HAIGAZIAN UNIVERSITY

THE INFLUENCE OF OIL AND OTHER MACROECONOMIC VARIABLES ON GCC STOCK MARKETS

By

LOUCINE KHATCHIG BASMAJIAN

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By

LOUCINE KHATCHIG BASMAJIAN

Approved by:

Dr. Samih Antoine Azar, **First Reader**

Associate Professor of Business Administration and Economics

Faculty of Business Administration & Economics

Dr. Hassane Saadeh, **Second Reader**

Assistant Professor of Business Administration

Faculty of Business Administration & Economics

Date of Thesis Presentation: January 22, 2013

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AN ABSTRACT OF THE THESIS OF

Loucine Khatchig Basmajian **For** **Master in Business Administration**
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THE INFLUENCE OF OIL AND OTHER MACROECONOMIC VARIABLES ON GCC STOCK MARKETS

This research paper performs an empirical investigation on the impact of oil and other macroeconomic variables on the stock market returns of the Gulf Cooperation Council countries. The study employs daily data from January 2008 to October 2012, a period during which the world economy suffered from a deep financial distress. Using the least square method, the research concludes that the GCC stock returns are mostly influenced by Saudi and Jordanian stock returns. This proves that the GCC countries are highly integrated with each other as well as with other Arab countries. Using Granger-causality, however, the study establishes that the Saudi Arabia, Kuwait, Qatar, and Oman markets are highly affected by the lagged values of the dependent and the independent variables and finds some evidence of inefficiencies in these markets. Moreover, and most importantly, the study concludes that oil returns affect the Saudi Arabia, Kuwait, Qatar and Bahrain markets in a nonlinear manner.

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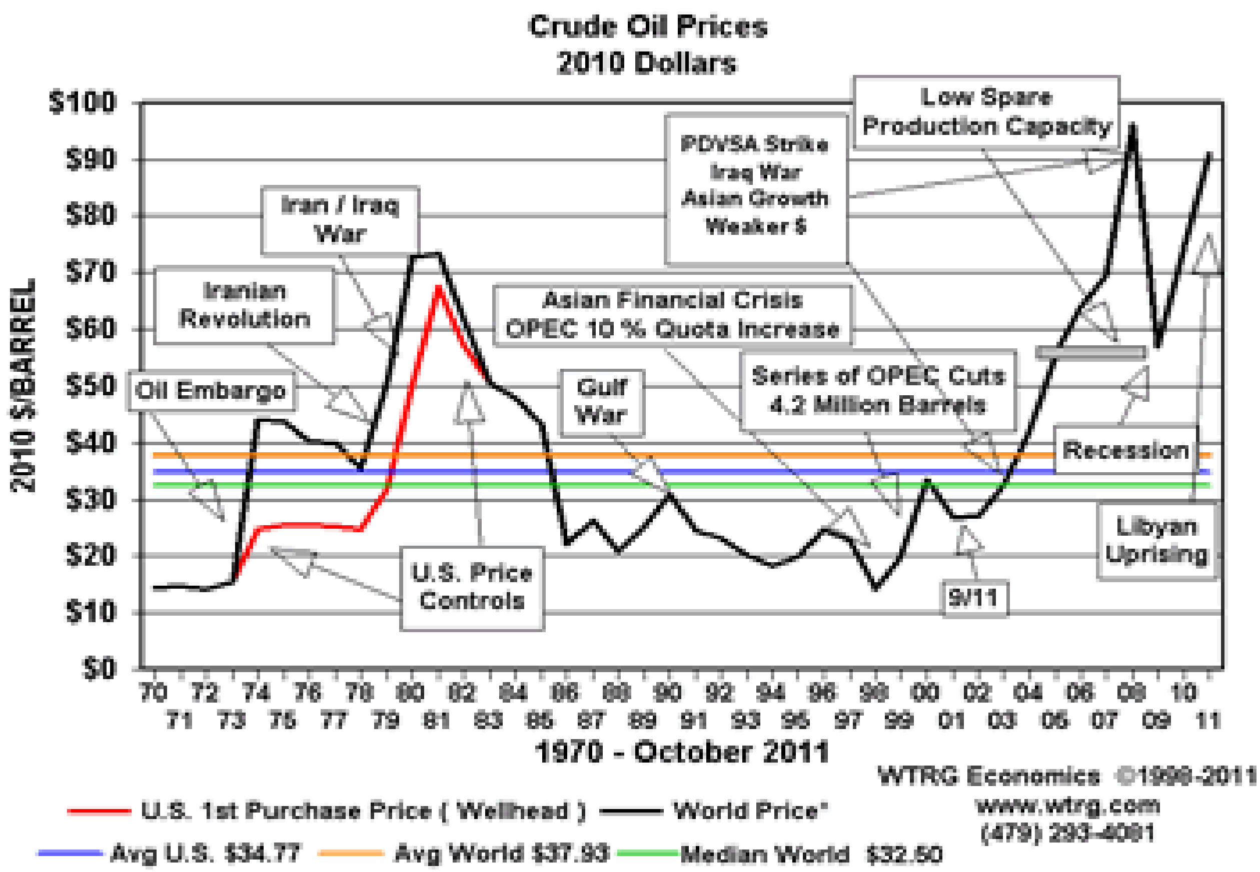
I. INTRODUCTION

In a period of recovery from a deep financial distress, it is important to note that though the world economy has not regained its pre-crisis situation, oil prices have gained momentum and are on a rise.

Remarkably, oil price increases have been an important factor in all of the last three major recessions. The oil price rise in the wake of the Iranian revolution in 1979 initiated the 1980-83 recession, the short lived but influential increase at the start of the Iraq war in 1991 led to a small but intense recession during 1991-92, and the dramatic hike to nearly $150 a barrel helped burst the housing bubble and spread the distress of a global financial crisis.



Oil is a scarce yet a vital resource for the growth of the world economy and given that its demand is price inelastic, it is mostly the supply that influences the movement of oil prices. Since a huge sum of this supply is centered in the hands of 3 main GCC countries: Saudi Arabia, Kuwait, and the United Arab Emirates that together capture about 45% of the proven world oil reserves, studying how oil prices affect these highly oil dependent countries is worthwhile.

The Gulf Cooperation Council was established in Abu Dhabi on the 25^{th} of May 1981. The council is an economical and a political alliance of the Arab states bordering the Persian Gulf, namely Saudi Arabia, Oman, United Arab Emirates, Qatar, Bahrain, and Kuwait. These six countries are major exporters of oil in the global energy market but at the same time major importers of manufactured goods from oil importing countries. Thus, the transmission mechanism of oil price fluctuation shocks to GCC economy and stock markets totally differs from that of net oil importing countries such as UK and USA.

In the GCC markets, a rise in oil prices has a positive impact on corporate output and earnings and thus stock returns. Yet in net oil importing countries, such hikes negatively impact corporate profits by increasing costs of production. Here, the corporation is faced with two choices: either transfer the encountered losses of profits to investors by decreasing the dividends or cover up those losses by increasing prices of goods and services sold to customers. If the diminished earnings are portrayed in the dividends, then stock prices and returns directly decrease. However, if they are offset by increasing prices, then inflationary pressures are imposed on the countries in which these goods and services are produced as well as on the countries that import these manufactured products. Since GCC countries are importers of finished goods from oil importing countries, then oil price increases negatively impact their markets by stimulating inflationary pressures. Therefore, the final impact of an oil price shock on the GCC stock markets depends on whether the positive or the negative influence counterweighs the other.

Referring to Table 1, it is noticeable that the inflation rate reached its peak in 2008 at the same time when oil prices hit their all time highs of about $150/barrel. Moreover, the table also shows how the central banks of the GCC countries counteracted those immense inflationary pressures by increasing interest rates. In 2009, interest rates hit unordinary levels of more than 20%, even 40% in Oman and Qatar. These huge increases in interest rates calmed down inflationary pressures and brought them back to normal levels but, at the same time, they could have made bonds more attractive and caused huge drops in stock prices and returns. It is this dilemma that is going to be uncovered in the research: Whether oil price shocks had the final say in the fluctuations of GCC stock returns, or whether other factors counterweighed oil effects.

The paper contributes to the literature on the relationship between oil prices and GCC stock markets because it studies the intriguing and different transmission mechanism of oil price fluctuations on GCC stock returns in a period of global financial turmoil. It also uncovers the impacts of other macroeconomic variables: S&P 500 index return, T-bill and Baa bond rates and Jordanian stock returns, and investigates the significance of each and every variable.

The paper is structured as follows: The upcoming section provides the literature review of previous studies on the relationship of oil prices and GCC stock markets. The following section presents the data and the methodology used in the study. Next, the paper reports the empirical results and the interpretation of the outcomes. Finally, the last section presents the conclusion of the study and the recommendations.

II. LITERATURE REVIEW

The most invoking rationale for using oil price changes as a factor affecting stock prices is that the price of any stock is the summation of the discounted values of expected future cash flows.

$$Ps = \sum E(PV \quad of \quad CF) = E(CF)/E(r)$$

Where Ps is the stock price, PV is the present value, CF is the future cash flow, r is the discount rate and E (.) is the expectation symbol.

According to Huang et al. (1996), since these cash flows are highly affected by macroeconomic variables, and in turn, economic activities are greatly influenced by oil price changes, then oil price shocks are said to have a huge influence on stock price valuation. This influence can either be beneficial or detrimental depending on whether the company is a net producer or a net user of oil. Most of the world economy is a net consumer of oil because oil is an essential resource in the production of most goods and the creation of many services. Thus, oil price increases are expected to induce production cost hikes in almost all the net oil-importing countries and accordingly stimulate future cash flow reductions and stock price declines.

Moreover, it is noteworthy that oil price fluctuations not only have an impact on stock prices but also on stock returns. The realized return can be approximately expressed as:

$$R = \partial(E(CF))/E(CF) - \partial(E(r))/E(r)$$

Where R is the realized stock return and ∂ (.) is the differential symbol.

Since the discount rate is made up of both the expected inflation rate and the expected real interest rate, both of which are affected by oil prices, then oil price fluctuations are said to have huge effects on discount rates. These effects are as well dependent on whether the country is a net exporter or a net importer of oil. However, independent of the country's nature, oil price increases lead to higher inflation rates. To counteract such inflationary pressures, most central banks undertake contractionary monetary policy and increase interest rates making bonds much more attractive than stocks. Thus, both inflation and real interest rates put upward pressures on the discount rate and, in turn, exert a downward pressure on stock returns.

Furthermore, oil price hikes affect exchange rates as well. Since USA is a net importer of oil, oil price increases dampen its balance of payments and accordingly put a downward pressure on the US dollar's foreign exchange rate. Since the currencies of the five GCC countries, except for Kuwait whose currency is set according to a basket of currencies but of which 70% is represented by the US dollar, are pegged to the US dollar; therefore, any depreciation in the dollar directly causes a drop in the GCC countries' currencies. Moreover, since oil prices are quoted in dollar, such depreciations cause oil price hikes as investors shift their investments from value losing currencies to high value commodities such as oil or gold.

The cycle of how most macroeconomic variables such as interest rates, exchange rates, and even gold prices and not just oil prices are all linked to stock prices and returns causes an intrigue to discover and research how these linkages occur. Moreover, the remarkable and different transmission mechanisms of these variables, especially oil, on the GCC stock markets makes the Gulf Cooperation Council countries even more worthy of this research than any other developed or emerging country.

Reviewing the literature of many previous researchers, it is noticeable that most of them focused on the impact of oil price shocks on the economic activities and stock markets of developed countries. The paper by Jones and Kaul (1996) paved the way for all other literature towards discovering the phenomenon of oil price shocks on stock price returns. They used the standard cash flow/dividend valuation model to investigate whether the effects of oil price shocks on the stock markets of USA, Canada, Japan, and UK could be explained by current and future changes in real cash flows and/or by changes in expected stock returns. Moreover, this method allowed them to identify whether these markets are rational or if they overreact to new information.

These pioneer researchers studied the postwar period when oil price increases Granger-caused most economic activities and had considerable and detrimental effects on the stock markets of all four developed countries. However, the evidence suggested that only the US and Canadian markets are rational. The reactions of the US and Canadian stock prices to oil price shocks were accounted for by their impact on expected future cash flows. On the other hand, the impacts of oil shocks on expected future cash flows were unable to explain the variations in the Japanese and UK stock prices. Therefore, Jones and Kaul believed that the volatility generated by oil price shocks in the Japan and UK stock markets was not justified by rational asset pricing models.

Huang et al. (1996) also studied the US equity market and investigated the interaction between oil futures prices and US stock prices. Their study examined two main issues: The extent to which oil futures prices and stock markets are simultaneously correlated and the degree to which changes in one market lead or lag the returns in the other market.

They asserted that in efficient markets, oil futures prices and stock prices must be contemporaneously correlated as each market would directly react to new information. However, using simple bivariate cross-correlation, they found no evidence of any simultaneous correlation between oil and stock returns, except for some oil company returns. Using daily data for the period of the 1980s, they proceeded with a multivariate VAR approach and investigated the existence of lead, lag, or feedback interactions between the two markets and discovered that oil futures lead only petroleum stock indices and three main petroleum stocks: Chevron, Exxon and Mobil, but did not detect any impact on a broad based index such as the S&P 500.

On the other hand, Ciner (2001), using the exact same data as Huang et al. (1996) applied the modified Baek and Brock test, fully developed in Hiemstra and Jones (1994), and examined the nonlinear linkages between oil price changes and stock returns. He demonstrated the existence of significant nonlinear Granger causality from oil futures returns to S&P500 index returns. He believed that the methods used by Huang et al were not powerful enough to detect such nonlinear relationships.

To further explain the nonlinear linkages between these two markets, Ciner (2001) referred to Cochrane's treatment of asset-pricing models. Cochrane (2001) suggested that returns on oil futures and stock markets are linked through a stochastic discount factor. He added that if this link depends on the properties of the discount factor, then inflation rate plays a significant role in the transmission mechanism. Since the risk-free component of the discount factor is composed of expected inflation rate and real rate of return, then inflation rate shocks are likely to create a link between oil and stock returns.

According to Ciner and to a number of esteemed authors: Mork (1989); Hamilton (1996, 2000); Balke et al. (1999) and Mork et al. (1994), the relationship that exists between oil prices and economic activity as well as stock returns is nonlinear. Moreover, many researchers have found that this nonlinear linkage is an asymmetric one as increases in oil prices are much more influential than decreases in oil prices.

Corresponding to Ciner's finding and contradicting with Huang et al, Sadorsky (1999) also showed a major link between oil price movements and stock market returns. Using variance decomposition and impulse responses, he studied the relationship of four major market elements: Industrial production, interest rates, oil prices, and stock returns. He found that oil price shocks impact US economic variables, but movements in US economic variables have little or no impact on oil prices. Thus, he asserted the existence of a unidirectional influence from oil to stock market returns.

Sadorsky showed that in an efficient stock market, oil price and interest rate shocks immediately cause a decline in stock prices and accordingly dampen stock returns. Interestingly, oil price shocks already cause interest rates to rise. As oil price increases are indicative of inflationary pressures, rising prices of manufactured goods are indicative of the future of interest rates and investment types. To counteract the inflationary impact of oil price increases, central banks respond by increasing interest rates. This increase in interest rates makes bonds more attractive to investors and causes a huge drop in stock prices.

Basher and Sadorsky (2006), using an international multi-factor model, found that future oil demands are highly correlated with the growth in industrial production. They argued that if rising oil demands are not offset by rising supplies, then prices of oil rise as well. According to Basher and Sadorsky, oil price hikes cause inflation taxes on consumers and producers. These taxes, in turn, decrease the income of consumers left to purchase other goods and increase the production costs of goods producing companies. Producers, unable to pass their losses unto consumers, transfer these losses to the key drivers of their stock prices, the dividends.

They also noted that globalization, the increased flow of goods, services, and financial capital among nations, heightened the interdependencies among all the economies in the world and enhanced the flow of investment money as well. Though emerging markets are influenced by oil price fluctuations more than developed markets due to their increased dependency on energy for their development, the impacts of oil price fluctuations are as well transferred to international investors who diversify their portfolios by investing in the stocks, bonds, or mutual funds of the emerging markets.

Due to this increased interest of international investors in the markets of emerging countries, many researchers investigated the effects of oil price changes on the stock returns of various emerging countries, especially the Gulf Cooperation Council countries that are rich in oil reserves.

Papapetrou and Hondroyiannis (2001) examined the movements of foreign stock markets along with four economic variables, industrial production, interest rate, exchange rate and oil prices, and studied their effects on the performance of the stock market in Greece.

Using unit root tests, they first asserted that all variables except for the foreign and domestic stock returns are integrated of order one, thus verifying that the time series contained autoregressive unit roots. After confirming that the variables are not cointegrated, they used the multivariate vector autoregressive model and established that stock returns in Greece are determined by the movements of all four macroeconomic variables. They found that real stock returns are positively correlated with exchange rate changes and negatively correlated with interest rates, real oil prices and industrial production shocks.

Proceeding with variance decomposition and impulse response analyses, they established that each of the variables can be explained by disturbances in the other variables. They showed that currency depreciations create inflationary pressures and accordingly a rise in interest rates. They added that such depreciations make the production of the domestic industry cheaper for foreign markets; thus, leading to increased demand on domestic products and resulting in higher profitability and higher domestic stock returns. Heightened interest rates, however, create negative shocks in the domestic production and accordingly dampen stock prices. Such interest rate rises are also caused by oil price hikes. These hikes cause huge declines in the earnings of companies and these lost earnings are then transferred to investors who earn fewer dividends eventually leading to dampened stock prices. Finally, they asserted that though these domestic macroeconomic variables influence the Greek stock market, stock price fluctuations do not rationally signal any change in these variables.

Hammoudeh collaborated with both Aleisa (2004) and Choi (2006) to study the effects of oil price shocks on GCC stock markets. In his collaboration with Aleisa, Hammoudeh examined two main objectives. First, whether GCC stock markets were linked, and if Saudi Arabia were in fact the leader, and second whether there was a unidirectional or bidirectional relationship between NYMEX oil futures prices and GCC stock markets. Using vector error correction models on a daily data extending from February 15, 1994 till December 25, 2001, they found that Saudi Arabia leads the long term relationships with the other GCC markets followed by UAE and Bahrain. The dominant characteristic of Saudi Arabia is not at all surprising given that it is the largest economy among all the GCC countries. Moreover, its stock market represents 50% of the total GCC market capitalization, and it is the 9th among emerging markets. However, as they examined the relationships of the GCC markets with oil, they found that the Abu Dhabi market, oil and the Saudi market dominate the long term relationships. The primary reason for UAE market's strong influence is that it allows cross-company listings. For example, Saudi companies are cross listed on the Abu Dhabi stock exchange.

Such differentiated results suggested that the GCC stock markets yield different returns and are thus potential candidates for portfolio diversification. Since the GCC markets are neither in perfect harmony in their movements to oil price shocks nor in their long term relationships with each other, then international investors can benefit from risk reduction potentials by investing in the stocks of the different GCC countries. Investing in stocks of different countries is one of the two ways of attaining diversification; the other is investing in different asset classes such as bonds and commodities like oil and gold. Therefore, it is worth studying the relationship between all of these different aspects of the economy: oil, gold, bonds and stocks, and not just the relationship between oil and stocks. The categorization of the GCC stock markets as a diversification haven for international investors can be enhanced by promoting stronger financial integration, permitting cross-company listing, and allowing privatization of publicly held companies.

In addition, Hammoudeh and Aleisa reached the same conclusion as Arouri and Rault (2009) who showed, using Granger causality tests, that there is a bidirectional relationship between oil price changes and Saudi stock market returns. This strong link between oil prices and Saudi stock markets is due to the fact that the Saudi market is the biggest in the region and Saudi Arabia is the leading oil provider in the world energy market. According to IMF statistics, Saudi Arabia oil exports accounted for about 90% of the state's earnings and revenues and more than 40% of the GDP in 2007. However, unlike Hammoudeh and Aleisa, Arouri and Rault found that there is a unidirectional causality from oil prices to stock markets for the other five GCC countries as well. Therefore, GCC policy makers, as OPEC members, should monitor oil prices as fluctuations can largely affect their stock market returns.

Arouri and Rault (2009) used bootstrap panel cointegration and seemingly unrelated regression tests to examine the existence of long-term relationships between oil prices and GCC stock markets. Using both weekly and monthly data, they first conducted unit root tests and concluded that the oil price index and stock market indices are non-stationary. Proceeding with the panel cointegration technique, they established the existence of significant long-term relationship between oil prices and stock markets of the GCC countries and using the seemingly unrelated regression, they asserted that oil price increases had a positive impact on the stock prices of all GCC countries except for Saudi Arabia. This result is puzzling given that Saudi Arabia is the most oil-dependent country and the largest among the GCC markets.

Arouri and Rault also suggested that the GCC markets constitute an opportunity for portfolio diversification. They believed that international investors can benefit from investing in GCC markets along with their investments in developed stock markets because oil price increases have positive impacts in the GCC markets as opposed to negative impacts in the developed markets. Through such diversifications, investors can reduce their risk to oil price fluctuations. Moreover, such significant cointegrations between oil and the GCC markets allow for some degree of predictability in the GCC stock markets; thus, permitting investors to benefit from profitable speculations.

Hammoudeh and Choi (2006), however, studied the long-term effects of not only oil but also T-bill rates and S&P500 indices on GCC stock market returns. Using vector-error correction models, they found that T-bill rates have a direct but mixed impact on the GCC market returns but found no evidence of any S&P 500 index or oil return influences on these markets' returns. They suggested that local and regional factors might have affected these markets instead. Proceeding with impulse response analysis, they inferred that GCC markets rise with US markets. Furthermore, variance decomposition confirmed the significance of own domestic and other GCC shocks impacts on the total variation of the GCC stock index returns.

In collaboration with Fouquau (2009), Arouri found that there is an asymmetric long-term relationship between oil prices and stock markets in GCC countries. First, using monthly data, they tested the presence of unit roots and found that the time series are integrated of order one. Then, using the Engle and Granger procedure, they investigated the existence of no cointegration against asymmetric cointegration. Furthermore, they decomposed the time series into positive and negative components and asserted that there is an asymmetric cointegration for all the GCC countries, and that the relationship is especially valid when oil prices increase.

This empowering phenomenon that oil price increases have a larger impact than oil price decreases was also established by many recent researchers such as Hamilton (2003), Zhang (2008), Lardic and Mignon (2006, 2008) and Cologni and Manera (2009). By applying the VAR model, Abu Zarour (2006), also concluded that GCC stock markets respond faster to oil price rises.

Mohamed El Hedi Arouri, a pioneer in the research on the relationship of oil price shocks and GCC stock market returns, partnered with many researchers such as Lahiani and Bellalah (2010), Lahiani and Nguyen (2010), and Bellalah and Nguyen (2011). Arouri et al. (2010) investigated the oil and stock market relationship using both linear and nonlinear methods. He asserted that this relationship is first and foremost nonlinear and varying according to the values of oil prices; however, he only found it to be significant in Qatar, Oman, Saudi Arabia, and United Arab Emirates but not in Bahrain and Kuwait.

Furthering his research, Arouri examined the short and long-term relationships between oil and GCC stock markets. Using weekly data that better captures the interactions between these two factors, Arouri, Nguyen, and Bellalah, undertook unit root tests and found that all the series are integrated of order one. Proceeding with Granger causality, they concluded that in the short-run oil prices caused changes in the stock markets of Qatar, UAE, and Saudi Arabia (5%), Bahrain and Oman (10%). In the long-run, however, a unidirectional causality from oil to stock returns existed only for the Bahraini stock market. Cointegration tests estimated that a 10% increase in oil prices led to a 4.19% rise in the Bahraini stock market.

Diversifying his research, Arouri, in his partnership with Lahiani and Nguyen, used the VAR-GARCH approach and studied the link between return and volatility transmission of oil and GCC markets. They discovered that Gulf Cooperation Council stock markets have lower daily average stock returns and volatilities than the world oil markets. Furthermore, they showed that skewness is positive for the oil markets whereas it is negative for all the stock markets and demonstrated that kurtosis coefficients are considerable in both size and significance, indicating a leptokurtic distribution. These findings are of great importance to international investors as skewness coefficients are indicative that extreme positive and negative returns can be realized in the oil and stock markets respectively and since both the stock and oil distributions are leptokurtic, investors can gauge themselves from irregular swings in both returns and risk. Thus, though the inclusion of oil in a diversified portfolio might increase the risk of the portfolio, it would definitely induce larger diversification benefits.

Mimouni, Abu Ali, and Al-Azzam (2012) also studied the correlation between oil and stock price volatilities. Using the Heston and Nandi GARCH (1,1) model, they found significant evidence of correlation as well as bidirectional relationship between the volatility of these two markets, meaning that large price volatilities in any of the markets lead to big price variations in the other market.

Ravichandran and Alkhathlan (2010) investigated the long-term relationship between changes in oil prices and GCC stock markets as well as liquidity ratios. Using the multivariate approach of Johansen and Juselius, they found that oil price fluctuations affected the liquidity of the GCC stocks more than their prices. They believed that in the long-run, the influence of oil price fluctuations prevails because the effects transmit to macroeconomic variables that impact the liquidity of these markets, and since liquidity is proportional to market size, the effects of oil price changes on liquidity are stronger on the economies that are more oil dependent.

Finally, Daly and Fayyad (2010, 2011) performed vector autoregressive analysis on five of the six GCC countries (Kuwait, Qatar, Oman, Bahrain, and UAE) in addition to UK and USA. They used daily data from September 2005 till February 2010. Moreover, they included UK and USA in their study because during the study period, tripling oil prices not only created cash surplus for the GCC countries but also caused deficits in the current accounts of UK and USA.

With the aim of examining the dynamic interrelationships between oil prices and stock markets during this volatile period, Daly and Fayyad divided the estimation period into three sub-periods.

- Constant oil prices, which included the period that extended from September 2005 to October 2006
- Rising oil prices comprised the period in which oil prices tripled and reached an all time high of about $150/barrel. This period extended from October 2006 to October 2008
- Falling oil prices after the Global Financial Crisis, which included the period from October 2008 to February 2010

During the first period of constant oil prices, they found that there is no significant relationship between oil prices and stock market returns, neither market predicted the returns of the other market. However, responses during the global financial crisis period increased, oil price shocks predicted the returns of UAE, Kuwait, and USA stock markets. Surprisingly, most of the stock markets, except for UAE and Bahrain, predicted the oil price changes. In the last period, oil price changes predicted the movements of Oman, Qatar, UAE, UK, and USA stock markets whereas the Kuwait, Bahrain, Qatar, UK, and USA stock markets predicted the changes in oil prices. Such results should not come as a surprise for neither the GCC markets nor the advanced UK and USA markets as GCC countries are major oil exporters whereas UK and USA are two of the biggest importers of oil in the world.

Daly and Fayyad proceeded with variance decomposition and impulse response analyses for the three sub-periods. During the first period, they found that Bahrain for the

GCC countries and USA representing the advanced countries were the least exogenous with 22% and 33% of the error variance explained by the other markets respectively. These results complemented the VAR results as oil returns played a minor role in forecasting the error variances. After oil prices hiked to an astonishingly all time high value of $150/barrel, almost all variables in the system exhibited more endogenous power. During the falling of oil prices, however, oil played a significant endogenous role in the advanced markets of USA and UK where 11.4% and 22.6% of their forecast error variance were explained by the oil market. Yet, while oil had the first endogenous power for the Omani market, it was the third endogenous player for the remaining GCC markets.

The impulse responses showed that though oil price shocks had a significant and a continual impact on the Qatar, UAE, and UK stock markets, their effects tapered off for the other GCC markets and USA market. The UK market displayed a quicker and a larger response to oil price changes than the USA market, and this was apparent in all three periods. Moreover, the Qatar market was the only GCC market that was influenced by oil price changes in all three periods. This result is not at all surprising because approximately 42% of Qatar’s GDP is derived from oil.

III. DATA

The financial crisis of 2007-2008 resulted in the collapse of financial institutions, bailout of banks, and downturn spirals of stock markets around the world. Since the objective of the research is to examine whether the GCC markets encountered such downturns and investigate the macroeconomic variables that had significant influences on these markets, the research studies the post-crisis period that extends from 2008 to October 2012.

High-frequency data, weekly or daily, capture the interactions between the independent variables and the dependent variable more accurately than low-frequency data such as monthly or yearly. Moreover, larger sample sizes increase the precision of estimation. Since there is only five years of post-crisis data, the paper investigates the relationship between the macroeconomic variables and the GCC stock markets using daily data that includes the period from January 2, 2008 to October 23, 2012. However, due to the availability of data on GCC stock markets, there is a smaller sample size running from June 1, 2010 to October 23, 2012 for four of the six GCC countries: UAE, Qatar, Oman, and Bahrain.

The data are collected from various sources. The Brent oil spot prices are obtained from the Energy Information Administration. The values of the S&P 500 index are collected from Google finance. The daily 1month Treasury bill rate is gathered from the US Department of Treasury. Daily historical data for gold price, Moody's corporate Baa rate and the exchange rates are collected from USAgold.com, Wikiposit.com and Forexpros.com respectively. The GCC and Jordanian stock prices are obtained from two main sources: the Saudi all share index and the Kuwait S.E prices are collected from the Arab Monetary Fund database whereas the

DFM General, QE General, MSM 30, Bahrain all share index and Amman SE General are collected from ForexPros.com.

Before moving unto the empirical analysis, the study first justifies the choices of independent variables and identifies their expected relationships with the GCC stock markets. GCC countries are the richest in oil reserves; therefore, their economies are highly dependent on oil export revenues, thus it is expected for oil returns to be positively related to GCC stock market returns. However, GCC countries are importers of manufactured goods from USA, Europe and China, thus oil price increases are expected to indirectly lead to higher inflation rates. According to Habibi (2010), the purchasing power of the Arab countries, especially GCC countries, rose with the increase in oil prices and their merchandise purchases sharply increased from $200 billion in 2003 to $650 billion in 2008. Therefore, the final impact of oil shocks on GCC stock markets depends on whether the positive or the negative influence counterweighs the other.

Rises in inflation rates do not only cause stock price drops but interest rate increases as well and when interest rates increase, bills and bonds become much more attractive than stocks. This occurrence causes investors to shift their investments from stocks to bonds as they seek safer and higher quality investments; a phenomenon known as “Flight to Quality”. According to CBS news reporter Larry Swedroe, the correlation between bonds and stock indices has become negative in the last decade and has recorded a correlation of -0.55 for the period from 2000 to 2011. Thus, the research not only studies the effects of short-term T-bill rates but also long-term Baa corporate bond rates. The study uses Baa rates rather than Aaa rates in order to investigate the relationship between middle class bonds and the emerging stock markets of the GCC countries. Both the T-bill rate and the Baa rate are expected to record a negative relationship with GCC stock price returns.

Gold and foreign exchange represent other types of investment opportunities for international investors. While stock markets were crashing due to the global financial crisis, gold prices were increasing and recording all time highs. Therefore, investors were more likely to shift their investments from stocks to gold. Thus, it is interesting to study the significance of the effects of gold returns on the GCC stock market returns. In regards to the exchange rate, the relationship is not that clear as all the GCC exchanges, except for Kuwait, are pegged to the US Dollar. During the crisis, the US dollar significantly depreciated causing equivalent depreciations in the GCC currencies. Moreover, such reductions caused investors to shift their investments from value losing currencies to value gaining commodities such as oil and gold; thus, further increasing the prices of these commodities.

The reason for including the Jordanian stock market and the S&P 500 index in the study is to investigate the effects of regional, non-oil exporting Arab countries on the oil-dependent GCC markets and examine the linkages between the developed US market and the emerging GCC markets. Moreover, the rationale for choosing Jordan as a reflection for all Arab, Middle Eastern and North African countries is that Jordan has similar social and economical structure as the GCC countries, is contingent to Saudi Arabia, and is the most developed stock markets in the Middle East besides the GCC markets. It is important to note that most other markets, such as the Lebanese market, are smaller, shallower, and are characterized by thinner trading. While the rationale for not choosing the Egyptian or the Syrian market is that both markets had been too volatile and had suffered extensive breaks in the data during the study period. In addition, during the Council's summit on May 2011, Jordan was the only country that was welcomed as a future member of the Gulf Cooperation Council. In accordance with the council's decision, Hamdi al-Tabaa, head of the Jordanian Business Association said, "The structure of the Jordanian economy is more or less ready to become part of the Gulf Cooperation Council system given the socio-demographic convergence and historical relations between the two parties, and their adoption of a free-market economy". He added "Jordan and the Gulf states are signatories to similar conventions such as the Greater Arab Free Trade Organization and the Global Free Trade Organization". Therefore, it is expected for the Jordanian stock market returns to have a significant positive relation with the GCC stock market returns. It is also expected for the S&P 500 index return to have a significant positive effect on the GCC stock market returns, especially on the markets of the countries that have strong relationships with USA.

The study adds another variable that previous researchers have not investigated. The analysis includes the Saudi stock return as an independent variable to examine the effect that the largest market has on the other markets. Accordingly, the influence of the second largest market, the Kuwaiti market, is investigated in the Saudi analysis. The effects are expected to be highly significant and the coefficients are predicted to be large as these markets are highly integrated. In addition, this independent variable allows for the identification of whether external variables such as Baa and T-bill rates, S&P 500 return and oil return have a stronger influence on Arab stock market returns or whether these markets endogenously explain their variations.

Furthermore, the research also aims at uncovering the efficiency of the GCC markets. For this specific purpose, the paper undertakes Granger-causality to test whether the lagged values of the independent variables present statistically significant information about the future values of the independent and the dependent variables. More importantly, the research investigates the significance of all lagged values, the dependent and the independent variables, together making the hypothesis under study much stronger. Since the GCC markets and the developed market of the US have only 3 days in common: Monday, Tuesday, and Wednesday as the US equity closes on Saturday and Sunday while that of the GCC countries closes on Thursday and Friday, the Granger-causality is performed using 3 day lags that represent these 3 common weekdays.

Below is a table that summarizes the entire dependent and independent variables as these symbols are used in the tables to represent the differences and the lags.

Symbol	Variable Description
log(S)	The log of the Market Stock Index of Saudi Arabia
log(K)	The log of the Market Stock Index of Kuwait
log(Q)	The log of the Market Stock Index of Qatar
log(U)	The log of the Market Stock Index of United Arab Emirates
log(O)	The log of the Market Stock Index of Oman
log(B)	The log of the Market Stock Index of Bahrain
log(J)	The log of the Market Stock Index of Jordan
log(SE)	The log of the Foreign Exchange Rate of Saudi Arabia against the US Dollar
log(KE)	The log of the Foreign Exchange Rate of Kuwait against the US Dollar
log(QE)	The log of the Foreign Exchange Rate of Qatar against the US Dollar
log(UE)	The log of the Foreign Exchange Rate of United Arab Emirates against the US Dollar
log(OE)	The log of the Foreign Exchange Rate of Oman against the US Dollar
log(BE)	The log of the Foreign Exchange Rate of Bahrain against the US Dollar
log(BO)	The log of the Brent Oil Price
log(S&P)	The log of the S&P 500 Index
log(GP)	The log of the Gold Price
TB	The 1 month US T-Bill Rate
Baa	The US Corporate Baa Bond Rate

According to the above mentioned symbols, the Δ(log(.)) represents the returns whereas the Δ(log(.(-1))), Δ(log(.(-2))), and Δ(log(.(-3))) represent the first, second, and third lags of the returns respectively.

IV. METHODOLOGY

A. Unit Root Tests

As a first step of the analysis, it is important to test for the existence of unit roots in such time series data. Most economic data are characterized by seasonality and their statistical properties such as mean, variance, and correlation are not constant through time. Therefore, such data need to be transformed and differenced to become stationary otherwise regression analysis cannot be carried out. The first difference of a time series is the series of changes from one period to the next and all the economic variables need to be differenced to become stationary. The stock prices and all the macroeconomic variables, except for US corporate Baa and T-bill rates, are in natural logarithms. Moreover, the first difference is applied on the logs as this difference is approximately equal to the percentage change and since the data is daily, the difference in logs is almost exactly equal to the percentage change; thus, representing the returns.

There are three main unit root tests, the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwaitowski-Phillips-Schmidt-Shin (KPSS). The difference between the three is that ADF and PP tests are for the null hypothesis that a time series is integrated of order one whereas the KPSS test is for the null hypothesis that a time series is integrated of order zero. Since the objective is to demonstrate stationarity, the KPSS test is used with the inclusion of a constant and a linear trend.

The results obtained are reported in Table 2 and 3. Table 2 reports the unit root results for the large sample size whereas table 3 includes the 4 GCC countries that have a rather smaller sample. Both results show that most series are integrated of order (1). Table 2 reports that all differenced series are stationary at the 5% or lower significance level but Table 3 reports stationarity at varying significance levels. The exception that is worthy of notice is that only the Kuwaiti exchange rate is integrated of order (1), while the others are stationary in log-levels and more interestingly the exchanges of Saudi Arabia and UAE are non-stationary.

Since the exchange rates are either stationary in log-levels or non-stationary, the research opts to remove them from the analysis and focus the investigative efforts on studying the effects of the other independent variables.

B. Multiple Regression and Granger Causality

When studying the effects of independent variables on a dependent variable, it is important to undertake regression analysis to discover the independent variables that have a significant effect on the dependent variable. Since the aim of the research is to investigate which of the macroeconomic variables affected the GCC stock market returns, the least square method is used. Moreover, when carrying out regression analysis, two issues must be avoided. The first is autocorrelation, which is the similarity between the observations as a function of the time separation between them and the other is heteroskedasticity, which is the existence of sub-populations that have different variabilities from others. Since the data is daily data, then chances of correlation between the error terms are higher than if the data were weekly or monthly and since the existence of heteroskedasticity can invalidate the significance of the empirical study, the regression is performed using the Newey and West (1978) HAC correction method to adjust the standard errors of the coefficients to both serial correlation and heteroskedasticity of unknown origins in the residuals.

After running a preliminary survey on all the independent variables, it is found that both the exchange rate and the gold price have highly insignificant coefficients. This justifies the decision of eliminating exchange rates as well as gold prices from the regression analysis and directs the focus on analyzing the variables that actually could have caused the fluctuations in the GCC stock returns. Therefore, the investigation concentrates on the impacts of five main macroeconomic variables: Brent oil return, S&P 500 index return, Jordanian stock market return, T-bill and Baa corporate bond rates. In addition, it highlights the effects of the GCC market return, Saudi and Kuwaiti returns, when taken as independent variables.

Moreover, with the aim of discovering how efficient the GCC markets are, Granger causality tests are performed with 3 day lagged values to uncover any lagged impacts of the dependent and independent variables on each of the six GCC markets.

V. EMPIRICAL RESULTS

This section of the analysis portrays the empirical results found for every GCC stock market separately and the following section interprets the results found in all the GCC markets collectively.

A. Large Sample: Saudi Arabia and Kuwait

The analysis is first conducted on the largest two GCC markets: Saudi Arabia and Kuwait. These countries are highly integrated and they share similar economic, social, and political structures; therefore, the investigation also analyzes the impacts of these markets on one another. As expected, both coefficients are positive and highly significant. However, as portrayed in Table 4, Kuwaiti stock market return's influence on Saudi return is much stronger than that of the Saudi return on the Kuwaiti return. The Saudi return is expected to increase by 0.54% whenever the Kuwaiti return increases by 1% whereas the Kuwaiti return is expected to increase by 0.23% whenever the Saudi stock return increases by 1%. Even though one would expect Saudi's market to be more influential, this strong influence is expected to be portrayed in the UAE market more than in any other market because many Saudi stocks are cross-listed in the UAE stock market.

Interestingly, the Saudi market is also significantly influenced by the S&P 500 index. Though the GCC countries used to claim that their markets are segmented from international markets, globalization efforts have increased both trade and financial linkages between advanced and emerging economies. Such interdependencies have made the emerging markets more exposed to turmoil in the global markets.

Moreover, as shown in Table 5, the correlation between the GCC equity markets and the S&P 500 index increased in the wake and the aftermath of the global financial crisis. As the 9th emerging market, Saudi Arabia witnessed the highest percentage increase (833%) in its correlation with S&P 500. This outstanding increase is portrayed in the significant positive impact that the S&P 500 index return has on the Saudi stock market return. A 1% increase or decrease in the S&P 500 index is expected to result in a 0.31% shift in the Saudi index respectively. The fact that Saudi's stock market is the most influenced by the financial crisis is not surprising given that it is the largest among the six GCC markets. In addition, by the end of 2005, Zawya had ranked the Saudi market as the 16th in the world in terms of market capitalization and the 14th in terms of number of trades.

On the other hand, the Kuwait stock market return is negatively affected by the change in the Baa corporate bond rate and this influence is highly significant as a 1% decrease in the Baa rate is expected to result in a 1.8% increase in the Kuwaiti stock return.

Unexpectedly, these markets are as well affected by lagged values of the S&P 500 index return and the Baa rate. The 1 day lagged value of the S&P 500 return as well as the Kuwaiti stock return Granger-cause the Saudi stock return whereas the 3 day lagged value of the Baa rate Granger-causes the Kuwaiti stock return.

Wald Test	
Δ(log(S))	**Δ(log(K))**
0.791905 (0.6957)	1.829711 (0.0216)

The actual P-values of the F-statistic are in parenthesis

To further investigate the matter, the study opts to remove all the insignificant variables that have actual P-values that are greater than the significance level of 5% and aims to conduct a regression analysis on only the significant variables. However, before proceeding with the regression, a Wald test is conducted on the coefficients of the insignificant variables to see if the omission of the variables is valid. The Wald test investigates whether all the coefficients on the excluded insignificant variables are all jointly zero. Since the results obtained fail to reject the null hypothesis at the 1% significance level, all the insignificant variables are omitted and the new regression is carried out using only the significant independent variables. As portrayed in Table 6, the results of the new regression show that the effects of the lagged values are no longer significant except for the 1 day lagged value of the S&P 500 on the Saudi stock return. Moreover, the coefficient of this variable is highly influential as a 1% increase or a decrease in the 1 day lagged value of the S&P 500 index return is expected to result in a 0.24% shift in the Saudi stock return. The evidence that past returns of the S&P 500 index can predict the upcoming return of the Saudi stock contradicts with the foundations of the market efficiency theory.

Moreover, it is also important to note that after the removal of the insignificant variables, all three goodness of fit criteria, the Akaike information criterion, Schwarz criterion, and Hannan-Quinn criterion are less in value asserting that the new restricted models are better. It is also worthy to notice that these criteria are even more negative after the inclusion of the interactive dummy variables with oil prices. The significance of at least one of these interactive dummies signals some nonlinearity which is further investigated in the research below.

B. Small Sample: All Six GCC Countries

Since the Saudi market is the biggest among the GCC countries and most influential, the analyses of all the markets include the Saudi stock return as an independent variable. Interestingly, all the GCC stock returns, except for Bahrain, are positively influenced by the Saudi stock return and, in turn, the Saudi return is highly affected by the Kuwaiti stock market return. As expected and portrayed in Table 8, the Saudi return has a strong and highly significant effect on the United Arab Emirates return. A 1% increase in the Saudi return is expected to result in a 0.46% increase in the UAE return. In addition, these same five GCC countries are also positively influenced by Jordanian stock returns. This shows that the GCC markets are highly linked with regional but non-oil exporting Arab countries. Therefore, a local investor has limited diversification opportunities by investing only in the stock markets of various Arab countries.

The puzzling result of the Bahraini stock market not being affected by neither the Saudi nor the Jordanian stock returns is explained by the extremely low value of the adjusted R squared (0.002288) and the insignificance of the overall regression in explaining the variations in the Bahraini stock return. As shown in Table 8, the P-value of the overall regression is 0.427898 which is insignificant. However, it is important to note that the adjusted R squared of the remaining five GCC countries are relatively high for daily data and all the P-values of the F-statistic are significant even at the 1% significance level. The F-statistic tests for the null hypothesis that all of the regression coefficients are equal to zero. Therefore, the highly significant P-values of the overall regressions allow the rejection of the null hypotheses and show that the regression equations of the five GCC countries have some validity in fitting the data. That is, the independent variables are not purely random with respect to the dependent variables.

Surprisingly, two of the GCC markets, Kuwait and Qatar, exhibit significant positive responses to even 3 day lagged values of the Saudi stock return whereas the Omani stock return exhibits significant positive response to the 1 day lagged value of the Jordanian stock return. These influences trigger the questioning of the efficiency of these markets. Moreover, as shown in Table 9, the Kuwaiti and Saudi returns are influenced by the 2 day Baa rate and the 1 day S&P 500 lagged values respectively. However, the most surprising market response is that of the Omani stock market which is highly affected by many lagged values.

According to Sedik and Williams (2011), the intensified fluctuations in the mature markets caused the conditional covariance of GCC equity markets to reach their peak and originated comovements of these markets especially during the financial crisis. They also asserted that the impacts of past shocks originating from mature markets were highly significant in all GCC markets except for Bahrain. These findings are consistent with the results regarding the Saudi, Kuwaiti, Omani and Bahraini markets as the latter market is not affected by any lagged return whereas the 3 other markets are significantly influenced by the lagged values of the mature markets. Further research on the Omani market's overreaction to many lagged values shows that it is the only GCC country which has a foreign investment ceiling of above 50% as well as the only market that allows foreign investors to invest in its stocks with low or even without any restrictions.

It is also important to notice that the Kuwaiti and Saudi market returns are the only two markets among the six GCC countries that are affected by the change in the Baa and T-bill rates respectively. Surprisingly, the Baa effect on the Kuwait market return is approximately the same as the effect recorded in the large sample. A 1% increase in the Baa bond rate is expected to result in a 1.9% decrease in the Kuwaiti stock return. However, unlike the large sample, the T-bill rate records a strong and a significant influence on the Saudi stock return. A 1% increase in the T-bill rate is expected to cause a 9% decrease in the Saudi stock return. Moreover, these two biggest and most influential markets are significantly influenced by the S&P 500 index return, and the Saudi market return records, yet again, the largest coefficient. These results show that these two markets were highly influenced by the fluctuations that happened in the stocks, bills, and bonds markets of the US during the financial crisis.

Wald Test					
Δ(log(S))	**Δ(log(K))**	**Δ(log(Q))**	**Δ(log(U))**	**Δ(log(O))**	**Δ(log(B))**
0.894972 (0.5755)	1.734800 (0.0535)	1.058390 (0.3939)	1.611743 (0.0491)	0.987428 (0.4705)	0.898031 (0.6015)

The actual P-values of the F-statistic are in parenthesis

To further investigate the matter, the study opts to remove all the insignificant variables that have actual P-values that are greater than the significance level of 5% and aims to conduct a regression analysis on only the significant variables. However, before proceeding with the regression, a Wald test is conducted on the coefficients of the insignificant variables to validate the omission of the insignificant variables. The Wald test investigates whether all the coefficients on the excluded insignificant variables are all jointly zero. Since the results obtained fail to reject the null hypothesis at the 1% significance level, all the insignificant variables are omitted and the new regression is carried out using only the significant independent variables. The results of the new regression show that the effects of the lagged values are still significant in Saudi Arabia, Kuwait, Qatar and Oman. In Saudi Arabia, the 1 day lagged value of the S&P 500 index return significantly Granger-causes the stock market's return. A 1% increase in the 1 day lagged value of the S&P 500 return is expected to result in a 0.11% increase in the Saudi return. In Kuwait, the 1 day and 3 day lagged values of the Saudi stock return have significant coefficients. A 1% increase in the 1 day and 3 days lagged values of the Saudi return is expected to result in a 0.08% and a 0.09% increase respectively. Moreover, the 2 days lagged value of the Baa corporate bond rate Granger-causes the Kuwaiti return as well. In Qatar, the Saudi return lagged values have even stronger coefficients. A 1% increase in the 1 day and 2 days lagged values of the Saudi return is expected to result in a 0.14% and a 0.09% increase respectively. The Omani market still is affected by many lagged values. The most significant is that of the Jordanian stock return as a 1% increase in the 1 day lagged value of the Jordanian market return is expected to result in a 0.14% increase in the Omani stock return. These various causalities contradict with the foundations of the market efficiency theory.

Moreover, it is also important to note that after the removal of the insignificant variables, all three goodness of fit criteria, the Akaike information criterion, Schwarz criterion, and Hannan-Quinn criterion are less in value asserting that the new restricted models are better. However, these criteria differ in value after the inclusion of the interactive dummy variables with oil prices. As portrayed in Table 11, the information criteria record lower values for both Qatar and Bahrain. This result signals that the model which includes the interactive dummy variables is a better fitted statistical model and this is consistent with the findings as these two markets, unlike the other four markets, reacted to at least one of the interactive dummies. On the other hand, the information criteria record slightly lower values for Saudi Arabia and much higher values for Kuwait, UAE, and Oman. These results are also consistent with the findings as these markets did not react to any of the interactive dummies. These differentiated responses to the interactive dummy variables with oil prices are further investigated later in the research to uncover any nonlinearity that exists in these markets.

VI. INTERPRETATION

The finding that the GCC markets, except Bahrain, are affected by the Saudi stock market return and that the Saudi return is affected by the Kuwaiti market is not at all surprising because the GCC countries share geographic, demographic, political, social, and economic features. These markets move in accordance to one another as they share similar structures. Moreover, the positive linkage with the Jordanian market asserts that all Arab countries, oil-dependent and non-oil exporting countries, are linked and move in tandem with each other. In addition, GCC countries share most of these features with Jordan as well, to the extent that there had been discussions about Jordan's future membership in the Council. Since they were and still are aiming at financial and economic integration with Jordan, it is only natural that Jordan's equity return affects the GCC countries' equity market returns.

Since the results caused the questioning of the efficiency of the GCC markets, the analysis proceeds with uncovering whether these markets are truly inefficient. According to Alharbi (2009), economists are mainly apprehended by three types of market efficiency:

1. Allocational Efficiency: Allocating capital resources in the most productive manner
2. Operational Efficiency: Conducting transactions at competitive costs
3. Informational Efficiency: Reflecting all available information in security prices

The biggest advocate of informational efficiency, Eugene Fama (1965) asserted, in his research paper "The Behavior of Stock Market Prices" that stock prices are unpredictable and follow a random walk. In 1970, he developed the efficiency market hypothesis and suggested that prices of stocks fully reflect all available information. He argued that investors cannot predict returns as no one has access to additional information that is not available to everyone else. Because the market efficiency theory is difficult to comprehend and accept, the hypothesis is divided into three classifications:

1. Weak Efficiency, which Fama (1991) referred to as Return Predictability:

   Fama asserted that returns cannot be predicted from past returns, and that the best forecast of a return is its historical mean. Hence, expected returns are constant through time.

2. Semi-Strong Efficiency, which Fama (1991) referred to as Event Study:

   On average, stock prices adjust within a day of the event announcement. Therefore, adjustment of stock prices to new information is efficient. All public information is reflected in the stock's current price.

3. Strong Efficiency, which Fama (1991) referred to as Tests for Private Information:

   According to Fama, even private information, such as insider information, is accounted for in stock prices.

Critics of the efficiency hypothesis argue that many investors, such as Warren Buffet, have outperformed or beaten the market. Moreover, many portfolio managers and investment houses have performed better than others because of better investment strategies and not just by pure luck as advocates claim. In actuality, it is the investors' different behaviors that fuel the market back to efficiency. Most investors believe that markets are inefficient and that they can take advantage of predictable patterns in the stock market to gain superior profits, but as arbitrageurs and speculators know, the market adjusts itself back to equilibrium. Even Fama and French (1988) asserted that dividend yields were able to explain most of the variation in future returns. Moreover, in their 1992 study of the US stock markets for the period of

1963-1990, Fama and French documented the outperformance of stocks with low price to book-value ratios compared to stocks with high price to book-value ratios.

For a market to be efficient, it has to be large and liquid, information must be available for all investors at the same time, and transaction costs must be less than expected profits. Investors must also believe that they can outperform the market and take advantage of the inefficiencies because their behavior regulates the market back to efficiency. However, literature has shown that most emerging markets are likely to be inefficient as they are characterized by small-sized, thin trading, and less regulations.

Gulf Cooperation Council markets are categorized as emerging markets and many studies have shown that their markets are inefficient. Alharbi (2009), in his research paper, "Nonlinearity and Market Efficiency in GCC Stock Markets", mentions few. For example, Ghandi et al (1980) investigated the efficiency of the GCC financial markets and found that stock prices in the Kuwaiti stock market were significantly serially correlated and volatile. Bulter and Malikah (1992), using run tests, arrived to market inefficiency conclusions for both the Saudi and the Kuwaiti markets. Elango and Hussein (2008) tested for random walk using run tests for the period of 2001-2006 and found significant evidence to reject the null hypothesis of market efficiency, even in its weak-form, for all six GCC countries.

Though previous researchers have found inefficiencies in the GCC markets similar to the inefficiencies uncovered by the study, one cannot totally eliminate the possibility that these inefficiencies can be due to sampling error. One of the basic causes of sampling error is chance and the main protection against it is the use of larger samples. The research doubts the existence of this kind of sampling error because in the large sample study, Kuwait was not affected by the Saudi lagged values whereas in the small sample study, Kuwait was affected by both the 1 day and the 3 day lagged values. In addition, some other lagged effects also signal the existence of sampling error. For example, the Omani market was affected by many 2 day and 3day lagged values but not by the 1 day lagged value of the same independent variable. Moreover, the time zone differences that exist between the US market and the GCC markets explain the effect of the 1 day lagged value of the S&P 500 index return. There exists not only trading hour differences but also trading day differences between these markets as the US trading days are from Monday to Friday whereas that of the GCC markets are from Saturday to Wednesday.

Even though market inefficiency can somewhat be the cause of the GCC markets reacting to lagged values, it is certainly not the cause for these markets to be significantly unaffected by oil price fluctuations. The puzzling results reached by the least square method raise some doubts as to how none of the highly oil-dependent markets are affected by oil returns. Therefore, since many researchers have found that oil price increases have a stronger impact on GCC stock markets than oil price decreases, the investigation proceeds with separating the impact of oil to positive and negative shocks.

$DUM = 1$ if $\Delta (\log(BO)) > 0$

$DUM = 0$ if $\Delta (\log(BO)) \leq 0$

Moreover, since many researchers have previously uncovered nonlinearity in the GCC markets, the study also uses interactive dummy variables with oil prices in order to investigate any nonlinearity that might exist in these markets.

$DUM * \Delta (\log(BO))$

$(1-DUM) * \Delta (\log(BO))$

As shown in Table 7, both the Saudi and the Kuwaiti returns are significantly affected by the Brent oil returns. However, and in contrast to previous findings, the Kuwaiti market is strongly and positively affected by oil price decreases rather than increases. On the other hand, the Saudi market follows through with expectations and reacts positively to oil price increases. Surprisingly, both markets record a coefficient of 0.13, that is a 1% increase in oil return is expected to influence the Saudi return by a 0.13% increase whereas a 1% decrease in oil return is expected to influence the Kuwaiti stock return by a 0.13% decrease.

However, as shown in Table 11, only the Qatar stock return reacts positively and significantly to oil price increases and unpredictably the Bahraini return reacts negatively to such increases. The Bahraini dilemma can be explained by the fact that since Bahrain is not as rich in oil as the other GCC countries, the negative impacts of the inflationary pressures counterweighed the positive influences of oil price increases. But the dilemma that still remains is that Oman and UAE did not record any reaction to the recent mind boggling and intense fluctuations in oil prices. Moreover, though the large sample study found oil influences in both Saudi and Kuwaiti stock markets, these reactions were not apparent in the analysis conducted on the small sample.

Could it be that the rapid growth that these markets witnessed after 2005 and the increased level of imports to $650 billion in the year 2008 caused heightened inflationary pressures to offset the fruitful positive impacts of the oil price increases? Or were there some irregularities that the model could not explain?

Looking back at the level of inflation rates in Table 1, it is noticeable that during the period of 2007-2008 inflation rates rose tremendously by more than 100% in all six GCC countries. Therefore, one cannot eliminate the huge negative impact that inflationary pressures had on the GCC markets. At the same time, however, one cannot incriminate heightened inflation with all the blame because after 2008 rates started to decrease and stabilize at normal levels. Therefore, further investigative efforts find that Alharbi (2009) had mentioned other volatilities that had occurred in 2006 and 2007 in the GCC markets, a 34% drop then a 54% rise respectively, which could not have been explained by linear models as well. Thus nonlinearities do exist in the GCC markets and they are apparent in the reactions recorded by the four GCC markets. The large sample analysis recorded the reaction of both the Saudi and the Kuwaiti market returns whereas the small sample analysis recorded significant reactions in both Qatar and Bahrain to the interactive dummy variables with oil prices.

Moreover, according to Savit (1988), such nonlinearities could be accredited to a very important feature in financial markets which is the “feedback mechanism” in asset price movements. That is, asset prices self-regulate themselves back to equilibrium. This means that fluctuations in economic variables such as stock prices could be endogenously generated rather than being caused by exogenous shocks. As mentioned in the literature review, Daly and Fayyad (2010, 2011) had actually reached such a conclusion using nonlinear models. Through variance decomposition and impulse response analyses, they had asserted that all GCC markets as well as the USA and UK markets exhibited more endogenous power, especially when oil prices were increasing. This endogenous power is highly apparent in the

UAE market as almost all of the stock's variation is explained by the Saudi and the Jordanian stock returns.

Nonlinearity exists where additivity and homogeneity do not. That is, when outputs are not proportional to inputs. The presence of imperfections, such as transaction costs and overreaction to new information, cause such nonlinearities in financial markets. For example, high transaction costs may contribute to investors' cautionary response to new information. It is important to note that lagged responses to new available information contradict with the market efficiency theory as well. Therefore, if markets are nonlinear, then they are inefficient as well. Notice how neither inefficiency nor nonlinearity is found in the UAE stock market.

Moreover, Maghyereh and Al-Kandari (2007), using nonlinear cointegration analysis, have concluded that oil prices affect GCC stock markets. In addition, Alharbi (2009) has found strong evidence of serial correlation in the GCC daily stock returns and rejected the null hypothesis of market efficiency even in its weak form. Running three different nonlinearity tests: Hinich bispectrum approach, White's neural network, and Kaplan's test, he has found strong evidence of nonlinearity in the daily stock returns of all GCC markets. He has also asserted that it is inappropriate to use linear methods when dealing with such nonlinear financial data. Moreover, he has argued that GCC stock markets are overvalued and influenced by nonlinear speculative bubble and that chaos theory provides the proper explanation for such complexities that exist in the GCC markets. The above mentioned findings strengthen the research's claim that nonlinearities in the GCC markets are the reason for not uncovering the linkages between oil price returns and GCC stock returns through the linear regression models.

VII. CONCLUSION AND RECOMMENDATIONS

Using the least square method, the research concludes that the S&P 500 index return affected only the largest two stock markets: Saudi Arabia and Kuwait. The relationship between the US stock return and these two emerging stock market returns is positive and highly significant, especially for the Saudi market. The research also shows that these two markets were the only ones among the six GCC countries that were negatively affected by the T-bill and Baa rates. These results allow the research to conclude that Saudi Arabia and Kuwait are highly linked to the developed market of the US and they were, as a result, the most influenced by the fluctuations that happened during the financial crisis.

Moreover, and more importantly, the regression reaches a conclusion that the GCC countries, except for Bahrain which is the smallest among the six countries, are highly linked to one another and even to regional, non-oil exporting Arab countries. This is apparent in the positive and highly significant coefficients of the Jordanian and the Saudi stock returns. For example, the only two returns that significantly impacted the UAE market return are the Jordanian and the Saudi returns with coefficients of 0.46% and 0.49% respectively. This strong positive relationship between the UAE market and the other two markets is due to the fact that the UAE stock market allows for cross-listing of other stocks. In addition, Qatar recorded the second highest coefficients of 0.45% and 0.31% with the Jordanian and Saudi returns respectively. This strong and positive linkage between these markets shows that local investors have limited diversification opportunities by investing only in the stock markets of different Arab countries.

Using the Granger-causality method, the research concludes that the Saudi Arabia, Kuwait, Oman, and Qatar markets are significantly affected by various lagged values. The delayed reactions of these markets allow for investors to benefit from predictable patterns and contradict with the market efficiency theory. Therefore, one can conclude that these four markets are inefficient but cannot eliminate the possibility of sampling error as well. Moreover, time zone differences between the US and the GCC markets explain the effects of the 1 day lagged value of the S&P 500 index return on the Saudi stock return.

Using the interactive dummies with oil prices, the investigation concludes that the relationship between oil return and GCC stock market returns is nonlinear and asymmetric. This strong relationship is apparent in the Saudi Arabia, Kuwait, Qatar and Bahrain markets, but not in the UAE and Oman stock markets. The two highly oil-dependent countries, Saudi Arabia and Qatar, reacted positively to oil price increases whereas the Kuwaiti market reacted positively to oil price decreases. Unexpectedly, the Bahraini market showed negative relationship with oil price increases. Even though the GCC markets are highly integrated and they react similarly to other oil-exporting and non oil-dependent stock market returns, they are influenced differently by oil price fluctuations. These differences can be due to the fact that these markets are not monetarily integrated. For example, the Kuwaiti market, which is the only GCC country whose currency is not completely pegged to the US Dollar, reacts to oil price decreases whereas the other 3 markets: Saudi Arabia, Qatar, and Bahrain react to oil price increases. These diversified relationships between oil and GCC stock market returns allow for international investors to benefit from portfolio diversification opportunities by adding GCC stocks and oil futures contracts into their international portfolios. Therefore, if these markets undertake a monetary union, such diversifications might not be attained as all GCC stock returns might then react similarly to oil price fluctuations as well.

It is highly recommended for the GCC markets to permit cross-listing of stocks in their markets as this will enhance their relationships with one another and will improve the efficiency of their markets. The UAE market is a proof that cross-listing of stocks allow for the subsistence of these benefits.

As for future research, it is recommended for other researchers to investigate oil return influences on the GCC markets during a period of financial serenity. This will assert whether nonlinearities exist in these markets only during financial turmoil or consistently.

VIII. TABLES

Table 1
Inflation and Real Interest Rates for all six GCC Countries from 2002 to 2011

	Saudi Arabia		Kuwait		Oman		Qatar		Bahrain		United Arab Emirate	
	Inflation Rate	Real Interest Rate	Inflation Rate	Real Interest Rate	Inflation Rate	Real Interest Rate	Inflation Rate	Real Interest Rate	Inflation Rate	Real Interest Rate	Inflation Rate	Real Interest Rate
Year												
2002	1.00	N/A	2.00	1.30	-0.50	10.80	1.90	N/A	0.50	6.60	2.80	N/A
2003	0.50	N/A	1.20	0.50	-0.30	1.00	2.30	N/A	-0.20	1.10	3.20	N/A
2004	0.80	N/A	2.30	-5.20	0.20	-2.90	3.00	-3.90	2.10	-1.10	3.20	N/A
2005	0.40	N/A	4.10	-11.70	1.20	-11.10	8.80	-15.50	2.70	-3.00	10.50	N/A
2006	1.90	N/A	3.00	-8.60	3.00	-4.80	7.20	-9.60	3.50	-2.20	10.00	N/A
2007	4.10	N/A	5.50	2.50	5.90	0.60	13.70	-3.60	3.30	0.70	14.00	N/A
2008	9.90	N/A	10.60	-7.10	12.50	-16.40	15.10	-13.00	7.00	-3.00	20.00	N/A
2009	5.10	N/A	4.00	30.90	3.50	40.40	-4.90	41.30	2.80	26.20	1.60	N/A
2010	5.70	N/A	3.80	-7.20	4.00	-10.00	1.10	-4.10	3.30	-5.60	2.20	N/A
2011	5.00	N/A	4.70	-16.80	4.10	-9.70	1.90	-7.80	-0.40	N/A	0.90	N/A

Source for the Inflation Rates: Index Mundi
Source for the Real Interest Rates: World Bank

Table 2
Unit Root Test

Kwiatkowski-Phillips-Schmidt-Shin (1992) with a Constant and a Trend		
	Levels	First Difference
Baa	0.180389**	0.069087
log(BO)	0.314228*	0.10607
log(GP)	0.266775*	0.04792
log(K)	0.414609*	0.078516
log(KE)	0.469717*	0.118929
log(S)	0.360568*	0.085197
log(SE)	0.0434	0.037556
log(S&P)	0.342198*	0.094986
TB	0.494367*	0.083597

Critical Values for the 1%, 5% and 10% levels are 0.21600, 0.14600 and 0.11900 respectively.
*, ** and *** denote rejection of the null hypothesis at 1%, 5% and 10% levels respectively.
Sample Period: January 2, 2008 to October 23, 2012

Table 3
Unit Root Test

Kwiatkowski-Phillips-Schmidt-Shin (1992) with a Constant and a Trend		
	Levels	First Difference
Baa	0.164721**	0.03814
log(B)	0.234771*	0.11371
log(BE)	0.122119***	0.500000*
log(BO)	0.407369*	0.04168
log(GP)	0.408571*	0.03669
log(J)	0.182417**	0.05612
log(K)	0.210837**	0.05327
log(KE)	0.488888*	0.05447
log(O)	0.195711**	0.080000
log(OE)	0.167086**	0.237282*
log(Q)	0.312557*	0.04347
log(QE)	0.056311	0.225419*
log(S)	0.135153***	0.05189
log(SE)	0.049938	0.04999
log(S&P)	0.187345**	0.07014
log(U)	0.174032**	0.05413
log(UE)	0.025972	0.08842
TB	0.428208*	0.02442

Critical Values for the 1%, 5% and 10% levels are 0.21600, 0.14600 and 0.11900 respectively.
*, ** and *** denote rejection of the null hypothesis at 1%, 5% and 10% levels respectively.
Sample Period: June 1, 2010 to October 23, 2012

Table 4

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(S))	Independent Variables	Dependent Variable Δ(log(K))
Δ(log(BO))	0.052421 (0.2591)	Δ(log(BO))	0.027766 (0.4477)
Δ(log(BO(-1)))	0.014165 (0.5790)	Δ(log(BO(-1)))	0.023530 (0.1187)
Δ(log(BO(-2)))	0.016437 (0.5061)	Δ(log(BO(-2)))	-0.006397 (0.8084)
Δ(log(BO(-3)))	0.025761 (0.4136)	Δ(log(BO(-3)))	-0.004541 (0.7979)
Δ(log(S&P))	0.312598 (0.0000)*	Δ(log(S&P))	0.025763 (0.4918)
Δ(log(S&P(-1)))	0.251733 (0.0000)*	Δ(log(S&P(-1)))	0.055043 (0.1088)
Δ(log(S&P(-2)))	0.079919 (0.1915)	Δ(log(S&P(-2)))	-0.010219 (0.7705)
Δ(log(S&P(-3)))	-0.039808 (0.5758)	Δ(log(S&P(-3)))	-0.040392 (0.3367)
Δ(TB)	0.023046 (0.2654)	Δ(TB)	0.006508 (0.4538)
Δ(TB(-1))	0.002655 (0.6336)	Δ(TB(-1))	-0.005325 (0.1423)

* and ** denote the rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 4 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(S))	Independent Variables	Dependent Variable Δ(log(K))
Δ(TB(-2))	0.002570 (0.7690)	Δ(TB(-2))	-0.007313 (0.2065)
Δ(TB(-3))	0.009251 (0.2300)	Δ(TB(-3))	-0.005542 (0.4049)
Δ(Baa)	0.013267 (0.3486)	Δ(Baa)	-0.019272 (0.0237)**
Δ(Baa(-1))	-0.001237 (0.8942)	Δ(Baa(-1))	0.000964 (0.8719)
Δ(Baa(-2))	0.003182 (0.7441)	Δ(Baa(-2))	-0.009059 (0.2921)
Δ(Baa(-3))	-0.009835 (0.3725)	Δ(Baa(-3))	0.014508 (0.0226)**
Δ(log(K))	0.543981 (0.0000)*	Δ(log(S))	0.229780 (0.0000)*
Δ(log(K(-1)))	-0.132479 (0.0173)**	Δ(log(S(-1)))	0.013028 (0.5966)
Δ(log(K(-2)))	-0.077260 (0.3111)	Δ(log(S(-2)))	0.002368 (0.9444)
Δ(log(K(-3)))	0.007009 (0.9328)	Δ(log(S(-3)))	0.028120 (0.4055)

* and ** denote the rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 4 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

	Δ(log(S))	**Δ(log(K))**
Adjusted R Squared	0.364591	0.232551
F-Statistics	19.24650 (0.0000)*	10.62600 (0.0000)*
Akaike Info Criterion	-5.155192	-5.974212
Schwarz Criterion	-5.008266	-5.827286
Hannan-Quinn Criterion	-5.098151	-5.917171

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 5

GCC and S&P 500 : Simple Correlation

	Saudi Arabia	**Kuwait**	**Oman**	**Qatar**	**Bahrain**	**UAE**
			2001:M9 - 2008:M9			
S&P 500	0.09 (0.78)	0.22 (2.06)	0.19 (1.81)	0.14 (1.26)	0.30 (2.89)	0.07 (0.63)
			2008:M9 - 2010:M9			
S&P 500	0.84 (7.47)	0.77 (5.79)	0.69 (4.66)	0.84 (7.44)	0.66 (4.80)	0.44 (2.33)

T-Statistics are mentioned in parenthesis

Source: IMF Working Paper WP/11/138

Table 6

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	**Dependent Variable** Δ**(log(S))**	**Independent Variables**	**Dependent Variable** Δ**(log(K))**
Δ(log(S&P))	0.392915 (0.0000)*	Δ(Baa)	-0.018041 (0.0461)**
Δ(log(S&P(-1))	0.243591 (0.0000)*	Δ(Baa(-3))	0.011064 (0.1064)
Δ(log(K))	0.556006 (0.0000)*	Δ(log(S))	0.278278 (0.0000)*
Δ(log(K(-1)))	-0.089883 (0.0660)		

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 6 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

	Δ(log(S))	**Δ(log(K))**
Adjusted R Squared	0.347200	0.215382
F-Statistics	85.83205 (0.0000)*	59.19517 (0.0000)*
Akaike Info Criterion	-5.155793	-5.978238
Schwarz Criterion	-5.120895	-5.950252
Hannan-Quinn Criterion	-5.142246	-5.967373

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-value are in parenthesis

Table 7

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	**Dependent Variable** $\Delta(\log(S))$	**Independent Variables**	**Dependent Variable** $\Delta(\log(K))$
Δ(log(S&P))	0.381386 (0.0000)*	Δ(Baa)	-0.017754 (0.0204)**
Δ(log(S&P(-1)))	0.228728 (0.0000)*	Δ(log(S))	0.261884 (0.0000)*
Δ(log(K))	0.570053 (0.0000)*	DUM*Δ(log(BO))	-0.053134 (0.4351)
DUM*Δ(log(BO))	0.138857 (0.0267)**	(1-DUM)*Δ(log(BO))	0.131607 (0.0021)*
(1-DUM)*Δ(log(BO))	-0.071683 (0.3073)		

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 7 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

	Δ(log(S))	**Δ(log(K))**
Adjusted R Squared	0.360850	0.249102
F-Statistics	73.04014 (0.0000)*	53.99538 (0.0000)*
Akaike Info Criterion	-5.175373	-6.017760
Schwarz Criterion	-5.133496	-5.982905
Hannan-Quinn Criterion	-5.159118	-6.004231

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 8

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(S))	Independent Variables	Dependent Variable Δ(log(K))	Δ(log(Q))	Δ(log(U))	Δ(log(O))	Δ(log(B))
Δ(log(S&P))	0.299915 (0.0000)*	Δ(log(S&P))	0.106886 (0.0003)*	0.045906 (0.3006)	-0.006745 (0.9263)	-0.015831 (0.7580)	-0.000246 (0.9947)
Δ(log(S&P(-1)))	0.072055 (0.1073)	Δ(log(S&P(-1)))	0.061020 (0.1177)	0.025386 (0.5455)	0.103160 (0.1485)	0.110506 (0.0205)**	0.053691 (0.1044)
Δ(log(S&P(-2)))	-0.042077 (0.4297)	Δ(log(S&P(-2)))	-0.002702 (0.9495)	-0.070091 (0.1829)	-0.098305 (0.1821)	0.012567 (0.7235)	0.045898 (0.2466)
Δ(log(S&P(-3)))	-0.011369 (0.8530)	Δ(log(S&P(-3)))	-0.022863 (0.5618)	-0.037701 (0.3907)	-0.087073 (0.2223)	-0.152404 (0.0067)*	0.037362 (0.1206)
Δ(log(BO))	0.034924 (0.3527)	Δ(log(BO))	-0.017062 (0.3426)	0.008873 (0.7725)	0.044800 (0.3134)	0.009420 (0.7231)	-0.008963 (0.6882)
Δ(log(BO(-1)))	0.045168 (0.1530)	Δ(log(BO(-1)))	-0.001492 (0.9427)	0.008360 (0.7114)	-0.013532 (0.6664)	-0.000443 (0.9827)	-0.022183 (0.1752)
Δ(log(BO(-2)))	-0.040836 (0.2916)	Δ(log(BO(-2)))	-0.023860 (0.2376)	-0.001372 (0.9587)	0.023791 (0.6107)	-0.004715 (0.8666)	0.010884 (0.5525)
Δ(log(BO(-3)))	-0.025203 (0.5000)	Δ(log(BO(-3)))	0.000927 (0.9689)	0.003077 (0.8864)	0.065495 (0.1274)	0.041353 (0.0361)**	-0.010928 (0.4549)
Δ(log(J))	0.270027 (0.0031)*	Δ(log(J))	0.218532 (0.0040)*	0.456758 (0.0001)*	0.441560 (0.0096)*	0.230376 (0.0004)*	0.063796 (0.2900)

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 8 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	**Dependent Variable**	**Independent Variables**	**Dependent Variable**				
	Δ(log(S))		**Δ(log(K))**	**Δ(log(Q))**	**Δ(log(U))**	**Δ(log(O))**	**Δ(log(B))**
Δ(log(J(-1)))	-0.008302 (0.9273)	Δ(log(J(-1)))	-0.064267 (0.1938)	0.004885 (0.9418)	0.005445 (0.9560)	0.128736 (0.0353)**	0.001709 (0.9723)
Δ(log(J(-2)))	0.259156 (0.1340)	Δ(log(J(-2)))	-0.064267 (0.2838)	0.122017 (0.1620)	-0.013572 (0.9241)	0.132987 (0.3079)	0.010658 (0.8262)
Δ(log(J(-3)))	0.149636 (0.2970)	Δ(log(J(-3)))	0.021845 (0.7734)	0.040548 (0.5408)	-0.083506 (0.4617)	0.014646 (0.8088)	0.042015 (0.4617)
Δ(TB)	-0.089204 (0.0168)**	Δ(TB)	0.018682 (0.4610)	-0.067036 (0.0993)	-0.047666 (0.2932)	-0.021975 (0.5615)	-0.039545 (0.0141)**
Δ(TB(-1))	0.045962 (0.2908)	Δ(TB(-1))	0.013768 (0.6339)	-0.019871 (0.3331)	0.046393 (0.3627)	0.017977 (0.5536)	-0.026357 (02842)
Δ(TB(-2))	-0.062801 (0.2569)	Δ(TB(-2))	0.021599 (0.4318)	0.014683 (0.5723)	0.084703 (0.1281)	0.050558 (0.0485)**	0.000984 (0.9590)
Δ(TB(-3))	-0.034238 (0.2868)	Δ(TB(-3))	0.041639 (0.0553)	0.006679 (0.8188)	-0.022704 (0.5459)	-0.034782 (0.1295)	0.024458 (0.2754)
Δ(Baa)	0.005835 (0.6458)	Δ(Baa)	-0.019346 (0.0035)*	0.010601 (0.3627)	0.009993 (0.4561)	0.006533 (0.6163)	0.000609 (0.9334)
Δ(Baa(-1))	0.010872 (0.3260)	Δ(Baa(-1))	-0.006682 (0.2546)	0.000692 (0.9238)	-0.021821 (0.0421)**	-0.004443 (0.5916)	-0.008457 (0.0867)
Δ(Baa(-2))	0.018156 (0.0499)**	Δ(Baa(-2))	-0.009413 (0.1159)	0.006335 (0.4733)	0.0000737 (0.9948)	0.008470 (0.2680)	-0.005523 (0.3401)

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.

The actual P-values are in parenthesis

Table 8 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(S))	Independent Variables	Δ(log(K))	Δ(log(Q))	Δ(log(U))	Δ(log(O))	Δ(log(B))
Δ(Baa(-3))	-0.007155 (0.5252)	Δ(Baa(-3))	0.010855 (0.0924)	-0.000464 (0.9545)	0.011131 (0.2863)	0.016693 (0.0044)*	-0.001886 (0.5998)
Δ(log(K))	0.367317 (0.0178)**	Δ(log(S))	0.126205 (0.0004)*	0.260078 (0.0000)*	0.460249 (0.0000)*	0.138114 (0.0262)**	0.033724 (0.3583)
Δ(log(K(-1)))	-0.153580 (0.2307)	Δ(log(S(-1)))	0.058662 (0.1275)	0.123723 (0.0476)**	0.040008 (0.5269)	-0.050674 (0.3084)	-0.007716 (0.7772)
Δ(log(K(-2)))	-0.142833 (0.4571)	Δ(log(S(-2)))	0.053749 (0.1250)	0.118905 (0.0006)*	0.170339 (0.0127)**	0.054262 (0.3551)	0.015204 (0.7605)
Δ(log(K(-3)))	0.019206 (0.8704)	Δ(log(S(-3)))	0.101748 (0.0183)**	-0.015042 (0.6292)	0.007208 (0.9101)	0.054910 (0.0806)	0.003395 (0.9238)

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 8 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

	Δ(log(S))	Δ(log(K))	Δ(log(Q))	Δ(log(U))	Δ(log(O))	Δ(log(B))
Adjusted R Squared	0.307112	0.211420	0.401102	0.297214	0.185806	0.002288
F-Statistics	6.709324 (0.0000)*	4.451814 (0.0000)*	9.622814 (0.0000)*	6.316255 (0.0000)*	3.938191 (0.0000)*	1.029532 (0.427898)
Akaike Info Criterion	-5.887556	-6.953744	-6.561991	-5.623264	-6.594708	-7.282120
Schwarz Criterion	-5.586219	-6.652407	-6.260654	-5.321928	-6.293372	-6.980784
Hannan-Quinn Criterion	-5.767094	-6.833282	-6.441529	-5.502803	-6.474247	-7.161659

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 9

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(S))	Independent Variables	Dependent Variable Δ(log(K))
Δ(log(S&P))	0.294658 (0.0000)*	Δ(log(S&P))	0.088591 (0.0016)*
Δ(log(S&P(-1)))	0.110197 (0.0000)*	Δ(log(J))	0.228556 (0.0026)*
Δ(log(BO))	0.032812 (0.3880)	Δ(Baa)	-0.019672 (0.0026)*
Δ(log(J))	0.259670 (0.0051)*	Δ(Baa(-2))	-0.010963 (0.0321)**
Δ(TB)	-0.102451 (0.0148)**	Δ(log(S))	0.119127 (0.0004)*
Δ(Baa)	0.005775 (0.6211)	Δ(log(S(-1)))	0.079194 (0.0078)*
Δ(Baa(-2))	0.012202 (0.1041)	Δ(log(S(-3)))	0.094317 (0.0115)**
Δ(log(K))	0.349410 (0.0276)**		

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 9 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	**Dependent Variable** $\Delta(\log(Q))$	**Independent Variables**	**Dependent Variable** $\Delta(\log(U))$
$\Delta(\log(J))$	0.434991 (0.0001)*	$\Delta(\log(J))$	0.464469 (0.0065)*
$\Delta(\log(S))$	0.322287 (0.0000)*	$\Delta(Baa(-1))$	-0.012169 (0.2177)
$\Delta(\log(S(-1)))$	0.143475 (0.0046)*	$\Delta(\log(S))$	0.503184 (0.0000)*
$\Delta(\log(S(-2)))$	0.089371 (0.0009)*	$\Delta(\log(S(-2)))$	0.118957 (0.0902)

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 9 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	**Dependent Variable** **Δ(log(O))**
Δ(log(S&P(-1)))	0.064376 (0.0346)**
Δ(log(S&P(-3)))	-0.103326 (0.0062)*
Δ(log(BO(-3)))	0.045752 (0.0573)
Δ(log(J))	0.230897 (0.0008)*
Δ(log(J(-1)))	0.143368 (0.0291)**
Δ(TB(-2))	0.047813 (0.0556)
Δ(Baa(-3))	0.014947 (0.044)**
Δ(log(S))	0.153387 (0.0000)*

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 9 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

	Δ(log(S))	**Δ(log(K))**	**Δ(log(Q))**	**Δ(log(U))**	**Δ(log(O))**
Adjusted R Squared	0.280923	0.207050	0.389996	0.275787	0.167809
F-Statistics	16.23619 (0.0000)*	12.63821 (0.0000)*	50.86803 (0.0000)*	30.70306 (0.0000)*	8.839062 (0.0000)*
Akaike Info Criterion	-5.908256	-7.003695	-6.607340	-5.664442	-6.616436
Schwarz Criterion	-5.800537	-6.907946	-6.547496	-5.604599	-6.508465
Hannan-Quinn Criterion	-5.865209	-6.965431	-6.583425	-5.640527	-6.573283

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 10
Foreign Investment Ceiling for Listed Stocks in the GCC Markets

Market	**Foreign Investment Ceiling**
Bahrain	49% in general; 10% for a single entity; some banks & insurance companies are 100% open to foreign ownership; 100% in general for GCC nationals
Kuwait	49% in general
Oman	Up to 70% with some restrictions at company level; restrictions may differ for GCC nationals
Qatar	25% in general
Saudi Arabia	25% for GCC nationals, other foreign investors may access market via mutual funds managed by Saudi banks
United Arab Emirates	49% in general, different restrictions may apply to individual companies; 100% for GCC nationals with company's approval

Source: International Research Journal of Finance and Economics (2010), Issue 37.

Table 11

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(S))	Independent Variables	Dependent Variable Δ(log(K))
Δ(log(S&P))	0.313347 (0.0000)*	Δ(log(S&P))	0.089984 (0.0036)*
Δ(log(S&P(-1)))	0.117566 (0.0000)*	Δ(log(J))	0.225398 (0.0028)*
Δ(log(J))	0.268849 (0.0029)*	Δ(Baa)	-0.019271 (0.0041)*
Δ(TB)	-0.100028 (0.0179)**	Δ(Baa(-2))	-0.011360 (0.0265)**
Δ(log(K))	0.336999 (0.0221)**	Δ(log(S))	0.120102 (0.0004)*
DUM*Δ(log(BO))	0.048391 (0.4208)	Δ(log(S(-1)))	0.079110 (0.0087)*
(1-DUM)*Δ(log(BO))	0.012353 (0.7966)	Δ(log(S(-3)))	0.094468 (0.0107)**
		DUM*Δ(log(BO))	-0.034714 (0.2150)
		(1-DUM)*Δ(log(BO))	0.017650 (0.5291)

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 11 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	**Dependent Variable** $\Delta(\log(Q))$	**Independent Variables**	**Dependent Variable** $\Delta(\log(U))$
Δ(log(J))	0.447218 (0.0002)*	Δ(log(J))	0.465424 (0.0095)*
Δ(log(S))	0.314970 (0.0000)*	Δ(Baa(-1))	-0.012370 (0.2109)
Δ(log(S(-1)))	0.144128 (0.0036)*	Δ(log(S))	0.479581 (0.0000)*
Δ(log(S(-2)))	0.093385 (0.0003)*	Δ(log(S(-2)))	0.119610 (0.0821)
DUM*Δ(log(BO))	0.122708 (0.0415)**	DUM*Δ(log(BO))	0.116168 (0.1013)
(1-DUM)*Δ(log(BO))	-0.060258 (0.1502)	(1-DUM)*Δ(log(BO))	0.016763 (0.7431)

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 11 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

Independent Variables	Dependent Variable Δ(log(O))	Independent Variables	Dependent Variable Δ(log(B))
Δ(log(S&P(-1)))	0.062278 (0.0417)**	Δ(TB)	-0.027373 (0.0950)
Δ(log(S&P(-3)))	-0.10113 (0.0077)*	DUM*Δ(log(BO))	-0.065245 (0.0389)**
Δ(log(BO(-3)))	0.045265 (0.0604)	(1-DUM)*Δ(log(BO))	0.055173 (0.0873)
Δ(log(J))	0.225787 (0.001)*		
Δ(log(J(-1)))	0.145109 (0.0277)**		
Δ(TB(-2))	0.045743 (0.0686)		
Δ(Baa(-3))	0.014326 (0.0546)		
Δ(log(S))	0.145437 (0.0001)*		
DUM*Δ(log(BO))	-0.00448 (0.9107)		
(1-DUM)*Δ(log(BO))	0.039236 (0.3068)		

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in parenthesis

Table 11 (Continued)

Least Squares Method with HAC Standard Errors and Covariance

	Δ(log(S))	Δ(log(K))	Δ(log(Q))	Δ(log(U))	Δ(log(O))	Δ(log(B))
Adjusted R Squared	0.279296	0.204843	0.405369	0.281159	0.165382	0.020834
F-Statistics	18.27290 (0.0000)*	9.930575 (0.0000)*	36.44926 (0.0000)*	21.33864 (0.0000)*	7.162534 (0.0000)*	3.212794 (0.023263)**
Akaike Info Criterion	-5.909102	-6.994715	-6.626600	-5.665623	-6.60733	-7.342315
Schwarz Criterion	-5.813352	-6.875028	-6.542819	-5.581842	-6.47536	-7.294440
Hannan-Quinn Criterion	-5.870838	-6.946885	-6.593119	-5.632142	-6.55458	-7.323183

* and ** denote rejection of the null hypothesis at 1% and 5% significance levels respectively.
The actual P-values are in Parenthesis

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