

2006

## Financial integration of the MENA emerging stock markets

Hazem Ali Marashdeh  
*University of Wollongong*

Follow this and additional works at: <https://ro.uow.edu.au/theses>

University of Wollongong

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

### Recommended Citation

Marashdeh, Hazem Ali, Financial integration of the MENA emerging stock markets, PhD thesis, School of Economic and Information Systems, University of Wollongong, 2006. <http://ro.uow.edu.au/theses/543>

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: [research-pubs@uow.edu.au](mailto:research-pubs@uow.edu.au)

## **NOTE**

This online version of the thesis may have different page formatting and pagination from the paper copy held in the University of Wollongong Library.

## **UNIVERSITY OF WOLLONGONG**

### **COPYRIGHT WARNING**

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

# **Financial Integration of the MENA Emerging Stock Markets**

A thesis submitted in fulfillment of the  
requirements for the award of the degree

**Doctor of Philosophy**

from

**University of Wollongong**

by

**Hazem Ali Marashdeh**

BEd (Economics and Accounting), Jordan

MEd (Economics), Jordan

**School of Economic and Information System**

**2006**

## **Certification**

I, Hazem Marashdeh, declare that this dissertation, submitted in fulfillment of the requirement for the award of Doctor of Philosophy in the faculty of commerce, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Hazem Marashdeh

December 2005

## **Dedication**

*To the dearest friend  
my father  
Ali Marashdeh*

## **Acknowledgments**

I would like to express my sincere gratitude and appreciation to my supervisor Associate Professor Edger Wilson for his supervision, guidance and encouragement throughout the study. His profound knowledge and experience provided me with the opportunity to broaden my knowledge and to make a significant progress. Also I would like to thank Associate Professor Amnon Livermore for his supervision through most of the study. His insight into economic theory and creative comments were of a great assistance. And I would like to thank Dr. Abbas Valadkhani for his supervision in the final stages of the study. His exceptional editing skills and invaluable suggestions always inspired me to strive for quality work.

I would like to thank my wife Diana Bakir for her love, care and extraordinary support throughout my long study period. Dear Diana, you will always be in my heart.

I am very grateful to my parents, for their blessing, encouragement and support throughout the duration of this study. Also I would like to thank my dearest brother, Mones and my sisters, Arwa, Rabab, Aram, Demh, Layla, Lama and Farah for their encouragement and support. Also, I would like to thank my father and mother-in-law for their support.

Also, I would like to express my sincere thanks to my colleagues at the faculty of commerce, Akhsyim Afandi, Mosayeb Bahlavani, Min Shrestha, Maen Al-hawari and Reetu Verma. I have greatly benefited from their comments throughout my study period. Finally, I would also like to thank Dr. Aktham Maghyereh for his help at the early stage of this study.

## **Abstract**

The main objective of this study is to examine the financial integration among four emerging stock markets in the Middle East and North Africa (MENA) region, namely, Egypt, Turkey, Jordan and Morocco. Their interrelationships with three developed markets, the US, UK and Germany, are also examined. The motivation behind this study is that, although a lot of research has been focused on stock market integration, the emphasis has been mostly on developed markets. Stock market integration in the MENA region has not been investigated deeply enough despite the region being of a global economic and political importance.

To attain this objective, the study conducts recent econometric techniques on the monthly time series of stock market price indices. It starts with testing for a unit root in the presence of structural change at an unknown time of the break, using the Innovational Outlier (IO) model. To empirically examine the financial integration, the study utilizes the newly proposed autoregressive distributed lag (ARDL) approach to cointegration. The ARDL approach has been recognized as more preferable in estimating the long-run equilibrium relationship than other cointegration approaches in small samples with mixed order process. Finally, the study explores the short and long-run dynamic relationships among these markets using Granger-causality within a correctly specified vector error correction model (VECM).

The empirical results indicate that all variables show evidence of non-stationarity, even in the presence of structural change. The endogenously determined times of the breaks for all markets coincide with observed real events which affected each market. This result is consistent with the efficient market hypothesis as the non-stationarity random walk is associated with the weak form of the efficient market hypothesis. Consequently, this result emphasises that the stock markets in the MENA region are efficient.

The cointegration test results show that there are long-run equilibrium relationships among all stock markets in the MENA region. This indicates that stock markets in the MENA region move together in the long-run. So, at the regional level all markets are integrated. At the same time no long-run equilibrium relationship is found between MENA markets and developed markets. This means that the MENA stock markets are segmented from developed markets. However, Egypt was the exceptional

case; the study found that the stock market of Egypt has long-run equilibrium relationship with the US and UK markets.

The implications of these findings are analysed at two levels, the regional and international. At the regional level, the existence of cointegration among the MENA markets implies the existence of the *law of one price* (LOOP). This means that the potential of regional investors for obtaining abnormal profits through portfolio diversification is limited in the long-run. The reason for this is that as the MENA stock markets are cointegrated, abnormal profits will be arbitrated away in the long-run. However, despite no arbitrage opportunities in the long-run, investors can still achieve arbitrage profits through portfolio diversification in the short-run.

At the international level, the results show that stock markets in Turkey, Jordan and Morocco are not integrated with developed markets. This means that there is no long-run impact from developed stock markets towards these markets. However, a long-run relationship is found between Egypt and both US and UK when Egypt is a dependent variable. Based on these results, there are opportunities for international investors to obtain long-run gains through international portfolio diversification in stock markets of Turkey, Jordan and Morocco. Also at the same time, investors from these three countries have the opportunities to obtain long-run gains through investing in developed markets. The existence of long-run relationships between Egypt and both US and UK implies that the potential for investors from the Egyptian stock market to obtain abnormal profit through portfolio diversification in the US and UK is limited in the long-run. However, there are opportunities for achieving abnormal profit by investing in Germany as it is not cointegrated with the MENA markets. In the short-run, arbitrage opportunities and possible profits may also be achieved from diversification as the LOOP may not hold.

In addition to these findings, an important contribution is made by this study. It contradicted Granger's (1986) theory on the relationship between the existence of cointegration and market efficiency. Granger (1986) asserted that the existence of cointegration between two stock prices implies the ability to predict each price movement, which indicates market inefficiency. Also, this study does not fully agree with another stream of studies, such as Wallace (1992), Baffes (1994), Engle (1996), Ahlgren and Antell (2002) and Masih and Masih (2002) in which they asserted that cointegration does not necessarily imply market inefficiency or efficiency. However, what this study tries to bring out is that if cointegration exists between two stock



markets then these markets are efficient in the long-run because the existence of cointegrated vector implies the (LOOP). Therefore, little or no arbitrage opportunities or possible benefit can be achieved from the diversification of a portfolio across markets. However, with the short-run error correction model (ECM), there could exist arbitrage opportunities and possible benefits from diversification. That is, the LOOP may not hold in the short run.

The results of Granger-causality test based on the vector error correction model (VECM) reveal the existence of short-run causal relationships among the MENA markets. This means that these markets influence each other. Also, the results show that developed markets influenced stock markets in the MENA region. In the short-run, there is unidirectional Granger-causality running from stock prices in Turkey, Morocco, the US and UK to Egypt. Also, there is unidirectional Granger-causality running from Germany and the US towards Turkey. In addition, The UK and Turkey are found to Granger-cause the stock prices in Jordan. Finally, there is a unidirectional Granger-causality from Germany to Morocco.

Finally, despite the empirical results show that there is a possibility of an increase in the portfolio equity flow to the MENA stock markets, the statistics of portfolio equity flow show little portfolio inflow to the region from developed countries over the period of study. Some of the reasons behind this situation are that most of these markets are still from some perspective underdeveloped, vulnerable to macroeconomic shocks and political instability in the region. Based on this, the study suggests that huge efforts should be carried on to improve the institutional reforms in these markets and increase the degree of openness for foreign capital. Also increasing the markets capitalization and adopting new technology are very crucial factors for attracting equity portfolio to the region.

# Table of Contents

<b>Certification</b>	ii
<b>Dedication</b>	iii
<b>Acknowledgment</b>	iv
<b>Abstract</b>	v
<b>Table of Contents</b>	viii
<b>List of Tables</b>	xi
<b>List of Figures</b>	xii
<b>Abbreviations</b>	xiii
<b>Publication from the research</b>	xiv
<b>Chapter 1. Introduction</b>	
1.1 Background of the Study	1
1.2 Objective of the Study	4
1.3 Data and Methodology	7
1.3.1 Data Sources	7
1.3.2 Method of the Study	8
1.4 Structure of the Study	9
<b>Chapter 2. The Early Theoretical Models Relating to Stock Market Integration</b>	
2.1 Introduction	12
2.2 The Notion of Stock Markets Integration	13
2.3 The Early Theoretical Studies Relating to Stock Markets Integration	18
2.4 Asset Pricing Model for Testing Stock Market Integration	22
2.5 Arbitrage Pricing Theory (APT) for Testing Stock Markets Integration	30
2.6 Alternative Approaches for Testing Stock Markets Integration	36
2.7 Conclusion	38
<b>Chapter 3. The Recent Techniques Relating to Stock Market Integration: The Cointegration Approach</b>	
3.1 Introduction	40
3.2 Cointegration Approach for Testing Stock Market Integration	41
3.3 The Asian Financial Crisis and Stock Market Integration	54
3.4 Efficient Market Hypothesis	60
3.4.1 Cointegration and Stock Market Efficiency	61
3.4.2 More Evidences on Stock Markets Efficiency	66
3.4.3 A new Approach for the Relationship between Cointegration and Efficiency	67
3.5 The Integration of the Emerging Stock Markets in the MENA Region	69

3.6	Conclusion	77
<b>Chapter 4. Features and Characteristics of the Emerging Stock Markets in the MENA Region</b>		
4.1	Introduction	78
4.2	General Economic Features of the MENA Region	80
4.3	An Overview of the Emerging Stock Markets in the MENA Region	87
4.3.1	Stock Market Liberalization of the Emerging Stock markets in MENA Region	88
4.3.2	The Stock Market in Egypt	92
4.3.3	The Stock Market in Turkey	97
4.3.4	The Stock Market in Jordan	102
4.3.5	The Stock Market in Morocco	108
4.4	Conclusion	113
<b>Chapter 5. Structural Changes and Efficiency in the MENA Stock Markets</b>		
5.1	Introduction	115
5.2	Data and descriptive statistics	116
5.3	The Conventional Augmented Dickey-Fuller (ADF) and Phillips–Perron (PP) Unit Root Tests	143
5.4	The Development of Testing for Structural Change	148
5.4.1	Procedures for Selecting the Order of the Lag	156
5.4.2	Procedures for Determining the Time of the Break	157
5.5	Testing for Structural Changes in MENA Stock Markets	158
5.6	The Random Walk Behavior and the Efficiency of the MENA Stock Markets	170
5.7	Conclusion	171
<b>Chapter 6. Stock Market Integration in the MENA Region: Cointegration and Causality Tests</b>		
6.1	Introduction	173
6.2	The Autoregressive Distributed Lag (ARDL) Approach to Cointegration	174
6.3	Model Specification	179
6.4	Interpretation of the Results	183
6.4.1	Stock Market of Egypt	185
6.4.2	Stock Market of Turkey	188
6.4.3	Stock Market of Jordan	190
6.4.4	Stock Market of Morocco	192

6.5	Implications of the Empirical Results	195
6.6	Granger Causality	204
6.7	Conclusion	211
<b>Chapter 7. Summary and Conclusions</b>		
7.1	Introduction	213
7.2	Summary of the Study	214
7.3	Implications of the Study	222
7.4	Contribution of the Study	224
7.5	Suggestions for Future Research	226
<b>Appendices</b>		
	Appendix A. Conventional Unit Root Tests	228
	Appendix B. Cointegration and Causality Tests	238
	Appendix C. Diagnostic Tests	243
<b>Bibliography</b>		247

## List of Tables

2.1	A summary for the Results of the Main Previous Studies	35
3.1	Summary of Selective empirical Studies on Stock Market Integration	57
4.1	Economic Overview for MENA Countries	86
4.2	Openness of Stock Markets in MENA Region	89
4.3	Portfolio Equity Net Flows to Stock Markets in MENA Region	90
4.4	Egypt Stock Market Indicators	95
4.5	Istanbul Stock Exchange Indicators	100
4.6	Amman Stock Exchange Indicators	106
4.7	Casablanca Stock Exchange Indicators	111
5.1	Descriptive Statistics for Monthly Stock Returns in (Local Currency)	136
5.2	Descriptive Statistics for Monthly Stock Returns in (\$US)	138
5.3	Correlation Coefficients for Monthly Stock Indices in (Local Currency)	140
5.4	Correlation Coefficients for Monthly Rate of Returns in (Local Currency)	140
5.5	Correlation Coefficients for Monthly Stock Indices in (\$US)	142
5.6	Correlation Coefficients for Monthly Rate of Return in (\$US)	142
5.7	Estimated Results of ADF and PP Unit Root Tests (Local Currency)	145
5.8	Estimated Results of ADF and (PP) Unit Root Tests (\$US)	145
5.9	Estimated Results of ADF and PP Unit Root Tests (Local Currency)	146
5.10	Estimated Results of ADF and PP Unit Root Tests (\$US)	146
5.11	Empirical Results, Perron's (1997) Model (IO2), (Local Currency)	163
5.12	Empirical Results, Perron's (1997) Model (IO1), (Local Currency)	163
5.13	Empirical Results, Perron and Vogelsang (1992) (IO), (Local Currency)	165
5.14	Empirical Results, Perron's (1997) Model (IO2), (\$US)	168
5.15	Empirical Results, Perron's (1997) Model (IO1), (\$US)	168
5.16	Empirical Results, Perron and Vogelsang (1992) (IO) Model, (\$US)	169
6.1	F-Statistics for Testing the Existence of a long-Run Relationship	184
6.2	Long-Run Coefficients Estimated Based on ARDL (1,0,0,0,1,1,0) Model Selected Based on SBC. Dependent Variable: Egypt (lnE)	185
6.3	Error Correction Model (ECM) Results for the Selected ARDL (1,0,0,0,1,1,0) Selected Based on SBC. Dependent Variable: $\Delta \ln E$	187
6.4	Long-Run Coefficients Estimated Based on ARDL (1,0,0,0,0,0,1) Model Selected Based on SBC. Dependent Variable: Turkey (lnT)	188
6.5	Error Correction Model (ECM) Results for the Selected ARDL (1,0,0,0,0,0,1) Selected Based on SBC. Dependent Variable: $\Delta \ln T$	190
6.6	Long-Run Coefficients Estimated Based on ARDL (1,0,1,0,0,2,0) Model Selected Based on SBC. Dependent Variable: Jordan (lnJ)	191
6.7	Error Correction Model (ECM) Results for the Selected ARDL (1,0,1,0,0,2,0) Selected Based on SBC. Dependent Variable: $\Delta \ln J$	192
6.8	Long-Run Coefficients Estimated Based on ARDL (1,0,0,0,0,0,0) Model Selected Based on SBC. Dependent Variable: Morocco (lnM)	193
6.9	Error Correction Model (ECM) Results for the Selected ARDL (1,0,0,0,0,0,0) Selected Based on SBC. Dependent Variable: $\Delta \ln M$	194
6.10	The long-Run Impacts on Stock Markets in the MENA Region	195
6.11	Net Inward Portfolio Equity Flows to developing Countries, 1995-2003	200
6.12	Granger Causality Results Based on Vector-Error Correction Model	208
6.13	Recent American Aids to Egypt	209

## List of Figures

4.1	Market Capitalization in Egypt Stock Exchange 1994-2004, \$US Million	96
4.2	Trading Value in Egypt Stock Exchange 1994-2004, \$US Million	96
4.3	Market Capitalization in Istanbul Stock Exchange 1994-2004, \$US Million	101
4.4	Trading Value in Istanbul Stock Exchange 1994-2004, \$US Million	101
4.5	Market Capitalization in Amman Stock Exchange 1994-2004, \$US Million	107
4.6	Trading Value in Amman Stock Exchange 1994-2004, \$US Million	107
4.7	Market Capitalization in Casablanca Stock Exchange 1994-2004, \$US Million	112
4.8	Trading Value in Casablanca Stock Exchange 1994-2004, \$US Million	112
5.1	Stock Price Indices in MENA region (Local Currency)	118
5.2	Stock Price Indices in MENA region (\$US)	118
5.3	Stock Price Indices in All Countries (\$US)	120
5.4	Monthly Stock Price Index in Egypt (Local Currency)	121
5.5	Monthly Stock Price Index in Egypt (\$US)	121
5.6	Monthly Stock Price Index in Turkey (Local Currency)	122
5.7	Monthly Stock Price Index in Turkey (\$US)	122
5.8	Monthly Stock Price Index in Jordan (Local Currency)	123
5.9	Monthly Stock Price Index in Jordan (\$US)	123
5.10	Monthly Stock Price Index in Morocco (Local Currency)	124
5.11	Monthly Stock Price Index in Morocco (\$US)	124
5.12	Monthly Stock Price Index in United Kingdom (Local Currency)	125
5.13	Monthly Stock Price Index in United Kingdom (\$US)	125
5.14	Monthly Stock Price Index in Germany (Local Currency)	126
5.15	Monthly Stock Price Index in Germany (\$US)	126
5.16	Monthly Stock Price Index in the United States	127
5.17	Monthly Rate of Return in Egypt (Local Currency)	128
5.18	Monthly Rate of Return in Egypt (\$US)	128
5.19	Monthly Rate of Return in Turkey (Local Currency)	129
5.20	Monthly Rate of Return in Turkey (\$US)	129
5.21	Monthly Rate of Return in Jordan (Local Currency)	130
5.22	Monthly Rate of Return in Jordan (\$US)	130
5.23	Monthly Rate of Return in Morocco (Local Currency)	131
5.24	Monthly Rate of Return in Morocco (\$US)	131
5.25	Monthly Rate of Return in United Kingdom (Local Currency)	132
5.26	Monthly Rate of Return in United Kingdom (\$US)	132
5.27	Monthly Rate of Return in Germany (Local Currency)	133
5.28	Monthly Rate of Return in Germany (\$US)	133
5.29	Monthly Rate of Return in United States (Local Currency)	134
5.30	Plots of the series and Estimated Timing of Structural Breaks	162

## Abbreviations

ADF	Augmented Dickey Fuller
ADR	American Depositary Receipts
AFM	Amman Financial Market
APT	Arbitrage Pricing Theory
ARDL	Autoregressive Distributed Lag
ARVAR	Augmented Restricted Vector Autoregression
ASE	Amman Stock Exchange
AUVAR	Augmented Unrestricted Vector Autoregression
CAPM	Capital Asset Pricing Model
CASE	Cairo and Alexandria Stock Exchange
CMA	Capital Market Authority
CRDW	Cointegration Regression Durbin Watson
CSE	Casablanca Stock Exchange
ECM	Error Correction Model
ECT	Error Correction Term
EMH	Efficient Market Hypothesis
GARCH	Generalized Autoregressive Conditional Heteroscedasticity
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GDR	Global Depositary Receipts
GNP	Gross National Product
HSBC	Hong Kong and Shanghai Banking Corporation
ICAPM	International Asset Pricing Model
IMF	International Monetary Fund
IPO	International Public Offering
IRF	Impulse Response Function
ISE	Istanbul Stock Exchange
JD	Jordanian Dinar
JJ	Johansen-Juselius
JSC	Jordan Securities Commission
LOOP	Law of One Price
MENA	Middle East and North Africa
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Square
PP	Phillips and Perron
SDC	Securities Depository Centre
UVAR	Unrestricted Vector Autoregression
VAR	Vector Autoregressive Model
VDC	Variance Decomposition
VECM	Vector Error Correction Model
WTO	World Trade Organization

## Publication from the Research

- 1 Marashdeh, H., 2005, "Testing For Structural Changes in MENA Equity Markets", *46<sup>th</sup> NZAE Conference*, New Zealand.  
This article has been considered as "a quality assured paper". Available on line at:  
[http://www.nzae.org.nz/conferences/2005/QA29-Hazem\\_Marashdeh.pdf](http://www.nzae.org.nz/conferences/2005/QA29-Hazem_Marashdeh.pdf)
- 2 Marashdeh, H. and E. J. Wilson, 2005, "Structural Changes in the Middle East Stock Markets: The Case of Israel and Arab Countries", University of Wollongong, *Working Paper*, 05-22. Available on line at:  
<http://www.uow.edu.au/commerce/econ/wpapers.html>
- 3 Marashdeh, H., 2005, "Stock market integration in the MENA region: An application of the ARDL bound testing approach", University of Wollongong, *Working Paper*, 05-27. Available on line at:  
<http://www.uow.edu.au/commerce/econ/wpapers.html>
- 4 Marashdeh, H, 2005, "Cointegration and efficiency: An empirical investigation of the Middle East stock markets". A presentation delivered at *Workshop of: "Mathematics in Finance"*. Sponsored by School of Applied Mathematics and Statistics, University of Wollongong, 25<sup>th</sup> November 2005.
- 5 Marashdeh, H, 2005, "Interdependence of the MENA emerging stock markets: A Cointegration Approach", Accepted to the *4<sup>th</sup> INFINITI Conference on International Finance*, University of Dublin, Trinity College, Monday 12-Tuesday 13 June 2006.
- 6 Marashdeh, H. and Ali Saleh, 2006, "Re-visiting trade and Budget deficit in Lebanon: Critique", University of Wollongong, *Working Paper*, 06-07.  
Available on line at:  
<http://www.uow.edu.au/commerce/econ/wpapers.html>