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An Empirical Investigation of the UAE Stock Markets

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AN EMPIRICAL INVESTIGATION OF THE UAE STOCK
MARKETS

Safa Maatouq Ahmed Al Mohana

This dissertation is submitted in partial fulfilment of the requirements for the degree
of Doctorate of Business Administration

Under the Supervision of Professor Abdulnasser Hatemi

November 2015

Declaration of Original Work

I, Safa Maatouq Ahmed Al Mohana, the undersigned, a graduate student at the United Arab Emirates University (UAEU), and the author of this dissertation entitled "*An empirical investigation of the UAE stock markets*", hereby, solemnly declare that this dissertation is my own original research work that has been done and prepared by me under the supervision of Professor Abulnasser Hatemi., in the College of <College Name> at UAEU. This work has not previously been presented or published, or formed the basis for the award of any academic degree, diploma or a similar title at this or any other university. Any materials borrowed from other sources (whether published or unpublished) and relied upon or included in my dissertation have been properly cited and acknowledged in accordance with appropriate academic conventions. I further declare that there is no potential conflict of interest with respect to the research, data collection, authorship, presentation and/or publication of this dissertation.

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Abstract

This thesis consists of six chapters. The first provides an overall introduction. The second offers a retrospective review of the development of the financial markets in the UAE from their start until now. The third chapter investigates empirically the causal nexus of the Abu Dhabi and Dubai stock markets in order to assess the degree of integration between these two domestic markets. To our best knowledge, this is the first attempt to explore domestic financial market integration within the context of the UAE. The fourth chapter extends the analysis in order to examine the degree of financial market integration of the UAE with regard to the global market. The fifth chapter deals with the impact of the recent real estate financial crisis on the UAE real estate market, which is considered an important sector for the economic development of the country. Chapter 6 examines the dynamic impact of oil prices on the stock market. Our methods consist of both symmetric and asymmetric causality tests, which are used in Chapters 3-6. When testing for causality, we do not make any distributional assumptions. We generate critical values via bootstrap simulations with leverage adjustments. This approach is expected to be more accurate since the underlying data set is usually non-normal with time varying volatility. We also make use of the asymmetric generalized impulse response functions in Chapter 5 and the last chapter. Allowing for asymmetric impacts is considered to be in line with the way that markets generally operate since it is widely agreed that people in the financial world tend to react more to negative news than positive news. Our conjecture is that the empirical findings which this thesis offers can be useful to both investors and policy makers in the UAE.

Keywords: UAE financial market, Oil prices, Real estate markets, Asymmetric impacts, Bootstrap simulations.

Title and Abstract (in Arabic)

استقصاء تجريبي لأسواق الأوراق المالية الإماراتية

الملخص

تتألف هذه الأطروحة من ستة فصول، أولها عبارة عن مقدمة عامة. فيما يقدم الفصل الثاني مراجعة لتطور الأسواق المالية في دولة الإمارات العربية المتحدة وذلك بأثر رجعي منذ انطلاقتها وحتى يومنا هذا. أما الفصل الثالث فهو يستقصي تجريبياً العلاقة السببية بين سوقي الأسهم في أبوظبي ودبي من أجل تقييم درجة التكامل فيما هاتين السوقين المحليتين. تعتبر هذه المحاولة الأولى من نوعها على حد علمنا لاستكشاف تكامل الأسواق المالية في سياق دولة الإمارات العربية المتحدة. يتناول الفصل الرابع التحليل باستفاضة من أجل فحص درجة تكامل الأسواق المالية في دولة الإمارات العربية المتحدة بالنسبة للسوق العالمية. أما الفصل الخامس فيتناول تأثير الأزمة المالية والعقارية الأخيرة على سوق العقارات في الدولة، والذي يعتبر قطاعاً هاماً لتحقيق التطور الاقتصادي للدولة. أما الفصل السادس فيتناول التأثير الديناميكي لأسعار النفط على سوق الأسهم. تضم الطرق التي نتبعها في هذه الأطروحة الاختبارات السببية المتناسقة وغير المتناسقة، وهي مستخدمة في الفصول 3-6. لا نقدم أي افتراضات توزيعية عند اختبار السببية، وإنما نقوم بإحداث قيم حساسة عن طريق محاكاة الخيوط مع إجراء التعديلات الداعمة. يتوقع أن يكون هذا النهج أكثر دقة نظراً لكون مجموعة البيانات الأساسية غير طبيعية في حالات التقلب المتغيرة مع الوقت. كما أننا نستخدم أيضاً وظائف الاستجابة للنبض العامة وغير المتجانسة في الفصل الخامس والفصل الأخير. يعتبر السماح للتأثيرات غير المتجانسة منسجماً مع الطريقة التي تعمل بها الأسواق بصورة عامة لأن من المتفق عليه عموماً أن الأشخاص في عالم المال يميلون للتفاعل للأخبار السلبية أكثر من تفاعلهم مع الأخبار الإيجابية. يشير حدسنا إلى أن النتائج التجريبية التي توصلت إليها هذه الأطروحة يمكن أن تكون مفيدة للمستثمرين وصناع السياسة في دولة الإمارات العربية المتحدة.

مفاهيم البحث الرئيسية: سوق الامارات المالي، أسعار النفط، أسواق العقارات، الآثار غير المتماثلة، المحاكاة التمهيدية.

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Dedication

"My mother is the most beautiful woman I ever saw. All I am I owe to my mother. I attribute all my success in life to the moral, intellectual and physical education I received from her. She always appreciates and encourages me and what I am is only with the blessings of my Almighty Allah and with the prayers and appreciation of my mother. I cannot return anything as great as her love and appreciation except to say that I have dedicated my whole life to her love. This project would never have been completed without the prayers, support and encouragement of my mother. I dedicate all my work to one of the great ladies of the universe, my mother."

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List of Abbreviations

ADX	Abu Dhabi Securities Exchange
DFM	Dubai Financial Market
GLOBX	Global financial price index
UAEX	United Arab Emirates stock price index
GFC	Global Financial Crisis
AI	Abu Dhabi Index
DI	Dubai Index
WR	World Real Estate
UAER	United Arab Emirates Real Estate
SCA	Securities and Commodities Authority
OI	Oil price index
WM	World market

Chapter 1: Introduction to the study

1.1 Overview

Since the UAE, with a federal system of government, follows an open economic strategy, the UAE financial markets have recently expanded to trade internationally with other financial markets, such as the DUBAI NASDAQ exchange market, even though the recent financial crisis has negatively affected the economies of many countries. According to (Al-Shayeb, A. & Hatemi-J, A, in press, 2013) the Security and Commodities Authority (SCA) has a superior regulatory role in managing and supervising the UAE stock markets and organizing their activities in accordance with Federal Law no 4/2000. In the year 2000, the SCA permitted both the ADX and the DFM to begin to operate in the financial markets.

Furthermore, since 2005 the UAE has allowed foreigners to invest in the UAE markets in order to expand invested equity volume for shareholders in UAE companies, and in order to give local public joint stock companies a chance to compete globally, to get the necessary liquidity to invest internationally, and to enhance their ability to invest in various sectors, such as real estate, telecommunications, and other services. This will contribute in improving the UAE's GDP through foreign direct investment, which will fulfill the UAE's open economic strategy of diversifying its national income from non-oil-sector activities.

One of the important aims of this study is to investigate the level of integration between the UAE stock markets and world stock markets. Integration among international financial markets has recently become an important issue, and the UAE has opened its financial markets to funds from foreign investors in order to improve

economic growth rates in the UAE.

We examine also the causal relationship between the oil market in the UAE and the UAE stock market for the period 2005-2013, collecting the data on a weekly basis. Another goal of this study is to apply asymmetric causality and generalized asymmetry impulse response methods to explore the relationship between the oil prices and stock prices, and to investigate whether there is a significant impact on stock prices due to changes in oil prices.

In terms of measuring the integration relationship between the variables, and in order to choose a convenient method to implement empirical tests, this study will be based on two test methods; the use of asymmetric causality tests based on leveraged bootstrapping, and a newly developed asymmetry generalized impulse response by (Hatemi-J A. , Asymmetric generalized impulse responses with an application in finance, 2014a) to investigate the potentially asymmetric interaction between the underlying variables. These methods are expected to provide informative empirical results compared to previous methods in the literature.

1.2 Research Aims, Objectives, Questions and Hypotheses

1.2.1 Aims and objectives

This thesis has the following aims and objectives:

➢ To provide a review of the historical development of the financial markets in the UAE.

➢ To examine empirically whether the Abu Dhabi securities exchange is integrated or segmented with the Dubai financial market by implementing new tests for causality which unlike standard methods can separate the impact of positive shocks from those of negative ones.

➢ To evaluate the degree of integration between the UAE financial market and the world stock market by applying newly developed asymmetric causality tests which are based on bootstrap simulations with leverage adjustments.

➢ To explore the impact of the world real estate crisis on the UAE real estate market. We consider the Global Financial Crisis (GFC) in our investigation. Besides the asymmetric causality test methods, this chapter uses recently developed asymmetric generalized impulse response functions and variance decompositions, which separate the effect of positive shocks from those of negative ones.

➢ To examine the dynamic and asymmetric impact of the oil price index on the Abu Dhabi Securities Exchange (ADX) and the Dubai Financial Market (DFM) by means of several econometric approaches, namely, the symmetric and asymmetric causality methods and a newly developed method by (Hatemi-J, 2014) to estimate the asymmetric generalized impulse response functions.

1.2.2 Research Questions

• Is there any integration between the UAE financial markets and world stock market?

• Are the DFM and the ADX financial markets integrated or segmented?

• Did the world's real estate crisis have any influence on the real estate market in the UAE?

• What is the impact of oil prices shock on the ADX and Dubai financial markets?

1.2.3 Hypotheses

This thesis has formulated the following null hypotheses:

❖ Exploring the integration between Abu Dhabi Securities Market Index (ADX) and Dubai Financial Market Index (DFMI), we have defined six hypotheses, as follows:

    a. ADXI does not Granger cause DFMI based on the standard symmetry method.

    b. DFMI does not Granger cause ADXI based on the standard symmetry method.

    c. A positive shock in ADXI does not Granger cause a positive shock in DFMI based on the asymmetry causality method.

    d. A positive shock in DFMI does not Granger cause a positive shock in ADXI based on the asymmetry causality method.

    e. A negative shock in ADXI does not Granger cause a negative shock in DFMI based on the asymmetry causality method.

    f. A negative shock in DFMI does not Granger cause a negative shock in ADXI based on the asymmetry causality method.

❖ Financial integration of the UAE financial market index (UAEX) and Global financial market (GLOBX):

    a. GLOBX does not Granger cause the UAEX based on the standard symmetry method.

    b. GLOBX does not Granger cause the UAEX in terms of positive shocks based on the asymmetry causality method.

c. GLOBX does not Granger cause the UAEX in terms of negative shocks based on the asymmetry causality method.

❖ The impact of the world's real estate market (WR) on the UAE real estate market (UAER) taking into account the potential impact of the Global financial crisis (GFC).

    a. WR does not Granger cause the UAER based on the standard symmetry method.

    b. WR does not Granger cause the UAER in terms of positive shocks based on the asymmetry causality method.

    c. WR does not Granger cause the UAER in terms of negative shocks based on the asymmetry causality method.

    d. WM does not Granger cause the UAER based on the standard symmetry method.

    e. WM does not Granger cause the UAER in terms of positive shocks based on the asymmetry causality method.

    f. WM does not Granger cause the UARE in terms of negative shocks based on the asymmetry causality method.

❖ Examining the interaction between Oil Prices Index (OPI) with regard to the Abu Dhabi Securities Exchange Index (ADXI) and Dubai Financial Market Index (DFMI).

    a. OPI does not Granger cause the ADXI based on the standard symmetry method.

    b. OPI does not Granger cause the ADXI in terms of positive shocks based on the asymmetry causality method.

    c. OPI does not Granger cause the ADXI in terms of negative shocks based

on the asymmetry causality method.

d. OPI does not Granger cause the DFMI based on the standard symmetry method.

e. OPI does not Granger cause the DFMI in terms of positive shocks based on the asymmetry causality method.

f. OPI does not Granger cause the DFMI in terms of negative shocks based on the asymmetry causality method.

1.3 Contribution of the Study

This thesis provides a review of the development of the financial markets from their start to the present. It also examines the relationship of variables by using causality tests and asymmetry generalized impulse response functions for the period 1/1/2005 − 31/12/2013. The thesis goes further by investigating the impact that oil prices have on the UAE stock market.

In addition, we have also examined the impact of the recent world real estate crisis on the real estate sector in the UAE. We have made use of new advances in econometric methodology. Since the underlying financial data are usually not normally distributed, and are volatile, the standard causality tests may not perform correctly. To remedy this potential problem, we make no distributional assumptions and we make use of bootstrap simulations in order to produce accurate critical values when causality tests are implemented.

Another novelty of this thesis is that we allow for potential asymmetry when dynamic interactions between the underlying variables are investigated. This is the case for both testing for causality in the Granger sense and for the estimation of

impulse response functions. These methods provide the possibility of separating the impacts of positive shocks from those of negative ones. Thus, the empirical results that this thesis provides can be very informative and useful for both investors and policy makers.

For example, the empirical findings based on these new approaches may enable investors to improve their decisions in both falling and rising markets and in future planning, and will help regulatory bodies in the UAE to set up more effective policies to ensure the stability of the economy during possible adverse market situations.

1.4 Research Theoretical Framework

The study has applied an empirical test using new methods to test for well-known theories in finance, such as financial market integration, and the efficient market hypothesis within the context of the UAE. Furthermore, this study has investigated the impact of the world real estate crisis on the UAE real estate market, taking in our consideration of the influence of the global financial crisis during the study period by using simulation-based test methods that are likely to be more accurate than other methods used in the current literature. The theoretical framework for this study deals with the following topics:

- An empirical investigation of the relationship between variables to see whether there is integration or segmentation between the Abu Dhabi Securities Exchange and Dubai Financial Market.

- Evaluating the financial integration between the UAE financial market and the global financial market by using asymmetric causality tests, combined with leveraged bootstrapping methods, because the data are not normally distributed.

- Examining the influence of the world's real estate crisis on the UAE real estate market, in an account which takes in the effect of the global financial market, using both methods, an asymmetric causality test and an asymmetry generalized impulse response.

- Measuring the interaction between oil markets and the UAE financial market, we have used both methods: an asymmetric causality test and an asymmetry generalized impulse response.

1.5 Research Methodology

Since this thesis makes use of financial data in the form of time series data, there are several issues that need to be dealt with. First, testing for unit roots is important in order to avoid spurious empirical results; therefore, we have implemented tests for unit roots. The impact of potential unit roots are taken into account when causality tests are implemented by including one unrestricted lag in the model following the suggestions made by (Toda and Yamamoto, 1995). Diagnostic tests are performed and the results show that the underlying data set is usually non-normal with ARCH effects. Thus, we make use of causality tests based on bootstrap simulations with leveraged adjustments, as suggested by (Hatemi-J & Hacker, 2005)

Another aspect that deserves attention is the potential asymmetric impact that usually exists in financial markets but is neglected when causality tests are implemented. It is widely agreed that people react more to negative news than positive ones. This shows the importance of potential causal impacts in empirical research. In order to allow potential asymmetric dynamic interaction between the underlying variables, we have applied two recently developed econometric methods.

The first is the asymmetric causality test introduced by (Hatemi-J A. , 2012), which splits the causal influence between favorable, and unfavorable changes, since, due to the nature of financial markets, investors appear to be more sensitive to negative results than to positive ones. The second method is the asymmetry generalized impulse response recommended by (Hatemi-J, 2014), to examine the possibly asymmetric relationship between the variables, which separates the effect of positive shocks from the negative ones. It likewise uses a recently created methodology, which permits positive and negative innovations to be recognized.

1.6 Research Strategy

The research strategy is based on the data collected, which is inductive. The study consists of collected relevant data by observing the general index for 9 years on a weekly basis, which provides 432 observations for each stock market. In addition, observations related to oil prices and real estate indices for the same period are also collected.

Subsequently we investigate the relationship between the variables under study through empirical experiment by using asymmetric causal testing and the asymmetric generalized impulse response method. After conducting the analysis, we draw out the financial and economic implications of the empirical findings. By reviewing previous published studies on the same topic, we adopt deductive strategies and relate them to our study context. The formulation of the study hypothesis is centered on a literature review in order to provide answers to the research questions.

In addressing the areas of requirement, the study has to identify the nature of the performance by the stock exchanges in the UAE. The stock exchange performance is assessed by using quantitative measures that can be understood, and interpreted

using methods appropriate to numerical data. However, it is clear that there is also qualitative reasoning behind the interpretations of the numbers. It is therefore evident that, while trends can be established using numbers, the reasons for the trends have to be identified using qualitative methods. This is the main framework, which outlines the design of the study, consisting of qualitative and quantitative outcomes. For example, we investigate the impact of the recent financial crisis, which can be treated as a qualitative property.

We collect the required information about the performance of the stock exchanges from well-known databases. The study further identifies aspects such as the performance of the UAE real estate sector, as well as the changes in oil prices. The study has not collected information directly from any of the stakeholders involved within the areas of discussion; rather the study has focused on collecting details based on secondary information.

Numerical information about the performance of the UAE stock exchanges was available in the form of the indices, while details of the performance of oil prices were available through the commodity markets. As the study requires insights into both qualitative and quantitative aspects, it is clear that a mixed methodology should be used. In doing so, it was interesting to note that many of the studies that are conducted in the area of stock exchanges and their performance are quantitative in nature.

This is because the prime purpose of many of these studies is to establish the relationship between two variables. In the case of the present study, where the relationships have to be formulated, the study is likely to have some quantitative aspects. Thus, for establishing the true nature of the relationships between real estate,

oil prices and the stock exchange performance, we have used appropriate econometric methodology.

This discussion is clarified by examples; for instance, if the markets are positively impacted by oil prices, it is likely that an increase in oil prices will also increase equity. This will provide an upward push to the market indices. If the market is not efficient, it is likely that this upward push will not take place immediately. Further, qualitative information has been identified where the general indices have indicated sharp upward and downward trends.

This has also contributed to further enhancing the understanding of the area of study. It will be possible to identify how efficient the markets have been in taking account of available information when decisions related to stock prices are made. If the markets remain efficient, it is likely that the share prices will be impacted soon. But if the markets remain inefficient, it is likely that a longer period will be needed for the share prices to adjust to the changes.

1.7 Ethical Considerations

There are not many ethical considerations applicable in the case of this study. This is because the required details are available in the public domain. However, it is clear that the study has furnished parties who are interested in financial markets insights, with details about financial market efficiencies in the UAE. With the possibility that such information can influence the decision making of investors, this study may cause an effect on the stock markets in the UAE.

It is apparent that the analysis involved in the study of the UAE stock exchanges is comprehensive in nature. Gaining access to the study will provide

privileged information, even though the conceptions of the study are based on publicly available information. However, it is important to recall that the study provides insight into the markets in the context of an academic analysis.

While market efficiencies can be identified on the basis of past information, this does not mean that the same things will be the case in the future. Therefore, the study is unlikely to affect the decision making of investors, and is not intended to do so. Identification of the efficiency levels of the financial markets in the UAE does not constitute any information or provide any insights, which endorses the fact that the study should not be used for making of investment decisions by investors.

A major consideration associated with the study is that a number of people who access it will have privileged information associated with the financial markets of the country and this may influence the making of decisions for investments. It is the responsibility of the researcher to state that the study has not been developed for investment decision-making purposes and such decisions should not be taken on the basis of the findings in the study.

1.8 Applicability and Significance

Like the many studies available, this study also provides significant insights into the level of efficiencies associated with the UAE financial markets. However, numbers of such studies are limited in perspective to the UAE stock markets. Therefore, the findings of this study should be of high significance and value. It has practical and theoretical significance, and this will ensure that the findings are used appropriately in the context of shaping financial markets in the UAE.

The practical significance is high for the regulators of the stock exchanges. It

is important that they take the required steps to improve the liquidity of the efficiencies of the markets. Investors will be able to take appropriate decisions on stocks if the markets remain efficient. Comparison between two markets can provide insight as to why one market has a higher level of efficiency than the other does. This will allow steps to be formulated which can be taken to improve the levels of efficiency in the less efficient market.

Investors will also examine the levels of efficiency associated with the investment platforms. If one platform is proven more efficient than another, it is likely to be used as an indicator for the direction of the other platform. People will use the behavior of the efficient platform in planning their investment activities. In other words, investors may use the findings of the study to select the most suitable indicators in making investment decisions.

Additionally, the empirical results of the present research are related to the area of interest in investment. The relationship between the price of oil and the growth of the stock market can be beneficial for countries rich in oil resources such as the UAE to further develop their economies. Therefore, this study will add to and expand the existing body of knowledge about the UAE's financial markets.

1.9 Thesis Structure

➢ Chapter 1: The first chapter provides information about the research aims and objectives, research methodology, strategy, contribution, theoretical framework, applicability, significance, ethical considerations, together with an overview of the chapters.

➢ Chapter 2: This chapter highlights the history of the UAE financial markets, including their development and further information relevant to their context.

- ➢ Chapter 3: This chapter assesses the degree of internal integration between the two markets: the Dubai Financial Market (DFM, hereafter) and the Abu Dhabi Stock Exchange (ADX, hereafter)

- ➢ Chapter 4: This chapter investigates the degree of integration or segmentation between the UAE financial markets with regard to the world's stock markets.

- ➢ Chapter 5: This chapter investigates the impact of the world real estate crisis on the UAE real estate markets, taking into consideration the influence of the global financial crisis during the study period, assessing how far the real estate sector has interacted with this crisis.

- ➢ Chapter 6: This chapter examines the dynamic impact of oil prices on both the Abu Dhabi Securities exchange and the Dubai financial market.

Chapter 2: Development of the UAE financial market

2.1 Introduction

The financial market is an integral component in ensuring a healthy and stable economy and it enhances societal wealth through the well-organized transfer of capital from lenders to borrowers. A well-organized financial market is of great importance, in particular for emerging economies in developing countries. It has received increasing attention since the 1990s (Al – Shayeb, 1999).

The United Arab Emirates is a young country established in the 1970s (HighBeam Research , 2005). It has one of the highest per capita GDPs in the world, making it the envy of many advanced countries. The nation's gross domestic product depends heavily on the income from oil and gas. The high gas prices have enabled the leaders of the country to finance development and infrastructure projects which will eventually support the diversification of the economy in order to minimize its dependence on oil and gas revenues.

Realizing the potential importance of a securities market to the national economy prompted the UAE leaders to make serious efforts to establish one. The stability of the sources of oil and gas produced in the 1960s in commercial quantity encouraged the formation of a treaty between a number of different tribes.

Before the discovery of oil and gas, the different tribes survived on pearl diving, limited forms of agriculture or sheep herding. Many had to go to neighboring countries to find work. After the precious resource was found, investments poured in and the life of the nation took a turn for the better. Expertise and technology were transferred from the advanced nations as they competed to establish their presence in

the oil-rich UAE.

The war with Israel in the 1970s saw the price of oil and gas skyrocketing to unprecedented levels after OPEC declared an oil embargo (A&E Television Networks 2013). With much higher gas prices, the country benefited from a huge influx of cash, which the leaders deftly used to expand the economic base of the country by diversifying into other areas, in particular the securities and stock market.

This is considered a master-stroke because it placed the country strategically in the arena of economic development in the Middle East and Northern Africa. The country has become the gateway to this part of the world and is now resorted to by portfolio investors worldwide who want to see their money grow in the financial haven that is the UAE.

The region is rich in underdeveloped and untapped markets. Foreign direct investors who search for partnerships, joint ventures or exclusive entry look for a base in the UAE to reach new market potentials, increasing further the economic activities of the still young country. As more money circulates, individuals and corporations became more willing to take risks in the securities markets.

This chapter discusses the development of the Securities Exchange in the UAE. An overview of the country's economy and financial system in the period of financial reporting is also analyzed. The portfolio investments in the UAE are composed of equity instruments, which are concentrated on stocks.

Overall, this chapter discusses the UAE and the development of its financial markets. It is divided into eight sections. Section 2.2 presents the background of the emerging markets. Section 2.3 focuses on the economy, in particular the fact that the

UAE is one of the main oil producing countries in the world. Section 2.4 discusses the history of financial systems in the UAE.

Section 2.5 presents the environment of the present financial reporting. Section 2.6 is about the background of the capital markets in the country, showing when and how they were developed from 1980 up to 2000. Section 2.7 presents the performance of the stock exchanges. Last, Section 2.8 presents a summary of the chapter.

2.2 Background of the Emerging Markets

There are different types of markets to consider, depending on their various orientations and goals, customers and maturity. For instance, according to (Brigham, 1992), there are physical and financial asset markets (based on whether the assets are tangible or intangible), spot and future market (based on the timing of delivery), money and capital markets (based on maturity). The focus here is on the capital market.

The capital market can be classified as either a primary or a secondary market, with respect to its purpose. Primary markets are institutions for raising funds for long-term debt and managing contributions for new joint-stock corporations (Al-Shayeb, 1999). These markets help with the transfer of capital from investors to borrowers, hence contributing to a healthier economy (Mayer & Vives, Capital Markets and Financial Intermediation, 1995)

Markets that are involved in buying and selling securities are called "Secondary markets" (Al-Shayeb, 1999). These markets have no effect on any corporation's position, with respect to its obligations and finances, where outstanding securities are traded among investors. Secondary markets have a great impact on the economy, although, they have no real effect on one's corporate position. They allow

primary markets to function appropriately through providing price signaling (Thomas, 1989).

Secondary markets also help to ensure investors' flexibility when the market changes. They make it easier for investors to liquidate their investments when necessary. Secondary markets can be classified into Stock Markets and Over-the-Counter Markets. Stock markets are organized and unified institutions, physical entities with governing bodies. These markets allow buyers and sellers to come to one place and their bargain their supply and demand outstanding securities through specified rules and mechanisms issued by the regulatory body of the Stock Exchange.

Stock market development has played a major role in economic and financial development (Al-Shayeb, 1999). Nevertheless, many economic analysts view stock markets as 'casinos', which have little positive but potentially much negative impact on economic growth, in developing countries in particular. Stock markets in developing countries have not been regarded as a marker of economic development (Al-Shayeb, 1999).

Since there is no corporate investment financed through the issuance of equity, stock markets are regarded as inessential for economic growth (Mayer, New issues in corporate finance, 1998) This has caused a wide debate on whether stock market development has an important impact on economic growth in a country, some people arguing that it has a positive impact on economic growth while others disagree (Demirguc-Kunt & Levine, 1996b).

2.3 Overview of UAE Economy

The economy of the United Arab Emirates used to be solely dependent on its oil and gas revenues. With the intelligent decisions taken by the leaders of the country, the economy has diversified into different industries such as oil and gas, banking and finance, tourism and manufacturing.

The oil and gas revenue is down to roughly one fourth of the country's income, 25%. Tourism has raised the country's revenues and banking services and tourism sector fuels the earning for the labor force. Manufacturing and agriculture form a small part of the country's economic activities. Among the oil producers in the world, the UAE controls roughly 10% at around 98 billion barrels.

Most of it is found in Abu Dhabi. It is said that the state has 92 billion barrels of the precious reserve. Dubai, Sharjah and Ras Al- Khaimah share a small portion, around 6%. Even in the natural gas sector, the UAE ranks fifth. The UAE exports both oil and natural gas to different parts of the world to earn its most stable source of income (Al-Zarouni, 2008).

2.4 History of Financial System in UAE

All structures of government agency and all businesses in the country comply with the organization of the different federal states. The monetary system, is based on the Federal Law of 1980 and, while independent from any intervention of government which gives it a free hand to organize and run itself profitably, is organized following this structure from the local states level to the federal level (Al-Zarouni, 2008).

The Ministry of the Economy oversees the Emirates Securities and Commodities Authority (ESCA). This office was created under the Federal Law

4/2000 last January 2000. ESCA is the body which regulates the Abu Dhabi Securities Exchange, the Commodities Exchange and the Dubai Financial Market. These three trading floors are highly active in the trading of securities and stocks.

The federal government created the Dubai International Financial Centre (DIFC) in 2004. The DIFC is a financial center that allows residents, including foreigners, free access to financial transactions. Locators are allowed to make use of its facilities free of any encumbrance from ESCA regulations. This move is meant to promote the financial activities in the country and let foreign money flow in.

To protect the economy of the country, trading in the national currency is not allowed. DIFC is under the regulation of the Dubai Financial Services Authority (Al-Zarouni, 2008). In the 2007 report of the International Monetary Fund, it was reported that the United Arab Emirates has a strong financial position. The strength of the UAE economy comes from strong fundamentals in prudent financial policies and development strategies which incorporate the opportunities in the global financial markets (Al-Zarouni, 2008).

2.5 The Environment of Financial Reporting

A key component of the supervision and regulation of the banking and financial system is mandated in the reportorial requirements as set by the different regulatory agencies for implementation in the affected companies, and the legal statutes that the government passes which affect those same companies in the same industry.

(Al-Shayeb, 1999) believes that the UAE is characterized by two significant financial reporting periods, including the periods before and after 2000 that entailed

the establishment of the SCA and the start of operations for DFM and AMX. Notably, two vital forces, namely, the Central Bank of the UAE and the Ministry of Economy, initially shaped the legal and regulatory framework relating to financial reporting in the UAE earlier on in 2000.

The UAE Companies Act no. 8/1984 and its subsequent Amendment no. 8/1984 provide a superb representation of the moderated regulations covering the UAE's financial reporting practices.

In line with the Act, companies were required to maintain effective records of their operations and provide both the federal and state authorities with audited financial statements. However, this provision was deemed enormous and vague in terms of its wording. Again, it lacked the most important element of any effective disciplinary authority. (Al-Shayeb, Corporate Financial Reporting in the UAE. , 2003a) Affirms that the lack of an independent supervisory body to oversee the accounting and auditing profession and the absence of a stock market made it difficult for firms to benefit from the umbrella.

It is worth noting that another additional legal and regulatory framework is in place to govern financial institutions, banks, finance, and investment firms. This framework has played an instrumental role in helping to strengthen the reporting requirements and practices adopted by these institutions and the Central Bank of the UAE. According to Decree no. 10/1980, the Central Bank of the UAE is obliged to organize, regulate, and facilitate the development of financial institutions apart from monitoring the financial system.

In line with this, (Al-Shayeb, Financial Reporting in Developing Countries: the Case of the UAE. , 2003b) is of the view that firms operating in the service sector

would be required to disclose more information than world firms in the banking and insurance sectors because of the lack of an efficient enforcement authority to regulate the latter. Provision no 445/1988 formed the stepping-stone for the start of the Central Bank's accounting and disclosure requirements.

In accordance with this provision, financial institutions were required to prepare audited annual reports that matched the format of those from the Central Bank, besides detailed information about assets and liabilities. Auditors were also authorized to ensure that they verified the consistency of the facts presented in annual reports and prepared a report for the Central Bank concerning their findings.

Nevertheless, (Al-Shayeb, Corporate Financial Reporting in the UAE. , 2003a) points out that the overall degree of compliance in the unregulated financial markets in the U.A.E was not at an optimum level before the establishment of SCA, FDM and ADX. He expresses the view that only ten companies (18%) out of the 54 companies attained a score of more than 60%, as revealed by the disclosure index. The government later specified the adoption of the IAS/IFRS in preparing the annual reports through Circular No. 20/1999. Henceforth, all banks and financial institutions were required to make their reports following the specified format.

The second period that began after February 2000 entailed the establishment of the SCA and the opening of operations for the DFM and ADX and was characterized by the enactment and the gradual implementation of numerous regulations. Some of the crucial regulations that came about after February 2000 include laws such as the law on securities markets and the law on the Capital Market Authority.

To add to the list, a set of rules was formed to govern their work and relations with listed companies, brokers and investors. Accordingly, (Al-Shayeb, Financial

Reporting in Developing Countries: the Case of the UAE. , 2003b) reports an overwhelming increase in the number of individuals who acknowledge the moderate level of improvement in the corporate reporting practices compared to the situation earlier. This is in line with the statistics collected from the sampled users of financial statements. Overall, this has helped bring about a level of optimism concerning effective financial reporting standards in the UAE.

2.6 UAE Financial Market Development:

The capital markets are agreed to be a very stable source of funds for any economy, making it more resilient to any shocks or limitations within its companies to such as those who have contented themselves with minority shares due to lack of capital (AICPA, 1991)

Thus, it has been a long-term dream of many countries, including the UAE, to set up a securities market that can channel funds and capital to its fledgling economy (Al-Zarouni, 2008). In the following sections the historical background to the securities market is presented and discussed. The development of the securities market in the UAE is generally divided into three stages (Al-Zarouni, 2008). The young United Arab Emirates had its foundations in the securities market only in the 1980s, barely 10 years after its inception.

- **Stage One: 1959 – 1982**

The Dubai Beverages Company, founded in 1959, holds the distinction of being the first public joint stock company. Its capitalization was only AED 2 million dirhams. After its inception, other joint stock companies were also created. They were the Dubai National Bank (1962), Oman Limited Bank (1967), the Abu Dhabi National

Bank (1968) and finally the National Cement Company (1968).

The Central Bank of the UAEs initiated the creation of the UAE Securities Market. Financial experts from the International Finance Corporation were chosen to guide the country's leaders on this exciting journey. A report was submitted between April and May of 1982 about the potential for creating a securities market. A key development at the time was the collapse of the Al-Manakh Securities Market of Kuwait with companies and investors losing billions of dollars.

This was a revelation to the leaders of UAE. It was agreed that a comprehensive regulatory framework was needed (Al-Shayeb, The Emergence of the United Arab Emirates Official Securities Market, 1999); at the interface of the economy, business, and the capital markets, this was established in order to avoid the misfortune that Al-Manakh Securities Market encountered. The persistence in the high prices of oil and gas was a strong factor for the UAE at the time. What was once a cash deprived economy became awash with cash. It became easier to make a decision on creating a securities market, since many public joint ventures were entering the capital market.

The country was proven right in its assessment that a securities market was needed. In the year 1982, there were roughly 80 public joint companies with an overall capitalization of around USD 2.8 billion (Bin Sabt, 2000). This meant that more cash was circulating in the UAE economy and thus its liquidity was well under way. Banks and other businesses that made earnings from big public companies easily met the downstream financial requirements.

Despite the increase in the activity of the securities market, it is a fact that the UAE capital market was insignificant compared to those in the Kingdom of Saudi

Arabia and of Kuwait, who had created their own ahead of UAE. However, this era was marked by a lack of the supervisory and regulatory agencies that are needed to control the existence and operations of such companies.

The absence of regulatory and statutory standards to direct the way in which companies can incorporate and satisfy the requirements of a public company created confusion among businesses. But the growth of the UAE securities market was hampered by the downfall of the Al-Manakh Market in 1982. The success that public joint companies saw with the brisk trading of shares once oil and gas prices shot up in the mid-1970s began to wither. A bear trend showed how the trading volume and the prices of stocks were affected negatively at this time.

- **Stage Two: 1983 - 1992**

A major factor in the economy of the country and the consequent actions in the securities market was the falling of gas prices from USD 36 per barrel to USD 8, less than a fourth of the price. With less money in circulation, business persons hesitated to set up companies, in particular companies that were publicly listed. At this time, only 5 companies were allowed to conduct an IPO with a meager capital of only 70 USD Million (Bin Sabt, 2000).

In response, the government announced through the Undersecretary of the Economy, Al-Ghanim, that there was a dire need to first set up and implement economic laws and regulations that would integrate the different facets of the securities market and ensure its productive and effective operation. This called for the creation of the Companies Act, a holistic and systemic approach to managing the securities market (Al-Khaleej, 1982)

It was also during this period that other federal decrees were enacted to complement other laws intended to ensure the smooth operation of the UAE capital market. They were FD No. 8/1984, which controlled the commercial companies; FD 9/1984 regulating the insurance companies; and Fund profit from No. 6/1985 that oversaw the operations of Islamic banks and financial institutions.

The brokerage services were also regulated through CBUAE Decision No 6/88 which restricted share trading activities to the nationals of the country. Certain indicators confirm the establishment of the securities market. There were only 5 publicly listed companies and the volumes of traded shares were minimal. This implies that there were very few investment opportunities for investors to choose from and profit from. Hence the stock market at this time was not attractive to investors. Another important factor is that the banks were offering high savings interest that exceeded the profit rate from stock trading (Al-Dabas, 1995).

- **Stage Three: 1993 - 2000**

After the difficulties of setting up and aligning regulatory requirements, the period of 1993 up to the year 2000 saw highly dynamic activity in the capital market. New companies were sprouting all over the UAE and they were all striving to reach the stage of an IPO. The government gave 27 companies the signal to proceed, with a total capital of USD 2.5 billion.

The effort to organize and regulate the brokerage sector bore fruit. Its presence facilitated the trading in several stocks by keen investors who had no knowledge of business. The government limited their involvement in the trading of shares involving local and foreign bonds and foreign currencies and goods.

However, the easy availability of cash through bank loans and the lack of restrictions and regulations regarding fair share pricing encouraged the trade volume in the securities market to grow in leaps and bounds, and yet it was characterized by weakness in its legal framework for dealing with the high volume of trade brought by the many participants. Despite the successful and profitable transactions, the capital market was considered volatile at the time, due to the severe fluctuations in share value and trading volume.

Although a securities market boosts and protects an economy, part of its very existence are its bull and bear runs. Interchangeably, trading volume and share prices surge and plunge, making investors nervous or excited about what will happen next. These conditions were experienced in the UAE. The surge of share prices from a total of USD 47 billion in August 1998 to a high of USD 64 billion in September tapered off to USD 34 billion as of December 1998.

It further fell to a low of USD 28 billion in 1999 (UAE Ministry of Planning, 1999). Investors were devastated. But the government knew that this steep rise and fall are caused partly by the lack of legal and operational frameworks in the securities market. The volatility of share prices is triggered and aggravated by speculation, but this practice can be controlled if the correct policies and systems are in place. Within a few months, the Governor of CBUAE announced the formalization of the securities market in the UAE

In fact he was proven right by the financial crisis of the "Black Summer" (Al-Shayeb, Financial Reporting in Developing Countries: the Case of the UAE. , 2003b) which made a severe impact on the economy in general and the securities market in

particular. It was generally accepted by the leaders of the country that the official establishment of a securities market will minimize these negative impacts.

The situation prompted the Crown Prince of Dubai to announce on 17th October 1998 the creation of a stock trading floor and a clearing house for the transactions between Dubai and Abu Dhabi. The intent of the Crown Prince was to protect the critical financial sector from any fraud or negative developments in order to help secure the economy (Gulf Newspaper, Al-Sewaidi: More Data Sought From Public Firms., 1998). This move opened the way for the creation of ESCA, the DFM and the ADX.

Finally, on January 29, 2000, a Federal Decree was released. FD No. 4/2000 created the UAE Securities and Commodities Authority, better known as ESCA. It was tasked to organize and regulate the UAE securities market in order to protect investors from volatility and the manipulation of their stocks. Different trading floors that were interconnected electronically were created, facilitating the financial transactions of the securities market. The Dubai Financial Market and the Abu Dhabi Securities Markets were set up within the year. At last, the age of unregulated stock market operations was over.

In retrospect, this era in the capital market was characterized by volatility in trade volumes and share price fluctuations; shares alone were traded since there was no capacity as yet to trade bonds or treasury bills, and most of the publicly listed companies were owned and controlled by UAE nationals. Financial markets facilitate exchanges of equity, as well as debt instruments, with the public. This is considered an important feature of an advanced capitalist society.

It allows changes of company ownership and facilitates economic

development. Furthermore, companies do not have to rely on financial intermediaries to raise the funding that they need for new ventures. Companies listed on the exchange are able to sell shares directly to the public when they feel the need to raise capital. This ensures that the required funds will be available to the public as needed (Ben Naceur, S, Ghazouani, S, & Omran, M, 2007).

Companies can raise capital from the public if they are listed in the financial market, by listing their equity as well as debt. Financial markets in emerging economies constitute an important part of their development. They allow a means of diversification for the investor asset classes and redistribution of the risks associated (Suetin, 2011). If the companies in a country are seeking investments from the public, this indicates that they plan to grow bigger and thereby contribute more towards the growth of the national income.

This was the intention behind establishing the financial markets of the UAE. Foreign investors would also find a suitable platform where they could invest and receive a return based on the financial performance of local companies. Both the DFM and the ADX serve these needs (RAO, 2008).

According to (Al-Shayeb, A. & Hatemi-J, A, in press, 2013), in order to monitor and regulate the markets for commodities and securities in the UAE ax`xnd ensure compliance with the internationally accepted standards related to the professional securities markets, the Federal Law No. 4/2000 declared the establishment of SCA or the Securities and Commodities Authority.

The aim of the authority is to prevent a conflict of interests by separating the responsibilities related to supervision and also by organizing trading in the markets for commodities and securities, on the basis of equal policies and a regulatory structure.

The Securities and Commodities Authority performs the functions of the regulatory body that is supposed to supervise the operation of the markets, brokers, investors, parties with securities and others engaged in market activities.

Securities are traded only by those markets which are licensed by the CSA under strict rules and regulations. Abu Dhabi Securities exchange, or ADX, and Dubai Financial Market (DFM) were both licensed in 2000 by the SCA. The Abu Dhabi Securities exchange is authorized to establish branches and centers outside Abu Dhabi in accordance with the Emirates of Abu Dhabi, local law number 3/2000. There are branches in Sharjah, Ras al Khaimah, Fujairah and Zayed. In 2003, owing to the unregulated character of the trading that rambled around fewer than twenty companies, shareholders were not willing to have their shares listed, for they opposed revealing them to the public gaze.

The following year, the Federal Authority adopted new laws to ensure that every shareholding company in UAE listed its shares either in ADX or in DFM. Since 2004, there has been significant development of the securities market and the volume of capital and listing has increased considerably. The number of public shareholding companies had grown from 17 to 127 in the 10 years from 2000 to 2010. The capital correspondingly increased from one billion to five billion AED.

Both these operations ensure that the required platform is offered for companies to meet financiers and offer them the equity or the debt that they structure. As Dubai was the first center to open to outsiders, the Dubai Financial Market (DFM) was naturally the first to open its doors to such operations.

The DFM was opened in March 2000, and soon afterwards, in November 2000, the second stock exchange in the country, the Abu Dhabi Stock Exchange (ADX) was

opened (Squalli, 2005). Both stock exchanges saw excessive growth during the 2004-05 periods due to the massive inflow of investments to the region.

In 2005, the financial market in the UAE was open for foreign investment, since the resolutions adopted by the general meetings of numerous public shareholding companies entailed amendment status and allowed non-residents of the UAE to own a capital stake. The foreign ownership rate can range between twenty and almost fifty per cent.

The main objective was the expansion of the shareholder base and the increase in the liquidity level by raising the demand, trading and supply volume on the basis of the number of shares offered by each company. Moreover, the UAE financial markets started to employ non-national funds instead of diversion outside the UAE

After foreign investments got a chance to penetrate into the open financial market of the UAE, those contributions caused an increase in the prices of numerous companies on the list above the fair value they used to have before 2005. Such price rises occurred against the background of the continuous growth of GDP or gross domestic product and sustainable economic performance of the UAE, and improvements in corporate distribution and profitability.

Another consequence of such an initiative was the growth in the base of speculators and investors in the UAE financial market. The number of investors and traders in the Dubai Financial Market and Abu Dhabi Stock Exchange had increased fivefold in the course of five years and amounted to more than 1,000,000 investors in 2005, in contrast to 200,000 in the early years of financial market development.

In addition, there has also been a significant increase in the trading volumes,

which mounted from more than two billion AED in 2001 to more than five hundred billion AED in 2005. This growth was stable, however, and in 2008 the trading volume reached the rate of 537 billion.

- **The following is an overview of the major developments in 2013**

At the end of 2013, the UAE companies which are listed in the market showed a total market value of 646 billion AED. This amount shows that the worth of these companies had increased by 70.45% above the value of the same companies at the end of 2012, one year before.

The Emirates Securities Market witnessed a total trading of 178.68 billion shares during the year 2013. The total value of these shares is estimated as 244.50 billion AED, while the total value of share trading done during 2012 was 70.70 billion AED. The number of shares traded during 2012 was 56.85 million shares.

Most of the sectors showed overall improvement in their performance in 2013. The top among those sectors was "Investment and Financial Services". This sector showed an appreciation rate of 161.78% over its performance in 2012. It settled at 5311.479 points, whereas it had recorded 2028.964 points by the end of 2012.

The next sector, which showed the highest performance in 2013, was the Real Estate sector, which appreciated by 117.02%. It settled at 5287.335 points by the end of 2013 having settled at 2436.371 points at the close of 2012. The third highest sector was the Banking sector, which appreciated by 74.94%, and had settled at 2912.226 at the end of 2013. The same sector had settled at 1664.721 at the end of 2012.

The Transport sector was the next to show high performance, with a 70.50% increase, settling at 3653.379 points. In comparison the Transport sector had settled at

2142.708 points at the end of 2012. Next was the Industry sector, which improved by 61.06% and settled at 1109.932 points. At the end of 2012, the Industry sector had settled at 689.143 points. The Telecom sector also showed improved performance and settled at 2412.040 points, recording an appreciation of 40.50%. At the close of 2012, the Telecom sector had recorded 1716.720 points.

Subsequently, high performance by the Services sector was shown buy its increase of 32.56%; it settled at 1496.065 points, having closed at 1128.570 points in 2012. The Energy sector appreciated by 31.84% and settled at 170.355 at the close of 2013. At the end of 2012, the same sector had settled at 129.217 points.

The Consumer Staples sector also showed improvement and appreciated by 30.85% by settling at 1482.746 points. At the close of 2012 this sector had closed at 1133.147 points. However, the Insurance sector did not show improvement; it depreciated by -0.36%. It settled at 1597.00 points in comparison to 2012 when it closed at 1602.81 points.

New companies had been listed under the Emirate Securities Market, including a Kuwaiti Company. ESM also saw the delisting of four public joint stock companies. These companies included two Kuwaiti companies and two local ones. In this way the total number of companies listed at ESM decreased from 123 at the close of 2012 to 120 at the end of 2013. (Arnold, 2013)

Performance of Emirates Stock Market (ESM) from 2001 to 2013

The information presented below indicates how the ESM index has advanced. Other indicators include the market value, trading volume, trades numbers, and the companies listed from 2001 to 2013.

Table 2.1: Details of listed Companies during 2013 from ESM

Year	ESM Index	Market Cap. (AED)	Traded Volume (Share)	Traded Value (AED)	No. of Trades	No. of Listed Co.
2001	1,116.68	50,130,930,613	77,253,923	1,515,071,809	19,334	27
2002	1,253.36	109,784,090,882	209,230,202	3,861,378,020	36,341	37
2003	1,657.24	145,631,820,623	561,439,842	7,457,778,820	50,712	44
2004	3,251.57	305,803,235,070	6,069,276,451	66,786,465,772	299,280	53
2005	6,839.97	839,683,136,512	33,811,933,303	509,868,016,048	2,300,452	89
2006	4,031.01	514,697,464,200	50,939,871,239	418,149,306,407	3,138,749	106
2007	6,016.21	824,629,199,856	157,318,141,814	554,333,583,214	3,354,617	120
2008	2,552.23	363,872,030,000	126,439,280,603	537,134,415,081	3,257,450	130
2009	2,771.56	404,702,513,093	148,297,352,509	243,489,889,472	2,728,964	133
2010	2,655.32	385,429,934,198	56,003,360,875	103,804,933,675	1,158,505	129
2011	2,341.42	346,135,787,877	40,995,866,992	56,819,194,126	728,097	128
2012	2,561.21	379,062,031,092	56,858,376,402	70,705,517,247	880,087	123
2013	4,313.56	646,270,799,980	178,682,361,983	244,504,710,417	1,894,030	120
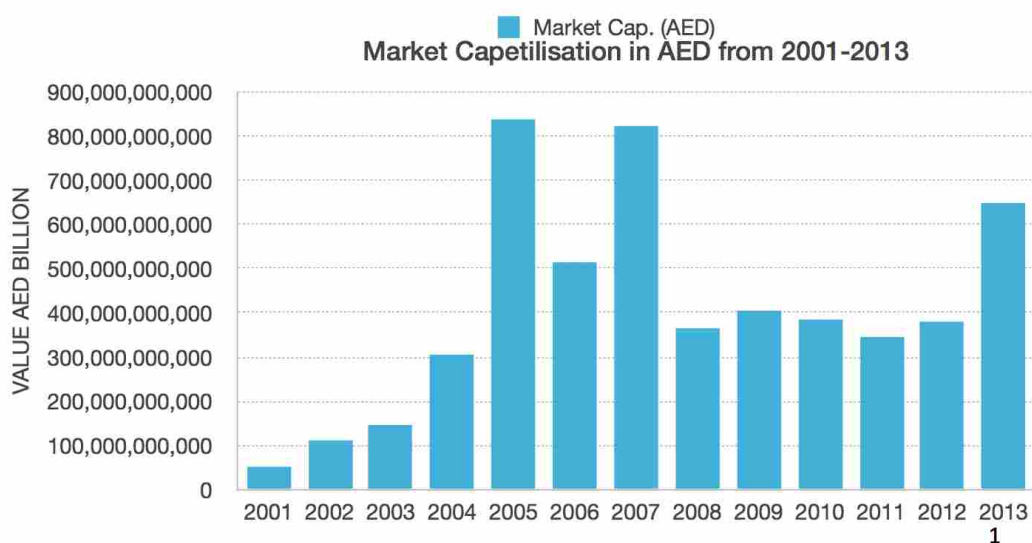
Figure 1: Market capitalization from 2001-2013
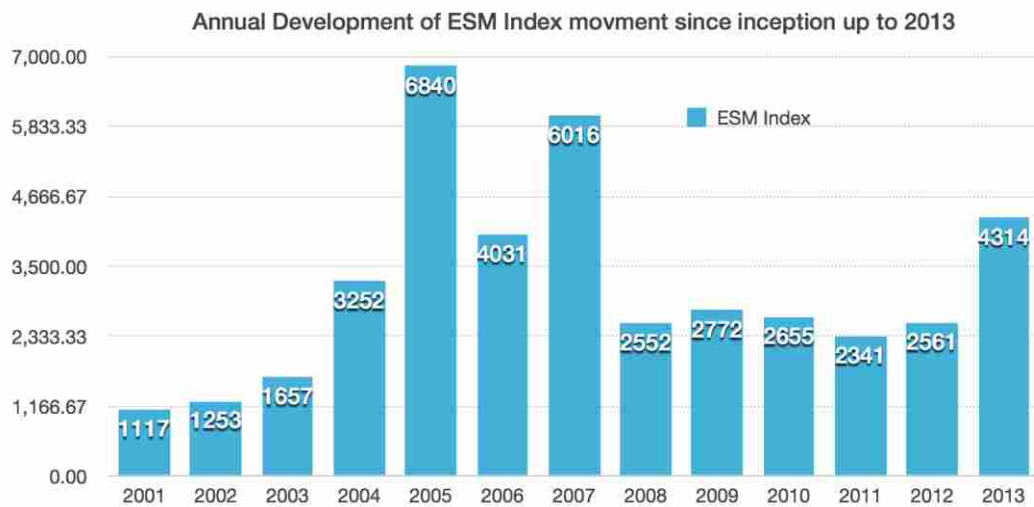
Figure 2: Annual development of ESM index
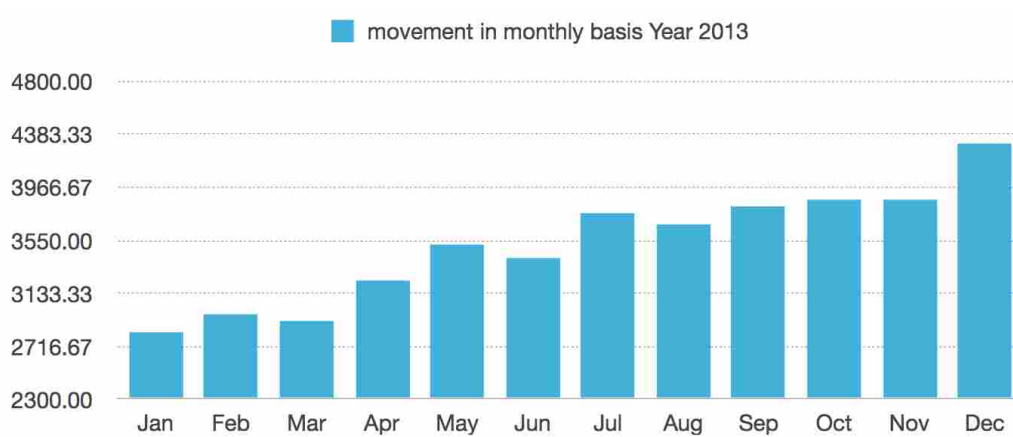
Figure 3: Monthly basis movement in 2013

Figure 4: Monthly growth rate

Foreign Investment during 2013

Foreign investors showed outstanding interest in the UAE local financial markets during 2013. The amount invested by foreign investors showed a total purchase value of AED 101.38 billion. At the same time the foreigners paid a total sales value of AED 97.68 billion. In this way, a Net Foreign Investment of AED 3.7 billion was recorded at ESM. During 2012, the amounts in the same category showed an AED 1.46 billion investment. This means that the amount in 2013 was more than twice the amount in 2012.

Table 2.2: Foreign Investors' Total Trading during 2013

Market	Foreigners Total Purchase Value (AED)	Foreigners Total Sale Value (AED)	Net Foreign Investment (AED)	Foreigners Trading Rate %
ADX	32,405,542,682	30,398,367,151	2,007,175,531	36.96%
DFM	68,975,593,060	67,282,170,222	1,693,422,838	42.61%
Total	**101,381,135,742**	**97,680,537,373**	**3,700,598,369**	**40.65%**

Net Foreign Investment on UAE Markets

Table 2.3 presents the increase in the foreign investment to ADX and DFM between the years 2009 and 2013. The information shows how the inflow touched AED 3.701 billion, which was almost double the amount in 2012 of AED1.457 billion. In 2013, the total trading done by foreign investors was 40.65% of the total trading volume. However, this amount was less than the percentage of 45.18% that the foreigners had invested during 2012. The reason was that in 2013 more local people invested in the UAE stock market.

Table 2.3: Net Foreign Investment Comparison from 2009 to 2013

YEAR	2009	2010	2011	2012	2013
Net foreign investment (AED) Million	2,636	-54	224	1,456	3,701

Table 2.4: Comparison between 2012 and 2013Net Foreign Investment on ADX and DFM

Market	Net Foreign Investment 2012	Net Foreign Investment 2013	Change
ADX	995,453,387	2,007,175,531	1,011,722,144
DFM	461,156,945	1,693,422,838	1,232,265,893
Total	1,456,610,332	3,700,598,369	2,243,988,03

It should be noted that repercussions of the global financial crisis have affected the financial market of the UAE in a negative way. The influence of the changes of the global financial markets during the financial crisis resulted in the extensive flow of foreign investments out of the financial markets in the UAE. This process was especially intensive in mid- and late 2008. During this time the sale volume of foreign investors in DFM exceeded the volume of purchases. The excess equaled six billion

AED. In the previous year, the excess of purchase volume by foreign investors over the selling volumes amounted to 12 billion AED (Al-Shayeb, A. & Hatemi-J, A, in press, 2013).

The Central Bank of the UAE reported a positive inflow of foreign currency through capital investments in trade and businesses. The trade surplus was around 20.2 billion Dirhams. The country engaged in foreign business as well but spent only USD2.2 billion, while the economy benefited from USD 7.7 billion which was invested inside the United Arab Emirates, giving it a surplus of cash to enjoy, according to the report of the Central Bank.

The chief economist of the National Bank of Abu Dhabi, Giyas Gokkent, was positively delighted with this surplus for 12 years without a break. Most international investors are active in the oil and gas sector, making both sectors a prime choice to invest in for many years.

However, the amount involved is still lower than the amount in the pre-Global Recession 2008 era, Mr. Gokken said. Nevertheless, in 2007, when world oil prices were higher and the real estate development sector was booming, outward investments were a little higher, at USD 14.6 billion, than the USD 14.2 billion investments that came inward.

Other sources showed a substantial increase of outward going capital from USD 2.7 billion in 2010 to a high of USD 26 billion today. This is a very high amount in comparison to what had been transacted since 2008, the time when lessening oil prices also lessened the national income from oil and gas.

Mr. Gokkent clarified that the previously mentioned outgoing capital

investments must have been sovereign wealth funds. There was a marked increase in national income from oil and gas. It was reported that it increased from USD 74.6 billion in 2010 and to USD 111.5 billion after that.

Mr. Gokkent proudly announced that there was a greater surplus of revenue because the UAE was selling more oil to the country than any other country was, and thus had excess cash to fund investments ((Arnold, 2013).

However, the markets corrected themselves and subsequently reached a more realistic value (DCCI, 2006). The Dubai Stock Exchange was demutualized in November 2006 and 20% of the shares were floated, while the Government of Dubai held the other 80%. The Dubai Financial Services Authority regulates the DFM. After the financial recession during 2008-2009, the DFM continued to lose profitability, and in 2011 it made a loss.

There are 61 companies listed in the stock exchange, and this is currently the largest of the financial markets in the UAE in terms of market capitalization (Dubai Financial Market, 2012). The Abu Dhabi Stock Exchange (ADX) in Abu Dhabi lists a separate set of 67 companies. The records indicate that the DFM has higher trading volumes than the ADX. The main advantage of having two stock exchanges is that companies can choose where they are listed.

The regulatory approaches in the two markets are also different and this allows companies to select the best financial market in line with their industry and their needs (Abu Dhabi Stock Exchange, 2013). After the financial recession, the activity levels associated with the ADX were also impacted negatively.

However, due to the accelerated growth of the economy, it is likely that UAE

equity markets will also grow in the future (Kern, 2012). These two financial markets have been able to facilitate the continuous growth of many companies. Both of the exchanges allow the minority ownership of companies by foreign shareholders. Having two exchanges allows sector efficiencies to improve and they can correct each other within the same economic framework (Madura & Richie, 2007).

NASDAQ Dubai is another financial market in the region. The center allows companies in the UAE and the region to have access to international investors in their shares. The regulatory framework in the exchange is in line with international standards, thus providing international investors with opportunities to invest in local markets. The exchange started operations in 2005, and in May 2010 the company was acquired by the DFM from Bourse Dubai and the NASDAQ OMX Group.

All the trading activities of NASDAQ Dubai are outsourced to the DFM at present (Dubai Financial Market, 2012). While the ADX and DFM have seen lower levels of activity since the 2008-2009 recession, it is expected that this scenario will change and growth will return to the markets, because the region was able to sustain economic growth in the past, and the indications are that over the long term, the ADX and DFM will be attractive places for investment.

The issue of thin trading is still very prominent, because many companies have a majority ownership which does not change and investor confidence is yet to grow (Al-Khazali, 2008). Like any stock exchange, they have also seen ups and down in investor confidence levels (Kern, 2012). This volatility is to a certain extent due to market sentiment, while the company performance fundamentals have also contributed (Bank Audi, 2013).

The UAE is seeking to become a hub in the global context, and the role played

by the financial markets is providing the crucial infrastructure needed in order to attain this goal (Al-Tamimi & Kalli, 2009) country effectively has two stock market operations and this allows companies as well as investors the chance to meet. The current downturn is expected to change in the 2013-14 period and the trend is already beginning to shift (Bank Audi, 2013). Furthermore, international investors also have a chance to make sure that they invest in these lucrative markets and that appropriate returns are achieved in line with their expectations (Benjelloun & Squalli, 2008).

Both the DFM and the ADX have taken the initiative to get more companies listed with them and to diversify the financial instruments that they offer to the public. This will increase public interest in these stock exchanges.

The need to have more than one financial market in the country is debated, however. Admittedly, many countries, have multiple stock exchanges in place. For instance, India has two large exchanges in Mumbai and New Delhi. China also has a number of exchanges in different parts of the country, the best known being the Shanghai Stock Exchange and the Hong Kong Stock Exchange. These exchanges have been able to provide companies with varied platforms for listing and ensure that the companies have an increased choice of where to be listed, and in attracting new investors (Krishnamurti & Lim, 2001).

Indeed, a number of factors may determine the number of stock exchanges in a country; one of the main factors is the level of financial activity in the country. Is the country seeing an increased volume of financial activity, and do the company requirements differ from one to another? If so, it is enough to indicate that having more than one exchange is justified (Krishnamurti & Lim, 2001).

Another factor is that, within a single country, different regions have different

economic and development policies in place. Multiple exchanges will allow companies in different regions to be listed in a regional stock exchange where they can raise the capital they need. Investors, for their part, will invest in companies which they think will meet their needs and will also invest in such exchanges (Krishnamurti & Lim, 2001).

Thus, both development policies and investors' expectations are factors which could justify having more than a single stock exchange. Another important aspect to be considered in favor of multiple exchanges is the possibility of risk diversification. With multiple exchanges, it is more likely that investors will be able to diversify their risk. This will contribute to the reduction of the overall risk levels associated with the companies.

Table 2.5: Comparison of Stock Exchanges, Sources: Abu Dhabi Stock Exchange and Dubai Stock Exchange, Abu Dhabi Stock Exchange, 2013 and Dubai Financial Markets, 2013

	Abu Dhabi Stock Exchange	**Dubai Stock Exchange**
Place of establishment	Abu Dhabi	Dubai
Number of listed companies	68	67
Nature of investors allowed	Local / foreign	Local / foreign
Minimum capital need for a local company to be listed	AED20 million	AED35 million
Paid up capital limits	Paid up capital not less than 50% of equity	Paid up capital not less than 35% of equity
Foreign companies	AED40 million	AED40 million
Shareholder limitations	Over 100 shareholders	Over 100 shareholders
Foreign ownership percentage	Not disclosed	7.42%
Availability of a secondary board	No	Yes

Shareholder number limitations do not apply to local companies. Thus, local companies could comply with the general regulations of the Companies Act when it comes to public joint stock company requirements. All foreign companies in both cases have to be listed in their respective countries of origin.

2.7 Performance of the stock exchanges

The market capitalization of the Abu Dhabi Stock Exchange is AED 242 billion, while that of the Dubai Financial Market is AED 203 billion. Thus, the ADX remains ahead of the DFM in terms of market capitalization level. However, when it

comes to trading volumes and activities (liquidity levels), the DFM has seen more activity than the ADX (BTFLive.net, 2013). The following chart indicates the comparison and shows the indices of performance over the past year.

Figure 5: ADX Compared with DFM (Bloomberg, 2012)

From the chart, it is evident that the DFM has seen more activity during the period and the growth of the index has been faster than the index performance of the ADX. However, it is also evident that the gaps between these two markets are actually declining and this ensures that the markets will experience similar levels of preference over the long run.

From the above chart it can also be identified that the market volatility levels associated with the DFM remain high compared to those of the ADX. Thus the two markets indicate different levels of dynamics and it is very likely that investors who seek distinct types of risks and returns will be attracted to one of the markets (Al-Tamimi & Kalli, 2009) .

It is important to note that the better performance in the real estate sector of

Abu Dhabi, compared with Dubai, has resulted in the recent reduction of the gaps between the indices of the chart. Over the long term, these performance gaps are generally expected to disappear, and only the fundamentals-based performance aspects will remain (Arouri & Nguyen, 2009). Therefore, it is likely that the stock exchange performance gaps in terms of the infrastructure and the nature of the policies will reduce over the long term, with Abu Dhabi also pursuing open economic policies.

Based on the above discussion, it is evident that the level of stock market integration will increase. It is likely that internal integration, as well as international integration, are both areas which could be highly important to stock markets of this nature.

2.8 Summary

The United Arab Emirates is a member of OPEC, the Organization of Petroleum Exporting Countries, and holds roughly 10% of the total oil deposits in the world. A key source of revenues for the country is its oil and gas exports. The concerted effort of government to diversify the economy reduced such dependence to only 30% of current gross domestic product.

The leaders of the country established the capital market after they realized the important role that it plays in free economies. In the early 1980s, direction was given to explore the possibilities of creating financial markets that were responsive to the need of the people. From there, the history of the financial markets was divided as follows:

➢ Stage one: from 1959 to 1982

➢ Stage two: from 1983 to 1992

➤ Stage three: from 1993 to 2000

The UAE government had the opportunity to build the economy of the country after it earned much from the increased oil and gas prices of the 1970s. To begin, it was necessary that businesses and corporations should be organized well since they were the companies that would be listed publicly. Without a robust, strong and well run business group, the capital markets can do nothing. At this period, the economy was strengthened and the financial infrastructure was put in place. Many shareholding companies were supported at this time and they formed part of the group that was listed in the stock market.

Finally, on January 29, 2000, ESCA was created through Federal Decree No. 4/2000. ESCA is the highest regulatory body in the UAE; it controls the securities market. Through FD 4/2000, the DFM was created in March of the same year and then the ADX the following November. The time when any group could raise capital by sharing their stocks ended. Companies first needed to register and qualify with ESCA before they could be listed publicly.

Chapter 3: An assessment of the financial integration of the Abu Dhabi Securities Exchange with the Dubai Financial Market, using asymmetric causality tests

Abstract

Economic growth is the result of the development and integration of financial markets through an increase in the exchange and efficient allocation of resources. The main goal of this chapter is to examine empirically whether the Abu Dhabi Securities exchange is integrated or segmented with the DFM (Dubai Financial Market) by implementing new tests for causality, which separates the causal impact of positive shocks from the negative ones. The empirical results, based on the symmetric as well as the asymmetric causality test, provide evidence of a one-way causality between the Abu Dhabi Securities Exchange and the Dubai Financial Market, The latter significantly affects the former, but not vice-versa.

3.1 Introduction

The UAE is a nation which supports open economic activity. This has led to the inflow of many financial investments from many parts of the world. Abu Dhabi and Dubai are the main areas of its economic activity. Both these areas possess separate financial markets in order to control and manage the overall financial activities of the two constituencies.

The Abu Dhabi Securities Exchange (ADX) was incorporated to trade the shares of UAE companies. The Dubai Financial Market (DFM) trades the shares of over 61 companies; which include UAE companies and a few companies that belong to the MENA region. Recent efforts have been made to merge these two financial markets since they have been showing significant performance. Hence, it is necessary to ascertain the feasibility of merging these two entities.

Financial market integration refers to eliminating the barriers to financial inflow between two or more financial entities. This brings about freedom of capital inflow whilst the risks and returns have to be shared by the merged entities.

Financial market integration can take place in various ways. These include the sharing of capital inflows, sharing of information and technology, participation of foreign investors in the domestic market, etc. When we talk about financial integration, we should take into consideration that there are many factors contributing towards financial integration, which include the deregulation of the market, government policies for combining the strength of two or more financial markets, growth in the number of investors, and policy targets of reduced costs and increased performance.

In the event of conducting financial market integration, various benefits can be obtained by the amalgamating entities. The primary benefit that could be derived through this process is increasing the efficiency of capital allocation. This is because the merger would increase the capital base of the two markets and the capital flows from the financially stronger market would assist the development of the financially weaker market.

Second, corporate governance could be improved since local and foreign firms would be competing with each other to gain a competitive edge. This in turn would enhance the production capabilities of the respective markets and thus also lead to higher consumption.

Third, investments in the related markets would consequently increase, since they would improve their financial stability. This is because investors from firms as well as the public would be inclined to invest their financial resources − expecting healthy returns − as the stable financial markets would be perceived as a secure

location for investments. Moreover, the integration of financial markets would reduce the business risk, since resources would be shared between the two markets and the potential constraints could be minimized with the collaboration in the use of competencies. Financial markets which are fully integrated follow similar patterns in risk and return tradeoffs.

At the same time, financial market integration could also create certain disadvantages. A main disadvantage that could arise is that it may restrict small-scale businesses (in each region) from obtaining more capital because the capital inflows would be concentrated on the leading/large scale entities. It could also reduce the economic growth of a certain locality, in particular if the other region possesses firms that are financially stronger. Another disadvantage could be that the wealthier economy would tend to draw off the resources from the weaker one whereby the weaker market would suffer in the long term.

In this context, it is helpful to ascertain the feasibility of the merger between ADX and DFM. It is evident that the economic strength of both Dubai and Abu Dhabi could be enhanced by integration, since the maturity, financial strength, and consistent performance of the two entities would attract a higher number of investors. In addition, the credibility of the markets would increase since the operations would be more transparent. Importantly, both economies would be able to overcome the deficiencies in their budgets as the capital inflows would increase. Furthermore, risks that could arise due to external economic constraints could be mitigated largely due to the pooled effort of the two markets – by collectively reducing costs and efficiently allocating resources.

The above factors create a need to investigate the nature of the union between

ADX and DFM. We should examine this fact in order to ascertain whether the two markets were integrated or segmented. Hence, the study is conducted by using the leveraged bootstrap causality test (Hatemi-J & Hacker, Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application, 2006), which would provide an accurate and reliable result regarding the conditions pertaining to the merger.

This is a very interesting and timely chapter. The issue of the financial integration of the United Arab Emirates through the joining of its bourses and its banking policies is a call of the time. There is an urgent need to put forward the arguments that have been made academically for and against financial integration to help the government make the correct decision.

This chapter aims to investigate whether the Abu Dhabi Securities Exchange (ADX) and Dubai Financial Market (DFM); are integrated or segmented, by using statistical tools that analyze causality.

The conventional methods of research may not be adequate for the purpose of achieving the analysis required for the discussion. This is due to the nature of the data and the relationships between the variables. Thus, the conventional data analysis techniques may not be able to facilitate the identification of the results in line with expectations. This is the reason why the study expects to use bootstrapping as the technique for analyzing the data. This correlates with different scenarios and situations in line with the data patterns identified. Thus, the insights provided by the study could be different to the previous studies available, due to the technique of analysis used.

The two entities will be evaluated if they affect each other. This will be an original contribution to the field of financial studies since there are no publications to

date examining the financial integration between domestic stock markets in UAE, to the best of our knowledge.

The structure of this chapter is indicated below. Section 2 contains a brief literature review. Section 3 represents the potential debate of others about the merging between ADX and DFM, and the methodological framework is discussed in section 4. Section 5 discusses the results of the study and establishes the nature of the relationships observed between the variables. The final section summarizes the study and shows its outcomes.

3.2 Brief literature review

Many papers have been published on financial market integration between countries, but there is only one on financial market integration within one country, to the best of our knowledge.

Various studies have used different approaches to test for financial market integration. There are two kinds of empirical study about integration: the financial economics models and the co-integration analysis models. The financial economics models use Capital Asset Pricing Models (CAPM) to analyze capitals; the GARCH framework or latent factor framework that analyzes return and volatility spillovers between markets (Chung & Rhee, 2002); (Bekaert, Harvey, & Ng, 2005); (Jeon, Oh, & Yang, 2006); (Hardouvelis, Malliaropoulos, & Priestly, 2006). The co-integration approach uses bivariate or multivariate analysis based on the vector error correction representation of the vector autoregressive (VAR) model (Dickinson, 2000) ; (Ng & Siklos , 2001); (Masih & Masih, 2002).

For example, (Lee & Rui, 2002) conducted an empirical study on the causal

relations of trading volumes of stock markets, their returns and volatility, considering both domestic and inter-country transactions. The data used were records of daily transactions and volume of the New York Stock Exchange, Tokyo Stock Exchange and London Stock Exchange. An important aspect of the research was the usefulness of trading volume information in the forecasting of returns and its volatility within the dynamic context of the stock market high volume trading.

The authors established through their study that there is no Granger causality running from trading volumes to stock market returns on each of the markets under study. This result does not support previous studies by other authors using certain theoretical models, which showed that a causal relationship exists. Another finding is a positive relationship between the trading volume and returns volatility of the New York Stock Exchange, Tokyo Stock Exchange and London Stock Exchange.

3.3 Potential Debate of Others about the Merger between Abu Dhabi Securities Exchange (ADX) and Dubai Financial Market (DFM)

From our point of view, the UAE financial industry is undertaking financial reforms by pushing the merger of the DFM and the ADX. It will be the biggest major reform that has been undertaken so far. Such a move will facilitate investors' movements across the markets, giving them a wider choice of stocks to invest in, and it can bring in fresh capital from foreign investors, both as individuals and corporate.

The global financial crisis in 2008 weighed heavily on Dubai, and affected the transactions for the merger of its two financial markets, which had been going on since 2010. The Dubai Financial Market has only a weak attraction to foreign investors, due to its link to real estate development projects and properties.

The negative public image that Dubai suffered when it almost reneged on its financial obligations in the wake of the 2008 global financial crisis, known as the Great Recession, was stuck in the minds of investors. The Abu Dhabi Exchange is good and strong, but its stock offering is sparse and limited. It is not attractive enough for a wide base of investors from different parts of the world.

The nature of investors in advanced economies is that they were afraid of the contagion that they saw spreading and devastating economies worldwide. There was no model or explanation for the way in which economies were affected by the global financial crisis that started in the US.

Nevertheless, there is one thing that everyone recognized: the emerging economies were not as affected as the advanced economies. This is one cause of the current interest in emerging markets. ADX and DFM should be able to capture investments that are looking for a place to settle by offering a wide selection of stocks and bonds of different companies that are still growing, satisfying the appetite of the rich investors from overseas.

Many entrepreneurs from the GCC and the MENA region could greatly benefit from a financially integrated bourse. There will be a long line-up of initial public offerings (IPOs) which will make investors interested. On the lookout for profit, investors will be competing for the stocks of these fast growing companies who need capitalization. Policy makers and regulators have long been contemplating the idea of a merger between the two markets.

A researcher (Wafa Sherif) in the UAE financial markets says that by uniting together the Abu Dhabi Securities Exchange (ADX) and the Dubai Financial Market (DFM) will be in a better position to manage resources and position the resulting body

as a power in the industry to reckon with. The developments in technology and the globalization of all aspects of business including competition demand that institutions and processes meet efficiency concerns.

In stock markets, the competition is stiff, the crunch for efficiency is very tight, and the demand for transparent transactions is high. ADX and DFM can only respond if they merge as one body. The merger of the Abu Dhabi Securities Exchange (ADX) and the Dubai Financial Market (DFM) will provide the new entity with stronger muscles to deal with global competition and new opportunities that will unfold alongside its competitiveness.

The merger of these two securities markets is not a matter of choice, but a matter of survival and competitiveness in the cutthroat conditions of the industry, whose movements and trends are affected not only locally or regionally, but dictated by trends in the global markets.

The much-awaited merger of these security entities will have a positive impact. Their credibility will receive a very much needed boost that international investors want to see. Foreign investors need to be convinced that not only are the fundamentals in place, but that the market is capable of dealing with all the inherent risks of the business, and has the presence that attracts strategic partners.

This is achievable by producing a unified entity that is stronger. With these considerations, there is no doubt that a merger of DFM and the ADX will be beneficial to the economy of the United Arab Emirates and to its investors. Furthermore, the integration of the ADX and the DFM will position the new UAE stock exchange strategically so that it can negotiate with much bigger and stronger competitors, and make a name for itself in the capital markets worldwide.

As well as the benefit to the national economy, the shareholders and stakeholders will also benefit. Hence it is expected that the performance of the securities market will improve dramatically. This will help position the UAE in the regional and global stock markets. One of the expected improvements in operating a single securities exchange is the expanded items that will be made available to investors, the lowering of trading costs and a narrower range of stock prices.

This will contribute to stabilizing the domestic investors and attract foreigners to place their monies with the UAE. Beyond doubt, investment portfolios will grow exponentially and the flow of capital will substantially increase. Consequently, the publicly listed companies will be presented as one listing. After the merger, they will be part of a big, synergized operation and in a far stronger financial position.

They will have the chance to explore the regional and international markets more easily. They will have access to improved share prices and bigger payouts on dividends. It is of course a given that this endeavor entails corresponding risks, as all mergers or alliances do. With the worldwide scramble among bourses to join forces and deal with the challenges that have arisen from recent world events come inevitable risks, which should be given serious consideration.

To ensure the success of the new entity, the two markets in question must also come up with a combined strategy team that will assess it and identify the success and failure factors in order to manage them strategically (Al Kady, 2010).

According to the president of the UAE Financial Markets Association, Mohammad Al Hashemi (WAM, 2013) the integration of the markets in the United Arab Emirates, specifically those in Abu Dhabi and Dubai, is projected to become of the most powerful in the Gulf and the MENA region.

The UAE Securities Markets have penetrated the global financial scene, and so they are now challenged on an international level to present themselves as being on a par with the strongest in the world's financial sector by having a wide array of products that international investors can choose from.

Mohammad Al Hashemi continued that the national economy of the country will greatly benefit from a joint force of the Abu Dhabi and Dubai Markets. An integrated market will be able to offer a lineup of the products that promise higher gains to global investors, setting the stage for the market leadership of the UAE. With this, shareholders in publicly listed companies will enjoy a more dynamic stock market, earning higher returns which benefit not only the country but the people as well.

The financial joint force will introduce the world to the newfound status of the United Arab Emirates in the financial markets, making it perform beyond its current capability. Investors will be enthusiastic to buy stocks and invest in the UAE. This will strengthen the country's financial sector and be more appealing to investors and stockholders

A single financial platform will be a sound approach, and it will surely draw the interest and funds of big investors, since it can arrange for them all the transactions that they need. In the international arena, the merger of the Dubai and Abu Dhabi markets will improve its position to transact internationally with major investors. This alone makes the merger worthwhile, for it will be able to enter into strategic partnerships in new and emerging markets.

Al Hashemi also points out that the operation of the UAE markets is hampered by having two entities, lessening its capability and reach. He discusses in detail how

beneficial the merger will be to the stockholders. A predicted consequence is that the country can expect big portfolio inflows, which will enhance the financial and operating position of the new entity. This will in turn improve the performance of share prices and yield better returns on investments.

With the merger, a single trading, clearance and settlement system will improve efficiency. The standards and services for brokerage firms who deal directly with investors will also level up and be reflected in the quality and reliability of operations. Al Hashemi concluded by saying that strong partnerships will be developed between the market dealers in Abu Dhabi and Dubai.

The current cutthroat competition will be eliminated or downplayed. A healthy and cooperative trading environment will foster good will and bring in higher trading volumes that are beneficial to all stockholders and stakeholders (WAM, 2013).

I support the two above opinions. A single securities market in the UAE will make its listed companies attractive to institutional and country investors who are on the lookout for strong and high yielding products with sound fundamentals. Merging the two bourses now will show maturity and will help strengthen the national economy. It will also prevent the bourses from being used as an avenue for gambling.

Meanwhile, Abdullah Al Turaifi, the chief executive of SCA (the Securities and Commodities Authority), confirmed the advantages and benefits that a merged bourse will bring to the market. Instead of the two markets spending individual resources on serving clients, they will be able to achieve more when united in serving their investors. The demand for high standards in disclosure, transparency and corporate governance is a major concern in the securities markets.

This lesson made its mark on the Securities and Commodities Agency. It continues its responsibility to oversee the long term strategy it has conceptualized and ensure that will be put into action to help the industry and the country succeed (Kumar, 2013).

Finally, a senior analyst (Said Sanyalaksna Manibhandu) at the NBAD Securities commented that he understands the difficulty of finalizing the merger because of "not knowing what the format of the merger will be." However, he underscored the fact that the planned merger can only have positive results as the final entity will be highly liquid and the expanded listing of both primary and secondary stocks will attract more interested investors. Something to look forward to is the planned announcement of the merger this December (2015).

It can be expected that whatever the quirks of the negotiations, the final announcement will show that the two bourses are equals. This will give both entities enough power and strength; they will be able to cut costs, streamline technologies and workforce capabilities and gain access to the top companies in the UAE. They may be operating as separate locations of one joined bourse, but their assets and capabilities will make them much stronger than they are now (Carvalho & Nair, 2013).

3.4   Econometric Data and Empirical Analysis of the Relationship between the Abu Dhabi Securities Exchange and the Dubai Financial Market

The main aim of this section is to analyze the causal relationship and the integration between the Abu Dhabi Securities Exchange and the Dubai Financial Market, and we describe below the procedures that were followed in implementing this methodology.

A. Methodology

Since many economic and financial time series are non-stationary and non-normal, we use a methodology in measuring the causal effects that overcomes the problems arising from non-stationary non-normalities and autoregressive conditional heteroscedasticity (ARCH) in the data. Earlier works on stock market integrations have mainly used asymptotic approaches.

However, in the presence of non-normalities and ARCH effects in the data, as is usually the case with financial data, asymptotic approaches provide misleading statistical inference (bias) when the sample size is insufficient (Hatemi-J A. , Money Supply and the Informational Efficiency of the Stock Market in Korea: Evidence from an Alternative Methodology, 2002). In this study, we apply a leveraged bootstrap approach developed by (Hatemi-J & Hacker, Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application, 2006), which is robust to non-normalities and ARCH effects.

In addition, in order to determine if there is a multivariate ARCH effect or not, we apply a test developed by (Hatemi-J & Hacker, 2005). Moreover, we test Granger (1969) causality by using a leveraged bootstrap test based on the procedures developed

by (Hatemi-J & Hacker, Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application, 2006) .

We also test for asymmetric causality by implementing a recent test developed by (Hatemi-J A. , 2012). This is important, since it has been established in the literature that investors react more to negative changes than positive ones.

B. Tools

Two statistical software components written in Gauss are used to implement the symmetric and asymmetric causality tests. The symmetric causality test is implemented via the statistical software component produced by (Hatemi-J & Hacker, HHtest: GAUSS module to implement bootstrap test for causality with leverage adjustments. Statistical Software Components G00005, 2009). The asymmetric causality test is implemented by another code that is written by (Hatemi-J A. , ACTest: GAUSS Module to Apply Asymmetric Causality Tests. Statistical Software Components G00012, 2011).

C. Data

The data used for this study were obtained from the Abu Dhabi Securities Exchange and the Dubai Financial Market. We use the daily closing price data from the Abu Dhabi Securities Exchange Index (ADXI) and the Dubai Financial Market Index (DFMI), spanning from 2nd January 2005 to 17th April 2013 for a total of 2156 observations.

D. Non-Stationary and Testing For Unit Roots

Many series in finance and economics are non-stationary and exhibit stochastic trends (Brooks, 2008). A series can usually be made stationary by transforming its

members into their differences or by constructing percentage changes of them. Therefore, before conducting the causality test, we first analyze the time series properties of the data. We determine the non-stationary nature and the order of integration of the variables by performing a unit root test (Brooks, 2008).

A common example of a non-stationary series is the random walk model with drift:

$$y_t = y_{t-1} + \mu + \varepsilon_t \tag{1}$$

Where y_t is the time series, μ is the drift term and ε_t is assumed to be white noise. Note that model (1) could be generalized to the case of the AR(1) model where y_t is an explosive process:

$$y_t = \emptyset y_{t-1} + \mu + \varepsilon_t \tag{2}$$

Typically, the explosive ($\emptyset > 1$) case is ignored and we use $\emptyset = 1$ to characterize the non-stationarity; this system is said to have a "unit root" (Brooks, 2008). We can generalize this concept to consider the case where the series contains more than one "unit root". That is, we would need to apply the first difference operator (Δ), more than once to induce stationarity. If it is a non-stationary series, y_t must be differenced d times before it becomes stationary, and then it is said to be integrated of order d. We write $y_t \sim I(d)$.

➔ An *I(0)* series is a stationary series

➔ An *I(1)* series contains one unit root (i.e. is non-stationary).

Several test criteria are available for the single unit root test. (Dickey & Fuller, 1979) proposed simple tests for testing the hypothesis that the series has a single unit root, but the test criteria are not valid when the process is an autoregressive moving

average process. (Phillips and Perron, 1988) suggested alternative criteria which correct the bias in the Dickey-Fuller test statistics (Pantula, 1991). The basic objective of the test is to test the null hypothesis that $\emptyset = 1$ in: $y_t = \emptyset y_{t-1} + \mu + \varepsilon_t,$ against the one-sided alternative $\emptyset < 1$.

The econometric package E Views provides a variety of powerful tools for testing a time series (or the first or second difference of the time series) for the presence of a unit root. We perform the (Perron, 1989) unit root test on the daily closing price data from the Abu Dhabi Securities Exchange Index (ADXI) and the Dubai Financial Market Index (DFMI). This test takes into account the potential effect of structural breaks when the null hypothesis of one unit root is tested. The estimation results from the unit root test on the data are shown in Table 3.1.

Table 3.1: Results of Test for Unit Roots Using the Perron Test

Variable	Hypothesis	Estimated Test Statistic	Critical Value		
			At 1%	At 5%	At 10%
ADXI	$H_0: I(1), H_1: I(0)$	-1.36(Prob. = 0.602)			
	$H_0: I(2), H_1: I(1)$	-34.72 (Prob. = 0.000)	-3.43	-2.86	-2.57
DFMI	$H_0: I(1), H_1: I(0)$	-1.01 (Prob. = 0.752)			
	$H_0: I(2), H_1: I(1)$	-47.73 (Prob. = 0.000)			

For the null hypotheses of *I(1)*, i.e. integration of the first order, the estimated test statistics, in absolute terms, are found to be less than the critical values at the conventional significance levels. Hence, the null hypothesis that each variable is *I(1)* cannot be rejected. We then investigate whether each variable becomes stationary after taking the first difference – that is, we test the null hypothesis that each variable is *I(2)*.

It can be seen from the results shown in Table 3-1 that the null hypothesis is rejected at the one percent significance level for each variable. Hence, we can conclude that each variable contains one unit root only. This implies that we have to pay attention to the integration properties of the data in order to avoid spurious and false inference. This is achieved by including an additional unrestricted lag order in the VAR model, as suggested by (Toda &Yamamoto, 1995).

E. Test for Normality

Financial data are usually not normally distributed and risk is not constant but varies over time. It is quite common that the likelihood of extreme events is much higher than what a normal distribution would indicate. Thus, before testing for causality we conducted diagnostic tests for normality and ARCH effects.

The report concerns the multivariate extensions of the Jarque-Bera residual normality test. It is the comparative analysis of the 3rd and 4th residual moments which diverges from the normal distribution. In the context of the multivariate test, the selection of a factorization of k residuals is mandatory and these elements are orthogonal to one another.

Suppose p is a k x k factorization matrix such as :

$$v_t = Pu_t \sim N(0, I_k) \qquad (3)$$

where u_t = demeaned residuals.

Define the 3rd & 4th moment vectors $m_3 = \sum_t v_t^3/T$ and $m_4 = \sum_t v_t^4/T$ Then:

$$\sqrt{T} \begin{bmatrix} m_3 \\ m_4-3 \end{bmatrix} \to N\left(0, \begin{bmatrix} 6I_k & 0 \\ 0 & 24I_k \end{bmatrix}\right) \qquad (4)$$

With the consideration of a null hypothesis in the light of normal distribution, each factor is independent of the others; therefore we can write the χ^2 statistic by adding squares of moment of 3rd and 4$^{th.}$.

EViews give room for the selection of factorization matrix P:

- Cholesky (Lütkepohl 1991, pp.155-158): P is not directly proportional to the lower triangular Cholesky factor in the context of the residual covariance matrix. The statistical data of the test result is based upon the sequence of the variables in VAR.

- Opposite Square Root of Residual Correlation Matrix (Doornik & Hansen, 2008):

$P = H\Lambda^{-1/2} H' V$

Because

Λ = diagonal matrix

It is holding the eigenvalues of the residual correlation matrix on the diagonal,

H = matrix

Its pillars are the equivalent eigenvectors,

V = diagonal matrix

It is the opposite square root of the residual variances on the diagonal.

This P is very important for the opposite square root of the residual correlation matrix. The test does not change in ordering and in the variable scale in the VAR. (Doornik & Hansen, 1994) say that we calculate and display a minor sample correction to the transformed residuals v_t before the execution process of the statistics.

For the sack of joint tests, usually we report:

$$\lambda_3 = Tm_3{}' \, m_3/6 \to \chi^2(k)$$

$$\lambda_4 = T(m_4 - 3)'(m_4 - 3)/24 \to \chi^2(k)$$

$$\lambda = \lambda_3 + \lambda_4 \to \chi^2(2k)$$

If, however, (Urzua's, 1997) test is selected, λ will not only be used for the sum squares of the "pure" 3rd and 4th moments, but will also capture the sum of squares of all the said movements.

In this context,

λ = asymptotically distributed as a χ^2 with $k(k + 1)(k + 2)(k + 7)/24$

which reflects the degrees of freedom.

We tested the underlying data for multivariate normality using the (Doornik & Hansen, 2008) test. The null hypothesis in this test is multivariate normality. The results of these multivariate diagnostic tests are presented in Table 3-2, which indicate that the null hypothesis of multivariate normality is strongly rejected because the p-value is less than any conventional significance level in each case.

F. ARCH Effects

The literature shows in many cases that in the case of financial as well as of economic variables, autoregressive conditional heteroscedasticity (ARCH) effects are common, due to the nature of the time varying related volatility associated with such variables. (Engle, 1982), has carried out work to highlight this aspect prominently. The financial markets are an example of such outcomes; they exhibit periods with lower

volatility followed by periods of higher volatility; the concept of volatility is calculated on the basis of the standard deviation of the return from the average returns of the market.

The volatility associated with the financial markets is an important area for attention; this signifies the risks associated with the market, allows a valuation of the assets, influences the monetary policymaking and leads to clear investment decision-making (Huang, 2001). The ARCH model remains one of the best methods of describing and estimating the volatility associated with the stock returns; this is associated with the time varying volatility.

The model is also considered as a good method of describing the outcomes associated with stock returns. (Engle, 1982) was at the forefront in the development of the seminal ARCH (q) model. The model represents the returns of the past q period squared and the development of the conditional variance of returns based on the maximum likelihood procedure; the model does not use sample standard deviation for the purpose.

In this work, we test for multivariate ARCH effects by implementing a test suggested by (Hatemi-J & Hacker, 2005). Consider the following vector autoregressive (VAR) model:

$$X_t = a + B_1 X_{t-1} + \cdots + B_p X_{t-p} + v_t \qquad (5)$$

Where

X_t = a vector of n variables,

a = a vector of n intercepts,

v_t = a vector of n error terms, and

B_p = an nxn matrix of coefficient matrix for lag order p.

The test for Multivariate ARCH (k) can be implemented by using the following regression:

$$\hat{v}_t^2 = d + c_1\hat{v}_{t-1}^2 + c_2\hat{v}_{t-2}^2 \dots + c_k\hat{v}_{t-k}^2 + w_t \qquad (6)$$

Where $\hat{v}_t$ is the estimated value of v_t. The null hypothesis of no multivariate ARCH effects of order k is defined as:

$$H_o : c_1 = c_2 = \dots = c_k = 0 \qquad (7)$$

This null hypothesis can be tested by the following test method, according to Hacker and Hatemi-J (2005):

$$MLM_{(k)} = (T - J) \log\left(\frac{|\pi_R|}{|\pi_U|}\right) \qquad (8)$$

Where

π_R: is the estimated variance – covariance matrix for w_t when the restriction implied by the null hypothesis are imposed.

π_U: is the variance – covariance matrix in the unrestricted model.

J : is an adjustment for parameters that is equal to $k \times n + 0.5 (n(k - 1) - 1$

k : is the ARCH order.

n : is the number of variables in Vector x_t.

T: is the sample size.

The $MLM_{(k)}$ test is distributed as χ_k^2 if standard assumptions are fulfilled. However, for financial data these assumptions are not fulfilled. To remedy this problem, (Hatemi-J & Hacker, 2005) suggest the following bootstrap approach in order to generate more reliable critical value.

This bootstrap approach consists of the following steps:

Estimate the $VAR_{(p)}$ as presented by Equation (5), and obtain $\hat{v}_t$ and $\hat{v}_t^2$. Next, estimate model (6) and obtain $\hat{d}, \hat{c}_1, \hat{c}_2, \dots, \hat{c}_k$.

And simulate the data by bootstrapping via the following equation:

$$\hat{v}_t^{x_1^2} = \hat{d} + \hat{c}_1\hat{v}_t^2 + \hat{c}_2\hat{v}_t^2 + \cdots + \hat{c}_k\hat{v}_t^2 + \qquad (9)$$

This is done independently and with replacement. The bootstrap values, is v_t^* are mean-adjusted. Estimate the regression using the bootstrap data and test for no ARCH (k) effects using Equation (8).

Repeat this process 10,000 times, and obtain the test value each time. In this way the bootstrap distribution of the test can be obtained. If we take the α_{th} quintile of this distribution, then we obtain the bootstrap critical value at $\propto -$Level of confidence. Let us denote the critical value as c_α^*.

Finally, estimate the model (6) using original data and test for no multivariate ARCH (k), and compare the estimated test value with c_α^*. If the estimated value of the test is higher than c_α^* then the null hypothesis of no multivariate ARCH(k) effects can be rejected at the $\propto -$Level of significance, using bootstrap critical values.

An alternative way is to estimate the p-value. If the p-value is less than $\propto$ then the null hypothesis can be rejected. The bootstrap simulations and the implementation of the underlying test are carried out by a statistical software component that is produced by (Hatemi-J & Hacker, HHtest: GAUSS module to implement bootstrap test for causality with leverage adjustments. Statistical Software Components G00005, 2009).

We computed the daily returns from ADXI and DFMI over the whole study period. The daily returns from the ADXI and DFMI are defined in the standard way by the natural logarithm of the ratio of consecutive daily closing levels. The results are presented in Table 3.2.

As is evident from these results, the null hypothesis with no multivariate ARCH is rejected in four cases. It is best to use bootstrap simulation techniques in this scenario. This is because standard symmetric causality methods, based on the normality and accuracy of the performance of the constant variances, remain questionable.

In addition, the results of the descriptive statistics for Abu Dhabi and Dubai stock market are reported in Table 3.3. As can be seen, both return series appear to have similar statistical properties. The skewness is negative and significant, implying a possible leverage effect in the data.

The excess kurtosis is positive and significant, indicating fat-tails. The standard deviation of returns of ADXI is less than the returns of DFMI, which means that Abu Dhabi Securities Exchange is likely to be less volatile than the Dubai Financial Market.

Table 3.2: Results for Multivariate Diagnostic Tests

Variables	Multivariate normality	Multivariate ARCH
ADXI, DFMI	<0.0000	<0.0000
DFMI, ADXI	<0.0000	<0.0000
ADXI$^+$, DFMI$^+$	<0.0000	0.090000
DFMI$^+$, ADXI$^+$	<0.0000	0.132000
ADXI$^-$, DFMI$^-$	<0.0000	<0.002000
DFMI$^-$, ADXI$^-$	<0.0000	<0.002000

Table 3.3: Descriptive Statistics

Variable	Returns of ADXI	Returns of DFMI
Mean	-0.0004	-0.0057
Median	0.0034	0.0000
Maximum	3.3134	4.4384
Minimum	-3.7694	-5.0069
Std. Dev.	0.5567	0.8135
Skewness	-0.0838	-0.0273
Kurtosis	9.9653	7.9666
Observations	2155	2155

We also plotted the daily closing indices and returns for both the ADXI and DFMI over the whole study period from 2nd January 2005 to 17th April 2013 as shown in Figures 6, 7, and 8 in particular, the plots show strong evidence of time-varying volatility clustering.

Figure 6: Abu Dhabi Securities Exchange Daily Index (ADXI) & Dubai Financial Market Index (DFMI)
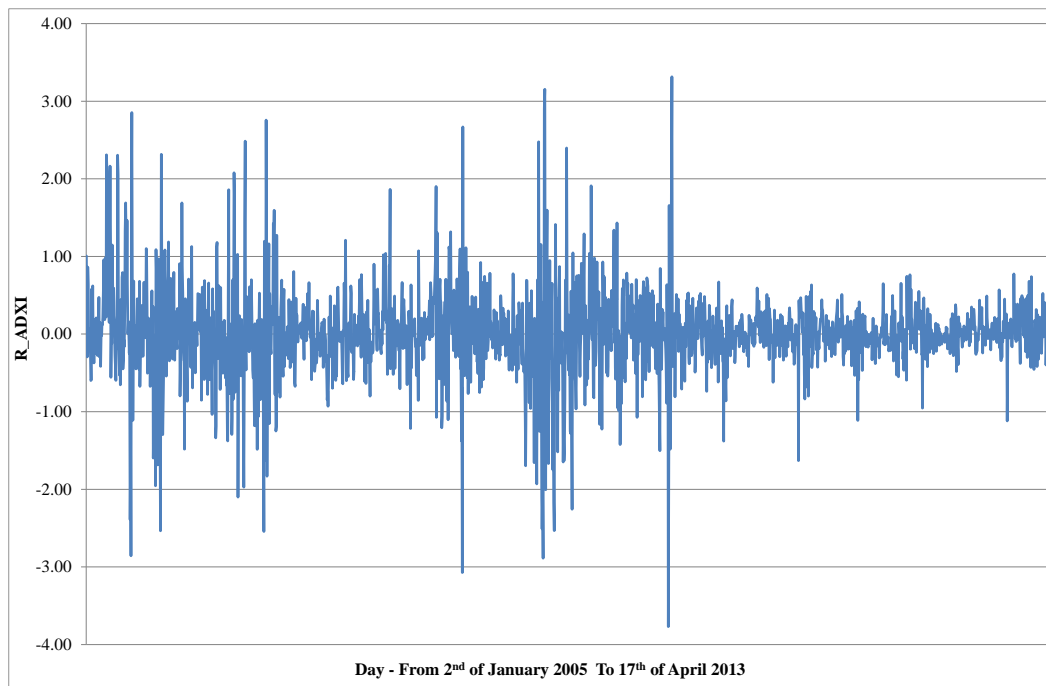
Figure 7: Abu Dhabi Securities Exchange Daily Returns (R_ADXI)
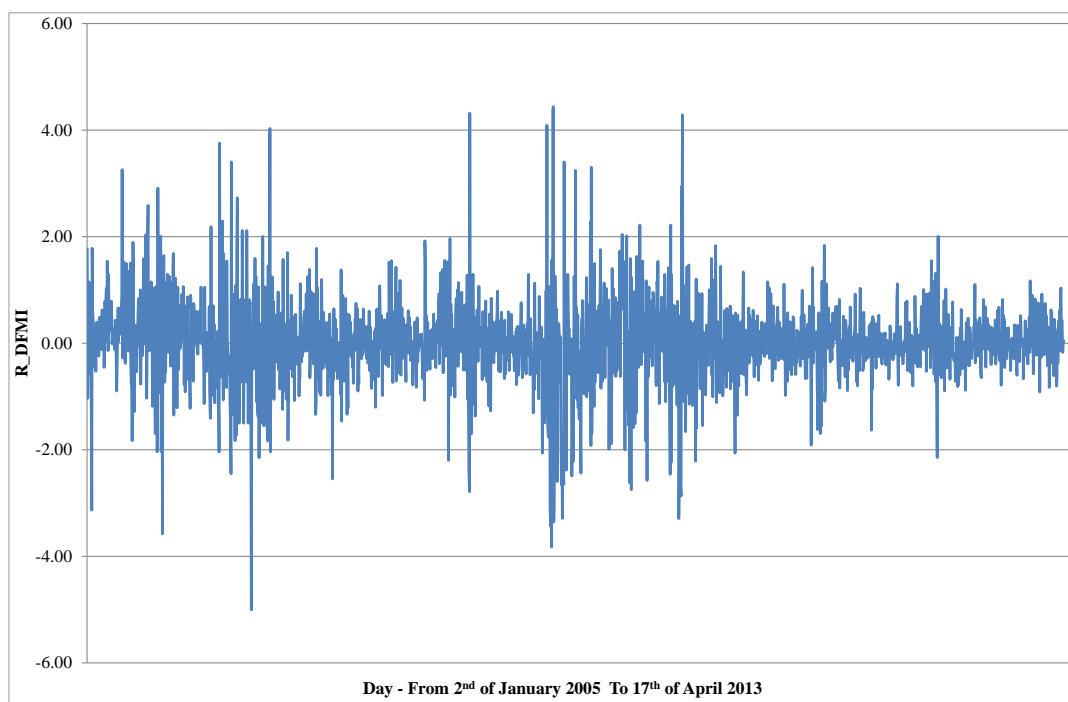
Figure 8: Dubai Financial Market Daily Returns (R_DFMI)

G. Causality Test

Causality, as defined by (Granger, 1969), is our goal here; we want to figure out whether one variable leads to another variable or not. Thus, Granger causality is based on the simple notion of whether including a variable's past values (let's say x) as explanatory variables in an otherwise autoregressive model of another variable (let's say y) can provide statistically significant improvement in the forecasting of that other variable.

The Granger approach to the question of whether (y) causes (x) is to see how much of the current value of (y) can be explained by past values of (y); and then to see whether adding lagged values of (x) can improve the explanation. (y) is said to be Granger-caused by (x) if (x) helps in the prediction of (y), or equivalently if the coefficients on the lagged values of (x) are statistically significant. Granger causality is usually implemented within the VAR model. Consider the following 2-variable VAR (k) model, where y_t and x_t are random variables, ε_{xk} and ε_{yk} are random error terms; and the α_k and β_k terms are constant parameters:

$$y_t = \alpha_{01} + \alpha_{11}y_{t-1} + \cdots + \alpha_{1k}y_{t-k} + \beta_{11}x_{t-1} + \cdots + \beta_{1k}x_{t-k} + \varepsilon_{yt} \quad (10)$$

$$x_t = \alpha_{02} + \alpha_1 x_{t-1} + \cdots + \alpha_{2k}x_{t-k} + \beta_{21}y_{t-1} + \cdots + \beta_{2k}y_{t-k} + \varepsilon_{xt} \quad (11)$$

A Wald statistic is used to test for each null hypothesis on non-causality. For example, if the following null hypothesis is rejected:

$$H_0 : \beta_{11} = \cdots = \beta_{1k} = 0.$$

it means that (x) does not Granger-cause (y).

After testing for the presence of non-normality and ARCH effects in the data,

we then investigate the Granger causal relationship between the Abu Dhabi and Dubai financial markets to determine empirically whether they are integrated or segmented financially.

For this purpose, we perform symmetric and asymmetric causality tests based on leveraged bootstrap simulations developed by (Hatemi-J & Hacker, Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application, 2006); (Hacker & Hatemi-J , 2012) and (Hatemi-J A. , 2012). The asymmetric causality test will allow for a possible difference between the impacts of positive shocks and negative ones.

Since people tend to react more to negative shocks than to positive ones, even in cases when the size of the shock is the same in absolute terms, it is important, in financial markets, to separate the impact of positive shocks from negative ones. The first is to identify the optimal lag order; in this instance, we use a one lag. It should be mentioned that the optimal lag order k is determined by minimizing an information criterion.

Stochastic disturbance terms to positive and negative shocks are separated on the basis of (Hatemi-J A. , 2012). The causality effect associated with the Abu Dhabi stock price index and Dubai stock price index are separated into positive and negative shocks. If we take the assumption that the Abu Dhabi stock price index and Dubai stock price index patterns would follow a random walk model, the task becomes easier.

The cumulative sum of the positive error term in Equations 10 and 11are indicated by (ε_{yt}) and (ε_{xt}) . We indicate the test results for the positive direction of causality and then identify the tests for cases of causality relationships between the positive cumulative changes. We also take into consideration the examination of the

causal impact between the two variables under study in terms of cumulative negative

changes . In case $y_t^+ = (y_{1t}^+, y_{2t}^+)$; the vector autoregressive (VAR) model of order p,

VAR (p) can be used for the purpose of causality testing based on (Hatemi-J A. , 2012).

$$y_t^+ = \upsilon + A_1 y_{t-1}^+ + \cdots + A_p y_{t-1}^+ + u_t^+ \qquad (12)$$

The null hypothesis can be tested after determining the optimal lag order; in

the case of a null hypothesis, the kth element of y_t^+ and the ωth element of y_t^+ will not

Granger cause. This can be further explained as follows:

H0: in the column k and the row ω in Ar = 0; r = 1,..., p. the model can be

reformulated in the matrix form, as indicated below:

$$Y = (y_t^+, \ldots, y_T^+)(n \times T) \qquad (13)$$

$$D = (\upsilon, A_1, \ldots, A_p)(n \times (1 + np)) \quad (14)$$

$$Z_t = \begin{bmatrix} 1 \\ y_t^+ \\ y_{t-1}^+ \\ . \\ . \\ . \\ y_{t-p+1}^+ \end{bmatrix} ((1 + np) \times 1), \text{for } t = 1, \ldots, T \qquad (15)$$

$$Z = (Z_0, \ldots, Z_{T-1}) \left((1 + np) \times T\right), \text{and} \quad (16)$$

$$\delta = (u + 1, .., u + T)(n \times T) \qquad (17)$$

Modified Wald (MWALD) test statistics are associated with the Granger

causality test procedure developed by Hatemi-J in the VAR model. The notations $\delta_i = 0$ or $\varphi_i = 0$ indicate the null hypothesis associated with non-Granger causality. In this

instance, the MWALD test statistics associated with the variables Y and Z can be

indicated as shown below:

$$\text{MWALD} = (Y\varphi)'[Y ((Z'Z)^{-1} \otimes V_U) Y']^{-1} (Y\varphi) \sim \chi^2_P \quad (18)$$

The asymmetric properties associated with the data are taken into consideration by (Hatemi-J A. , 2012) and through the causality test critical values are generated that remain robust to time varying volatility as well as non-normality. Table 3.4 below shows the outcomes associated with the symmetric and asymmetric causality tests. Thus, the null hypothesis, which states that the Abu Dhabi stock market price index does not affect the financial markets of Dubai when the shock is positive, if tested with the standard causality test, cannot be rejected.

The asymmetric structure of the causality testing does not affect the outcomes. The null hypothesis associated with the standard causality testing, which indicates that Dubai stock price index and the null hypothesis of the positive and negative changes based on the asymmetric causality in Dubai financial market price index does not affect the Abu Dhabi stock market index is rejected. Accordingly, one can conclude that the ADXI market is significantly integrated with the DFMI market, while the DFMI market significantly affects the ADXI market, but not vice-versa.

However, the asymmetric causality tests show that the null hypothesis of negative shocks in the Abu Dhabi stock price index not affecting the stock price index of Dubai market is rejected. Nevertheless, the results of the asymmetric causality tests of negative shocks show that the ADXI market is integrated with the DFMI market.

Table 3.4: Results of The Symmetric and Asymmetric Causality Tests

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Conclusion on H0
ADXI≠>DFMI	11.645	7.992	6.273	3.751	Not Rejected
DFMI≠>ADXI	12.793	7.980	6.611	84.172	Rejected
ADXI⁺≠>DFMI⁺	8.596	6.023	4.662	1.281	Not Rejected
DFMI⁺≠>ADXI⁺	10.017	6.555	4.688	42.480	Rejected
ADXI⁻≠>DFMI⁻	12.040	8.996	7.379	26.581	Rejected
DFMI⁻≠>ADXI⁻	13.856	10.274	8.166	102.163	Rejected

Notes:

1. The ADXI indicates the Abu Dhabi stock market price index and the DFMI indicate the Dubai stock price index.

2. Minimization of the information criterion was used for the purpose of determining the optimal lag order in the associated VAR model.

3. (Doornik & Hansen, 2008)'s guidance was taken into account when the null hypothesis was tested for multivariate normality.

4. (Hatemi-J & Hacker, 2005) have developed a bootstrap multivariate LM test and this was used for the testing of the ARCH effect,. (Hatemi-J & Hacker, HHtest: GAUSS module to implement bootstrap test for causality with leverage adjustments. Statistical Software Components G00005, 2009) also developed a software component and this was used for the purpose of the bootstrap simulations which were used for the ARCH tests.

5. (Hatemi-J, 2003) should be referred to when selecting the true lag order attached in the causality analysis.

6. Within the Gauss software, the statistical significance levels of 1%. 5% and 10% should be taken into consideration when critical values are generated for the bootstrapping simulation method.

7. The guidance of (Granger and Yoon, 2002) directs us to develop tests which could lead to understanding the hidden co-integration indicating the impact of the cumulative positive and negative changes.

8. The denotation ADXI≠>DFMI means that the ADXI does not Granger cause the DFMI. The denotation CV is an abbreviation for 'critical value'.

9. For the purpose of accounting for the impact of the unit root an extra lag is included in the VAR model, in line with the guidance provided by (Toda &Yamamoto, 1995).

H. Conclusion

This study aimed to test the causal relationship between the Abu Dhabi Securities Exchange and the Dubai Financial Market daily closing price data from the Abu Dhabi Securities Exchange Index (ADXI) and the Dubai Financial Market Index (DFMI) over the period 2nd January 2005 to 17th April, 2013.

By applying ARCH tests, the conditional heteroscedasticity was confirmed in both return series for the Abu Dhabi Securities Exchange and the Dubai Financial Market, and the results show high own-volatility persistence in both markets. These markets, being small compared to many exchanges, are sensitive to rebalancing decisions and the worldwide portfolio adjustments of large investment houses.

Moreover, the UAE is located in the politically unstable and oil-dependent Middle East region, and this introduces other risk factors that may make these markets

more volatile than other exchanges. Consequently, these markets may be more risky than other stock exchanges, whether well-established or emerging.

We also conducted Granger causality tests, which attempt to identify whether fluctuations in a particular market affect another market. The results of this empirical analysis provide evidence of one-way causality between Abu Dhabi Securities Exchange and the Dubai Financial Market, where the latter significantly affects the former but not vice-versa.

Our findings also show that the asymmetric causality tests provide better information than the symmetric tests. . The asymmetric test results reveal that when prices are falling both Abu Dhabi and Dubai markets cause changes in each other. However, when prices are rising only the Abu Dhabi market causes change in the Dubai market.

Finally, it is important to point out that the methods introduced by Hacker and Hatemi-J and implemented in this analysis are robust to non-normality and the presence of the ARCH effect, where standard estimation methods are not reliable.

Chapter 4: Evaluating the financial integration of the UAE Financial Market with the Global Financial Market

4.1 Introduction

The previous chapter dealt with domestic financial market integration within the UAE context. This chapter investigates whether or not the UAE financial market is integrated with the global financial market. Over the past thirty years, the question of integration among stock markets has gained more prominence than ever before. As stated by (McAndrews, I & Chris Stefanidis, 2002), the financial integration of stock markets brings about a more open and diverse business and speculation environment with expanded business liquidity, more beneficial and gainful exchanging frameworks, and a more effective placement of capital.

When stock markets all around the world perform in the same way and show similar risks and returns, then the stock markets are integrated. There are two factors that determine the perfect integration of two stock markets; primarily investors should not bear any additional costs if they move from one market to the other, and also an arbitration mechanism is available to ensure stock price parity, discussed by (Jawadi, F & Arouri, M.E.H, 2008).

Stock market integration is considered a significant topic in financial economics and it primarily deals with the way in which stock markets are related. The study of stock markets at a global level is deemed important by different types of investor, such as individual, institutional and portfolio managers. Apart from these, researchers, decision makers and stock market practitioners rely on the study of stock market integration to make investment decisions, which become more important in the context of financial crisis. The goals of global diversification and economic stability can be achieved by studying the details of stock market integration.

Decisions made by global level investors can be effectively aided by studying the extent of interdependence and integration between stock markets. The need for detailed studies on stock market integration has risen, due to an increase in global investments, which have been made possible by prevailing globalization and liberalization policies.

Stock market integration as an idea gained popularity three decades ago but major works on this topic have been conducted in the last few years. The advent of a globalized economy has encouraged international investments to aim at maximizing the returns. In order to maximize the returns and minimize the risk on investment, different types of investor diversify their investment portfolio.

However, diversification becomes futile when stock markets in different countries have the same level of returns, as they do when they are integrated. Therefore, before investing in foreign markets, investors first examine the level of integration among different financial markets. This is what has made the study of stock market integration popular in last 20 to 30 years.

Integration of stock markets as a topic has not only become popular in developed countries, but is also gaining momentum in the developing countries of Asia. The reason for its popularity as a research topic is that one has to study the linkages between stock markets to maximize the returns on international investments.

The integration of stock exchange as a study topic is of specific pertinence to any further developments of financial markets because the combination of the UAE financial markets may make financial development faster and may bring about higher degrees of efficiency.

International investment has indeed found many open doors over the last few decades welcoming it to several emerging markets, not least the financial markets of the UAE. These countries have been trying to attract much needed foreign direct investment for boosting the growth of their own economy.

If several countries get together to bond financial markets, it also helps them to reduce the costs of financial transactions. Such steps help to pool amounts in large numbers for investment purposes. In this way the chances of economic growth for those countries are also increased.

The financial systems of developing countries also get benefit through the integration of their financial markets with other countries. An added advantage is that capital liquidity also flows better by this means. In the world of modern international markets, the combining of different countries to form a financial market has several theoretical and practical ramifications.

Financial market integration has likewise significant theoretical and practicable suggestions in today's worldwide financial markets. Theoretically speaking, whether the financial markets are integrated or not has significant repercussions as regards the input for global portfolio diversification and open economy models.

Practically speaking, investors can realize the potential worldwide benefits achievable through diversification but they rely on the manifold relations between financial markets. The combination of financial markets also provides useful information to those who regulate the financial markets. They get the parameters for spillover effects and risk calculation for setting adequate financial policies in different markets. One implication of the integration of the financial markets could be that the

relationship between risk and return is the same in both markets (i.e. the same risk level is rewarded by the same amount of return in each market).

This chapter will endeavor as necessary to look at the impact of the causal relationship between the UAE and international financial markets to observe whether the latter had any significant impact on the former in order to judge whether there is integration or segmentation.

This chapter has the following objectives; primarily, it will research whether the UAE financial market is integrated or segmented with respect to the international financial market. Second, it will consider the potential deviated property of the underlying financial information.

This will be accomplished by implementing a strategy which, unlike the standard symmetric routines, will consider a possible contrast between the effects of positive impacts and those of negative ones.

Differentiating the effect of the constructive impacts from the adverse ones is vital, in financial markets in particular, because individuals have a tendency to respond more to negative impacts than to positive ones even in situations when the measure of the impact is the same in absolute terms.

Therefore, the knowledge that this chapter gives about financial market integration can be taken as correct and dependable and the outcomes can provide significant information to researchers and professionals who are chipping away at monetary, administrative, or institutional dimensions of the integration UAE markets.

After this introduction, the rest of the study is structured as follows. A survey of the relevant literature is given in Section 2. Section 3 is dedicated to describing the

research methodology and the related data. Section 4 introduces the outcomes. The last section gives a summary of what the chapter has done.

4.2 Literature review

The stock markets and their integration have been considered of importance since the 1980s; however, the studies associated with the topic of stock market integration have been carried out only during the last few years. Many of the studies have used linear models for understanding the integrations in stock markets around the globe. They have used correlation analysis as the basis of understanding the nature of the relationships. We can provide examples of this model in studies conducted by (Markellos, R.N & Siriopoulos, C, 1997), (Gjerde, O & Saettem, F, 1995) (Goh, K.L, Wong, Y.C, & Kok, K.L, 2005), (Hamao, 1990), (Masih & Masih 1999), (Boujir & Lahrech, 2008), (Mukhopadhyay, 2009), and (Chen, Firth, & Rui, 2002).

However, this does not mean that this is the only approach to such a study; (Karim & Gee, 2006), (Hassan, M.K & Naka, A, 1996), Masih and Masih (1997, 1999), (Chang & Nieh, 2001), (Zhang, 2009) and (Karagoz & Ergun, 2010) have used modern techniques associated with econometric analysis for the purpose of testing the hypotheses in the studies, such as error correction mechanism, Johansen's cointegration test, variance decomposition (VDC), Granger causality and the impulse response function (IRF).

It was evident through the literature available that USA was the main focus point (Bekaert & Campbell, Time Varying World Market Integration, 1995) ; (Tai C. , 2007); (Ewing, Payne, & Sowell, 1999); (Hamao, Y, Masulis, R.W, & Ng, V, 1990); (Johnson, R & Soenen, L, 2002); (Majid, M.S.A, Yusof, R.M, & Razali, A.N, Dynamic financial linkages among selected OIC countries: evidences from the post-September

11, 2006) when it comes to stock market based research.

But the focus gradually changed to other nations, such as India (Siddiqui, Exploring integration between selected European market indexes and sensex, 2008); (Ahmad, Ashraf, & Ahmed, 2005); (Siddiqui, S & Seth, N, 2010); (Mukhopadhyay, 2009), UK ((Phylaktis, K & Ravazzolo, F, Stock market linkages in emerging markets: implications for international portfolio diversification, 2005); (Malkamaki, M, Martikainen, T, Perttunen, J, & Puttonen, V, 1993); (Wang & Moore, T, 2008); (Markellos, R.N & Siriopoulos, C, 1997), Greece ((Gklezakou, T & Mylonakis, J, 2009); (Hardouvelis, Malliaropoulos, & Priestly, 2006), Australia (Kim & Shamsuddin, 2003); (Simpson, 2008); (Masih, A.M.M & Masih, R, Are Asian stock market fluctuations due mainly to intra-regional contagion effects? Evidence based on Asian emerging stock markets, 1999), and Malaysia ((Ibrahim, 2005); (Majid, M.S.A, Meera, A.K.M, & Omar, M.A, Interdependence of ASEAN-5 stock markets from the US and Japan, 2008), together with certain other nations ((Seabra, 2001); (Gjerde, O & Saettem, F, 1995); (Fratzscher, 2002); (Maysami, R.C & Koh, T.S, 2000); (Yusof, R.M & Majid, M.S.A, 2006); (Yi, Z & Tan, S.L, 2009); (Simpson, J & Evans, J, 2004); (Boujir & Lahrech, 2008); (Karagoz & Ergun, 2010).

The topic has gradually become popular due to the interest from various investors as well as the researchers in identifying how a particular stock market is linked with the global stock market. The interests may vary according to the enquirer's need. The study conducted by (Kazi, 2008), we observe, covers the maximum period in the context of evaluating stock market integration; it surveys a period of 57 years.

Further, the research by (Gutierrez, L & Otero, J, 2007) covers a period of 38 years. When we consider the number of countries covered, (Mukhopadhyay, 2009)

exceeds the rest in using 46 nations for his study. The study also reveals a split to represent the merging as well as the developed nations, 23 national stock exchanges being surveyed in each group. (Alam & Hasan, 2003)'s study focused only on US markets and sought to identify the nature of the relationship between the direction of the stock market indices and the growth of the economy of the country.

The main focus of this chapter is to identify whether UAE stock markets are well integrated with or fragmented from the global stock markets. A review of the studies can be found in the table below Table 4.1.We additionally take into account that the underlying financial data could be non-normal with time-varying volatility. This is accomplished through utilizing bootstrap simulation techniques that are not sensitive to non-normality when the data are time-varyingly volatile.

Table 4.1: General Articles on Securities Exchange Integration

Author's Name and Year of publication	Data Regions	Time period	Type of data, frequency	Experiential Methodology	Notable Results
(Agmon, 1972)	US, UK, Germany, and Japan	Jan 1959 – Jun 1968	monthly data	Asset pricing model	He found that stock exchanges are integrated
(Errunza & Losq, 1985) (De Santis & Imrohoroglu, 1997) (Gerard, Thanyalakpark, & Batten, 2003) (Tai C. , 2004) (Phylaktis, K & F. Ravazzolo, Stock market linkages in emerging markets: implication for international portfolio diversification, 2004) (Bekaert, Harvey, & Ng, Market integration and contagion, 2005)				Capital Asset Pricing Model (CAPM) framework by testing the hypothesis of market integration	Their studies further focus on how such integration affects international and domestic factors of risk on investors' capital and its return. According to their study parameters, the stock markets move in unison with each other if only international factors are considered. But when domestic factors are considered, markets show segmentation. A combination of local and international factors produces results in which markets are seen as integrated with segmentation. These research studies show a combination of both types of results.

(Wheatley, 1988)		February 1959 to December 1981	monthly data	A simple discrete-time version of the consumption based asset pricing model	He found that stock exchanges are integrated.
(Hamao, Y, Masulis, R.W, & Ng, V, 1990)	Tokyo, London, and New York	Pre-October 1987 period.	Daily stock price indexes	Autoregressive conditionally heteroskedastic (ARCH)	They found that stock exchanges are integrated.
(Kasa, 1982)	Financial markets of the developed world including the USA, UK, Canada, Japan, and Germany.	January 1974 through August 1990	Monthly and quarterly data	Multivariate co-integration method of Johansen	Kasa's focus was to analyze what common stochastic trends existed as drivers of a system of co-integration. This scenario was developed to test the hypothesis about finding any single trend of stochastic nature common among all stock markets. If this hypothesis turned out to be true the result could be derived that over long periods of time such trends can be traced. However, if co-integration does not exist, it would show that the financial markets are segmented. These studies conclude that the stock markets in the developed world show certain relationships if they are studied over a long period of time.

(Espitia & Santamaria, 1994)	EEC markets. (*European Economic Community)*			VAR methodology	They found that stock exchanges are integrated
(Fraser, Helliar, & Power, 1994)	France, Germany, Italy, the UK, USA	1974-1990	Market-value weighted price indices	Time–varying methodology	The British value market has strong relationships with the New York stock trade. Finished outcomes do not change with the examination of distinctive extensions.
(Bekaert & Campbell, Time Varying World Market Integration, 1995)	twelve emerging markets: Chile, Colombia, Greece, India, Jordan, Korea, Malaysia, Mexico, Nigeria, Taiwan, Thailand, and Zimbabwe		Stock price indexes from IFC and MSCI	The Capital Assets pricing model	They consider that market integration does not follow a uniform pattern in a given period. Their study focuses on developing a model which separates the time periods when domestic stock markets showed different trends as compared to the international markets in the same duration. They also show time periods when the two markets show signs of integration with the sample. Integration of both types of markets varies over time. Emerging markets also start showing signs of integration by the end of the time period of the sample.
(Koutmos, 1996)	UK, France,	1986-1991	Daily prices	Multivariate	Both types of connections, lead as well as lag, and asymmetric

				VAR-EGARCH model	volatility around the analyzed that securities exchanges exist.
(Beckers, Connor, & Curds, 1996)	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, the Netherlands, Norway, New Zealand, Spain, Sweden, Switzerland, the U.K., the U.S.A	1982-1995	Monthly returns	Factor model approach (Heston and Rouwenhorst)	Inside the EU the degree of integration expanded almost more than the level of international stock market integration.
(Serletis, Apostolos & Martin King, 1997)	Belgium, Denmark, Greece, Germany, France, Ireland, Italy, Netherlands, Spain, UK	1971-1992	Quarterly returns	Johansen's (1988) maximum likelihood extension of the Engle and Granger (1987) Co-integration framework, Time varying parameter technique	Some stock exchanges imparted stochastic patterns. Relationship of EU value markets was escalated.
(Kanas, 1998)	UK, Germany, France	1984-1993	Daily prices	EGARCH model	Around the analyzed securities exchanges have found asymmetric volatility. After the

					1987 crash more overflows and overflows of more amazing power existed
(Bodart & Reding, 1999)	Germany, France, Belgium, Italy, the UK, Sweden	1989-1994	Daily returns	Correlation analysis and threshold analysis	Conversion scale variability affected the cross country relationship of stock exchanges. Levels of worldwide interconnecting of securities exchanges should diminish.
(Chelley-Steeley, Patricia, & Steeley, Changes on the Comovement of European Equity Markets, 1999)	United Kingdom, Germany, Italy, Switzerland, and France	1975-1991	Daily returns	VAR model and principal components based regressions	Elimination of trade controls affected the incorporation of European value markets and along these lines provincial components had a less noteworthy effect on national value business sector returns. Markets responded all the more seriously to overall improvements after the trade controls were softened.
(Cheung & Kon S, 1999)	France, Germany, Italy	France, Germany, Italy	Monthly returns	Gonzalo and Granger's analysis of common permanent components within the framework of a co-integration	Long haul co-movement exists between the three European markets. Co-integration completed does not exist between the significant European stock exchanges and more modest markets, in the same way as between Belgium and the

					analysis	Netherlands.
(Gerrits, Robert-Jan, & Ayse Yüce , 1999)	U.K., Germany, the Netherlands, U.S.	1990-1994	Daily returns	Vector error correction model		U.S. influenced the European stock markets in both the long and short run. Securities exchanges in Europe indicated solid connections.
(Phylaktis, K & F. Ravazzolo, Stock prices and exchange rate dynamics", 2000)						Focused on the financial market of the Pacific Basin. Their study focus was to find any relationships between exchange rate dimensions and their effects on the stock prices. They found no relationship between the two factors in the background of Singapore and Hong Kong stock markets during the 1980s. However, recent research conducted with co-integration tools confirms the absence of any integration or segmentation model in relation to a fixed period. They conclude that such effects keep varying over different periods.
(Bilson, V, & M, 2000)	Malaysia, Philippines, Taiwan, South Korea, and					He remarks that integration is faster among the stock markets of these nations than the integration in the global market.

	Thailand stock markets				
(Roca, E & E. Selvanathan, 2001)	Stock markets of the Far Eastern countries of Taiwan, Singapore, Hong Kong and Australia	1975-1995	Weekly data.	Co-integration, Granger-causality, variance decomposition and impulse response analyses	No relationship of the stock market is evident. Roca and Selvanathan (2001) draw this conclusion about both long and short durations of time.
(Galati & Kostas , 2001)	Belgium, France, Finland, Germany, Italy, Ireland, the Netherlands, Portugal, Spain	1990-2000	Monthly returns	Monthly cross sectional regression	The impact of sectorial consequences for value costs expanded and national elements remained stable.
(Chen, Firth, & Rui, 2002)	The study uses information from six stock exchanges in the Latin American region, namely, Argentina, Brazil, Chile, Colombia, Mexico and Venezuela.	February 1995 to June 2000	The daily closing values of the stock indices were taken for the analysis	Error correction vector, autoregression VAR and cointegration analysis has been used in this case.	The prices and the dependencies of the process can be explained on the basis of one cointegration vector. The sensitivity tests indicate that the results are robust and are impacted by the currency being converted to US dollars and dividing the sample into the periods before and after the Asian financial crisis in 1997-8 (Russian financial crisis also took place during the same period).
(Schich, 2002)	UK, Germany, France,	1973-2001	Daily returns	Multivariate extreme value theory (MEVT) and	Conditions between European value markets reinforced. Negative returns were transmitted more frequently than

	Netherlands, and Italy			Spectral measure	positive ones. What's more, conditions were symmetric.
(Adam, Jappelli, Menichini, & Padula, 2002)	EU-15	1994-2001	Monthly returns	Return correlation analysis	In 1999 association around the stock exchanges expanded extensively; however it diminished by 2001.
(Adler & Qi, Mexico's Integration into the North American Capital Market, 2003)	Mexican domestic stock market and North-American international stock market	January 1991 to February 2002	weekly closing stock prices	The Capital Assets pricing model which is a combination of domestic and international versions	Their study included the generalization of the Bekaert and Harvey (1995) model for studying exchange risk. Their findings revealed the partially integrated inclusion of Mexico's stock market into the stock market of North America. They concluded that the domestic market of Mexico showed important risk sources in the domestic market, which were different in time proportion to the risk sources of the international market in terms of currency. Thus, their study highlighted the difference between common and specific markets.
(Barari, June 2003)	Six Latin American stock markets, namely, Argentina, Brazil, Chile,	1988-2001	S&P monthly stock price index	A time-varying integration score analysis	The purpose of this study was to compare domestic and global stock market integration and showed different results.

	Colombia, Mexico, and Venezuela.				He concludes that, based on the empirical evidence of his research, international markets in the recent past have shown a higher rate of integration than the integration on the regional level has.
(Voronkova, 2004)	Czech Republic, Hungary, Poland, U.K., France, Germany, U.S.	1993-2002	Daily prices	Gregory-Hansen methodology	Rising CEE markets have ended up progressively integrated with the world markets.
(Hatemi-J A. R., 2004)	China, Hong Kong , Singapore, and Taiwan	1993- 2001	Daily MSCI price index	Toda and Yamamoto (1995) causality test model.	The analysis has yielded that during the period under study and while going through the Asian crisis, Singapore was the sole regional influence on the financial markets of Taiwan and Hong Kong. At the same time, it is also thought that basically it was the influence of the USA which was communicated through Singapore. The reason is that, in the USA, Granger became the cause of Singapore's position. However, after the crisis, the financial markets within China became interdependent. Another outcome of the same era is that Taiwan and Singapore gained significant

					influence over the other financial markets in the region. Singapore received effects from China. Therefore, it is assumed that, due to the increased dependence of Chinese markets on each other, they could not exercise much diversification and could not attract the financial markets to any great degree.
(Hatemi-J A. R., 2004)	Australia ,UK, Germany and France	1988 to 2001	weekly data from MSCI	Toda–Yamamoto causality test based on bootstrap simulation techniques	Reported that securities exchanges are segmented
(Baele, 2005)	Austria, Belgium, France, Germany, Ireland, Italy, The Netherlands, Spain, Denmark, Sweden, Norway, Switzerland, the U.K., US, EU	1980-2001	Weekly returns	A Regime - Switching Volatility Spillover Model	EU and U.S. sudden overflow power expanded over the 1980s and '90s. Exchange integration, value market improvement and low swelling help the increment in the EU shock overflow force. Effects shown from the U.S market to various neighborhood European value markets.
(Cappiello, Gérard, & Simone, 2005b)	Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Poland, Slovenia	1993-2004	Daily returns	"Co-movement box" methodology and variance decomposition approach	Build in co-movement around the new EU states. Markets with bigger volume more integrated than little markets.

(Lucey & Voronkova, 2005)	The study is focused on countries that include EMU nations, the UK, USA, Japan, Hungary, Czech Republic as well as Poland and Russia.	End of December 1994 to October 14 of 2004	The MSCI indices tracked on a daily basis	The multivariate and conventional co-integration tests, Gregory-Hansen co-integration tests, nonparametric Co-integration test as well as DCC-GARCH Approach were used in this case.	The role of the European markets are prominent when considering the role of the markets when it comes to displaying a common trend and the United States and United Kingdom have less influence in this context.
(Chelley-Steeley & Patricia, Modeling equity market integration using smooth transition analysis: A study of Eastern European stock markets, 2005)	Poland, Hungary, Czech Republic, Russia	1994-1999	Daily returns	Vector autoregressive process (VAR) and smooth transition analysis	Eastern European stock exchanges demonstrated a high level of segmentation However, Hungary's and Poland's level of integration somewhat expanded.
(Egert & EvzenKocenda, 2005)	Hungary, Czech Republic, Poland, Germany, UK, France	2003-2005	Daily returns	Granger causality test and VAR estimation	A co-integration relationship between the dissected CEE markets did not exist. Transient overflow impacts regarding stock returns and stock value unpredictability. Overflow impacts from both the Western markets to the CEE stock exchanges and from the other side

(Schotman, Peter C, & Anna Zalewska, 2005)	Czech Republic, Hungary, Poland, Germany, U.K., U.S.	1994-2004	Daily returns	Time-varying parameter regression model	CEE value markets demonstrated diverse linkages with the Western markets.
(Hammoudeh, S & Choi, K, 2006)	Five GCC stock markets with the WTI oil spot prices, the US 3-months Treasury bill rate, and the S&P Index	February 15, 1994 to December 28, 2004	weekly data	Co-integration tests	They found that stock exchanges are integrated.
(Syriopoulos T. , 2007)	The study is focused on emerging central European stock exchanges (Czech Republic, Poland, Hungary and Slovakia) and developed exchanges (Germany and United States)	1997-2002	The stock market indices closing value at closing for each week.	The method that is used for analysis is to identify the co-integration of the variable.	The Central European stock exchanges indicate they have a close relationship with the developed European stock exchanges. It was identified that there is evidence for a single co-integration vector to be in place both before and after the EMU period. The United States markets play the role of the leading influencing factor of the markets globally. The stock exchanges did not display any significant EMU related shock after EMU was developed.
(Valadkhani, A & Chancharat, S, 2008)	The study looks into the cases associated with Thailand and the most important	December 1987 to December 2005	The stock exchange price indices selected on	Given that there are no structural breaks in the data, the two step procedure of Engle-	The empirical outcomes associated with the two co-integration tests show the fact that long term benefits are

	trading partners of the country. They are Australia, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, the UK and the USA.		a monthly closing price basis.	Granger is used and, further, the Gregory and Hansen test is used, which allows for one structural break in consideration.	attached if the diversification of the investment portfolios consists in shares from different global markets and this reduce the systematic risk attached to the countries. Three of the single directional Granger causalities run on the pairing of the Philippines, Hong Kong and UK to Thailand. Moreover, another two unidirectional stock returns run from the side of Thailand towards Indonesia and United States. There is evidence to show bi-directional Granger causality as well. The outcomes eventually indicate that the stock returns generated by Thailand and Malaysia, Singapore and Taiwan are interrelated.
(Hong, Y, Tu, J, & Zhou, G, 2007) and (Alvarez-Ramirez, Rodriguez, & Echeve, 2009)					They show that when cross-correlation between stock markets is asymmetric, it is still basic practice to test for financial market integration through causality testing without considering the likelihood that financial markets may respond distinctively to terrible news contrasted with uplifting news.

(Zhang, 2009),	The markets in consideration here are mainly Asian markets including those of Mainland China, Hong Kong, Japan and Singapore as well as the United States.	The period from 1991 to 2007	Daily closing index of the stock exchanges in consideration.	The tests carried out include correlation analysis, the co-integration test, VDC, IRF and Unit root (ADF and PP) test.	The impact of the US markets is clearly visible on the Asian stock exchanges apart from the mainland China. The integration of the stock exchanges in Asia has increased during the Asian financial crisis.
(Mukherjee& Mishra, 2010)	The focus is on India and another 12 Asian stock exchanges	The period covered is November 1997 to April 2008	Daily prices an opening and closing basis	The GARCH model and correlation	The returns spillover generated by the intraday trading in a bi-directional and simultaneous manner was present between India and some of its prominent Asian counterparts. Thailand, Korea, Singapore, as well as Hong Kong, remain the main providers of information to India and the stock exchanges of nearby Pakistan and Sri Lanka were strongly influenced by the market movements of the Indian stock exchange.
(Arouri, Mohamed El Hedi, & Fredjj, 2010)	Philippines and Mexico	1988-2008	monthly stock price indices	nonlinear co-integration tests	Mexico shows the higher integration level of the two. These researchers also explore the level of integration in these countries, both in the long and the short term, and conclude that both of the above-mentioned

					markets are asymmetric, non-linearly integrated and time varying.
(Kenourgios, D & Samitas, A, 2011)	United States and five emerging stock markets, namely, Turkey, Serbia, Romania, Bulgaria and Croatia. European stock exchanges - developed markets including the UK, Greece and Germany	2000–2009	Daily closing prices of the stocks of all the stock exchanges that are mentioned on a daily basis applicable to the period in consideration.	Johansen and Gregory–Hansen co-integration tests as well as Monte Carlo simulation in a global context. AG-DCC GARCH model	The outcomes of the research show that there are a number of internal as well as external factors that impact the Balkan stock exchanges when the long run equilibrium is taken into consideration. The external impact can be attributed primarily to the growth of the exposure of the Balkan markets as more capital flows from foreign markets. This is primarily due to market liberalization, links with the other EU markets and growing foreign ownership as well as the nature of the trading behaviors indicated by the institutional investors during the period 2008-09. The long-term links between the Balkan and other global markets indicate that these markets are highly integrated with the global markets and seeking to diversify internationally is not likely to provide positive results in these contexts.

(Syriopoulos T. , 2011)	The markets involved in the study are developed markets of the US and Germany while a set of Balkan and emerging markets such as Bulgaria, Croatia, Cyprus, Greece, Romania and Turkey are included in the study.	2001-2007	The closing main stock index details associated with the selected markets	For the purpose of investigating the integration of the financial markets, several techniques such as the error-correction vector autoregressive model, integration vectors and causality models are taken into consideration.	The study identifies the role of two co-integration vectors from the outcomes. This indicates that there is a consistent and long run relationship in place. The internal as well as external factors impact on the returns of the stock exchanges and this leads to a long-run equilibrium.
(Hatemi-J A. , Is the UAE stock market integrated with the USA stock market? New evidence from asymmetric causality testing, 2012)	U.S. , UAE	2005 - 2011	Weekly stock price indexes	conducting symmetric as well as asymmetric Granger

Causality tests. | The experimental outcomes dependent upon standard symmetric causality tests show that the UAE's business is segmented from the USA market. However,

when asymmetric causality tests are executed the outcomes uncover ostensibly that the UAE business is surely integrated with the USA market. These outcomes show, likewise, that the level of integration is stronger when the business is going down rather than when it is going up. |

(Claus & Lucey, 2012)	Ten Asian Pacific states: :Australia, Hong Kong, India, Japan, South Korea, Malaysia, New Zealand, Singapore, Taiwan, and Thailand	April to May 2006	daily data	Discount factors	The results of an integration study appear to be mixed. This can be attributed to the fact that Asia Pacific stock markets generally show a low integration capacity, while all ten economies show different levels of segmentation

4.3 Econometric Data and Empirical Analysis of the Relationship between the UAE Financial Market and the Global Financial Market

In this section, our aim is to evaluate the causal relationship and the integration between the UAE financial market and the global financial market; we describe in this section the procedures that were followed in implementing this methodology.

I. Methodology

We are compelled to use a methodology which can overcome issues associated with autoregressive conditional heteroscedasticity (ARCH), non-normality and non-stationarity because the data set tends to be non-normal and non-stationary in nature. According to (Hatemi-J & Hacker, Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application, 2006), many economic and financial time series are not normally distributed.

Many previous studies on financial market integration are based on asymptotic distributions, which may not be accurate if the data are not normally distributed. In this scenario, we believe that the leveraged bootstrap approach, which is developed by Hacker and Hatemi-J is an appropriate methodology.

This method is robust towards ARCH effects and non-normal distribution. Furthermore, it may be necessary to determine the multivariate ARCH effects and this is achieved by applying a test which was developed by (Hacker, R.S & Hatemi-J, A, A test for multivariate ARCH effects, 2005). We also identify the need to perform symmetric and asymmetric causality tests based on the leverage bootstrap approach.

These tests are developed by (Hatemi-J & Hacker, Tests for causality between

integrated variables using asymptotic and bootstrap distributions: theory and application, 2006) and (Hatemi-J A. , Is the UAE stock market integrated with the USA stock market? New evidence from asymmetric causality testing, 2012). The importance of this asymmetric approach is highlighted by the fact that investors can react more intensely to negative changes in the markets than to positive changes.

J. Tools

In this scenario, statistical analysis software was used for carrying out asymmetric and symmetric causality tests. (Hatemi-J & Hacker, HHtest: GAUSS module to implement bootstrap test for causality with leverage adjustments. Statistical Software Components G00005, 2009);(Hatemi-J A. , ACTest: GAUSS Module to Apply Asymmetric Causality Tests. Statistical Software Components G00012, 2011) write the software in GAUSS. In additions, these codes endogenously determine the optimal lag order in the VAR model. This is the case when bootstrap simulations are conducted for both symmetric and asymmetric causality tests. This in turn can increase the accuracy of the statistical inferences.

K. Data

The data were collected from the UAE Securities and Commodities Authority; the main features of the data include the stock price indices related to the UAE Financial Market Index (UAEX), while Morgan Stanley Capital International (MSCI) is used for the Global Market Index (GLOBX). For UAEX, and GLOBX, the weekly closing prices indexes for a total set of 468 observations are used which are related to the period between 14th January2005 and 27th December, 2013.

L. Non-Stationarity and Testing For Unit Roots

As mentioned in the previous chapter. It is important to test for unit roots in order to avoid spurious empirical findings. The unit root test proposed by (Perron, 1989) was performed on the UAEX weekly closing prices and GLOBX data outcomes. The estimation results from the unit root test on the data are shown in Table 4.2.

Table 4.2: Unit Root Test Results

Variable	Hypothesis	P- Values
UAEX	H_0: $I(1)$, H_1: $I(0)$	-1.47 (Prob. = 0.547)
	H_0: $I(2)$, H_1: $I(1)$	-17.25 (Prob. = 0.000)
GLOBX	H_0: $I(1)$, H_1: $I(0)$	-1.64 (Prob. = 0.462)
	H_0: $I(2)$, H_1: $I(1)$	-22.08 (Prob. = 0.000)

Based on the test results that are presented in Table 4.2, we can conclude that the null hypothesis of one unit root cannot be rejected for each time series. However, the null hypothesis of two unit roots can be rejected for each case. Thus, each variable appears to have only one unit root. This means that we need to take into account the effect of one unit root when tests for causality are implemented. Following the recommendations of Toda-Yamamoto, an unrestricted additional lag is included in the VAR model in order to account for the existence of the unit root.

M. Test for Normality

The analysis was based on the Jarque-Bera test, which relies on residual normality of the variables. The 3rd and the 4th outcomes of the residual moments were used in the comparative analysis which was received from the normal distribution. When the multivariate test is used, it is necessary that a factorization associated with

k residuals and the related elements remains orthogonal to the others.

In case k x k the factorization matrix is represented by p:

$$v_t = Pu_t \sim N(0, I_k) \tag{1}$$

And u_t represents the demeaned residuals.

In the 3rd and the 4th outcomes related vectors are defined by $m_3 = \sum_t v_t^3/T$ and $m_4 = \sum_t v_t^4/T$; the outcomes

$$\sqrt{T} \begin{bmatrix} m_3 \\ m_4 - 3 \end{bmatrix} \rightarrow N \left(0, \begin{bmatrix} 6I_k & 0 \\ 0 & 24I_k \end{bmatrix} \right) \tag{2}$$

When the normal distribution has been observed for formulating the null hypothesis, the factors are observed to be independent of each other. This creates room for the formulation of the χ^2 statistic using the addition of the squares of moments associated with the 3rd and 4th vectors.

Factorization matrix P is selected based on the EViews:

- The lower triangular Cholesky factor is not directly driven in a proportional level when P is taken into consideration when the residual covariance matrix is taken into consideration (Cholesky in Lütkepohl, 1991). The VAR analysis related statistical variables were used to derive the outcomes of the analysis.
- Based on (Doornik & Hansen, 1994), the Opposite Square Root associated with the Residual Correlation Matrix can be indicated as follows:

$$P = H \Lambda^{-1/2} H' V$$

As,

Λ = diagonal matrix

It is identified as holding the eigenvalues associated with the residual correlation matrix on the diagonal.

H = matrix

The pillars associated are eigenvectors which are equivalent,

V = diagonal matrix

It is considered to be the opposite square root of residual variances when the diagonal is taken into consideration. The above discussion highlights the fact that P is one of the critical components of the opposite square root derived on the basis of the residual correlation matrix. When we consider the ordering as well as the VAR-related variable scale, the test related outcomes do not change. The view of (Doornik & Hansen, 1994) is that the calculation and display in this context indicate a minor sample correction attached to the transformed residuals v_t; this is before the statistical execution process.

The following indicates the reporting model based on the sack of joints tests;

$$\lambda_3 = Tm_3' \, m_3/6 \rightarrow \chi^2(k)$$

$$\lambda_4 = T(m_4 - 3)'(m_4 - 3)/24 \rightarrow \chi^2(k)$$

$$\lambda = \lambda_3 + \lambda_4 \rightarrow \chi^2(2k)$$

However, in the context of Urzua's (1997) test, the 3rd and the 4th moment related sum squares were used in the pure form in λ and this will capture the related sum of the squares of all the movements. In this case, the λ distribution is asymptotical while $k(k + 1)(k + 2)(k + 7)/24$ with χ^2 indicates the degree of freedom.

(Doornik & Hansen, 2008) is used for testing the multivariate normality of the data under study. The results of these multivariate diagnostic tests presented in Table 4.3, indicate that the null hypothesis of multivariate normality is strongly rejected for UAEX and GLOBX (*p-value* = <0.0000).

N. ARCH Effects

Before testing the symmetric and asymmetric causality relationship between the two variables under study, we tested for multivariate ARCH effects using Hacker and (Hatemi –J, 2005), as discussed in Chapter 3, above. The results are presented in Table 4.3. It is evident from the results that the null hypothesis of no ARCH effects should be strongly rejected for each variable.

Table 4.3: Results of the Multivariate Diagnostic Test

Variables	Multivariate normality	Multivariate ARCH
$GLOBX \not\Rightarrow UAEX$	<0.0000	<0.036000
$GLOBX^+ \not\Rightarrow UAEX^+$	<0.0000	<0.0000
$GLOBX^- \neq UAEX^-$	<0.0000	<0.0000

We also calculate the descriptive statistics for the returns of each market. The results are presented in Table 4.4. As can be seen in the table, both return series appear to have similar statistical properties. The skewness is negative and significant, implying a possible leverage effect in the data. The excess kurtosis is positive and significant, indicating fat-tails. The standard deviation of returns of GLOBX is less than the returns of UAEX, which means that the UAE's financial market is likely to be more volatile than the Global Financial Market.

Table 4.4: Descriptive Statistics

Variable	Returns of UAEX	Returns of GLOBX
Mean	0.0173	0.0259
Median	0.0737	0.1620
Maximum	5.3491	5.6260
Minimum	-9.3772	-10.5446
Std. Dev.	1.4420	1.2496
Skewness	-1.3443	-1.4775
Kurtosis	11.2975	15.4912
Observations	467	467

We also plotted weekly closing indices and returns for both UAEX and GLOBX over the whole study period from the 14th January 2005 to 27th December 2013, as shown in Figure 9, Figure 10 and Figure 11. The plots show, in particular, strong evidence of time-varying volatility clustering.

Figure 9: UAE Financial Market Weekly Index (UAEX) & Global Financial
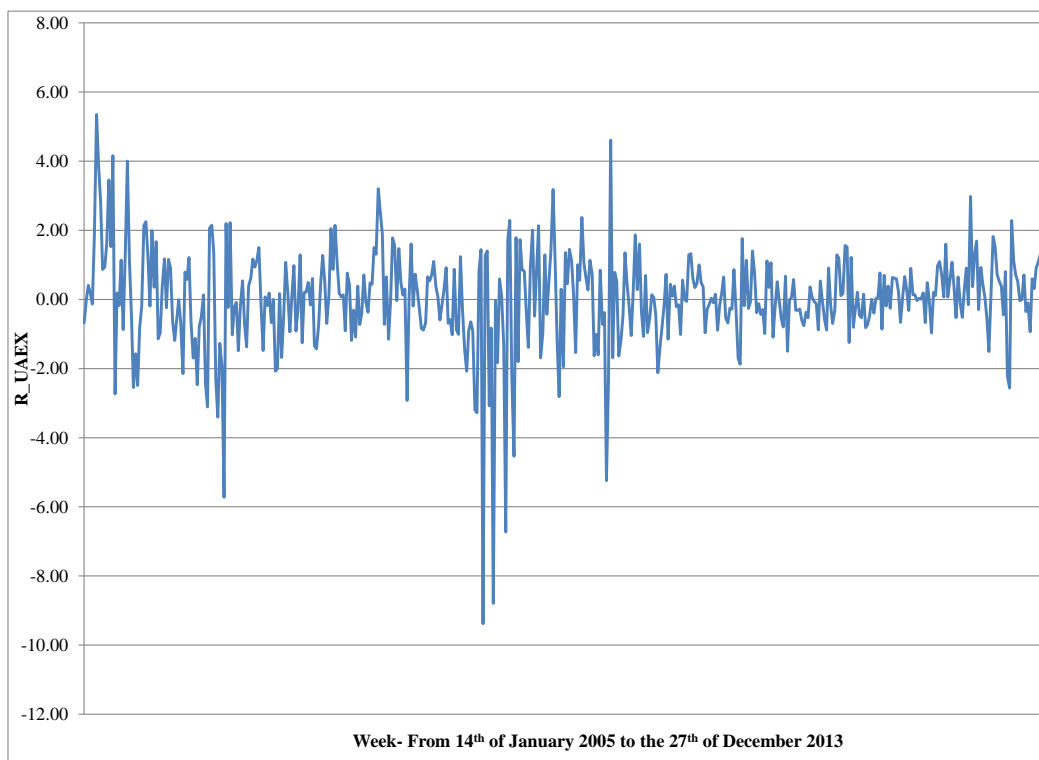
Figure 10: UAE Financial Market Weekly Returns (R_UAEX)
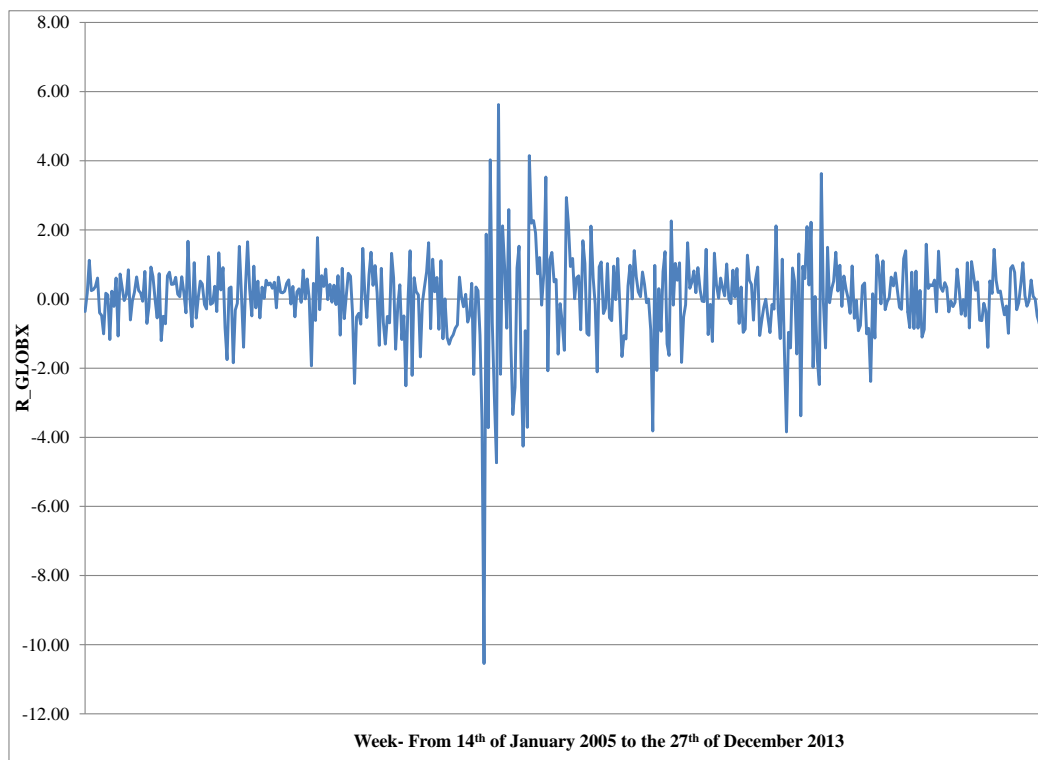
Figure 11: Global Financial Market Weekly Returns (R_GLOBX)

O. Causality Tests

We test for causality, using the Granger definition. This test is described above in the previous chapter. The identification of Granger causality relationships between the UAE and global financial markets would indicate whether the UAE financial markets are integrated into the global financial market. Symmetric and asymmetric causality tests can be performed between these two variables, using the leverage bootstrap method; the test procedures are based on the methods described in Hacker and (Jawadi, F & Arouri, M.E.H, 2008); (Hatemi-J, 2006) and (Hatemi-J A. , 2012).

We are interested in separating the causal impact of the positive shocks from those of the negative ones. This is achieved by implementing the asymmetric causality test suggested by (Hatemi-J A. , 2012). In the scenario of the financial markets, it is

important to separate the positive changes from the negative changes, because investors tend to reach more intensively towards the negative changes than towards the positive changes.

The initial requirement is to establish the optimal lag order and in this context the use of one lag is appropriate. Minimizing the information-related criterion will lead to the determination of the optimal lag order *k*.

(Hatemi-J A. , 2012) has separated the stochastic disturbance terms into positive and negative changes. We have separated the positive and the negative shocks of the global financial market indices and also the UAE stock price index. If the random walk model explains the behavior of the UAE as well as the way in which the global financial market price index is formed, the task becomes easier. The positive error that is related to Equations 10 and 11 in Chapter 3 are represented by (ε_{yt}) and (ε_{xt}).

The study establishes the results associated with the positive direction of the causality and was followed by tests that would establish the relationships between the positive cumulative changes. The causal relationships associated with the two negative variables, focusing on cumulative negative changes were applied. Based on the views of (Hatemi-J A. , 2012), in the case of $y_t^+ = (y_{1t}^+, y_{2t}^+)$, the order p, which is related to the vector autoregressive (VAR) model could be used for the purpose of causality testing.

$$y_t^+ = v + A_1 y_{t-1}^+ + \cdots + A_p y_{t-1}^+ + u_t^+ \qquad (3)$$

The testing of the null hypothesis could be carried out after the determination of the optimal lag order, provided that the kth element attached to y_t^+ and the ωth

element associated with y_t^+ would not Granger cause.

H0: it can be stated that *Ar = 0; r = 1,..., p*; column *k* and the row ω and this allows a reformulation of the matrix as shown below:.

$$Y = (y_t^+, \ldots, y_T^+)(n \times T) \tag{4}$$

$$D = \left(v, A_1, \ldots, A_p\right)\left(n \times (1 + np)\right) \tag{5}$$

$$Z_t = \begin{bmatrix} 1 \\ y_t^+ \\ y_{t-1}^+ \\ \cdot \\ \cdot \\ \cdot \\ y_{t-p+1}^+ \end{bmatrix} \left((1 + np) \times 1\right), for\ t = 1, \ldots, T \tag{6}$$

$$Z = (Z_0, \ldots, Z_{T-1})\left((1 + np) \times T\right), \text{and} \tag{7}$$

$$\delta = (u + 1, .., u + T)\ (n \times T) \tag{8}$$

Hatemi-J developed the Granger causality test procedures associated with the VAR model; the Modified Wald (*MWALD*) test related statistics are attached to these outcomes. The $\delta_i = 0$ or $\phi_i = 0$ shows the non-Granger causality association with the null hypothesis. The MWALD test statistics, which relate to Y and Z are as shown below:

$$MWALD = (Y\phi)'[Y\left((Z'Z)^{-1} \otimes V_U\right)Y']^{-1}(Y\phi) \sim \chi_P^2 \tag{9}$$

Through the causality tests, critical values are generated that are robust in the context of time varying volatility and non-normality; moreover, the (Hatemi-J A. , 2012) considerations on asymmetric properties, which are related to the dataset, are considered through the study.

The results obtained in the symmetric as well as the asymmetric tests are provided in the table below Table 4.5. If the Wald Test value is less than the bootstrap critical value, the null hypothesis of no causality cannot be rejected. The null hypothesis, which states that the global financial market price indices would not impact on the tendency of UAE stock prices to fluctuate, can be rejected irrespective of the significance level taken into consideration. Allowing the asymmetric properties does not impact on the outcomes of the test under consideration.

The surprising result for the symmetric causality test is that the global market affects the UAE market negatively. However, the result of the asymmetric causality tests reveals that a positive shock in the Global market causes a positive shock in the UAE market and a negative shock in the global market causes a negative shock in the UAE market. However, the causal impact of a negative shock seems to be stronger than the causal impact of a positive shock.

Table 4.5: Results of the Symmetric and Asymmetric Causality Tests

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Causal Parameter	Conclusion on H_0
$GLOBX \neq> UAEX$	9.382	5.774	4.497	14.116	-0.124	Rejected
$GLOBX^+ \neq> UAEX^+$	8.130*	5.347	4.363	7.456	0.025	Rejected
$GLOBX^- \neq> UAEX^-$	21.654	14.701	11.469	60.646	-0.041	Rejected

<u>Notes</u>

1. The term GLOBX represents the global financial price index while UAEX represents the United Arab Emirates stock market price index.

2. In order to determine the optimum lag order which is attached to the VAR model, the information criterion has been minimized.

3. At the point where the null hypothesis was tested for multivariate normality, the suggestions of (Doornik & Hansen, 2008) are used.

4. The bootstrap multivariate LM test was developed by (Hacker, R.S & Hatemi-J, A, A test for multivariate ARCH effects, 2005) for the main purpose of testing the ARCH effect. A software component was developed by (Hatemi-J & Hacker, HHtest: GAUSS module to implement bootstrap test for causality with leverage adjustments. Statistical Software Components G00005, 2009) for the purpose of bootstrap simulation; this was the one used in the present research.

5. The guidance given by (Hatemi-J, 2003) was used when the causality tests were conducted at the stage when the true lag order had to be selected.

6. When the bootstrapping simulation method is used for the purpose of generating critical value, the statistical significance levels of 1%, 5%, and 10% should be used in connection with the Gauss software.

7. (Granger & Yoon, 2002) provide references for the development of the tests which provide an understanding of the hidden co-integration and this shows the impact of the positive as well as negative outcomes in a cumulative context.

8. The denotation GLOBX $\neq>$UAEX means that the GLOBX does not Granger cause the UAEX. The denotation CV is an abbreviation for 'critical value'.

9. (Toda & Yamamoto, 1995) indicate that, for the purpose of accounting for the unit root, an extra lag has to become a part of the VAR model.

H. Conclusion

The purpose of this chapter is to evaluate the degree of integration between the UAE Financial Market and the Global Financial Market by using weekly closing price data from the UAE Financial Market Index (UAEX) and the Global Financial Market Index (GLOBX) over the period from 14th January 2005 to 27th December 2013 for a total 468 observations.

By applying ARCH analysis, we confirmed the conditional heteroscedasticity in both return series for UAE Financial Market and the Global Financial Market, and the results show high own-volatility persistence in both markets. Tests for normality also showed that the underlying data is not normally distributed. Thus, we needed to use the leveraged bootstrap method when causality tests were implemented.

We conducted symmetric and asymmetric causality tests. The symmetric causality test showed that the global market is negatively influencing the UAE market. This result is indeed surprising since a positive causal impact was expected. However, when we implemented the asymmetric causality tests we found that a positive and permanent shock in the global market resulted in a positive shock in the UAE market.

A similar result was found for negative shocks. Furthermore, we noticed according to the estimated results that a negative shock has a stronger causal impact than a positive shock has. Thus, we can conclude that the UAE financial market is not segmented from the world market, since it reacts to both positive and negative changes in the world market. UAE policy makers should however note that the reaction to falling markets is stronger than to rising markets and that they should design their policy strategies accordingly.

As a final remark, it may be mentioned that the UAE stock markets have remained greatly affected by the international capital markets. Hence, a closer integration may be observed between the domestic and foreign capital markets in the UAE. The UAE stock market is likely to receive prominence among foreign stock markets due to its important position. The result may be seen in the strong tendency now seen for investment companies to invest in the UAE stock market. It may be said with a high degree of certainty that this trend will increase in the next few years.

Chapter 5: Measuring the impact of the world real estate market crisis on the real estate market in the UAE: Evidence from the asymmetric generalized impulse response functions method

5.1. Introduction

Real estate markets have played an important role in the development of both Dubai and Abu Dhabi. Primarily, the UAE governments' distinctive policy of economic diversification has been the driving force for the development of the region. It is the oil sector which has been dominant in the economy of the UAE as it has in the whole region, in particular in the countries which have considerable reserves of this crucial resource.

It is estimated, as far as is known at present, that the UAE has the world's ninth largest energy resources (British Petroleum, Statistical Energy Review, 2012) indicating the UAE may still rely on its energy resources for decades to come. Despite this assurance, the country's marked diversification policy indicates that the UAE does not count solely on its oil stocks for its future economic performance.

This is due to the belief that it is not healthy for the economy to depend on a single product (Fernandes & Karnik, 2009). Therefore, the UAE has put forward strategies in an attempt to diversify its economy primarily in the area of real estate as well as various other areas. [1]

The integration between the real estate markets and international markets is of great importance. When the significance of the global real estate market is considered, it is evident that this topic is theoretically and practically significant.

The integrated model of real estate markets shows the international market

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[1]. Among others, tourism may be mentioned. See Hatemi-J (2015) for further details.

setting prices for real estate investments matched with the international asset pricing model. This allows the systematic risk of global market price penetrating into the local economy. This leads to the conclusion that the contagion risk which exists at the global level may on any global occurrence have a direct impact on a local real estate market. Investors and decision makers need to know about all these factors in detail because real estate markets are of prime importance to the national economy.

In recent times, the impact on the real estate market of the global financial crises has given invaluable evidence about the way in which of how real estate markets can affect the national economy. Therefore, it is very important for investors to consider all these factors if they wish to price real estate accurately. Otherwise, improper pricing is more likely to affect the local as well as the international markets. When the markets interact with each other, several other effects also emerge as by-products of the interaction.

These may include trade linkages, flow of capital, and links between banks (Glick & Rose, 1999). These effects become stronger when the basic causes of coordination between markets change. However, the influence of such incidents can exceed expectations for certain basic reasons. When the markets behave in a way that provokes a reaction then herding behavior can be seen in factors which are not basic to the coordination of markets.

In such cases, the contagion effects are the outcome of accompanying occurrences. It is of paramount importance to figure out if the spillover or co-movements between markets impacts by causing contagion since contagion, being the finding of non-fundamental factors, demonstrates the presence of market inefficiency. The effect of the globalization of stock markets has been to create more connections

and stronger relationships between them, and when they undergo financial crisis, there is a suspicion that the co-movements between markets comprise contagion impacts.

In this chapter, we explore the potential effect of the global real estate crisis on the UAE real estate market, and consider the recent global financial crisis (GFC) in our investigation. The influence of the world's real estate crisis on the worldwide market hazard for real estate markets is a key issue for financial investors, given the magnitude of the crisis and the overall effect it has made.

This chapter seeks to handle this issue with another methodology. Unlike previous studies, the current study uses the recently developed asymmetric generalized impulse response functions and variance decompositions which distinguish between positive and negative shocks. Likewise, it uses the recently created methodology which permits positive and negative innovations, and their potential asymmetric effects to be recognized.

To our knowledge, none of the existing studies of the impact of the global real estate market crisis on the real estate sector in the UAE has used this methodology to estimate the impulse responses to the underlying shocks.

The rest of the chapter is organized as follows. The following section presents an overview of the UAE real estate market. The literature review takes up Section 3. In Section 4, the methodology is discussed; while Section 5 exhibits the empirical results. Some conclusions are drawn in Section 6.

5.2. Overview of the UAE's real estate Market

The UAE authorities have been dynamically promoting the development of the country as a global hub. One of the primary requirements of such a hub is that the destination should provide sufficient accommodation for the parties who need to stay there (Hepsen & Vatansever, 2011). Dubai and Abu Dhabi have recognized this as one of the major requirements that they need to meet in order to achieve the status of a global hub. It is well known that Dubai was the first to pursue this goal, and the first to see a boom in the real estate sector (Balakrishnan, 2008). Real estate has been one of the most important growth sectors in Dubai, and one which is currently larger than the hydrocarbon economy. The following chart shows the real estate sector compared with other sectors in Dubai over the last five years. DFM Index = Dubai Financial Market (DFM) index.
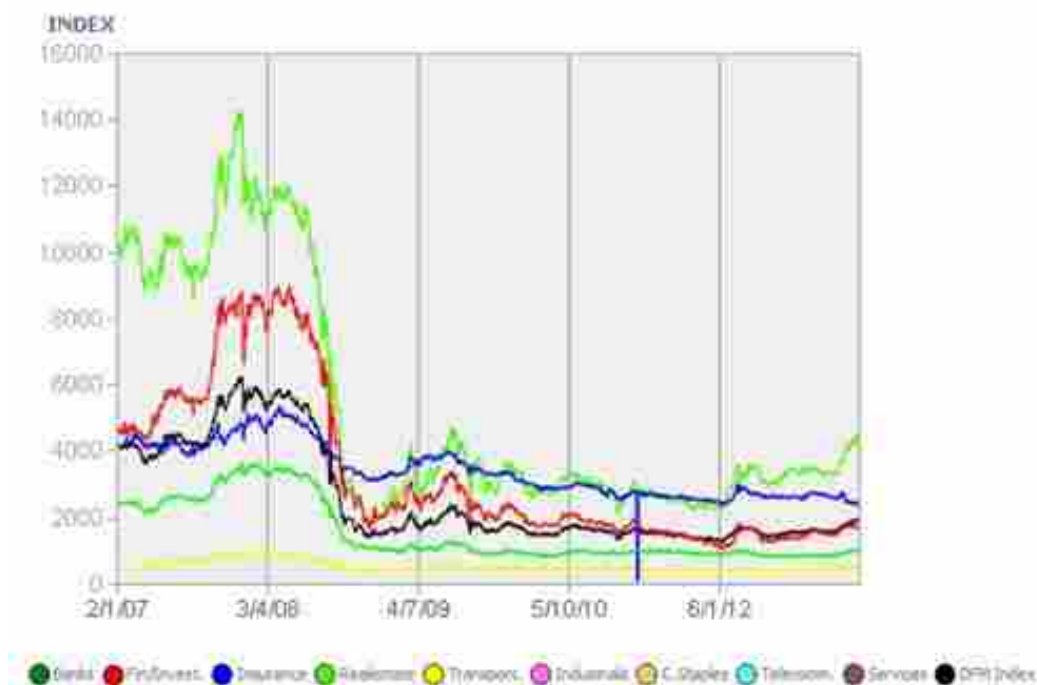

Figure 12: The sector indices of the Dubai Financial Market, (Source: the Dubai Financial Market, 2013)

It is worth noting that before the global recession the UAE real estate sector was performing well above its current level. However, this changed drastically after the recession: due to the problems that the sector underwent, a steep decline in performance was observed during the period 2008-2009. The result was that the sector's contribution to the economy reduced considerably. In fact, real estate contracted by 1.6% in 2009, the first contraction experienced up to this time.

The growth rebound was also very slow, and in 2010 was almost flat (Global Research, 2011). The sector suffered most in Dubai precisely because it had become by then the most important part of Dubai's economy, and its decline created considerable impact on the economy (Hepsen & Vatansever, 2011). The sector underperformed due to the drying up of funding from foreign sources. There had been considerable foreign investment in the sector because of the various concessions offered to foreign investors. With this loss of funding, the sector found it very hard to recover from the difficulties that surrounded it.

The declining performance of the sector is evident when the indices are examined. However, with the growth of the economy over time, the sector has returned to gradual growth (Global Research, 2011). It was expected that after the first half of 2012 the sector's demand and supply conditions would balance, and the real estate growth would be restored.

Unlike many other sectors, the real estate sector has been slow to recover. This is because the region has seen an oversupply of space while rents continue to decline, regardless of the fact that regional economies are seeing some growth (Global Research, 2011). It is evident that growth is only likely to return to this sector after the economies have accelerated to the level where demand for space exceeds the supply

in the market.

(Zawya, 2012) estimates that this is slowly ensuing and that the demand for real estate properties in the region is gradually growing. It is likely that rents will recover during the period, and that the eventual outcome in this regard will be renewed growth in the market, with the sector set to grow during 2013 followed by a considerable period of stagnation.

Amidst these hopes of growth, Dubai's real estate markets have shown clear signs of recovery (Global Research, 2011). From the second half of 2012 the sector recorded gradual growth, and into 2013, its performance has clearly outdone the performance of the other market sectors. This indicates that real estate is gradually recovering and will soon be the major growth sector of the region, attracting the required investments, and reflecting the changes taking place in the regional economy.

The growth of the real-estate sector is not limited to Dubai, for there are clear signs that growth is also taking place in Abu Dhabi. However, unlike Dubai, Abu Dhabi did not experience so great an effect from the non-performance of real estate since it was not a main player there before the recession. This is because the region at this point was only gradually developing, and the real estate sector was just opening its doors to investment. The relevant indices of the Abu Dhabi Stock Exchange are as follows:

Figure 13: The sector performance of the Abu Dhabi Stock Exchange

ADI = Abu Dhabi General Index

ADTL = Abu Dhabi Telecommunications Index

ADBF = Abu Dhabi Banking and Finance Index

ADCT = Abu Dhabi Consumer Staples Index

ADEG = Abu Dhabi Energy Index

ADRE= Abu Dhabi Real Estate Index

The above chart indicates clearly that before the recession the real estate sector was underperforming in Abu Dhabi. This was because the growth of this market was not seen as a necessary mechanism for the economic development of the region, which as a whole is entirely dependent on the hydrocarbon economy. Thus, the region functioned as a beacon leading the UAE out of recession, and maintained a better economic performance than all the other regions.

However, the real estate sector in Abu Dhabi is currently growing fast, due to the government's '2030 Vision', which states that Abu Dhabi will develop to become an international hub. This implies that the growth of the region will continue, and that growth similar to Dubai's is likely to occur in Abu Dhabi (LaSalle, 2012a). Naturally, these visions and aspirations are playing a major role in the growth and the performance of this sector.

It is clear, given the clear plan for the region's economic development, which considerable foreign investments as well as local investment are flowing into the region. This indicates that the growth of the real estate sector will continue there and is likely to become one of the primary sectors of the Abu Dhabi region, just as it did in Dubai (Abu Dhabi Vision 2030, 2007).

Another interesting aspect is that the sector is consolidating at the same time as growth is announced, which is a very unusual development for the region. However, the drive behind the consolidation is to create a company as powerful as Emaar to drive the real estate sector in the region. The recent upward trend in stock prices is driven by the approach of consolidation in the region. In view of the above facts, it is clear that Abu Dhabi will see a performance in the sector similar to Dubai's. However, the investors should identify the nature of the hike and make sure that the growth is in line with the needs of the region (Hepsen & Vatansever, 2011).

If a bubble is created by the growth, the eventual result will be detrimental for the sector as well as for the general performance credibility of the financial markets in the region (Lind, 2009). The markets must ensure that they have the necessary mechanisms in place to counter any kind of threat caused by the creation of bubbles.

It is evident that in the case of the Abu Dhabi Stock Exchange (ADX), as in that of the Dubai Financial Market (DFM), the real estate sector is the most prominent sector in the current context. The sector can probably be impacted considerably by considerations of a future global recession. However, the cautious development approach taken by both the regions means that even if such a problem persists, the companies are likely to be able to continue performing at the current level (Global Research, 2011).

Currently, the Abu Dhabi and the Dubai markets are seeing growth at a time when the economy of the developed world is not doing well. This indicates that the growth of the sector could be sustainable in the future and that the region will continue to thrive, regardless of the changes taking place in other regions.

The real estate sector in the country will continue to grow and the UAE will become an international hub for the real estate sector in the near future. This will allow the country to diversify its economy before long. This diversification will contribute to the growth of the financial markets, and is likely to be one of the driving forces behind them (RAO, Analysis of volatility persistence in Middle East emerging equity markets, 2008).

The role of real estate is growing in the UAE because all the real estate demand factors such as population, the economy, and new investments are growing. It is surprising that the research finds considerable detachment between the UAE and the global real estate markets. However, many factors differentiate the UAE real estate markets from those of other countries, and these contribute to the increased level of detachment affecting the UAE real estate sector.

5.2.1 Is UAE economic growth always driven by global growth driver?

The UAE is a well-diversified nation, with stable economic policies, and has the ninth largest oil reserves in the world (British Petroleum, Statistical Energy Review, 2014). While global economic growth could affect the growth of the country, the strong fundamentals in place in the UAE keep the economy resilient and create minimal effect in the long term. This allows investors to see the UAE as a safe location for investment in times of slow growth in other parts of the world.
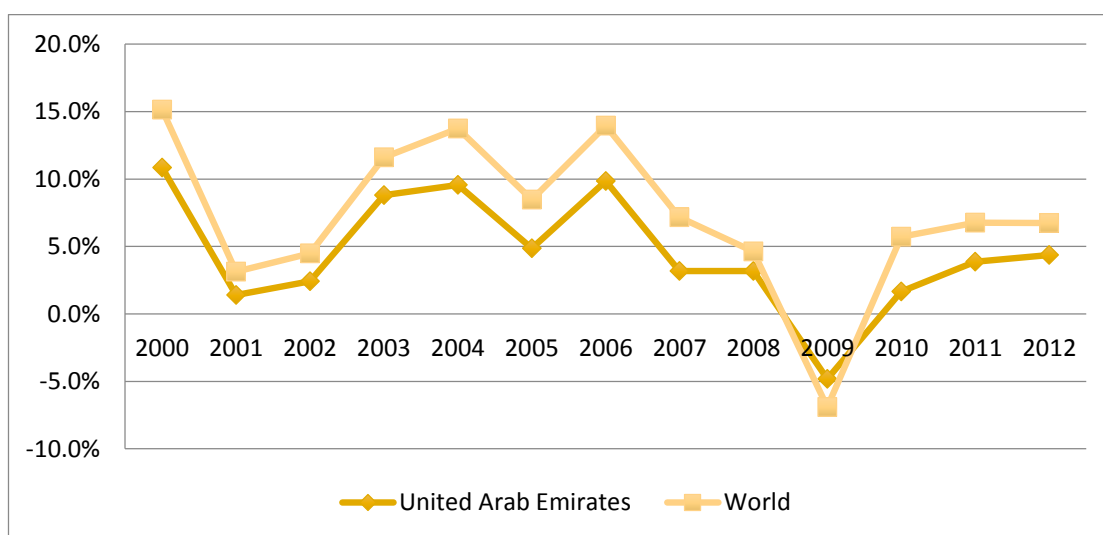
Figure 14: Economic Growth in the UAE compared to the World

Thus, investments are growing in the UAE driven by the timing of the recession in Europe and slow growth in the rest of the world. The UAE economy grew by 4% in 2013 compared with negligible growth in the developed markets (Gulf News, 2014).

5.2.2 Continuing high stake of the government sector

With the increase of the global energy prices, the UAE government has seen a buildup of reserves and has invested funds in various projects, including real estate developments. As a result, the involvement and the degree of guidance of the state

sector in the UAE real estate sector are high, and this has partially protected the sector from the changes in other nations' financial scenarios. This is acknowledged as another important differentiator for the industry.

5.2.3 Regulation of demand and supply issues

The country in 1999 saw an oversupply scenario regarding real estate in 2009, and the global recession negatively affected the sector. However, while the supply is continuing to increase, the demand is increasing significantly faster; hence, the sector has been able to strengthen its fundamentals. This is another reason why the real estate sector in the UAE has not suffered the global meltdown of other real estate sectors in recent years. While Abu Dhabi growth is still mild, (Lang Lasalle, 2014) believes that the demand continues to grow in Dubai. The supply stock of real estate in Abu Dhabi and Dubai is illustrated in Figures 15 and 16.
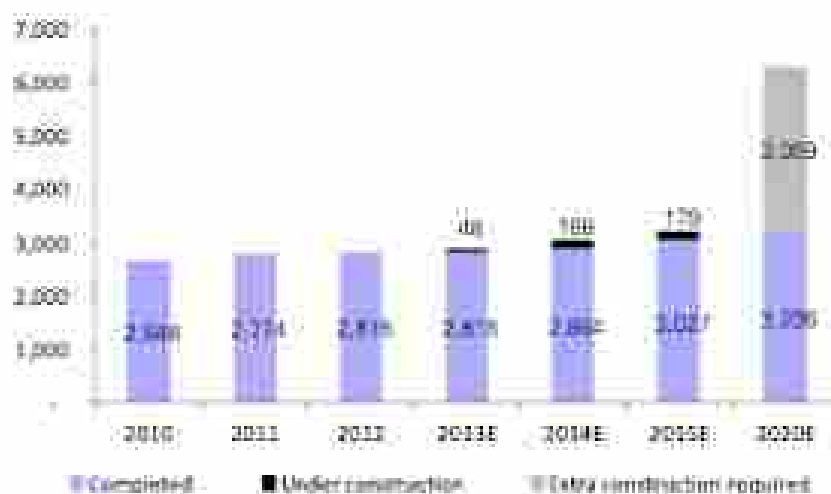
Figure 15: Real estate growth trend in Dubai

Figure 16: Real estate growth trend in Abu Dhabi

5.2.4 The major role in future growth played by Expo in Dubai

Expo 2020 is expected to attract a visitor base of over 25 million in 2020 compared with 10 million visitors in 2013. This indicates a massive growth and the investments are estimated to be around USD 43bn for the upgrading of the facilities in line with the requirements (Deutsche Bank, 2013). This further differentiates the real estate sector of UAE from the global sector and ensures that demand will continue to grow regardless of the global conditions.

5.2.5 The contribution to high growth of the demand from the expatriate population

Out of the total residential population of the UAE, it is estimated that over 80% are expatriates (CIA Factbook, 2014). This indicates that the UAE locals are small in number. This very large expatriate community increases the demand for residential and commercial properties. It is important to note that in 2013 the growth of the population was 5%, and this may accelerate with the continuous growth of the economy (Deutsche Bank, 2013). This also differentiates the real estate demand trends from global real estate trends.

5.3 Brief literature review

5.3.1 Definition and meaning of contagion

It is common knowledge in investment science that risk can be reduced by engaging in diversification. This is why investors regularly put resources into distinctive sorts of benefit in diverse nations in order to reduce risk. However, during financial crises, the financial markets of two countries often show the same characteristics, i.e. they either climb together or, even more frequently, move down together.

It has been observed that even the relationship between various types of asset market may also intensify. This lessens the chance of diversification and makes it unable to give the perceived benefits to investors. In the financial literature this sequence is termed contagion.

The (World Bank Group, 2011) provides three meanings for the term *contagion*. In its general definition, contagion is a process of conveying the turbulence of one financial market into a whole country. Contagion also wields a spillover influence throughout a whole country.

According to the restrictive definition, contagion is the process when financial market turbulence is conveyed to other countries as well. Its effects may also create a cross-country relationship. Such influences are recorded even when there is no other type of relationship between these sectors within a country or set of countries.

The very restrictive definition is the one that has been used in most of the previous studies. According to this definition, contagion is created when the cross-country relationships intensify during times of financial crisis, unlike other

relationships in stable conditions.

Theoretically, contagion is understood as the spillover impacts or co-movements between markets that are brought about by non-fundamental factors. There are various distinctive descriptions with reference to why contagion happens throughout a crisis. These illustrations for the most part identify with information cascade and herd behavior.

Information about the crisis in one market may prompt a movement in desires or supposition with respect to the prospects in different markets. This may then lead investors in these different markets to auction holdings, which accelerate a domino effect.

Theoretical models, in this manner, point to the role of a third party, for example, investors or banks, in channeling contagion. The movements of these executors during a crisis bring about a critical connection between markets, which previously had been supposed discrete.

Investors and banks in a market hit by a crisis may encounter liquidity issues and may consequently decide to exchange their investments in different markets, keeping in mind the end goal of raising the required funds. Additionally, the decline in the worth of their speculations in the markets in a crisis may lead investors to sell off their possessions in different markets to re-adjust their portfolios. In this way, investors and banks transmit the crisis from one market to another.

5.3.2 Previous studies.

The internationalization of the real estate markets has been a primary phenomenon in the context of the real estate market over the past decade. This was

chiefly driven by the development of real estate related securities that would allow the participation of investors in a global area for real estate development (Bardhan & Kroll, Globalization and the real estate industry: issues, implications and opportunities, 2007) ; (Eicholtz & Nils, 2009); (Hobbs, Chin, H, & Topintzi, 2007). This suggests that the real estate markets are well enough integrated with each other to form a global real estate market.

While this seems the case, the fact remains that real estate is not a commodity that can be treated in an international context and this affects the prospect of achieving global integration on the part of the real estate markets (Bond & Patel, The conditional distribution of real estate returns: are higher moments time varying, 2003); (Liow, The dynamics of return volatility and systematic risk in international real estate security markets, 2007) (Liow & Webb, Common factors in international securitized real estate markets., 2005). However, the securitization of real estate allows the international trading of real estate related instruments to take place, eliminating the hurdles to internationalization: the last decade saw this model being established. It has been observed that the correlation of prices between the real estate markets is low, or in other words that the prices in one market move independently of those in other markets (Bardhan, Edelstein, & Tsang, Global Financial Integration and Real Estate Security Returns, 2007).

According to (Eichholtz, Gugler, & Kok, 2009); apart from investment globalization factors, there are other factors that contribute to the globalization of the real estate markets. These include the development of transparent international standards or benchmarks in the area of real estate: internationalization in the area of providers of real estate services; capital market liberalization; reduction in the number of political barriers; and the appearance of new financial instruments, which adjust to

equalize conditions for both local and foreign real estate investors.

Further, investors might have a tendency to concentrate on their local market as opposed to a global market. But real estate markets may be tempted to open up additional incentives to welcome foreign financial investors who are retreating from other global markets.

Many studies have been conducted on real estate, and a significant number of articles has been written about international diversification in this area, which has proven advantageous because of the low correlation mentioned above. Comparisons between global real estate returns and stock exchange returns in the USA were made in various studies, including (Gordon & Canter, International Real Estate Securities: A Test of Capital Markets Integration, 1999); (Conver & Howton, 1998), (Gordon, T. Canter, & Webb J, The Effects of International Real Estate Securities on Portfolio Diversification, 1998) and (Eichholtz P. , Does International Diversification Work Better for Real Estate than for Stocks and Bonds?, 1996). The results of the studies show that investment in foreign equity is less useful than investment in the international real estate market.

A study conducted by (Eichholtz, Huisman, Koedijk, & Schuin, 1998) claims that investors in Europe and North America can attain in other countries the benefits of global property market diversification. The findings for the investors of Asia Pacific implied the opposite, because the investors were found to maximize the benefit from worldwide real estate diversification in their home countries. The basic purpose of the study conducted by (Eichholtz, Huisman, Koedijk, & Schuin, 1998) was to investigate how real estate returns vary in different continents.

(Barry & Rodriguez, 2004) found that it would be beneficial if investors

invested concurrently in foreign countries and their home country. The focus of the above research was on the developing and emerging real estate markets. In a similar study, (Idzorek, Barad & Meier, 2006) showed that investing in a diverse portfolio of real estate mitigates risk for investors. These findings were for the period from 1990 to 2005 and for North American real estate in the US. In Europe and Asia, a diverse portfolio did not seem to reduce risks.

(Kasa, 1982); (Masih & Masih, 2002), (Yang, Min, & Li, European Stock Market Integration: Does EMU Matter?, 2003), (Fraser & Oyefeso, US, UK and European Stock Market Integration, 2005) have investigated the way in which major equity markets in the world are inter-related. The studies, which focused primarily on international stock markets, discovered a single common stochastic trend, which was responsible for changes in stock prices. The studies conclude that stock markets are strongly co-related in the long term and that this result dilutes the benefits that might be attained from diversification.

(McCue & Kling, 1994); (Ling & Naranjo, 1997); (Myer, Chaudhry, & Webb, 1997) Myer, Chaudhry and Webb (1997), (Case, Goetzmann, & Rouwenhorst, K.G, 2000) and (Liow & Yang, Long Term Co-Memories and Short-Run Adjustment: Securitized Real Estate and Stock, 2005) have conducted detailed studies to determine certain macroeconomic indicators that affect the prices of public properties. After this development, researchers are now trying to study possible linkages that real estate markets may have with one another in the global framework. For this purpose, a multivariate co-integration technique is being used to determine the integration of global real estate markets in different parts of the world.

(Wilson & Okunev, Evidence of Segmentation in Domestic and International

Property Markets, 1996) find that property markets in developed countries such as the USA, the UK, and Australia are segmented. Their study suggests that investors from these countries can make beneficial investments in foreign countries. (Myer, Chaudhry & Webb, 1997) examine the stochastic properties of the real estate wealth indices of the USA, the UK, and Canada. They find that among the real estate indices of the USA, the UK, and Canada a strong co-integrating relationship exists, and there are common factors that establish a linkage between all the indices.

(Wilson & Zurbruegg, Structural Breaks, Diversification and International Real Estate Markets—Some New Evidence, 2001), however, contradict the findings of the above study. Their study, taking in Australia and Japan along with the UK and the USA, concludes that global real estate markets are related only if the structural changes are taken into account.

(Liow & Yang, Long Term Co-Memories and Short-Run Adjustment: Securitized Real Estate and Stock, 2005) study the real estate markets in Asia-Pacific economies and discover a fractional co-integration between macroeconomic factors, stock market prices, and securitized real estate prices.

(Yang, Kolari, & Zhu, European Public Real Estate Market Integration, 2005) consider the effect of the European Monetary Union (EMU) on relationships in Europe's public real estate markets. The study reveals that real estate markets in large EMU economies can integrate better with their European counterparts than can the smaller EMU economies.

The long-run and short-run relationships between real estate markets in Australia, Singapore, Hong Kong and Japan have been investigated by (Yunus & Swanson, Modeling Linkages between US and Asia-Pacific Securitized Property

Markets, 2007). The findings of their study show that investors of the USA can attain the benefits of real estate diversification on a global scale if they invest in the countries on the above list.

Since several real estate markets are still not integrated with the international stock market, global investors find it helpful, according to (Hatemi-J, Roca, & Al-Shayeb, How integrated are real estate markets with the world market? Evidence from case-wise bootstrap analysis, 2014) to use the benchmark of international real estate in place of the world stock market benchmark when they want to decide about allocating their international assets and other practices of performance measurement. Real estate is a sector which offers important opportunities to investors who wish to diversify their portfolio, because it has shown persistent growth in value over the years.

In several countries real estate is not as highly correlated with conventional assets, for example, stocks and bonds, as other investment instruments are. Real estate is also favored because of its capacity to perform as a hedge against inflation, as documented by (Hudson-Wilson, Gordon, Fabozzi, Anson, & Gilliberto, 2005); (Yunus, Increasing Convergence between U.S. and International Securitized Property Markets: Evidence Based on Cointegration Tests, 2009) and (Bond, Shaun, Maridi, & Renee, 2006), among others. One of the disadvantages of physical real estate, however, is that it is often considered "lumpy" and increasingly "illiquid". The processes involved in finalizing transactions to do with physical properties may linger protractedly, perhaps six months to a year (Hwang, 2004).

To avoid the disadvantages of investing in physical real estate, an alternative is to invest in real estate securities. (Yunus, Increasing Convergence between U.S. and International Securitized Property Markets: Evidence Based on Cointegration Tests,

2009) points out that ever since the securitization of real estate took place in the early 1960s, receiving higher emphasis during the last decade, Real Estate Investment Trusts (REITs), Real Estate Operating Companies (RECOs) and several private vehicles have appeared which provide feasible alternatives to domestic real estate ownership, which is done on a commercial basis. These have enabled more investors to invest in the real estate sector.

The advent of REITs and similar securities has been the result of demand from the institutional investors for these securities. This has in turn given rise to the securitized real estate markets. The National Association of Real Estate Investment Trusts (NAREIT) reports that there has been an increase of 170% in global market capitalization among the publicly listed property securities. The growth is from $350 billion to approximately $945 billion, covering a period of seven years, from January 2000 to March 2007. The value of real estate securities market had touched the $1 trillion mark by 2010.

In addition, there are a very few papers which have analyzed the issue of the worldwide integration of real estate markets. For example, (Liow, The dynamics of return volatility and systematic risk in international real estate security markets, 2007) researched the relevance of the international capital asset pricing model (ICAPM) in connection with the securitized real estate markets of Australia, Japan, the UK, and Europe. This study used the world stock exchange and world real estate market advertisers as proxies for the world market.

It assessed contingent and time varying betas and discovered the average betas of the markets to be less than one. The consequences of the study indicate that the world real estate market has a positive impact on the real estate markets of the Asia-

Pacific countries: Hong Kong, Singapore and Malaysia, and a negative impact on the real estate markets of Europe and the UK. It additionally inferred that the world real estate market, as contrasted with the world stock exchange, was a superior proxy for the world market.

(Ling & Naranjo, Commercial real estate return performance: a cross-country Analysis, 2002) likewise examined the securitized real estate markets while (Goetzmann, 2001) scrutinized the direct real estate markets. The discoveries of their examinations additionally demonstrate that the world market fundamentally influences individual real estate markets.

However, (Hatemi-J, Roca, & Al-Shayeb, How integrated are real estate markets with the world market? Evidence from case-wise bootstrap analysis, 2014) examined which real estate markets were integrated with the international market; they covered five international real estate markets, namely, the US, the UK, Japan, Australia and the UAE, using a case- wise bootstrap analysis, which was robust to non-normality, and to the high volatility that characterizes financial data.

Their discoveries indicate that every one of the five markets is integrated with the world market, the US and the UK markets being the most universally integrated real estate markets and the UAE being the least. Their results likewise show that the US sub-prime crisis had a different impact on individual real estate market: the US real estate market crisis made the US, Australia, and the UAE real estate markets more universally integrated, while the Japanese market moved in the reverse direction.

Further, the crisis did not influence the degree to which the UK market was integrated with the global market, whether with the world securities exchange or the world real estate market. These results imply that, in real estate calculations,

worldwide market risk should be estimated, and that universal turbulences, for example, the US sub-prime crisis, have a differential effect on diverse real estate markets. This was the first study to take into consideration the impact that the recent world financial crisis had on the markets concerned.

At the same time, in regard to contagion effects, the few studies that have been conducted to investigate the impact of contagion between real estate markets across the globe, in particular in the case of the real estate crisis in the US, have demonstrated different findings. For instance, a study conducted by (Hatemi-J & Roca, 2011) set out to identify the global implications for the crisis in the area of real estate in the UK, the USA, and Australia.

They were the first who applied the contagion test suggested by (Hatemi-J & Hacker, 2005), regarding real estate market contagion. The main conclusion of the study was that the contagion effect was not revealed in the relationships between the US real estate market and those of other countries.

(Fry, Martin, & Tang, 2008) conducted an investigation of contagion in the real estate markets of Australia, Germany, Japan, Hong Kong, the US, and the UK through the application of a contagion test, which was supposed to determine the changes at the most critical moments; however, the study failed to identify the evidence of such contagion. (Bond, Shaun, Maridi, & Renee, 2006) investigated the contagion in the real estate markets of Hong Kong, Singapore, Australia, Japan and the US with the use of a multivariate latent factor model.

In contrast with the study of (Fry, Martin, & Tang, 2008), contagion between the markets in question was found. The evidence of contagion effects in the real estate markets was found by (Mun, 2005), who based his investigation on the countries of

the Pacific Rim in the period of financial crisis in Mexico, Asia, Russia and Brazil.

(Yunus, Increasing Convergence between U.S. and International Securitized Property Markets: Evidence Based on Cointegration Tests, 2009) emphasized the importance of investigating the level of interdependence among real estate markets. He selected the USA and six developing countries to apply a co-integration test for the period January 1990 to August 2007. The results of his investigation showed an interconnection between the US markets and the markets of the selected countries. Moreover, he determined that the leaders and lawmakers in the area of common trends are Japan and the US, and that the two larger real estate markets have a positive effect on developing countries.

Our study diverges in a few ways from the previous study conducted by (Hatemi-J, Roca, & Al-Shayeb, How integrated are real estate markets with the world market? Evidence from case-wise bootstrap analysis, 2014) on the integration of real estate markets with the world market. First, we make use of an alternative estimation methodology. We use asymmetric generalized impulse response functions. It is important to consider asymmetry because it is a widely agreed that people in finance respond differently to good news and bad news for legal, moral or other applicable reasons. We will also apply asymmetric causality tests.

5.4 Data and methodology.

In this section, we report on applying two econometric methods and confirm that we obtained the same results, thus establishing the credibility and reliability of our empirical results.

5.4.1 Asymmetric generalized impulse response.

Background

The impulse response functions and variance decompositions are normally used within the empirical literature, following the pioneer contributions of (Sims, 1980). But, again, this unique strategy is prone to the way that the variables are ordered in the VAR model. (Koop, Pesaran, & Potter, 1996)and (Pesaran & Shin, 1998) recommend using the generalized impulse response in order to cure this ordering limit. As (Hatemi-J A. , Asymmetric generalized impulse responses with an application in finance, 2014a) indicates, a paramount issue that has not been considered in past approaches to the estimation of impulses and variance decompositions is that account asymmetry should also be considered.

Hatemi-J argues that it is important not to omit asymmetry in view of the financial world's different response to good news and bad, for the reasons suggested above. Hatemi-J has developed an asymmetric approach that differentiates the effect of a positive turbulence from that of a negative one on the proliferation system of the impulse response functions and variance decompositions, which is used as part of this chapter (see below).

We apply asymmetric generalized impulse response functions and asymmetric variance decompositions to assess the effect of turbulence in the world real estate market price index on the UAE real estate market price index. We also take into account the effect of the global financial crisis (GFC) on the two markets concerned.

In addition, we show how the underlying variables might be fragmented into positive and negative innovations in order to produce the asymmetric generalized impulse response (AGIR) functions.

Consider the following integrated components variable with trend parts:

$$W_{1t} = a + bt + W_{1t-1} + \varepsilon_{1t} \qquad (1)$$

In this equation, a and b are constants. t denotes the trend of time. This equation has the following solution:

$$W_{1t} = at + \frac{t(t+1)}{2}b + W_{01} + \sum_{l=1}^{t} \varepsilon_{1i} \quad (2)$$

For t =1, 2, …T. The constant W_{01} indicates the starting value and ε_{1t} denotes a white noise disturbance term. Negative and positive turbulences are presented as ε_{1i}^{+} := max $(\varepsilon_{1i}, 0)$, and ε_{1i}^{-} := min $(\varepsilon_{1i}, 0)$ respectively.

$$W_{1t} = a + bt + W_{1t-1} + \varepsilon_t = at + \frac{t(t+1)}{2}b + W_{01} + \sum_{l=1}^{t} \varepsilon_{1i}^{+} + \sum_{l=1}^{t} \varepsilon_{1i}^{-} \quad (3)$$

In this way, the positive and negative turbulences of all elements can be denoted through a collective form as shown below:

$$W_{1t}^{+} = \frac{at + [\frac{t(t+1)}{2}]b + W_{01}}{2} + \sum_{l=1}^{t} \varepsilon_{1i}^{+} \quad (4)$$

And

$$W_{1t}^{-} = \frac{at + [\frac{t(t+1)}{2}]b + W_{01}}{2} + \sum_{l=1}^{t} \varepsilon_{1i}^{-} \quad (5)$$

Accordingly, $W_{1t} = W_{1t}^{+} + W_{1t}^{-}$

The other variable in our model, which is the weekly closing stock price index of the UAE real estate market, signified by W_{2t} , could be decomposed in a comparative manner. These decomposed qualities could be used to gauge the asymmetric impulses and variance decompositions between the weekly closing stock price index of the world real estate market and the real estate market in the UAE. It is assumed that we seek to catch the dynamic relationship of all the positive turbulences

between these two variables; this is the vector of interest,

$$W_t^+ = (W_{1t}^+, W_{2t}^+).$$

The following VAR (k) model can be estimated

$$W_t^+ = \Gamma_0 + \Gamma_1 W_{t-1}^+ + \cdots + \Gamma_k W_{t-k}^+ + u_t^+ \quad (6)$$

Where Γ_0 is a 2 x 1 vector, Γ_s (s = 1, ..., k.) is a 2x2 matrix, and u_t^+ is a 2 x 1 vector of error terms. In order to calculate the asymmetric impulses, we have to demonstrate the VAR model in the moving average format as shown below:

$$y_t^+ = \sum_{i=0}^{\infty} C_i + \sum_{i=0}^{\infty} A_i u_{t-i}^+ , \; for \; t = 1, ..., T. \qquad (7), \quad \text{where the 2X2}$$

coefficient matrixes A_i are acquired recursively, as follows:

$$A_i = \Gamma_1 A_{i-1} + \Gamma_2 A_{i-2} + \cdots + \Gamma_k A_{i-k}, for \, i = 1,2,\ldots, \quad (8)$$

With $A_0 \simeq I_2$ and $A_i = 0, \forall i < 0$ and $C_i = A_i \Gamma_0$. The asymmetric generalized impulse response of the impact of one SE turbulence in the jth equation at time t on W_{t+f}^+ is derived through the following equation:

$$AGIR(f) = \sigma_{jj}^{-0.5} A_f X e_j, \text{ for } f = 0,1,2, \ldots, \quad (9)$$

Where X is the calculated variance-covariance matrix of the error terms in the VAR model (i.e., X = $\{\sigma_{ij}$, i, j = 1,2.$\}$) and, e_j is a 2 x 1 indicator variable denoted in such a manner that its jth element is 1 and all other elements are 0. The symmetric forecast error variance decomposition can also be calculated, denoted by $AVD_{ij}(f)$, via the following equation:

$$AVD_{ij}(f) = \frac{\sigma_{ii}^{-1} \sum_{l=0}^{f} (e_i' A_l X e_j)^2}{\sum_{l=0}^{f} (e_i' A_l X A_l' e_j)^2} , \quad ij = 1, 2. \quad (10)$$

We apply the methodology of the asymmetry generalized impulse response

recommended by (Hatemi-J A. , Asymmetric generalized impulse responses with an application in finance, 2014a) to research the possibly asymmetric relationship between the UAE real estate market price index (indicated by UAER) and the world real estate market price index (signified by WR) on a week after week premise. The sample period is from 01/14/2005 – 06/14/2013.

The Morgan Stanley Capital International (MSCI) price index is used as a part of the instanced world real estate market price index while the Securities Commodities Authority price index is used within the instance of the UAE real estate market price index.

Cumulative positive and negative aspects of the data are separated by the use of the statistical software of (Hatemi-J A. , ASCOMP: GAUSS module to transform data into cumulative positive and negative components, 2014b) and the asymmetric generalized impulses and variance decompositions are estimated by using EViews 8.The date of the structural break was decided to be August 1, 2008 in view of the fact that this was the point at which the condition of the US real estate issue became critical (Frank & Hesse, 2009); (Kiff & Mills, 2008).

5.5 Empirical Results

5.5.1 Empirical findings for the asymmetric impulse relationship between the world real estate market and the UAE real estate market

The results for asymmetric impulses joined with relating the 95% confidence intervals that are produced by means of the Monte Carlo simulations before and after the crisis period are exhibited in Figures 17, 18, 19, 20, 21, and 22

Figures 17 and 20 introduce the standard impulses for the original data joined with the 95% confidence intervals. These demonstrate that the reaction of the UAE real estate market to a symmetric turbulence on the world real estate market is not statistically noteworthy before or after the crisis period for a time horizon of ten periods. Next, we present the asymmetric impulses.

Figures 18 and 21 exhibit the reaction for the variables given in the total of positive changes together with the 95% confidence interval. It is evident that, before and after the crisis period, the combined positive variations on the world real estate market do not have any considerable effect on the UAE real estate market. We also estimated the asymmetric variance decomposition in this situation and can reveal the following results.

The real estate industry of the UAE is responsible for 99% of the variations in the forecast error and the remaining 1% of variations in the forecast error is due to the cumulative positive shocks of the global real estate market. In contrast, the cumulative positive shocks in the global real estate market and the real estate market in UAE are 97.6% and 2.3% respectively.

Figures 19 and 22 mutually outline the reaction for the variables in the combined negative configuration with the 95% confidence interval. It is obvious to an observer from these estimations that, before and after the crisis period, the total negative progressions of the UAE real estate are not statistically significant to any negative impulse in the world real estate market index. On the same lines, the real estate market in the UAE was not influenced by the crisis in the real estate market on a global scale.

Response to Generalized One S.D. Innovations ± 2 S.E.
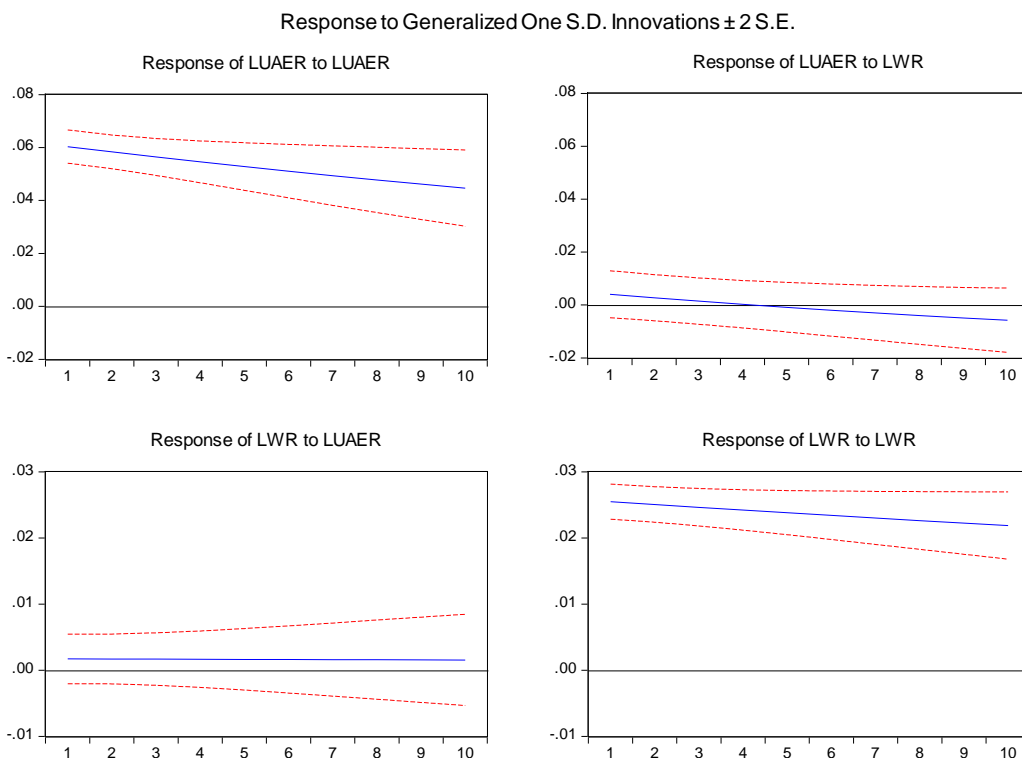
Figure 17: The standard generalized responses from the original data between WR and UAER before the crisis period

Next, we estimated the variance decomposition and came up with the following results. The cumulative negative changes in the UAE's real estate market are responsible for 99.5% of the forecast error in the analysis. The remainder of the 1% change in the forecast error is attributable to cumulative negative innovation in the overall global real estate market. The corresponding values of the cumulative negative shocks in the global real estate market are 94% and 5.5% for the real estate market in the UAE.

5.5.1.1 The world real estate market and the UAE real estate market before the crisis period between 01/14/2005 and 08/01/2008.

The following figures illustrate the responses.

Figure 18: The asymmetric generalized responses to the cumulative positive shocks between WR and UAER before the crisis period

Figure 19: The asymmetric generalized responses to the cumulative negative shocks between WR and UAER before the crisis period

After the crisis period during 08/08/2008 to 06/14/2013, the responses were as illustrated in the figures below.

Response to Generalized One S.D. Innovations ± 2 S.E.

Response of LUAER to LUAER

Response of LUAER to LWR

Response of LWR to LUAER

Response of LWR to LWR

Figure 20: The standard generalized responses for the original data between
WR and UAER after the crisis period

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of UAERP to UAERP

Response of UAERP to WRP

Response of WRP to UAERP

Response of WRP to WRP
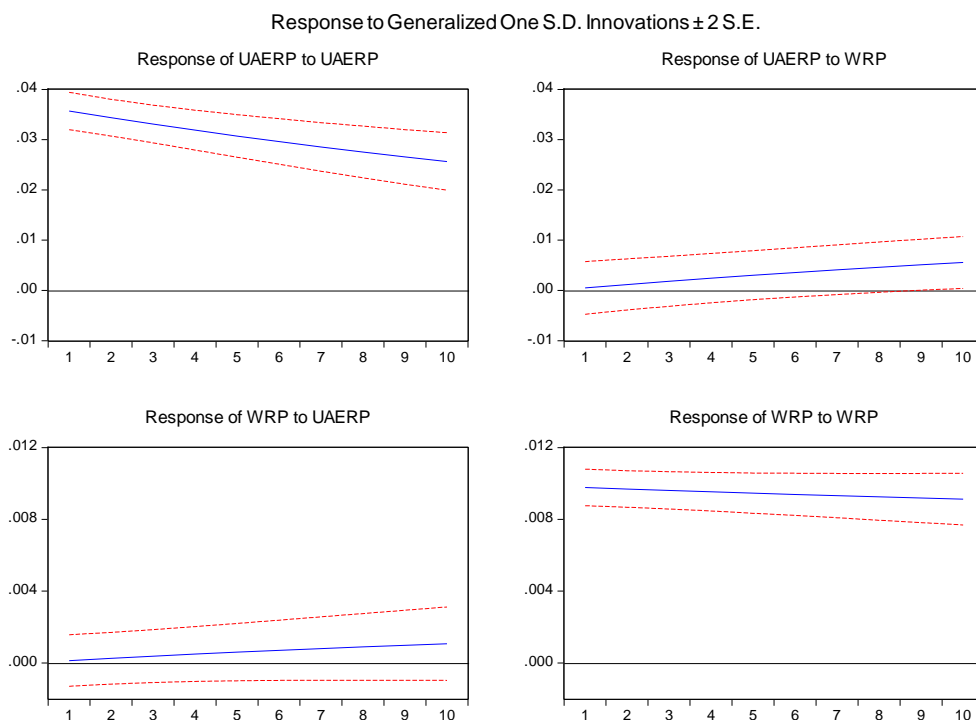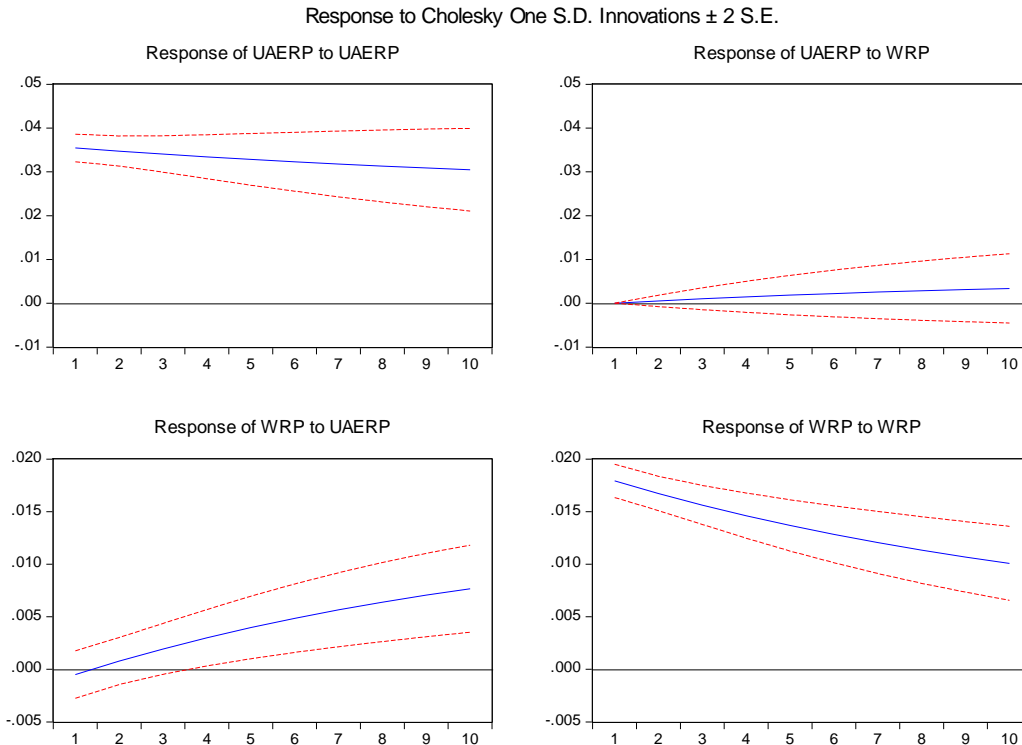
Figure 21: The asymmetric generalized responses to the cumulative positive
shocks between WR and UAER after the crisis period

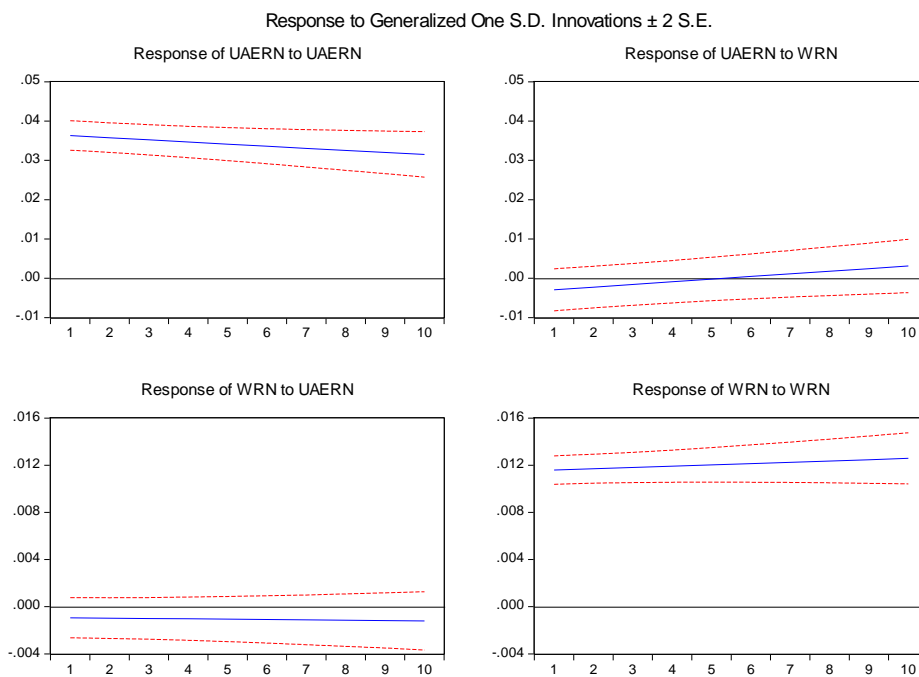Response to Generalized One S.D. Innovations ± 2 S.E.
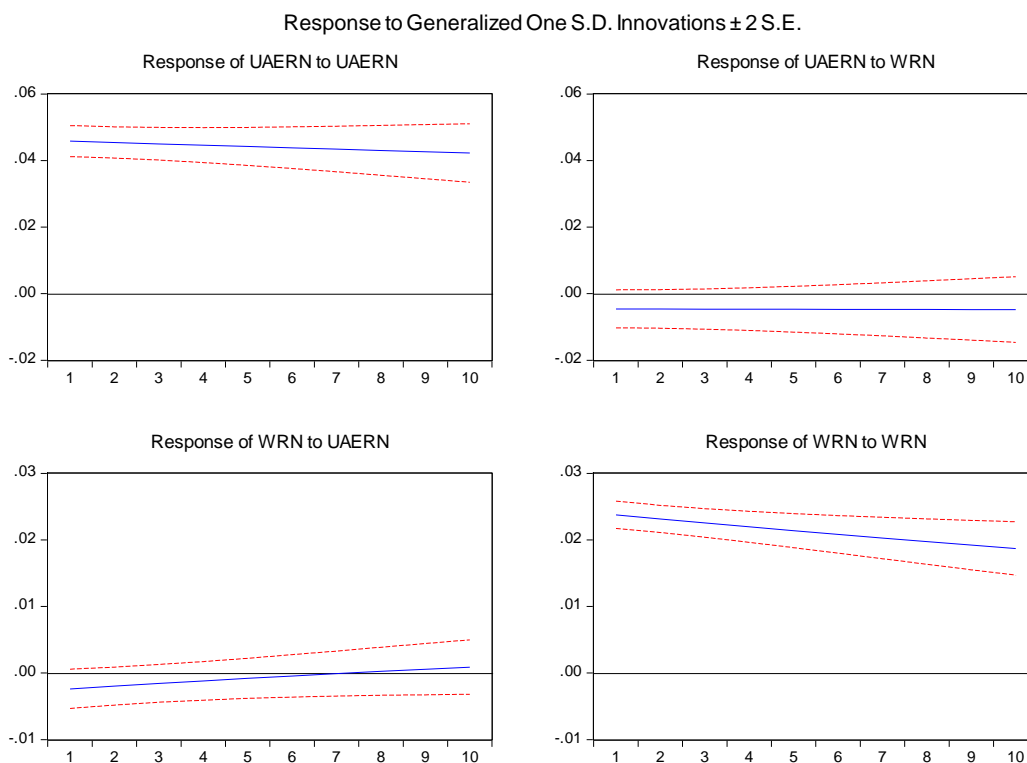
Figure 22: The asymmetric generalized responses for the cumulative negative between WR and UAER after the crisis period

5.5.2 Empirical results for the asymmetric impulse relationship between the world stock market and the UAE real estate market.

In this section, we investigate the interaction between the world stock market and the UAE real estate market. The results for the asymmetric impulses joined with the related 95% confidence intervals, which are produced by means of Monte Carlo simulations before and after the crisis period, together with the interaction between the world stock market and the UAE real estate market are shown diagrammatically in Figures 23, 24, 25, 26, 27, and 28.

Figures 23 and 26 present the standard impulses for the original data joined with the 95% confidence intervals. As is demonstrated, the reaction of the UAE real estate market to symmetric shocks on the world stock market is not statistically

significant before and after crisis period for a time horizon of ten periods. Next, we will investigate the asymmetric impulses to see whether or not there are asymmetric effects.

Figures 24 and 27 exhibit the reaction for the variables given in total positive changes together with the 95% confidence interval. As is evident, before and after crisis period the combined positive variations on the world stock market do not have any significant impact on the UAE real estate market. The estimated variance decomposition for this case reveals the following.

Among the changes in the forecast error in the real estate market of the UAE, 2% is attributable to the UAE market and the remaining 98% is accounted for by the forecast error in the cumulative positive innovation of the global stock market. The corresponding value of cumulative positive shocks in the UAE real estate market is 97% and that for the world equity market is 3%.

Figures 25 and 28 exhibit the mutual reaction of the variables in the combined negative configuration with the 95% confidence interval. We can plainly observe that, before and after the crisis period, the total negative progressions of the UAE real estate after a positive shock in the world stock market index are not statistically significant. Following this line of thought, the real estate market in the UAE was not impacted by the global financial market. Next, we estimated the asymmetric variance decomposition and found the following.

Cumulative positive changes were responsible for less than 1% of the changes in the forecast error of the UAE real estate market and the overall cumulative negative shocks in the global stock market were responsible for 99.9% of the changes in the forecast error. 90% and 96% are the corresponding values for the cumulative negative innovation overall in the UAE's real estate market and global stock market

respectively. It should be noted that in no case does the UAE real estate market price

index react to shocks in the world stock market.

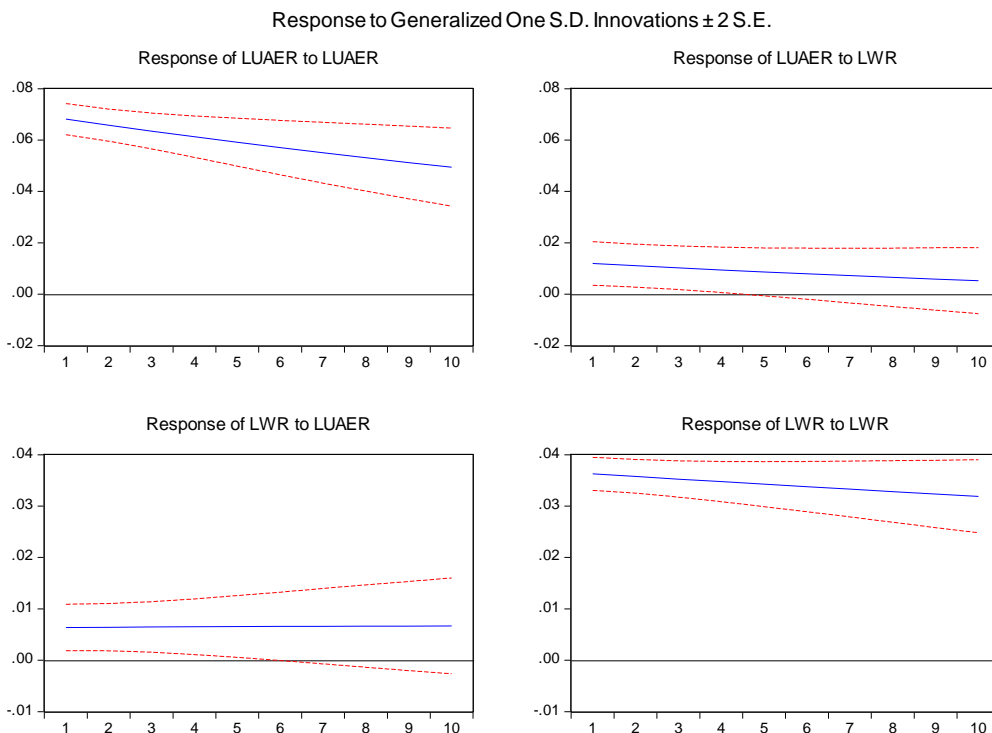### 5.5.2.1 World stock market and the UAE real estate market between 01/14/2005 and 08/01/2008
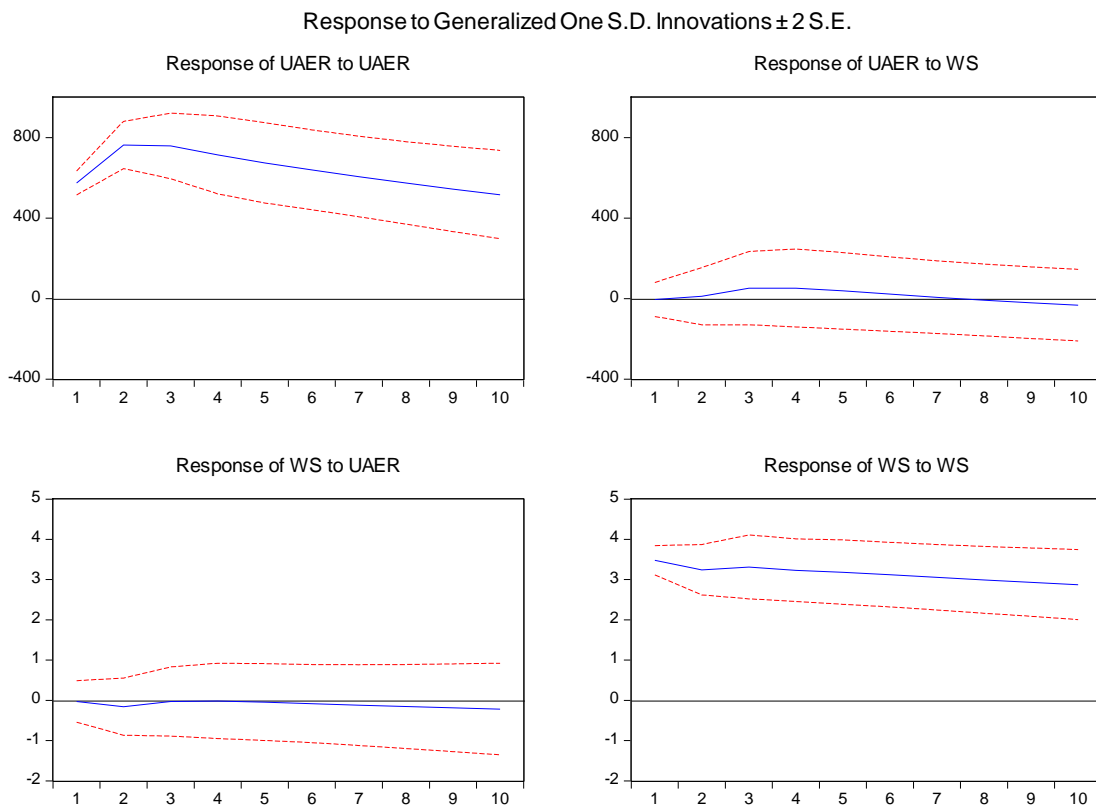
Figure 23: The standard generalized responses from the original data between WS and UAER before the crisis period

Response to Generalized One S.D. Innovations ± 2 S.E.
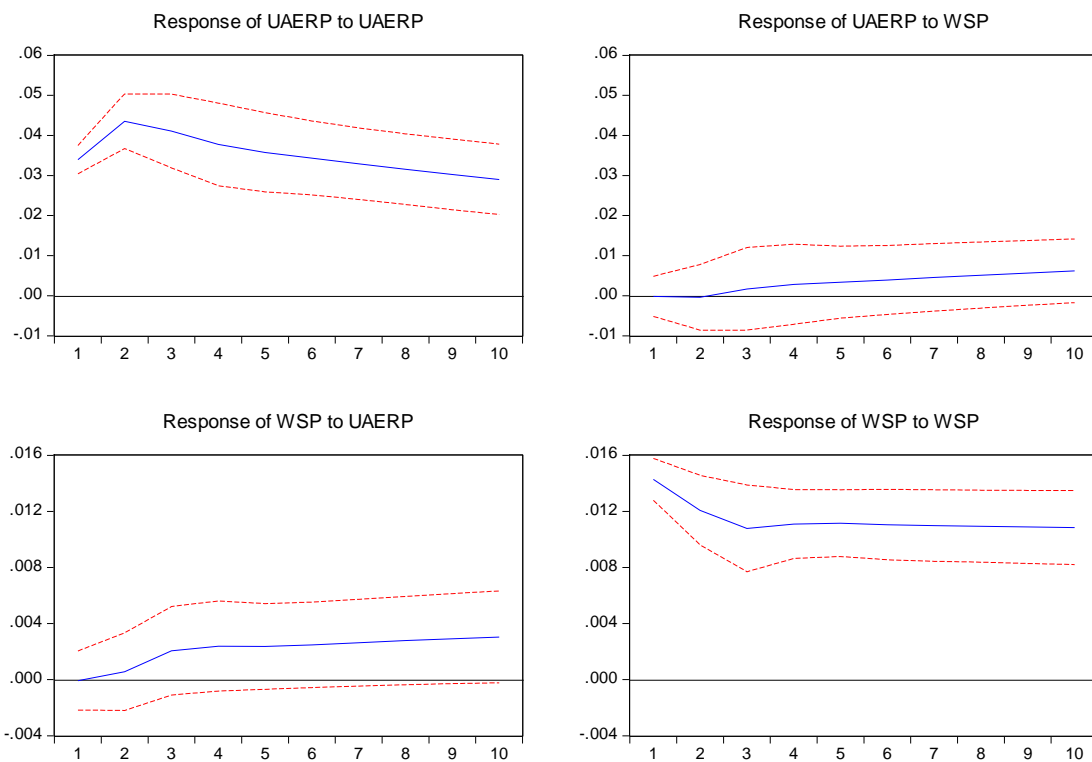
Figure 24: The asymmetric generalized responses to the cumulative positive shocks between WS and UAER before the crisis period

Response to Generalized One S.D. Innovations ± 2 S.E.
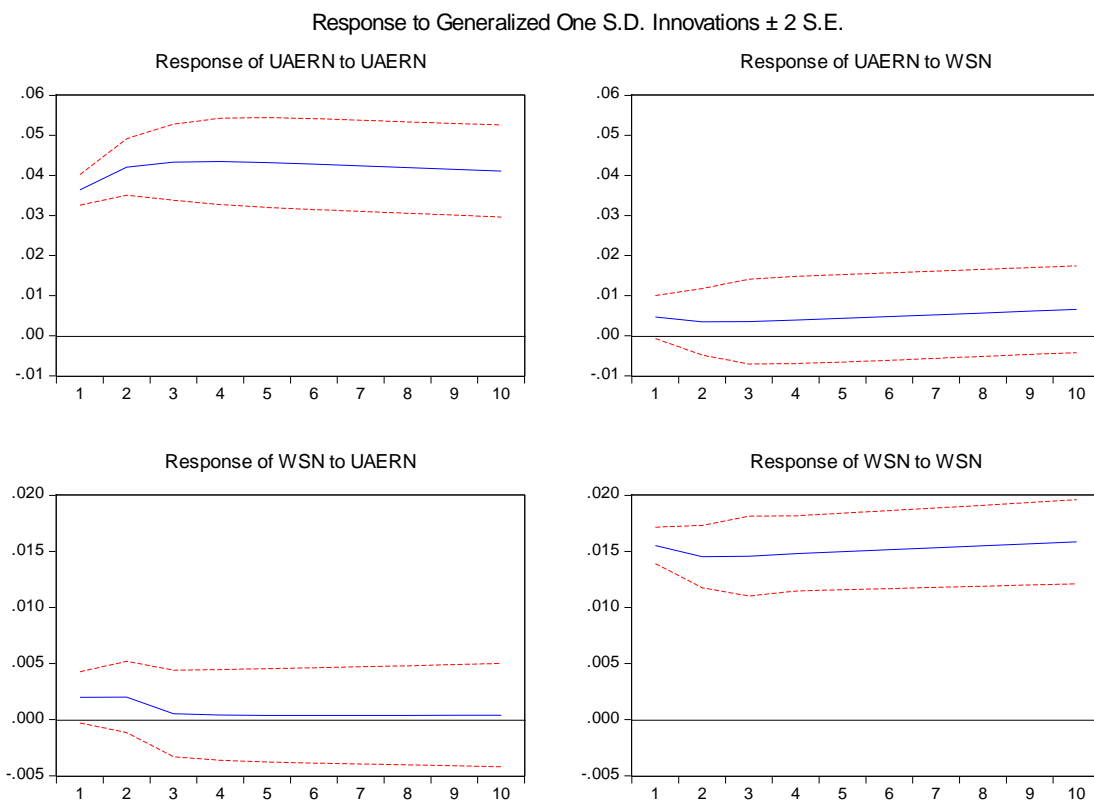
Figure 25: The asymmetric generalized responses to the cumulative negative shocks between WS and UAER before the crisis period

After crisis period during 08/08/2008 to 06/14/2013

Response to Generalized One S.D. Innovations ± 2 S.E.
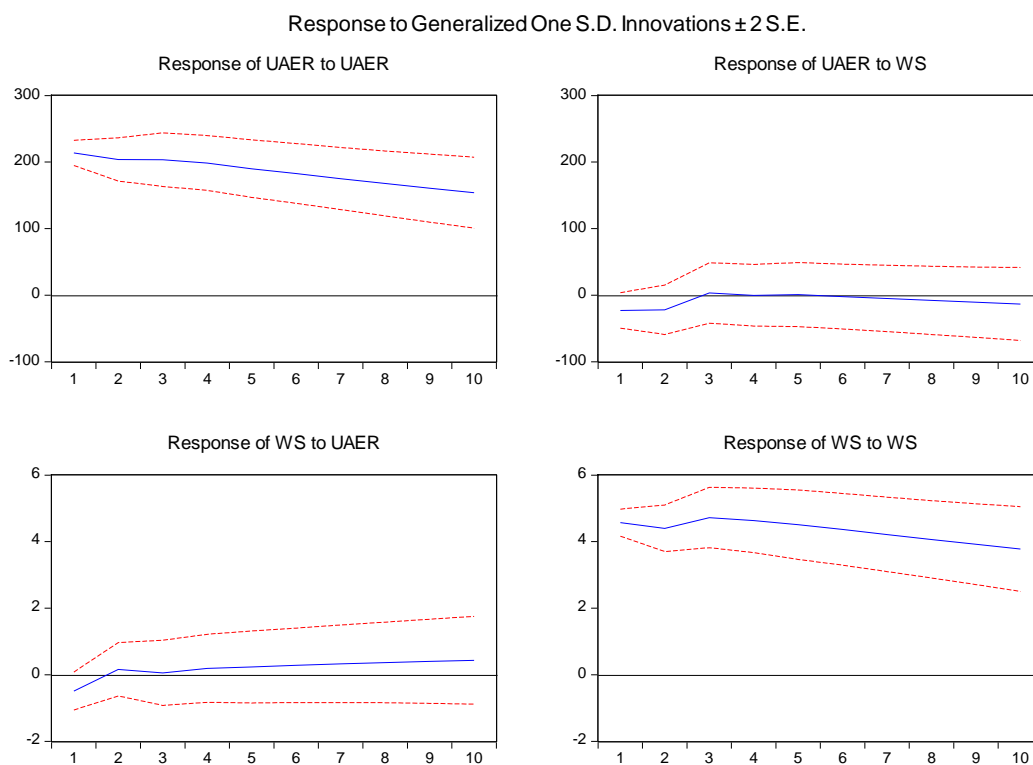
Figure 26: The standard generalized responses from the original data between WS and UAER after the crisis period
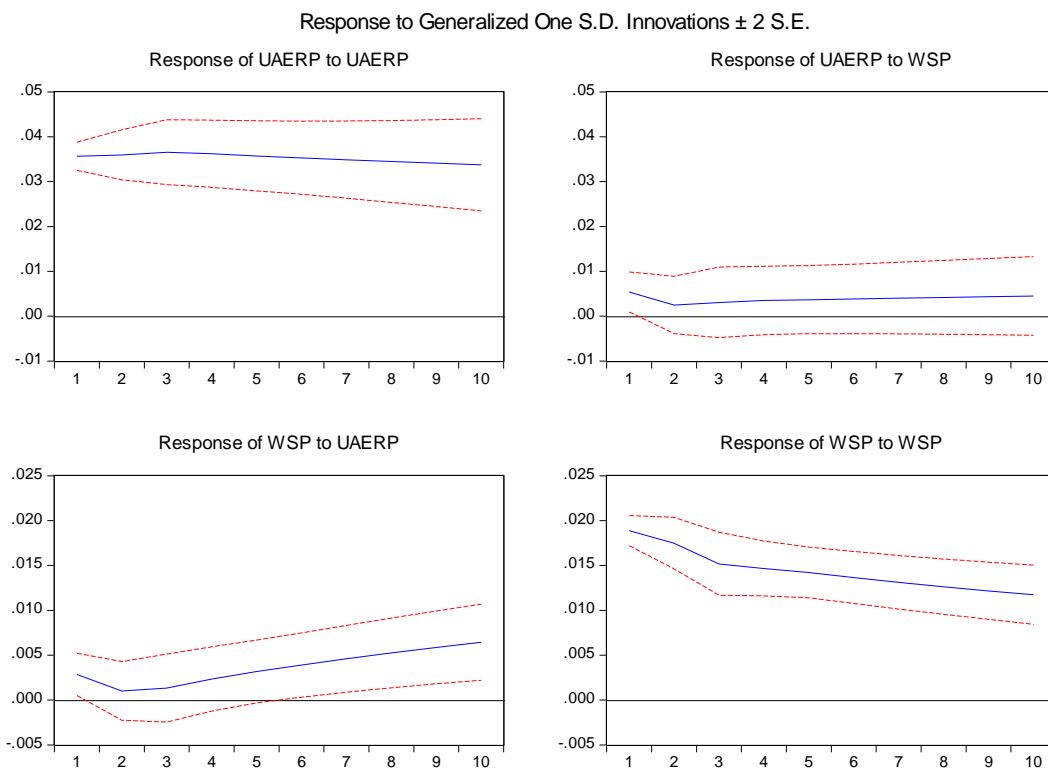
Figure 27: The asymmetric generalized responses to the cumulative positive shocks between WS and UAER after the crisis period

Response to Generalized One S.D. Innovations ± 2 S.E.
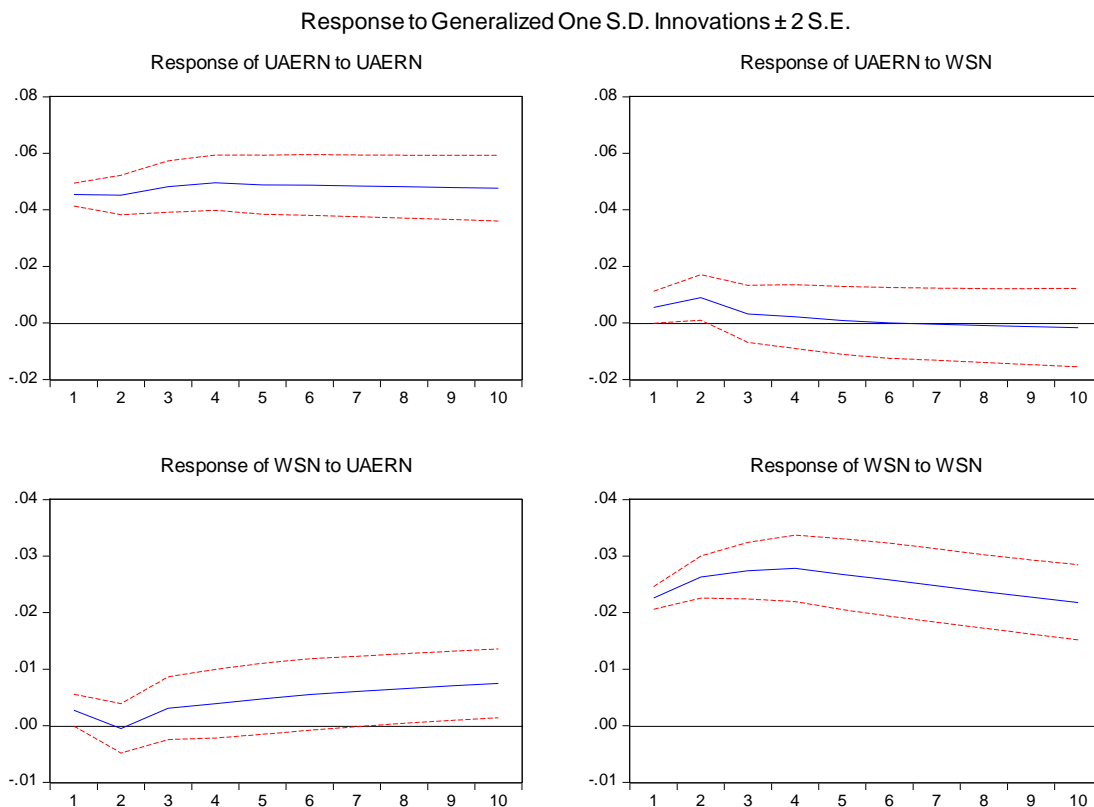
Figure 28: The asymmetric generalized responses to the cumulative negative
between WS and UAER after the crisis period

5.5.3 Asymmetric Causality Tests.

In order to check the robustness of the results we also conducted symmetric
and asymmetric causality tests, as developed by (Hatemi-J A. , Is the UAE stock
market integrated with the USA stock market? New evidence from asymmetric
causality testing, 2012); see Chapters 3 and 4. The results are presented in Tables 5.1
and 5.2. These causal results support the results obtained by the impulse response
functions. The null hypothesis of no causality cannot be rejected in any of the three
cases.

Table 5.1: Results of the Symmetric and Asymmetric Causality Tests for the pre-crisis period for WR and UAER between 01/14/2005 and 08/01/2008 on a weekly basis (186 observations)

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Conclusion on H_0
$WR \not\Rightarrow UAER$	9.255	5.762	4.529	0.561	Not rejected
$WR^+ \not\Rightarrow UAER^+$	10.112	5.635	4.193	0.682	Not rejected
$WR^- \not\Rightarrow UAER^-$	7.499	4.008	2.684	0.649	Not rejected

Notes: The denotation WR $\not\Rightarrow$ UAER means that the WR does not cause the UAER. The denotation CV is an abbreviation for 'critical value'.

Table 5.2: Results of the Symmetric and Asymmetric Causality Tests after the crisis period for WR and UAER between 08/08/2008 and 06/14/2013 on a weekly basis (254 observations)

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Conclusion on H_0
$WR \not\Rightarrow UAER$	7.327	4.047	2.681	0.082	Not rejected
$WR+ \not\Rightarrow UAER+$	9.065	3.704	2.747	2.164	Not rejected
$WR^- \not\Rightarrow UAER^-$	9.954	6.533	4.487	6.51	Not rejected

Notes: The denotation WR $\not\Rightarrow$ UAER means that the WR does not cause the UAER. The denotation CV is an abbreviation for 'critical value'.

The empirical results of the null hypothesis indicate that the changes in the real estate sector of the UAE were not caused by the world's real estate crisis either in the pre-crisis period or the post-crisis period but can be attributed to some positive factors which contributed to insulating the UAE from negative international spill-over effects.

The reason that the UAE market was not negatively affected by the world market may be as follows. The UAE Federal Cabinet's decision on October 13, 2008 to take major steps to tackle this crisis entailed the promise that the UAE's Central Bank would guarantee bank deposits in both local and foreign banks (so long as they had shown significant operations in the UAE for at least 3 years).

On 14th December 2009 the Abu Dhabi government played a key role by providing funds for Dubai World, the owner of Nakheel, the giant real estate arm of the Dubai government, in order to avoid a default in paying back the debt due to its creditors, which strengthened the investors' trust and restored their confidence. The confidence grew further with the considerable increase in earnings and the enormous monetary reserve that the UAE had been amassing from the dramatic increase in oil prices since the year 2000.

The UAE Government's realistic and timely planning of expenditure in the infrastructure sector significantly strengthened the demand of the real estate market in the UAE. In addition, the high influx of tourists, and the presence of expatriate investors for newly finished residential units intensified the demand during this period, contrasting with the lukewarm ness of the pre-crisis and post- crisis period.

After the crisis, a boom in the real estate sector in Abu Dhabi started. The estimated supply of residential units available during the year 2010 was 31,000, while the demand was estimated to be about 160,000 units, which led real estate prices to climb and also led to more construction, as firms tried to plug the shortage in the market.

There had been a prevailing recession and decline in the properties market in Dubai in 2008 and 2009, when prices dropped by around 30% to 40%, but the UAE

Government managed to overcome this by imposing a strategic control on monetary policy on the part of the UAE Central Bank, thus minimizing the impact of the crisis. Within the Middle East region it is the United Arab Emirates whose real estate market enjoys the highest rank as far as stability, security, and transparency are concerned (LaSalle, 2012a).

We further explored the influence the Global Financial Crisis (GFC) on the real estate sector of the UAE. For this purpose, the MSCI world stock price index was used along with the Emirates Securities and Commodities Authority index for the UAE real estate sector on a weekly basis, covering the period from 2005 to 2013. The sample period for this purpose ran from 01/14/2005 to 06/14/2013, based on weekly data. The structural break period was selected at 1st August, 2008.

Tables 5.3 and 5.4 illustrate the results of the estimation of parameters, which were used separately for the pre-crisis and post-crisis periods. The estimated value of the causal relationship between the UAE real estate price index and the stock price index of the global stock market is evident in both tables. It shows in both cases that the stock price index of the global stock market does not have any significant influence on the UAE real estate price index, either before or after the crisis.

However, we also find that the real estate market of the UAE is more sensitive to the world stock market then is the world's real estate markets, since these markets registered higher critical values with the former than the latter during the pre-crisis period. Nevertheless, the real estate market of the UAE seems to be more sensitive to the world's real estate market than to the world stock market after the crisis period.

Table 5.3: Results of the Symmetric and Asymmetric Causality Tests for the pre-crisis period for WM and UAER between 01/14/2005 and 08/01/2008 on a weekly basis (186 observations)

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Conclusion on H_0
WM $\not\Rightarrow$ UAER	9.471	6.023	4.635	1.538	Not rejected
$WM^+ \not\Rightarrow UAER^+$	9.010	4.436	3.010	0.661	Not rejected
$WM^- \not\Rightarrow UAER^-$	11.456	8.440	6.426	0.792	Not rejected

Notes: The denotation WM $\not\Rightarrow$ UAER means that the WM does not cause the UAER. The denotation CV is an abbreviation for 'critical value'.

Table 5.4: Results of the Symmetric and Asymmetric Causality Tests after the crisis period for WM and UAER between 08/08/2008 and 06/14/2013 on a weekly basis (254 observations)

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Conclusion on H_0
WM $\not\Rightarrow$ UAER	6.719	3.527	2.526	0.220	Not rejected
$WM^+ \not\Rightarrow UAER^+$	10.555	3.824	2.512	0.033	Not rejected
$WM^- \not\Rightarrow UAER^-$	7.609	4.285	2.860	1.083	Not rejected

Notes: The denotation WM $\not\Rightarrow$ UAER means that the WM does not cause the UAER. The denotation CV is an abbreviation for 'critical value'.

5.6 Concluding remarks

This chapter explores the possible relationship between the UAE real estate market and the world real estate market. It also investigates the interaction between the world's stock market and the real estate market in the UAE by applying generalized asymmetry impulse responses. The use of this approach improves performance more

than the other standard methods do. We also used asymmetric causality tests which can separate the effects of adverse changes from those of favorable ones.

The technique of bootstrap simulation was used to ensure the reliability of critical values since the data are not normally distributed. Both methods confirm the same empirical results. The estimated results make it statistically evident that the real estate market of the UAE received no impact from the global real estate market before or after the crisis period.

Taking into account the asymmetry in these assessments may be essential for evaluating whether positive turbulences have the same total effect as negative turbulences. This is attained by evaluating the impulses and reactions to turbulences focusing on the total segments of the positive and negative progressions of the world's real estate market and the UAE's real estate market.

Furthermore, we investigate the movement of the world stock market price index with regard to the real estate price index in the UAE for the period between 1/14/2005 and 14/6/2013; considering the impact of the global financial crisis. This chapter is fundamentally different from other studies in its use of asymmetric causality tests for differentiating between positive and negative changes.

In order to establish authentic critical values, bootstrap simulation methodologies were used. The results make it clear that the null hypothesis that the world stock price indexes do not cause a negative impact on the UAE real estate stock price index under any conventional level of significance is valid for both positive and negative changes. Thus, there seems to be no linkage between the world stock price index and the real estate stock prices in the UAE.

The outcome of the analysis indicates that the developments in the world's real estate market price did not prompt any critical reaction in the UAE real estate market price index. This was due to the bailout effort of the Abu Dhabi government in creating the required cash flow in the Dubai market from bulk purchases of property stocks valued in the range of 10 million Euros, which allowed Dubai to settle its debts & loans.

Further, Abu Dhabi's commitment to the 2030 Vision is shown by an investment plan of US$180 billion in various sectors such as property and infrastructure facilities, in particular the development of the Saadyat and Al Reem Islands which compose about 18% of Abu Dhabi.

However, during the financial crisis a number of real-estate projects in the UAE were abandoned or shelved, due not only to the drop in the oil and gas prices but also the 25%-40% decline in property prices brought about by the world financial crisis. During this period, many of the bankrupt real estate companies survived only by outsourced loans.

The conventional banking system in the UAE is controlled by the Central Bank under strict regulations for securing lending facilities. The collateral that exists in the banking sector serves to protect lenders against borrowers. Thus, the banks in the UAE managed to sustain the world financial crisis and its negative effects.

Sustainability in this sector was maintained simply by the strict policies covering loan facilities to minimize credit risk. In addition, the growth in the Islamic banking sector, which contributed to its power to resist the world's financial crisis can be traced to the fact that Islamic banking products are based not on interest but on strict Shari'ah law using the Murabaha system.

The real-estate crisis in the USA and the world market was led by the failure in other banking systems to select reliable mortgagors, which was not the case in the UAE. The real estate investors, consumers, and bankers were not sure what to decide during the world financial crisis, which created suspicion and uncertain conditions, resulting in an unpredictable period while the crisis continued.

The situation led consumers to postpone any decision to buy a new residential unit, real-estate investors to cancel projects, and banks to pretend to be more strict on their financing policies than they had been, as a precaution against negative consequences encouraged by the crisis.

The UAE has the richest possible sovereign funds, which contributed to the rescue of the UAE economy and the real-estate sector from the turmoil of the financial crisis. This appears to be the situation when the impulses are estimated, taking account of the concept of asymmetric property.

Another implication of our empirical findings is that the UAE real estate market can be considered as informationally efficient with regard to movements in both the world real estate market and the world stock market.

Chapter 6: Do oil price shocks influence the financial markets?
An empirical study from the Abu Dhabi Securities Exchange and Dubai Financial Market

6.1 Introduction

Oil prices have undergone several major changes between the oil crisis of the 1970s and recent days. Oil price fluctuation has also been in the limelight because of the uncertainty that it has caused in the energy sector. Oil was not always a very expensive resource; before 1973, the price of a barrel of oil was as low as $3.00 and either the oil embargo imposed by the Organization of Arab Petroleum Exporting Countries (OAPEC) or a reasonable price resulted in price increases reaching $12.00 per barrel by April 1974.

This was one of the first oil shocks that the world had experienced. The next oil crisis took place in 1979 when the Iranian revolution took place (Mouawad, 2008) . The price of oil increased to nearly $40 per barrel due to the realization that there could be a future shortage in oil production. However, this did not last long and the prices started to decline gain in the early 1980s.

This decline was primarily driven by the lowering of the oil consumption in the USA, due to a recession. The decline was long term in effect and continued for a period of 20 years. However, a rise in the consumption of oil changed the prices and created an upward trend again (British Petroleum, 2015) . This was primarily driven by increased consumption from the emerging markets; mainly China and India. These countries have the largest markets in the world and when they began to demand energy, the demand grew rapidly.

It is the increased demand from the markets of China and India that has led the increased overall demand for oil. The eventual outcome was that the oil prices started to increase once more. As the growth of the Chinese and Indian markets, as well as the markets of many other emerging nations has been aggressive, they continued to grow fast: the oil prices also grew closer to $60 per barrel before the end of 2007 (British Petroleum, 2015).

The period from 2007 to 2008 witnessed a hike in the oil prices until it crossed the 100-dollar threshold and reached an all-time high of 147 dollars per barrel in July 2008. By August the price had dropped to 115 dollars and it then fell sharply in the next four months until it dropped as low as 45 dollars in December 2008. The next cycle of fluctuation started in March-April 2009, when the oil price had been steady at 40 dollars per barrel.

It started to rise again and touched 70 dollars by August 2009. In the first half of January 2014, Brent crude oil was traded at over 107 dollars per barrel. Among the factors which deeply affect markets, consumers and producers, oil prices occupy a high position. The areas most affected are marketing strategies, costs and the motivations used for launching new technological investments or restructuring older ones.

The oil price fluctuations of the 1970s gave rise to the production of a large volume of literature seeking to identify the impact that oil prices had on activities in the economic sphere. (Hamilton, 1983) , (Rebeca Jiménez-Rodríguez & Sánchez, 2005), (Cunado, Juncal & Perez de Gracia, 2014) were among the authors who researched the relationship and dependence of developed countries' GDP on oil prices.

(Hamilton, 1983) produced the major work focusing on the shock that oil prices induced in the factors which triggered the recession of the American economy.

This study prompted numerous other studies about the effect of oil prices on several macroeconomic activities. It has been found that oil price fluctuations produce a significant statistical impact on the macroeconomic activities within the circle of the G-7 (Cologni, Alessandro & Manera, Matteo, 2008); (Kilian L. , 2009), the G-7 and Norway (Rebeca Jiménez-Rodríguez & Sánchez, 2005) and on Asian economies as studied by (Cunado & Perez de Gracia, 2005).

Although a fair number of researchers focused on the impact made on a country's GDP by oil price fluctuations, only a handful of studies have actually focused on the impact of oil prices on stock market returns. In this field some of the most significant studies have been conducted by, among others, (Jones C. M., 1996), (Sadorsky, 1999), (Huang & Masulis, 1996), (El-Sharif, 2005), (Naifar & Al Dohaiman, 2013), (Mohanty, 2011) and (Nguyen, 2012) . (Huang & Masulis, 1996) do not point out any noteworthy link between oil price fluctuations and stock returns for certain markets such as the S&P 500 stock market.

However, such researchers (Nandha & Faff, 2008), (Papapetrou, 2001), (Sadorsky, 1999), (Miller & Ratti, 2009) and (Awerbuch & Sauter, 2006) assert that oil price increases result in a negative impact on stock returns. (Ciner, 2001) strongly suggests that real stock returns are sensitive to oil price futures, but this connection does not follow a linear pattern.

There are many reasons for the study of a potential connection between oil prices and the two stock markets of the UAE to be worthwhile. The first reason is that the UAE as an oil exporter is among the important suppliers of world energy markets.

Oil is the main source of income in the country. The stock markets of the UAE are prone to the fluctuations of the oil market.

The second reason is that the UAE stock market is quite different from the stock markets of developed countries. The UAE stock market is also different from the stock markets of emerging countries. The reason for this difference is that the UAE is influenced by political events taking place at the regional level. The last reason is that the UAE stock market provides regional and global level portfolio diversification.

Therefore, it is useful to understand the impact of oil price changes on the Abu Dhabi Securities Exchange and the Dubai Financial Market so that investors can make the necessary decisions about investments. It is also important from the perspective of policy makers in that it enables them to regulate the stock markets effectively. Overall, oil prices are closely watched by billions of people across the globe, since oil is still the main source of energy.

This chapter studies the impact of oil price fluctuations on the Abu Dhabi Securities Exchange (AI) and Dubai Financial Market (DI) by considering the closing price indices every week on the oil market and the AI and the DI stock indexes covering the period from 1 January 2005 to 4 December 2014.

This study uses symmetric as well as asymmetric causality tests and the recently developed asymmetric generalized impulse response functions and variance decompositions (Hatemi-J A. , Asymmetric generalized impulse responses with an application in finance, 2014a), which divides the effect of positive shocks from that of negative ones. This new methodology permits the impact of positive and negative innovations to be recognized separately.

This chapter proceeds as follows. Section two provides an overview of the oil industry's development in Abu Dhabi and Dubai. Section three provides a review of the literature on the impact that stock markets receive from oil price fluctuations. Section four describes the data and methodology used in the empirical analysis. This section presents the modeling approach and it also discusses the empirical findings. Section five provides the conclusions of the study.

6.2 Overview of the oil industry development in the UAE

It is widely agreed that the oil and gas sector plays a very important role in the economies of the nations who have substantial hydrocarbon resources as well as in those of the countries that import oil and gas. It does so because the global energy requirements are increasing and the oil and the gas reserves still provide the greater part of the world's energy.

Thus, the demand for oil and gas products are increasing worldwide and as a result the demand for these products is increasing fast. This naturally indicates that the countries which hold high oil and gas reserves tend to become highly dependent on these resources for the growth of their economies.

This is the case with the UAE, for one. The country sees that the economy is growing in line with the expectations that they had. Naturally the contribution of the oil and gas sector is very high. Only a few decades ago, the country was been one of the least developed. When the British left the region, the country was planning its future growth (Shihab, 2014). However, it has realized that the growth has to be financed and has used the resources of oil and gas for this purpose.

(Shihab, 2014) specifically states that the significant economic development that the UAE was seen during the period 1973–1982 and was purely attributable to its oil revenues. This indicates that the oil and the gas sector primarily drove the growth of the UAE economy at first.

Even today the sector remains the largest in the economy and its economic contribution remains very high: the (CIA Factbook, 2014) estimates it to account for 45% of the country's exports. Thus, the future growth of the sector is expected to be crucial for the development of the country.

The oil sector, as the main source of energy, has a very important role to play in any modern economy. The International Monetary Fund (IMF, 2013) has identified the fact that the oil producing countries during the 2012 slowdown of the global economy still continued to do well. This indicates that even amidst such a slowdown, the oil exporting countries could be confident that their economies would probably continue to grow.

This was the time when the Middle East region began to lose stability due to uprisings of the Arab spring. These uprisings have led to economic issues in the region (Shihab, 2014). However, it is important to note that the role of oil was to make sure that growth continued at its previous level, showing that oil in this context plays a stabilizing role and has not ceased to drive growth in the countries where it is found (Butt, 2014).

This suggests that the growth of the oil and the gas sector in the context of the UAE markets remains an important element in the economic growth of the region. It is important to identify strategies that can result in freeing an economy from complete

dependence on oil; however, in regard to development the sector has played a very important role in the past and it is likely to continue to do so in the future.

The IMF (2013) indicates that countries which are completely dependent on oil exports for adding economic value (such as Saudi Arabia) are at economic risk of any future drop in oil prices, where the impact on the economy is likely to be negative.

This is because, to stay profitable in the oil and energy business, nations need to have a certain breakeven price. Should the price fall below this level, nations may not attain their desired outcome. The following chart indicates the oil breakeven prices for various countries.
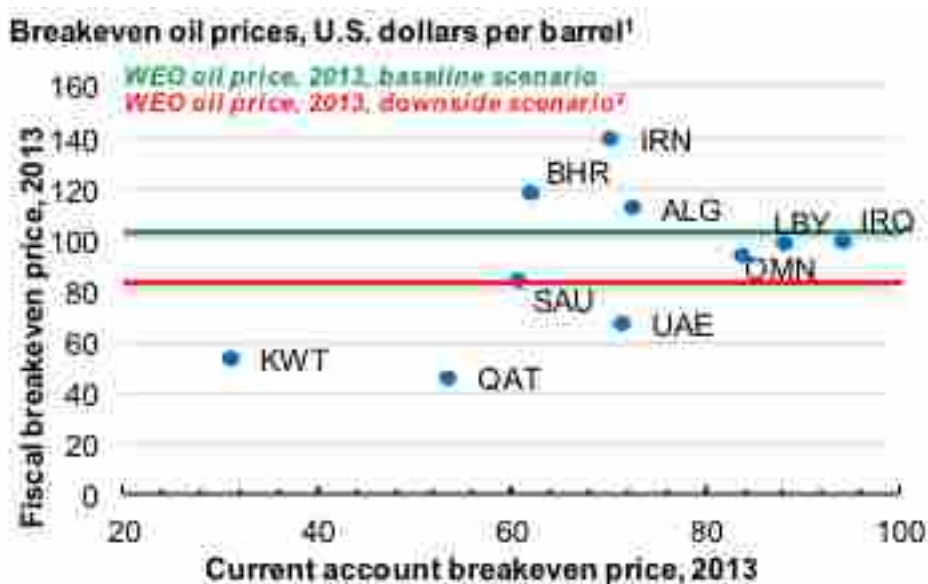

Figure 29: Breakeven oil prices in different countries; Source: International Monetary Fund (2013)

The above chart indicates that the UAE's breakeven price for oil stands at about US$ 75 in fiscal as well as current account breakeven points. The current price of oil remains well above this point and this will probably make sure that the country

will continue to grow given the role that oil is likely to play in the economy of the nation.

Thus, oil contributes substantially to the growth of the UAE's economy. It is also interesting to note that Kuwait and Qatar have also been able to maintain lower oil prices and the eventual outcome in this context is likely to be positive (IMF, 2013).

Thus, the UAE together with other oil exporting nations in the region has seen that oil plays a very important part in shaping the economy. It is very likely that the growth of the economy can be achieved and benefits can be maximized thereby. The historical role of oil in the context of the growth of the UAE economy should be identified appropriately.

6.2.1 Historical role of oil (hydrocarbon products) in the UAE's economy

Before the discovery of oil resources in the region, the UAE was primarily engaged with various other economic activities. Amongst them were subsistence agriculture, nomadic animal husbandry, the extracting of pearls and the trade in pearls, fishing, and seafaring, considered the most common of all.

These economic activities contributed to the growth of the region and allowed the inhabitants to build a reputation as a global hub (Malachova, 2012). However, it is important to note that such economic activities of this nature had been going on for centuries without change. The growth of economy was thus slow and gradual.

Today, the developing nation is one of the largest producers of oil and other petroleum products in the world. It has been able to develop its resources in line with the demand from the global markets. The British discovered oil in the region before World War II (Butt, 2014).

While they were very keen on exploring the extent of these resources, the war conditions prevented their activities from continuing. However, they later resumed and found where oil could be unearthed. At this time it was British and other European companies that formed conglomerates to continue exploring the oil resources in the region (Malachova, 2012).

Once the UAE received its independence in 1971, the country was keen to take these resources out of foreign control and put them under the control of its own leaders. Thus, they developed the Abu Dhabi National Oil Company (ADNOC) with the intention of managing these very important resources.

The company is a part of the administrative structure, which is in existence even today for the purpose. The main intention was to make sure that the oil reserves of the country were well protected and to manage well the funds received from the industry for the development of the region (Butt, 2014) . The company is the only one in the region to have maintained foreign stakes via oil sharing agreements.

However, simply having oil is not enough to reap all the benefits from the oil industry, since the oil has to be refined before distribution. The main challenge for the countries receiving refined oil was that the techniques needed for refining oil from different regions may differ.

Thus, the nations who produce oil can add more value by refining the products from their own oilfields. The first oil refinery in the country, with a capacity of 15,000 barrels per day, was established in 1976 for the purpose of resolving this issue. The current capacity of ADNOC is estimated to be around 2.8 million barrels per day and the company is attempting to build refinery capacity to reach 1.35 million barrels per

day by the end of 2017 (Butt, 2014) . This suggests that the UAE would be able to ensure that most of their oil output was in the form of refined oil.

It is the Supreme Petroleum Council that overlooks the operations of the industry. The role of the council is of high national significance and it is the ruler of the country who oversees the processes of management. The council was set up in 1988 with its main purpose that of ensuring that the operations of ADNOC remain efficient.

The council restructured the operations of ADNOC in 1998 in order to improve its operational efficiency (Butt, 2014) . It was important to do this because of the immense national significance of oil production; the organization has to be managed so that it contributes to the development of the national economy.

In order to guarantee that the future of the hydrocarbon resources can be secure, Abu Dhabi is trying to develop the country's gas resources as well. The region has a high level of gas deposits as yet largely untapped. It is clear that this resource will make the country certain to grow, given the increasing demand for it.

Thus, the role of gas, as well as oil, remains very important for the future of the Abu Dhabi region and its leaders are likely to want both of these sectors to continue to grow even faster in the future. If the region could benefit from the growth of these resources it would eventually see results in line with its expectations (Butt, 2014).

The development story of Dubai is similar; however, the main issue in the past was that the region has a lower level of petroleum than the Abu Dhabi region. Thus, the region at first (in 1960s) had to borrow from Kuwait in order to develop its infrastructure. However, it has also developed its oil exporting capacity and from 1969 onwards resources have flowed into the country.

Dubai continues to invest these sources in the development of various sectors, because they have a good understanding of the limited nature of the resources they have in place on the hydrocarbon front and they are aware that they must develop their resources to maximize the benefits that the country is likely to gain (DeNICOLA, 2005).

Consequently, Dubai used the revenues from the hydrocarbon sector to invest in areas such as industrialization, tourism development, real estate properties, financial services and other aspects of the economy. The result has been that Dubai has become one of the most successfully diversified economies in the region and has been able to provide various services at the national as well as international level.

While Abu Dhabi is keeping up its own growth level and its development is more stable, it is quite clearly also influenced by the strides that Dubai has made in this short period and the benefits it has derived from its development.

The current state of the oil industry is such that it accounts for 80% of the federal government revenues of the country; from US$ 75 billion in 2010, it rose to US$118 billion by 2012. This indicates that the country has grown significantly by this industry (IMF, 2013). The fundamentals of the industry remain strong because the demand for the oil resources is steadily increasing despite possible temporary falls in oil prices in the global markets.

6.2.2 The UAE economy, growth and diversification

The economic growth of a country in past few years would indicate how its economy as a whole has been changing. Two indicators are selected for discussion – namely, the per capita GDP and the GDP growth of the country. Both of these would indicate how the entire economy of the country has grown. Thus, these indicators act

as proxies to show the direction of the economic well-being of the country. The following charts indicate the performance of the economy of the UAE, based on the above criteria over the past three decades.

Figure 30: The Economic Growth of UAE
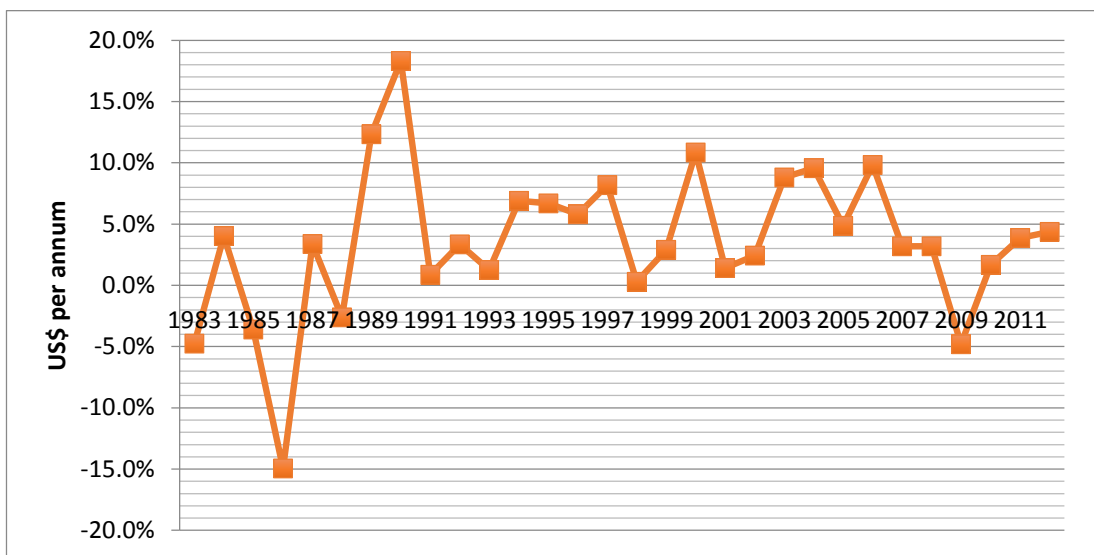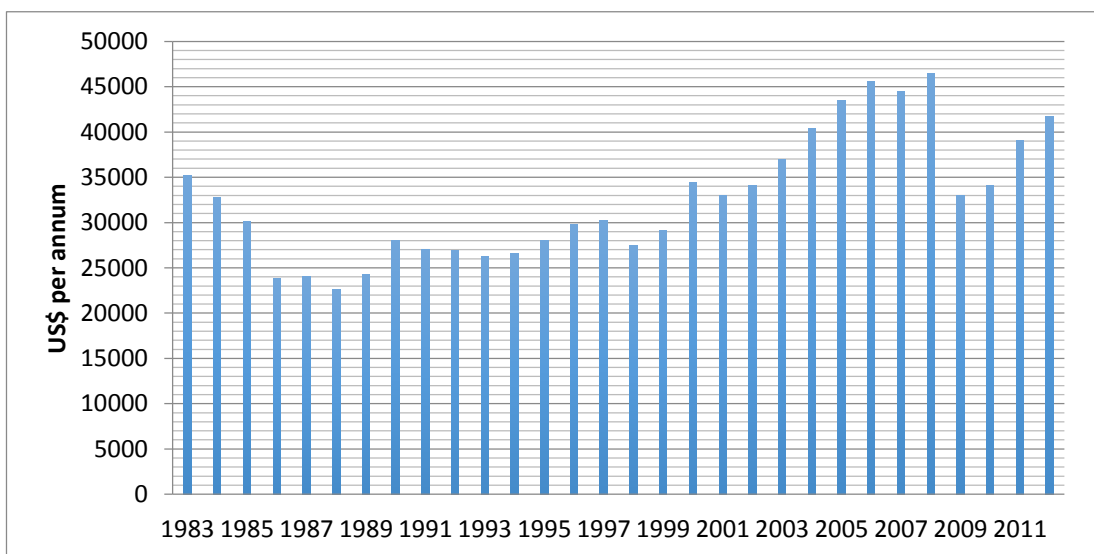

Figure 31: The Per Capita Income Level Changes of the UAE

The above charts indicate that the country has been experiencing economic growth during the entire period except for recessions in 1983, 1987 and some points in the period 2008-2009. This also indicates that the growth of the economy has accelerated in the past few years. However, the chart also indicates that the per capita

GDP levels are still below the levels before the first recession and the likelihood that with the right fundamentals in place, the economy could grow faster in the future.

Regarding economic growth, it should be noted that the country has been able to maintain an almost stable growth rate over the past few years. While the economy has not seen extraordinary but non-sustainable growth rates such as it experienced in the past, it is likely that a healthy and sustainable rate of economic growth could ensue (World Bank, 2014).

This indicates that the post-recession growth of the UAE has been marked by a reasonable, rational and suitable growth rate compared with the very high but volatile growth that the country saw before recession began.

It is very likely that the country will continue on the same sustainable level of growth in the future. As discussed above, it is evident that UAE has focused intently on the diversification of the economy in order to reduce the level of economic risk. The country has been able to successfully diversify the growth sectors and ensure that it does not overly rely on any growth in oil prices for its overall economic growth.

(Schiliró, 2013) observes that the UAE has seen the importance of economic diversification over the long run and has been able to use this awareness to make sure that the country continues to expand its economy in many directions. This implies that the country will gradually become less dependent on oil as its main source of income.

Hence, the country has sought to ensure that the risks associated with the economy are diversified, so that, even if a single sector is impacted, the whole national economy would probably feel a very minimal impact in the long run. For an economy to be globally competitive it should be capable of sustaining its growth in line with its needs.

At the same time, knowledge has to be seen in the modern era as the key catalyst for economic growth. It is evident that the UAE has to a large extent been able to obtain these outcomes. It can also be seen that it has developed plans for economic diversification in the context of its states as well as the whole country. This will make sure that the country can grow and establish itself as a lucrative global service destination, instead of being focused only on its hydrocarbon-related assets.

6.2.3 Oil price fluctuations in the global markets

Oil prices have been increasing for almost a decade in response to the growing demand for energy worldwide. The high level of industrialization of the emerging nations has prompted an increased demand for energy. But oil and other hydrocarbon reserves are not renewable and will eventually run out. We may infer that the prices of these resources will probably increase further in the future. Figure 31 indicates the direction of these prices.
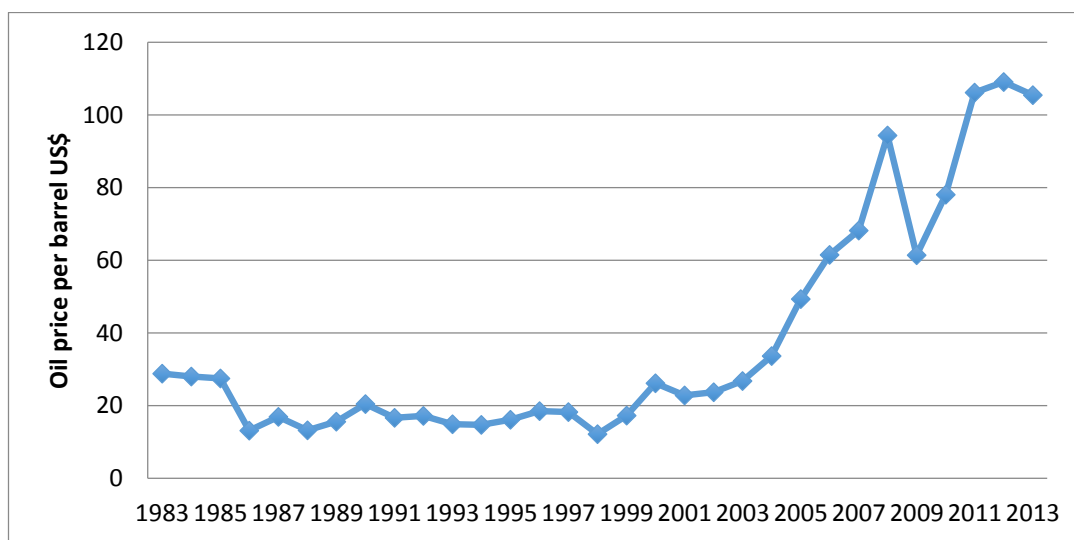
Figure 32: Oil prices 1983-2013 (US$ per barrel)

The above chart indicates that price increases for oil in recent years have been rapid. This has resulted in high energy prices over the past decade. From 2003

onwards, the prices associated with oil products increased rapidly and the result for the oil producing nations was better revenues in the long run.

However, it is clear that the global recessionary periods in 2008-09 caused prices to fall sharply for a time. Still, the recent behavior of oil prices has been different; from 2010 onward they have remained almost stable in the global markets even though they remain high. Nonetheless, these prices recently have gradually been tumbling. They have done so because the emerging markets have been growing more slowly, while alternative resources for oil and other hydrocarbon products have also been under development.

Thus, this latest sharp decline of oil prices in the markets probably indicates a reduced demand for oil and an eventual decline in oil prices. This suggests that when the global market outcomes are taken into consideration there is an upward thrust on the oil prices. It is important to understand the reasons for this change.

One of the main issues is the imbalance of demand and supply. It has been identified that the energy demand from the emerging nations is growing rapidly, because these nations are developing fast and they need to fuel their growth.

India and China are the two countries with the largest populations in the world and both have to make sure that they have access to as much energy as their markets demand. This kind of growth in the demand for energy would eventually result in raising the level of the global demand. However, the supply dynamics may not keep up with it.

The reason is that certain nations that have been supplying oil products to the global markets are reaching the limits of their capacity. However, certain other nations seek to maintain the products at a certain price level and this tends to lead them to

control the prices of oil products. But investments in the sector take longer to materialize, suggesting that suppliers may not be able to provide enough to meet the increased demand. This has been one of the main factors pushing up the prices of oil products.
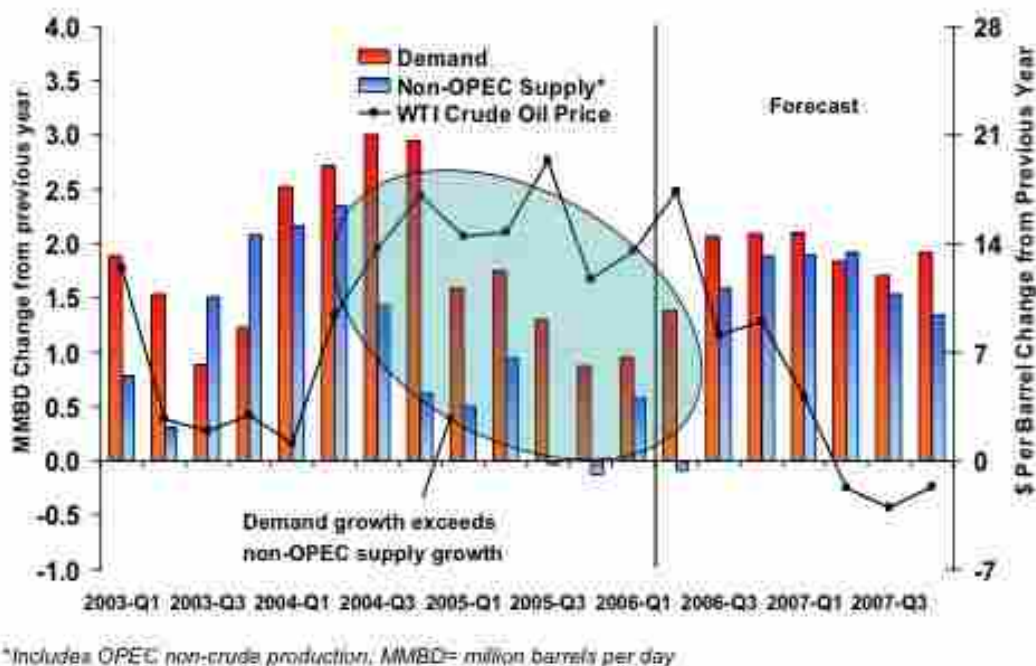
Figure 33: Demand and supply disparities of oil

The above chart indicates that the capacity limitations are prominent in non-OPEC nations and it is likely that the growth of oil resources will remain one of the aspects that is imitated by the growth of energy resources. This indicates that the energy prices in the markets will fluctuate and the eventual outcome of this volatility remains negative over the long run. Thus oil prices in the global markets will probably continue to increase.

Nonetheless, every country has only a limited capacity to refine oil products. This is also one of the main limitations for the world's supplies of oil products as well as for the UAE's refineries. Growing downstream tightness, especially in light, clean

products for transportation, has increased the pressure on product prices in the oil markets. Yet, to maximize the efficiencies associated with oil refining, refineries have to be developed to suit the type of oil that is found in their region. Thus, it seems that refining capacity is what needs to grow in the future.

Political and climatic conditions are two other factors that have helped to disrupt supplies. For instance, the instability in Iraq and Libya has contributed to limitations I the oil supply in the market and this will very probably contribute to the growth of oil prices in the future. Thus, political issues as well as developmental ones are among the major issues that the companies face and this is likely in the end to impact on oil prices in the global markets.

It should be noted that the oil exporting nations will see that the explosive growth in oil prices benefits them in the short run, since they can thereby earn more from the oil that they produce. This increases their income level of income and allows them to invest in various other aspects of development for their country. The UAE is one nation that has continued to invest such funds in developing its infrastructure.

It is clear that investments are flowing in to increase the production of oil and that new technologies improve the amounts extracted from the existing oil fields. However, it should also be remembered that investments in this area generally take time to respond to market expectations. Hence, companies may find it difficult to increase production quickly enough.

It is very likely that the growth of production will not affect high energy prices in the future, since the availability of the oil resources will remain limited while with global growth the demand for the oil will continue to increase. Even though alternative

energy sources are being developed, they are decades away from being able to replace the oil based system.

6.2.4 Financial markets and resources allocation

The role of the financial markets in the economic context remains very important, according to (Caporale & Soliman, 2004). They point out that any dynamic and developing economy is closely linked with the financial markets, for the role of the markets remains important when it comes to the allocation of the resources within the economy. (Darŝkuvienė, 2010) discusses various methods of allocating resources between sectors. The financial markets in developed countries have evolved develop a high degree of variety and offer investors a range of financial instruments for this purpose.

The main role of the financial market in each country is to allocate scarce resources efficiently; some parties require resources while others have the resources already. The financial system should see to it that needy parties receive resources from well-endowed parties and provide resources to those who need them for investment purposes. The eventual outcome of the exercise overall is that the organizations and the individuals will receive what they need provided that their course of action can be justified. This is similar in all the cases and locations that are under consideration (Darŝkuvienė, 2010).

When the financial resources are being allocated in an economy based on the market demand for such resources, it is generally considered to be efficient in nature. The investors are likely to invest these resources in activities that will provide positive long run returns. The eventual outcome of the process is that the lender as well as the

borrower can benefit from the process. This stimulates the growth of the economy by contributing to the various economic activities taking place.

Thus, the appropriate allocation of resources is likely to create a positive impact on the economy as whole. (FitzGerald, 2006) accepts this argument and reasons that, to build a healthy economy, a nation must have an efficient financial system in place. It should be noted, he goes on, that larger financial systems and the markets remain highly efficient when it comes to the allocation of resources between parties.

(Gray, S & Blejer, 2007) argue, however, that the financial markets in the Gulf Coordination Council (GCC) region have been developed in order to encourage market growth over the long run. However, they point out that the development of the capital markets in the region must go further to maximize the benefits that they may provide.

(Bartolini, Goldberg, & Sacarny, A, 2008) examine the impact of a country's stock markets on economic performance. Their findings indicate that, while relationship exists, its nature is not very clear in all the stock exchange indices and the records of economic performance. This leads to inconclusive results, since certain situations promote a relationship between the stock exchange and the economic performance while other situations may weaken this.

(Gray, S & Blejer, 2007) differ, saying that the relationship between the oil prices and the financial markets in the GCC region remains unclear. This also indicates that, while it is possible that the economy and the financial markets are sometimes related, discussion also concludes that in the GCC region such a relationship between oil prices and financial market performance may not exist. (Woolley, 2010) puts forward an alarming set of insights to indicate that the conventional belief systems about the financial markets are wrong.

He identifies that it is no longer realistic to accept the efficient market paradigm that the whole financial and the economic link is built on. He takes it that the current information builds a momentum for investment in the market and this leads to changes in the demand and supply of stocks; this sequence is not necessarily built on rational assessments of scenarios that predict changes in the long term capabilities of the market.

This assumes that investors are fundamentally not rational and do not make rational decisions. This is the main basis on which to explain bubbles in the market. According to him, if investors ever made rational decisions and took account of all the information about the market, they would not be likely to see such issues arising.

(Woolley, 2010) argues that there could be a certain level of disconnection between a country's economic performance and the performance of its financial markets. While the theories can generalize various aspects of this proposition, it should be noted that it focuses on the developing markets and developing economies; but neither the markets nor the economies in the GCC region, including the UAE, are mature (Gray, S & Blejer, 2007) .

(Kose, Prasad, Rogoff, & Wei, 2009) remark that financial systems and markets cannot separately result in economic growth; thus the policies of the economy and the other related driving factors should remain well integrated with the national economies. However, the financial sector cannot be discussed in isolation. (Kose, Prasad, Rogoff, & Wei, 2009) highlight the fact that globalization is one of the important factors affecting the role of the finance sector.

The financial sector has been able to develop globalized capabilities allowing it to attract more investors to a given market. It should be noted that the financial sector

of a given country has a close relationship with the other economic sectors and the development of these sectors will eventually result in the growth of the financial sector as well (Christopoulos & Tsionas, 2004).

6.2.5   Economic Growth and Key Drivers

The oil prices have broadly been increasing over the past few years; however, recent developments indicate that after 2012 actual oil prices remained stagnant for some time. This is mainly attributable to the fact that the growth of countries such as China and India has become comparatively slow. Hence, the net demand for oil from these nations has reduced. This reduction suggests that the oil revenues from the nations who depend on oil will eventually reduce.

However, it is clear that oil is not the only source of revenue that a nation such as the UAE could have; other sectors of the economy are growing fast as a result of the appropriate diversification. (Haouas & Heshmati, 2013) believe that the UAE have actually diversified their economy and it has been able to grow even in the face of reduced oil prices through this action. However, they also point to the fact that the UAE have not been able to diversify their activities altogether. Thus, they are still faced with what the researchers call the "oil curse", which could impact on the economy of the country in the future.

The UAE is clearly seeking to diversify its economy further. The country has many plans in place and believes that it will gradually be able to diversify all the aspects of the economy as appropriate. However, while the challenge remains, the fact that energy prices remain high is one of the aspects that mitigate the need for diversification, since in the short run investment it seems highly profitable and would earn better benefits to develop the country's hydrocarbon resources. Because

investments in the oil production remain lucrative, in other words, the country may not take a serious approach to investing in other sectors and diversification.

(Haouas & Heshmati, 2013) is that while the sectors of the UAE, such as real estate, tourism and other such areas have grown over the past few years, most of these areas are still closely linked with the oil sector and if the oil revenues decline, these sectors will also be negative affected. Thus, the role of the economic growth and the diversification activities taking place in the UAE have a very close relationship and it is very important for the country to effectively develop policies and actually work towards a higher level of economic diversification in the future.

While the country is still faced with the oil curse scenario, then, it is also taking the required steps to break out of this situation and benefit from the process. Figure 33 indicates that investments in the oil sector as a percentage of gross domestic product (GDP) have declined over the past few years while the role of investments in the non-oil based sectors is growing fast.
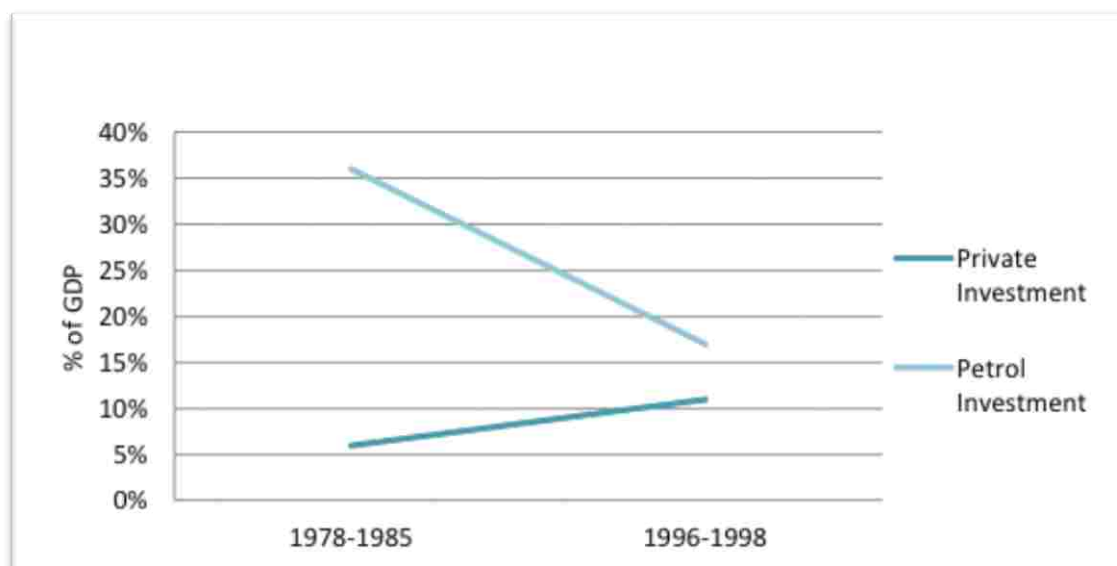
Figure 34: Oil and non-oil investments in the UAE

The main challenge is that the growth of the economy of the UAE in the past few years has been attributed by its investors to the growth in oil prices, given that the international demand for the oil has been increasing. This means that the role of oil and oil prices in the UAE market still dominates and is one of the important drivers of economic growth. However, it seems that the role of the oil sector is gradually declining with the growth of the other sectors in the economy. Thus, the future benefits of diversification in this context are likely to be higher.

6.2.6   The UAE economic growth and the contribution of financial markets

One of the key questions that has been discussed for some time is the relationship between the financial markets and the eventual growth of the economy (Jalloh, 2009). In a logical sense, these two variables have to be connected because economic growth-related efficiencies are implied so long as financial markets can ease the efficient allocation of resources to the sectors. (Christopoulos & Tsionas, 2004) have examined data for 10 developing countries and found that there is a positive relationship between the above variables.

(Caporale & Soliman, 2004) , for their part, indicate that a well-developed stock market reflects a country's economic performance. Their study is based on data collected from seven countries which have well established stock markets. Thus, the discussion reveals much evidence that there is a clear relationship between financial markets and economic growth; the financial market in a given country works to reflect the country's economic growth.

(Mohtadi & Agarwal, 2001) indicate that the scenario is true when the stock market fulfills a number of conditions in line with market expectations. This reflects

the statement of (Caporale & Soliman, 2004) that well developed markets reflect the economic conditions of a given country. But if the country does not have a well-developed economy, the markets cannot reflect the economic reality of the country under discussion. Such situations are considered failures of the financial market. While no such situations have been reported in this context, there is no evidence of many failures of international markets in the past.

(Woolley, 2010) however, remains very skeptical regarding this issue, mainly because the financial markets have not been performing in line with investors' expectations. He agrees that bubbles are related to the irrationality of investors' thinking and that they lead to the eventual collapse of the expectations of investors as a whole, indeed on market confidence as a whole. (Woolley, 2010) therefore criticizes most of the theories underlying the supposition of existence of relationships between an economy and the stock exchange.

An OCED study (2009) also indicates that many failures are associated with the financial markets of various countries. It is apparent that the systems associated with the financial markets remain among the culprits and that the regulatory approach taken by different countries affects the success or failure of the financial markets in general. This indicates that it is not the concept but rather the actions that impact on the success or failure of the financial markets around the world over the long run. This indicates that a number of limitations operate and that Woolley's line of thinking (Woolley, 2010) is in conflict with the thinking of the OECD.

(Winkler, 1998) has placed the whole issue in context; his discussion clearly indicates that the financial markets may play a dual role in the economies where they operate; one of the roles is to facilitate economic growth or even reflect the growth of

the economy of the country. The whole discussion indicates that the financial system, as well as the other issues such as regulation, etc. could impact on the financial markets.

As discussed, the UAE has two stock exchanges: the Dubai Financial Market (DFM) and the Abu Dhabi Stock Exchange (ADX). Both of these stock exchanges have equity as the primary source of their investment instruments. Certain levels of debt are listed, as well. The numbers of companies listed in these stock exchanges is limited. The main point to note is that they have been able to expand with the growth of the UAE's economy. The following chart indicates the details.
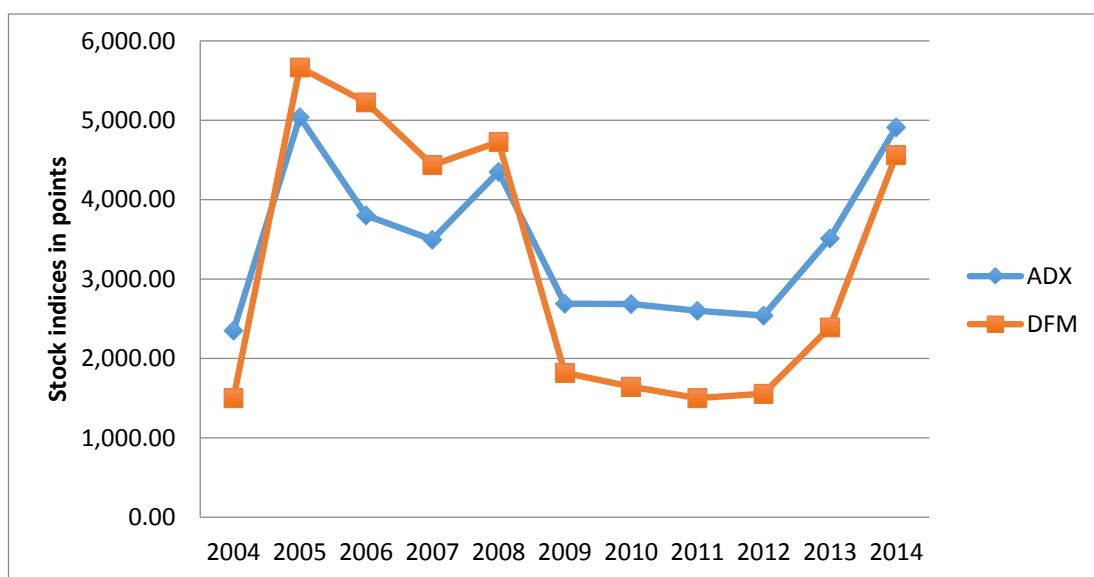
Figure 35: The changes in the stock indices of ADX and DFM

The chart indicates that, while the stock indices suffered in the period 2008-09 due to the recession, they are evidently growing fast now. If the past few years are taken into account, the growth has in fact been accelerating. Thus, the role and the direction of the financial markets remain among the key areas that the companies must focus on to achieve the expected results.

The upward trend that can be seen in Figure 34 indicates that the financial markets of the UAE have been able to attract investors. It should also be noted that during the period the trading volumes as well as the number of companies listed in the stock exchange increased. This indicates that the market liquidity and the variety of financial investment options offered have increased, making the market more attractive to investors, who enjoy benefits in consequence.

It may also be claimed that the economy of the UAE has been growing fast during the last few years. This may have been driven by the fact that the recession pushed the economy down and the fundamentals have allowed room for the economy to growth. However, such growth opportunities give the companies further chances to make a profit and these changes may be another contributing factor to the growth of the UAE stock markets in the period. This means that the growth of the financial markets has been continuous and it is likely to continue to grow in the next few years.

It is also important to note the fact that the trends impacting the growth of ADX as well as DFM have been similar. The trend also indicates that in recent years, DFM has been more volatile than ADX. Thus, the changes in market conditions as well as other factors could have a greater impact on DFM behavior than on ADX. However, it should be noted that in both cases, the markets have been following similar trends over the past few years and this indicates that the overall market and the operating conditions that they are under are likely to be similar.

6.2.7   The oil prices and GCC financial markets

This is the main focus of the discussion; its outcome must indicate the nature of the relationship between the variables under consideration. (Gray, S & Blejer, 2007) find that the GCC countries have seen their stock market developing fast and they have

been able to ensure that this development as a platform for resource allocation has been at least partially successful. However, the present paper suggests that, while the oil prices may have affected the financial markets of the region, the nature of the impact may not be as profound as it is believed to be.

(Gray, S & Blejer, 2007) in this case think as (Caporale & Soliman, 2004) and seems to indicate that the UAE has financial markets which are still emerging. This indicates that these financial markets have further maturity to aim for if they are to reach the level of performance that is expected of them.

(Al-Yousif, Yousif Khalifa, 2004) identifies oil as one of the major exports of the GCC nations, but the countries will have to be well integrated with the rest of the world economy to maximize the possible benefits. Oil exports alone may not be adequate to fulfill the future needs of these nations.

(Ravichandran & Alkhathlan, 2010) bring out a different argument in their comprehensive study of the GCC markets. They conclude that oil markets remain one of the catalyzing factors that would precipitate changes in the financial markets of the Gulf countries.

However, their paper comments that the Kuwaiti and Bahraini markets are more speculative than concerned with economic fundamentals. Thus they remark that they may not reflect a strong relationship between oil prices and the performance of the financial market. However, other nations are observed to have a stronger relationship.

It should be noted over the long run the impacts of the fundamentals are generally falling. (Mohtadi & Agarwal, 2001) see that when the relationship between

the financial markets and the economies is evaluated, a relationship is apparent only in the long run.

(Ravichandran & Alkhathlan, 2010) find the same scenario. (Arouri & Rault, On the Influence of Oil Prices on Stock Markets: Evidence from Panel Analysis in GCC Countries, 2009) assert that in Qatar, Oman and the UAE oil prices even have a short term impact on the financial markets. Thus the role of the oil prices in the financial markets seems to be heavily involved with the economies of these countries.

This indicates that these financial markets are fundamentally responsive to the changes in oil prices in a better way than are other financial markets in the region and this allows them to adjust fast to the likely future information about oil prices. Thus, it could be either information efficiency (Darkŝkuvienė, 2010; Woolley, 2010) or regulatory efficiencies (OCED, 2009) that lead to results of this kind over the long run.

Eventually the discussion shows that, compared with the other markets, these markets remain efficient and they have been able to reflect the changes in oil prices effectively through changes in their financial market. In specific terms, the Abu Dhabi Securities Exchange (ADX) and the actual impact of the oil prices have been surveyed by (Abberger, Shorooq, Nierhaus, & Khaled, 2013) who report that a relationship between the oil prices and the Abu Dhabi markets is perceptible.

They have no direct contact, for the Abu Dhabi Securities Exchange (ADX) includes no company that is directly linked to the oil sector, because none of the oil related companies is a private sector company. All are state sector operations, and not listed on the stock exchange.

However, the paper claims that with the increase in the oil revenues, the associated market confidence would increase. This would probably be received

positively and the markets would grow. Thus the paper argues that there is a relationship between the oil prices and the markets. The finding from this assessment is similar to the conclusions reached by (Gray, S & Blejer, 2007) in relation to most of the stock markets in the region.

To the best of the author's knowledge, no direct studies have been carried out on a link between the Dubai Financial market and the price of oil. However, it should be noted that similar facts that have been identified from studying other markets in general could also be applied in the context of the Dubai Financial market. Thus it would safer to ascertain that the oil prices impact on the Dubai Financial Market returns.

Overall, the purpose of the previous section was to discuss the development of the oil markets in the United Arab Emirates and ask how this has impacted on the country's economy and financial, markets. The financial markets and the economies of the countries are generally expected to have a close relationship and such a discussion would indicate the nature of the relationship between these entities. The UAE has seen its economy grow over the last few years and expects this to continue in the foreseeable future. The impact of oil has to be identified because it is still the most important commodity that the country has.

As we have seen, the UAE has been to some extent able, through its efforts, to reduce its dependence on oil resources for its economic growth, while making sure that the benefits can be maximized and the best possible results can be achieved. Yet the role of oil remains very important. Almost half of the UAE's exports are oil based products and the sector will continue to play a leading role for some time.

The oil prices in the global markets continue to fluctuate, indicating that it would be best if the UAE could diversify its economy. While prices increased in the last decade, after 2012, they stagnated. This provides the basis and justification for the increase in the oil prices in the global markets. The financial markets provide one of the best, most prudently based methods for re-allocating resources in suitable contexts and receives the results in line with the needs in place.

The economy of UAE has been growing fast; while certain writers have attributed this growth to the increase in oil prices, many attribute it to a mix of factors. This is mainly because the economy has been diversified; irrespective of the recent fall in the price of oil, the country and the economy have been able to grow. The financial markets of the country also have been able to reflect this growth, since they can allow the allocation of resources and maximize the economic benefit derived from different sectors.

UAE has two financial markets and it is clear that both have been contributing to the growth of the national economy. Many have found that the growth of the UAE financial markets has been achieved in step with the growth of the economy. The factor of oil prices has been highly influential in the past. However, because no oil companies are listed and the level of economic diversification is high, this influence is no longer a direct factor influencing the growth of the financial markets.

6.3 Literature Review

Research on the area of oil price and stock market relationship is minimal, since only a few empirical studies which focus specifically on the relationship of the oil price to stock market in the UAE are available.

Public attention has recently been re-directed to the links found between stock returns and oil prices. This is probably due to the fact that crude oil prices have exhibited extraordinary volatility, which has impacted negatively on the energy sector by increasing the uncertainty about it. The same uncertainty is felt about the economy and the financial markets.

These problems have raised the concern to re-examine how the negative connection between oil prices and stock returns can best be explained. Earlier studies on the same subject have shown that oil price increases and volatility lead to increased unemployment and inflation. These in turn depress macroeconomic development and financial assets (Awerbuch & Sauter, 2006).

Oil price fluctuations have been the focus of attention for several financial practitioners as well as market participants, for two main reasons. First, the producers' decisions are substantially affected by oil prices. Second, investors base their decision to invest in the oil sector, their portfolio allocations, and risk management on these prices.

With such influence, it is of very useful for decision making in the financial sector to be able to forecast oil price fluctuations and the direction they take. With this in mind, (Arouri, Lahiani, & Nguye, Forecasting the conditional volatility of oil spot and futures prices with structural breaks and long memory models, 2010) state,

"Aggregate output dynamics and corporate earnings can be also severely affected, and policymakers should consider the volatility impacts of oil price when conducting economic policies. Moreover, to the extent that oil price volatility provides information about risk levels and how financial asset returns should behave in response to oil shocks, accurately modeling and forecasting oil price volatility are crucial for

financial decisions involving oil investments and portfolio risk management particularly with regard to the valuation issues of oil-related products and energy derivative instruments".

This shows that near-accurate oil-volatility forecast can play a pivotal role in the better management of portfolios (Kroner, Kneafsey, & Claessen, 1995). These findings have prompted numerous studies examining oil prices and their volatility and the macroeconomic as well as the microeconomic impact that an economy, and more specifically financial markets, can receive because of them.

The important research about oil fluctuations has concentrated on the impact of the oil price on macroeconomic variables. Among others, (Dissou, 2010); (Huang B.-N. H.-P., 2005); (Jacobs, Kuper, & Van Soest, 2009); (Jiménez-Rodríguez R. ,., 2005); (Jiménez-Rodríguez R. &., 2009); (Lardic & Mignon, 2008) assert that macroeconomic variables are fundamentally sensitive to oil price increments and volatility.

(Eksi, I, H, Senturk, M, Yildirim, H, & S, 2012) contend that since oil constitutes a significant input for some industries, the increment in oil value prompts economic crises by making noteworthy cost-push inflation and higher unemployment. On the same lines, (Basher & Sadorsky, 2006) assume that an rise in oil prices goes about as inflation tax and subsequently leads consumers to search for option vitality sources on the one hand and increases risk and vulnerability on the other; this greatly influences the stock price and reduces wealth.

Using a multifactorial model of arbitration that takes into account both conditional and unconditional risk factors, these researchers discover powerful

confirmation that oil price risk affects the execution of stock markets in emerging nations.

Regardless of the essential number of studies created on the connections between oil price movements and macroeconomic activity, a couple of papers concentrating on the associations between oil price volatility and stock returns are available. A few papers add different variables to direct the stock returns practices. Among other things, oil production is presented as an explanatory variable by (Kilian L. , 2009); (Kilian L. &., 2009) and (Güntner, 2013).

(Bernanke, Ben S, Gertler, Mark, Watson, Mark, Sims, & Friedman, 1997); (Lee B.-J. Y.-N., 2012) present the short term interest rate. (Sadorsky, 1999); (Park & Ratti, 2008); (Cunado & Perez de Gracia, 2005); (Cuñado, Juncal & Pérez de Gracia, Fernando, 2003) create models that link the stock returns to distinctive variables including oil price, oil production, short term interest rates and industrial production.

(Jones & Kaul, 1996) use quarterly data for Canada, Japan, the UK and the US over the period 1947-1991 to test whether the response of stock returns to oil fluctuations can be supported regarding present and future changes in real cash flows as well as changes in expected returns. The point of the study is to figure out whether stock exchanges are rational, here characterized as completely adjusting to the effect of oil price fluctuations on dividends.

In light of a standard cash-flow dividend valuation model and proxying the oil price index by the Producer Price Index, they give an account of the US and Canada that helps to show how the response of stock prices to oil price fluctuations can be totally represented by the impacts that incite the turning of these fluctuations into cash flows. Discoveries for Japan and the UK did not reveal any significant results.

(Park & Ratti, 2008) look at the impacts of oil price fluctuation and oil price volatility on the real stock returns of the US and 13 European nations over the period from January 1986 to December 2005. Deploying a multivariate VAR model, they find that oil price fluctuation push a factually huge effect on real stock returns in the same month or within a month. They prove likewise that this result is strong against perceptible changes in the VAR model of variable order and the consideration of extra variables.

On almost similar lines (Naifar & Al Dohaiman, 2013) researched the nature of the relationship between crude oil prices, stock market returns and macroeconomic variables. Their investigation is carried out in two steps. First, the authors analyze the effect of oil price change and volatility on stock exchange returns under regime shifts, using a specimen made out of data from the Gulf Cooperation Council (GCC) nations.

To create regime probabilities for oil market variables they use a Markov regime-switching model. Two state Markov switching models are used, the crisis regime and the non-crisis regime. For the second time, they investigate the non-linear associations between oil price, interest rates and inflation rates before and during the subprime crisis.

They consider different Archimedean copula models with diverse tail dependence structures. The fundamental discoveries that they acquire demonstrate a regime dependent relationship between GCC securities exchange returns and OPEC oil market volatility, making a special case of Oman.

Their results indicate an asymmetric dependence structure between inflation rates and crude oil prices and they find that this structure is situated at the upper end

amid the recent financial crisis. They discover also a significant symmetric dependence between crude oil prices and the short-term interest rate during the financial crisis.

Numerous papers have also recently explored whether future stock exchange returns can be anticipated when the focus is on past oil price changes. Among others, (Driesprong, Jacobsen, & Maat, Benjami, 2008) use data from eighteen developed and thirty emerging nations. Their fundamental target was to test if month to month oil price advances help to foresee stock returns.

Their discoveries affirm significant predictability in twelve developed markets and also all their chosen emerging markets. (Torous, Valkanov, & Hong, 2002) report a noteworthy negative relationship between the slacked petroleum industry returns and the US stock exchange. These discoveries affirm those of (Papapetrou, 2001) using month to month data on the Greek stock exchange from 1989 to 1999.

The consequences of his study show, in fact, that the oil price structures a necessary element in clarifying stock price movements, and the increases in oil price fluctuations incite genuine low points in real stock returns. Thus, (Miller & Ratti, 2009) test the long term link between the world price of crude oil and global stock exchanges. They use a Vector Error Correction model over the period from January 1971 to March 2008.

The results for six OECD nations affirm a reasonable long-term association between oil price and real stock market returns, which implies a negative response of real stock prices to the increase in oil prices. The negative response of real stock prices to the increase in oil prices is credited by a few researchers who agree on the immediate impact of this increase on cash flows and inflation.

Some studies give vital confirmation of the association between oil prices and stock returns. Among others presenting nonlinear impacts, (Ciner, 2001) affirms the negative effect of oil price futures on real stock returns. The same result showing that an expanding oil price leads to lower stock returns is regularly reported by numerous researchers, for example, (O'Neill, Penm, & Terrell, 2008) for the US, the UK and France, (Park & Ratti, 2008) for the US and 12 European oil importing nations, and (Nandha & Faff, 2008) for worldwide industry indices (with the exception of attractive industries).

(Reboredo & Rivera-Castro, 2014) analyze the association between oil price and stock market returns using day by day data comprising the total S&P 500 and Dow Jones Stoxx Europe 600 indices and US and European industrial sectors (automobiles and parts, banks, chemical, oil and gas, industrial goods, utilities, telecommunication, and technologies) over the period from 1 June 2000 to 29 July 2011.

From wavelet multi-resolution analysis, they find that oil price changes have no great impact on stock exchange returns in the pre-crisis period at either the total or the sectoral level. With the onset of the financial crisis, their discoveries help to confirm the positive association between oil price fluctuation and stock returns at both the total and the sectoral level.

The examination of the link between oil price risk and stock returns has likewise been the subject of investigation, taking an example drawn from the UK-recorded oil and gas firms (El-Sharif, 2005) . It is found that progressions in crude prices, the stock market condition and additionally the exchange rate as a risk factor trigger critical effects on oil and gas stock returns.

(Aloui & Jammazi, 2009) apply a two regime Markov-switching EGARCH model to the relationship between crude oil fluctuation and stock returns. Using data from France, the UK and Japan over the period January 1987 to December 2007, their discoveries demonstrate that net oil prices take a crucial part in deciding first the volatility of real returns and second the likelihood of a move crosswise over regimes.

A study by (Dhaoui, A & Khraief, N, 2014) inspects observationally whether oil price fluctuations affect stock exchange returns. Using month to month data from eight developed nations between January 1991 and September 2013, they evaluate an EGARCH-in-M model to manage, notwithstanding the impact of oil prices on stock market returns, the asymmetry in stock price conduct – the solid negative associations between oil prices and stock exchange returns which are found in seven of the chosen nations.

Oil price changes are without noteworthy impact on the stock market of Singapore. On the volatility of returns, the changes in oil prices are significant for six stock markets but have very little impact on the others.

(Jawadi & Bellalah, 2011) investigate the relationship between the stock markets and oil markets in France, Mexico, the Philippines and the USA, applying nonlinear co-integration methodology. The researchers conclude that there is a strong and significant linkage between stock and oil markets in all four countries.

The Vietnamese market is the focus of an investigation by (Narayan & Narayan, 2010) employing Gregory and Hansen tests. Nominal exchange rates are added as a third variable to examine the effect of oil prices on the stock market in Vietnam. Narayan & Narayan conclude that from the statistical point of view, the

effect of oil prices on the stock market in Vietnam is positive and there is co-integration between all these variables.

According to (AROURI & FOUQUAU, 2009) , there is a significant interaction between the stock price and oil price in Qatar, Oman and the UAE. The study focused on non-linear and linear relationships, together with the effect of oil price fluctuations on financial markets. However, in Kuwait, Saudi Arabia and Bahrain, changes in oil prices do not have any significant impact on stock prices.

On the contrary, the empirical results of a study concluded by (Maghyereh & Al-Kandari, 2007) indicate that there is a non-linear linkage between the oil price and GCC stock markets. These writers contradict previous findings and ascribe the anomaly to the use of non-linear co-integration analysis, whereas all the preceding researchers had applied only linear analysis.

The findings of (Ravichandran & Alkhathlan, 2010) show that in GCC countries oil prices exert a certain influence on the stock markets, and also co-integration relations between two of the variables in the long term. (Hamilton, 1983) argues that since World War II, almost all the United States recessions have been preceded by oil shocks.

Some studies were based on using a VAR model. (Schwert, 1989) uses this model in explaining the volatility of stock returns. His study is based on macroeconomic indicators that include bond returns, the growth rate of the producer price index, and the monetary base. (Huang & Masulis, 1996) study the link between US stock returns and oil daily future returns by means of an unrestricted VAR model for the period 1979-1990.

They find that the returns from oil futures resulted only from the stock returns of some individual leading oil companies but their effect on the broad-based market indices, for instance the S&P 500, was negligible. After three years (Sadorsky, 1999) used the same model as (Huang & Masulis, 1996), that also included the short-term interest rate and industrial production figures.

The purpose of the study was to examine the link between stock prices and oil prices. This was based on monthly data from the US for the period January 1947 to April 1996. He highlights the significance of the oil price by describing the fluctuations of the other variables. These discoveries nullify those of (Huang & Masulis, 1996).

They are conversely additional to the results seen in (Chen, Roll, & Ross, 1986) according to which the returns produced by oil futures are without critical effect on stock market indices, for example, the S&P 500, and no additional effect is discernible when considering the risk brought by the exorbitant volatility of oil prices on stock exchanges.

 Following the above, (Abu Zarour, 2006) also uses VAR analysis to study the effect of oil price changes on GCC stock markets. The study reveals that only the results of the Saudi and Muscat markets can be predicted from oil price increases.

Moreover, the relationship between the Chinese stock market and oil price fluctuations are examined by (Cong, Wei, Jiao, & Fan, 2008). They use multivariate VAR and find that the Chinese stock market is not sensitive to the impact of oil prices in any numerically important way. However, the manufacturing index and some oil companies sometimes register changes due to oil price fluctuations.

In addition to the VAR model, some studies are based on the multivariate model. In a survey article, (Mork, 1994) states that for a group of oil importing

companies there is a negative correlation between oil prices and aggregate measures of output and employment. (King, Sentana, & Wadhwani, 1994) study the linkage between stock returns and observable factors and unobservable factors by examining the data from a number of emerging and developed markets.

The observable factors include interest rates, industrial production, and oil prices, while the unobservable factors were those that were not reflected in the published data of the stock markets in question. They find that the unobservable factors play an important role in describing the volatility of stock returns.

Another technique on which recent studies have been based is the Johansen co-integration technique. (Hammoudeh & Aleisa, 2004) use this technique to examine the relation between oil prices and stock markets in the GCC countries. They conclude that the Saudi stock market is the only one in the group where the movement can be predicted by oil prices.

(El-Wassal, 2005) also uses this model to demonstrate the existence of long-term link between stock market indicators such as liquidity and size with macroeconomic indicators. However, his study is based on countries in Asia, Africa, and Latin America that export their oil.

Mean and variance causality have been used as an approach to examining the multifarious link between Iran as an oil exporting country and the international oil market price index. The research results indicate that because the data for the series of this research process have been generated they show no link between the variance in the changes of oil price in Iran and the impact of this variance on the stock returns. This suggests that when the international oil market shows any volatility, it does not have any impact on Iran's stock market (Oskooe, 2012).

(Apergis & Miller, 2009) use a VEC model to investigate whether the structural oil market variations impact the stock return in eight developed countries. Their findings show that international stock markets do not make any important responses between international stock market returns and oil price changes.

(Arouri & Rault, On the Influence of Oil Prices on Stock Markets: Evidence from Panel Analysis in GCC Countries, 2009) apply linear and non-linear models to examine the GCC countries as regards stock markets and their link with oil price fluctuations. These writers use data from 7 June 2005 to 21 October 2008 and show that stock markets in Qatar, Oman, Saudi Arabia, and the UAE react to oil price fluctuations. But the stock markets of Bahrain and Kuwait show no such impact.

(Bjørnland, 2009) applies a VAR model on the stock market of Norway as an oil exporting country and examines the effect on oil prices. After considering the information from 1993 to 2005, Bjørnland concludes that the Norwegian stock market responded to the oil price fluctuations in the shape of an increase in average wealth and in demand. He also finds that in Norway monetary policy effects are felt on stock market prices in the short term.

(Arouri, Lahiani, & Nguye, Forecasting the conditional volatility of oil spot and futures prices with structural breaks and long memory models, 2010) in a recent study examine the sector return sensitivities to oil price fluctuations in the stock markets of Europe. They use the Granger causality test and the two-factor market model to conclude that the responses of oil price to stock returns show different behavior according to the sector of activity.

(Chen S.-S. , 2010) uses time-varying transition probability Markov-switching models to investigate the S&P price index in relation to oil price fluctuations and their

effect on stock prices. He demonstrates that stock markets are pushed into bear territory when the oil prices experience a hike.

(Arouri, Lahiani, & Bellala, Oil Price Shocks and Stock Market Returns in Oil-Exporting Countries: The Case of GCC Countries, 2010) use co-integration regression to investigate the link between oil price fluctuations and stock returns in the countries which export oil. They also use such regression methods as SUR, which seem to be unrelated to studying these phenomena. They examine the data sets on a fortnightly and monthly basis from 7 June 2005 to 21 October 2008 and from January 1996 to December 2007.

Their study reveals that GCC countries show considerable evidence of co-integration of both stock markets and oil prices. Their application of the SUR method for the same period also shows that an oil price hike impacts positively on the stock results. All members of the GCC showed the same results, except Saudi Arabia.

The study conducted by (Olufisayo, 2014) analyzes the relationship between changes in oil prices and securities exchange development over the period 1981-2011, using vector error correction modeling. The results propose a long-term relationship between oil value, exchange rate and stock exchange development. Unidirectional causality runs from oil price shocks to growth in securities exchange. The impulse response function demonstrates that oil prices have a transitory positive effect on the stock exchange.

Another paper, by (Boyer & Filion, 2007) finds that Canadian energy stocks are markedly related to the general markets return and the appreciations of crude oil and natural gas prices. Contradicting a study by (Olufisayo, 2014), the examination

demonstrates that securities exchange records react adversely to increments in the oil price over the long run.

Be that as it may, as they suggest, this example seemed to break away from findings for the earliest starting point, the year 2000. The empirical findings of the study by (Lardic & Mignon, 2008) indicate a remarkable solid unidirectional causality from oil prices to share prices, most particularly for nations that export oil.

Moreover, (Gogineni, 2007); (Yurtsever & Zahor, 2007) endorse the finding that oil prices are decidedly connected with stock prices: oil price fluctuations reflect changes in average demand. Then again, the relationship turns negative where oil price fluctuation reflects total supply. In addition, the results demonstrate that stock prices react symmetrically to shocks in oil prices.

(Bhar & Nikolova, 2010) find that worldwide oil price returns have a noteworthy effect on Russian stock market returns and volatility. The study by (Hasan & Mahbobi, 2013) of the impact of oil prices on the Canadian stock exchange demonstrates that the effect of oil prices on the Canadian securities exchange has been powerfully expanding in the second period studied.

The exact investigation by (Lin, Fang, & Cheng, 2010) demonstrate that the effect of oil price fluctuations in Greater China has been mixed in nature. The impact on Taiwan's stock exchange was fundamentally the same as that in the US securities exchange. At long last, the results demonstrate that all three impacts had critical positive effects on Hong Kong's equity market return.

(Kilian L. &., 2009) put forward the notion that in the U.S stock markets the response of real stock returns to an oil price shock differs significantly according to whether the change in the price of oil is caused by demand or supply shocks in the oil

market. Increases in the oil prices also generate negative impacts on equity returns for all sectors except the mining, oil and gas industries (Nandha & Faff, 2008).

(Hatemi-J A. , Is the UAE stock market integrated with the USA stock market? New evidence from asymmetric causality testing, 2012) in his study tests the EMH attached to the UAE stock market for a relationship with the oil shocks. When the conventional significance levels are borne in mind, it is not possible to reject the null hypothesis, which indicates that there is no causality between the oil price shocks and the stock market returns.

The outcomes show that the information efficiency of the UAE stock markets remain high when the oil prices are taken into consideration; there is no difference observed in this outcome regarding either positive or negative oil price shocks. Whether or not the asymmetric structure of the causality testing is taken into consideration, similar causal inferences can be made.

In the current literature, there are many studies seeking to identify the relationship between the oil price shocks and the stock market returns through using a different econometric technique. However, most of these studies focus on the oil importing nations, mainly the US. Most of the results agree in finding a negative relationship between these two aspects, for example (Basher & Sadorsky, 2006); (Chen S.-S. , 2010); (Elder and Serletis, 2010); (Jones and Kaul, 1996); (Kilian L. &., 2009); (Mesh et al, 2011), (Sadorsky, 1999) and (Wei, 2003).

Further, there are a few other studies implying that the significance of the relationships is not as high as is generally believed (Huang et al, 1996); (Apergis & Miller, 2009) and (Miller & Ratti, 2009). There are certain studies of the same relationships in the context of the oil exporting nations. In the case of Norway,

(Bjørnland, 2009) identifies that a 10% increase in the oil price could lead to a 2.5% increase in the stock market returns.

Another study of the Norwegian Stock Market and oil prices by (Park & Ratti, 2008) indicates that a higher oil price leads to positive influence on the stock market returns of Norway as an oil exporting country; conversely, increases in oil prices in oil importing countries have a negative impact on the stock markets.

The study by (Jung & Park, 2011) on the impact of oil shocks on an oil-exporting nation (Norway) and an oil importing nation (Korea) establishes that the impact of oil price shocks on the returns of the stock exchange can differ significantly. The overall results of the above researchers indicate that the impact created by the oil price shock on the stock exchange returns in oil exporting and oil importing nations is probably heterogeneous.

6.4 Data and Methodology

The data used in this study are derived from the following sources (during the period 6 January 2005 to 4 December 2014);

- ➢ Weekly data on international crude oil price index (OI)
- ➢ Abu Dhabi Securities Exchange index (AI)
- ➢ Dubai Financial index (DI).

The data relating to the weekly international oil price index was obtained through the US Energy Administration website (www.eia.gov), and the data on the AI were acquired through www.adx.ae whilst the data on the DI were derived from www.dfm.ae. The study sample consists of 506 observations.

An asymmetrical causality test is the basis for conducting empirical analysis in this study; this is based on the approach suggested by (Hatemi-J A. , Is the UAE stock market integrated with the USA stock market? New evidence from asymmetric causality testing, 2012). The causal impact of positive shocks is separated from that of negative shocks through the analysis. It is well known that investors in the financial markets react more to negative outcomes than to positive ones; this indicates that the asymmetrical test above is closer to the situation in the financial markets.

Given the above, we believe that the asymmetric approach is applicable to the situation in the present discussion. The causal impact is asymmetric in nature since the financial markets have a tendency to watch the ups and downs of the indices. Let us look into a scenario where there are three variables $x_{1t}, x_{2t}, and x_{3t}$, to determine the causal relationship between the three, based on the random walk process indicated below.

$$x_{1t} = x_{1t-1} + \varepsilon_{1t} = x_{10} +$$
$$\sum_{i=1}^{t} \varepsilon_{1i} \qquad (1)$$

$$x_{2t} = x_{2t-1} + \varepsilon_{2t} = x_{20} +$$
$$\sum_{i=1}^{t} \varepsilon_{2i} \qquad (2)$$

$$x_{3t} = x_{3t-1} + \varepsilon_{3t} = x_{30} +$$
$$\sum_{i=1}^{t} \varepsilon_{3i} \qquad (3)$$

For t = 1, 2….,T. The variables ε_{1i}, ε_{2i} and ε_{3i} represent the white noise disturbance terms while initial values are denoted by $x_{1.0}, x_{2.0}, and x_{3.0}$. The formula that can be used to identify the positive and the negative shocks in this instance can be

indicated as follows: $\varepsilon_{1i}^+ = \max(\varepsilon_{1i}, 0)$, $\varepsilon_{2i}^+ = \max(\varepsilon_{2i}, 0)$, and $\varepsilon_{3i}^+ = \max(\varepsilon_{3i}, 0)$ $\varepsilon_1^- = \min(\varepsilon_{1i}, 0)$, and $\varepsilon_{2i}^- = \min(\varepsilon_{2i}, 0)$, and $\varepsilon_{3i}^- = \min(\varepsilon_{3i}, 0)$.

Now the positive shocks and the negative shock-related outcomes have to be calculated on the basis of cumulative form. The following equations can assist in this scenario:

$$x_{1t}^+ = \sum_{i=1}^t \varepsilon_{1i}^+, \; x_{1t}^- = \sum_{i=1}^t \varepsilon_{1i}^-, \quad x_{2t}^+ = \sum_{i=1}^t \varepsilon_{2i}^+, \; x_{2t}^- = \sum_{i=1}^t \varepsilon_{2i}^-, x_{3t}^+ = \sum_{i=1}^t \varepsilon_{3i}^+,$$

$$x_{3t}^- = \sum_{i=1}^t \varepsilon_{3i}^- \; .$$

These components can be used for testing for asymmetric causality. The asymmetric causality tests are performed by using bootstrap simulations with leverage adjustments in order to produce reliable critical values, since residuals in the VAR models are not normally distributed and ARCH effects exist, according to the diagnostic test results that are presented in Table 6.1 for the VAR model.

The existence of an asymmetric structure in the context of causality testing is important. The bootstrap method is used with suitable leverage adjustments, as indicated above. The main benefit is the provision of valid inference, regardless of the possibility that the variables are non-normally distributed, coupled with potential ARCH volatility.

Table 6.1 shows the results and the above-discussed properties have contributed to the shaping of these results. Whether the VAR model is estimated for negative cumulative or positive changes, the null hypothesis of multivariate normality is rejected in all situations.

In two cases, the null hypothesis with no multivariate ARCH is rejected. So it is best to use the bootstrap test in this scenario. This is because standard symmetric causality

methods are based on normality and the accuracy of the performance of the constant variances remain questionable.

Table 6.1: Results of the multivariate diagnostic test

Variables	Multivariate normality	Multivariate ARCH
OI, AI	<0.0000	0.018000
OI, DI	<0.0000	0.010000
OI^+ , AI^+	<0.0000	0.192000
OI^- , AI^-	<0.0000	0.164000
OI^+ , DI^+	<0.0000	0.122000
OI^- , DI^-	<0.0000	0.128000

Table (6-2), which is shown below, contains the results of both asymmetric and symmetric causality tests. The null hypothesis of no causality in the negative shocks, which indicates that the oil price shocks do not impact on the Abu Dhabi Securities Exchange and Dubai Financial Market cannot be rejected. The case holds irrespective of the fact that causality testing has an asymmetric structure. However the standard symmetric and asymmetric tests reveal that the null hypothesis is rejected and the standard causality test and positive shocks in the oil price shocks do not cause similar shocks in Abu Dhabi and Dubai stock markets.

Table 6.2: Results of the Symmetric and Asymmetric Causality Tests from
1/6/2005 to 12/4/2014 on a weekly basis (506 observations)

Null Hypothesis H_0	Bootstrap CV at 1%	Bootstrap CV at 5%	Bootstrap CV at 10%	Wald Test Value	Conclusion on H_0
$OI \neq> AI$	9.666	6.390	4.966	20.313	Rejected
$OI \neq> DI$	10.411	6.520	4.739	15.238	Rejected
$OI^+ \neq> AI^+$	15.111	9.612	7.743	48.565	Rejected
$OI^- \neq> AI^-$	7.386	4.102	2.600	2.635	Not rejected
$OI^+ \neq> DI^+$	17.231	13.424	11.511	44.639	Rejected
$OI^- \neq> DI^-$	9.904	6.648	4.745	0.253	Not rejected

Notes:
1. As indicated, OI is the oil price related index, AI is the stock price index of the Abu Dhabi Securities Exchange, and DI is the stock price index of the Dubai Financial Market. The positive and cumulative shocks in the analysis are represented by (OI^+, AI^+, DI^+), whereas, the negative cumulative shocks are indicated by the vector (OI^-, AI^-, DI^-).

2. Statistics (Doornik & Hansen, 2008) have been used for the purpose of testing for multivariate normality. Further, based on the ideas by (Hacker, R.S & Hatemi-J, A, A test for multivariate ARCH effects, 2005) (ScottHacker & Hatemi-J, 2005), the multivariate ARCH effect is also tested using the bootstrap test in this case. The statistical software developed by (Hatemi-J & Hacker, R, MV-ARCH: GAUSS Module to Implement the Multivariate ARCH Test, Statistical Software Components G00009,, 2009) has been used for the testing. It is interesting to note, on the basis of the analysis, that the multivariate ARCH effect exists in this case and the data for the three variables are not normally distributed.

3. In the case of positive shocks, the optimal lag order remains at 4.00 for AI^+ and this reaches 6.00 when the case associated with it is DI^+ . The case of negative shocks is also highlighted here; 1.00 for AI^- and 2.00 in the case of DI^-. Should the shocks not be separated, the outcome stands at 2.00. A logarithmic approach must be used in the case of both these variables.

Next, we make use of the asymmetric generalized impulse responses method and conduct the asymmetric variance decomposition analysis for the Abu Dhabi price index, the Dubai price index, and the oil price index. These methods were described in Chapter 5 and are for measuring the impact of the oil price shock on the Abu Dhabi and Dubai stock markets. The empirical findings of this discussion study are not presented, but they are available for information on request.

The results reveal that the oil price index for negative innovations has had a significant impact on the stock markets of Abu Dhabi and Dubai. However, no evidence could be found to establish that, in terms of positive innovation, either of the stock markets has been affected by changes in oil price. Hence, these empirical results appear differently from the findings from the standard symmetric and asymmetric Granger causality tests.

Since financial data are not normally distributed in line with the instability of time variations, we use the bootstrap techniques in order to deal with this issue by powerful leverage correction. In this context, it is important to state the significance of applying the bootstrap simulation methods with the purpose of generating accurate and instructive outcomes pertaining to the asymmetric causality relationship between the underlying variables.

This results in conflicts between the outcomes generated using the asymmetric generalized impulses method and the outcomes generated through the symmetric and asymmetric Granger causality tests.

Now we illustrate some particular and common characteristics from the above experimental outcomes and offer several suggestions in this regard.

The initial finding is that, when considering positive or negative oil price shocks, their impact on the Abu Dhabi and Dubai stock market price indexes is significant whenever the performance of stock markets either improves or deteriorates. This illustrates the fact that the correlation in stock market price indexes and oil price shocks should be considered in line with the investors' positive or negative perceptions.

Hence, it is imperative for policy-makers to ensure that uncertain information about oil prices – which could result in generating increased shocks in the stock market – are discarded, since especially irrational behavior is highly prevalent in stock markets. This makes it necessary for policy-makers to take measures to stabilize or stimulate stock markets, since the markets cannot positively react to temporary and larger oil price shocks due to their lack of maturity.

6.5 Conclusions

Studies pertaining to the link between oil prices and financial markets are few in number, although several have been written about the connection between oil prices and economic activities. In this context, this study mainly focuses on illustrating how the Abu Dhabi and Dubai stock markets would be influenced by oil price changes.

It used weekly data between 6 January 2005 and 4 December 2014 for all variables, and employed two econometric methods in the process – i.e. the symmetric and asymmetric causality test and asymmetric generalized impulse response functions;

and the asymmetric variance decomposition analysis. This methodology enables to differentiate between the causal impacts of negative shocks and those of positive shocks.

The tests estimated and analyzed the impact of the shocks in oil prices on the above stock markets. The results of the symmetric and asymmetric causality test indicate that if the shocks are positive the oil price has a significant impact on the stock markets of Abu Dhabi and Dubai, and that when negative shocks occur there is no asymmetric relationship between oil price shocks and the stock markets of Abu Dhabi and Dubai.

Our empirical results come into line with those of (Hatemi-J A. , Is the UAE stock market integrated with the USA stock market? New evidence from asymmetric causality testing, 2012) in terms of negative cumulative oil changes on both the Abu Dhabi and Dubai stock markets. We infer from our study results that the Abu Dhabi and Dubai securities exchanges are informationally efficient markets.

The fact that the oil price indexes for negative innovations have had a significant impact on the stock markets is also revealed by the asymmetric generalized impulse response functions and the asymmetric variance decomposition analysis. However, no evidence could be found to establish that in terms of positive innovation, either of the stock markets has been impacted by changes in the oil price.

Hence, the predictions that we made from the symmetric and asymmetric causality test are more reliable an accurate results compared with those findings of the asymmetric generalized impulses test. In general, investors portray high levels of negativity when the prices on the stock market performance are adverse.

But they also take a highly optimistic attitude to good news – whenever the stock market improves its performance. This indicates that the participants in the stock

market need to focus closely on the performances of the stock market and subsequently decide which standpoint (i.e. optimistic or pessimistic) would benefit from considering the probable impact of oil price shocks on stock returns.

This conclusion also indicates that since the new information results in increased volatility, the information from variations in oil prices has no effect on the volatility of the Abu Dhabi Securities Exchange and Dubai Financial Market. The volatility of stock returns is highly important for the pricing of options, future strategies, and hedging strategies and therefore the conclusions drawn in this study have significance for portfolio managers, individual investors and institutional ones.

Similarly, the makers of the UAE's economic policy should take note that their activities have a direct effect on oil prices. Due to their impact on oil prices they influence the UAE economy and the stock market. Moreover, our discoveries ought to be of importance to financial regulators, and business members. Specifically, the UAE as an OPEC policy maker should keep an eye on the impact of oil price fluctuations in the domain of their economy and securities exchange.

A key limitation of the study is that it uses "oil price index" as the only variable in determining the oscillations in the stock market. However it should be remembered that financial market behavior is far more complex and the study does not consider several other major variables concerning stock prices. This creates the need to use additional relevant variables in the stock market which may have a direct or indirect influence on it.

In addition the implications of this study could influence business policies; however, it mainly provides grounds for individual investors in the Abu Dhabi and Dubai stock markets on which to base their decisions with regard to oil price changes and subsequently to determine their returns more accurately.

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