DYNAMIC LINKAGES AND VOLATILITY TRANSMISSION AMONG THE MENA COUNTRIES' EQUITY MARKETS AND VIS-A-VIS SELECTED DEVELOPED MARKETS

BY

ABDELGHANI ECHCHABI

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Kulliyah of Economics and Management Sciences
International Islamic University Malaysia

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ABSTRACT

With the latest development of the liberation of capital movements, the advanced process of securitisation of stock markets, and the financial globalisation, the international equity markets have become increasingly interdependent. This situation has resulted in the limitation of diversification opportunities across international equity markets. Similarly, this situation has rendered highly integrated and interdependent equity markets exposed to financial contagion which can cause the collapse of these markets in the case of crises and bubbles. In this regard, the MENA equity markets appear to be one of the alternative avenues for international diversification due to the recent economic and political reforms implemented by most of these countries. Hence it is crucial to understand the nature of equity markets relationships between countries in the region and vis-à-vis the developed equity markets. Accordingly, the study examines the long and short run relationships, as well as the volatility transmission among the MENA equity markets, as well as between the MENA equity markets and selected developed equity markets. Furthermore, the study investigates the possible impact of the global political and economic events on the interdependence structure between the studied equity markets. The study covers the period between 29/03/2000 through 12/12/2012 in weekly form. In line with these objectives, the study applied the Johanson and Juselius (1990) cointegration test to examine the long run association between the studied equity markets, vector error correction model to outline the short run adjustments towards possible long run equilibrium, Toda and Yamamoto (1995) Granger non causality tests for the short run dynamic relationships, Multivariate BEKK GARCH to study the volatility and shocks transmission between the studied markets, and finally Bai and Perron (2003) and Lee and Strazicich (2004) to identify the structural breaks during the study period and their possible impact on the interdependence structure between the studied equity markets. The findings revealed that there is no long run association between the GCC equity markets, between the three developed equity markets, between the North African equity markets, and between the developed and North African equity markets. In the short run, the GCC equity markets are mostly influenced by changes in the remaining GCC and Levant equity markets. Similarly, the Levant equity markets are mostly influenced by changes within the region. In contrast, among the North African equity markets only the Egyptian equity market is influenced by the Palestinian and Israeli equity markets. On the other hand, the developed equity markets of Japan and UK are influenced by the US equity market, while the latter is not influenced by the two former equity markets. Finally, the existence of multiple structural breaks during the study period had significant influence on the long run relationships among the selected market. This study has significant contribution to the theory, to the policy makers and regulators, as well as to the practitioners.

ملخص البحث

مع التطور الأخير لتحرير حركة رؤوس الاموال، تقدم عمليات توريق أسواق الأسهم، و العولمة المالية، أصبحت أسواق الأسهم الدولية في ترابط متزايد. وقد أدى هذا الوضع الى الحد من فرص التنويع بين أسواق الأسهم الدولية. وبالمثل، قد جعل هذا الوضع أسواق الأسهم المتكاملة والمترابطة تتعرض لامكانية العدوى المالية التي يمكن أن تتسبب في انهيار هذه الأسواق. في هذا الصدد، تبدو أسواق الأسهم في دول الشرق الأوسط وشمال أفريقيا واحدا من السبل البديلة لتنويع الاستثمارات الدولية بسبب الإصلاحات الاقتصادية والسياسية الأخيرة التي قامت بها معظم هذه البلدان. وبالتالي فمن الأهمية بمكان أن نفهم طبيعة العلاقة بين أسواق الأسهم في دول المنطقة وعلاقتها مع أسواق الأسهم المتقدمة. وفقا لذلك، تبحث الدراسة العلاقات الطويلة والقصيرة المدى، فضلا عن انتقال تقلب بين أسواق الأسهم في منطقة الشرق الاوسط وشمال افريقيا، وكذلك بين الاخيرة وسوق الأسهم الامريكي، الانجليزي والياباني. بالاصافة الى ذلك، تبحث الدراسة التأثير المحتمل للاحداث الساسية والاقتصادية العالمية على شكل الترابط بين اسواق الاسهم قيد الدراسة. تغطي الدراسة الفترة ما بين 29\03\2000 و 12\12\2012 في شكل مؤشرات اسبوعية. تماشيا مع هذه الاهداف، تستخدم الدراسة مجموعة من الاساليب التجريبية الحديثة. فالدراسة تطبق اختبار جوهانسون وجوسيليوس (Johanson and Juselius, 1990) لتحديد العلاقة الطويلة المدى بين الاسواق المالية المدروسة، ونموذج تصحيح خطأ الاتجاه لدراسة تعديلات المدى القصير وامكانية التوازن على المدى البعيد. من جهة اخرى تستخدم الدراسة اختبار جرانجر اغير السببية على طريقة طودا و ياماموطو (Toda and Yamamoto, 1995) لدراسة العلاقات الديناميكية القصيرة المدى. بالاضافة الى ذلك، تطبق الدراسة BEKK GARCH متعدد المتغيرات لدراسة انتقال التقلبات والصدمات بين الاسواق المالية. ختاما تستخدم الدراسة طريقتي باي وبيرون (Bai and Perron, 2003) و لي وسترازيسيتش (Lee and Strazicich, 2004) لتحديد الفواصل الهيكلية خلال فترة الدراسة وتأثيراتها المحتملة على شكل الترابط بين الاسواق المالية قيد الدراسة. كشفت النتائج أنه لا يوجد أي ارتباط طويل المدى بين أسواق الأسهم الخليجية، بين أسواق الأسهم الثلاثة المتقدمة، بين أسواق الأسهم في شمال أفريقيا، وبين أسواق الأسهم المتقدمة والشمال افريقية. في المدى القصير، تتأثر أسواق الأسهم الخليجية في الغالب بالتغيرات في باقي دول الخليج وأسواق الأسهم وبلدان الشام، وتتأثر أسواق الأسهم في بلاد الشام في الغالب بالتغييرات في بقية اسواق الاسهم في المنطقة. في المقابل اسواق الاسهم في شمال افريقيا تبدو الاكثر فاعلية بين اسواق الشرق الاوسط وشمال افريقيا حيث السوق المصري وحده يتأثر بالتغيرات في سوق الاسهم الفلسطيني والاسرائيلي. من ناحية أخرى، تتأثر أسواق الأسهم المتقدمة في اليابان والمملكة المتحدة من قبل سوق الأسهم الأمريكية، بينما لا يتأثر الأخير بأي من الاثنين السابقين.. وأخيرا، كان لوجود فواصل هيكلية متعددة خلال فترة الدراسة تأثير كبير على العلاقات في المدى الطويل بين الاسواق. على وجه التحديد، كان لهجمات 11 سبتمبر، وحرب العراق وأزمة الرهن العقاري تأثير ملحوظ على هيكل الترابط داخل وعبر الأقاليم على حد سواء، إلا على الترابط ضمن أسواق الأسهم في شمال أفريقيا. في المقابل، كان للانتفاضة العربية في الغالب تأثير على الحقائب التي تنطوي على أسواق الأسهم الخليجية. هذه الدراسة لها مساهمات كبيرة للنظريات المالية، لصانعي السياسات والمنظمين، فضلا عن الممارسين.

APPROVAL PAGE

The dissertation of Abdelghani Echchabi has been approved by the following:

Hassanuddeen Abd. Aziz
Supervisor

Ahamed Kameel Mydin Meera
Supervisor

Razali Haron
Internal Examiner

Annuar Md. Nassir
External Examiner

El-Fatih Abdullahi Abdelsalam
Chairman

DECLARATION

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Abdelghani Echchabi

Signature …………………………… Date ……………………..

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To

My late Grandmother (Aisha Awwad) and our late sister (Fatimah Omotayo Salami),

my parents (Larbi Echchabi and Fatima Koudouni),

my siblings (Mohammed, Meryem, Redouane, Amal, Fatiha and Youssef)

and my wife (Faseeyah Echchabi)

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller test
AR	Auto Regressive model
ARCH	Auto Regressive Conditional Heteroskedasticity
ASEAN	Association of South East Asian Nations
BEKK	Baba Engle Kraft and Kroner
BHHH	Berndt, Hall, Hall and Hausman algorithm
CAPM	Capital Asset Pricing Model
DF	Dickey Fuller test
ECM	Error Correction Model
e.g.	(exempli gratia): for example
EGARCH	Exponential GARCH
EMH	Efficient Market Hypothesis
et al.	(et alia): and others
etc.	(et cetera): and so forth
EU	European Union
GARCH	Generalised Auto Regressive Conditional Heteroskedasticity
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HAC	Heteroskedasticity and Auto Correlation estimator
i.e.	(id est): in other words
JJ	Johansen and Juselius cointegration test
LM	Lagrange Multiplier
LOP	Law of One Price
MENA	Middle East and North Africa
MGARCH	Multivariate GARCH
MLE	Maximum Likelihood Estimation
MPT	Modern Portfolio Theory
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Square
PP	Philippe Perron test
QML	Quasi Maximum Likelihood
VAR	Vector Autoregression
VECH	Vectorised GARCH
VECM	Vector Error Correction Model
UAE	United Arab Emirates
UK	United Kingdom
UNICEF	United Nations Children’s Fund
USD	United States Dollars
US	United States of America

CHAPTER ONE

INTRODUCTION

1.0. BACKGROUND OF THE STUDY

Contemporary finance theory has demonstrated the advantage, legitimacy and easiness of international diversification (Lessard, 1973). Specifically, portfolio risk could be dramatically reduced by including international securities as opposed to domestic securities (Solnik, 1974). For this, a necessary condition is that the international securities in question should be less than perfectly correlated or interdependent among each other (Wilcox and Huumonen, 1999; Valadkhani, Chancharat and Harvie, 2008; Phuan, Lim and Ooi, 2009; Abd. Majid and Kassim, 2010).

In the current context, international financial markets have become increasingly interdependent due to several reasons among them, the developments in the liberalisation of capital movements, the securitisation of stock markets, and financial globalisation (Maghyereh and Al-Zoubi, 2004; Abdul Karim, Mohd. Kassim and Arip, 2010). Such circumstances have a direct impact on the investors' international portfolios management, specifically international investors who diversify their investments across international markets to reduce their exposure to risk and to enhance their earnings (Ali, Butt, and Rehman, 2011).

In line with the above development, a growing body of literature attempted to establish and explain the nature and extent of the interdependence of international financial markets. During the early stage, the majority of these studies focused on developed markets. However, in recent years, attention has shifted toward emerging markets, mainly because previous studies almost unanimously found that interdependence among the developed countries became stronger in the last few years, which limits the benefits of diversification across these countries. This trend may also be due to the fast growing economic activities in many emerging countries, which could provide rejuvenating diversification opportunities for international investors (Ferdows and Roy, 2012).

Previous studies have emphasised on the growing investment opportunities in emerging Asian, European and Latin American countries. However, these regions have experienced reverting financial crises and bubbles (e.g. the European debt crisis, the 1997 Asian crisis, the Peso crisis in Mexico, the on-going Argentina crisis, etc.), which have led international investors to look for alternative investment avenues in the emerging markets (Fadhlaoui, Bellalah, Dherry and Zouaouii, 2009). In contrast, the Middle East and North African (MENA) region has received less attention in the literature and remains under-investigated despite the significant developments in the equity markets in the region since the early 1990s (Khallouli, 2008). Though the region has experienced a string of political events such as the recent Arab uprising, developing an efficient portfolio diversification despite the risks associated with such crises remains manageable (Engelbrekt and Forberg, 2005).

Investment opportunities in the MENA countries have increased and became more attractive as they have recently implemented policies to reform various aspects of their economies that, contribute in enhancing the efficiency and performance of the financial systems in the region (Baghli, 2012; Lynch, Lynch and Maguire, 2012; O'Sullivan, Rey and Mendez, 2012; Elkhafif, Taghdisi-Rad and Elagraa, 2012). As a result, the region has become more and more important globally (Baghli, 2012), and its capital markets are now highly regarded by investors and asset managers (OECD, 2012). On average, market capitalisation in the MENA region can currently reach up to USD2 trillion[1]. As such, the MENA region could provide a new avenue for investors to benefit from diversification opportunities, especially in the current era of increasing globalisation and its implications for the interdependence of international markets (Lane, 2012).

However, for the existing as well as potential international investors and asset managers to venture and successfully manage their investments across the MENA countries' stock markets, a major requirement is the understanding of the linkages structure among these markets, and between these markets and those of the developed countries. This is necessary because when the MENA countries are seen as a single investment entity, the investment opportunities possible are much greater than a single country (Ahmed, 2008). Furthermore, this assists international investors and asset managers to better control their foreign exposures to reduce risk without sacrificing returns (Azman-Saini, Azali, Habibullah and Matthews, 2002; Rim and Setaputra, 2010; Bracker, Docking and Koch, 1999; Korkmaz, Cevik, and Gurkan, 2010).

In this regard, it is worth noting that most of the existing studies on the MENA region have focused on a limited number of MENA countries (Abumustafa, 2007; Abd. Majid, Mohd. Yusof and Razal, 2007; Lagoarde-Segot and Lucey, 2007; Alkulaib, Najand, and Mashayekh, 2009). Existing literature has failed to provide a comprehensive view on the dynamic linkages structure in the MENA region as a whole.

Other studies have examined a mixture of MENA countries together with selected emerging and developed countries (Agyei-Ampomah, 2011; Bekaert and Harvey, 1995; Bekaert, 1995; Korajczyk, 1996; Ratanapakorn and Sharma, 2002; Forbes and Chinn, 2004; Al-Zalabani, Sagaran, Menon and Subha, 2012). However,

[1] Daily estimation based on Bloomberg data.

these studies do not provide insights on the interdependence among the MENA countries' equity markets and between these markets and those of developed countries, since one country is not representative of the whole region. There is therefore a need to examine the investment potential of the MENA region based on a vision of MENA countries a single investment entity.

In contrast with the above studies, the current research attempts to include a larger number of MENA countries to allow for a comprehensive understanding of the equity markets' linkages in the region as well as relationships with the selected developed markets i.e. UK, US and Japan. The study investigates the influence of four main events on the dynamic linkages and volatility transmission among MENA countries, namely, September 11 attacks, US invasion of Iraq, subprime crisis, and the Arab uprising. These events are considered the most relevant in the case of the MENA region (Perthes, 2002; Bell, 2003; Blanchard, 2012; Perezalonso, 2006; Dalacoura, 2012; Guzansky and Heller, 2012; Momayezi and Rosenburg, 2011)

1.1. PROBLEM STATEMENT

With the increasing globalisation and its implications for international markets' linkages (Lane, 2012), international investors are faced with the need to extend their investments to international markets that would provide them with diversification benefits without sacrificing their returns. In this regard, the emerging countries of MENA could be one of the main suitable targets due to the successful reforms implemented by these countries in recent years, which potentially provide abundant opportunities for foreign investors (Alkulaib et al., 2009). The understanding of the linkages structures among the MENA countries' equity markets is indispensable for international investors because the MENA equity markets as a whole may be able to offer investment opportunities not possible by one individual MENA country (Gentzoglanis, 2007).

However, the inter-linkages structure of the MENA equity markets remains unclear because most of the studies conducted in the context of MENA countries examined a small number of countries, which does not provide a comprehensive understanding of the linkages structure among these countries. Moreover, most of these studies ignored several events that took place in the last few decades, which were directly or indirectly linked to the MENA countries. These global economic and political events make it difficult for international investors to elaborate their international investment strategies, since sudden events may affect their investment outcomes.

Similarly, the experience of such global events demonstrated the extent of risk embedded in highly interdependent stock markets, which may cause disastrous financial contagion effects (Phuan et al., 2009). Such high levels of financial contagion can easily cause the collapse of financial integrated markets, unless the authorities are able to cooperate prior to the shocks, which is only possible when a given country is aware with which country its equity market is interrelated (Salvatore, 2010).

Thus, there are relevant questions that remain unanswered, and which the current study attempts to answer; namely, are the MENA countries interdependent in the long run? Are they interdependent with the developed markets in the long run? Are there short run dynamic linkages among the MENA countries equity markets and between these markets and selected developed markets? Are there volatility transmissions among the MENA countries' equity markets, and between these markets and the selected developed markets? Do the global economic and political events have any impact on the interdependence and volatility transmission among the MENA countries equity markets and between these markets and selected developed markets?

1.2. RESEARCH OBJECTIVES

The main objective of the study is to explore the equity markets' interdependence and volatility transmission mechanism among MENA[2] countries, and their relationship with the developed markets of the US, UK, and Japan. More specifically, the study aims at:

i. Investigating the long and short run dynamic relationships among the MENA countries' equity markets, and with those of selected developed markets.
ii. Examining the volatility transmission mechanism among the MENA countries' stock markets, and with those of selected developed markets.
iii. Investigating the influence of the global economic and political events on the interdependence among MENA countries' equity markets and with selected developed markets.

1.3. RESEARCH METHODOLOGY

In order to achieve the above mentioned objectives, the study uses weekly closing stock indices for the MENA countries' equity markets, which include those of Bahrain, Egypt, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates, and Palestine, together with those of the US, UK, and Japan. These indices are expressed in local currency units.

[2] MENA in the study is defined as a combination of GCC, Levant and North African countries.

Due to September 11 attacks, the US invasion to Iraq, the subprime crisis as well as the latest Arab uprising, the sample period is subdivided accordingly to capture the possible effects of these events on the interdependence and volatility transmission between the selected markets. This sub-division also provides some insights on the time varying interdependence and the contagion effects that are potential outcomes caused by these events. The corresponding data is obtained from Bloomberg database, and covers the period between 2000 through 2012.

The present study uses the JJ cointegration procedure (Johansen, 1988; Johansen and Juselius, 1990) to examine the long run relationships among the selected markets and Granger non causality test based on Toda and Yamamoto (1995) for estimation of the short run dynamic linkages. Furthermore, volatility transmission among the MENA countries' equity markets and between these markets and the selected developed markets are examined using multivariate GARCH model (MGARCH) with BEKK specification.

Finally, the interdependence among the studied markets is tested by allowing for multiple structural breaks (Bai and Perron, 2003; Lee and Strazicich, 2004). Such a test allows for determining the structural breaks in the study period, and provides insights on the influence of each structural break on the relationships among the selected markets.

1.4. MOTIVATION OF THE STUDY

The MENA region is a well-diversified region in terms of social, economic and political dimensions. It is comprised of various sub-regions that have different characteristics .e.g. North Africa, Levant, GCC, etc. Recently, there have been continuous attempts to bring the efforts of these countries together and unify their long term objectives and plans. This includes the extension of the GCC to include other MENA countries, starting with Morocco and Jordan. It also includes the efforts made by a number of North African countries to revive and strengthen the Maghreb Arab union. These efforts have been further emphasised after the first premises of the Arab uprising, which has brought tremendous changes in the political, social and economic arenas in many Arab countries, including those that have not experienced the Arab uprising, but learned from other countries' experiences.

It is worth noting that the unification of the MENA countries passes through the unification and integration of the respective financial markets of these countries. This would serve as a strong platform for regional development as well as safeguarding the region from the shocks of the global markets. Nevertheless, this has a number of disadvantages to the concerned countries, mainly the financial contagion from the related markets, which is mostly possible between strongly related markets. Hence, part of the objectives of the current study is to examine the nature of relationships among the MENA countries and with selected developed markets and to closely examine the possibility of financial contagion between the studied countries. This would provide the authorities in the respective MENA countries with guidelines and strategies for economic and financial cooperation and regulation with the remaining countries.

Furthermore, the increasing globalisation and interconnectedness of international financial markets have reduced the international diversification opportunities for international investors. In this regard, the MENA countries have implemented tremendous reforms to enhance their financial and economic performance vis-à-vis the regional and international markets. For this reason, MENA countries can offer rare rejuvenating opportunities for international investors, especially through the diversified aspects of their economies.

On the other hand, early finance theories, particularly the law of one price, the modern portfolio theory as well as the efficient market hypothesis have been under-applied in complex settings such as that of the MENA region, which combines various levels of political, economic and social development across countries and sub-regions. Thus, this study attempts to unravel how these theories apply in the MENA and similar contexts.

In addition, recent decades have witnessed numerous political and economic crises around the world. These crises have had tremendous impacts on various aspects of the world economies and politics, involving the individual and institutional investors, international financial and banking institutions as well as the government authorities and other stakeholders. For instance, these crises influence the regulations and cooperation strategies of the respective government authorities with the remaining ones. In light of this, examining the possible effects of these crises on the interdependence structure among the various sub-regions of MENA, and between these region and selected developed markets is a relatively appealing issue. The findings of this study provide significant and rich insights to the above mentioned players.

1.5. SIGNIFICANCE OF THE STUDY

The study has significant contributions that can be grouped under contribution to the body of knowledge, contribution to the practitioners and stakeholders, as well as the contribution to policy makers and regulators.