$$

The continuously compounded return by using the log is mostly preferred to discrete returns in empirical studies. Ryan and Worthington (2004) point out that there is an advantage in using compound return instead of discrete return. Compounded return is more likely to transfer the data to be normally distributed. Strong (1992) noted that there are two advantages in using the logarithmic returns instead of a discrete one. The theoretical reason is that logarithmic returns are

analytically more tractable when linking together sub-period returns to form returns over longer intervals. Empirically, the logarithmic returns are normally distributed (Strong, 1992). The continuously compounded returns result in a lower value (except for zero returns), thus implying that the effect of any outliers or data errors is reduced, as this series is more likely to follow a normal distribution as compared with a discrete series. In addition, continuously compounded returns are consistent with returns generation via calendar rather than trading time (Ryan and Worthington, 2004). Also, using compounded returns is supported by many researchers (see, for example, Cong *et al.*, 2008; El-Masry, 2004; Strong, 1992).

3.5.2 Market Returns

The measurement of market returns is used to capture the influence of all the market variables on listed firms. Table 3.1 below shows the market indexes of the Gulf Cooperation countries.

Table 3.1: market indexes in GCC countries.

Country	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	United Arab Emirates
Index	BSE	KSE	MSM	QE	SSE	DFM and ADX

Note: The BSE represents the Bahrain Stock Exchange measuring the Bahrain All Share Index, KSE stands for the Kuwait Stock Exchange index, MSM represents the Muscat Securities Market index of Oman, QE is Qatar Exchange index, SSE is Saudi Stock Exchange market index, DFM and ADX represent the Dubai Financial Markets index and the Abu Dhabi Securities Exchanges index of the United Arab Emirates respectively.

The daily market index was obtained for each country from Datastream for the study period, January 2007 to June 2012. The returns on the market index are estimated using the equation:

$$RM_t = \ln\left(\frac{M_t}{M_{t-1}}\right) \quad 3.4$$

where RM_t is market return at time t , M_t is the market index at time t and M_{t-1} is the market index at time $t-1$.

Market return is used to capture the influence of the market on the firm's returns. The market returns are used as proxy for the market portfolio which covers a large portion of the market value of the firms. This study follows most of the research that used market returns as a proxy of market value (see, for example, El-Sharif *et al.*, 2005). Also, using market returns reduces the problem of omitted variable bias in the estimate of betas. The residual variance which bias the coefficient estimate of the beta variable in an cross-sectional regression is reduced. This should lead to accurate estimation of the risk exposures (Iorio and Faff, 2000).

3.5.3 Exchange rate measures

The GCC countries, besides exporting oil, depend highly on importing goods from all around the world. In order to assess exchange rate exposure, I used the top foreign currencies that the region deals in. In addition, analysis has been done

using equally weighted exchange rate measures and the real and nominal exchange rates.

3.5.3.1 Equally weighted measures

The literature shows different preferences of using exchange rates. Some authors (such as, Choi and Prasad, 1995; Jorion, 1991; Loudon, 1993) use real and nominal exchange rates while others (such as, Harris *et al.*, 1991; Joseph, 2002) employ an equally weighted exchange rate. One of the weaknesses of using the trade weighted exchange rate index is that it assumes that all currencies included in the basket are used by all firms, which is not true.

The bilateral exchange rate is mostly used in this study (a comparison on using the equally weighted exchange rate is made in Chapter four). According to Dominguez and Tesar (2001) firms are exposed to one or more currency, not to the trade-weighted index of currencies. Some researchers prefer trade weighted exchange rates in order to remove multicollinearity when using more than one foreign currency (see, for example, Joseph, 2002). Other researchers (for example, Bartman, 2004; Fraser and Pantzalis, 2004; Muller and Verschoor, 2006) argue that using trade weighted instead of bilateral exchange rates offers no preference on reduction in the significant exposure coefficient.

The study uses both bilateral exchange rate and equally weighted exchange rates following other studies (such as, El-Masry, 2007). It does not use the trade weighted exchange rates because there was no readily available basket of most traded currencies weighted by usage.

The equally weighted currency used in this study is obtained as follows:

$$EQ_t = (EX_1 + EX_2 + EX_3 + EX_4 + EX_5) / 5 \quad 3.5$$

where EQ_t is the equally weighted index at time t , EX_1 to EX_5 are the exchange rates for each of the partner currencies and 5 is the number of currencies used.

Separate regressions could capture the exposure coefficient for each currency. However, that may be affected by the collegiality between the currencies. For that, the study has used the major trading partner currencies for each of the GCC countries.

As stated above, the study employed the equally weighted exchange rate as the trade weighted was not available for the GCC countries. As reflected in equation 3.5 above, the equally weighted exchange rate was employed by adding the top five traded currencies for each of the GCC countries. Then, those top traded currencies were divided by their number, which is five. These top traded currencies for each GCC country are discussed below.

According to the Kuwait central bank, for the period 2007 to 2012, the highest traded currencies with the Kuwaiti Dinar are Euro, US Dollar, Japanese Yen, Chinese Yuan and Emirati Dirham (CBK, 2015). For the United Arab Emirates, the major trading currencies with the Emirati Dirham are Japanese Yen, Euro, South Korean Won, Chinese Yuan, Indian Rupee. While for Qatar, the major trading currencies for the Qatari Riyal are the South Korean Won, Japanese Yen, Euro, Singaporean Dollar and Indian Rupee and for Oman, the major trading currencies against its Omani Riyal are Japanese Yen, Euro, British Pound, US Dollar and Emirati Dirham. For Bahrain, the Japanese Yen, Euro, British Pound, US Dollar and Emirates Dirham are the major trading currencies against the Bahraini Dinar. For Saudi Arabia's Riyal, the major trading currencies are Japanese Yen, Euro, Chinese Yuan, US Dollar and South Korean Won. The exchange rates are used to get the equally weighted exchange rate for each country using formula 3.5 above for.

3.5.3.2 Nominal and Real exchange rate

The nominal exchange rate is measured by the value of the currency against a trade weighted of other currencies in a certain date. The real exchange rate is obtained by adjusting for inflation included in the nominal exchange rate. In short, while the nominal exchange rate tells how much foreign currency can be exchanged for a unit of domestic currency, the real exchange rate tells how much

the goods and services in the domestic country can be exchanged for the goods and services in a foreign country (Seka, 2008).

In some studies, the nominal exchange rate is distinguished from the real exchange rate. For example, Choi and Prasad (1995) studied the impact of changes in exchange rates using the nominal and real exchange rates. They (Choi and Prasad) did not find any difference as the firms were exposed to the nominal exchange rate and the real exchange rate at the same time. Khoo (1994) points out that if the changes in exchange rates are measured in real terms, the regression equation should be adjusted for inflation. Griffin and Stulz (2001), on the other hand, argued that the correlation between the nominal exchange rate and the real exchange rate is perfectly correlated, so using any of them does not matter. Thus, there is no big difference in using either of the exchange rates if they are highly correlated (see, also, Atindehou and Gueyie, 2001). Badnor and Gentry (1993) argued that using real exchange rates in calculating exchange changes assumes that inflation rates in the financial markets will be detected. Thus, using either nominal or real exchange rate does not matter, since they are highly correlated.

This study uses only the nominal exchange rates without adjusting for inflation as the literature shows that using any of them does not make any difference. Table 3.2 below shows the currencies that are used for each of the GCC countries. These, as mentioned above, were chosen with regard to the most traded currencies according to the central banks of each of the GCC countries.

Table 3.2: The highest traded currency in GCC.

Country	Related exchange rate (CODE)
Bahrain	Emirati Dirham (AED) Euro (EUR) Great British Pound (GBP) Japanese Yen (JPY) United States Dollar (USD)
Kuwait	Chinese Yuan(CNY) Emirati Dirham (AED) Euro (EUR) Japanese Yen (JPY) United States Dollar (USD)
Qatar	European Euro (EUR) Indian Rupee (INR) Japanese Yen (JPY) Singaporean Dollar (SGD) South Korean Won (KRW)
Oman	Emirates Dirham (AED) European Euro (EUR) Great British Pound (GBP) Japanese Yen (JPY) United States Dollar (USD)
Saudi Arabia	Chinese Yuan (CNY) European Euro (EUR) Japanese Yen (JPY) South Korean Won (KRW) United States Dollar (USD)
United Arab Emirates	Chinese Yuan (CNY) European Euro (EUR) Indian Rupee (INR) Japanese Yen (JPY) South Korean Won (KRW)

Source: Central banks of GCC countries (2015)

3.5.4 Interest rate measures

The interest rate used in studies have been either short term or long term interest rate. Short term interest rates from the one-month Treasury bill rates, were used in the Prasad and Rajan (1995) study for Germany, United Kingdom and the United States. Three-months Treasury bill rates were used in Abd-Kadir *et al.*, (2011) study for Malaysia. Similarly, Beirne *et al.*, (2009) employed three-months Treasury bill rates and long term interest rates of 10-year government bond yields. However, Bae (1990) posited that longer term maturity rates had no significantly different effect on the stock market than short term interest rate of three months, for instance. In addition, Dinenis and Staikouras (1998) highlighted that there is no significant correlation between the three-months Treasury bill rate and one-month rates.

In the GCC countries, the interest rate variable closely follows the US interest rate (Alshehry and Slimane, 2012). Hebous (2006) shows that in Bahrain and Saudi Arabia, interest rates coincide with US interest rates, with the highest interest rates among the GCC countries observed in Bahrain and the lowest in Saudi Arabia.

Having regard to the limited difference between the highest and lowest changes in interest rates, choosing the interest rates for this study depended on the most fluctuating interest rates for each of the GCC countries so as to effectively capture the effect of the changes. The short term interest rates were chosen as these

fluctuate more than the long term rates (Espinoza *et al.*, 2012). In addition to the short-term interest rates, the long term interest rate for the 10-year government bond is used only for Saudi Arabia. This is due to the relative fluctuations observed for the 10-year government bonds and the availability of information. In the other GCC countries, data on long term interest rates was not readily available to be used in this study. Table 3.3 below shows the interest rates that have been chosen for each of the GCC countries in this study.

Table 3.3: Interest rate used in GCC countries

GCC	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	United Arab Emirates
Interest rate	6 months Labour rate	6 months interbank loan	Over rate	6 month's deposit	6 months interbank loan & 10 years government bond	6 months interbank loan

Source: Bloomberg (2015)

3.5.5 Oil Price change measurement

Crude oil makes up the largest traded commodity on the world commodity market. The world consumption was about 80 million barrels a day in 2003 (90 million barrels a day in 2013). Of this, Brent oil serves as a benchmark for about 50 million barrels a day, West Texas Intermediate for about 15 million barrels a day, and Dubai for about 15 million barrels a day (Maghyereh and AL-Kandari, 2007).

Malik and Hammoudeh (2007) used daily closing spot prices for West Texas Intermediate (WTI) in their study on Bahrain, Kuwait and Saudi Arabia. West Texas Intermediate spot and futures prices were used in Hammoudeh and Aleisa (2004) study on the GCC countries. This study uses crude oil Brent prices as the main indicator of oil price and used by most studies as a proxy for international oil prices (Maghyreh, 2007). The existence of the relationship between oil price changes and stock markets in the GCC countries was studied by Arouri and Rault (2009) who used weekly and monthly OPEC spot oil prices.

3.6 Description of the determinants

This section covers the relevant determinants that are used in this study. The determinants influence the level of exposure of the firms to exchange rate risk, interest rate risk and oil price risk. The determinants used are discussed and justified below:

1. Size: the natural log of total assets as a proxy for firm size is used following Judge (2002) and Choi and Kim (2003) studies.

There is high evidence that large firms are more likely to use derivatives (Allayannis and Weston, 2001). Nance *et al.*, (1993) explained that the firm's size is proportionate to the firms' hedging activity whether positive or negative. Similarly, Judge (2002) explains that the larger firms are more likely to hedge than the smaller one. Hedging costs are very high hence their

relative usage by larger firms. Jin and Jorion (2004) studied the hedging techniques of the oil and gas risk. They found that hedging firms are two to three times larger in size than non-hedging firms. In a study of the exchange rate risk exposure in the gas firms, Haushalter (2000) noted that hedging exchange rate risk is higher in larger firms. Judge (2002) argues that the size of the firm that exhibits hedging is still not known. Small firms have a greater incentive to hedge because of the inverse relation between firm size and direct bankruptcy costs, because they have greater information asymmetries implying costly external financing and because the fixed transaction costs associated with external financing activities are likely to make financing more expensive for smaller firms. For larger firms, however, the hedging activity exhibits significant information and transaction cost scale economies implying that larger firms are more likely to hedge (*ibid*). The larger firms are more likely facing high risk which makes hedging valuable.

Firm size, in Sadorsky (2008) study, was measured using annual sales. This is similar to other studies (see, for example, Schumpeter, 1942; Scherer, 1980; Cohen and Klepper, 1996). On the other hand, Tufano (1996) expressed firm size using annual average of daily market value of equity plus book value of preferred stock plus book value of long-term and current debt.

Choi and Kim (2003) argue that firm size shows a significant impact on Asian currencies. The effect of firm size is negative for positive-exposure

firms, and positive for negative-exposure firms suggesting an economy of scale in hedging activities. Thus bigger firms are more efficient in managing exchange rate risk than smaller ones regardless of whether exposures are positive or negative initially for positive exposure firms and a positive significant sign to the negative exposure firms.

2. Profitability: return on assets (ROA) is used as a proxy for profitability of the firms. This follows Choi and Kim (2003) study on the Asian currency exposure of US firms.

The argument is that the most profitable firms are likely to have more trade (Allayanis and Weston, 2001; Jin and Jorion, 2006). Palazzo (2012) found that firms with high cash holdings have more growth opportunities and lower current profitability and as a result, they are less exposed to the sources of risk proxied by the value, investment, and profitability factors. These firms earn a larger and more significant risk-adjusted return over firms with a low cash-to-assets ratio, suggesting the presence of a source of risk related to cash holdings. On the other hand, Choi and Kim (2003) found that there was insignificant effects of profitability in their on Asian currency exposure of U.S. firms.

Thus, in terms of the exchange rate exposure, the argument is whether the fluctuations in the value of assets and liabilities are critically influenced by changes in exchange rates. The fluctuations in exchange rates resulting in either gains or loss in value which could then impact on the firm's stock prices (Abd.Kadir *et al.*, 2011).

3. Liquidity: the dividend pay-out and quick ratio are used. This is consistent with El-Masry *et al.*, (2007) study that used quick ratio and dividend pay-out as proxies of liquidity.

The quick ratio is current assets minus inventory divided by current liabilities. This index was found for each firm in the study and used in its absolute terms. The quick ratio has been used as a proxy of liquidity in many studies (such as, Haushalter, 2000; Howton and Perfect, 1998; Muller and Verschoor, 2006). The ratio is used to indicate the firm's short-term liquidity. It measures the company's ability to meet its obligation on a short term basis. Quick ratio is considered as a proxy of gross interest rate exposure (Bartram *et al.*, 2011). Thus, firms with low quick ratio have significantly high gross interest rate exposure.

The dividend payout is the measurement of dividend per share to earnings per share. Like quick ratio, the dividend payout is a proxy of short-term liquidity (Choi and Kim, 2003). A lower dividend payout makes it more likely that

funds will be available to service the firm's debt payments and therefore the lower the likelihood of the firm hedging. Thus, low dividends might imply liquidity constraints and more hedging indicating a negative association between dividend payout and hedging (Berkman and Bradbury, 1996). In contrast, Choi and Kim (2003) argue that firms with higher dividend payout make hedging more cost effective. Although, they found higher dividend payout firms were involved in hedging more to reduce their exposure (*ibid*). Lee *et al.*, (2011) noted the non-linear relationship between payout ratio and risk. They (Lee *et al.*, 2011) found that when growth rate is higher than returns, the relationship between risk and payout is negative but when growth is low, the relationship is positive.

4. Degree of international operations: foreign assets and foreign sales

Firms' cash flows could be affected by fluctuations of the exchange rate, interest rate and commodity prices. The effect depends in part on the level of international operations or ownership of foreign assets (Clark and Judge, 2008) whether this relates to exports or imports. Firms with high export rates, and firms with large foreign ownership are more exposed to fluctuations (of exchange rates, for instance) than other firms (Dahlquist and Robertsson, 2001). Thus, firms that have high foreign assets and foreign sales are most likely to be exposed to a high level of risk exposure. Gulf countries are

exposed as they export oil and import foreign good (and services) considering that the manufacturing sector is small in this region.

Williamson (2001) draws attention to the firms' exchange rate exposure arguing that the exposure depends on foreign as well as domestic demand elasticity. He defined the elasticity function as the sensitivity of a firm's cash flow in home currency to the exchange rate. As firms can correspond to the depreciation of home currency by increasing the prices in local currency, the firms with high export and low elasticity face lower exposure. Also, Williamson (2001) argues that in spite of foreign sales increase, the exposure of the foreign operations reduces the net effect. The exchange rate exposure reduces when firms have a higher ratio of foreign market cost to revenue and increases as the ratio of foreign market cost to the revenue decreases. Further, foreign sales ratio, which is foreign sales/total sales could be used to represent the level of international operations (Nydahl, 1999).

5. Growth: market value to book value. The growth of a unit of investment could be measured by market value to book value ratio (Clark and Judge, 2005). Firm having positive-net present value (NPV) projects have growth opportunities. Investing in future growth opportunities is beneficial to the firm value when it increases and vice versa (Myers, 1976). Firms with higher growth face higher underinvestment cost and need more hedging (Allayannis and Ofek, 2001). Firms' expected returns for high growth companies are less

sensitive to a change in the riskiness of assets. According to Palazzo (2012) high cash firms have more growth opportunities but lower current profitability and, as a consequence, they are less exposed to a variety of risks.

6. Leverage: total debt to total assets.

The ratio of total debt to total assets examines the capital structure of the firm and can be used as a proxy of financial distress (Judge and Korzheniskaya, 2012).

Studies (such as, Allayannis and Weston, 2001; Joseph and Vezos, 2006) used the ratio of debt to equity as proxy of leverage while other studies (such as, Judge and Korzhenitskaya, 2012) measured leverage as a ratio of gross total debt to market value of assets. Belghitar *et al.*, (2008), on the other hand, measured leverage as the ratio of book value of long term debts to total assets. Firms with high levels of leverage are more likely to hedge (El-Masry *et al.*, 2010). Bartram (2005) posits that there is a positive relationship between risk exposure and financial leverage. Further, Bartram *et al.*, (2011) suggest that firms with high leverage and low quick ratio are exposed to higher interest rate risk. Thus, firms with high financial leverage have high financial distress and should have higher risk exposure. Similarly, Chow and Chen (1998) pointed out that high leverage would increase the exposures to risk. A firm with lower debt is less concerned about the volatility of interest payments

(Faulkender, 2005). In addition, Aricia *et al.*, (2013) found that there was a negative relationship between interest rate and risk exposure for banks with more liquid assets. Thus, leverage can be considered as the most important determinant of interest rate exposure (Bartram, 2002).

The next section outlines the data sources and the sample selection criteria used.

3.7 Source of Data and Sample selection

The data for the present study is collected from Bloomberg and Datastream databases. The data collected from Bloomberg is for the exchange rates for the GCC currencies against the respective major trading currencies. The interest rates for the countries is obtained from Bloomberg database also. For the information on the most traded currencies for each GCC country, this was taken from the central bank websites of each of the six GCC countries.

The share prices of the listed firms was obtained from Datastream. Also, the market index and the oil prices used in this study were taken from data stream. The determinants as discussed in section 3.6 above were also collected from Datastream. The data collected span for the period January 2007 to June 2012, a five and half years. The data span a long period in order to effectively capture the exposure as argued by Bodnar and Wong (2003) that short term horizon leads to a weak result in stock return regression. Since the study conducted data from the

financial crisis of 2007, the exchange rate, interest rate and oil prices should be more volatile and the risk exposure greater.

Table 3.4 below gives a summary of the population and sample that was selected for the study. The sample selected has been segregated between the financial and non-financial firms. In total, this study analysed 77 per cent of the population of listed firms in the GCC countries. The explanation of how this was derived is given below.

Table 3.4: Sample selection and analysis

Category	United Arab Emirates	Oman	Kuwait	Saudi Arabia	Qatar	Bahrain	Total	Percentage
Financial	32	25	50	13	14	30	164	34%
Non-financial	33	75	100	74	21	18	321	66%
Total	65	100	150	87	35	48	485	
Population	119	118	205	92	48	48	630	
Sample percentage	55%	85%	73%	95%	73%	100%	77%	

The selection of the study sample started with the identification of all the listed firms in the GCC countries (population). The population was then filtered to remove firms that had been listed for only part of the study period. These were firms that had subsequently been de-listed or new listings during the period. The filtered population is what makes the selected sample. This sample has been further divided into financial and non-financial firms. For instance, out of a total population of 118 listed firms in Oman, 100 firms qualified the criteria and were

included in the analysis, representing 85 per cent of the population. Of the 100 firms selected, 75 per cent were non-financial and 25 per cent financial firms.

Out of the total 485 firms selected (representing 77 per cent of the population), 164 firms (34 per cent) were financial firms and 321 (66 per cent) non-financial firms.

As explained above, the data was collected using Bloomberg and Datastream databases. After collecting the data, Microsoft excel was used to set it up. Then SPSS (Statistical Package for the Social Sciences) was used to measure the correlation and run the diagnostic test while EViews (Econometric Views) was used to run the Ordinary Least Square (OLS) regression and EGARCH-M models. Further, analysis was done on the segregated data so that results for the financial and non-financial firms could be examined.

3.8 Actual and unexpected changes in the exchange rates, interest rates and oil price

In an efficient financial market, asset prices reflect all the expected changes in the market whether in exchange rate, interest rates, oil prices or any other thing that can have influence in the market (Giddy and Dufey, 1992). In that case, the expected changes will not affect the market as the market anticipates the changes. However, the unexpected changes affect the market reflected in the changes in the

market share prices (Choi *et al.*, 1992). Studies have examined the effect of different unexpected changes (in exchange rates, interest rates, oil prices) (see, for example, Choi and Prasad, 1995; Choi *et al.*, 1992; Fang and Loo, 1994; Harries *et al.*, 1991).

Calculation of the unexpected changes in the variables is by subtracting the anticipated (expected) from actual changes. Extracting the unexpected changes in the exchange rate, interest rates and oil price needs employment of the Autoregressive Integrated Moving Average (ARIMA) model. The ARIMA model has been used to construct the unexpected interest rates (see, for example, Bae, 1990; Dinenis and Staikouras, 1998; Korkeamaki, 2009; Madura and Zarruk, 1995; Sweeney and Warga 1986) and unexpected exchange rates (see, for example, Fang and Loo, 1994; Lothian and Taylor, 1996).

The ARIMA model is used to extract the unexpected changes in the exchange rate, interest rates and oil prices. The unexpected changes (white noise) are extracted from the time series data. Autocorrelation functions for each series are estimated up to 36 lags. ARIMA model is formulated by using two-step procedures. The first step involves finding the ARIMA model and the residual of that model are the unanticipated changes in the time series (exchange rate, interest rates and oil price changes). The second step employs the anticipated changes of the time series instead of the expected changes in the regression models.

Flannery and James (1984) (see also, Madura and Zarruk, 1995; Wetmore and Brick, 1994) found that there is no difference in the results when actual or unexpected changes are used for either short term or long term interest rates. As there is no difference in using the actual and unexpected changes in exchange rates or interest rate (Atindehou and Guyehie, 2001), this study uses the actual changes only.

3.9 Multicollinearity

3.9.1 Correlations

In Appendix A, the correlation of the independent variables for all the GCC countries is presented. The appendix is classified as follows: A.1 presents the correlation of Bahrain; A.2 correlation of Kuwait; A.3 correlation of Qatar; A.4 correlation of Oman; A.5 for Saudi Arabia and A.6 for United Arab Emirates.

The test is aimed at examining whether there is any pair-wise correlation between the independent variables, and that any correlation is less than 80 per cent (Abd.Kadir *et al.*, 2011). The multicollinearity should be considered if the correlation is over 80 per cent (Leon, 2008). With reference to Bahrain (Appendix A.1), there is no high correlations between the explanatory variables in the Bahrain equations. The highest correlations can be found between the market and the oil price changes (12.8 per cent), which understandably refer to their

dependence on the market for oil revenue. Since there is no high level of correlations, this justifies the reason for putting all the explanatory variables into the same equation. Appendix A.2 represents the correlations of the explanatory variables in Kuwait that show that there is an acceptable level of correlation sufficient to put the entire variables in one equation. There is, however, some relatively high correlations for the Chinese Yuan (CNY) to the UAE and US currencies (30.07 per cent and -38.68 per cent respectively). At the same time, the UAE currency with the Euro (-29.86 per cent), US currency with AED (-31.19 per cent). The high levels of correlation though, are still sufficiently acceptable to be in the same model. Appendix A.3, which summarises the correlation for Qatar, shows there are high correlations between the Euro and the Singaporean Dollar (61.33 per cent). Appendix A.4 shows the Oman explanatory variables correlations. The correlation was not too high except in Euro and the British Pound (66.82 per cent). Appendix A.5 summarises results for Saudi Arabia where there is no high correlation between the independent variables. Also, Appendix A.6 shows there is no high correlation for the United Arab Emirates. Thus, all the independent variables for each country are in one equation are no correlation was observed to be higher than 80 per cent.

3.9.2 Auxiliary Variables and VIF

Further tests for multicollinearity are auxiliary variables and variance inflation factor (VIF) models. This test is used to confirm any available linear relationship between the explanatory variables of the model (Abd.Kadir *et al.*, 2011). Multicollinearity is tested by using the ordinary least square (OLS) model. The OLS was adjusted for Heteroscedasticity and autocorrelation by using Newey-west practise. Variance inflation factors (VIF) are implemented by SPSS software to deduct the Multicollinearity. Most researchers recommended thresholds above 10, which means that VIF above 10 suggests the existence of collinearity among variables (Hair *et al.*, 2009, p.193). Hence, VIF above 10 indicates the existence of imperfect multicollinearity (Leon, 2008). If it is close to 1, this means there is no collinearity. Appendix B1 presents the result of the VIF test. For this research, there is no high value of VIF that exceeds 10 to suggest multicollinearity. Thus, in this study, multicollinearity is not a big problem as the VIF values are close to 1 (the VIF values are between 1.004 to 1.941). As argued by Bartram (2002), this suggests that there is no multicollinearity. Therefore, estimated variables in the model, exchange rate, interest rate, oil returns and market returns can be measured in one equation.

3.8 Empirical methodology

The sensitivity of stock returns to the changes in exchange rates, interest rates and oil prices is examined using the capital asset pricing model (CAPM). The development of the CAPM model is achieved by increasing the factors and making changes to these factors in the model. The CAPM two-factor model is used in some studies (such as, Abdalla and Murinde, 1997; Al-Shboul and Anwar, 2014; Allyanis and Ofek, 2001; Bartram *et al.*, 2010; Bodnar and Gentry, 1993; Choi and Prasad, 1995; Dominquez and Tesar, 2001; El-Masry, 2006a; Williamson, 2001). The model has been used to study exchange rate exposure with market exposure (such as, Al-Albadi and Sabbagh, 2006; Dinenis and Staikouras, 1998; Lynge and Zumwalt, 1980; Sweeny and Warga, 1986) while others have examined interest rate exposure instead of exchange rate (see, for example, Bodnar and Wong, 2003; Gueyie and Atinde, 2001)

The model is expanded to become a three-factor model and used to estimate the exchange rate exposure and interest rate exposure with the market exposure in studies (such as, Choi *et al.*, 1992; Murtagh and Bessler, 2003; Shamsuddin, 2009; Wetmore and Brick, 1994; Yong *et al.*, 2009).

In addition, some studies have used more than three factors in the CAPM model framework. For instance, Ryan and Worthington (2004) included in the model the market portfolio, long and medium term interest rate and their volatility. Al-

Tamimi *et al.*, (2011) used the model for the factors earnings per share, dividend per share, oil price, gross domestic product, consumer price index, interest rate, and money supply. In this study, I extend the three-factor CAPM model. Thus, the factors included are exchange rates, short term interest rates for all GCC countries and long term interest rates for Saudi Arabia only and oil prices at firm level.

3.10 Foreign exchange rate, interest rate and oil price exposure

In this study, the OLS model is utilised to capture the risk exposure from exchange rate, interest rate and oil price changes. Many studies have used this model and adjusted for autocorrelation and heteroscedasticity using the Newey-West procedure (see, for example, Bartram *et al.*, 2010; Gomez and Zapatero, 2003; Olugbode, 2010).

This study uses the multi-index OLS regression presented below (equation 3.6) following other studies (such as, Choi *et al.*, 1992) which have used the multi-index model:

$$R_{it} = \alpha_i + \beta_{m,i} RM_t + \beta_{r,i} XR_t + \beta_{s,i} SR_t + \beta_{l,i} LR_t + \beta_{o,i} OR_t + \varepsilon_{it} \quad t=1, \dots, T \quad 3.6$$

Where α_i is the intercept term for firm i , R_{it} is the returns of the firm in period t , RM_t the market portfolio returns in period t , XR_t presents the percentage changes in exchange rates over time t , SR_t is the changes in short term interest rate over time t , LR_t is the changes in long term interest rate over time t , OR_t is the changes

in oil prices over time t and ε_{it} represents the error term with zero mean, a constant variance and assumed normal and independent distribution. For all the variables used in this study, lags has been used to reduce the residual errors and outlier problems. The beta of the equation is represented as follows:

$\beta_{m,I}$: market portfolio beta.

$\beta_{r,I}$: exchange rate exposure coefficient for firm i ,

$\beta_{s,I}$: short term interest rate exposure coefficient for firm i ,

$\beta_{l,I}$: long term interest rate exposure coefficient for firm i ,

$\beta_{o,i}$: the oil price exposure coefficient for firm i .

Regression residuals will be tested for autocorrelations using Q-statistics. The equation used to determine the lag length is $K = \ln(T)$, where T is the number of observations. The application of the method is similar to other studies (see, for example, Fang and Thompson, 2004; Fang *et al.*, 2007). The method is also recommended by Tsay (2005).

Accordingly $K = \ln(1407) = 7.25 \sim 7$ for Bahrain, Kuwait, Oman and UAE, while for Saudi Arabia it is $K = \ln(1396) = 7.24 \sim 7$ lag. Thus, autocorrelation in the autoregressive conditional heteroskedasticity (ARCH) model is tested using Q-statistics for 7 lags and 21 lags. The ARCH test is substantiated using the

Lagrange multiplier (LM) test which effectively tests the lag length of ARCH errors. Further, the Jarque-Bera tested the normality of the residuals. As indicated above, the Newey-West procedure was used in the OLS Regression to avoid the ARCH effect and autocorrelations by adjusting the standard errors. However, the OLS does not give any explanation of the heteroscedasticity of residuals in the regression, hence the need to use another model to further analyse the data. Appreciatively, though the OLS estimator is still unbiased in the presence of heteroscedasticity it becomes inefficient because the true variance and covariance are underestimated (Goldberger, 1964)

To continue on the regression model, the equation 3.6 above is used for Saudi Arabia only as the data for long term interest rates was available. In the other GCC countries, however, the data on the long term interest rates is not readily available. Thus, the model used in the other GCC countries is similar to equation 3.6 but without LR_t

$$R_{it} = \alpha_i + \beta_{m,i} RM_t + \beta_{r,i} XR_t + \beta_{s,i} SR_t + \beta_{o,i} OR_t + \varepsilon_{it} \quad t=1, \dots, T \quad 3.7$$

Volatility (or risk) is important in measuring the returns. Volatility clustering may occur where large (small) returns are followed by large (small) returns of either sign (Mandelbortt, 1963). In the ARCH model volatility is a function of errors. The usefulness of using ARCH model is in estimating beta by including past returns' innovations (McClain *et al.*, 1996).

The OLS method assumes that the variance is constant in spite of the ARCH effect in the regression. For that reason, it was hard for some research that implements OLS regression to come up with a significant result. This is because the ARCH effect in time series explains dependence on the news in the market, where the arrival of data is serially correlated. In general, the frequency of data dictates which types of volatility clusters can be seen and therefore measured. Low-frequency data allows only low-frequency fluctuations to be seen, while higher-frequency data reveals more about the volatility properties (Daly, 2008)

The first ARCH models were introduced by Engle (1982). He argued the presence of ARCH effect since the OLS estimator is not consistent with the existence of ARCH effect (see, also, Hacker and Hatemi, 2005). Joseph and Vezos (2006) employed LM to test the ARCH effect and argued that due to volatility clustering and ARCH effects, the OLS method is not appropriate. The ARCH model explains volatility as a function of errors, which are news or shocks corresponding to unexpected changes. The ARCH model is thus used to model volatility (Gokcan, 2000). The importance of volatility, measured by the standard deviation or variance, is explained in many studies (see, for example, Engle and Ng, 1993). Volatility is central to the finance market for asset pricing, asset allocation and risk management (Andersen *et al.*, 2001). Knowing how this volatility changes through time is crucial to understand how assets are priced (Pierre, 1998).

The GARCH method is used in studies (such as, Brewer *et al.*, 2007; Elyasiniani and Mansur, 1998; Faff *et al.*, 2000; Kock and Saporoschenki, 2001; Muller and Vershoor, 2006; Joseph and Vezos, 2006). The GARCH model is:

$$R_{it} = \alpha_i + \beta_{m,i} RM_t + \beta_{r,i} XR_t + \beta_{s,i} SR_t + \beta_{l,i} LR_t + \beta_{o,i} OR_t + \varepsilon_{it} \quad 3.8$$

$$\varepsilon_{it} \sim N(0, \sigma_t^2) \quad 3.9$$

$$\sigma_t^2 = \alpha_0 \quad 3.10$$

From equation 3.8, R_{it} represents the return of the firms i at time t , α_i is the intercept for the firm i , RM_t is the returns in the market portfolio, SR_t is the changes in short term interest rate percentage changes over time, LR_t is the percentage changes in long-term interest rate over time, OR_t is the percentage of the changes in oil price over time. In equation 3.9, error term ε_{it} is normally distributed with mean 0 and variance σ_t^2 . Equation 3.10 explains the variance as a constant. Meanwhile, the error variance is heteroscedastic in equation 3.8. Then the error variance refers to it as a function h_t , thus the $\sigma_t^2 = h_t$, the distribution of the error is conditionally normal for the error as follows:

$$\varepsilon_{it} | I_{t-1} \sim N(0, h_t) \quad 3.11$$

In equation 3.11, I_{t-1} refers to information at time $t-1$. Hence, the error variance function in time-varying (h_t) with a constant term and lagged error squared. The

variance in the previous period squared (e^2_{t-1}). The volatility for period t depends on the magnitude of the squared errors of the period $t-1$.

$$h_t = \alpha_0 + \alpha_1 e^2_{t-1}, \alpha_0 > 0, 0 \leq \alpha_1 < 1 \quad 3.12$$

In equation 3.12, α_0 and α_1 values should be positive to make the variance a positive value, although the value of α_1 should be less than 1, otherwise it will explode over time. Equation 3.11 and 3.12 represents ARCH model suggested by Engle (1982a, 1982b) which is based on the linear ARCH(q) model with the additional constraint that the α_i 's decline linearly with the lag. A major limitation of ARCH (q) is that it is a short memory process in that only the most recent q squared residuals are used to estimate the changing variance. Engle (1982) introduced conditional variances, and he proposed the variance equation, though it is hard to use such model to capture the effect of long memory (long lagged) since only the recent squared residuals are captured in the model to estimate changes in the variance, thus making a less accurate estimation. Capturing the long lagged effect is unavailable in this mode, however. The volatility in the stock market has long memory (Christensen and Nielsen, 2007) making it really important to have longer memory effects. For that reason, Bellerslev (1986) built a new model GARCH (p, q) that allows for long memory by involving all past squared residuals to estimate the present variance. Bellerslev (1986) constructed the conditional inflation variance equation to test the effect of inflation rate. The long-term memory equation is presented as:

$$h_t = \alpha_0 + \alpha_1 e^2_{t-1} + \beta_1 h_{t-1} \quad 3.13$$

h_{t-1} in equation 3.13 is defined as a variance lagged value where it measures the long lags of the shocks. To better understand the models, $\alpha_1 + \beta_1 < 1$ and $\alpha_1 > 0$, $\beta_1 > 0$ (ARCH and GARCH parameters) cannot be negative. GARCH used the weighted average of past squared residuals and predicted variance in the next period as a weighted average of long run average variance (Engle, 2001). The variation of stock returns is described by the conditional variance of h , since larger conditional variance (h_t) revealed higher risk.

Taing and Worthing (2005) distinguish between systematic and unsystematic risk. They believe that if the fluctuations in volatility are caused by unsystematic risk, this means an increase in volatility might not necessarily be followed by high returns.

The shortcoming of the GARCH model is the assumption of determinant σ^2 which is that it can be measured by the magnitude of unanticipated excess returns, nor has any positive or negative sign influence on the returns (Nelson, 1991). EGARCH by Nelson (1991) has a wide use in forecasting. The EGARCH model was used to capture the most of asymmetric (see, also, Engle and Ng, 1993). Brandt and Jones (2006) used daily data in the EGARCH model. The EGARCH model captures the most important features in stock returns volatility (time series clustering), negative correlation with returns, log-normality and in long memory

(Bollerslev *et al.*, 2001). Faff *et al.*, (2000) argued that the arrival of shocks with a negative impact on assets values leads to a redundancy in price and increases the debt to equity level of firms. The EGARCH model added a value to the traditional GARCH model by adding more specification to the volatility equation to differentiate positive shock from the negative shock. Under EGARCH framework, separated into leverage effects, it indicates that negative news increases the volatility of returns more than positive news.

Nelson (1991) overcomes the problem of different influence on volatility of the positive and negative value of ε_t by using exponential GARCH (EGARCH). Similar model were used in other studies (see, for example, Brandt and Jones, 2006; Harvey and Sucarrat, 2014; Vrontos, *et al.*, 2000; Zhang and Chen, 2011). Zhang and Chen (2011) noted that the EGARCH model supplies the evidence of asymmetry, thus, it discriminates between the influence of positive and negative innovations. Creal *et al.*, (2008, 2011) defined EGARCH model variance as driven by the equation depending on the conditional score of the last observation. Koutmos and Martin (2007) claims that high frequent time series data which estimated with the normal distribution was incapable of accounting the leptokurtosis in the residuals. Like student t distribution, where t distribution is symmetric around zero (Bollerslev, 1987), estimation will be with AR (K) up to 7 lags. AR(1) EGARCH-M model with t-distribution to all estimations in this study is used.

$$R_t = \alpha_i + \beta_{rt}R_{it-1} + \beta_{mt}RM_t + \beta_{xt}XR_t + \beta_{st}SR_t + \beta_{lt}LR_t + \beta_{ot}OR_t + \lambda \log(h^2_{it}) + \varepsilon_{it} \quad 3.14$$

$$\varepsilon_{i,t} | I_{t-1} \sim t(0, h^2_{i,t}, V_{i,t}) \quad 3.15$$

$$\log h^2_{i,t} = \alpha_0 + \alpha_1 \frac{\varepsilon_{i,t-1}}{h_{i,t-1}} + \alpha_2 \left(\left| \frac{\varepsilon_{i,t-1}}{h_{i,t-1}} \right| \right) + \phi_1 \log h^2_{i,t-1} \quad 3.16$$

The variables in equation 3.14 can be explained as follows, α_i is the intercept for firm i , R_{it} present the returns of the firms at time t , R_{t-1} autoregressive lag parameter for firm i at time $t-1$ accounting for autocorrelation, RM_t the rate of return of market at time t , XR_t is the percentage change in exchange rate index time t , SR_t is the percentage of short term interest rate at time t , LR_t is the change in the long term interest rate at time t , OR_t is the change in oil price at time t . $\log(h^2_{it})$ is the log of conditional firm volatility with coefficient λ thus expressing the relationship between expected return and the measure of previous conditional volatility. To capture risk pattern over time and the error term ε_{it} equation 3.15 present $\varepsilon_{i,t}$ error term with zero mean and the variance, h^2_i time is varying, and t -density of distribution $V_{i,t}$, whereas I_{t-1} is the information available at time $t-1$. In equation 3.16, $\log h^2_{i,t}$ is the log of the conditional variance, is a forecast of the current volatility restricted to the conditional variance of previous periods and error. The constant term thus finds the time independent module of volatility that shows volatility when ARCH and GARCH are statistically insignificant. In addition, past innovation has an asymmetric impact on present volatility measured by α_1 . Once $\alpha_1 < 1$ there are leverage effect but once $\alpha_1 \neq 0$ there are asymmetric effects. ARCH term (α_2) that links between the conditional variance and

asymmetric function of past innovation. Past period variance ($\log h_{i,t-1}^2$) and the GARCH (ϕ_1) term parameters associate current volatility with past volatility. To conclude the equations (3.14, 3.15 and 3.16) are used to estimate the contemporaneous changes in exchange rate, interest rate, and oil price changes on firms' returns y using the actual changes for a sample period from 2006 to 2012. Both OLS and EGARCH models are checked by using Q-statistics for the residual autocorrelation. At the same time, Q^2 test and Lagrange multiplier (LM) are used to test the present of residual ARCH. Furthermore, to test the normality of the residual, Jarque-Bera statistics is used.

Further to the models given above, lagged changes of exchange rate, interest rate and oil price changes in the mean equation, testing the significant mispricing hypothesis, are used. Studies (such as, Choi and Kim, 2003; Fraser and Pantzalis, 2004; Hsin *et al.*, 2007; Nydahl, 1999; Judge, 2002; Joseph, 2002) implement both contemporaneous and lagged changes as independent variables in the same model. Other studies use either contemporaneous or lagged changes in one model (see, for example, Lee *et al.*, 2012; Iroio and Faff, 2002; Jayasinghe and Tsui, 2008). Using contemporaneous and lagged changes in one model causes bias in the regression coefficient, for changes in exchange rate for example, which may not be independent from others over time (Krishnamoorthy, 2002). That can be the same in interest rate or oil price changes.

$$R_t = \alpha_i + \beta_{rt}R_{i,t-1} + \beta_{mt}RM_t + \beta_{xt}XR_{t-1} + \beta_{st}SR_{t-1} + \beta_{lt}LR_{t-1} + \beta_{ot}OR_{t-1} + \lambda \log(h_{it}^2) + \varepsilon_{it} \quad 3.17$$

$$\varepsilon_{i,t} | I_{t-1} \sim t(0, h_{i,t}^2, V_{i,t}) \quad 3.18$$

$$\log h_{i,t}^2 = \alpha_0 + \alpha_1 \frac{s_{i,t-1}}{h_{i,t-1}} + \alpha_2 \left(\left| \frac{s_{i,t-1}}{h_{i,t-1}} \right| \right) + \varphi_1 \log h_{i,t-1}^2 \quad 3.19$$

Equation 3.17 can be explained as follows, α_i is the intercept for firm i , R_{it} represents the returns of the firms at time t , R_{t-1} is the autoregressive lag parameter for firm i at time $t-1$, RM_t the return of market at time t , XR_{t-1} , SR_{t-1} , LR_{t-1} , OR_{t-1} are the lagged changes in the exchange rate, short term interest rate, long term interest rate, oil prices that are found if lagged explanatory variables are used in the model for one week.

3.11 The determinant of explanatory variables

This section of the study examines the determinant of firms' exposure to exchange rate, interest rate and oil price exposure. In general, firms that are involved in hedging operations are less exposed to risk than non-hedging firms. In addition, hedging should add value to the firms (see, section 3.6 above for discussion of the determinants used in this study). Clark and Judge (2008) point out that hedging can mitigate the agency problem of underinvestment and suggest that hedging, which could involve the use of derivatives, increases firm value. The hedging data is not available for most firms in this study. Since firms do not disclose in detail

their use of derivatives, a proxy was used for hedging. The model to measure the determinants of exchange rate is:

$$\beta_{xt} = \delta_0 + \delta_1 TA_i + \delta_2 ROA_i + \delta_3 DPA_i + \delta_4 QR_i + \delta_5 FA_i + \delta_6 FS_i + \delta_7 MVBV_i + \delta_8 TDTA_i + \varepsilon_{it} \quad i = 1, \dots, N \quad 3.20$$

and the determinants of short-term interest rate:

$$\beta_{st} = \delta_0 + \delta_1 TA_i + \delta_2 ROA_i + \delta_3 DPA_i + \delta_4 QR_i + \delta_5 FA_i + \delta_6 FS_i + \delta_7 MVBV_i + \delta_8 TDTA_i + \varepsilon_{it} \quad i = 1, \dots, N \quad 3.21$$

and determinants of long-term interest rate:

$$\beta_{lt} = \delta_0 + \delta_1 TA_i + \delta_2 ROA_i + \delta_3 DPA_i + \delta_4 QR_i + \delta_5 FA_i + \delta_6 FS_i + \delta_7 MVBV_i + \delta_8 TDTA_i + \varepsilon_{it} \quad i = 1, \dots, N \quad 3.22$$

while that of determinants of oil price changes is:

$$\beta_{ot} = \delta_0 + \delta_1 TA_i + \delta_2 ROA_i + \delta_3 DPA_i + \delta_4 QR_i + \delta_5 FA_i + \delta_6 FS_i + \delta_7 MVBV_i + \delta_8 TDTA_i + \varepsilon_{it} \quad i = 1, \dots, N \quad 3.23$$

Where, β_{xt} is the exchange rate exposure coefficient of the firm i , β_{st} is the coefficient of short term interest rate exposure of firm i , β_{lt} is the coefficient exposure of long term interest rate and β_{ot} is the oil price changes exposure. Further, it should be specified that it is the absolute exposure coefficients of the exchange rate, interest rate and oil prices changes that are examined in this study.

The definition of the explanatory variables are, TA_i is the log of total assets, ROA_i is the return on assets, DPA_i is the dividend pay-out, QR_i is the Quick ratio, FA_i is the log of foreign assets ratio, FS_i is the log of foreign sales ratio, $MVBV_i$ is the ratio of market value to book value and $TDTA_i$ is the ratio of total debt to total asset.

First the correlation between the determinants is checked to make sure that there are no high correlations between the explanatory variables in the determinant equation. The determinants do not show any correlations between them thus allowing for the above equation to have the entire variables. Thus, the determinants for all the risk factors is tested in this study for all the GCC countries. See the correlations results between the determinants in appendix C.

The next section discusses the pilot study that was conducted to gain an understanding of the risk management strategies in the GCC countries.

3.12 Pilot study

As the researcher should adopt an appropriate research methodology and research design, selection of methodology should be based on the objective of the research and the ability to fulfil it (Cohen *et al.*, 2011). In that regards, this research starts with an early pilot study to investigate risk management employment in Kuwait as

a sample from the Gulf Cooperation Countries (GCC). After the pilot study, the research proceeds with the empirical study.

The pilot study took place in the early stage of this research to shed light on the major risks in the Gulf Cooperation Countries. The pilot study took an interview format. The targeted interviewees were the risk management managers in the biggest companies in Kuwait. The questions were designed to discuss about the different risk types and the risk management technique mostly used in Kuwait. Thus, the focus of the questions was on the way that those companies deal with risk. One of the main reasons for choosing Kuwait as the case study was because of accessibility challenges. Access to risk managers in the major listed companies was limited.

In total, 8 interviews were conducted. The risk managers interviewed were from three (3) big banks (one global Islamic bank, one global convention bank and one local bank), two (2) investment companies, one insurance company, one national telecom company and one transport company making a total of 8 companies (see table 3.5 below) Thus, both financial and non-financial firms are represented. The aim was to capture a representative sample of most listed companies in GCC countries.

Table 3.5: Summary of interviewed sectors

Industry	Sector
Financial	Global Islamic Bank
	Conventional Bank (local bank)
	Conventional bank (international)
	Insurance company
	Investment companies (x2)
Non-financial	Transport/Shipping company
	Telecommunication company

3.12.1 Interviews

Interviews with the risk managers were conducted to enlighten the researcher's understanding about the risk management practices in the Kuwait listed firms and to also support the empirical results. The interview questions are shown in appendix D.

There were three main themes investigated through the interviews. Firstly, identifying the most important risks faced by the stock listed companies. Then, in particular, discussing the companies' exposure to the interest rate risk, exchange rate risk and oil price changes. Thirdly, revealing how the Kuwait stock listed companies deal with the risks. Different questions were asked depending on the level of the risks that companies face and how they deal with interest rate risk, exchange risk and oil price risk. The following sub-sections discuss the risk management in the Kuwait stock market.

3.12.2 General risk management

Several types of risk were included in the questions to determine the most influential risks faced by the Kuwaiti companies (see, appendix D). In general, market risk was the top risk faced by all financial institutions while it was ranked as the third in nonfinancial companies. Interest rate risk is not a big issue that is faced by companies according to the interviewees mainly because Kuwait does not issue many bonds especially long-term bonds. This aspect was confirmed by the interviewees from the different companies, and they assert that the Kuwait government does not need funds. While the Kuwait government bonds are not allowed in Islamic Sharia, 'Sukuk' is allowed. This is an Islamic equivalent of bonds. Sukuk grants the investor a share of an asset, along with the commensurate cashflows and risk (ISDB, 2015). This is different to conventional bonds that merely confer ownership of a debt. However, the Kuwait government does not issue 'Sukuk' which is the accepted type of bonds in Islamic laws.

Although interest rates are important, they are most applicable to inter-bank loans. Thus, some companies consider that they do not have interest risk exposure because they do not have a high level of debt. In addition, derivatives do not exist in Islamic banking. However, it does have some little usage in the Kuwait market. In addition, the companies point out that interest rate risk does not have a direct impact, but the interest rates in the global market may have an impact on their business.

Exchange rate risk is not considered as a high risk when it comes to the Kuwait stock market according to the interviewees as the Kuwait currency does not suffer from significant currency fluctuations. In contrast, most of the multinational companies face the exchange rate risk, with varying influence from one company to another.

On the other hand, though oil prices drive the Kuwaiti economy, it does not drive the market share prices of the companies. Interviewees however, consider oil price changes to have an indirect effect on their shares on the stock market

Equity and credit risk were the most prominent in the financial companies while this was not the case for non-financial companies. Volatility risk was not applicable to most of the companies since they are not big dealers of financial instruments. However, some companies were less exposed to volatility risk than others. Both financial and non-financial firms ranked liquidity risk as the least exposure risk. On the other hand, operational risk is high, and is faced by all of the companies as per the interviewees. The companies in Kuwait do not have high exposure to legal risk and political risk, due to the fact that Kuwait is considered as a stable country.

All the companies agree that risks exist, but they do not find this threatening the existence of their companies unless they are having trouble managing it. All the companies in the sample of the pilot study have a risk management team, whether

they are financial companies or not. When asked whether they accept all the risk or transfer it, the answer was that no one transferred risk. In the banks, they use the liabilities to create loans investment, and Sukuk to earn a ratio of return. The banks have to face risks to be in business, and they agree they cannot eliminate all the risk. All companies have to face risks to operate. In an Islamic bank, they cannot buy derivatives to cover themselves from customer default because of sharia compliance. Hence, they have to estimate how much they can lose from their loan book and decide accordingly. The risk manager is decides on how to mitigate the risk. They can either accept or transfer or insure the risk. The risk management team's duty is to raise the risk to the manager, then they decide whether to take the risk or not. In general, they agree that if no risk is taken, then no business will operate. Moreover, risk transfer is not accepted but it is managed.

The cost of risk management is acceptable in all companies which have been interviewed. Tools like re-insurance and diversification have been found useful and effective in risk management. In the case of Islamic companies, there is risk management policy and compliance policy. There exists also in other companies risk management relating to information security, business continuity and physical security.

Regarding the difficulties related to risk management, there were three major areas. Firstly, the lack of data is largely a problematic area when assessing the risk and simulating risk mitigation. Secondly, from a strategic risk point of view,

there are international global economic changes that are not known or are difficult to estimate. Finally, operational risk sometimes brings with it a difficulty in estimating the eventualities or accidents that may happen and the associated side effects of these.

In general, derivatives are not widely used in Kuwait. Some banks use them in a simple way either using profit rate swaps or cross currency swaps. For Islamic banks, these are specifically Sharia-compliant derivatives which are different to other conventional (normal) derivatives. Other firms use forwards. Further, some companies do not hedge using derivatives but hedge using natural hedging. This involves matching assets with liabilities of the same currency. Diversifications are used in the insurance company with re-insurance. In general, hedging is not applied as a dependent variable for risk management.

3.12.3 Exchange rate risk

The way that companies deal with foreign exchange risk varied from one firm to another. But in general, firms manage foreign exchange risk from the onset of their business. The interviewees find exchange rate risk management useful but they cannot hedge it completely to cover their positions. In the telecom company, the interview revealed that translations risk cannot be managed unless the exchange rates are tracked on a daily basis. Thus, the risk is only minimised. Where the foreign exchange risk is managed, it was found useful to reduce the

risk. Most transactions are usually in US Dollars or Euro. In foreign currency deals, the currency to be used is usually agreed. In general, some companies buy or sell forward contracts only. But no company uses options as the derivatives are not available or allowed. Companies do wish they had a better method to manage this risk as compared to using forward contracts only. However, because options are not allowed in Sharia law, they are rarely used or not available. Swaps, on the other hand, are used to hedge against the currency risk in the short term. In addition, most of the companies try to match assets and liabilities in order to manage to this risk. Furthermore, diversification is the most applicable tool for most companies to reduce the exchange rate risk.

3.12.4 Interest rate risk

The interest rate risk exposure differs from company to company. The Islamic banks face interest rate risk through the effect on the supply and demand for credit and investment. Thus, they are affected by interest risk changes in the economy. In Islamic banks, they do nothing to manage the interest rate risk but in conventional banks they use swaps. Diversification in investment is most used by the Islamic banks to manage the risk. The insurance companies, on the other hand, diversify among banks using short and long term investment. Some of the companies do not deal with government bonds hence they face the risk of interest changes from borrowing money from banks whose interest rates are nearly fixed by government. The government offers a ceiling in borrowing funds from the

banks and banks usually aim to be near or close to this ceiling. In Kuwait, it is also difficult to manage the long-term interest rate risk.

Interviewees agree that managing this kind of risk will add more value to the company. To conclude, the interest rate risk is not a big problem to the companies since the interest rates are pegged and the government does not issue many bonds. In Kuwait, the interest rates have been stable for the last 2 years. Also, the companies generally do not have high debt so they do not face significant interest rate risk.

3.12.5 Oil price fluctuations

Oil price fluctuations do not add pressure to the companies at all since the oil is not sold or bought by companies and they do not deal with it directly. As a result, there is no hedging used against oil price changes. In the case of other companies, the expectations would be companies would need to hedge against the oil price fluctuations. However, in view of the fact that oil prices affect the economy, then this could indirectly affect the share prices of the companies. Thus, if oil prices increase on the world market, the economy should improve and demand for products should increase which could then affect the value of the firms. However, the oil price risk might not be easily hedged. Oil acts as second order risk. In some cases, oil price is used as one of macroeconomic factors in stress test analysis.

3.12.6 Risk management tools

Generally, most of the companies are involved in risk management in some way. Risk management is very important to sustainable business. However, the way that they deal with managing risk changes as required. The most difficult part of risk management is uncertainty of bad news and the absence of data. Most of the companies interviewed considered themselves to be doing well in risk management.

In using the tools in risk management generally, some of the companies are using a stress test and the scenario analysis depending on the products offered. Value at risk is used if there are specific derivatives and these do not do much. No company uses options as a measure of risk while some use the value of basis point. Forward swap durations are used in some institutions while other firms which do not use options have a reserve fund that can be used to measure the exposure. The firm's operations determines whether they use any kind of risk management tools. Some of the companies use swap transactions for the short term but not for the long term.

The economic cycles also affect the way (or culture) of dealing with risk. It was revealed that after the financial crisis in 2007, the risk management culture changed. Respondents stated that their behaviour and way of thinking changed. The financial crisis had a great effect on Kuwait. As a result, the risk management

attitude changed. For instance, the time taken to assign risk takes longer after the crisis. At the same time, there is a positive impact on risk management policy. With regard to regulation, this has also been changing as the Central Bank of Kuwait makes regular pronouncements.

3.12.7 Pilot study summary

In this pilot study, companies in different industries were interviewed about their exposure to exchange risk, interest risk and oil price fluctuations and their risk management techniques. It has been clear from this pilot study that there is widely applied risk management in all interviewed companies but they do not have sophisticated techniques to deal with these risks. Exchange rate risk management varies between the companies depending on whether the companies are multinationals and have foreign operations or operate locally. There is more awareness of the exchange rate risk by financial firms as compared to non-financial firms. Interest rates are more stable in Kuwait and hence the interest rate risk exposure does not attract much attention. Oil price fluctuations are a second order risk and hence do not have a direct link with stock market return.

3.13 Summary of the chapter

The hypotheses of the study were explained in this chapter. In addition, the sources of data and the selection process was discussed. The methodology that

will be used to explore the exposure of firms in the GCC countries to the three risks were also discussed. Further, the determinants of the explanatory variables were revealed. Thus, the absolute exposure coefficients of the exchange rate, interest rate and oil price risk were revealed. The overall aim of the chapter was to discuss the research hypothesis and outline how these will be empirically investigated.

The chapter ends with the pilot study conducted in Kuwait to scan the risk management practices in the Gulf region. The findings of the pilot study were reported. The aim was to gain a background understanding of risk management to enhance the interpretation of the empirical results to be discussed in chapters four to six.

Thus, the next chapter discusses the results of the estimation of the exchange rate, interest rate and oil price changes using the OLS regression model. Chapter five reveals the results using the EGARCH-M model while the determination of the risk exposure are discussed in Chapter six.

CHAPTER FOUR: AN OLS ANALYSIS OF THE FOREIGN EXCHANGE RATES, INTEREST RATES, OIL PRICES AND MARKET EXPOSURE OF THE GCC LISTED FIRMS

4.1 Introduction

This chapter presents results of the analysis conducted by running the Ordinary Least Square (OLS) model on the data obtained from the listed companies in the six GCC countries. The impact of the direct changes in exchange rates, interest rates and oil prices on the firms' returns is analysed using OLS regression. As explained in chapter 3 (section 3.9.2), all estimations were adjusted for autocorrelation and heteroscedasticity by using the Newey-West HAC procedure. In addition, the residual was tested for autocorrelation, heteroscedasticity and normality.

4.2 Descriptive statistics of the data

The descriptive statistics for the listed firms' returns is presented in table 4.1 below. In addition, the descriptive statistics for the changes in the independent variables of the firms are presented for each of the GCC countries in table 4.2. The descriptive statistics show the mean (the arithmetic mean across the returns), maximum and minimum values (the maximum and minimum values of the returns in the data), the standard deviation (which measures the spread of the returns), skewness (which measures the degree and direction of asymmetry of the data) and

kurtosis (which measures the heaviness of the tails of the distributions). In essence, the normality of the data is examined through the skewness and kurtosis values. An interpretation of the results follows each table.

Table 4.1: The descriptive statistics of listed firms' return in GCC market

Country	Mean	Max	Min	Std Dev*	Skewness	Kurtosis
Bahrain	-0.0315	29.2691	-31.4212	2.231	1.1575	165.3491
Kuwait	-0.0006	0.2161	-0.2358	0.0259	-0.1013	57.9988
Oman	0.0002	0.3162	-0.3135	0.0303	1.612	122.7259
Qatar	0.0273	26.99	-28.123	2.8392	0.0487	46.4839
Saudi Arabia	-0.0049	10.5734	-16.117	2.5851	-1.0935	29.1764
United Arab Emirates	0.0051	4.3511	-4.0016	0.5043	-0.1825	36.7262

Note: * this is standard deviation. The table reports a summary of the descriptive statistics of the listed firms in the GCC countries for the period 2007 to 2012.

The average stock returns for the study period was highest in Qatar at 0.0273 per cent and lowest in Bahrain at -0.0315 per cent which also had the lowest and highest absolute returns. This explains that investment in the Qatar stock market gives a higher return of the GCC countries. As the mean returns in Bahrain are negative, this implies that collectively, firms in Bahrain lost value. The risk associated with the observed average returns can be estimated using standard deviation (std dev) which measures the volatility of the stock returns. The stock returns in Qatar and Saudi Arabia had the highest volatility of 2.8392 per cent and 2.5851 per cent respectively while the lowest stock fluctuations were observed in Kuwait at 0.0259 per cent. In other words, stock returns in Qatar, Saudi Arabia and Bahrain fluctuated the most. In terms of the relationship between risk and returns, the results in Kuwait, Qatar and Oman support the fundamental principle

of high risk, high returns. This relationship does not seem to hold in the other three countries.

The distributions of the observed returns are positively skewed for Bahrain, Oman and Qatar and negatively skewed for the rest of the GCC countries. The kurtosis, which measures the degree to which a distribution is more or less peaked than in a normal distribution, is positive and higher than three in all the GCC countries. This implies that returns in the GCC countries have peaked distributions and are not normally distributed. Returns, in Bahrain for instance, are highly peaked with an asymmetric tail extending towards more positive values (positive skewness).

The descriptive statistics for the changes in the independent variables of the firms are presented next for each of the GCC countries in table 4.2 below. The table, similar to 4.1 above shows the mean, maximum, minimum, standard deviation, skewness and kurtosis of the daily logged changes in the independent variables. The independent variables are captured and presented for each country, to represent the three factors being examined (exchange rate, interest rate and oil price changes). The independent variables considered for Bahrain, for instance, are changes in the exchange rates AED/BHD, EUR/BHD, GBP/BHD, JPY/BHD, USD/BHD, market, interest rate and oil price changes. AED/BHD refers to the changes in the United Arab Emirates Dirham to the Bahraini Dinar nominal exchange rate while EUR/BHD denotes the changes in the Euro to the Bahraini

Dinar nominal exchange rate and, GBP/BHD refers to the changes in the British Pound to the Bahraini Dinar nominal exchange rate. JPY/BHD represents the changes in the Japanese Yen to the Bahraini Dinar nominal exchange rate and USD/BHD denotes the changes in the US Dollar to the Bahraini Dinar nominal exchange rate. For each country, therefore, the changes in the exchanges rates are observed for the major trading currencies as depicted in Table 3.2. The market represents the returns in the stock market index, the Bahrain index (BHA) while Interest Rate (IR) represents the changes in the short term interest rates and finally, Oil denoted the changes in the oil price returns.

A statistical analysis of these variables in the respective countries should give some representative effects of the exchange rate, interest rates and oil price fluctuations on the stock returns. A discussion of the results follows after the table for each country.

Table 4.2: The descriptive statistics of independent variables in GCC market

PANEL A						
Bahrain	Mean	Max	Min	Std dev*	Skewness	Kurtosis
Market	-0.0819	6.3089	-18.3786	1.2245	-3.5293	48.6998
OIL	0.0469	13.6874	-12.3077	2.2427	-0.0072	6.9555
AED	0.0000	0.4340	-0.3927	0.0396	0.4072	43.9785
EUR	0.0021	2.9389	-3.9678	0.6822	-0.3285	5.9945
GBP	0.0318	20.9145	-3.8776	0.8740	9.8021	234.1856
JPY	-0.0298	5.4512	-3.3847	0.7348	0.1410	7.0571
USD	0.0000	0.5377	-0.5714	0.0582	1.0431	49.8590
IR	-0.1608	13.6434	-49.1408	2.1490	-12.1165	240.3303

PANEL B						
Kuwait	Mean	Max	Min	Std dev*	Skewness	Kurtosis
Market	-0.0004	0.0746	-0.0752	0.0116	-0.3103	9.6564
OIL	0.0005	0.1369	-0.1231	0.0224	-0.0072	6.9555
AED	0.0000	0.0570	-0.0572	0.0031	-0.5282	165.7119
CNY	-0.0001	0.0264	-0.0311	0.0028	-1.2297	34.5215
EUR	0.0000	0.1296	-0.1293	0.0085	0.0091	79.6788
USD	0.0000	0.0280	-0.0287	0.0025	0.6045	36.9221
JPY	-0.0003	0.0639	-0.0573	0.0078	0.1328	12.1141
IR	-0.0012	0.2097	-0.1466	0.0145	0.5383	53.4196

PANEL C						
Oman	Mean	Max	Min	Std dev*	Skewness	Kurtosis
Market	0.0001	0.0804	-0.0870	0.0142	-1.1204	15.2901
OIL	-0.0002	0.1008	-0.1231	0.0222	-0.0858	6.8829
AED	0.0029	2.1631	-0.0263	0.0794	26.9404	733.4805
EUR	-0.0001	0.0242	-0.0289	0.0071	-0.0749	4.7992
GBP	0.0002	0.0342	-0.0230	0.0067	0.5269	5.9156
JPY	-0.0004	0.0551	-0.0336	0.0078	0.1825	8.2192
USD	0.0000	0.0044	-0.0027	0.0005	1.2865	24.4869
IR	0.0003	1.0427	-1.2809	0.1744	-0.5315	14.3251

PANEL D						
Qatar	Mean	Max	Min	Std dev*	Skewness	Kurtosis
Market	0.0244	11.2587	-13.1730	1.6582	-0.8373	16.7980
OIL	0.0469	13.6874	-12.3077	2.2427	-0.0072	6.9555
CNY	-0.0144	0.7220	-0.6231	0.1146	-0.0856	6.8341
EUR	0.0021	2.9731	-3.8959	0.6801	-0.3087	5.8355
INR	0.0155	2.5383	-3.2050	0.5095	0.1855	6.2134
JPY	-0.0299	3.0255	-4.8812	0.7110	-0.3759	7.4070
KRW	0.0159	10.2568	-13.2500	0.9866	-0.7150	38.3226
IR	-0.1360	220.6074	-175.7858	28.7505	0.2480	12.0138

Continued, Table 4.2: The descriptive statistics of independent variables in GCC market

PANEL E						
Saudi Arabia	Mean	Max	Min	Std dev*	Skewness	Kurtosis
Market	-0.0015	9.0874	-10.3285	1.6232	-0.7081	11.8580
OIL	0.0492	13.6874	-12.3077	2.2460	-0.0106	6.9617
CNY	-0.0150	0.7383	-0.7014	0.1165	-0.0986	7.8306
EUR	0.0011	2.9569	-3.9593	0.6837	-0.3073	6.0092
JPY	-0.0293	3.0267	-5.0034	0.7114	-0.3755	7.5847
KRW	0.0156	10.0437	-13.1908	0.9888	-0.7513	37.2223
USD	0.0000	0.4133	-0.5251	0.0468	-0.8219	34.2198
L-IR	-0.0433	14.3101	-17.4041	2.6972	-0.1658	7.9068
S-IR	-0.1163	8.0162	-23.1050	1.4794	-9.2596	122.0733

Note: * this is standard deviation. The tables report a summary of the descriptive statistics of the independent variables in each GCC country for the period 2007 to 2012.

PANEL F						
United Arab Emirates	Mean	Max	Min	Std dev*	Skewness	Kurtosis
Market	-0.0004	0.1163	-0.1174	0.0135	-0.6377	20.4082
OIL	0.0005	0.1369	-0.1231	0.0224	-0.0072	6.9555
CNY	-0.0001	0.0071	-0.0057	0.0011	-0.0572	7.0453
EUR	0.0000	0.0384	-0.0274	0.0071	0.0436	4.6563
INR	-0.0014	0.0254	-2.1631	0.0579	-37.0308	1383.1270
JPY	-0.0003	0.0367	-0.0366	0.0072	-0.0239	5.9351
KRW	0.0006	6.8931	-6.9004	0.2698	0.1880	611.5450
IR	-0.0008	0.1387	-0.1774	0.0104	-2.6210	105.2670

I start the country analysis of the independent variable with Bahrain, interpreting the results shown in Panel A. Positive average returns are observed for oil price returns and, the currency variations of the Euro and British Pound against the Bahraini Dinar. The currency changes of the United Arab Emirates Dirham and US Dollar to the Bahraini Dinar was indistinguishable from zero. Negative average returns are observed for the other variables with the highest being Interest rate at 0.16 per cent. The highest volatility occurred in the oil returns (2.24 per cent) and Interest rate changes (2.15 per cent). The currency fluctuations to the Bahraini Dinar are highest in the British Pounds (0.87 per cent) and lowest for the United Arab Emirates Dirham (0.04 per cent). It can be observed that both the United Arab Emirates Dirham and US Dollar currencies had the lowest average variations and were the least volatile. This is largely explained by the pegging of the Bahraini Dinar (and the United Arab Emirates Dirham) to the US Dollar. With the high means and volatility observed for both the oil prices and interest rates, firms in Bahrain need to manage this risk. In comparative terms, the average returns and volatility of the stock returns (from Table 1) to that of the explanatory variables (Table 2, Panel A) shows the stock returns in Bahrain to be more volatile than the macroeconomic indicators (currency, interest rate, oil prices, market index) examined. This finding supports Attari and Safdar (2013) study that looked at the relationship between macroeconomic volatility and stock market volatility.

With reference to Kuwait (Panel B), the highest positive average returns are for oil returns while the currency fluctuations for United Arab Emirates Dirham (AED), Euro and US Dollar to the Kuwaiti Dinar (KWD) was indistinguishably close to zero. This can be explained largely by the pegging of the Kuwaiti Dinar to the basket of currencies. The corresponding volatility for these currencies is low, ranging from 0.0025 to 0.0085) as compared to the other variables. Negative average returns, however, were observed for the Chinese Yuan Renminbi (CNY) and the Japanese Yen JPY though these still had low volatility. In short, the KWD depreciated against these two currencies. Large negative average returns were revealed for interest rates (0.0012) which were also associated with high volatility (0.0145). This could reflect a general lack of interest rate risk management in Kuwait or that firms and investors do not give an importance to the interest rate changes.

In both Bahrain and Kuwait, the kurtosis values are higher than 3, with both positive and negative skewness. This implies that the data is not normally distributed (see, for example, Maghyreh and Al-Kandari, 2007). In both countries, the oil returns and interest rates had the highest fluctuations. There is need, therefore, for firms in these two countries to manage these two risk. Interestingly, the data for oil returns in both countries was negatively skewed with the same kurtosis value. This was not the case for the data of the logs of interest rate changes, however.

Table 4.2, Panel C shows the independent variables statistics of Oman. The currency changes are to the Omani Riyal (OMR), for example, United Arab Emirates Dirham (AED) represents the changes in AED to the Omani Riyal. The range of the mean is between -0.0004 to 0.0029. In contrast to Kuwait and Bahrain, the average oil price returns were negative with highest values of 0.1 per cent and lowest -0.12 per cent. The highest positive average returns were observed in the AED changes which also recorded high fluctuations. Contrary also to Kuwait and Bahrain, the average returns were positive for interest rate. However, the interest rate had the highest volatility (0.1744). For the currencies, negative returns were revealed in the Euro and Japanese Yen while that of US Dollar was indistinguishably close to zero. The standard deviation for Oman Riyal to the USD Dollar showed the lowest volatility because the Omani Riyal is tied to US Dollar.

With regard to Qatar (descriptive statistics presented in Table 4.2, Panel D), the following variables were considered; for the currencies, the Chinese Yuan Renminbi (CNY), Euro, Indian Rupee (INR), Japanese Yen (JPY) and South Korean Won (KRW), daily log of changes to the Qatar Riyal (QAR) nominal exchange rate were considered; changes in oil price (OIL), changes in the market returns in Qatar (QAT), and changes in interest rate. The highest observed mean is 0.0469 for oil price returns and minimum was for interest rate at -0.136034. The standard deviation ranged between the highest of 28.7505 per cent to 0.1146 per cent for interest rate and Chinese Yuan respectively. Interestingly, the interest rate

which had the lowest average returns had the highest volatility. Qatar, similarly to Bahrain (above) and Saudi Arabia (discussed below), had the highest average returns in oil. This represents in part the high oil dependency. In addition, the market in Qatar, as compared to the other GCC countries, had a positive mean return. This implies that the Qatar market is more attractive to investors because of the expected positive returns.

Panel E in Table 4.2 above presents Saudi Arabia's descriptive statistics. For the currencies, the log of daily changes is to the Saudi Riyal (SDR) nominal exchange rate. For the changes in interest rates, a distinction was made between the long term interest rates (L-IR) and the short term interest rates (S-IR) as these were available (as compared to the other countries studied). The mean of the independent variables is between -0.1163 to 0.0492, the highest being oil price return and lowest short term interest rates. Among the currencies, positive mean returns are observed in the Euro and South Korean Won (KRW) with high fluctuations occurring in the KRW. The US Dollar had indistinguishable mean close to zero with the lowest volatility. This is because the SDR is in practice pegged to the US Dollar (Buiters, 2007). The highest volatility was in oil at 2.25 per cent. The average market returns were negative implying a fall in the market values. Interestingly, the independent variables in Saudi Arabia are all negatively skewed. This means that the returns are negatively biased. The kurtosis figures, all higher than 3, are not as high as for Bahrain which shows peaked distributions.

Panel F in Table 4.2 presents the descriptive statistics for United Arab Emirates (UAE). The nominal exchange rate changes are in reference to United Arab Emirates Dirham (AED). The changes in the daily log of short term interest (IR) and the market returns (EMART) are reflected too. The highest average returns are observed in the South Korean Won (0.0006). The other currencies show negative average returns which are also negatively skewed indicating a general depreciation of the AED against the currencies. The volatility range was 0.0011 to 0.2698 occupied by the CNY and KRW respectively. Interestingly, the oil price volatility was low, similar to Oman and Kuwait. The observed distributions are negatively skewed with kurtosis levels higher than 3, showing non-normal distribution.

Having discussed the independent variables for each country, the effect of each risk on the firms is examined next. I start the analysis with exchange rate risk.

4.3 OLS analysis of exchange rate risk in GCC listed firms using bilateral exchange rate

As discussed in Chapter three, section 3.5.3, there are different measures that have been used to capture the effect of exchange risk exposure. This section discusses the results of the OLS analysis of the exchange risk using bilateral exchange rates.

The impact of changes in exchange rates on firm values was discussed in chapter two. Exchange rate fluctuations are a source of uncertainty for firms (Bartram *et al.*, 2010). The stock returns could be affected significantly (Bartram and Bodnar, 2012). This sections presents results of the significance of the of the exchange risk. These are shown in table 4.3 below which distinguishes also between the positive and negatively significance. The currencies which have been presented reflect the major trading currencies in the respective countries as depicted in table 3.2. This follows the argument by Bartram (2004) on using the most important trading partner currencies to evaluate exchange exposure. Bahrain, for example, has the AED, EUR, GBP, JPY and USD as the major trading currencies and hence the exposure to these currencies by the listed firms in Bahrain is presented. A discussion of the findings follows after the table

Table 4.3: The significant exposure to bilateral exchange rate for GCC listed firms

Panel (A)	AED	EUR	GBP	JPY	USA
BAHRAIN (48 Firms)					
% significant	6(12.5%)	5(10.4%)	3(6.3%)	5(10.4%)	2(4.2%)
% significant at 1%	0	1	0	0	0
% significant at 5%	3	2	2	5	0
% significant at 10%	6(12.5%)	5(10.4%)	3(6.3%)	5(10.4%)	2(4.2%)
% Negative significant	6(100%)	1(20%)	2(66.67%)	5(100%)	2(100%)
% Positive significant	0	4(80%)	1(33.33%)	0	0
Panel (B)					
AED	CNY	EUR	GBP	JPY	
KUWAIT (153 Firms)					
% significant	16(10.46%)	29(18.95%)	21(13.73%)	18(11.76%)	16(10.46%)
% significant at 1%	1	5	1	4	4
% significant at 5%	10	22	9	14	8
% significant at 10%	16(10.46%)	29(18.95%)	21(13.73%)	18(11.76%)	16(10.46%)
% Negative significant	7(43.75%)	18(62.07%)	13(59.1%)	3(16.67%)	9(56.25%)
% Positive significant	9(56.25%)	11(37.93%)	9(40.9%)	15(83.33%)	7(43.75%)
Panel (C)					
CNY	EUR	INR	JPY	KRW	
QATAR (35 Firms)					
% significant	7(20%)	1(2.9%)	8(22.9%)	10(28.6%)	5(14.3%)
% significant at 1%	0	0	1	1	2
% significant at 5%	2	0	5	6	3
% significant at 10%	7(20%)	1(2.9%)	8(22.9%)	10(28.6%)	5(14.3%)
% Negative significant	7(100%)	1(100%)	7(87.5%)	0	5(100%)
% Positive significant	0	0	1(12.5%)	10(100%)	0
Panel (D)					
CNY	EUR	JPY	KRW	USD	
SAUDI ARABIA (92 Firms)					
% significant	10(10.87%)	6(6.51%)	4(4.35%)	11(11.96%)	16(17.39%)
% significant at 1%	1	3	0	1	4
% significant at 5%	3	4	1	9	10
% significant at 10%	10(10.87%)	6(6.51%)	4(4.35%)	11(11.96%)	16(17.39%)
% Negative significant	5(50%)	2(33.33%)	1(25%)	10(90.91%)	0(0%)
% Positive significant	5(50%)	4(66.67%)	3(75%)	1(9.09%)	16 (100%)

Table 4.3 continued: The significant exposure to bilateral exchange rate for GCC listed firms

Panel (E)	AED	EUR	GBP	JPY	USA
OMAN (114 Firms)					
% significant	16(14%)	7(6.1%)	11(9.6%)	8(7%)	15(13.2%)
% significant at 1%	6	3	1	1	3
% significant at 5%	12	5	3	5	6
% significant at 10%	16(14%)	7(6.1%)	11(9.6%)	8(7%)	15(13.2%)
% Negative significant	8(50%)	3(42.86%)	7(63.64%)	2(25%)	14(93.33%)
% Positive significant	8(50%)	4(57.41%)	4(36.36%)	6(75%)	1(6.67%)
Panel (F)	CNY	EUR	INR	JPY	KRW
UNITED ARAB EMIRATES (66 Firms)					
% significant	6(9.1%)	8(12.1%)	23(34.8%)	22(23.9%)	25(37.9%)
% significant at 1%	0	0	19	11	15
% significant at 5%	1	4	22	18	20
% significant at 10%	6(9.1%)	8(12.1%)	23(34.8%)	22(23.9%)	25(37.9%)
% Negative significant	5(83.33%)	3(37.5%)	11(47.83%)	0	8(32%)
% Positive significant	1(16.67%)	5(62.5%)	12(52.17%)	22(100%)	17(68%)

Note: The tables show the number of firms significantly exposed to each of the major trading currencies in each GCC country using the OLS model. The number of significant firms is presented at 1 per cent, 5 per cent and 10 per cent significant levels. In addition, the firms positively and negatively exposed to the exchange rates are given with the proportion/percentage out of the total significantly exposed shown in brackets.

Table 4.3, Panel A, presents the results of the exchange rate exposure for Bahrain listed companies. The number of Bahrain firms exposed to the Emirates Dirham (AED) was highest at 12.5 per cent and those exposed to the US Dollar lowest at 4.2 per cent. These were both negative exposures. Positive exposures were observed for the Euro (80 per cent) and British Pound (33.3 per cent). The positive exposure implies that the Bahrain firms benefit from the depreciation of the Bahraini Dinar to the foreign currency. In that regard, the market values of the listed firm increased from the depreciation of Bahraini Dinar against the Euro and British Pound for 80 per cent and 33.3 per cent of the significantly exposed firms

to the currencies. Most of the firms had significant negative exposure (100 per cent for AED, 100 per cent for JPY). These negative exposure could arise, for instance, if the companies had net imports from the countries with those currencies (for instance, the United Arab Emirates and Japan in the case of the 6 and 5 firms respectively) (Dominguez and Tesar, 2006). With reference to the negative exposure to the Japanese Yen, the results for Bahrain are inconsistent with those of He and Ng (1998) who found positive significant exposure at 25 per cent of the 171 firms studied. Interestingly, in spite of the great British Pound being considered as the most traded currency with Bahraini Dinar, there are only 3 firms (6.3 per cent) exposed to the British Pound, 1 firm (33.3 per cent) positively significantly; and 2 firms (66.7 per cent) are significantly negatively exposed. Overall, the Bahrain firms do not show high significance to changes in exchange rate with most traded currencies in the market. This could mean that exchange risk management strategies are being employed by the firms. Dominguez and Tesar (2006) found that larger firms were less exposed because of their ability to hedge against the exchange exposure. It would be insightful to research further on the exchange risk management strategies of the firms, for instance, the use of derivatives. Actual reasons could then be derived to support this observation.

Regarding the Kuwait market (Panel B) the exposure is investigated against the major trading currencies which are the AED, CNY, EUR, GBP and JPY. Of the 153 firms examined, there was a reported exchange exposure of 65 per cent. The

distribution of both positive and negative exchange exposure were the same (50 per cent negative and positive exposure). It was observed that 29 firms (19 per cent) had a significant exposure to the CNY, out of which 11 firms had a positively significant coefficient and 18 firms a negative exposure coefficient. The results also reveal the significant coefficient to the Euro, with 21 firms (13.73 per cent) of which 13 (59.1 per cent) had negative significant exposure and 9 (40.9 per cent) positively significant exposure. The implication, as noted above, is that firm value increased in the Kuwait market when the Kuwaiti Dinar depreciated against the trading currencies, AED, CNY, EUR, GBP and JPY with the highest increases observed when the GBP appreciated. Consequently, the negative coefficient indicated that the returns of the Kuwaiti firms are detrimental when the Kuwaiti Dinar depreciated against the currencies with the highest sensitivity being observed with the Chinese Yuan. With reference to the GBP, 15 (83.3 per cent) had positive significance of the 18 (11.76 per cent) firms that were exposed to the currency. This is a relatively high exposure to the GBP. As found by Dominguez and Tesar (2006), firms that engage in international activities are more likely to be directly affected by changes in exchange rates. There has been a recorded increase in trade (UKTI, 2013) and the researcher can point to the high percentage increase in tourism. The exposure is thus, also, related to the most tourist countries for Kuwaiti nationals. The United Arab Emirates (UAE) and United Kingdom (UK) are the main countries in which Kuwaiti nationals spend their holidays (Kuwait Times, 2014). Al-Enezi (2013) claims that the UAE is number one choice for the Kuwaiti traveller followed by UK. In addition, Al-

Enezi (2013) found that the total expenses for the Kuwaiti travellers in 2013 was \$4.5 billion with an average daily spending of USD3,000 per traveller.

Qatar firms (Table 4.3, Panel C) show a significant negative exposure to changes in the CNY, INR and KRW. Significant positive exposure is revealed for 10 firms (28.6 per cent) to the changes in the JPY. In general, of the 35 firms examined, 88 per cent of these were exposed to the exchange exposure at a 10 per cent significant level of change (46 per cent of firms were exposed at 5 per cent significant level of change). From the results, it implies that the average firm value increases from the depreciation of the Qatar Riyal to the Japanese Yen and firm values decrease from the depreciation of the Qatar Riyal against the Chinese Yuan, Indian Rupee and South Korean Won.

The Saudi Arabian market (Panel D), compared to Qatar and Kuwait shows a lower proportion of exposure to the total firms examined (51 per cent compared to 65 per cent for Kuwait on the total firms examined). Of the major trade currencies, significant exposure was revealed for the Chinese Yuan, South Korean Won and US Dollar. Only positive significant exposure was revealed for the US Dollar (100 per cent), which was the highest, as compared to the other currencies which had both positive and negative significant. The highest negative significant exposure was to the South Korean Won (KRW) at 90.91 per cent of the 11 firms significantly exposed. Equal numbers of firms (5 or 50 per cent for each), was observed for the negative and positive exposure to the Chinese Yuan. It can be

inferred from these results that the Saudi Arabian firms benefit most from the appreciation of the US Dollar against the Saudi Riyal and the depreciation of the South Korean Won.

The Oman firms (Panel E) revealed contrasting results to the Saudi Arabian firms. Contrary to the positive significant exposure to the US Dollar revealed for Saudi Arabia, the firms in Oman had a negative significant exposure (93.3 per cent of the total 15 firms significantly exposed). This could be largely be explained by the pegging of the Omani Riyal to the US Dollar such that any depreciation of the US Dollar should have a negative effect on the Oman firms. The firms also had negative significant exposure to the British Pound (63.6 per cent) as compared to the results for the Kuwait firms. Negative and positive exposure (at 50 per cent) was the same for the United Arab Emirates Dirham. Accordingly, some listed firms benefit and some do not from appreciation of United Arab Emirates Dirham. For the other currencies, Euro and Japanese Yen, firms are positively significantly exposed more than negatively exposed. Hence, firms in Oman get value from the appreciation of these currencies.

The United Arab Emirates firms (Panel F) revealed the greatest sensitivity at 1 per cent change (70 per cent were exposed) and 5 per cent change (98 per cent exposed) compared to the other countries. Firms were exposed to the CNY (9.1 per cent), EUR (12.1 per cent), INR (34.8 per cent), JPY (23.9 per cent) and KRW (37.9 per cent). The firms were positively significant to the JPY (100 per cent),

KRW (68 per cent) and INR (52.2 per cent). Interestingly, no negative exposure was revealed to the JPY. From the 66 firms examined, the firms benefited most from the appreciation of the JPY and KRW. For the INR, the number of firms with positive and negative exposures were almost the same. Overall, 86 per cent of the firms examined were positively significantly exposed compared to 14 per cent that were negatively exposed.

In order to further compare the effect of the exchange exposure between financial and non-financial firms, a segregated analysis is presented in table 4.3a below.

Overall, the financial firms exhibited lower exposure to changes in the exchange rates in all countries except Qatar. This suggests effective risk management strategies by the financial firms. In Qatar, however, the financial firms were more exposed to exchange rate risk than non-financial firms. Whilst exposure to exchange rate risk for both the financial and non-financial firms is observed in each country to the major trading currencies, there are instances where financial firms were completely unaffected by changes in some trading currencies. This was observed in Bahrain where financial firms were not exposed to the US Dollar and in Saudi Arabia to the Chinese Yuan, Japanese Yen and South Korean Won while in United Arab Emirates was to the Chinese Yen. This suggests either full hedging on the part of the financial firms or that the non-financial firms accounting for the majority of the transactions in these currencies. Interestingly, the non-financial firms similarly were not significantly exposed to the Euro in Qatar. This might

suggest that the financial firms trade more in Euro than the non-financial firms hence the significant exposure observed.

Table 4.4a: The financial and non-financial segregated analysis of exposure to bilateral exchange rate for GCC listed firms

Panel A: BAHRAIN	AED	EUR	GBP	JPY	USA
Financial firms	67%	40%	67%	60%	0%
Non-financial firms	33%	60%	33%	40%	100%
Panel B: KUWAIT	AED	CNY	EUR	GBP	JPY
Financial firms	19%	45%	24%	28%	25%
Non-financial firms	81%	55%	76%	72%	75%
Panel C: OMAN	AED	EUR	GBP	JPY	USD
Financial firms	31%	29%	18%	50%	27%
Non-financial firms	69%	71%	82%	50%	73%
Panel D: QATAR	CNY	EUR	INR	JPY	KRW
Financial firms	57%	100%	38%	60%	60%
Non-financial firms	43%	0%	63%	40%	40%
Panel E: SAUDI ARABIA	CNY	EUR	JPY	KRW	USA
Financial firms	0%	33%	0%	0%	77%
Non-financial firms	100%	67%	100%	100%	8%
Panel F: UNITED ARAB EMIRATES	CNY	EUR	INR	JPY	KRW
Financial firms	0%	25%	57%	45%	48%
Non-financial firms	100%	75%	43%	55%	52%

Note: The results are presented as a proportion of the observed significantly affected firms to changes in each major trading currency, e.g. for AED in Bahrain, 6 firms were affected by changes in AED, of these 4 (67 per cent) were financial and 2 (33 per cent) were non-financial firms.

Having used the bilateral exchange rates to measure the exchange exposure in the GCC countries, the study next analyses the exchange exposure using the equally weighted exchange rates.

4.4 OLS analysis of exchange rate risk in GCC listed firms using equally weighted exchange rate

The equally weighted exchange rate is the average of the five most traded currencies in each GCC country (see, section 3.5.3.1 above for detailed discussion). Table 4.5 below presents the results of the exposure of firms in the GCC countries to the equally weighted exchange rate. A discussion of the results follows after.

Table 4.5: The significant exposure to equally weighted exchange rate for GCC listed firms

Countries	No. of Sig	Positive	Negative
Bahrain	4(8.33%)	3(75%)	1 (25%)
Kuwait	10(6.53%)	6(60%)	4(40%)
Oman	2(1.75%)	0(0%)	2(100%)
Qatar	1(2.86%)	1(100%)	0(0%)
Saudi Arabia	14(15.22%)	4(28.57%)	10(71.43%)
United Arab Emirates	5(7.58%)	3(60%)	2(40%)

Note: The table shows the number of firms significantly affected by changes to the weighted exchange rate in the GCC countries. Of the significantly affected, the positively affected and negatively affected are shown in the separate columns. The percentages in brackets represent the percentage of the significantly exposed firms in each country, for instance, in Bahrain, 3 firms out of 4 (or 75%) were positively significantly exposed.

The analysis revealed that the exchange rate exposure is highest in Saudi Arabia, represented by 15.22 per cent of the sample of 92 firms, and lowest in Oman at 2 per cent of the total number of firms (114 firms) in the sample. These are low exposure rates compared to the results obtained using bilateral rates above (e.g. Kuwait had an average 13.2 per cent significant exposure with a 50.5 per cent positive exposure). The proportion of the positive significance exposure was observed at 60 per cent (Kuwait), 28.57 per cent (Saudi Arabia), 75 per cent

(Bahrain) and 60 per cent (United Arab Emirates). From the results, it can be inferred that the appreciation of the equally weighted currencies results in the overall fall in market values of firms mostly in Saudi Arabia (10.87 per cent) and Kuwait (2.61 per cent) whilst the appreciation causes the corresponding increase in market values of 4.35 per cent and 3.92 per cent respectively. In Oman, the firm values fall from the appreciation of the weighted currencies whilst in Qatar, they increase.

These results agree with Bartram and Bodnar (2012) study that showed that the use of equally weighted exchange rates does not give as good a result of foreign exchange rate exposure effect on stock returns as the bilateral exchange rates. They (Bartram and Bodnar) argued that the number of firms exposed to equally weighted currencies is very small (around 1 per cent annually). Similar results were obtained by Joseph and Vezos (2006) who studied the sensitivity of equally weighted exchange rate on firm returns. They (Joseph and Vezos) found that foreign exchange is not highly pronounced in stock returns.

Having discussed the exchange rate exposures, the next section discusses the results of the analysis of interest rate risk.

4.5 OLS analysis of interest rate risk in GCC listed firms

This section will discuss the results of the analysis of the interest rate changes on firm value in the GCC countries. As the interest rates in the GCC countries was stable in most of the years of the study (January 2007 to June 2012), the researcher chose the most fluctuating interest rates from the six countries. The interest rates used are depicted in Table 3.3 (section 3.5.4). The impact of the variation in interest rates on the returns of firms in the countries are examined using the OLS model. As further explained in chapter three, this study is not directed at sector or industry analysis. Hence, it does not distinguish between manufacturing versus non-manufacturing, financial versus non-financial, services versus non-services. This provides a good avenue for further post-doctoral research. The results of the analysis, country by country, are presented in table 4.5 below. The discussion follows after.

Table 4.6: The OLS analysis of interest rate risk exposure in GCC listed firms

Country		Number of significant	No. Positive sig.	No. Negative sig.
Bahrain		6 (12.5%)	1(16.67%)	5(83.33%)
Kuwait		16(10.5%)	8(50%)	8(50%)
Oman		9(7.9%)	3(33.33%)	6(66.67%)
Qatar		6(17.1%)	6(100%)	0(0%)
Saudi Arabia	Long- term	3(3.3%)	1(33.33%)	2(66.67%)
	Short-term	10(10.9%)	1(10%)	9(90%)
United Arab Emirates		12(18.2%)	4(33.33%)	8(66.67%)

Note: The table shows the number of firms significantly affected by changes to the short term interest rates (and long term interest rate for Saudi Arabia only) in the GCC countries using the OLS model. Of the significantly affected, the number of those positively affected and number of the negatively affected firms are shown in the separate columns with the percentages in brackets representing the proportion out of the significantly affected firms in each country.

In the Bahrain market, the impact of the interest rate changes on the firms is largely negative. Out of the significant firms that are influenced by the changes in the interest rate, the impact is on 12.5 per cent of the listed firms in the Bahrain market. In other words, firms in the Bahrain market are exposed to the interest rate risk by 12.5 per cent. To further categorise, 83.3 per cent of firms in Bahrain are exposed to interest rate changes negatively, which means that when the interest rate goes up, 10.4 per cent of the firms' share prices are likely to go down. These results are similar to Abd.Kadir *et al.*, (2011) study of the impact of interest rate on stock returns in Malaysian market. They (Abd.Kadir *et al.*, 2011) found that the relationship between interest rate and stock returns is negative. They (Abd.Kadir *et al.*, 2011) further revealed that the level of interest rate and its volatility affects the returns distribution. Al-Abadi and Al-Sabbagh (2006) also found negative significant exposure to interest rate changes in the Jordanian commercial banks. It should be acknowledged too, that there are about 87.5 per cent of firms not significantly influenced by interest rate changes.

The Kuwait market is one of the earliest markets in the region (Mohamad and Al-Rashed, 2013) with firm life longer than those in other GCC countries. The interest rate risk is one of the risks that have been hedged in some of the firms since the pilot study was done on a sample of the firms Kuwait (see section 3.12). Of the total number of firms examined, 10.5 per cent were significantly exposed to the interest rate. Of these firms, half showed negative exposure whilst the other half positive exposure. These mixed exposure results is consistent with Joseph and

Vezeos (2006) study which showed mixed sign coefficients to interest rate sensitivity. They (Joseph and Vezeos) attributed the mixed results to the degree of exposure in interest rate debts. Noted therefore, there are about 89.5 per cent of firms in the listed market in Kuwait that are not significantly exposed to changes in interest rate. The results are somewhat similar to Joseph (2002) study which found that interest rates had a negative effect on stock returns in UK firms. In addition, it can also be argued that this observation is weak (see also, Joseph and Vezeos, 2006) as the time-varying properties of the interest rate might not have been fully captured in the series. As Feldhutter (2008) argued, the risk and volatility in interest rates are time-varying hence inability of a model to capture these might affect the results.

The Oman market is exposed to the interest rate risk that emanates from other countries where loans to firms in Oman from their banks were obtained or that the government had a major role to play (Bologna and Prasad, 2009). Overall, 7.9 per cent of Oman listed firms are exposed to interest rate changes of which 66.7 per cent are exposed negatively and 33.3 per cent positively exposed. Thus, a rise in interest rates would result in a fall in the market values of 5.3 per cent of the total listed firms and an increase in market values in 2.6 per cent of the firms. Interestingly, the low proportion of firms exposed to interest rate changes implies that 92.1 per cent of firms will not be significantly affected by the changes. Compared to Kuwait or Bahrain therefore, there is a large number of firms on the Oman stock market that are not exposed to the interest rate risk. This observation

provides an interesting avenue for future research to assess whether this is as a result of low leverage or debt levels or effective hedging of the interest rate risk or other factors.

Qatar is considered one of the fastest growing market (EY, 2014). The listed firms in the market have been studied against the interest rate changes that impact the market. From Table 4.5 above, it can be observed that only 17.1 per cent of firms in the Qatar market are exposed to the changes in interest rate. Interesting however, all the 17.1 per cent of firms had a positive significant exposure to the changes in the interest rate. No firms in Qatar, as the table shows, were significantly negatively exposed to the changes in interest rate changes. In this case, the market values of the listed firms increased with the increase in interest rates. This is consistent with other studies (see, for instance, Bartram, 2002; Oertmann *et al.*, 2000) which observed that long-term interest rates are more often positive than negative. Brewer *et al.*, (2007) also found significant positive coefficient between the long term interest rate changes and portfolio returns. Positive relationship between interest rate changes and stock market values were observed by Nissim and Penman (2003). In Qatar thenceforth, 82.9 per cent of firms are not exposed to interest rate risk. In view of this, the listed firms in Qatar are not affected greatly by changes in interest rates.

The Saudi Arabia market has been studied for the interest rate in two phases, short term and long term. As explained in section 3.5.4, choosing the interest rate for

this study was based on the most fluctuating interest rate for the country, besides the availability of this information. Firstly, for the short-term interest rate risk (six-month interbank loan), there are 10 firms, which is 10.9 per cent of the sample, which had a significant coefficient exposure to the short-term interest rate changes comprised of 10 per cent positively significant and 90 per cent of the firms negatively exposed. On the other hand, long term interest rates are calculated on the 10 years government bonds. In the case of the impact of the long-term interest rates, it shows that there are 3 firms (3.3 per cent) of the listed firms in Saudi Arabia market which are exposed to the changes in long-term interest rate. From this significant exposure, the negatively coefficient firms to the interest rate change is 66.7 per cent. Thus, 9.8 per cent of the listed firms in Qatar benefit from the reduction of the long-term interest rate whereas only 1.1 per cent of the firms benefit from the changes in the interest rate in the long terms. Thus, it seems that the firms in Saudi Arabia are influenced by short term interest rate changes more than long term changes and that the effect on returns is largely negative.

The United Arab Emirates market is the most open market to the world than any other gulf countries (Bloomberg, 2015). The interest rate risk in this study was found to have a significant coefficient on the listed firms on the United Arab Emirates stock market in Dubai and Abu Dhabi. In particular, there were 12 firms (18.2 per cent) which had a significant exposure to the changes in interest rate. From this 18.2 per cent, 33.3 per cent of the firms were positively exposed and

66.7 per cent were negatively exposed to the interest rate risk. Consequently, 6.1 per cent of the firms benefit from interest rate increases. Also, 12.1 per cent of the listed firms' value decreases from the rise in interest rates. Overall, however, there are 81.8 per cent of the firms not significantly exposed to the changes in interest rates.

To further give insight on the interest rate exposure on the financial and non-financial sectors, a segregated analysis is presented below in table 4.5a below.

Table 4.7a: The segregated analysis of interest rate risk exposure in GCC listed firms

Country		Number of significant ^a	Financial firms ^b	Non-financial firms ^c
Bahrain		6 (12.5%)	5 (83.33%)	1 (16.67%)
Kuwait		16 (10.5%)	6 (37.50%)	10 (62.50%)
Oman		9 (7.9%)	4 (44.44%)	5 (55.56%)
Qatar		6 (17.1%)	1 (16.67%)	5 (83.33%)
Saudi Arabia	Long-term	3 (3.3%)	0 (0%)	3 (100%)
	Short-term	10 (10.9%)	0 (0%)	10 (100%)
United Arab Emirates		12 (18.2%)	5 (41.67%)	7 (58.33%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to interest rate risk in the GCC countries using the OLS model. ^b The column shows the number of financial firms significantly exposed to the interest rate risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 5 financial firms were significantly exposed which represents 83.33 per cent of the total 6 firms significantly exposed to the risk. ^c The column shows the number of non-financial firms significantly exposed to the interest rate risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 1 non-financial firm was significantly exposed which represents 16.67 per cent of the total 6 firms significantly exposed to the risk.

From table 4.5a above, it can be observed that financial firms are generally less exposed to interest rate risk than the non-financial firms. This is similar to the exchange rate exposure results discussed in section 4.4 above, suggesting overall stronger risk management strategies in the financial firms as compared to the non-

financial firms (Saunders, 2010). Contrary to the general observation, the financial firms in Bahrain were more exposed to interest rate risk than their non-financial counterparts. This could suggest the use of non-interest bearing sources of finance or lower gearing levels of non-financial firms in Bahrain such that changes in interest rates do not significantly affect the operational cashflows and the eventual firm values (Gordon, 1982).

Interestingly also, the financial firms in Saudi Arabia were not significantly affected by interest rate risk suggesting effective interest rate hedging practices. This could also imply the dominant use of interest bearing sources of finance by the non-financial firms making them susceptible to interest rate changes. Further research would be useful to determine the reasons for the observed levels of exposure.

Having covered the interest rate risk, the next section will discuss the results from the analysis of oil price risk.

4.6 OLS analysis of oil price risk in GCC listed firms

This section will discuss the effect of the oil price changes on the firm's market value. Hebous (2006) notes that GCC countries are the main exporters of oil to Asia, particularly the far east and Japan. For example, Kuwait exports 52.1 per cent of her oil to Asia. On the other hand, the EU and Asia are the main exporters

to the GCC countries, except UAE, where Asian firms export more than those of the the EU. A review of the studies that have sought to determine the relationship between oil price rik and stock returnrs was done in section 2.4.

The results of the analysis of the exposure of the firms to changes in the oil prices are shown in table 4.6 below. A discussion of these results follows thereafter.

Table 4.8: The result of OLS analysis of Oil Price Risk exposure in GCC listed firm

Oil price exposure (OLS)	Number of Significant	No. Positive sig.	No. Negative sig.
Bahrain	8(16.7%)	6(75%)	2(25%)
Kuwait	32(20.9%)	29(90.63%)	3(9.76%)
Oman	16(14%)	15(93.75%)	1(6.25%)
Qatar	8(22.9%)	7(87.5%)	1(12.5%)
Saudi Arabia	16(17.4%)	16(100%)	0(0%)
United Arab Emirates	13(19.7%)	11(84.62%)	2(15.38%)

Note: The table shows the number of firms significantly affected by changes to the oil prices in the GCC countries using the OLS model. Of the significantly affected, the number of those positively affected and number of the negatively affected firms are shown in the separate columns with the percentages in brackets representing the proportion out of the significantly affected firms in each country, for instance, in Bahrain, out of the 8 firms (16.7%) significantly exposed, 75% or 6 firms were positively exposed.

As presented in table 4.6, the results show that 16.7 per cent of the listed firms on the Bahrain stock market are exposed to the changes in oil prices. These significantly influenced firms were comprised of 75 per cent positively significantly influenced firms and 25 per cent negatively significantly influenced firms to the changes in oil prices. This implies that firm values respond positively to increases in oil prices for 12.5 per cent of the listed firms. Further, it should be acknowledged that there are still 83.3 per cent of the firms on the Bahrain stock

exchange which are not exposed to changes in oil price. A study by Park and Ratti (2008) supports the findings by noting that in general, oil exporting countries are positively affected by oil price shocks while oil importing countries are negatively influenced.

Like other GCC countries, Kuwait is an oil dependant country and the major income of the country comes from the oil revenue. The analysis of the oil price exposure on the listed firms on the Kuwait stock market revealed that 32 firms (20.9 per cent) out of the total 153 firms had a significant coefficient to the oil price changes. In comparative terms, it was found that Kuwait (20.9 per cent) and Qatar (22.9 per cent) had the highest proportion of firms that were significantly affected by changes in oil prices. This conceivably refers to the fact that of the GCC countries, these two countries depend the most on oil or that oil revenues represents the most of their income. With reference to positive and negative influence, Kuwait had 90.63 per cent (Qatar 87.5 per cent) and 9.76 per cent (Qatar 12.5 per cent) significance respectively. In short, in Kuwait (as is Qatar), oil price fluctuations affect the stock returns significantly when compared to other GCC countries.

The Oman market revealed that 16 firms (14 per cent) are exposed to the changes in oil price, of which 15 firms (93.75 per cent) benefit from the oil price increases and only 1 firm (6.25 per cent) is negatively influenced by the oil price changes.

In comparison, the Oman listed firms are the least exposed to changes in oil price, whether positive or negative, in the GCC countries. In general, 86 per cent of the firms are not exposed to oil price fluctuations.

In the Saudi Arabia market, the study found that 17.4 per cent of the firms are significantly affected by changes in the oil price. Interestingly, all of the significantly exposure firms are positively affected by the oil price changes. An increase in oil prices should result in market value gains. There are, however, 82.6 per cent of the firms which are not exposed to the oil price fluctuations.

In the United Arab Emirates market, unlike Saudi Arabia, had both positively and negatively significantly affected firms. United Arab Emirates, despite being an oil-rich market does not depend heavily only on the oil income (Elhiraika, 2006). From table 4.6 above, it can be observed that 19.7 per cent (13 firms out of the total 66 firms examined) were exposed to the changes in the oil prices of which 84.62 per cent of the firms positively benefit from the oil price fluctuation while 15.38 per cent are negatively affected. There are, thus, 80.3 per cent of the listed firms in the United Arab Emirates that are not exposed to oil price changes.

In summary, these results are consistent with other studies that have shown a positively significant effect of the changes in oil prices on the stock returns (see, for example, Al-Kandari, 2007; El-Sharif *et al.*, 2005; Maghyereh *et al.*, 2008). These results are however, inconsistent with those done for oil importing

countries where the exposure is negatively significant (see, for example, Papapetrou, 2001; Sadorsky, 1999)

In addition, a segregated analysis of the financial and non-financial firms is shown in table 4.6a below.

Table 4.9a: The financial and non-financial segregated analysis of oil price risk exposure

Oil price exposure (OLS)	Number of Significant^a	Financial^b	Non-financial^c
Bahrain	8(16.7%)	7 (87.5%)	1 (12.5%)
Kuwait	32(20.9%)	9 (28.13%)	23 (71.88%)
Oman	16(14%)	3 (18.75%)	13 (81.25%)
Qatar	8(22.9%)	3 (37.5%)	5 (62.5%)
Saudi Arabia	16(17.4%)	3 (18.75%)	13 (81.25%)
United Arab Emirates	13(19.7%)	5 (38.46%)	8 (61.53%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to oil price risk in the GCC countries using the OLS model. ^b The column shows the number of financial firms significantly exposed to the oil price risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 7 financial firms were significantly exposed which represents 87.5 per cent of the total 8 firms significantly exposed to the risk. ^c The column shows the number of non-financial firms significantly exposed to the oil price risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 1 non-financial firm was significantly exposed which represents 12.5 per cent of the total 8 firms significantly exposed to the risk.

From table 4.6a above, it can be observed that out of the 93 firms which were significantly exposed to oil price risk, 30 firms (32 per cent) of these were financial firms while the remaining 63 (68 per cent) were non-financial firms. Thus, non-financial firms' market values were affected more than the financial firms to changes in the oil prices in all GCC countries except Bahrain. In Bahrain, on the contrary, 7 firms out of the 8 firms significantly exposed to the oil price risk were financial firms with only 1 firm being non-financial. This could suggest

effective oil price risk management by the non-financial firms or lack of oil price risk management techniques by financial firms. This is further supported by the greater exposure observed for the exchange rate and interest rate risk also.

The least exposed financial firms were in Oman and Saudi Arabia (at 18.75 per cent) and highest in Bahrain at 87.5 per cent. Kuwait, which had the largest number of significantly exposed firms (32 firms) had 23 of these non-financial and 9 financial firms. The least exposed firms to oil price risk was in Oman (14 per cent).

The next section discusses the exposure to market risk including a segregated analysis.

4.7 OLS analysis of market risk in GCC listed firms

The stock markets in the GCC countries are relatively small and not very open to the world market (Hvidt, 2013). As market risk is a major risk that affects stock returns, it is imperative that its effect is analysed in this study. The significance of market risk on share prices has been explicated in other studies (see, for instance, Bali and Peng, 2004; Basher and Sadorsky, 2006). This section presents the results from the analysis on the GCC countries. These are presented in table 4.7 below and discussed thereafter.

Table 4.10: The OLS analysis of market risk exposure in GCC listed firms

Market Risk (OLS)	Number of Significant	No. Positive sig.	No. Negative sig.
Bahrain	22(45.8%)	21(95.45%)	1(4.55%)
Kuwait	126(82.4%)	125(99.21%)	1(0.79%)
Oman	61(53.5%)	60(98.36%)	1(1.64%)
Qatar	32(91.4%)	32(100%)	0(0%)
Saudi Arabia	92(100%)	92(100%)	0(0%)
United Arab Emirates	49(74.2%)	49(100%)	0(0%)

Note: The table shows the number of firms significantly exposed to the market risk in each of the GCC countries using the OLS model. Of the significantly affected, the number of those positively affected and number of the negatively affected firms are shown in the separate columns with the percentages in brackets representing the proportion out of the significantly affected firms in each country, for instance, in Bahrain, out of the 22 firms (45.8%) significantly exposed, 95.45% or 21 firms were positively exposed.

The Bahrain market with its small number of listed firms (50 firms in total) shows that 45.8 per cent of the sample is affected significantly by the market returns. Out of the significantly exposed firms, about 95.45 per cent are positively influenced to the changes in market returns. These results, in general, support Atindehou *et al.*, (2005) study which showed (bank) stocks as being positively related to the market index. However, 4.55 per cent of the significantly influenced firms were negatively impacted by the market returns. Interestingly, 54.2 per cent of the firms did not respond to the overall changes in the market index implying that other factors or determinant where of significance.

The Kuwait stock market is among the first and largest stock exchange in the Persian Gulf region (KSE, 2015) hence has firms that have been listed for a longer period (more than 15 years). From table 4.7 above, it can be observed that there are 82.4 per cent of firms in the Kuwait market that are significantly affected by changes in the market index of which about 99.21 per cent of the significantly influenced firms benefit from the market return increases and only 0.79 per cent

of the significantly affected firms are exposed negatively to the changes in market returns.

Compared to the Kuwait market, the Oman market reported a lower significant coefficient of 53.5 per cent of which 98.36 per cent were positively significantly influenced by the market returns. Overall, 46.5 per cent did not show as being significantly influenced by the changes in the market index. These results support Basher and Sadorsky (2006) study that demonstrated a significant relationship between market coefficient and returns.

Interestingly, Qatar, Saudi Arabia and United Arab Emirates markets all reported only positively significant coefficients at 91.4 per cent, 100 per cent and 74.2 per cent respectively. For Saudi Arabia in particular, it was found that all the listed firms had positively significant coefficient to the market index, which was the highest of all the GCC countries studies. These results do support Choi *et al.*, (1998) study that revealed positive market risk coefficient at a significance level of 1 per cent. In short, the stock prices of the observed firms rise as the market returns increase to reflect the market risk exposure.

In order to analyse the market risk exposure further, a segregated analysis of financial and non-financial firms is given below.

Table 4.11a: The segregated analysis of market risk exposure in GCC listed firms

Market Risk (OLS)	Number of Significant ^a	Financial ^b	Non-financial ^c
Bahrain	22(45.8%)	19 (86.36%)	3 (13.64%)
Kuwait	126(82.4%)	40 (31.75%)	86 (68.25%)
Oman	61(53.5%)	21 (34.43%)	40 (65.58%)
Qatar	32(91.4%)	14 (43.75%)	18 (56.25%)
Saudi Arabia	92(100%)	13 (14.13%)	79 (85.87%)
United Arab Emirates	49(74.2%)	25 (51.02%)	24 (48.98%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to market risk in the GCC countries using the OLS model. ^b The column shows the number of financial firms significantly exposed to the market risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 19 financial firms were significantly exposed which represents 86.36 per cent of the total 22 firms significantly exposed to the risk. ^c The column shows the number of non-financial firms significantly exposed to the market risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 3 non-financial firms were significantly exposed which represents 13.64 per cent of the total 22 firms significantly exposed to the risk.

The segregated analysis shows similar results to the exchange rate, interest rate and oil price risk in terms of the overall exposure of the financial and non-financial firms. Of the total firms significantly affected by market risk (382 firms), 250 of these were non-financial and 132 financial firms providing evidence of risk management strategies in the financial firms owing to their nature, financial structure and operations.

However, in Bahrain and United Arab Emirates, the financial firms were more exposed to market risk than non-financial firms. This could suggest risk management strategies in non-financial firms or that the financial firms are exposed to other risks other than exchange rate, interest rate and oil price changes especially in United Arab Emirates where exposure to the three risks had been

high for non-financial firms. The least exposed financial firms were in Saudi Arabia and Qatar.

A summary of the exposure to the exchange rate, interest rate, oil price and market risk exposure using the OLS regression model is presented next.

4.8 Summary

This chapter was directed at discussing the results obtained by running the Ordinary Least Square (OLS) model on the data obtained from the listed companies in the six GCC countries. The data for the countries has been analysed using the descriptive statistical method and the outcome is described in light of the research questions outlined in section 3.2. Using the OLS regression, the impact of changes in exchange rates, interest rates, oil price and market returns were examined in order to analyse the risk exposure of the listed firms. In summary, the listed firms in GCC countries are not significantly exposed to high levels of interest rate risk. This was demonstrated by the highest of only 18.2 per cent. This could be contrasted with Uddin (2009) study which found a significant relationship between share price and interest rates changes in both developed and developing countries.

Compared to the interest rate risk however, the GCC firms revealed high exposures to exchange rate risk ranging from 44 per cent to a high of 98 per cent

observed in the United Arab Emirates. This reflects the need for exchange risk management strategies in the GCC countries.

From the analysis of the oil price risk, it was clear that the changes in oil prices had a level of significant coefficient. Generally, the exposure was positively significant. This relates to the significant proportions of revenues which come from the oil sales. However, when compared to the exchange rate risk, the exposure was low with the majority of the firms (almost 80 per cent) not exposed to the oil price change. The most affected markets were Kuwait and Qatar. With respect to market risk, the listed firms in the GCC countries were mostly significantly exposed with the noticeable highest of 100 per cent in Saudi Arabia and lowest in Bahrain.

The segregated analysis of financial and non-financial firms generally revealed high exposure to the risks by non-financial firms than financial firms in all countries except Bahrain. For market risk exposure, financial firms in both Bahrain and United Arab Emirates were most affected than non-financial firms. The financial firms in Saudi Arabia demonstrated the lowest exposure among the GCC countries. This could suggest a higher presence of risk management by financial firms in Saudi Arabia.

Acknowledging the inherent limitations of the OLS regression model, the data has been analysed using the EGARCH-M model for comparative purposes. The results are presented and discussed in the next chapter.

CHAPTER FIVE: AN EGARCH-M ESTIMATION OF FOREIGN EXCHANGE RATE, INTEREST RATE, OIL PRICE AND MARKET EXPOSURE AT FIRM LEVEL IN GCC COUNTRIES

5.1 Introduction

Most studies have used Ordinary Least Square (OLS) regression to investigate exchange rate exposure (El-Masry, 2006; Donnelly and Sheehy, 1996; Doidge *et al.*, 2006), interest rate exposure (Dinenis and Staikouras, 1998; Madura and Zurrak, 1995; Oertmann, *et al.*, 2000) and oil price exposure (Lee *et al.*, 2007). However, as discussed in Chapter three, volatility clustering, non-normality in data and ARCH effects problems are not resolved in the OLS method which could result in insufficient estimates and unreliable deductions.

Moreover, the OLS estimation is used in econometrics to determine how much a variable will be changed by other variables. But in using models, there is need to further forecast and analyse the size of the errors in the models which should guide the level of volatility. The OLS model assumes that different dependent variables have the same variance in their errors, regardless of the values of the independent variables. In other words, the OLS model assumes that the expected value of all error terms, when squared, is the same at any given time (Engle, 2001). This assumption is called homoscedasticity.

However, in the ARCH and GARCH models this assumption does not apply. Data that suffers from heteroscedasticity, in which the variances of the error terms are not equal and where the error terms may reasonably be expected to be larger for some points or ranges of the data than for others, applied to the OLS might give a false sense of precision (Engle, 2001). This false sense of precision might occur because the standard errors and confidence intervals estimated by the OLS procedure will be too narrow, though the regression coefficients are still unbiased (*ibid*). The ARCH and GARCH models address the deficiencies of the OLS models, treating heteroskedasticity as a variance to be modelled.

These models provide a volatility measure, like standard deviation, that can be used in financial decisions about risk analysis, portfolio selection and derivative pricing (Engle, 2001). Thus, volatility clustering, non-normal distribution and ARCH effect are the main reason to use the GARCH model.

The Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model has been used to study interest rate exposure (Elyasiani and Mansur, 1998; Joseph and Vezos, 2006), exchange rate exposure (Abd.Kadir *et al.*, 2011; Beirne, *et al.*, 2009), both exchange rate and interest rate exposure (Olugbode *et al.*, 2014; Ryan and Worthington, 2004), oil price exposure in the GCC countries (Arouri *et al.*, 2011; Malik and Hammoudeh, 2007), oil and interest rate exposure (Sadorsky, 1999).

This study, further to running the OLS model (see chapter four above), implements the Exponential Generalized Autoregressive Conditional Heteroscedasticity in Mean (EGARCH-M) model (an extension of the GARCH model) to resolve data problems that cannot be circumvented using the OLS regression (see chapter three for detailed discussion). The EGARCH-M model allows for conditional volatility to change in response to excess return innovations and allows for the possibility that market participants review their forecasts of volatility differently depending on the sign of the excess holding period return innovations (Brunner and Simon, 1995). The EGARCH-M model is used when there is a high impact of volatility and the heteroscedasticity exists in the data. Thus the model offers a tool to measure the changes in variances and volatility (Attari and Safdar, 2013) and is very helpful in modelling the volatility of financial time series (Vrontons *et al.*, 2000). In addition, the EGARCH-M model can explain the existence for asymmetry in volatility (Nelson, 1991) which the higher order ARCH model or generalised ARCH (GARCH) model fails to capture.

The use of EGARCH-M model here also follows the application in other studies such as Attari and Safdar, (2013) and Joseph and Vezos (2006). Although the EGARCH model has been used to study the impact of oil prices changes on stock returns in the GCC countries (Arouri *et al.*, 2011; Ravichandran and Alkhatlan, 2010) no other study to the researcher's knowledge, has used the EGARCH-M

model to examine the effect of these financial risks, other than oil price changes, in the GCC countries.

This chapter is organised as follows, section 5.2 shows summary of OLS and EGARCH-M model diagnostics, section 5.3 discusses the exchange rate exposure by using the EGARCH-M model. The next section 5.4, discusses the interest rate exposure results. Then, section 5.5 shows oil price exposure results and the discussion of the market exposure results is in section 5.6. Lastly, lagged change is presented in section 5.7 and a summary given in section 5.8.

5.2 Summary of diagnostics on OLS and EGARCH-M model

In statistics, the standardised residuals Q and squared standardised residual (Q^2) are used for testing residual autocorrelation and the heteroskedasticity. In this research, the test is based on lag (7) and lag (21) with results presented to 5 per cent level of significance. Thus, the study used Q -stat up to 7 lags ($Q(7)$) and 21 lags ($Q(21)$) for the OLS and EGARCH-M models. The $Q(7)$ (or $Q(21)$) and $Q^2(7)$ (or $Q^2(21)$) give, respectively, the Ljung-Box statistic for standardised residuals and squared standardised residuals up to n th order of serial correlation. Thus, the first test is an ordinary test for serial correlation while the squared test can give an indication about heteroscedasticity in residual. The results do justify the preference of using EGARCH-M model to the OLS models. Tables 5.1 and

5.2 for OLS model and EGARCH-M models respectively present the diagnostic results. The discussion of the results follows after the tables.

Table 5.1: Descriptive statistics in OLS model

COUNTRY/OLS SIG. LEVEL	Q(7)	Q(21)	Q²(7)	Q²(21)	ARCH	JB STAT
BAHRAIN						
NO. SIG^a (5% Level)	26(54.17%) ^b	30(62.5%)	32(66.67%)	33(68.75%)	32(66.67%)	100%
KUWAIT						
NO.SIG (5% Level)	107(69.93%)	109(71.24%)	127(83.01%)	131(85.62%)	133(86.93%)	100%
OMAN						
NO.SIG (5% Level)	63(55.26%)	70(61.40%)	73(64.04%)	74(64.91%)	73(64.04%)	100%
QATAR						
NO.SIG 5% Level)	31(88.57%)	31(88.57%)	32(91.43%)	32(91.43%)	35(100%)	100%
SAUDI ARABIA						
NO.SIG (5% Level)	51(55.43%)	65(70.65%)	89(96.74%)	89(96.74%)	89(96.74%)	100%
UNITED ARAB EMIRATES						
NO.SIG (5% Level)	51(77.27%)	52(78.79%)	62(93.94%)	63(95.45%)	61(92.42%)	100%

Note: ^a NO. SIG. refers to the number of firms which were statistically significant at 5 per cent significance level. ^b The results are presented as number of firms and as percentage of population for each country for each observation e.g. 26(54.17%) in Bahrain at Q(7) implies 26 statistically significant firms which represents 54.17 per cent of the 48 firms in Bahrain.

Table 5.2: Descriptive statistics in EGARCH-M model

COUNTRY/EGARCH-M SIG. LEVEL	Q(7)	Q(21)	Q²(7)	Q²(21)	ARCH	JB STAT
BAHRAIN						
NO.SIG^a (5% Level)	13(27.08%) ^b	14(29.17%)	15(31.25%)	20(41.67%)	16(33.33%)	100%
KUWAIT						
NO.SIG (5% Level)	23(15.03%)	34(22.22%)	21(13.73%)	31(20.26%)	40(26.14%)	100%
OMAN						
NO.SIG (5% Level)	26(22.81%)	32(28.07%)	24(21.05%)	28(24.56%)	31(27.19%)	100%
QATAR						
NO.SIG (5% Level)	6(17.14%)	7(20%)	3(8.57%)	6(17.14%)	11(31.43%)	100%
KSA						
NO.SIG (5% Level)	2(2.17%)	2(2.17%)	8(8.7%)	9(9.78%)	7(7.61%)	100%
UAE						
NO.SIG (5% Level)	25(37.88%)	21(31.82%)	20(30.3%)	29(43.94%)	30(45.45%)	100%

Note: ^a NO. SIG. refers to the number of firms which were statistically significant at 5 per cent significance level. ^b The results are presented as number of firms and as percentage of population for each country for each observation e.g. 13(33.33%) in Bahrain at Q(7) implies 13 statistically significant firms which represents 27.08 per cent of the sampled firms in Bahrain.

From Table 5.1, it can be observed that for Bahrain, the Q statistic at lag 7 is significant (54.17 per cent). Thus, autocorrelation is significant at the 7th order of serial correlation. With lags up to 21, the significance increases to 62.5 per cent of the firms. This reflects the presence of autocorrelation in residual series at 5 per cent level of significance. Further, Q^2 is used to examine the heteroscedasticity of the model. The ARCH effect in the residuals is high in Bahrain with 66.67 per cent of firms showing significant coefficient at lag 7 and 68.75 per cent at lag 21. Thus, there is heteroscedasticity in the regression model. The ARCH test is used to verify the absence of conditional heteroscedasticity and it was found that there is 66.67 per cent significance. Further, the distribution of the residual series is not normal as the results show a 100 per cent of the Jarque-Bera (JB) test. This effectively means that the Jarque-Bera null hypothesis that the residual series are from a normal distribution is rejected at a 5 per cent significance level.

Compared to the EGARCH-M regression results presented in Table 5.2, the diagnostic test shows improvement for Bahrain. The autocorrelation has reduced for $Q(7)$ and $Q(21)$ to 27.08 per cent and 29.17 per cent of the firms respectively. The squared standardised residuals' significance has reduced by more than half at the 7th order of serial correlation (from 66.67 per cent to 31.25 per cent of firms). In addition, the ARCH effect in the EGARCH-M model has reduced by half (from 66.67 per cent to 33.33 per cent) at 5 per cent level of significance. In terms of normality of data distribution, the null hypothesis of normal distribution is equally rejected. Thus, the EGARCH-M regression also shows that the residuals of the stock returns are not normally distributed at the 5 per cent significant level.

Similar results are visible in Kuwait. There is significant observed levels of autocorrelation, partial autocorrelation, heteroscedasticity and serial dependence in the OLS model compared to the EGARCH-M model. At lag 7, the Q-test shows a reduction from 69.93 per cent significance to 15.08 per cent of firms under EGARCH-M and at lag 21, from 71.24 per cent to 22.22 per cent. That proves reduction of autocorrelation at the significant level. At the same time, heteroscedasticity within EGARCH-M model shows a shrinkage from 83.01 per cent in 7th lag to 13.73 per cent and from 85.62 per cent in 21th lag to 20.26 per cent. The ARCH effect also reduced to 26.14 per cent in EGARCH-M model from 86.93 per cent using the OLS.

Oman also shows a better diagnostics result for EGARCH-M than in OLS. To summarise, the autocorrelation is reduced from 55.26 per cent to 22.81 per cent and 61.4 per cent to 28.07 per cent for 7th and 21th order of serial correlation respectively. In addition, the heteroscedasticity has been reduced by more than half of those from the OLS model i.e. from 64.04 per cent for lag 7 and 64.91 per cent for lag 21 to be 21.05 per cent in lag 7 and 24.56 per cent in lag 21. Further, the ARCH effect has decreased to a lower level, 27.19 per cent in EGARCH-M, than it was in the OLS model at 64.04 per cent.

Qatar results show a similar pattern of improvement in the diagnostic results from the OLS to EGARCH-M. The autocorrelation was very high in OLS regression in both lags 7 and 21 at 88.57 per cent while in the EGARCH-M model the results improved in the autocorrelation to low of 17.14 per cent and 20 per cent for 7th and 21st order of serial correlation respectively. Likewise, heteroscedasticity has reduced with EGARCH-M regression than it was in the OLS

regressions. The significance was at 91.43 per cent for both lag 7 and lag 21 in the OLS model and reduced to 17.14 per cent and 31.43 per cent in lag 7 and lag 21 respectively in the EGARCH-M model. The biggest difference was in the ARCH effect in OLS regressions at 100 per cent of the firms to a low of 31.43 per cent under the EGARCH-M regression.

In the case of the Saudi Arabia diagnostic test, the Ljung-Box statistics displays that for Q-statistic there was 55.43 per cent autocorrelation with lag 7 and 70.65 per cent in lag 21 in OLS regressions, while, in EGARCH-M for lag 7 and lag 21 is 2.17 per cent. The indication of heteroscedasticity significance in OLS was high at 96.74 per cent in both lag 7 and lag 21, reducing to 8.7 per cent in lag 7 and 9.78 per cent for lag 21 in the EGARCH-M model. Lastly, for the ARCH effect, there was a high level of heteroscedasticity effect at 96.74 per cent in OLS reducing to only 7.61 per cent of regressions in the EGARCH-M regression.

Similar results to the other GCC countries are obtained in the United Arab Emirates. The Q-statistics showing autocorrelation was higher in the OLS regression than in the EGARCH-M, at both lag 7 and lag 21 (at significant levels of 77.27 per cent and 78.79 per cent respectively). For the heteroscedasticity, it is present in regression with high level at 93.94 per cent in lag 7 and 95.45 per cent at lag 21. This reduced in the EGARCH-M model, with autocorrelation reducing to be 37.88 per cent at lag 7 and 31.82 per cent at lag 21 respectively. Heteroscedasticity shrunk to 30.3 per cent in lag 7 and 43.94 per cent in lag 21. Finally, ARCH effect in OLS regression is high at 92.42 per cent while in EGARCH-M model it reduces to 45.45 per cent of the regressions.

In spite of the better results shown in EGARCH-M diagnostics by reducing residual autocorrelation and heteroscedasticity, OLS model produced more significant exchange rate, interest rate and oil price exposure coefficients (see chapter four and discussion below). Nevertheless, EGARCH-M results are preferred to the OLS, because the EGARCH-M model perceives the volatility in stock returns and thus shows a more appropriate estimation (Engle and Ng, 1993). In both regression models used in this study, the data are not normally distributed according to the Jarque–bera test. One of the reasons relates to overlapping in the daily data which could cause bias in the OLS standard errors. The bias comes from the assumption that each day has an independent observation (Jorion, 1995).

As discussed previously, due to the volatility clustering, ARCH effect and non-normality of data, OLS estimation method is insufficient (see, also, Joseph and Vezos, 2006). These elements are very noticeable in the case of high frequency data (Baillie and Bollerslev, 1989). Thus, while the OLS regression could have provided an unbiased estimate for the relationship between the three risks (exchange rate, interest rate and oil price risk) and stock prices, the standard errors and therefore inferences obtained from the data analysis could be incorrect. This is because the biased standard errors lead to biased inferences which could make results of the hypothesis tests to be possibly wrong.

5.3 EGARCH-M result of exchange rate risk in GCC listed firms

The AR(1)-EGARCH-M (1,1) is used in the GCC firms' returns to capture the contemporaneous changes in exchange rates, interest rate, oil price and market returns for all

listed firms in the GCC stock market. The results arising from the model are shown in the tables below for each explanatory variable followed by a discussion. In addition, a comparative note/discussion is given for each table segregating the financial and non-financial firms. This distinction is necessary, as discussed in chapter two, because of the risk management characteristics of the financial firms (Oldfield and Santomero, 1997). The EGARCH-M model is used for each listed firm in the GCC countries. Table 5.3 presents results for the exposure to exchange rate risk.

Table 5.3: The EGARCH-M results of the exchange rate risk exposure of listed firm in the GCC countries

Panel A: BAHRAIN	AED	EUR	GBP	JPY	USA
NO SIG^a	5(10.42%) ^b	8(16.67%)	3(6.25%)	5(10.42%)	5(10.42%)
POSITIVE-SIG^c	3(60%)	4(50%)	2(66.67%)	2(40%)	3(60%)
NEGATIVE-SIG^c	2(40%)	4(50%)	1(33.33%)	3(60%)	2(40%)
Panel B: KUWAIT	AED	CNY	EUR	GBP	JPY
NO SIG	26(16.99%)	14(9.15%)	20(13.07%)	22(14.38%)	14(9.15%)
POSITIVE-SIG	20(76.92%)	11(78.57%)	5(25%)	16(72.23%)	5(35.71%)
NEGATIVE-SIG	6(23.08%)	3(21.43%)	15(75%)	6(37.5%)	9(64.29%)
Panel C: OMAN	AED	EUR	GBP	JPY	USD
NO SIG	30(26.32%)	18(15.79%)	18(15.79%)	19(16.67%)	26(22.81%)
POSITIVE-SIG	12(40%)	12(66.67%)	8(44.44%)	10(52.63%)	11(42.31%)
NEGATIVE-SIG	18(60%)	6(33.33%)	10(55.56%)	9(47.37%)	15(57.69%)
Panel D: QATAR	CNY	EUR	INR	JPY	KRW
NO SIG	4(11.43%)	4(11.8%)	5(14.29%)	15(42.86%)	13(37.14%)
POSITIVE-SIG	0(0%)	2(50%)	2(40%)	15(100%)	0(0%)
NEGATIVE-SIG	4(100%)	2(50%)	3(60%)	0(0%)	13(100%)
Panel E: SAUDI ARABIA	CNY	EUR	JPY	KRW	USA
NO SIG	7(7.61%)	12(13.04%)	5(5.43%)	23(25%)	11(11.96%)
POSITIVE-SIG	5(71.43%)	10(83.33%)	0(0%)	1(4.35%)	8(72.73%)
NEGATIVE-SIG	2(28.57%)	2(16.67%)	5(100%)	22(95.65%)	3(27.27%)
Panel F: UNITED ARAB EMIRATES	CNY	EUR	INR	JPY	KRW
NO SIG	9(13.64%)	11(16.7%)	9(13.6%)	25(37.88%)	17(25.76%)
POSITIVE-SIG	4(44.44%)	7(63.64%)	6(66.67%)	21(84%)	12(70.59%)
NEGATIVE-SIG	5(55.56%)	4(36.36%)	3(33.33%)	4(16%)	5(29.41%)

Note: ^a NO. SIG. refers to the number of firms which were statistically significantly exposed to changes in the exchange rates. ^b The results are presented as number of firms and as percentage of population for each country for each currency, e.g. 5 (10.42%) in Bahrain for AED implies that 5 firms (which is 10.42% of 48 firms) were significant affected by changes in the AED to the Bahraini Dinar. ^c POSITIVE-SIG and NEGATIVE-SIG refers to the number of firms that were positively significantly affected and negatively significantly affected by changes in the currencies to the local currency respectively and the percentages in brackets representing the proportion out of the significantly affected firms for each currency e.g. in Bahrain, out of the 5 firms (10.42%) significantly exposed to the AED, 60% or 3 firms were positively exposed.

The results for the exchange rate exposure in table 5.3 above from the EGARCH-M model shows that the changes in Euro to the Bahraini Dinar affected a significant number of firms (at 16.67 per cent). As for the other currencies, the same results as is provided by the OLS model are evident. When the number of firms increases, the increase is equally positively and negatively significantly distributed for Euro but positively distributed for US Dollar. Further, firms in Bahrain benefit from depreciation of the Japanese Yen. On the other hand, a firm in Bahrain benefits more from appreciation of the Emirati Dirham, British Pound and US Dollar. Overall, 54 per cent of the firms were significantly positively affected to currency appreciation compared to 46 per cent that are significantly negatively affected.

The EGARCH-M model result for Kuwaiti listed firms does show a difference too. The exposure to the Emirati Dirham and British Pound is the highest (at 17 per cent and 14.38 per cent). The appreciation of these two currencies has a positively significant effect on the firms (at 76.92 per cent and 72.23 per cent). On the other hand, the appreciation of the Euro and Japanese Yen had a significant negative effect on the firms (at 75 per cent and 64.29 per cent respectively). In the case of the exchange rate between Emirati Dirham and Kuwaiti Dinar, the proportion which is negatively significant is at 23.08 per cent while that of the Chinese Yuan was positively significant at 78.57 per cent of the 14 firms exposed. Thus, in Kuwait, firms' value increases if the Kuwaiti Dinar is depreciated against Emirati Dirham, Chinese Yuan and British Pound. On the other hand, the firm exposure increases to currencies like the Euro and Japanese Yen if the Kuwaiti Dinar appreciates against these currencies.

The results for the Oman listed firms are presented in table 5.3, panel C. The results obtained using the EGARCH-M model when compared to the OLS model (table 4.3) show that the number of significant coefficients has increased for all of the major trading currencies with the Omani Riyal. Overall, 48 per cent of firms were positively significantly affected while 52 per cent were negatively significantly affected to the depreciation of the Oman Riyal. In comparative terms, the results show, for instance, for the Emirati Dirham and US Dollar against the Omani Riyal, that there is a significance percentage increase of more than half (14 per cent to 26.32 per cent) for Emirati Dirham and for the US Dollar (13.2 per cent to 22.81 per cent). In general, therefore, the exposure of all exchange rates is increased by using the EGARCH-M model rather than using the OLS model. In addition, the appreciation of the Omani Riyal against the Emirati Dirham, British Pound and US Dollar results in a reduction of firm value because of the significantly negative exposure to the given currencies. On the other hand, a number of firms benefit from an appreciation of the Euro (10.53 per cent in total or 66.67 per cent of 18 firms) and Japanese Yen (8.78 per cent in total). For the Japanese Yen though, the positive and negative significant exposures are almost the same.

With regard to Qatar (refer to table 5.3, panel D), the exchange rate exposure shows some significant coefficient increases for some currencies against the Qatari Riyal when the results of the two models are compared. The observed significant coefficient increases are for Euros (from 2.9 per cent to 11.8 per cent), Japanese Yen (from 28.6 per cent to 42.86 per cent) and South Korean Won (from 14.3 per cent to 37.14 per cent). Most of the significant increase was in positive coefficient except for the South Korean Won where the increase was in the negative significant coefficient. Thus, the firm exposure to exchange rate risk is increased

with the EGARCH-M model for Euro, Japanese Yen and South Korean Won. Firms on the Qatar stock market gain value from the appreciation of the Japanese yen, however, they lose value from the appreciation of the Chinese Yuan, Indian Rupee and South Korean Won.

In the case of Saudi Arabia (table 5.3, panel E), it was found that the percentage of the significant coefficient increased for the currencies, Euro (6.51 per cent to 13 per cent), Japanese Yen (4.35 per cent to 5.43 per cent) and South Korean Won (11.96 per cent to 25 per cent) against the Saudi Riyal. The increase in significance was positive for the Euro and negative for Japanese Yen and South Korean Won. According to the EGARCH-M results, the Saudi Arabian listed firms' value increase when there is an appreciation of the Chinese Yuan, Euro and US Dollar by 5.43 per cent, 10.87 per cent and 8.7 per cent respectively. This represents 71.43 per cent, 83.3 per cent and 72.73 per cent of the significantly affected firms of each currency respectively. In addition, the Saudi Arabian firms gain value of 5.43 per cent and 23.91 per cent from the depreciation the Japanese Yen and South Korean Won respectively.

Similar pattern of results is observed for United Arab Emirates. The EGARCH-M model results (table 5.3, panel F) show an increase in the significant coefficient of exchange rate exposure for all currencies except the Indian Rupee and South Korean Won where it reduced from 34.8 per cent to 13.6 per cent and from 37.9 per cent to 25.76 per cent respectively. The EGARCH-M model improves the positive significant coefficient for Euro and Japanese Yen. In general, the Emirati firms' exposure is positive when there is a depreciation of Emirati Dirham against the Euro, Indian Rupee, Japanese Yen and South Korean Won. On the other

hand, an appreciation of Emirates Dirham against the Chinese Yuan reduces 7.58 per cent of the listed firms' value (which is 55.56 per cent of the total 9 firms significantly exposed to changes in the Chinese Yuan)

In general, the increase in the number of significantly exposed firms to changes in the exchange rates when using the EGARCH-M model as compared to the OLS model is consistent with Joseph and Vezos (2006) findings which showed an increase of 10 per cent of firms significantly exposed to exchange rate changes when using the EGARCH estimation method as compared to the OLS model. Similarly, Joseph (2003) finds a slight increase in the incidence of significant exchange rate exposure coefficients when using the GARCH and GARCH-M models as compared to the OLS model.

In order to further understand the distribution of exchange rate exposure in the GCC countries, a segregated analysis of the financial and non-financial firms was conducted with results shown in Table 5.3(a) below.

Table 5.4(a): The financial and non-financial segregated analysis of the exchange rate risk exposure in the GCC countries

Panel A: BAHRAIN	AED	EUR	GBP	JPY	USA
Financial firms	60%	63%	67%	80%	80%
Non financial firms	40%	38%	33%	20%	20%
Panel B: KUWAIT	AED	CNY	EUR	GBP	JPY
Financial firms	42%	50%	45%	41%	50%
Non financial firms	58%	50%	55%	59%	50%
Panel C: OMAN	AED	EUR	GBP	JPY	USD
Financial firms	17%	22%	22%	32%	15%
Non financial firms	83%	78%	78%	68%	85%
Panel D: QATAR	CNY	EUR	INR	JPY	KRW
Financial firms	25%	25%	40%	40%	38%
Non financial firms	75%	75%	60%	60%	62%
Panel E: SAUDI ARABIA	CNY	EUR	JPY	KRW	USA
Financial firms	0%	8%	0%	17%	0%
Non financial firms	100%	92%	100%	83%	100%
Panel F: UNITED ARAB EMIRATES	CNY	EUR	INR	JPY	KRW
Financial firms	33%	36%	22%	36%	47%
Non financial firms	67%	64%	78%	64%	53%

Note: The results are presented as a proportion of the observed significantly affected firms to changes in each major trading currency, e.g. for AED in Bahrain, 5 firms were affected by changes in AED, of these 3 (60 per cent) were financial and 2 (40 per cent) were non-financial firms.

From table 5.3(a) above, it can be observed that the highest proportion of financial firms exposed to changes in the exchange rate are in Bahrain and Kuwait. For the non-financial firms, the highest exposed were in Saudi Arabia, Oman and Qatar. The least exposed financial firms were in Saudi Arabia where exposure was only to the Euro and South Korean Won, accounting for only 5 per cent of the observed exchange rate exposure. This suggest effective hedging against fluctuations in exchange rates in Saudi Arabia. In contrast, the financial firms in Bahrain accounted for the majority of the exposure (at 70 per cent overall). This could suggest the lack of effective exchange rate risk management in the sector when compared to the other GCC countries. Interestingly also, the exposure to the Chinese Yuan and Japanese Yen was equally distributed between the financial and non-financial firms in

Kuwait. Overall, the financial firms in the GCC countries were less exposed to the exchange rate risk than the non-financial firms. As discussed in chapter four, this reflects the nature of the industry and its risk management practices.

The next section discusses the results of the interest rate risk.

5.4 EGARCH-M results of Interest rate risk in GCC listed firms

This section discusses the results of the interest rate exposure using the EGARCH-M model.

The results are presented in table 5.4 below.

The findings from the EGARCH-M model used shows that the number of significant of exposure to interest rate risk in Bahrain is very low at 10.42 per cent of the listed firms. In addition, all exposed firms are influenced negatively by changes in short term interest rates. Thus, firm value increases in Bahrain from a decrease in interest rate. This is supported by Abd.Kadir *et al.*, (2011) (see, also, Elyasiani and Masur, 1998) that interest rates have a negative significant effect. On the other hand, the non-significant effect was observed in Ryan and Worthington 2004) study where it was found that about 87.5 per cent of firms were not significantly exposed to changes in interest rate.

Table 5. 5: EGARCH-M result of interest rate risk in GCC listed firm

Interest rate risk/EGARCH-M		Number of significant ^a	No. Positive sig. ^c	No. Negative sig. ^c
Bahrain		5(10.42%) ^b	0(0%)	5(100%)
Kuwait		16(10.46%)	8(50%)	8(50%)
Oman		12(10.53%)	8(66.67%)	4(33.33%)
Qatar		1(2.86%)	1(100%)	0(0%)
Saudi Arabia	Long term	4(4.35%)	0(0%)	4(100%)
	Short term	8(8.70%)	0(0%)	8(100%)
United Arab Emirates		8(12.12%)	1(12.5%)	7(87.5%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to changes in the interest rates. ^b The results are presented as number of firms and as percentage of population for each country e.g. 5 (10.42%) in Bahrain implies that 5 firms, which is 10.42 per cent of the population, were significant affected by changes in the interest rates. ^c No. of Positive sig. and Non. of Negative sig. refers to the number of firms that were positively significantly affected and negatively significantly affected by changes in the interest rates in each country respectively and the percentages in brackets represent the proportion out of the significantly affected firms for each country e.g. in Bahrain, out of the 5 firms (10.42%) significantly exposed, 100% or 5 firms were negatively exposed.

The effect of interest rate changes on the listed firms in Kuwait is around 10.46 per cent of the sample, with the result mixed between negative and positive significance. The mixed result is consistent with Hammoudeh and Choi (2006) findings of the effect of interest rates in the GCC countries on both financial and non-financial listed firms.

The Oman market is affected by short term interest rate changes of 10.53 per cent. Of this total effect, 66.7 per cent of the firms are positively influenced and 33.3 per cent are negatively influence by changes in the interest rates. Further, the observed number of significance has increased from 7.9 per cent to 10.53 per cent using the EGARCH-M model. The positive significant effects of interest rate risk agree with Bartram (2002) study that revealed positive exposure of changes in interest rates of German firms for the period 1987 to 1995.

Qatar listed firms do not have a high level of significant firms that are affected by changes in interest rates. Consistent, thus, to Ryan and Worthington (2004) findings of no significant results of interest rate exposure, the EGARCH-M results show only a 2.86 per cent significance. Interestingly, the significant coefficient reduced from 17.1 per cent using OLS regression to the 2.86 per cent, the reduction all positively significant.

In the Saudi Arabia market, the study used long term and short term interest rate. The stock market was influenced less by long term interest rate (4.35 per cent) than short term interest rate (8.7 per cent). In both interest rate terms, the stock prices are affected negatively. Thus, when interest rates go up, the share prices go down and vice versa. These results are inconsistent with Bartram (2002) and Oertmann *et al.*, (2000) studies that showed that long term interest rates had a higher exposure than short term interest rates. Further, the exposure in their studies were mostly positive. In comparative terms, the EGARCH-M model does not show a noticeable difference from the OLS model as the number of significant in the long term changes from 3.3 per cent in OLS regression to 4.35 per cent in EGARCH-M only, whilst the change in short term was 10.9 per cent in OLS to 8.7 per cent in the EGARCH-M model. The EGARCH-M model pushes the significance to a negative coefficient for both terms. These results are consistent with Joseph and Vezos who noticed no change in the observed 8 per cent of the banks significantly exposed to interest rate risk when using the OLS and EGARCH models.

United Arab Emirates listed firms are affected by interest rate risk of 12.12 per cent of the firms. The largest significant are affected negatively by interest rate changes (87.5 per cent).

This, again, is consistent with Abd.Kadir *et al.*, (2011) findings of negatively affected firms from changes in interest rates. Thus, firms on the United Arab Emirates stock exchange are exposed to interest rate negatively implying that their values reduces as the interest rate increases.

To generalise, the EGARCH-M results show that the level of significant is low. When compared to the OLS regression, there is no distinctive difference in the level of significance, though a reduction is observed in Qatar and United Arab Emirates. In most cases, the significant is negative in either models.

A further examination to find the effect of the interest rate changes on the financial and non-financial firms was conducted with results shown in table 5.4(a) below.

Table 5.6(a): The financial and non-financial segregated analysis of the interest rate risk exposure in the GCC countries

Interest rate risk (EGARCH-M)	Number of significant ^a	Financial firms ^b	Non-financial firms ^c
Bahrain	5(10.42%)	3 (60%)	2 (40%)
Kuwait	16(10.46%)	4 (25%)	12 (75%)
Oman	12(10.53%)	5 (41.67%)	7 (58.33%)
Qatar	1(2.86%)	0%	1 (100%)
Saudi Arabia	Long term	4(4.35%)	2 (50%)
	Short term	8(8.7%)	0
United Arab Emirates	8(12.12%)	2 (25%)	6 (75%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to interest rate risk in the GCC countries. ^b The column shows the number of financial firms significantly exposed to the interest rate risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 3 financial firms were significantly exposed which represents 60 per cent of the total 5 firms significantly exposed to the interest rate risk. ^c The column shows the number of non-financial firms significantly exposed to the interest rate risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 2 non-financial firms were significantly exposed which represents 40 per cent of the total 5 firms significantly exposed to the risk.

From table 5.4a above, overall, the non-financial firms were exposed to interest rate risk more than the financial firms, which is similar to the exchange rate risk exposure results. This is evidenced by 38 non-financial firms (70 per cent) out of the total 54 firms observed as significantly influenced by changes in interest rates. This could support the risk management characteristics inherent in the financial firms (Oldfield and Santomero, 1997). The financial firms in Qatar and Saudi Arabia (for short term interest rates only) were insignificantly affected to changes in the interest rates. In Bahrain however, the financial firms were more affected (60 per cent) to changes in interest rates than non-financial firms (40 per cent). This is similar to the results obtained for the exchange rate risk exposure discussed above suggesting ineffective risk management practices by the financial firms in Bahrain. Besides Qatar and Saudi Arabia, the non-financial firms were most exposed in Kuwait and United Arab Emirates (accounting for 75 per cent of the exposed firms)

The next sections discussed the exposure to oil price changes.

5.5 EGARCH-M result of Oil price changes in GCC listed firms

Table 5.5 presents results for the exposure to oil price changes in the GCC stock markets.

Table 5.7: Significant exposure to oil price risk of listed firms in the GCC stock market.

Oil price exposure (EGARCH-M)	Number of Significant^a	No. Positive sig.^c	No. Negative sig.^c
Bahrain	6(12.5%) ^b	3(50%)	3(50%)
Kuwait	20(13.07%)	13(65%)	7(35%)
Oman	14(12.28%)	9(64.29%)	5(35.71%)
Qatar	6(17.14%)	6(100%)	0(0%)
Saudi Arabia	3(3.26%)	2(66.67%)	1(33.33%)
United Arab Emirates	13(19.7%)	11(84.62%)	2(15.38%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to changes in the oil prices. ^b The results are presented as number of firms and as percentage of population for each country e.g. 6 (12.5%) in Bahrain implies that 6 firms, which is 12.5 per cent of the population, were significant affected by changes in the oil prices. ^c No. of Positive sig. and Non. of Negative sig. refers to the number of firms that were positively significantly affected and negatively significantly affected by changes in the oil prices in each country respectively and the percentages in brackets represent the proportion out of the significantly affected firms in each country e.g. in Bahrain, out of the 6 firms (12.5) significantly exposed, 50% or 3 firms were positively exposed.

Bahrain firms are influenced by oil price fluctuation by 12.5 per cent which is close to their exposure to interest rate changes. However, the significant is equally divided between positive and negative significant exposure. Hence the percentage of firms that benefit from oil price increase is the same as the firms benefiting from oil price reduction. There is a reduction in the number of significant (of 4.2 per cent), from using the OLS regression to the EGARCH-M model.

The Kuwait stock market is affected by oil price fluctuations by 13.07 per cent. The positive effect (65 per cent) is more than the negative effect (35 per cent). Higher prices of oil should result in higher returns for the positively significantly affected firms and a reduction in value for the negatively significantly affected firms. In comparative terms, the number of significance has reduced from 20.9 per cent when using the OLS regression to 13.07 per cent with the EGARCH-M model.

In Qatar, the percentage of the firms influenced by changes in oil price is the highest compared with other GCC countries. In both the OLS and EGARCH-M models, the influence of oil price changes is the highest. The effect is positively significant at 17.14 per cent. Thus, when oil prices go up, the firm value goes up increasing the shareholder's wealth. Further, it's observed that there is a reduction in the number of significant from 22.9 per cent to 17.14 per cent when the EGARCH-M model is used. These results are similar to Fayyad and Daly (2011) results that showed Qatar and United Arab Emirates as being more responsive to oil price shocks than other GCC countries.

On the Oman stock market, the oil price exposure is up to 12.28 per cent of the total sample. More than half of the significantly affected firms are positively significantly affected to the changes in oil prices. Few firms (35.71 per cent) are affected negatively by changes in oil price. The level of significance has not changed from using the OLS regression to EGARCH-M in this case.

Saudi Arabia, the biggest market of the GCC countries and the highest oil exporter, is the least effected by oil price returns. Only 3.26 per cent of firms in Saudi market are affected by change in oil price returns. In comparative terms, the number of significance has reduced from 17.4 per cent to 3.26 per cent using the EGARCH-M model.

United Arab Emirates firms are affected by oil price changes up to 19.7 per cent of the sample. This gives the highest exposure to changes in oil prices in the GCC countries similar to the findings by Fayyad and Daly (2011) study. The exposure is mostly positively

significant, at 84.62 per cent compared to 15.38 per cent for negative significance. Thus, when oil prices go up, that has a positive influence on the stock prices of the listed firms on the United Arab Emirate stock market. The number of significant is the same whether using the OLS regression or the EGARCH-M model for United Arab Emirates oil price exposure.

These results are similar to Bjørnstad (2009) study which revealed that stock returns were significantly affected by oil price changes. In the oil exporting countries especially, high oil prices should have a positive impact on income and wealth (*ibid*). This is evidenced by the high positively significantly exposed firms in the GCC countries to oil price changes. Similarly, Huang *et al.*, (2005) revealed mixed exposure to oil price risk while Hammoudeh and Aleisa (2004) revealed bi-directional effects in Saudi Arabia only and a causal relationship in Kuwait and Oman. Sadorsky (2001) revealed similar results of significant effects of interest rate and oil price changes on stock market returns. On the other hand, the results in this study are contrary to Dhaoui and Khraief (2014) study that revealed strong negative effect of oil prices changes on stock market returns.

A comparative analysis of the exposure to oil prices changes for financial and non-financial firms is shown in table 5.5(a) below.

Table 5.8(a): Oil price exposure of financial and non-financial firms in the GCC countries.

Oil price exposure (EGARCH-M)	Number of Significant	Financial Firms	Non-financial firms
Bahrain	6(12.5%)	3 (50%)	3 (50%)
Kuwait	20(13.07%)	5 (25%)	15 (75%)
Oman	14(12.28%)	2 (14%)	12 (86%)
Qatar	6(17.14%)	4 (67%)	2 (33%)
Saudi Arabia	3(3.26%)	0%	3 (100%)
United Arab Emirates	13(19.7%)	6 (46%)	7 (54%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to oil price risk in the GCC countries. ^b The column shows the number of financial firms significantly exposed to the oil price risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 3 financial firms were significantly exposed which represents 50 per cent of the total 6 firms significantly exposed to the risk. ^c The column shows the number of non-financial firms significantly exposed to the oil price risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 3 non-financial firms were significantly exposed which represents 50 per cent of the total 6 firms significantly exposed to the risk.

From table 5.5(a) above, the financial firms in Qatar were the highest exposed to oil price changes accounting for 67 per cent of the significantly affected firms. This could suggest the significant proportion of reliance on the oil business by the financial firms in Qatar relative to other GCC countries. In Saudi Arabia, however, the financial firms are hedged or unaffected by changes in oil prices. This suggests high risk management practices in Saudi Arabia as revealed by the low risk exposure to exchange rate and interest rate risk also. Besides Saudi Arabia, the non-financial firms in Oman and Kuwait were most affected by the oil price changes (accounting for 86 percent and 75 per cent respectively).

Overall, the financial firms in the GCC countries were less affected than the non-financial firms, accounting for 32 percent as compared to 68 per cent respectively of the total significantly affected firms to oil price risk. This is consistent with Bodnar *et al.*, (1998) survey that revealed limited risk management practices in the non-financial firms as compared to the financial firms.

Section 5.7 below discusses the exposure to market risk.

5.6 EGARCH-M result of Market risk in GCC listed firms

Table 5.6 below presents results for the market risk exposure of the GCC countries listed firms.

Table 5. 9: EGARCH-M result of market risk exposure of the GCC listed firms

Market Risk (EGARCH-M)	Number of Significant^a	No. Positive sig.^c	No. Negative sig.^c
Bahrain	9(18.75%) ^b	5(55.56%)	4(44.44%)
Kuwait	74(48.37%)	71(95.95%)	3(4.05%)
Oman	48(42.11%)	43(89.58%)	5(10.42%)
Qatar	30(85.71%)	30(100%)	0(0%)
Saudi Arabia	88(95.65%)	88(100%)	0(0%)
United Arab Emirates	34(51.52%)	34(100%)	0(0%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to market risk in the GCC countries. ^b The results are presented as number of firms and as percentage of population for each country e.g. 9 (18.75%) in Bahrain implies that 9 firms, which is 18.75 per cent of the population, were significant exposed to market risk. ^c No. of Positive sig. and Non. of Negative sig. refers to the number of firms that were positively significantly exposed and negatively significantly exposed to market risk in each country respectively and the percentages in brackets represent the proportion out of the significantly affected firms for each country e.g. in Bahrain, out of the 9 firms (18.75%) significantly affected, 55.56% or 5 firms were positively exposed.

The Bahrain listed firms are affected up to 18.75 per cent by market risk. The market returns have a positive significant of 55.56 per cent which is higher than the 44.44 per cent negative significance. The exposure, when compared to the OLS regression has reduced from 45.8 per cent to 18.75 per cent. Thus, positive changes in the market index has a positive effect on the share prices of most firms.

For the Kuwaiti listed firms, the 74 significantly affected firms are positively significantly exposed to market risk by 95.95 per cent compared to only 4.05 per cent negative

significance. Further, the number of significance has reduced from 82.4 per cent to 48.37 per cent. Similarly to Bahrain, a positive movement in the market index has a positive effect on share prices of the firms. In Qatar, firms are significantly exposed to market returns by 85.71 per cent. All significantly affected firms to market returns are positively exposed and there are no firms affected negatively by market returns.

In Oman, the listed firms are exposed to changes in market returns by 42.11 per cent, which is made up of 89.58 per cent positively exposed to the changes in market and only 10.42 per cent negatively exposed to market returns. This implies that firms in Oman are benefit from market value increase.

In the Saudi Arabian market, about 96 per cent of firms in the Saudi Arabia stock market are affected and all of the affected firms are positively influenced by changes in market returns. This is the case for United Arab Emirates where 51.52 per cent are all positively affected. Similar to other GCC countries, the number of significance has reduced (from 100 per cent to 95.65 per cent and 74.2 per cent to 51.52 per cent for Saudi Arabia and United Arab Emirates respectively) when using the OLS regression and EGARCH-M model.

Thus, in summary, in all GCC countries, there is an effect of changes in market returns (reflected by the market index) on the individual firms with the effect ranging from a low of 22.5 per cent in Bahrain to a high of 96 per cent in Saudi Arabia.

A further analysis of the financial and non-financial firms' exposure to the market risk was carried out with results displayed in table 5.6(a) below.

Table 5.10(a): A comparative analysis of financial and non-financial firms' exposure to market risk

Market Risk (EGARCH-M)	Number of Significant^a	Financial Firms^b	Non-financial firms^c
Bahrain	9(18.75%)	6 (67%)	3 (33%)
Kuwait	74(48.37%)	25 (34%)	49 (66%)
Oman	48(42.11%)	17 (35%)	31 (65%)
Qatar	30(85.71%)	13 (43%)	17 (57%)
Saudi Arabia	88(95.65%)	16 (18%)	72 (82%)
United Arab Emirates	34(51.52%)	15 (44%)	19 (56%)

Note: ^a Number of significant refers to the number of firms which were found as statistically significantly exposed to market risk in the GCC countries. ^b The column shows the number of financial firms significantly exposed to the market risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 6 financial firms were significantly exposed which represents 67 per cent of the total 9 firms significantly exposed to the risk. ^c The column shows the number of non-financial firms significantly exposed to the market risk and the proportion of the total number of significantly exposed firms in each country e.g. for Bahrain, 3 non-financial firms were significantly exposed which represents 33 per cent of the total 9 firms significantly exposed to the risk.

From table 5.6(a) above, it can be observed that the non-financial firms were generally more affected by market risk than financial firms (67 per cent compared to 33 per cent). As argued by Oldfield and Santomero (1997), this supports the argument that the risk management characteristics inherent in the financial firms are stronger. The lowest exposed financial firms was in Saudi Arabia accounting for only 18 per cent of the market risk exposure. This is contrasted to Bahrain where financial firms accounted for 67 per cent of the significantly exposed firms to market risk. Similarly to the observed results for exchange rate and interest rate results, this suggests ineffective risk management practices by financial firms in Bahrain relative to other GCC countries.

The next section discusses the AR(1)-EGARCH-M (1,1) variance equation parameters.

5.7 AR(1)-EGARCH-M (1,1) variance equation parameters

In Table 5.7 below, the estimated parameter coefficients from the variance equation are shown. Thus, the characteristics of the AR(1)-EGARCH-M (1,1) model used in this study to estimate the effect of exchange rate, interest rate and oil price changes on the stock returns are revealed. As discussed in chapter three, the equations 3.17 - 3.19 represent the model AR(1)-EGARCH-M (1,1). From the equations, the mean equation presents the risk premium parameter while the variance equation presents the asymmetric term, ARCH and GARCH coefficient parameter. The risk-return trade off parameter measures the relationship between industry returns and volatility. If the parameter is positive and statistically significant, that could imply that increase in volatility is compensated for by a higher average return. Taing and Worthington (2005) point out that the risk premium parameter is a measure of total risk (systematic and unsystematic risk), hence an increase in volatility is not always followed by an increase in the risk premium. Thus, if fluctuations in volatility are as a result of shocks to the unsystematic risk, then the trade-off parameter can be any sign. Overall, the findings for the trade-off between volatility and returns have been mixed (Campbell and Hentschel, 1992; Glosten *et al.*, 1993; Leon, 2008). The asymmetric term, α , measures the asymmetric impact of past innovations on current volatility. As discussed in chapter three, one of the advantages of the EGARCH-M model is that it imposes no restrictions on parameters. In addition, the asymmetric impact of shocks on the conditional variance is captured within the model. This asymmetry is found particularly in share price data (Ahlstedt, 1998)

Table 5.11: The variance equation of GCC listed firm

Country	α^a	Negative % (positive %) ^b	(ARCH) ^c	Negative % (positive %) ^d	(GARCH) ^e	Negative % (positive %) ^f	Risk and return ^g	Negative % (positive %) ^h
Bahrain	40%	18.75(81.25)	42.50%	29.41(70.59)	90%	19.44(80.56)	35%	71.43%(28.57%)
Qatar	79.41%	0(100)	32.35%	45.45(54.55)	94.12%	3.13(96.88)	23.53%	87.51%(12.49%)
Kuwait	61.07%	1.1(98.9)	28.19%	50(50)%	88.59%	5.3(94.7)	17.45%	38.45%(61.55%)
Oman	58.51%	12.73(87.27)	43.62%	31.71(92.68)	88.30%	19.28(92.77)	30%	42.57%(57.13%)
Saudi Arabia	94.51%	0(100)	31.87%	0(100)	97.80%	0(100)	40.45%	100%(0%)
UAE	64.62%	0(100)	27.69%	33.33(66.67)	92.31%	5(91.67)	22%	41.95%(55.95%)

Note: ^(a) α is the coefficient denoting the asymmetric impact of past innovations on current volatility. The significantly exposed firms are shown and the proportion of these with negative (positive) exposure coefficient are given in column ^(b). Column ^(c) shows the ARCH parameter coefficient results with the proportion of firms with significant negative (positive) exposure given in the column ^(d). The GARCH parameter coefficient results are shown in column ^(e) and the proportion of firms with negative (positive) significant exposure given in ^(f). The risk-return trade-off parameter coefficient results are shown in ^(g) and the proportion of negative (positive) given in ^(h).

From table 5.7 above, the asymmetric coefficients are mostly positively significant. In Qatar, Saudi Arabia and United Arab Emirates, 100 per cent of the firms had significant asymmetric coefficients. This suggests that positive innovations are more destabilising than negative innovations or simply that good news increases the prediction of the volatility of the return in firms more than bad news does. Therefore, firms are volatile to good news more than to bad news. The sequence of the movement in exchange rate, interest rate, and oil prices depicts the volatility of the return of the firms. This effect applies to the significantly affected firms. The non-significantly affected firms act similarly to good and bad news. These firm type will not be influenced by negative or positive movement in exchange rate, interest rate and oil price.

With regard to the ARCH parameter coefficient, the significantly exposed firms ranged from 27.69 per cent (United Arab Emirates) to 42.5 per cent (Bahrain). Further, in Saudi Arabia, 100 per cent of the significant firms had positive coefficient while in Kuwait the proportion was equally distributed. The finding of a high proportion of significant positive coefficient

indicates the presence of volatility clustering (tendency of shocks to persist). In addition, conditional volatility rises (falls) when the absolute value of the standardised error is larger (smaller).

Concerning the results of the GARCH term, the results revealed that firms that had a significant GARCH coefficients ranged from 88.3 per cent in Oman to 97.8 per cent in Saudi Arabia. The results show mostly positive significant GARCH coefficients with the highest observed in Saudi Arabia where 100 per cent of the significant firms had positive GARCH coefficients. Thus, there exists significant persistence of volatility in returns which are mostly positive. For instance, in Qatar, 94.12 per cent of the firms had significant persistence of volatility in returns with 96.88 per cent of these with positive significance.

The results support the assertion that volatility has a long memory and when it increases, it may probably remain high over several period. The number of firms with significant ARCH and GARCH coefficients also supports that the current volatility of most GCC firms' returns are time varying, are a function of past innovations and past volatility.

With respect to the results of the mean equation, firms exhibited significant coefficients for the risk return parameter ranging from 17.45 per cent (in Kuwait) to 40.45 per cent (in Saudi Arabia). The risk return significant coefficients were mostly negative in Bahrain, Qatar and Saudi Arabia and mostly positive in Kuwait, Oman and United Arab Emirates. Generally, the number of firms with significant risk-return coefficients were few.

5.8 Summary

This chapter discussed the results of the regression using the EGARCH-M model. When the EGARCH-M model results are compared with results in chapter four for the OLS regression, it shows that the percentage of exposure to the risk factors reduced. However, the EGARCH-M model provides a better fit.

In general, the exposure to exchange rates was higher than that of interest rate risk and oil price risk. These results agree with Choi and Elyasiani (1997) and Joseph and Vezos (2006) studies that both found exposure to the exchange rate to be stronger than that of the exposure to interest rate changes for US banks. In addition, the number of firms significantly exposed to the changes in the short term interest rates (and long term interest rate for Saudi Arabia) were less than those significantly exposed to exchange rate measures. This contradicts Joseph (2002) findings of exposure to the short term interest rates being stronger than the exposure to the exchange rate for a selected sample of UK non-financial firms. These results also disagree with Choi *et al.*, (1992) study that reported much stronger evidence of interest rate sensitivity than exchange rate sensitivity of US banks. The results further reveal that for oil price exposure, most of this was positively significant as compared to interest rate exposure where the effects showed both positive and negative significance. These results agree also to Hammoudeh and Aleisa (2004) and Sadorsky (2001) studies that found significant effects of interest rates and oil prices changes on stock market returns and also with Huang *et al.*, (2005) study that revealed mixed exposure to oil price risk. However, the results are contrary

to Dhaoui and Khraief (2014) study that revealed strong negative effect of oil prices changes on stock market returns.

Further, the chapter segregated financial and non-financial firms in the GCC countries to evaluate the effect of these three financial risks. In general, the financial firms were less exposed to exchange rate, interest rate and oil price risk. This is reflective of the nature of the industry and its risk management practices which are generally more robust than the non-financial sector (Bodnar *et al.*, 1998). In addition, the sector is highly regulated or supervised. However, they were more exposed to market risk. In addition, firms in Saudi Arabia showed lower risk exposure than in other countries.

Further, the results from the variance equation of the EGARCH-M model used in this study suggests that volatility is not an important factor for asset pricing in most GCC firms. However, there is some evidence that increased volatility might reduce returns in Saudi Arabia. Thus, in Saudi Arabia, as compared to the other GCC countries, investors might be adversely rewarded for risks they take by holding stocks. The results further revealed that the asymmetric coefficient was significant for over half of the firms examined with most of these predominantly positive (95 per cent) implying that positive innovations seemed to affect volatility of returns more than negative innovations. In addition, there is overwhelming support of the presence of volatility clustering (ARCH effects) and persistence of volatility (GARCH effects) suggesting that volatility of returns, has a long memory and once it increases, might remain high over several periods. The majority of the firms had significant ARCH and GARCH parameter coefficient and in all countries, the number of firms with

significant GARCH coefficient was more than those with significant ARCH coefficient parameter. This further suggests that current volatility of firms' returns (conditional variance) is time varying, a function of past innovation and past volatility.

The next chapter will cover the determinant of foreign exposure, interest rate, oil price exposure.

CHAPTER SIX: DETERMINANTS OF EXCHANGE RATE, INTEREST RATE AND OIL PRICE EXPOSURE

6.1 Introduction

The knowledge of risk and risk management is important for decision makers in corporations, such as corporate treasurers and portfolio managers, in order to manage the (financial) risks that firms are exposed to. As discussed above, firms are at risk as a result of changes in exchange rates, interest rates and oil prices. The exposure to these risks could have an effect on the operating cash flows and eventual firm values. Thus, the importance of risk management is in measuring and reducing the firm's vulnerability to the unexpected changes (Papaioannou, 2006). Financial risks create uncertainty about future cash flows as a result of changes in economic conditions, revenue, operating expenditure and financing costs (Loudon, 2004).

As discussed in chapter two, firms engage in hedging practices in order to minimise their risk exposure. The level of hedging is usually according to the level of the firms' expected exposure. Firms that hedge their risk exposure are, therefore, less exposed to movement in exchange rate, interest rate and oil price. As noted in chapter three, firms mostly do not disclose their hedging practices, thus, data is not complete about hedging such that a distinction between hedging firms and non-hedging firms is difficult to make. Companies may hedge against foreign exchange rate, interest rate and oil price changes but not announce publicly. Importantly for this research is the possibility that the revealed insignificant

exposure results discussed in chapters four and five could be partly explained by hedging practices of firms in the GCC countries.

As noted in chapter two, firms can use several methods to hedge against the financial risk (exchange rate, interest rate and oil prices). Derivatives are widely used to manage risk. It is not easy to establish the usage of derivatives in risk management by firms due to insufficient disclosures. However, studies have attempted to establish relationships between risk exposure and derivatives usage in firms. For example, Cherneko and Faulkender (2011) identified that derivatives are used in some firms for speculation besides hedging. On the other hand, Allayannis and Ofek (2001) found a strong negative association between foreign currency derivatives use and firm exchange-rate exposure suggesting that firms use derivatives as a hedge rather than to speculate. Using international data, Bartram *et al.*, (2011) found strong evidence that suggested that financial derivatives used in hedging reduce total risk and systematic risk. However, the empirical evidence on the effects of derivative use on firms' risk and value is still mixed (see, for example, Allayannis and Weston, 2001; Graham and Rodgers, 2002; Guay, 1999; Hentschel and Kothari, 2001)

Loudon (2004) studied the exposure to interest rate, currency and fuel price risk in the airline industry of Australia and New Zealand. The airline industry was noted as using varied financial instruments and hedging techniques for risk management. The financial instruments include interest rate swaps, forward agreements and options to manage interest rate risk, cross currency swaps, forward foreign exchange contracts and options to manage foreign exchange risk and options and swaps for crude oil to manage fuel price risk (Loudon, 2004). Hedging

can reduce taxes and the cost of financial distress (Chrmenko and Faulkender, 2011) by providing the opportunity for increased leverage. Haushalter (2000) examined the hedging policies of oil and gas producers and showed that the extent of hedging is related to financing costs. Thus, the companies with high level of leverage manage price risk more extensively. Further, reducing the variability of cash flows reduces the bankruptcy cost (Mayers and Smith, 1990) through lowering the probability of entering bankruptcy.

Thus, risk management tools are widely used to eliminate or reduce the risk exposure through reducing the volatility of cash flows and the fluctuations of earnings. Hedging provides, therefore, a way to capturing the unexpected losses from fluctuating cash flow (Buckley, 2000) reducing the risk exposure. Tufano (1996) study of risk management in gold mining industry identified that almost three-fourths of firms implemented one of the financial engineering technique to reduce their exchange rate, interest rate, and commodity price exposure. Further, firms that are exposed highly to the financial risks (exchange, interest or commodity risk) use hedging extensively (El-Masry, 2006). Firms that hedge should, therefore, be less influenced by changes in exchange rate risk, interest rate risk and commodity price risk. As it is rare for firms to announce their hedging processes and techniques, measuring the correlation between hedging practices with firm exposure could prove difficult. The lack of information on hedging is usually a challenge in examining the hedging behaviour and actions taken by firms to determine their risk exposure. Thus, studies have used various determinants in order to estimate the risk exposure. Alssayah and Krishnamurti (2013), for instance, considered competition as a determinant of foreign exchange exposure while He and Ng (1998) used firms' export ratio level. Bartram *et al.*,

(2001) used foreign sales (relative to total assets), foreign income (relative to total income), and foreign assets (relative to total assets) as measures of exchange exposure.

In this study, when the pilot study was carried out to gain an understanding of risk management, it showed that the Kuwaiti firms do not use hedging intensively for the exchange rate risk, interest rate risk or oil price risk. This is besides hedging being a widely used technique in developed countries. In the US for example, Bartram *et al.*, (2011) found that around 90 per cent of the 5,000 firms studied were using financial derivatives to manage their risk exposure. Bartram *et al.*, (2011) in their study of the effects of derivative use on firm risk and value found that users of derivatives are more exposed to exchange rate risk due to foreign sales, foreign income and foreign assets and exposed to interest rate due to high leverage and low quick ratios. Jin and Jorion (2006) found that hedging increases the firm's market value and reduces the firm's sensitivity to oil price and gas prices. In addition, Guay and Kothari (2003) found that foreign exchange and interest rate derivatives constituted the bulk of the activity both in terms of the number of users and the amount of derivatives used.

As discussed in chapter one, the level of exposure to financial risk could be affected by a number of factors. It is important that the determinants of risk exposure are examined in order to assess which factors influence the risk exposure the highest and might assist in determining the level of hedging required. Al-Qaisi (2011), for example, concluded that size and financial leverage have a significant effect on the systematic risk value of firms.

This chapter discusses the determinant of exchange rate, interest rate and oil price exposure. The results of the determinants regressed to risk exposure for each GCC countries will be presented. In section 6.2, the empirical results of the determinants are introduced for subsequent individual risk exposure discussions. Section 6.3 presents the determinants of exchange rate risk, section 6.4 is about the determinant of interest rate risk while section 6.5 presents the determinants of oil price risk. In section 6.6, the determinant of market risks is discussed. Section 6.7 summarise this chapter.

6.2 Empirical models of the determinants

Chapter three, section 3.11 outlined the determinants of exchange rate, interest rate and oil price changes on firms' stock prices. The models to measure the determinants are shown in equations 3.20 to 3.23. The absolute exposure coefficients using the EGARCH-M model for each of the risks, exchange rate risk, interest rate risk and oil price risk are examined. The next sections discuss the results obtained.

6.3 The determinants of exchange rate risk

This section discusses the determinants of firms' exchange rate exposure. Table 6.1 below shows the results of the determinants used for exchange rate risk. The determinants for exchange rate exposure are leverage, liquidity, profitability, foreign operations and firm size. Similar to other studies (see, for example, El-Masry *et al.*, 2007; Judge and Korzhenitskaya, 2012), the proxies used for each of the determinants is given. Thus, total debt to total assets

(TD/TA) is used as a measurement of leverage. The quick ratio (QR) and dividend pay-out (DVD) are proxies for liquidity while return on assets (ROA) for profitability. Foreign assets (FA) and foreign sales (FS) are used to measure the foreign operations of the firm. The market value to book value (MV/BV) is proxy for growth and firm size (SIZE) is measured as the log of total assets.

**Table 6.1: The results of exchange rate determinant of GCC listed firms
(absolute exposure coefficient from the EGARCH-M model)**

Exchange Rate	ABSAED	ABSAED	ABSGBP	ABSGBP	ABSEUR	ABSEUR	ABSJPY	ABSJPY	ABSUSD	ABSUSD
BAHRAIN	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	-0.0011	-0.0008**	0.0001	0.0000	0.0001	0**	0.0000	-0.0001***	-0.0012	-0.0007**
QR	-0.0027	0.0000	-0.0001	0.0000	-0.0004	0.0000	0.0009	0.0000	0.0046	0.0003
ROA	0.0052	0.0007	0.0001	0.0001	0.0000	0.0000	0.0000	-0.0001	-0.0002	0.0002
DVD	-0.00213*	-0.0003	0.0000	0***	0.0000	0***	0.0000	-0.0001***	-0.0002	-0.0006***
FS	0.0000	-0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0001**	0.0000	-0.0003
FA	-0.0010	0.0014***	0.0001***	0.0003***	0.0001***	0.0002***	0.0000	0.0000	-0.0006*	0.0029***
MV/BV	-0.0052	-0.0094	0.0001	-0.001*	0.0000	-0.0013**	0.0006	-0.0029***	-0.0004	-0.0207**
SIZE	0.0041	0.0235***	0.0007**	0.0017***	0.0018***	0.0024***	0.0009**	0.0054***	0.0054	0.0369***
Exchange Rate	ABSAED	ABSAED	ABSCNY	ABSCNY	ABSEUR	ABSEUR	ABSGBP	BSGBP	ABSJPY	ABSJPY
KUWAIT	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0003	-0.0002	-0.0004	0.000535**	-0.0001	0.0002	0.0000	-0.0003*	0.0000	0.0002***
QR	-0.0084	0.0001	-0.0167	-0.0020	-0.0088	-0.0008	-0.0085	-0.0019**	-0.0068**	0.0008*
ROA	0.0002	0.0001	0.0000	0.001**	-0.0004	0.0005*	-0.0002	0.0003	-0.0001	0.0000
DVD	0.0005	-0.0002	-0.0003	0.0001	0.0001	-0.0001	0.0003**	0.0000	0.00018**	0.0000
FS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FA	0.0008**	0.0002	-0.0001	-0.0001	0.0000	-0.0001	-0.0001	0.0000	0.0000	0.0001
MV/BV	-0.0013	-0.023***	-0.0011	-0.0133***	-0.0005	-0.0078**	-0.0005	-0.0104***	-0.0002	-0.0019
SIZE	-0.0017	-0.0101***	0.0032	-0.0069***	0.0029*	-0.005***	0.0025	-0.0036***	0.0004	-0.0012**

Exchange Rate	ABSAED	ABSAED	ABSEUR	ABSEUR	ABSGBP	ABSGBP	ABSJPY	ABSJPY	ABSUSD	ABSUSD
OMAN	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0000	0.0000	-0.0001	-0.0001**	0.0000	-0.0001	-0.0002	-0.0001**	-0.0025*	0.0003
QR	-0.0011	0.0001	-0.0092	0.0000	-0.0088	0.0007	-0.0048	0.0005	-0.0931*	0.0283***
ROA	0.0000	0.0000	-0.0001	-0.0001	0.0003	-0.0002	-0.0011**	0.0000	-0.0033	-0.0035**
DVD	0.0000	0.0000	-0.0001	0.0000	-0.0005**	0.0000	0.0000	-0.0001*	-0.0004	-0.0005
FS	-0.0001	0.0000***	-0.0004	0.0004***	-0.0011	0.0000	-0.0004	0.0005***	-0.0134	0.0048***
FA	0.0002	0.0001***	0.0015	0.0010***	0.0013	-0.0002	0.0036***	0.0023***	0.0384***	0.0311***
MV/BV	-0.0001	0.0000	-0.0051	0.0002	-0.0080	-0.0002	-0.0048	-0.0002	-0.0051	0.014**
SIZE	0.0000	0.0001***	-0.0011	0.0022***	0.0033**	0.0018*	-0.0004	0.0011	0.0147	0.0164**

Exchange Rate	ABSCNY	ABSCNY	ABSEUR	ABSEUR	ABSINR	ABSINR	ABSJPY	ABSJPY	ABSKRW	ABSKRW
QATAR	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0000	-0.0019	-0.0008***	0.0001	0.0006*	0.0007***	0.0003	0.0002	-0.0005	0.0001
QR	-0.0037	0.0002	-0.0005	0.0052*	0.0018**	-0.0028	0.0016**	0.0029	-0.0015	-0.0003
ROA	-0.0023	0.0000	-0.0027**	0.0006	0.0023	0.0005	0.0013	-0.0021***	-0.0101***	0.0015*
DVD	0.0001	0.0022**	0.0001	0.0000	0.0001	-0.0003**	0.0001	-0.0003	0.0007***	0.0002
FS	-0.0003	-0.0017	-0.0017***	-0.0003	-0.0015***	0.0001	-0.0002	-0.0002	0.0008	-0.0003
FA	0.0011	0.0015	0.0016***	-0.0002	0.0006	-0.0007*	0.0018***	-0.0007	0.0005	-0.0004
MV/BV	0.0217	0.0000	-0.0050	0.0000	0.0042	0.0000	-0.0052	0.0000	0.0019	0.0000
SIZE	-0.0033	0.0047	-0.0012	0.0007	-0.0032	0.0045***	0.0020	0.0059***	-0.0052	0.0031*

Exchange Rate	ABSCNY	ABSCNY	ABSEUR	ABSEUR	ABSJPY	ABSJPY	ABSKRW	ABSKRW	ABSUSD	ABSUSD
SAUDI ARABI	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0007	-0.0008	-0.0004	-0.0003***	-0.0003	-0.0002**	0.0000	-0.0002**	-0.0027	0.0010
QR	0.0248	0.0052	0.0013	0.0006	-0.0040	-0.0007	0.0032	0.0024**	0.0014	0.2366
ROA	-0.0045	0.0001	0.0001	0.0000	0.0016**	-0.0003**	0.0018	0.0001	-0.0014	0.7297
DVD	-0.0007	0.0003	0.0001	0.0000	-0.0001	0.0000	-0.0002	0.0001**	-0.006***	0.0376
FS	NA	-0.0010	NA	0.0002	NA	0.0001	NA	0.0004	NA	0.5891
FA	0.0062**	0.0003	0.0003	0.0000	-0.0004	0.0000	-0.0006	0.0000	0.0040	0.2508***
MV/BV	-0.0046	0.0013	0.0004	-0.0001	-0.0005	0.0001	-0.0032	0.0000	-0.0488**	0.1677
SIZE	0.0318***	-0.0066	0.0048***	-0.0010	0.0023	0.0007	0.0039	0.0003	0.0597**	0.3654

Exchange Rate	ABSCNY	ABSCNY	ABSEUR	ABSEUR	ABSINR	ABSINR	ABSJPY	ABSJPY	ABSKRW	ABSKRW
UAE	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	-0.0007	0.0004	-0.0003**	-0.0006***	0.0000	0.0000	-0.0006**	0.0008**	0.0000	0***
QR	0.0189	0.0125*	0.0167***	-0.0006	-0.0003	0.00142***	0.0251***	0.0045*	-0.0001	0.0006***
ROA	-0.0009***	-0.0029	-0.0006	-0.0006	-0.0001	-0.0001*	-0.0019**	-0.0002	0.0000	-0.0001***
DVD	0.0004	-0.0006	0.0000	-0.0003**	0.0000	0.0000	-0.0001	-0.0002	0.0000	0***
FS	0.0006	0.0011	0.0003	-0.0001	0.0001***	0.0001***	0.0019***	0.0001	0.0000	0.0000**
FA	0.0013	-0.0039***	0.0000	-0.0006*	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MV/BV	-0.0060	-0.0163*	-0.0026	-0.0035	-0.0004	-0.0001	-0.0015	0.0003	-0.0001	0.0001
SIZE	0.0207***	0.0343***	0.0046***	0.0163***	0.0004**	-0.0001	0.004**	0.0151***	0.0002***	0.0000

Notes: The table presents results for the determinants of exposure to the unexpected changes in the exchange rates for each major trading currency in each GCC country. The ABS (absolute) exchange rate exposure coefficients for each major trading currency segregated between the financial and non-financial firms are presented. The exchange rate exposure coefficient, which is the dependent variable has been estimated using the EGARCH-M methodology. The explanatory variables are represented by TD/TA which is the ratio of total debt to total asset, QR is the quick ratio, ROA is return on asset, DVD is dividend payout, FS is foreign sales, FA is foreign assets, MV/BV is ratio of market value to book value and SIZE is firm size. *, **, *** represents the significance at the 1 per cent, 5 per cent and 10 per cent level of significance. In Saudi Arabia, however, the foreign sales information was not available for the financial firms.

From a risk management perspective, it is necessary to know what determines the exposure and what the firm could do about it. From table 6.1 above, it can be observed that leverage determines the non-financial firm's exchange rate exposure to the Emirati Dirham, Euro, Japanese Yen and United States Dollar in Bahrain. Liquidity as proxied by dividend payout significantly influences the exposure to changes in Emirati Dirham, British Pound, Euro, Japanese Yen and United States Dollar for mostly non-financial firms. Profitability as proxied by ROA and liquidity as proxied by quick ratio do not show any significant effect on the firms' exchange rate exposure in Bahrain. Similarly, foreign sales negatively influence the exposure to Japanese Yen only. These results are inconsistent with Bartram (2004) study that showed foreign sales as having a significant effect on foreign exchange exposure. On the other hand, foreign operations, proxied by foreign assets, has significant positive effect on the exchange exposure to British Pound, Euro and United States Dollar. The growth of firms has a negative significant impact on exchange exposure for non-financial firms in Bahrain to British Pound, Euro, Japanese Yen and United States Dollar. Firm size shows as the greatest impact on the value of the coefficient of the exchange rate exposure. Thus, in Bahrain, firm size positively influences firms, both financial and non-financial, to fluctuations of exchange rates of Emirati Dirham, British Pound, Euro, Japanese Yen and Untied State Dollar.

In Kuwait, the level of leverage influences the non-financial firms' exposure to the changes in Chinese Yuan, British Pound, and Japanese Yen while the influence of profitability is positively significant to Chinese Yuan and Euro only. Liquidity levels negatively influence the exposure to British Pound (non-financial firms only) and both negatively (for financial firms) and positively (for non-financial firms) to the Japanese Yen. The firms' profitability

has a positive impact on the non-financial firms' exposure to Chinese Yuan and Euro. Unlike in Bahrain where foreign operations had an influence on the exposure, in Kuwait, this factor is not significant for all major trading currencies except the exposure to Emirati Dirham for the financial firms. Non-financial firms are negatively influenced by changes in exchange rates. The firms' growth has a negative significant influence on the level of exposure, for non-financial firms, to Emirati Dirham, Chinese Yuan, Euro and British Pounds. Thus, as non-financial firms grow, their exposure to these currencies reduces. These results are similar to those of Chow and Chen (1998) study on the effect of growth. Similarly, an increase in the size of non-financial firms has a negative significant influence on their exchange rate exposure to the Emirati Dirham, Chinese Yuan, Euro, British Pounds and Japanese Yen. Thus, the argument that bigger firms are more aware and do try to minimise the exchange rate exposure holds (see, for example, Haushalter, 2000; Sadorsky, 2008). However, a positive influence of size to exposure to the changes in the Euro was observed for the financial firms in Kuwait.

Leverage in Omani firms has a negative effect on firm's exposure to Euros, Japanese Yen and United States Dollar. This implies that increasing a firm's leverage levels could reduce the exchange rate exposure. This is contrary to other studies' findings (see, for instance, Bartram *et al.*, 2011; Chow and Chen, 1998) that suggest that firms with high leverage have high exposures. Profitability has a negative influence on firms' exposure to Japanese Yen and United States Dollar while liquidity negatively influences exposure to British Pounds and Japanese Yen only. The non-financial firms, on the other hand, are positively affected by changes in United States Dollar when their liquidity increases. Similar to Bartram (2004),

liquidity significantly determined foreign exchange rate exposure. Foreign operations has a significant positive influence on the non-financial firms' exchange rate exposure. Thus, non-financial firms with external operations face a greater risk to currency fluctuations as compared to financial firms that were exposed to the Japanese Yen and United States Dollar only. Compared to Kuwait that showed strong negative significance to growth, this factor does not significantly affect firms (whether financial or non-financial) in Oman were growth only influenced positively the exposure to United States Dollar for non-financial firms. Firm size has a positive significant influence on the extent of exposure for non-financial firms in Oman also (this is different to the case in Kuwait where the influence of size was negative). This suggests that larger firms in Oman have a higher exchange rate exposure. This could be partly explained by the lack of risk management strategies to these (financial) risks in the non-financial firms as was evident in the pilot study. This finding is also inconsistent with other studies that have shown a negative significant influence to exposure of firm size (see, for example, Sadorsky, 2008)

Qatar's financial firms are negatively influenced by leverage, profitability and foreign operations on their exposure to the changes in the Euro against the Qatari Riyal. The exposure to the fluctuations in the Euro for the non-financial firms is positively influenced by the liquidity levels while the leverage levels have a positive impact on the non-financial firms' exposure to the Indian Rupee. Short term liquidity positively influences the non-financial firms' exposure to the Chinese Yuan and negatively to the Indian Rupee while there is a positive influence to South Korean Won for the financial firms. Further, foreign operations of firms (proxied by share of foreign assets) has a positive effect on the firms'

exposure to the changes in Euro and Japanese Yen for the financial firms and influenced negatively to changes in the Indian Rupee for the non-financial firms. Williamson (2001) argued that firms have a significant exposure not only if firms have substantial sales in foreign markets but with the level of competition from foreign firms as well. Growth has no effect on the exchange rate exposure values in Qatar. That may suggest managed growth in Qatar. The size of firms, similarly to Kuwait, positively influences the non-financial firms' exposure to changes in the Indian Rupee, Japanese Yen and South Korean Won.

In Saudi Arabia, leverage is a significant determinant for non-financial firms. The non-financial firms are negatively influenced to changes in the Euro, Japanese Yen and South Korean Won by the leverage levels. Liquidity, on the other hand, positively influences non-financial firms' exposure to the South Korea Won and negatively for financial firms' exposure to the United States Dollar. Profitability of firms has an impact on the firms' exposure to the Japanese Yen only (positively for financial firms and negatively for non-financial firms). Foreign assets can positively influence the firms' exposure rate to the Chinese Yuan and United States Dollar. Interestingly, the firm size is a determinant for the financial firms' positive exposure to the Chinese Yuan, Euro and United States Dollar. Size does not significantly influence the exchange rate exposure for non-financial firms in Saudi Arabia.

In the United Arab Emirates, leverage shows a negative effect on the exchange rate exposure to the Euro and Japanese Yen and positively significant for the non-financial firms' exposure to Japanese Yen and South Korean Won. Liquidity, on the other hand, positively influences

non-financial firms' exposure to changes in the Chinese Yuan, Indian Rupee, Japanese Yen and South Korean Won. Thus, higher levels of liquidity increases the firms' exposure to the exchange rate fluctuations. Foreign sales have a positive effect on three out of five traded currencies while foreign assets have a negative effect on the exposure to Chinese Yuan and Euro only. The firms' growth rate does not significantly influence the firms' exchange rate except for non-financial firms' exposure to the Chinese Yuan. Finally, firm size in the United Arab Emirates positively influences the exchange rate exposure to most of the traded currencies. Thus, as the effect is positive, larger firms are most exposed to the risk. This is inconsistent with other studies that suggested that larger firms are mostly likely to engage in hedging practices that smaller firms (see, for example, El-Masry *et al.*, 2007).

In summary, therefore, the firms in the GCC countries are mostly affected by firm size, leverage and foreign operation of the firms. The effect of profitability and liquidity on the level of exposure are less significant. Further, the effect of firm size and leverage on the exchange rate exposure is more prominent in non-financial firms than financial firms. This is consistent with the argument that financial firms engage more in risk management activities (see, Gerich and Karjalainen, 2006).

6.4 The determinant of interest rate risk

Table 6.2 below presents the results of the interest rate determinants in the GCC countries. As noted in chapter three, section 3.11, the determinants for interest rate risk are the same as for exchange rate risk (see section 6.3 above)

From table 6.2, it can be observed that the level of leverage has an influence on the firms' exposure to interest rate risk. The financial firms in Bahrain, Oman, Qatar and Saudi Arabia for short term interest rate are positively influenced by the level of leverage. On the other hand, the interest rate exposure for non-financial firms in Bahrain and Saudi Arabia for long term interest rate are affected by the levels of leverage. These results are consistent with Al-Qaisi (2011)'s finding that leverage significantly affects firm risk value but contrary to Bartram (2002) argument that financial leverage is not an empirically significant exposure determinant. The results obtained in this study suggest that firms with high leverage have higher interest rate exposure.

The only effect of liquidity on interest rate exposure is in Qatar's financial firms and all firms in the United Arab Emirates. The influence is all positively significant in the two countries, thus with higher liquidity firms are more exposed to interest rate risk. The results in Qatar and United Arab Emirates on the influence of liquidity (proxied by quick ratio) is consistent with Bartram (2002) findings.

Table 6.2: The result of interest rate risk determinant of GCC listed firms (absolute exposure coefficient from the EGARCH-M model)

COUNTRY	BAHRAIN		KUWAIT		KSA S-IR	KSA S-IR	KSA L-IR	KSA-L-IR
	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0000*	0.000***	0.0000	0.0000	0.0003**	0.0000	-0.0001	-0.0002***
QR	0.0000	0.0000	-0.0022	0.0000	0.0013	0.0001	0.0004	-0.0008
ROA	0.0001	0.0000	-0.0001	-0.0002**	-0.0001	0.0001*	-0.0004	0.0000
DVD	0.0000	0.000**	0.0000	0.0000	-0.0001**	0.0000	0.0001	-0.0001**
FS	0.0000	0.000*	0.0000	0.0000	NA	0.0000	NA	0.0001
FA	0.0000*	0.0000***	0.0000	0.0001**	0.0000	0.0000	0.0001	0.0000
MV/BV	0.0001	-0.0002	-0.0001	-0.0019*	0.0000	0.0000	-0.0006	-0.0002
SIZE	0.0004**	0.0004***	-0.0001	0.0003	0.0021***	0.0000	-0.0005	-0.0005

COUNTRY	OMAN		QATAR		UAE	
	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.000**	0.0000	0.000**	0.0000	-0.0001	-0.0001
QR	-0.0004	0.0000	0.0001**	0.0000	0.0076**	0.0035** *
ROA	0.0000	0.0000	0***	0.0000**	-0.0007**	-0.0003
DVD	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0001
FS	-0.0001*	0.0000***	0.0000	0.0000	0.0007***	0.0002** *
FA	0.0002***	0.0000***	0.0000	0.0000	0.0000	-0.0003*
MV/BV	-0.0001	0.0000	0.0000	0.0002***	-0.0017	-0.0015
SIZE	0.0001	0.0002***	0.0000**	0.0000	0.0019***	0.0055** *

Notes: The table reports the results for the determinants of exposure to the unexpected changes in the short term interest rate measures for the period January 2007 to June 2012 for each of the GCC countries segregated into the financial and non-financial firms. The interest rate exposure coefficient, which is the dependent variable has been estimated using the EGARCH-M methodology. The explanatory variables are represented by TD/TA which is the ratio of total debt to total asset, QR is the quick ratio, ROA is return on asset, DVD is dividend payout, FS is foreign sales, FA is foreign assets, MV/BV is ratio of market value to book value and SIZE is firm size. *, **, *** represents the significance at the 1 per cent, 5 per cent and 10 per cent level of significance. In Saudi Arabia, however, the foreign sales information was not available for the financial firms

In terms of profitability, non-financial firms in Kuwait, Saudi Arabia (short-term) and Qatar, and financial firms in Qatar and United Arab Emirates, have their interest rate exposure

mostly negatively significantly influenced (positive in Saudi Arabia and Qatar). For foreign operations' effect on the interest rate exposure, non-financial firms have been influenced positively in Bahrain, Kuwait and Oman, and negatively influenced in United Arab Emirates. The influence of foreign operations on the interest rate exposure of financial firms is also positive in Bahrain and United Arab Emirates. Growth of the firms is not a major determinant of the level of exposure to interest rate risk. Positive significant influence is observed for non-financial firms in Qatar and negative effect in Kuwait only. Lastly, firm size is the most important determinant of the interest rate exposure in the GCC firms. The effect is positively significant, which imply that large firms are more exposed to the interest rate risk than small firm. This is contrary to the suggestion by Faulkender (2005) that large firms manage interest rate risk better than small ones and thus are less exposed to the risk. The relationship between size and risk exposure is positive suggesting that larger firms do not engage in hedging activities as postulated by other studies (see, for example, Allayannis and Weston, 2001; Nance *et al.*, 1993)

6.5 The determinant of oil price risk

Oil price risk has an impact on firm value. It is imperative that factors that could influence the level of this exposure are highlighted in order to direct risk management decisions accordingly. Table 6.3 below shows the determinants of the oil price exposure on the GCC countries segregated between the financial and non-financial firms.

In Bahrain, the determinants show more influence in non-financial firms than financial firms. That may relate to the implementation of risk management strategies in financial firms as compared to non-financial firms. The results show that leverage has an impact on the oil price risk exposure to non-financial firms in Bahrain, Kuwait, and Oman. The impact being negative in Bahrain and positive in Qatar and Oman. Thus, consistent with Al-Qaisi (2011), financial leverage is a major determinant of the financial (oil price) risk. This is also consistent with Bartram (2005) study of the commodity price exposures. Bartram (2005) argued that leverage has a positive empirical relationship with commodity price exposure. Further, non-financial firms with high profitability could be less exposed to the oil price risk in Bahrain as are financial firms in Oman and United Arab Emirates. Liquidity, proxied by quick ratio and dividend pay-out impacts firms' exposure to the oil price risk positively (Kuwait, Oman and United Arab Emirates) and negatively (Qatar and Saudi Arabia) in the GCC countries. Foreign operations also display a significant influence on risk exposure for non-financial firms in Bahrain, Kuwait, Oman and United Arab Emirates, and a significant influence for financial firms in Qatar, Oman and United Arab Emirates.

Table 6. 3: The results of the determinants of oil price risk exposure of GCC listed firms (absolute exposure coefficient from the EGARCH-M model)

COUNTRY	BAHRAIN		KUWAIT		QATAR	
	FINANCIAL/ NONFINANCIAL	Financial Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0000	-0.0001***	0.0000	0.0001**	0.0001	0.0000
QR	0.0002	0.0000	-0.0018	0.0005*	0.0001	-0.0011*
ROA	0.0000	-0.0001*	0.0000	0.0000	0.0003	0.0002
DVD	0.0000	0***	0.0000	0.0000	0.0000	0.0001
FS	0.0000	0**	0.0000	0.0000	0.0002	0.0000
FA	0.0000	0*	0.0000	0.0001***	-0.0003*	-0.0002
MV/BV	0.0002	-0.0012***	-0.0001	-0.0008	-0.0016	0.0000
SIZE	0.0009***	0.0023***	0.0003	-0.0002	0.0004	0.0009**

COUNTRY	OMAN		SAUDI ARABI		UAE	
	FINANCIAL/ NONFINANCIAL	Financial Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	0.0000	0**	0.0002	0.0000	-0.0001	0.0000
QR	-0.0021	0.0003	0.0005	0.0003	0.0077***	0.0004
ROA	-0.0002*	-0.0001	0.0003	-0.0001	-0.0005*	0.0000
DVD	0.0000	0**	-0.0001***	0.0000	0.0000	-0.0001
FS	0.0004	0.0001***	NA	-0.0001	-0.0001	-0.0001*
FA	-0.0004**	0.0008***	0.0000	0.0000	0.0002**	0.0002
MV/BV	-0.0011	0.0000	0.0001	0.0000	-0.0010	-0.0014*
SIZE	0.0003	0.0009***	0.0025***	-0.0005	0.0018***	0.0035***

Notes: The table reports the results for the determinants of exposure to the unexpected changes in the oil prices for the period January 2007 to June 2012 for each of the GCC countries segregated into the financial and non-financial firms. The oil price risk exposure coefficient, which is the dependent variable has been estimated using the EGARCH-M methodology. The explanatory variables are represented by TD/TA which is the ratio of total debt to total asset, QR is the quick ratio, ROA is return on asset, DVD is dividend payout, FS is foreign sales, FA is foreign assets, MV/BV is ratio of market value to book value and SIZE is firm size. *, **, *** represents the significance at the 1 per cent, 5 per cent and 10 per cent level of significance. In Saudi Arabia, however, the foreign sales (FS) information was not available for the financial firms

Growth does not significantly influence the oil price exposure in the GCC countries, with negative influence exposed in non-financial firms in Bahrain and United Arab Emirates only. Similar to interest rate exposure, most firms in the GCC countries are influenced by firm size. A positive significant influence is observed for non-financial firms in Bahrain, Qatar, Oman and United Arab Emirates and for financial firms in Bahrain, Saudi Arabia and United Arab Emirates. Firm size has no impact at all to firms' exposure to oil price risk in Kuwait.

6.6 The determinants of market risk

Table 6.4 below presents the results of the determinants of market risk exposure of listed companies in the GCC countries. To enhance the analysis, segregated results of financial and non-financial firms are presented. A discussion of the results follows.

From table 6.4, it can be observed that leverage has a negative effect on the financial firms' market risk exposure in Bahrain and United Arab Emirates and positively on the non-financial firms in United Arab Emirates and Qatar (but negatively in Bahrain and Oman). Liquidity has a significant effect on market risk exposure for financial firms in Saudi Arabia and United Arab Emirates, and positive impact on non-financial firms in United Arab Emirates, Qatar and Oman. On the other hand, profitability negatively influences the non-financial firms' exposure to market risk in United Arab Emirates and Qatar and a positive influence for non-financial firms in Qatar only. Firms with international operations are most impacted by market risk. The impact of foreign operations is mostly positive (negative effect observed in Qatar's non-financial firms). Growth shows negative influence on market risk exposure in non-financial firms of Bahrain and Kuwait (and negative impact for financial firms in Oman). This suggests that firms with higher growth tend to be least affected by market risk. Lastly, firm size shows the highest effect on market risk exposure. The effect is positively significant.

**Table 6.4: The result of market rate risk determinant of GCC listed firms
(absolute exposure coefficient from the EGARCH-M model)**

COUNTRY FINANCIAL/ NONFINANCIAL	BAHRAIN		KUWAIT		SAUDI ARABI		UAE		QATAR		OMAN	
	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial	Financial	Non-financial
TD/TA	-0.0006**	-0.0001*	-0.0002	-0.0009	0.0042	-0.0003	-0.0028*	0.0046**	-0.0012	0.0038***	-0.0023	-0.0011*
QR	0.0008	0.0000	-0.0533	0.0068	0.1154*	-0.0151	0.1484**	0.0421**	-0.0008	0.0237**	-0.0792	0.0165**
ROA	-0.0003	0.0001	-0.0011	0.0014	-0.0034	-0.0002	-0.014**	-0.0029	-0.0217***	0.0061**	-0.0042	-0.0008
DVD	-0.0001	0***	0.0000	-0.0002	-0.0014	0.0001	-0.0012	-0.0015	0.002***	-0.0014**	-0.0023*	-0.0006
FS	0.0000	0.0000	0.0001	0.0000	NA	0.0012	0.011***	-0.0036*	-0.0013	-0.0005	0.0060	0.0061***
FA	0.0000	0.0005***	0.0009	0.0004	0.0111	-0.0006	0.0072***	0.0039	0.0051**	-0.0036*	0.017***	0.0172***
MV/BV	-0.0009	-0.0022*	-0.0044	-0.0492**	0.0096	-0.0016	-0.0181	-0.0067	0.0338	0.0001	-0.0641*	-0.0012
SIZE	0.004**	0.0041***	0.0021	0.0065	0.1527***	-0.0103	0.0346***	0.0816***	-0.0009	0.0191***	0.0283***	0.0337***

Notes: The table reports the results for the determinants of the exposure to market risk for the period January 2007 to June 2012 for each of the GCC countries segregated into the financial and non-financial firms. The market risk exposure coefficient, which is the dependent variable has been estimated using the EGARCH-M methodology. The explanatory variables are represented by TD/TA which is the ratio of total debt to total asset, QR is the quick ratio, ROA is return on asset, DVD is dividend payout, FS is foreign sales, FA is foreign assets, MV/BV is ratio of market value to book value and SIZE is firm size. *, **, *** represents the significance at the 1 per cent, 5 per cent and 10 per cent level of significance. In Saudi Arabia, however, the foreign sales (FS) information was not available for the financial firms

6.7 Conclusion

This chapter discussed the determinants of risk exposure. The determinants of foreign exchange risk, interest rate risk, oil price risk and market risk were examined. As discussed in chapter three, the key determinants of these financial risks were identified as leverage, profitability, liquidity, growth, foreign operations and firm size. These determinants were examined against each risk. The results were further segregated between financial and non-financial firms to enhance understanding.

With regard to exchange rate exposure, foreign operations and firm size presented the highest influence on the level of exposure to the exchange rate risk. The influence was mostly positively significant. This is similar to other studies that show that size and foreign operations determine the level of exposure (see, for example, Jin and Jorion, 2004; Judge, 2002). With respect to interest rate exposure, leverage, foreign operations and firm size had the most influence. Studies (such as, Joseph and Vezos, 2006; Allayannis and Weston, 2001) have shown the effect of leverage on the exposure to interest rate risk. Oil price risk exposure, on the other hand, was mostly influence by firm size and foreign operations. Other studies have shown similar results in terms of the influence of foreign operations (see, for example, Dahlquist and Robertsson, 2001) on oil price

risk exposure. The market risk exposure was largely influenced by leverage, foreign operations and firm size.

Further, the study reveals mixed results in terms of the overall risk exposure of non-financial firms and financial firms in the GCC countries. The listed firms in the GCC countries are exposed to these financial risks, though not in equal proportions. The main issue, therefore, is in finding ways of hedging against the levels of exposure. It is clear that the countries depend on oil revenues and thus, tend to experience similar challenges. This can inform the need to embark on strategies that can benefit all of them.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This study was aimed at examining the effect of exchange rate, interest rate and oil price fluctuations on firm value in the GCC countries. In order to examine the influence of the three risks on firm value, data for the period January 2007 to June 2012 was collected and analysed. The data was analysed using the OLS regression model and the EGARCH-M model. This chapter gives a summary of the study and also suggests areas for future research. The implications and limitations of the study are highlighted. Section 7.2 will briefly outline the contribution to the literature of this study by outlining the literature gap. Section 7.3 outlines the implications of this study while section 7.4 discusses the limitations. Section 7.5 suggests future research

7.2 Contribution to literature gap

As discussed in chapters one and two, exchange rate, interest rate and oil price risks are considered to be among the most important risks that the listed firms in the GCC countries face (Hammoudeh and Aleisa, 2004). Previous studies on these risks have either focussed discretely on financial firms (for, example, Bodnar *et al.*, 2003), non-financial firms (see, for example, Doidge *et al.*, 2006) or oil producing companies (see, for example, Battermann *et al.*, 2006; Bjørnlad, 2009;

Dhaoui and Khraief, 2014). Hence, previous studies have rarely examined a combination of these financial risks (exchange rate, interest rate and oil price risk). Noticeably, previous studies, for example, on exchange rate risk have mostly focused on non-financial firms (see, for example, Aabo, 1999; Bartram, 2007) while those on interest rate risk have been biased to financial firms (see, for example, Kilian and Lewis, 2009; Mark, 2009). Oil price risk, on the other hand has been studied in several ways, with some studies concentrating on the oil firms (for example, Hammoudeh and Li, 2005) and others on non-oil producing firms (for example, Huang *et al.*, 1996; Jones and Kaul, 1996). Of these studies, some have considered all the risks examined this study but only focused on one sector of firms (such as, El-Masry *et al.*, 2010). Although some studies have examined the exposure to exchange rate, interest rate, and oil price risks at the same time (see, for example, Ramos and Veiga, 2011; Rostamy *et al.*, 2013) they are limited by not representing the market or by concentration on a sector.

Specifically to the GCC countries, most of the studies that have been done focused mainly on the influence of oil prices on the market share prices (see, for example, Arouri, 2010, 2011; Hammoudeh and Choi, 2006; Mohant, *et al.*, 2011). To the researcher's knowledge, there is no study that has been done in the GCC countries that covers all the three financial risks (exchange rate, interest rate and oil prices) at firm level. Appreciatively, some studies have examined two of these three risks at the same time, such as, exchange rate and interest rate exposure (for example, Joseph, 2002; Ryan and Worthington, 2004; Wetmore and Brick, 1994),

oil price exposure and interest rate exposure (for example, Wu and Ni, 2011), oil price and exchange rate exposure (for example, Lizardo and Mollick, 2010). On the other hand, El-Masry *et al.*, (2010) examined the three risks, exchange rate exposure, interest rate exposure and oil price exposure, however, this was specific to the shipping firms only.

The motivation for this study has been to contribute to this literature by examining the exchange rate, interest rate and oil price changes on the stock market returns of the listed firms in the GCC countries.

7.3 Summary of the results

The study, aimed at examining the effect of changes in the exchange rate, interest rate and oil prices on firm value used both the OLS regression model and the EGARCH-M model. The EGARCH-M model was used so that the deficiencies of the OLS regression model, with regard to volatility clustering and time series heteroscedasticity, could be addressed. Comparing the results from the two model, it was found that using the EGARCH-M model increased the number of significant coefficients for exchange rate exposure but reduced the number of significant observations for interest rate risk and oil price risk in general.

The examination of the effect of the risk exposure on firm value was done, firstly, on all listed firms in each country, and then secondly, the firms segregated

between financial and non-financial firms. This was necessary to give a better understanding of the effect of the risk exposure on firm values as the risk characteristics and management of financial firms is generally different to non-financial firms. In this regard, because the risks being considered are financial risks, there is an inherent limitation that the financial firms already manage these risks.

The study was aimed at achieving two main objectives. Firstly, it was aimed at examining the relationship between the various risks (exchange rate risk, interest rate risk and oil price risk) and firm value, and secondly, at examining the determinant of the exchange rate risk, interest rate risk and oil price risk in the GCC listed firms.

In summary, the exposure to exchange rates risk was higher than that of interest rate risk and oil price risk. The GCC firms revealed high exposure to exchange rate risk with the highest exposure observed in Oman, Qatar and United Arab Emirates and the lowest in Saudi Arabia. When segregated between the financial and non-financial firms, the financial firms showed lower exposure to exchange rate risk than non-financial firms. The non-financial firms in United Arab Emirates were the highest exposed and the lowest exposed were in Bahrain. The highest exposed financial firms were those in Oman and lowest in Saudi Arabia.

Of the three risks, the interest rate risk had the least effect on the firm values. The highest effect was observed on firms in Oman, Bahrain and United Arab Emirates. The effect was negatively significant for firms in Bahrain and Saudi Arabia but positive for firms in Qatar. Firms in Kuwait, Oman and United Arab Emirates were both negatively and positively affected by changes in interest rates. Similar to exchange rate risk exposure, the financial firms overall showed lower interest rate risk exposure than non-financial firms. Interestingly however, financial firms in Oman and Saudi Arabia (for long term interest only) were affected more than non-financial firms.

The oil price exposure showed mixed results with the exception of firms in Qatar that were positively significantly influenced. The firms in United Arab Emirates and Qatar were the most exposed to oil price changes while those in Saudi Arabia were the least affected. Overall, the financial firms' market values were less affected than non-financial firms. However, in Qatar, the financial firms were most affected than the non-financial firms while in Saudi Arabia, the financial firms were not significantly affected by oil price changes. The listed firms in the GCC countries are positively affected by market risk with the highest effect observed in the Saudi Arabian firms.

The results are consistent with Choi and Elyasiani (1997) and Joseph and Vezos (2006) studies that both found exposure to the exchange rate to be stronger than that of the exposure to interest rate changes for US banks. However, this is

contrary to Joseph (2002) findings that exposure to changes in the short term interest rates was stronger than that for fluctuations in the exchanges for a selected sample of UK non-financial firms. Further, the results for interest rate and oil price exposure agree with Hammoudeh and Aleisa (2004) and Sadorsky (2001) studies that found significant effects of both the interest rate and oil price changes on stock market returns. The high oil price risk exposure in United Arab Emirates and Qatar are consistent with Fayyad and Daly (2011) study that showed the responsiveness to oil shocks as highest in the two countries when compared to the other GCC countries. The positive significant exposure to oil price changes however contradicts Dhaoui and Khraief (2014) findings of strong negative effect of oil price changes on stock market returns in seven out of the eight countries studied. The results of the segregated analysis between financial and non-financial firms' exposure to the risks are consistent with Bodnar *et al.*, (1998) survey that revealed lower risk exposure of financial firms as compared to non-financial firms owing to the limited risk management practices in the non-financial firms. However, in Bahrain, the non-financial firms were less exposed as compared to the financial firms disagreeing with Bodnar *et al.*, (1998) survey.

The results from the variance equation of the EGARCH-M framework showed that the asymmetric coefficient were mostly positively significant for over half of the firms suggesting that positive surprises (news) increase return volatility more than negative surprises (news). In addition, the ARCH parameter coefficient were mostly positively significant indicating the presence of volatility clustering.

Similarly, the GARCH coefficients were mostly positive and higher than the ARCH coefficients, showing significant persistence of volatility in returns. Further, the number of firms with significant ARCH and GARCH coefficients supports the postulation that current volatility of most GCC firms' returns are time varying, are a function of past innovations and past volatility. With respect to the risk-return parameters, the number of firms with significant risk-return coefficients were few. Compared to the other GCC countries, the significant parameter coefficients in Saudi Arabia suggests that investors might be adversely affected by taking additional risks. These results are similar to Elyasiani and Mansur (1998) and Ryan and Worthington (2004) findings of negative risk parameters for banks in their studies. This is also consistent with Glosten *et al.*, (1993) study which showed a negative relationship between the trade-off risk parameter and returns.

With regard to the determinants of the risk exposure, these were identified as leverage, profitability, liquidity, growth, foreign operations and firm size. Foreign operations and firm size showed the highest influence on the level of exposure to exchange rate. For interest rate exposure, leverage, foreign operations and firm size influenced the level of exposure the greatest. Further, firm size and foreign operations significantly influenced the level of exposure to oil price fluctuations. These results are largely consistent with Al-Qaisi (2011) study that showed firm size and financial leverage as having a significant effect on the value of the firm and Bartram *et al.*, (2011) study that showed foreign operations as having a

significant effect on the level of exposure to exchange rate risk. Growth, profitability and liquidity did not exhibit significant influence on the level of exposure to the three financial risks. Further, the effect of firm size on the extent of exposure to exchange rate risk was significant for financial firms in all the GCC countries.

7.4 Implications of the study

This study has examined the daily stock returns of listed firms in the GCC countries. There exists a research gap in the GCC countries which this study contributes to filling. The effect of the three financial risks on firm values has been examined with results showing that exchange rate exposure has the highest effect on the stock returns.

This has implications in terms of the planned currency union and the need for exchange rate risk management as firms' foreign operations and size increase. With regard to a regional currency, this could have an effect of reducing the exchange rate exposure.

On the part of governments, there is need for governments to maintain a stable currency that does not fluctuate greatly exposing the firms to more exchange rate risk. The pegging to the US Dollar of the local currencies does not eliminate the

exchange rate exposure of the GCC firms. Further, as these countries open their economies to more trade, there is a need for a stable currency.

Additionally, GCC countries need to open their economies to more investment as this could have an effect of reducing market interest rates which have an effect on firm values. The relationship between exchange rate, interest rate and oil price effect on firm values have important policy implications. As argued by El-Masry (2006) there is need for policy makers to understand the link between the policies that affect exchange rate, for example, and relative wealth effects. Similarly, as oil prices have an effect on firm values, there is need for policy makers to be aware of changes in oil price level and policies that could influence the oil prices see, also, Maghyereh and Al-Kandari, 2007)

For international investors, Papaioannou (2006) argue that international investors usually manage their exchange rate risk for fundamental assets and liabilities, since exchange exposure is linked to translation risks of assets and liabilities in foreign currencies. This implies that an increased level of international investors may result in a reduction of exchange rate exposure. Masih *et al.*, (2011) argue that oil importing countries should carefully measure policies to improve energy efficiency, conservation of oil and use alternative fuels. At the same time, they need to enhance their dialogue with oil-exporting countries to increase multilateral cooperation and minimise shocks which adversely affect their economies (*ibid*). Thus, oil-exporting countries, such as the GCC countries, need to be aware of the

reactions of oil importing countries despite their benefiting from oil price increases. The oil producing countries should collaborate with oil importing countries economically to minimise the effects of oil price shocks.

For investors, knowing the risk and returns relationship of firms is most important. This study can help investors in GCC countries to understand share movements and enhance performance forecasts. Maghyereh and Al-Kandari (2007), for instance, showed that there is a nonlinear relationship between oil prices and stock market returns which could be estimated using a predictive model. This study, arguably, could increase the investors' understanding of share price behaviour. Knowing the volatility of asset returns is important in its pricing. Thus, from the results of this study, prospective investors could be hinted on which markets in the region could give higher returns relative to risk. The highest volatility of returns, for example, is observed in Qatar and lowest in Kuwait. Investors could be attracted to invest in Qatar as the average returns are also highly positive. Saudi Arabia, on the other hand showed the highest risk premiums which could make it most attractive to investors.

The findings of the study are also importance to investors and fund managers as they highlight to what extent stock returns react to the financial risks considered. This should enhance their financial decision making (El-Masry, 2006). Similarly to Masih *et al.*, (2011) study that showed that oil price volatility affects investment, this study has revealed that exchange rates, interest rates and oil price

fluctuations have an effect on stock returns. In terms of prioritisation of risk management, firms should hedge or manage exchange rate fluctuations first, then oil price movements and lastly interest rate changes. Firms in the GCC countries should adjust their risk management strategies accordingly. Further, interest rates are an analytic implication for the state of the economy. As discussed in chapter one, the interest rates in the GCC countries have been relatively constant (Espinoza *et al.*, 2012).

One of the implications relates to how the exchange rates fluctuate in the GCC countries. As Verdelhan (2010) argued, an exchange rate tied to domestic consumption growth could be more volatile as compared to one pegged to a basket of currencies. Firms need stability in their trading hence the need to manage risk, whether operational or financial risks. Further, firms should be aware of market returns and factors that could influence these returns so as to remain competitive and attractive to investors.

7.5 Limitations of the study

This study attempted to cover all the firms that were listed in the GCC countries. However, some data was not available. This forced the researcher to adjust the population and sample. Also, regarding the availability of data on stock returns of listed firms during the study period, some of the listed firms were suspended or newly listed, and thus not listed for the full study period. This persuaded the

researcher to eliminate uncompleted data from the span. Further, some data on long term interest rates was not available, except in Saudi Arabia. While these are argued to be relatively stable, it would have been elaborated if the data was available and examined.

As firms' hedging data was not available, the examination of the risk exposure of firms did not take into consideration the hedging application or firms' hedging strategies. The determinants used in this study were influenced by the data availability with the risk exposure proxied from the available data.

Another possible limitations relates to the chosen study period of 2007 to 2012. This period covers both during and immediately after the 2007 /8 global financial crisis. The financial crisis could have had an effect on the results and the inference thereof. Further comparative or robust studies to investigate the period before the crisis could have been elaborate to mitigate this possible limitation. This also provides opportunities for further research.

Further, the study was done at firm level and hence could be limited if considered at industry level. However, this is largely because some industries are represented by one listed firm only which could be unrepresentative and generalisations biased. One of the study limitations was with regard to the pilot study which was only conducted in Kuwait. This was largely due to accessibility problems to the fund and risk managers in the other GCC countries. A further limitation relates to

the interview questions. Other possible questions could have been asked to solicit more information, for instance, the specific rationale for hedging practices employed besides hedging instrument availability. However, the objective of gaining a general understanding of the risk management strategies in the GCC countries was achieved.

7.6 Suggestions for future research

This study was highly influence by the El-Masry *et al.*, (2010) study on the exposure of shipping firms' stock returns to financial risks and oil prices. This study has expanded the sample, not been limited to one industry and focussed on the GCC countries. Two models were used to measure the risk exposure and the determinants of the risk exposure.

In future research, more factors could be included to examine the effect on firm value in the GCC countries. For example, inflation could be included as a factor especially that the countries are surplus economies and susceptible to high inflation levels. More research could be done to identify the hedging process and strategies in the region.

Further, research can be extended to cover more determinants of the risk exposure than what has been used in this study. In addition, the hedging levels of the firms was not clarified in this study which could be considered as a limitation of the

study. The pilot study was aimed at partly addressing this limitation by understanding the hedging processes used in the region. However, there is still more work which should be done to address this limitation. For instance, using in-depth interviews or questionnaires could assist to shed light on the hedging processes used and the level of that hedging. If the level of hedging is known, that could contribute to give an accurate estimate for the determinants and the impact of each of the risk exposures on each other and on the stock returns.

Future research can be extended to examine individual industries as one portfolio. Furthermore, more currencies can be included in the study to determine the exchange rate risk exposure to a wide range of currencies, especially when the firms define the traded currency. Also, the adopted methodology could be implemented in extended work to examine the long run relationship of exchange rate, interest rate and oil price on stock returns.

Thus, while this research has achieved its objectives, there are opportunities for further research.

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APPENDIX ONE : EXCHANGE RATE REGIMES

Regime	Main Features	Main Benefits	Main Shortcomings	Key episodes /Comments
1. Free Float	-Here the value of foreign exchange is determined freely in the market. The exchange rates also reflect the both the actual as well as the expected changes in either the demand or the supply of goods and services.	-It does not need higher international reserves.	-The allocation of resources might be distorted by higher nominal exchange rates volatility. -The framing up of monetary policies should be done in terms of the nominal anchors.	-As a matter of practicality, there is hardly any country that is having pure float. Only countries like USA, Switzerland and Japan, together with Germany, are closer to it.
2. “Dirty” Float	-Periodic intervention of Central Bank in the foreign exchange market. -both the sterilized as well as non-sterilized interventions are not causing any change in the reserves.	-The benefits are as in free float with exception that dirty float may require very high international reserves.	-Some degree of uncertainty may be experienced because of the central bank’s failure to show transparency. -The influences of interventions are not long lasting.	-Most of the advanced economies around the globe have implemented this regime and they include Japan and Canada. -Dirty floats may be taken to be managed floats, normally with wider bands and undisclosed position that provides the criteria for the intervention.

3. Floating within a band (Target zone)	<p>-The nominal exchange rate is permitted to fluctuate freely, but within a band. The central of the band should be a fixed rate and this is done either in the form of one currency or even a collection of several currencies. Width of the band is not constant, but varies.</p>	<p>-This is bringing together the importance of bits of flexibility along with credibility. -Expectations of the public are guided by the primary parameters i.e. midpoints and bands. -The absorption of shocks is aided by the changes of the nominal rates within bands.</p>	<p>-In certain scenarios, the entire system may be destabilizing and this may make it prone to some kinds of speculative attacks, more so with the very narrow bands. There is no triviality when choosing the band width- -weakening of the credibility is achieved via the systems that are making it possible to do a realignment to the bands as well as the central parity.</p>	<p>-An example of the regime is the exchange rate mechanism of - ERM crises that occurred in the years between 1992 and 1993 did indicate that this system is capable of being put under intense speculative pressures.</p>
4. Sliding Band	<p>-The authorities concerned do not show any commitments to indefinitely maintain central parity. -The entire system is in fact an adaptation of band regime to the cases of economies that experience high inflation.</p>	<p>-This system is permitting nations that experience the present inflation greater than that experienced by other countries around the globe to adopt it minus waiting to experience a number of appreciations.</p>	<p>-Some amount of uncertainty is brought about by the fact that the amount of central parity adjustment together with the timings are not known. This is leading to higher interests rate volatility. -It is not easy choosing the appropriate bandwidth and this is common with all the standard bands.</p>	<p>-From as early as 1989- 1991, Israel was having a system that was the same as this -Uncertainty together with volatility that are connected with this system is making it less attractive compared with the other available options like the crawling band.</p>
5. Crawling Band	<p>-This is a kind of band system where central parity does crawl but with time. -A number of rules may be applied in the determination of the</p>	<p>-Permits for higher inflation nations to implement the band systems minus taking larger stepwise</p>	<p>-Selection of the criteria for the setting of the crawl rate has some perils e.g. backward looking method will lead to the experience of inflationary inertia in the system.</p>	<p>-In December, 1991, this system was implemented in Israel. Chile did the same in the year 1986 to 1998. Italy also used it in the year 1979 as well</p>

	rates of crawl. These include the backward looking crawl and the forward looking crawl.	modifications of central parity.	On the other hand, forward looking method will or may set a wrong inflation target.	as in 1991.
6. Crawling peg	<ul style="list-style-type: none"> -Nominal exchange rates are periodically modified and its fluctuation is not allowed to go beyond a narrow range: 2% for example. -One of the systems of the variant is consisting of adjustment of the nominal rate by a rate that is pre-announced. 	<ul style="list-style-type: none"> -Higher inflation countries are permitted to avoid extreme real exchange rates overvaluation -tablet variant is used in order to guide expectations of the general public as well as buying a limited amount of credibility. 	<ul style="list-style-type: none"> -The pure backward looking crawling peg is situation where nominal rates are mechanically modified taking into account past inflation. It results in inflationary inertia. -It is not easy accommodating changes in the real exchange rates. 	-The system increasingly became popular in the year 1960s moving to 1990s in countries such as Brazil, Chile and Colombia.
7. Fixed but adjustable exchange rate	<ul style="list-style-type: none"> -This regime was epitomized by Bretton woods system. It fixes the annual exchange rate. - It recognises that parity devaluations are in fact powerful policy tools. 	<ul style="list-style-type: none"> -It is providing for the microeconomic discipline through the maintenance of the prices of commodities in line with foreign prices. -There is a built in escape clause that is permitting those in charge to do devaluations if need arises and thus is giving the system some sort of flexibility. 	<ul style="list-style-type: none"> -Devaluations also called realignments under the system are particularly large as well as disruptive, that is, introducing not only inflationary pressure but also some uncertainties instead of bringing events that are smooth and orderly. 	<ul style="list-style-type: none"> -It is the most liked regime of the century. -Quite a number of the upcoming countries are continuously buying into the system defector. An example is Mexico in the year 1993 and Thailand in the year 1997.

8. Currency board	- Monetary authority is the only body that has the permission to issue domestic money, especially when it is having full support of the foreign exchange.	-This system maximizes credibility as well as reduces the various problems concerning the inconsistency of time.	-This system is in fact short on flexibility but long on credibility. A bigger number of the external shocks cannot be absorbed during exchange rates though must be taken care of by the changes in unemployment as well as in economic activities.	-As contained in history, a small number of countries has tried to use this type of systems. Some of these countries were never successful. These countries had to abandon the regime when they were faced with severe external shocks.
9. Full 'dollarization'	-This is the generic name that is given to the extreme form of currency board system. This is where the country completely gives up the autonomy of its monetary policy through the adaptation the currency of a different country.	-The maximization of credibility is only achieved in this regime. The varying monetary authorities have theoretically no right to surprise the general public.	-Just as in the currency board, this is a system that is long on credibility while at the same time short on flexibility. The severe shocks will need to be absorbed by the real economy fully. -In this case the central bank will lose its role of being a lender of the last resort. -The problem with this system is that it is sometimes resisted both on political grounds as well as on nationalistic grounds.	Few historical records of full dollarization exist. A similar regime did work well in Panama. Something was also seen in Liberia, though it had some problems when Liberia plunged into civil war. The politicians decided to change everything and in fact did issue a national currency.

APPENDIX A : CORRELATION COEFFICIENTS OF EXPLANATORY VARIABLES.

Appendix A.1: Bahrain

Bahrain	6MLB	EUR	BHA	AED	JPY	GBP	OIL	USA
6MLB	1.0000							
EUR	-0.0304	1.0000						
BHA	0.0361	-0.0738	1.0000					
AED	-0.0170	0.0322	0.0001	1.0000				
JPY	-0.0253	0.1552	0.0372	-0.0113	1.0000			
GBP	-0.0029	0.1282	-0.0316	0.0254	-0.0431	1.0000		
OIL	0.0150	-0.3880	0.1281	-0.0107	0.1139	-0.1050	1.0000	
USA	-0.0353	0.0046	-0.0158	-0.0724	-0.0249	-0.0034	0.0052	1.0000

Notes: Table A.1 present the correlation coefficient in actual changes of the explanatory variable. 6MLB is the 6 months labour rate, EUR present the exchange rate return EURO/BHD, BHA present Bahrain market index, AED exchange rate AED/BHD, JPY is the exchange rate change JPY/BHD, GBP is present the change between GBP and BHD GBP/BHD, OIL present the change in return of crude oil, USA present USD/BHD.

Appendix A.2: Kuwait

Kuwait	CNY	INT6M	JPY	KUW	OIL	USD	AED	EUR
CNY	1.0000							
INT6M	0.0472	1.0000						
JPY	0.0907	0.0113	1.0000					
KUW	0.0126	-0.0397	0.0732	1.0000				
OIL	0.0056	0.0419	0.1182	0.0544	1.0000			
USD	-0.3868	-0.0382	-0.2117	-0.0168	-0.1120	1.0000		
AED	0.3007	0.0276	-0.0051	0.0106	0.0872	-0.3119	1.0000	
EUR	0.0589	0.0044	-0.0536	0.0158	0.2106	0.0902	-0.2986	1.0000

Note: Table A.2 present the correlation coefficient between the actual independent variables. CNY is CNY/KWD represent CNY, INT6M represent the 6 months inter bank loan, JPY/KWD represented the JPY exchange rate, KUW the Kuwait market index, oil price exchange return of crude oil, USD/KWD represent USD, AED is the changes in AED/ KWD and EUR changes in EUR/ KKWD.

Appendix A.3: Oman

Oman	AED	EUR	GBP	JPY	OIL	OMAN	ORL	USD
AED	1							
EUR	0.048495	1						
GBP	0.027394	0.668228	1					
JPY	-0.02156	0.101869	-0.08881	1				
OIL	-0.0417	-0.3601	-0.3604	0.086438	1			
OMAN	-0.01508	-0.12259	-0.10353	0.097414	0.180758	1		
ORL	0.019713	0.071987	0.013656	-0.01719	-0.06864	0.04885	1	
USD	-0.02376	0.023402	0.01908	0.00071	-0.02178	0.0014	-0.00841	1

Notes: Table A.3 presents the correlation coefficient for explanatory variables for Oman market. AED is the changes in the AED/OR exchange rate, EUR is the changes EUR/OR exchanges rate, GBP is the changes in the GBP/OR exchanges rate, JPY is the changes JPY/OR exchanges rate, OIL is the crude oil changes returns, ORL is the changes in the ORL/OR exchanges rate and USD is the changes in the USD/OR exchanges rate.

Appendix A.4: Qatar

Qatar	INR	EUR	JPY	KRW	OIL	QAT	SGD	6MD
INR	1							
EUR	0.341633	1						
JPY	-0.13301	0.134447	1					
KRW	0.37828	0.26898	-0.16797	1				
OIL	-0.27513	-0.38715	0.152864	-0.23386	1			
QAT	-0.17375	-0.10933	0.112908	-0.2906	0.118736	1		
SGD	0.412444	0.613308	0.004827	0.444006	-0.33511	-0.08697	1	
6MD	-0.02381	0.040365	0.01037	-0.02716	-0.01497	0.043562	0.002159	1

Notes: Table A.4 present the correlation coefficient for independent variable in Qatar model. INR represent the INR/QR, EUR/QR represent EUR exchange rate, JPY/QR is present exchange rate JPY, KRW present KRW/QR exchange rate, OIL present the return in Crude oil, QAT Qatar market index, SGD is the changes in SGD/QR, 6MD is present six months deposit.

Appendix A.5: Saudi Arabia

KSA	10YINR	6MINR	CNY	EUR	KRW	JPY	OIL	SAUDI	USD
10YINR	1								
6MINR	0.067195	1							
CNY	0.019092	0.020598	1						
EUR	0.040817	-0.00833	0.152735	1					
KRW	-0.01597	0.017533	0.05681	0.273637	1				
JPY	0.128308	0.018514	0.025554	0.139065	-0.1644	1			
OIL	0.115447	-0.00721	-0.03424	-0.21616	-0.12907	0.127435	1		
SAUDI	0.047771	-0.02762	-0.04395	-0.17689	-0.30472	0.141714	0.166686	1	
USD	-0.06292	-0.03639	0.15032	0.02441	-0.07039	0.038331	0.008232	0.036349	1

Notes: The table A.5 present the correlation coefficient of the explanatory variable in Saudi Arabia. 10YINR represent the changes in 10 years treasury bills, 6MINR represent the changes in 6 months interbank loan, CNY is the changes in CNY/SR exchange rate, EUR is the changes in EUR/SR exchange rate, KRW is the changes in KRW/SR exchange rate, JPY is the changes in JPY/SR exchange rate, OIL change in Crude oil price, SAUDI is the changes in Saudi Market and USD is the changes in USD/SR exchange rate.

Appendix A.6: United Arab Emirates

UAE	6MINT	CNY	EMART	EUR	INR	JPY	KRW	OIL
6MINT	1							
CNY	0.007394	1						
EMART	-0.13066	-0.03605	1					
EUR	-0.01514	-0.08763	0.053769	1				
INR	0.0028	-0.03442	-0.01229	0.005207	1			
JPY	-0.02932	0.02785	0.08436	-0.11553	0.013584	1		
KRW	0.002253	0.02532	-0.00649	0.029884	-0.21454	-0.0098	1	
OIL	-0.02691	-0.06919	0.19384	0.295553	0.007851	0.095248	-0.02274	1

Notes: Table A.6 present the correlation coefficient of the explanatory variables in United Arab Emirates. 6MINT present the 6 months inter bank loan, CNY is the changes in CNY/AED exchange rate, EMART is the change in Emirate market, EUR is the changes in EUR/AED, INR is the changes in INR/AED exchange rate, JPY is the changes in JPY/AED exchange rate, KRW is the changes in KRW/AED exchange rate, OIL is the changes in crude oil.

APPENDIX B: MULTICOLLINEARITY

BAHRAIN	Market	OIL	IR- ST	JPY	EUR	USD	AED	GBP	IR-LT
VIF	1.020	1.238	1.004	1.069	1.253	1.008	1.008	1.024	NA
KSA	Market	OIL	S- term IR	JPY	EUR	USD	CNY	KRW	
VIF	1.145	1.104	1.008	1.117	1.216	1.038	1.049	1.210	1.041
KUWAIT	Market	OIL	IR	JPY	EUR	USD	AED	CNY	NA
VIF	1.010	1.116	1.006	1.080	1.227	1.305	1.331	1.283	NA
OMAN	Market	OIL	IR	JPY	EUR	USD	AED	GBP	NA
VIF	1.038	1.183	1.008	1.067	1.782	1.007	1.002	1.759	NA
QATAR	Market	OIL	IR	JPY	EUR	INR	SGD	KRW	NA
VIF	1.117	1.273	1.006	1.130	1.826	1.340	1.941	1.446	NA
UAE	Market	OIL	IR	JPY	EUR	INR	CNY	KRW	NA
VIF	1.062	1.156	1.018	1.039	1.128	1.050	1.013	1.051	NA

Notes: The table presents the multicollinearity in the GCC countries. VIF stands for variance inflation factor. KSA is Saudi Arabia, UAE is United Arab Emirates, S-term IR is short term interest rates and IR-LT represents long term interest rates.

APPENDIX C: CORRELATION IN DETERMINANTS

Appendix C.1: Bahrain

Bahrain	TA	MVBV	FA	FS	DPA	ROA	TDTA	QR
TA	1							
MVBV	0.043038	1						
FA	0.251904	-0.03718	1					
FS	-0.01162	0.389397	-0.06802	1				
DPA	-0.05328	0.001637	-0.13119	-0.16949	1			
ROA	-0.15463	0.01234	-0.16544	0.109699	0.409872	1		
TDTA	0.40866	0.137129	0.088595	0.025469	-0.28389	-0.28035	1	
QR	-0.20179	-0.07788	-0.10837	-0.03068	0.045329	0.09387	-0.18552	1

Appendix C.2: Kuwait

Kuwait	TA	MVBV	TDTA	QR	ROA	FA	FS	DPA
TA	1							
MVBV	0.060697	1						
TDTA	0.35294	0.081249	1					
QR	-0.31174	0.00815	-0.18971	1				
ROA	-0.14932	0.021984	0.059085	0.199825	1			
FA	0.186214	0.042635	0.259674	-0.14795	0.0163	1		
FS	0.037689	0.02641	0.014064	0.009672	0.077643	-0.0355	1	
DPA	-0.12736	0.025225	0.122962	0.142352	0.423609	-0.03544	0.025641	1

Appendix C.3: KSA

KSA	QR	FA	FS	DPA	MVBV	ROA	TA	TDTA
QR	1							
FA	0.040198	1						
FS	-0.08807	-0.08916	1					
DPA	0.059873	0.03612	-0.07235	1				
MVBV	0.049516	0.013389	-0.01864	0.042337	1			
ROA	0.24429	0.109542	-0.06357	0.505219	0.080874	1		
TA	-0.17503	0.018308	0.017003	0.166541	0.04811	0.09746	1	
TDTA	-0.12797	0.100739	0.063862	-0.06299	0.014152	-0.0172	0.293287	1

Appendix C.4: Oman

Oman	TA	FA	FS	MVBV	QR	ROA	TDTA	DPA
TA	1							
FA	0.095029	1						
FS	0.157798	0.038731	1					
MVBV	0.174064	0.015733	0.065478	1				
QR	-0.05171	0.006129	-0.01459	-0.00792	1			
ROA	0.153468	0.067458	0.036343	0.158555	0.029621	1		
TDTA	0.081489	-0.05005	0.07556	-0.10092	-0.08757	-0.20195	1	
DPA	0.358332	0.033557	0.040572	0.184026	-0.00253	0.380941	-0.18562	1

Appendix C.5: Qatar

Qatar	TDTA	ROA	QR	MVBV	TA	FS	FA	DPA
TDTA	1							
ROA	-0.16418	1						
QR	0.011364	-0.00685	1					
MVBV	-0.20338	0.078731	-0.09475	1				
TA	0.445731	0.102983	-0.01259	-0.03889	1			
FS	0.308655	-0.04517	-0.03287	0.024325	0.274288	1		
FA	0.31053	-0.08616	-0.06116	0.029762	0.341195	0.87892	1	
DPA	0.029116	0.217038	-0.13885	0.104277	0.275413	-0.06483	-0.11204	1

Appendix C.6: United Arab Emirates

UAE	TDTA	ROA	QR	MVBV	TA	FS	FA	DPA
TDTA	1							
ROA	-0.14303	1						
QR	-0.0742	0.291727	1					
MVBV	0.033191	-0.12288	-0.06289	1				
TA	0.171542	-0.16155	-0.15653	0.030454	1			
FS	0.142391	-0.01269	0.074004	-0.08682	0.107163	1		
FA	0.14898	-0.08383	-0.04602	-0.02802	0.137679	0.345762	1	
DPA	-0.20842	0.235611	-0.04851	-0.0334	0.037732	-0.02354	-0.0031	1

Notes: The tables C.1 to C.6 presents the correlation in determinants for each GCC country. The explanatory variables are represented by TD/TA which is the ratio of total debt to total asset, QR is the quick ratio, ROA is return on asset, DPA is dividend payout, FS is foreign sales, FA is foreign assets, MV/BV is ratio of market value to book value and TA is Total assets. The correlation results are at a 5 per cent level of significance.

APPENDIX D: INTERVIEW QUESTIONS

Risk Management Practices in Kuwait Companies Interview Questions

Part A: General questions:

- 1) What are the major risks faced by your organisation? Rank the risk from (1-5) according to the most your company faces.

Type of risk	1	2	3	4	5
Market risk					
Interest risk					
Exchange rate risk					
Commodity risk (oil)					
Equity risk					
Volatility risk					
Credit risk					
Liquidity risk					
Operational risk					
Legal risk					
Political risk					

- 2) Does the risk threaten the existence of your company?

- a. Yes, how?
- b. No

- 3) Is there a department or corporate policy for tackling the risks that the company faces?

- a. Yes
- b. No

- 4) From the table below, choose the most appropriate category of answers (1=Less serious/less likely, 5=Most severe or most likely)

Item	1	2	3	4	5
Macro-economic risk factors like interest rates or exchange rates will affect our operations					
We always transfer our risks					
We accept the risks					

- 5) How do you measure risks in your company?
.....
.....
.....
- 6) What is the cost of measurement and do you satisfy with that cost?
.....
.....
- 7) Do you have effective risk management policies?
a) Yes(justify what this policy)
.....
b) No. why (see below)
(i) can you refer not using risk management to the company doesn't expose to risk and the risk not significant?
.....
(ii) Can you refer not using the risk management tools related to rare of the knowledge and experts?
.....
.....
- 8) To what extent you face a problem in estimating the risk?
.....
.....
- 9) Do you use the derivatives in your company?
Yes (go to q12)
No (go to q 13) justify why?
.....
.....
- 10) What type of risk can be hedged by derivatives (what is the quantity of the exposure can be hedged)?
.....
.....
- 11) What other techniques that have been used to hedge your company risk?
.....
.....
- 12) Do you think that the benefits of using risk management policies exceed the expected cost?
.....
.....

Part B: Foreign Exchange risk:

13) Do you use exchange risk management?

- i. Yes (see 17)
- ii. no (see 19)

14) (i) How long have you been using this technique?

.....

(ii) Do you find it useful to reduce the risk?

.....

(iii) Is there any alternative technique that you wish to use to manage the foreign exchange risk?

.....

(iv) Do you think your firm will keep using this technique?

.....

15) What is the reason for not using any kind of exchange risk management?

i) We do not face any kind of exchange risk

.....
.....

ii) We do not know how to deal with it? Please justify:

.....
.....

iii) We do not have Experience.

.....
.....

iv) Cost exceeds the benefits.

.....
.....

16) Do you sell your forward contract?

.....
.....

17) Do you buy a put option?

.....
.....

18) Do you use the swap technique?

.....
.....

19) If you have payment to a foreign country, in which currency you pay?
.....
.....

Part C: Interest rate:

20) Do you face the interest rate risk?

- (i) Yes (see q22)
- (ii) No (see 26)

21) Do you manage it?

- (i) Yes (see q 23)
- (ii) No (see q 24)

22) Which technique do you use? Please justify:

.....
.....

23) Do you face any kind of difficulty to manage this kind of risk?

.....
.....

24) Do you think managing this kind of risk will not add more value to your company?

.....
.....

25) If you are not facing interest rate risk, why?

.....
.....

Part D: Oil price:

27) Do you consider your company under pressure from the fluctuation in the oil price?

- (i) Yes
- (ii) No

28) Do you think this kind of risk could affect the company value?

- (i) Yes
- (ii) No

29) Can your company manage this kind of risk?

- (i) Yes
- (ii) No

30) To what degree do you think that this kind of risk could be measured?
.....
.....

31) Do you hedge this risk? How?
.....
.....

Part E: General risk management questions:

32) Do you change the methods that you have been using to manage the risk?
Why?
.....
.....

33) Why do you think that your company is not involved in risk management?
.....
.....

34) What is your view about the risk management strategies in controlling foreign
exchange risk exposure by the company?
.....
.....

35) What do you do when you face risk and you cannot avoid it?
.....
.....

36) To what extent do the amounts of the exposure affect the hedging?
.....
.....

37) What is the determinant of the type of financial instrument used in hedging?
.....
.....

38) Does your firm use any of the following methods for evaluating the riskiness
of specific derivatives transactions or portfolios?

- a) Value at risk
Explain:
- b) Stress testing or scenario analysis
Explain:
- c) Option sensitivity measures (delta, gamma, Vega)
Explain:
- d) Price value of a basis point (change value of 0.01)
Explain how:

- e) Duration
Explain how:
- f) Other like :
- g) Forward, swaps, option, futures

.....

39) Has your approach in dealing with risk changed (for example, because of the financial crisis)?

How do you assess the risk?

.....
.....

40) Concluding Questions

(i) Overall, what is the impact of risk management policies on your company?

.....
.....

(ii) What are the most problematic areas in risk management?

.....
.....

41) Gender

- (i) Male
- (ii) Female

42) What is the name of your company?

.....
.....

43) What is your age?

- (i) 20-30 years old
- (ii) 30-40 years old
- (iii) 40-50 years old
- (iv) 50-60 years old

44) For how long have you been working for this company?

.....
.....