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The Integration of African Stock Markets into the Global Financial System

Derek Crompton Seely

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2012

ABSTRACT

This report constitutes an exploratory study into African stock markets and the effect that the 2008 financial crisis has had on the degree of co-integration on these exchanges within the global financial environment.

In recent years, globalisation, economic and financial integration among countries and their financial markets have increased the interdependency among major world stock markets. The study of the available literature has, as its focus, the influence of stock markets as a key determinant of economic development, providing an incentive for government sponsorship. The dynamics of equity investment in Africa and the resultant variable degree of co-integration of these markets with the rest of the world, partially explains Africa's vulnerability to future global disruptions or crises.

The empirical work, has as its foundation, the data collected from Bloomberg and analysed using the co-integration concepts suggested by the researchers Messrs P. Philips and S. Ouliaris.

African governments appear to have embraced stock markets and the potential benefits that they hold for their countries' economic development. This policy influences both global investors' asset allocation decisions and future domestic economic policies aimed at ensuring economic stability. The evidence presented indicates that the rise in volatility in global markets since the financial crisis has resulted in a self-sustaining contagion effect on African stock markets strengthening their degree of global integration. However, despite this improvement in integration, these markets, individually, are not closely linked to either developed country stock markets or their global economic drivers, suggesting that Africa will continue to experience capital inflows as fund managers seek the international risk diversification that these markets offer.

DECLARATION

I, Derek Crompton Seely, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

_____

Derek Crompton Seely

Signed at ……

On the …….. Day of …… 2012

DEDICATION

To my wife, Tania, my sincerest thanks for your endless patience, support and encouragement throughout my studies and particularly your love and strength always.

To my boys, Joshua and Daniel, you are my inspiration. Thank you for constantly reminding me what life's true riches are all about.

ACKNOWLEDGEMENTS

I wish to express sincere appreciation to all those who gave their invaluable assistance in the preparation and completion of this research report with particular thanks: -

- To my supervisor, Dr. Thabo Mosala, for his guidance and support in completion of this report;
- To my family and friends for their encouragement and support during the MBA program;
- To the Senior Managing Director, Daron Walker at Constant Capital, who gave up his time to discuss the topic and opened his offices and Bloomberg terminals to assist in gathering the data needed to complete this research.

TABLE OF CONTENTS

ABSTRACT ..... **II**

DECLARATION ..... **III**

DEDICATION ..... **IV**

ACKNOWLEDGEMENTS ..... **V**

TABLE OF CONTENTS ..... **VI**

LIST OF TABLES ..... **IX**

LIST OF FIGURES ..... **XI**

1 INTRODUCTION **1**

1.1 PURPOSE OF THE STUDY 1

1.2 CONTEXT OF THE STUDY 1

1.3 PROBLEM STATEMENT 3

1.3.1 MAIN PROBLEM 3

1.3.2 SUB-PROBLEM 1 3

1.3.3 SUB-PROBLEM 2 4

1.3.4 SUB-PROBLEM 3 4

1.3.5 SUB-PROBLEM 4 4

1.4 SIGNIFICANCE OF THE STUDY 5

1.5 DELIMITATIONS OF THE STUDY 6

1.6 DEFINITION OF TERMS 7

1.7 ASSUMPTIONS 9

2 LITERATURE REVIEW **10**

2.1 INTRODUCTION 10

2.2 BACKGROUND 11

2.2.1 THE STOCK MARKETS' ROLE IN ECONOMIC AND FINANCIAL MARKET DEVELOPMENT 12

2.2.2 ROLE OF EMERGING MARKET FINANCIAL SYSTEMS 17

2.3 DEVELOPED AND EMERGING MARKET INTEGRATION 18

2.3.1 INTEGRATION DEFINED 18

2.3.2 FACTORS AFFECTING MARKET INTEGRATION 19

2.3.3 MEASURING MARKET INTEGRATION 23

2.3.4 Integration of the Global Financial System 27
2.3.5 Effects of turmoil on market integration 30
2.4 African Stock Markets 32
2.4.1 Size of Financial Markets 33
2.4.2 Liquidity and Risk of African Markets 35
2.4.3 Promotion of African stock exchanges 37
2.5 Research Question 39
2.6 Conclusion of Literature Review 41

3 RESEARCH METHODOLOGY 42

3.1 Research methodology / paradigm 42
3.2 Research Design 42
3.3 Population and sample 43
3.3.1 Population 43
3.3.2 Sample 44
3.3.3 Sample and sampling method 50
3.4 The research instrument 52
3.5 Procedure for data collection 52
3.6 Data analysis and interpretation 53
3.6.1 The Phillips-Ouliaris co-integration test 54
3.7 Limitations of the study 54
3.8 Validity and reliability 54
3.8.1 External validity 55
3.8.2 Internal validity 55
3.8.3 Reliability 55

4 PRESENTATION AND INTERPRETATION OF RESULTS 56

4.1 Introduction 56
4.2 Results for South Africa 56
4.3 Results for Egypt 57
4.4 Results for Morocco: 58
4.5 Results for Nigeria: 59
4.6 Results for Kenya: 60
---------- 61
4.7 Analysis of results 61
4.8 Interpretation of results 64
4.8.1 Size of Financial Markets 65
4.8.2 Appetite for Risk 66
4.8.3 Liquidity 67
4.8.4 Rules and Regulations 68
4.8.5 Trade 69
4.9 Additional Findings 69
4.9.1 Geographic location 70

4.9.2 SOCIAL 70
4.9.3 POLITICAL 71

5 DISCUSSION, CONCLUSION & RECOMMENDATIONS..... 72

5.1 INTRODUCTION 72
5.2 DISCUSSION 72
5.3 CONCLUSIONS OF THE STUDY 73
5.4 RECOMMENDATIONS 75
5.5 SUGGESTIONS FOR FURTHER RESEARCH 76

REFERENCES..... 78

APPENDIX A 86

APPENDIX B 106

LIST OF TABLES

Table 1: African contagion during the 1997 Asian crisis using Corsetti's et al.,(2005) methodology. (Collins and Biekpe, 2003b) 26

Table 2: African contagion during the 1997 Asian crisis using the Forbes and Rigobon (2002) methodology. (Collins and Biekpe, 2003b) 27

Table 3: Trends in private investment and financial market development in selected countries (Misati and Nyamongo, 2011) 34

Table 4: Cost of Equity Estimates (Hearn, 2008) 36

Table 5: Weekly data table: Egypt, Kenya, Morocco, Nigeria and South Africa .. 52

Table 6: Phillips-Ouliaris Co-integration Test for South African markets vs. Global markets 56

Table 7: Phillips-Ouliaris Co-integration Test for South African markets vs. MSCI EAFE Index 57

Table 8: Phillips-Ouliaris Co-integration Test for Egyptian markets vs. Global markets 57

Table 9: Phillips-Ouliaris Co-integration Test for Egyptian markets vs. MSCI GCC Index 58

Table 10: Phillips-Ouliaris Co-integration Test for Moroccan markets vs. Global markets 58

Table 11: Phillips-Ouliaris Co-integration Test for Moroccan markets vs. MSCI Food and Staples Index 59

Table 12: Phillips-Ouliaris Co-integration Test for Nigerian markets vs. Global markets 59

Table 13: Phillips-Ouliaris Co-integration Test for Nigerian markets vs. MSCI World Oil and Energy Index 60

Table 14: Phillips-Ouliaris Co-integration Test for Kenyan markets vs. Global markets 60

Table 15: Phillips-Ouliaris Co-integration Test for Kenyan markets vs. MSCI Food and Staples Index 61

Table 16: Data Source, Starting Date, and Number of Observations for each Series 107

LIST OF FIGURES

Figure 1: Pre–crisis South Africa index vs. Global Markets index 86

Figure 2: Post–crisis South Africa index vs. Global Markets index 86

Figure 3: Pre–crisis South Africa index movement vs. Global Markets index movement 87

Figure 4: Post–crisis South Africa index movement vs. Global Markets index movement 87

Figure 5: Pre–crisis South Africa index vs. MSCI EAFE index..... 88

Figure 6: Post–crisis South Africa index vs. MSCI EAFE index 88

Figure 7: Pre–crisis South Africa index movement vs. MSCI EAFE index movement 89

Figure 8: Post–crisis South Africa index movement vs. MSCI EAFE index movement 89

Figure 9: Pre–crisis MSCI Egypt index vs. Global market index 90

Figure 10: Post–crisis MSCI Egypt index vs. Global market index 90

Figure 11: Pre–crisis MSCI Egypt index movement vs. Global market index movement 91

Figure 12: Post–crisis MSCI Egypt index movement vs. Global market index movement 91

Figure 13: Pre–crisis MSCI Egypt index vs. MSCI GCC index 92

Figure 14: Post–crisis MSCI Egypt index vs. MSCI GCC index..... 92

Figure 15: Pre–crisis MSCI Egypt index movement vs. MSCI GCC index movement 93

Figure 16: Post–crisis MSCI Egypt index movement vs. MSCI GCC index movement 93

Figure 17: Pre–crisis MSCI Morocco index vs. Global market index 94

Figure 18: Post–crisis MSCI Morocco index vs. Global market index 94

Figure 19: Pre–crisis MSCI Morocco index movement vs. Global market index movement 95

Figure 20: Post–crisis MSCI Morocco index movement vs. Global market index movement 95

Figure 21: Pre–crisis MSCI Morocco index vs. MSCI Food and Staples index ... 96

Figure 22: Post–crisis MSCI Morocco index vs. MSCI Food and Staples index . 96

Figure 23: Pre–crisis MSCI Morocco index movement vs. MSCI Food and Staples index movement 97

Figure 24: Post–crisis MSCI Morocco index movement vs. MSCI Food and Staples index movement..... 97

Figure 25: Pre–crisis MSCI Nigeria index vs. Global market index 98

Figure 26: Post–crisis MSCI Nigeria index vs. Global market index 98

Figure 27: Pre–crisis MSCI Nigeria index movement vs. Global market index movement 99

Figure 28: Post–crisis MSCI Nigeria index movement vs. Global market index movement 99

Figure 29: Pre–crisis MSCI Nigeria index vs. MSCI Oil and Energy index..... 100

Figure 30: Post–crisis MSCI Nigeria index vs. MSCI Oil and Energy index 100

Figure 31: Pre–crisis MSCI Nigeria index movement vs. MSCI Oil and Energy index movement 101

Figure 32: Post–crisis MSCI Nigeria index movement vs. MSCI Oil and Energy index movement 101

Figure 33: Pre–crisis MSCI Kenya index vs. Global market index 102

Figure 34: Post–crisis MSCI Kenya index vs. Global market index 102

Figure 35: Pre–crisis MSCI Kenya index movement vs. Global market index movement 103

Figure 36: Pre–crisis MSCI Kenya index movement vs. Global market index movement 103

Figure 37: Pre–crisis MSCI Kenya index vs. MSCI Food and Staples index 104

Figure 38: Post–crisis MSCI Kenya index vs. MSCI Food and Staples index... 104

Figure 39: Pre–crisis MSCI Kenya index movement vs. MSCI Food and Staples index movement 105

Figure 40: Post–crisis MSCI Kenya index movement vs. MSCI Food and Staples index movement 105

1 INTRODUCTION

1.1 Purpose of the study

The purpose of this research is to gain understanding in the dynamics of international portfolio flows to African stock markets in order to determine the level of African stock market integration in global financial markets and the resulting vulnerability of Africa to disruptions and crises.

1.2 Context of the study

During the early part of the 20th century, Africa had only 3 functioning stock exchanges: South Africa, Egypt and Zimbabwe (Alagidede, 2009). Most national exchanges in Africa are relatively new, operating since late 1980 (Irving, 2005). Many of these African markets, in introducing new financial instruments, have encouraged the use of exchanges as a vehicle for the privatisation of state assets. Hearn and Piesse (2010) stated that the International Monetary Fund (IMF) and World Bank, in an attempt to promote growth and alleviate poverty in developing countries, have implemented a range of structural change programmes to establish capital markets that will support the privatisation of state-run industries, a process, they argue, will improve efficiency. These programmes have, however, been challenged (Hearn and Piesse, 2010). The researchers contend that the development of stock markets, as a source of external finance, is an irrelevant and costly source of funding to poor countries that have unstable macroeconomic environments, low levels of regulation and poor systems of corporate governance (Hearn and Piesse, 2010).

Looking ahead, as the degree of integration and globalization of these markets advances, African markets should become financially integrated with the rest of the world resulting in any mispricing of assets disappearing. The benefits of well-functioning stock markets on developing economies (Wang, Yang and Bessler, 2003) is well documented. Research undertaken by (Atje and Jovanovic, 1993)

found that development of financial markets has a profound effect on the level of economic activity and the growth rate of the economy. Further research (Obstfeld, 1994) has shown that the integration of the global financial markets enables most countries to benefit from welfare gains. This research further argues that internationally integrated stock markets allow greater international risk sharing, resulting in accelerated productivity growth by enabling a portfolio shift from "safe", low return investments, to riskier, high return investments. Levine and Zervos (1998) found that a strong correlation exists between stock market liquidity (measured by both the value of stock trading relative to the size of the market and by the value of trading relative to the size of the economy) and positive growth, capital accumulation and productivity improvements. The benefits of integration have led to an observation that, after the 1987 stock market crash and 1997 Asian crisis, there has been increasing interdependence between developed and some emerging markets (Wong, Penm, Terrell and Ching, 2004). Should this trend occur in Africa, following the recent global banking crisis, the benefits of international diversification into African equity markets may be limited.

Emerging markets were first employed as a viable asset class in the 1990s (Collins, 2003). Africa, excluding South Africa, has been largely excluded from globalisation and financial integration. This isolation is evident by the small role that foreign investment, in particular portfolio investment, plays in the majority of these countries (Harvey and Harvey, 1995; Brink, 2000). It was argued by Harvey and Harvey (1995) that this was the inevitable outcome of their low correlations with other markets. They further stated that, over time, these correlations change as the level of integration into the global financial system changes. In the wake of the credit market developments in the US, policy makers and economists have realised that it is useful to understand the interdependence of financial markets (Raj and Dhal, 2009).

There is, therefore, substantial interest in the field of 'developing market finance' from academics, international portfolio managers and financial institutions (Hearn and Piesse, 2010). As most analysts now recognise the importance of measuring international integration of stock markets, much research has been published on

the integration of select national stock markets across several developed and emerging markets. However, studies that focus on African markets are rather scarce. Research into market integration appears to have been limited to Organisation for Economic Co-operation and Development (OECD) countries or emerging Latin America or Asia (Singh, 1997). Africa's exclusion from this research is probably due to the infancy of many of its exchanges (Piesse and Hearn, 2005). Where research has been done, it deals primarily with the benefits of integration on their economies (Bairoch, 1996).

We can expect that harmonizing trading practices, dual listings, promotion of trade between regions, geographical proximity, regional economic blocks, international trade agreements and historical ties should all push markets towards integration. However, there appears to be little evidence of the integration of Africa's stock markets with one another or the rest of the world (Alagidede, 2009). Given the potential returns of developed markets (Alagidede, 2009), this paper attempts to understand the importance of Africa to international investors who may be attempting, through portfolio allocation decisions, to reduce risk and exposure to falling investment asset returns in their global portfolios.

1.3 Problem statement

1.3.1 *Main problem*

Analyse and evaluate the level of integration of African countries' stock markets within global stock markets, before and after the 2008 global financial crisis, in order to assess the future vulnerability of Africa in times of financial disruptions and crises.

1.3.2 *Sub-problem 1*

The first sub-problem is to analyse and evaluate the change (if any) that the 2008 financial crisis had on the integration of African countries' stock markets into developed stock markets using the S&P 500 index as a proxy.

1.3.3 *Sub-Problem 2*

The second sub-problem is to analyse and evaluate the change (if any) that the 2008 financial crisis had on the integration of African countries' stock markets into the global stock market index for the largest contributing factor to each domestic economy.

1.3.4 *Sub-Problem 3*

The third sub-problem is to analyse and evaluate the change (if any) that the 2008 financial crisis had on integrating the weekly share price movement of African countries' stock markets with the weekly movement of the developed stock markets using the S&P 500 Index as a proxy.

1.3.5 *Sub-Problem 4*

The fourth sub-problem is to analyse and evaluate the change (if any) that the 2008 financial crisis had on integrating the weekly share price movement of African countries' stock markets with the weekly movement in the global stock market index representing the largest contributing factor to each domestic economy.

1.4 Significance of the study

The development of African stock markets is argued to be the essential component of financial sector development and is expected to play an important role in promoting the growth of African economies (Wang et al., 2003). Marashdeh and Shrestha (2010) believe that stock market integration is vital for the development of emerging economies. They argue that it provides an opportunity for risk-sharing among integrated markets while enhancing competition and efficiency in the allocation of resources. The result is a significant contribution to financial stability in these economies as well as a reduction in the cost of capital and price volatility between these markets (Marashdeh and Shrestha, 2010). It further encourages the adoption of new technologies in order to maintain a competitive advantage and reduce costs (Marashdeh and Shrestha, 2010). Other benefits include the promotion of domestic savings, investment, productivity and ultimately economic growth (Marashdeh and Shrestha, 2010).

This study then offers some confirmation that African equity markets may be more financially integrated than previously researched, and that the global 2008 financial crisis may have affected the flow of international investment capital to the region.

Understanding the degree of integration in African markets will provide insight into the scope and direction of future financial regulation, level of stock market efficiencies experienced in those countries and the effectiveness of monetary policies within the economy. In addition, if policy makers of a particular African economy understand fully the way their markets are integrated, suitable economic policies may be created and implemented to protect the country from an economic crisis contaminating the domestic market.

Further, it is expected that the results of this study will be useful in providing guidance to global portfolio managers on the impact that events in other developing or developed markets may have on African portfolio exposure.

Therefore, a study on stock market integration has significant importance for both investors and policy makers in today's economic environment.

1.5 Delimitations of the study

This study will review the theory, evidence and implications of African financial market integration. I note that "financial market integration" is a subset of economic integration.

As literature on the subject of financial market integration is vast, I will focus primarily on the seminal and most influential papers on financial market integration. Although these articles define, measure and draw implications for integration among developed financial markets, they have regularly been used as a base for numerous studies of integration among the developing or emerging financial markets of Asia, Central Europe and Latin America.

This study will examine and focus on how the level of integration in African markets changed during the 2008 global economic crisis in relation to their developed market peers. Data over longer periods has, therefore, not been included.

There are diverse perceptions of the current level of integration and globalization of African markets. However, the influence of these perceptions will not be explored.

It is recognised that, while there are numerous non-economic similarities there is also some degree of diversity among the countries explored in this research and that certain factors will be more important in some countries than in others. The effects of this have not been taken into account.

This report is exploratory in nature.

1.6 Definition of terms

African Stock Exchanges:

The five primary stock exchanges in Africa covered in this research. The exchanges represent North, South, East and West.

Financial integration:

Defined by Kabundi and Mouchili (2009)as “the combination of free movement of capital and integration of financial services”.

Financial Market integration:

Defined by Marashdeh and Sherstha (2010) as an environment in which there are no obstacles such as legal restrictions, transaction costs, taxes and tariffs levied against the mobility of portfolio equity flows.

Foreign investment: (Lensink and Morrissey, 2006)

The movement of capital from the capital owner’s country to a foreign country is called foreign investment. The investment in the host country can be classified as either: a portfolio investment where the investor, through a stock exchange, buys a share in a firm, or a loan where the investor makes capital available to a firm in a foreign country.

S&P 500 Index:

Standard and Poor’s 500 Index, is an index of 500 stocks listed in the United States. These stocks are chosen for liquidity, industry diversification and market size and are a leading indicator of risk and return characteristics of large market capitalisation companies globally as well as being one of the most cited indices in use today.

MSCI:

Morgan Stanley Capital International is a global provider of equity benchmarks. These are the most widely used by international investors as a consistent benchmark for comparison between funds in regional, sectorial and industrial investments.

MSCI EAFE Index:

Morgan Stanley Capital International's Europe, Australasia and the Far East Index comprising of 21 major indices which serves as the most frequently cited benchmark for the performance of the international stock markets outside the United States.

MSCI Food and Staples Index:

Morgan Stanley Capital International Index consisting of large, medium and small companies whose businesses includes food, beverages, non-durable household products and personal products which are traditionally less sensitive to economic cycles.

MSCI GCC Index:

Morgan Stanley Capital International Index Gulf Cooperation Council Index representing companies in the United Arab Emirates, Kuwait, Qatar, Bahrain and Oman. The index is designed to provide international investors with an asset allocation and performance measurement framework for the equity markets within the Middle East and North African regions.

MSCI World Oil and Energy Index:

Morgan Stanley Capital International oil and energy Index consisting of large, medium and small companies that represent consumable fuel and energy service businesses that incorporate oil and gas exploration and production.

MSCI Egypt Index:

Morgan Stanley Capital International Egyptian Index is a free-float weighted equity index covering 98% of the investable equity on the Egyptian Stock exchange.

MSCI Morocco Index:

Morgan Stanley Capital International Moroccan Index is a free-float weighted equity index covering 98% of the investable equity on the Casablanca Stock exchange.

MSCI Nigeria:

Morgan Stanley Capital International Nigerian Index is a free-float weighted equity index covering 98% of the investable equity on the Nigerian Stock exchange.

MSCI Kenya:

Morgan Stanley Capital International Nairobi Index is a free-float weighted equity index covering 98% of the investable equity on the Nairobi Securities exchange.

FTSE/JSE Top 40:

This index constitutes the forty largest companies listed on the Johannesburg Stock Exchange by market capitalisation and closely duplicates the performance of the entire exchange.

1.7 Assumptions

- The duration of the period under review is sufficient to draw conclusions. Should there be insufficient data available during this period, the research report could not draw any conclusions.

- Data stored by the data vendor Bloomberg is accurate. No independent verification is possible. Bloomberg is the world's leading source of financial market information and is widely accepted by market practitioners. Should the data be incorrectly captured the results would be distorted.

2 LITERATURE REVIEW

2.1 Introduction

Financial co-integration benefits domestic economies through better allocation of capital among potential investments and diversifies risk across countries (Kabundi, 2009). These benefits are not, however, without risk in times of financial crisis. The swiftness, potency and synchronicity with which a financial crisis spreads across countries cannot be explained by trade alone, but may be explained by capital movements (Kabundi, 2009). International business cycle linkages have increasingly become a focus of public interest (Kabundi, 2009).

This has led to a growing interest in researching and understanding linkages in global financial markets (Cowen, 1950; Chinzara, 2009), as better understanding of these linkages may help to explain the rapid transmission of national financial disturbances to other markets, as was witnessed in the global crash of October 1987, Mexican crash in 1995, the east Asian crisis in 1997 (Cowen, 1950) and most recently the financial market crash of 2008.

If these crises are unfairly disruptive on other markets, they may distort the allocation of capital and must thus be taken into account when making portfolio allocation decisions (Cowen, 1950). Research into financial market co-integration has concentrated primarily on the developed markets, while studies incorporating Africa have concentrated primarily on the Johannesburg Stock Exchange (Mlambo and Biekpe, 2007).

The focus of this research is on the change in the co-integration of African stock markets compared with the developed world and stock market indices that represent their primary economic drivers. The background of the literature review investigates the stock markets role in economic development and emerging market financial systems. The review then investigates developed and emerging market integration with specific reference factors affecting African Markets.

2.2 Background

The flow of international portfolio investment has grown significantly over the past few decades (Arshanapalli and Doukas, 1993). Arshanapalli and Doukas (1993) attributed this to a number of different factors such as: the relaxation of exchange controls on capital movements and transactions; improvements in computers and communication technology lowering the cost of cross border transactions and allowing effective flow of information and the expansion of multinational corporations that are listed on numerous exchanges. These changes have been influenced by the effects of globalization, deregulation and advances in information technology (Marashdeh and Shrestha, 2010).

Early studies on co-integration of financial markets, motivated primarily by the potential benefits of international portfolio diversification, occurred in the early 1970s. These studies found little evidence of co-integration, thus, the potential for diversification was large (Levy, 1970; Lessard, 1973; Solnik, 1974b) . More recently the converse has occurred with significant increases in the co-movement and interdependence of financial markets (Campbell, 1992; Roll, 1992; Bonfiglioli, 2005) being observed. It is accepted that financial co-integration can benefit domestic economies through better allocation of capital among investment opportunities(Bonfiglioli, 2005; Kabundi, 2009). The diversification of risk across countries does, however, acting as a conveyor of financial crisis between similar countries (Kabundi, 2009), have its drawbacks.

The impact of co-integration on financial markets in most developing countries has been significant (Chittedi, 2010). Research done by the author on stock market development, indicates that improvements in communication technology and increased financial market co-integration have resulted in greater levels of cross-border investment. Many companies in emerging markets now access capital through dual listings on international exchanges, which offer them a lower cost of capital and improved trading liquidity (Chittedi, 2010).

Although Africa contains a significant portion of the world's poorest and least developed countries, which, until recently, were divided along cultural, ethnic and

socio-political differences (Piesse and Hearn, 2002), during the past decade the African continent has seen rapid economic growth and the establishment of new stock exchanges. Former socialist economies of Mozambique and Tanzania now have rapidly growing stock exchanges, privatization policies and programs and allow the raising of domestic capital. It appears that countries in Africa are working towards integrated markets and trading systems (Piesse and Hearn, 2002). Despite these advancements, African stock exchanges are the smallest in the world in terms of number of listed stocks and market capitalisation relative to their economies (Mlambo and Biekpe, 2007).

2.2.1 *The stock markets' role in economic and financial market development*

A lot of research has been done to investigate the relationship between stock markets and economic growth in a country. Chittedi (2010) believes that the primary reason for a relationship to occur is that stock exchanges increase liquidity and allow investors to diversify risk. This makes investors more likely to invest in turn improving the flow of information resulting in the improvement of corporate governance(Chittedi, 2010) and thus increasing the level of investment.

Levine and Zervos (1998) argued that if markets were perfectly integrated then capital would flow across borders to equate the price of risk. If any controls impeded capital movement then the price of risk would differ between countries. The Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT), was argued, that by designed they would be positively correlated with co-integration (Levine and Zervos, 1998), under the "law of one price" (Korajczyk, 1996). Thus, an accurate estimator of the level of economic co-integration would be the use of the CAPM and APT, as these would then be robust models to estimate asset prices (Levine and Zervos, 1998). Investors would then be able to interpret the results from their multivariate regression as being a measure of market co-integration (Levine and Zervos, 1998). However, during times of market crisis or changes in capital controls when mispricing is often evident, shortfalls in these models is often evident (Korajczyk, 1996). Another shortcoming is that these

models may miss market segmentation, especially if one or more of the influences in the model is priced locally and not common to the whole group (Korajczyk, 1996). Market segmentation tends to be much larger for emerging markets than developed markets (Korajczyk, 1996) as these markets often have large barriers to capital flow and investment.

The nature and extent of bilateral trade relationships have been cited as the reasons for the extent of financial integration taking place among countries (Bracker, Docking and Koch, 1999). The authors studied the effect that relative export dependency of countries has on their level of co-integration. They also considered the extent that one country relies on the other for total imports, thus postulating that the dependent stock market would be more concerned with the ability of the independent market to continue importing goods and services (Bracker et al., 1999). Investigations into the economic conditions that influence bilateral trade use specific economic variables (Bracker et al., 1999). The authors noted that purchasing power parity and interest rate parity across markets may influence trade and capital flows among countries. In addition, volatility in bilateral exchange rates may reduce confidence and certainty between markets, thus reducing the effect of co-integration. Physical distance between countries adds additional costs in the transportation of goods, thus an increased distance between countries may be negatively correlated with bilateral trade (Bracker et al., 1999). The equity market's size may be indicative of the level of development of the country, thus influencing the level of liquidity, information and transaction cost in the market. With the sample period covering 22 years, the final variable included in the study was time: as innovative developments in products and communications reduce regulatory hurdles and increase the number of dual listings of stocks, levels of market co-integration increase over time (Bracker et al., 1999). The authors found that import dependence may increase the degree of co-movement across markets. Also, geographic distance among markets and the varying size of markets were both negatively correlated to co-movement among them.

In a study (Phylaktis, 2002) focused on the Pacific-Basin emerging market region, which included Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand. The researchers measured financial co-integration by testing the 'law of one price', which states that in an efficient market all identical goods should have the same price, on financial assets with the same risk. The study concurred with other research in that there exists a significant degree of regional co-integration between these financial markets and global developed markets. In 1999, the Pacific-Basin markets constituted 47% of emerging market capitalisation (Phylaktis, 2002). Thus, they investigated this region in order to provide an explanation for the apparent high degree of financial market co-integration between this region and the developed world, despite the presence of foreign exchange controls, to have a high degree of economic co-integration. Whether economic co-integration plays a role in linking the financial markets was also examined.

Phylaktis (2002) noted in their research that real economic co-integration has commonly been measured in many different ways, namely:

i.) Degree of openness calculated as the ratio of exports and imports to or from a country;

ii.) The amount of price and quantitative restrictions on traded goods;

iii.) The theory that trade interdependence transmits economic activity from one country to the other;

The authors found that whichever way economic co-integration was measured, it provided channels in linking the financial markets even in the presence of foreign exchange restrictions on international capital flows. For example, when they measured economic integration as a "contemporaneous movement of output", they noted that it provided a conduit for financial integration through the effects of expected economic activity on the expected cash flows of firms and their stock prices. Thus, if two countries experienced a co-movement in output then their cash flows would move together as would their stock markets (Phylaktis, 2002). In

practice, their findings indicate that a real economic shock originating in one country will have a similar effect on the economic growth of the other country through their trade interdependencies (Phylaktis, 2002). This in turn will result in corporate earnings and dividends of both countries moving together as if they are considered proxies for long-term real economic activity (Phylaktis, 2002).

Phylaktis (2002) found overwhelming evidence of a link between economic integration and financial integration. The researchers argued that if economic integration relates to countries' co-movements of output growth, and economic activity is positively related to stock prices, as has been demonstrated theoretically and empirically, then it would not be unexpected to find stock prices moving together. In fact the relationship between economic activity and stock prices is stronger if foreign influences are taken into account through consumption and production interdependencies (Canova and De Nicolo, 1995).

Integration relies not only on liberalisation of financial markets, the size of the market or turnover thereof but also on accessibility of those markets to foreign participation (Collins and Biekpe, 2003). Accessibility to foreign investors is often facilitated by the issuance of American Depository Receipts.

Vinh and Daly (2005) focused on the issue of a potential increase in the level of correlation, co-integration and causality in countries of the European Monetary Union and the United States. They found that by increasing the level of global financial co-integration, equity returns became more correlated and concluded that financial co-integration should be considered an important factor in asset allocation decisions. However, even though this financial co-integration influenced asset allocation, variations in correlations between markets in Europe were still observed. Weaker countries of the European Union such as Greece, Spain and Portugal's equity markets showed reduced levels of co-movement when compared with other European Union countries. This may be as a result of poor accounting standards, inefficient information dissemination or increased political risks(Vinh Vo and Daly, 2005). The results showed that strong financial ties were the only factor that affected co-integration (Vinh Vo and Daly, 2005).

Key to financial integration is the presence of a stock exchange (Chittedi, 2010). The stock exchange in an economy contributes to capital accumulation and technological innovation (Chittedi, 2010). In addition, it increases the amount of funding available for riskier investment projects, leading to an increase in the level of equity financing in the economy - an important determinant of a country's economic growth (Chittedi, 2010).

The stock market thus facilitates the internationalization of an economy through the inflow of capital, An efficient and well-functioning stock market should aid economic growth by raising the quantity and quality of investments (Levine, 2001). Levine (2001) further suggests that by removing restrictions on international portfolio fund flows, stock market liquidity would be enhanced, improving stock prices and boosting economic growth and confidence in the market. Other benefits of effective stock markets will reduce the cost of equity, making future investments cheaper, improving credit ratings and allowing real exchange rates to appreciate (Bekaert, Harvey and Lumsdaine, 2002).

Further, the stock exchange can ensure that through the 'takeover mechanism', whereby investors are able to influence the decisions of management, that investments are profitably utilised (Singh, 1997). It has been argued by stock market critics that even well-organised stock markets from developed countries, such as those in the United Kingdom and the United States, operate imperfectly and do not perform the monitoring, screening and disciplinary functions effectively (Singh, 1997). Therefore, if established markets are unable to perform these disciplinary and allocative functions, developing markets are likely to fair worse in these respects**.**

A simple measure of determining the size of stock markets would be to sum the total value of all the shares at a specific time. Chittedi (2010) found that the market capitalisation of all listed companies, taken together on all markets, amounted to around $65 trillion in 2007. Among the top 40 countries, 22 were developed markets and 18 were from developing markets. However African market capitalisation is considerably smaller(Chittedi, 2010). This is an important

indicator because the level of savings' mobilisation and risk diversification depend on the size of the market relative to other markets (Chittedi, 2010).

As set out previously, trade linkages and foreign direct investment reflect economic co-integration, thus, the co-movement of underlying macroeconomic variables across nations may lead to co-movement of stock prices (Chittedi, 2010). However, regional or global co-integration poses many risks to a country's capital markets and financial stability (Chittedi, 2010). In particular, reversals of capital flows or macroeconomic contagion will result in exaggerated low output and economic growth for periods of time (Chittedi, 2010). It appears that countries with less developed financial systems may be more vulnerable to crises and hence induce domestic volatility (Chittedi, 2010).

2.2.2 *Role of emerging market financial systems*

Emerging economies first became a recognised viable asset class during the 1990s (Collins, 2003). Gourinchas and Jeanne (2006) stated that, in the early 1990s, international financial integration was often viewed as a new engine of growth which would improve the living standards of developing countries. Harvey and Harvey (1995) suggested that what made these emerging economies attractive was that they had low correlations with developed markets and would serve as an effective hedge in a global portfolio. He also found that owing to shocks in the financial system, emerging market correlations with developed markets were changing over time. Indications are that since 1973 global crises have become more frequent, but have not become more severe (Collins and Biekpe, 2003). Collins and Biekpe (2003) found that a potential reason for increased frequency of crises was increased capital mobility. They argued that integration may be both a "blessing" and a "curse" for emerging market economies resulting in conflicting views by policy makers in countries with less integrated economies such as those found in Africa (Collins and Biekpe, 2003).

Financial reporting and dissemination of price information in Africa and other emerging markets has improved (Piesse and Hearn, 2005), resulting in both good and bad information in equity markets being transmitted to the world as fast as

good information, causing sudden capital flight and increased market volatility. Accessibility to information and speed of information dissemination results in an increase in international capital mobility (Chinzara, 2009). Thus, the higher the level of global integration the greater the exposure to global crises (Collins, 2003). It has been established by (Collins, 2003) that if a country is highly integrated with global markets, its financial market may suffer a dramatic market downturn which may or may not be related to that country's own sovereign risk.

Integration also leads to rapid flow of funds from 'less returns markets' to 'high returns markets' and, as a result equalises global returns (Jeyanthi and Pandian, 2008). If markets were to move in unison then, investing in various markets would not yield any gain to a long term global portfolio; whereas, if these markets are independent, investors could invest in different regions to effectively diversify their portfolio and they would not need to concern themselves with contagious effects from turmoil in other markets (Jeyanthi and Pandian, 2008). Further, policy makers are increasingly alarmed by the extent to which globalization causes their domestic economies to move in sync with other countries' economies, limiting the influence that their domestic policies have on their own economy (Kabundi, 2009).

There are important implications of the above analysis for Africa which require examination. The Mexican peso crisis in 1994, the Asian crisis of 1997 and the Brazilian crises of 1998 have ignited the debate about the role of globally integrated capital markets in a financial crisis.

2.3 Developed and emerging market integration

2.3.1 *Integration defined*

The most important development in international financial markets has been the increasing globalization of world capital markets (Brink, 2000).

Global co-integration of financial markets refers to all aspects of constant financial revolution (Brink, 2000). Among the most significant are the deregulation of domestic markets, the abolition of cross-border exchange controls, the

accelerated progress in communication technology and information systems and successive waves of financial innovation(Brink, 2000). International financial integration facilitates risk sharing, thereby enhancing (Obstfeld, 1994) production specialisation, capital allocation and economic growth.

Integration is defined by Eng (1995) as the degree of capability of financial capital to flow freely between domestic and international markets. These sentiments are echoed by (Tripathy, 2005) who regards integration as a process by which segmented markets become open and unified allowing participants to enjoy unimpeded access to international trade and finance.

Kearney and Lucey (2004) found two basic approaches in literature to define the extent to which international financial markets are co-integrated. These approaches were defined in terms of two broad categories – direct or indirect measures. The direct method identifies the degree to which the rate of return on financial assets, with similar risk characteristics and maturity, are equal across different countries. The result of an investment of this nature should yield the same return if cash flows are the same (Kearney, 2004). The difficulty in studying this approach is that it is almost impossible to find assets homogenous in their risk, to allow for comparisons to be carried out. The indirect method asserts that perfect capital mobility is available from the international capital markets to fund domestic investments without changes in the interest rate (Kearney, 2004).

Kabundi (2009) echoed the indirect measure of this explanation when he defined integration as a combination of the free movement of capital but expanded it to include the integration of global financial services.

2.3.2 *Factors affecting market integration*

Numerous researchers have investigated what the key determinants are that influence market integration (King and Wadhwani, 1990; Campbell, 1992; Arshanapalli and Doukas, 1993; Bachman and et al., 1996; Bracker et al., 1999). The findings are as follows:

Early studies (Campbell, 1992) looked for a 'force' that may affect movements across the US and Japanese exchanges. Possibilities included changes in volatility, (or some broader measure of "business cycle risk"); changes in risk aversion, (as average wealth rises and falls) and exogenous shifts in the demand for stock as 'noise traders' influence supply or demand. However, if independent market-clearing takes place in the different regions, then any co-movement must be coincidental (Campbell, 1992). Campbell and Hamao (1992) found further that, in particular, the level of Japanese dividend-price ratio, relative to the US dividend-price ratio was a powerful predictor of co-movement. They concluded that expected stock returns across markets must be influenced by a single common factor in the world capital markets.

Researchers (Arshanapalli and Doukas, 1993) found that the magnitude of interdependence between the US stock market and the stock markets in France, Germany and the UK had increased since the stock market crash in 1987. They found substantial cross-exchange efficiency between the US market and the three major European markets in the post 1987 crash period. Their research was influenced by the theory proposed by King and Wadhwani (1990) who used a method that was became accepted in early integration literature as a principle influence on changes in the levels of integration between markets. The authors observed that in some markets a change occurred in the correlation coefficient during a period of market turmoil in one country. Therefore, if the correlation coefficient increased during times of crisis, it demonstrated an increase in the relationship between these countries. This improvement in the relationship would then be interpreted as reinforcement and strengthening of the existing transmission mechanisms between the two countries, therefore increasing the degree of co-integration (King and Wadhwani, 1990). If there was no significant change in the correlations of asset prices during crises compared to those experienced before the crisis, then this would be evidence of interdependence, ("Interdependence" suggests that strong linkages between these economies will exist in all financial states (Forbes and Rigobon, 2002)) between countries and not contagion (King and Wadhwani, 1990).

Stock market contagion was defined in a similar way by Forbes and Rigobon (2002) as being observed only when the co-movement between assets increases significantly after the shock. This definition allows for simple testing of whether contagion occurs among markets and distinguishes between alternative explanations for how the crisis is transmitted (Forbes and Rigobon, 2002). Some theories argue that investors behave irrationally during a crisis while others find that co-movement is only possible through stable real linkages such as trade and investment among countries (Forbes and Rigobon, 2002).

Bachman et al (1996) found while investigating a growing 'trend' in stock prices of the G7, that the primary influencing factors, affecting co-integration of these markets, were technological change, trade liberalisation and financial deregulation. The researchers found that by comparing different bilateral environments, the degree of influence of these factors varied between the different regions. However, the factors remained constant.

Bracker, Docking and Koch (1999) found that the degree of capital market integration varied substantially across different pairs of national markets over time. During times of low correlation in the economic health of different countries, markets tended to follow their own paths and experience less co-movement with other markets (Bracker et al., 1999). They also found that during times of close association between countries, especially those that were interdependent through trade, a high degree of co-movement was observed. Thus, they concluded that the greater the economic integration across countries, the greater the level of integration in the capital markets.

Bracker et al., (1999) further believed that interdependence through trade and capital flows implied interdependence in investors' valuation decisions across national equity markets. The degree of international integration is positively associated with world market volatility and trend, while negatively related to exchange rate volatility, term structure differentials across markets, real interest rate differentials and the return on a world market index (Bracker et al., 1999).

A study by Kearney and Lucey (2004) found that the rapid expansion of international trade in commodities, services and financial assets were the driving forces behind global financial market integration. They found that a growing proportion of domestic commodity and service trade is being exported for consumption abroad, while a greater degree of domestic consumption and investment in commodities and services were being imported into domestic economies, thus increasing the economic interdependencies of global markets.

Further, Kearney and Lucey (2004) noted that as economic integration occurs, the level and pace of international financial integration increases. They believed those investors, whether households, corporations, or financial institutions, could increasingly decide whether to hold domestic assets, for example, bonds, equity or other assets in foreign countries. These actions indicate that investors seek the best risk-return profiles in an increasingly integrated global financial system (Kearney, 2004).

Corsetti et al., (2005) expanded on the literature and argued that a change in integration may be driven by an increase in the variance of a common factor, which would result in higher volatility making the transmission mechanism between the two markets constant while the co-movements between these markets changes. It was argued by the authors that, by testing for structural breaks in the international transmission mechanism due to herd behaviour of investors or financial panics, positive tests for contagion could be done without observing a rise in correlation (Corsetti et al., 2005), therefore finding that changes in integration influences may be strongly related to short term investor emotions and may return to pre-crisis levels once fundamental valuations were again accepted by investors.

Chinzara and Aziakpono (2009) found that globalization, intertwined with technological progress, financial innovation and financial liberalisation, has changed the financial landscape. Recently, integration and globalisation, among countries and their financial markets, have increased interdependency among major world stock markets, which may have had an impact on economic stability (Siddiqui, 2009). However, it is accepted that well-functioning stock markets will

raise the savings rate, improve the quality and quantity of investment and provide a mechanism that past investments are most profitably utilized (Singh, 1997; Chittedi, 2010).

2.3.3 *Measuring market integration*

In January 2008 global stock markets fell sharply in the wake of financial market distress in the US. This sudden shock to the financial system reverberated quickly around the globe, with other markets fearing contagion and collapsing in line with the US. Market participants have now realised the importance of measuring international integration of domestic stock markets (Raj and Dhal, 2009).

The literature proposes many frameworks that explore the theory of financial market integration (Raj and Dhal, 2009) including the law of one price and portfolio diversification. It also provides for the testing for evidence of integration of financial markets using the I-CAPM to identifying the changes in the correlation between markets, using econometric co-integration model to establish co-movement between markets (Marashdeh and Shrestha, 2010), using time varying measures of integration to expand on the static approaches used in the literature (Raj and Dhal, 2009) and measuring contagion between markets during crisis periods (King and Wadhwani, 1990).

a. *The International Capital Asset Pricing Model*

The international Capital Asset Pricing Model (I-CAPM), developed in 1983 by economist and Nobel Memorial Prize winner, William Sharpe, provides a theoretical platform for international portfolio selection, by expanding on the theory developed in the Capital Asset Pricing Model. This I-CAPM model derives time-varying measures of integration, which assumes that markets are perfectly segmented (Marashdeh and Shrestha, 2010). According to the I-CAPM model, Marashdeh and Shrestha (2010) found that a market would be integrated if stocks with the same risk traded at the same price level even if they were traded in different markets.

Numerous studies have used the I-CAPM to measure stock market integration, including (Solnik, 1974a; Stulz, 1981; Jorion and Schwartz, 1986). An Empirical study done by Campbell and Hamao (1992) analysed market efficiency by measuring the degree of integration within international financial markets by assessing the size and speed of the transmission of news across markets.

Bekaert and Harvey (1995) developed a model that allowed for the degree of market integration to change over time and allow for the switching between integration and segmentation by allocating probabilities to the asset pricing model. One of the difficulties Bekaert and Harvey (1995) as well as other researchers face when using I-CAPM is how to explain what is expected from a model that assumes that all capital markets are perfectly integrated and thus asset price variances are a result of the co-variances of local returns with the world market portfolio (Kearney, 2004). In an attempt to improve the theory Baekert and Harvey (1995) allowed the degree of market segmentation to vary smoothly over time. They found the degree of integration generally rises over time, but that the degree of integration is closely related to the degree of currency instability. One can, however, not place to much weight on these results as they are derived from the simplest single factor asset pricing framework.

b. *Econometric co-integration models*

Most of the recent research appears to have used the co-integration approach to assess the degree of integration in stock markets. If stock markets are integrated, then it is expected that their market indices will display common trends (Marashdeh and Shrestha, 2010). Thus, the existence of co-movements between stock prices will indicate integration and will imply that one of the markets will help predict the other market's returns. Researchers have investigated increasing integration of financial markets by studying the correlation structure of equity markets and demonstrating a trend over time towards increased correlation, this form of integration would thus be determined primarily by real economic linkages between countries (Campbell, 1992; Arshanapalli and Doukas, 1993; Bachman and et al., 1996; Bracker et al., 1999).

c. *Time –Varying estimates*

A weakness that has been identified in the above research is that they focus on fixed points in time, missing an important element of time variation in equity risk premiums (Kearney, 2004). Bekaert and Harvey(1995) argued that the risk premium on equities varies over time. Therefore, any attempt to model the integration of markets without taking account of this time variation will yield only partial results.

Different researchers have used varying methods to try and overcome this limitation. Koch and Koch (1991) used simultaneous equation models to investigate integration of eight national stock indeices across three different years.

In a similar paper by Longin and Solnik (1995), they developed a model for conditional correlation over a much longer period (1960-1990) and found that covariance and correlation matrices were unstable over time. The research did not, however, focus on the fundamental determinants of international correlation across equity markets. The correlation will probably be affected by the industries represented in each national economy as well as the domestic business cycles (Longin, 1995).

Gonzalo and Granger (1905) found that national stock markets had equilibrium constraints, preventing the co-integrated from indices diverging too far from each other in the long-run. They argued that these indices shared common trends as the forces driving markets were similar over extended time horizons. Thus, markets may be exposed to similar risk factors and, therefore, a common risk premium (Raj and Dhal, 2009).

d. *Contagion*

Data (Collins and Biekpe, 2003), from eight African countries (Egypt, Kenya, Mauritius, Morocco, Namibia, Nigeria, South Africa and Zimbabwe) from the 1997

Asian crisis market crash period has been used. The results are detailed in figure 1 below. The researchers, using an unadjusted correlation coefficient, suggested that some of the markets, including the small markets of Namibia and Mauritius, indicated contagion. However, when the correlation coefficient was adjusted, the research indicated that there was no evidence of contagion in any African market, with the exception of South Africa and Egypt. The authors expected this finding as South Africa was a significant participant, followed closely by Egypt in the emerging market arena in terms of market capitalisation, value traded and weight in the International Finance Corporation Index and, as a result would thus be more heavily influenced by international investors rebalancing their portfolios or participating in the 'herd' effect of the crisis.

Table 1: *African contagion during the 1997 Asian crisis using Corsetti's et al.,(2005) methodology. (Collins and Biekpe, 2003)*

	Tranquil period	Crisis period	t-statistic	Contagion
Unadjusted correlation coefficients				
Egypt	-0.09	0.46	10.074	Y
Morocco	-0.19	-0.53	-5.464	N
Nigeria	0.00	-0.04	-0.551	N
Zimbabwe	0.08	-.04	-1.775	N
Kenya	0.14	0.18	0.568	N
Mauritius	-0.16	0.05	3.265	Y
South Africa	0.31	0.61	4.839	Y
Namibia	0.12	0.37	3.936	Y
Adjusted correlation coefficients				
Egypt	-0.03	0.17	3.022	Y
Morocco	-0.06	-0.20	-2.065	N
Nigeria	0.00	-0.01	-0.177	N
Zimbabwe	0.02	-0.01	-0.569	N
Kenya	0.05	0.06	0.189	N
Mauritius	-0.05	0.02	1.038	N
South Africa	0.10	0.24	2.100	Y
Namibia	0.04	0.13	1.353	N

When the methodology of Forbes and Rigobon (2002) was applied to the same data, using a simple t-test, the results show in figure 2 below that South

Africa, Egypt, Morocco and Namibia experienced contagion during the Asian crisis. The inclusion of Namibia may be explained by the fact that they use the Namibian dollar which is pegged to the South African Rand, which would imply that the Namibian dollar index would reflect changes in the value of the Rand (Collins and Biekpe, 2003). Morocco probably experienced contagion during this crisis as it occupied the same weight in the International Finance Corporation Index as Egypt who also had a relatively large market that was reasonably well traded (Collins and Biekpe, 2003).

Table 2: *African contagion during the 1997 Asian crisis using the Forbes and Rigobon (2002) methodology. (Collins and Biekpe, 2003)*

	Correlation in tranquil period	Correlation in Crisis period	t-statistic	Contagion
Egypt	0.02	0.13	1.689	Y
Morocco	0.09	-0.26	2.633	Y
Nigeria	0.01	-0.09	1.225	N
Zimbabwe	0.03	0.01	-0.305	N
Kenya	0.05	0.10	0.764	N
Mauritius	0.02	0.05	0.458	N
South Africa	0.13	0.29	2.474	Y
Namibia	0.02	0.22	3.116	Y

Both methods indicate some contagion which influences the degree of integration of these markets during the crisis. The relative size, liquidity and degree of foreign participation in each of these markets is a likely explanation for their susceptibility to contagion, while smaller, less integrated African markets showed little evidence of contagion. The researchers acknowledged that neither of these two methods were perfect when measuring contagion as an influence in integration (Collins and Biekpe, 2003).

2.3.4 *Integration of the Global Financial System*

For many years' researchers, speculators and investors have been investigating the interrelationship between international stock markets. Efficiency studies suggest international markets which react quickly to news are volatile and difficult

to predict (Bekaert, 1992). Some evidence suggests that excess returns on equity and foreign exchange markets contain predictable components (Bekaert, 1992).

Stock markets in many societies are viewed as a potent symbol of capitalism (Singh, 1997). In a dynamic economic environment, an understanding of the international stock market structure is important for investors, portfolio managers and policy makers (Singh, 1997). International asset pricing models predict that as markets become more integrated, the cost of capital is reduced as risk is internationally diversified (Makina and Negash, 2005). Chittedi (2010) noted that co-integration among all stock markets would result in the systematic or market risk of investments converting to unsystematic or firm-specific risk, which could then be diversified through different portfolio investments. Thus, the more open and competitive the international capital markets are, the more efficiently capital will be allocated (Makina and Negash, 2005).

The integration of global markets has become boundary-less and, as a result, is no longer limited to just the industrialised countries: rather it now occurs in countries transforming between developing and developed economies as well as emerging economies (Singh, 1997).

Investors need to understand how financial markets integrate and how country-specific shocks are transmitted to other markets, as this will affect their ability to diversify their risk (Singh, 1997). It appears that although there is some disagreement, the research indicates predominantly that international equity market co-integration has progressed over time (Singh, 1997; Goetzmann, 2001; Kearney, 2004).

Goetzmann et al., (2001) studied the correlations of major equity markets over 150 years and found variations in the levels of co-integration. A key finding of this research was that periods when correlations were low and the diversification benefit was at its highest, tended to be periods when investors had the greatest difficulty in diversifying their portfolios, resulting in a difficulty for investors to access these benefits when they needed them the most. The risk reduction

benefits from diversification appear to rely mainly on investing into emerging markets (Goetzmann, 2001).

It is implied that if integration of financial markets results in increased development of the financial sector, then the benefits of international portfolio diversification will weaken as returns are equalised across countries (Kearney, 2004). Some researchers have suggested that co-integration of stock markets contradicts the efficient-market hypothesis since, in an efficient-market changes in asset prices cannot be predicted, In contrast, by assuming the effectiveness of co-integration models, deviations from long-run price relationships may indicate a predictable future change in prices (Lande, 1905; Ssekuma, 2011). Contradicting this argument, Dwyer and Wallace (1992) state that market efficiency is defined as the lack of arbitrage opportunities and since it is argued by Hassan and Naka (1996) that in co-integrated markets, price movements in one market immediately influence other markets, this would be consistent with efficient access to information by domestic and international investors and thus consistent with the efficient market hypothesis. Harvey and Harvey (1995) noted that improvement in co-integration between markets has led to an improvement in market efficiency.

The research undertaken by Raj and Dhal (2009)appears to indicate that relatively large and liquid markets are also well integrated. This may occur due to real economic interdependence of economic fundamentals across nations (Raj and Dhal, 2009). Asgharian and Nossman (2011) investigated how shocks in a European equity market affected other European markets and the U.S. equity market. They looked at an isolated European equity market shock, a general European regional shock and an American market shock within the U.S. and European financial system between 1982 and 2007. The authors noted a large positive co-movement between variance and correlation, which indicated that American market volatility generally contaminated other markets. An increased European integration, following the creation of the European union was also noted (Asgharian and Nossman, 2011).

2.3.5 *Effects of turmoil on market integration*

Researchers (Arshanapalli and Doukas, 1993) argued that the 1987 stock market crash exhibited price behaviour that was influenced by international events. These sentiments were echoed by The Brady Commission, a presidential task force set up to investigate market mechanisms, which noted that although the crash may have appeared as only a Wall Street collapse, it was the result of the cumulative impact of several developments occurring simultaneously in several other global financial centres. Research into financial distress by Bracker (1999) confirms that from time to time the world has witnessed contagion effects whereby national equity markets rally or crash together in response to economic and/or political events, exhibiting correlations that are temporarily very high.

Contagion is generally accepted as the spread of market disturbances form one market to another (Collins and Biekpe, 2003). It remains difficult to measure, but research has separated this phenomenon into two separate forms of contagion (Dornbusch, Park and Claessens, 2000):

The first type is caused by investor behaviour. In periods of economic turbulence investors may be forced to withdraw funds due to liquidity constraints in other markets. An example of this type would occur when asset prices in one region fall so significantly, that the fund manager expects a significant number of redemptions from his investors and as a result proceeds to sell other assets to raise capital to fund these redemptions. This type of behaviour will be more prevalent in liquid markets.

Further, Dornbusch et al.,(2000) found that agents conducted a significant number of transactions on behalf of investors without sufficient coordination between these parties resulting in unnecessary transactions, which exaggerate the contagion effect. In addition investors may be imperfectly informed about the economic situation and assume, whether correctly or not, that one country may have the same problems as another that is facing a crises. In practice it is acknowledged that it is very difficult to distinguish between these different forms of investor behaviour (Dornbusch et al., 2000).

The second type of contagion is fundamental and occurs as a result of macroeconomic shocks that have global repercussions on trade and financial links between countries (Dornbusch et al., 2000).

Both of these types of contagion require that for the crises to spread between markets it must be assumed that investors are investing in those markets (Collins and Biekpe, 2003). It can be concluded that the spread of the crises between markets depends primarily on the degree of financial market integration (Collins and Biekpe, 2003). Thus countries that are less integrated, either by the existence of capital controls or lack of international access to domestic markets should be relatively immune to contagion(Collins and Biekpe, 2003).

Research has noted an increase in financial market co-integration indicating an increasing risk of global market contagion during financial crisis. In response financial regulators need to take note of the degree and rate of transmission of financial discord from foreign markets when formulating or implementing policies aimed at stabilising the domestic financial system (Corsetti et al., 2005). Mishkin (1995), established that the asset channel is an important transmission mechanism for monetary policy and that asset price shocks may affect the effectiveness of monetary policy. Rigobon and Sack (2003) have empirically shown that monetary policy responds favourably to counter stock market shocks. Thus successful policies that limit the effects of contagion during financial crises will aid in the creation of successful international portfolio diversification that requires that co-integration between stock exchanges being low or negative, so that poor performance in one market would be hedged by other markets (Tastan, 2005).

2.4 African Stock Markets

Stock markets in Africa are relatively new (Wang et al., 2003), there are currently eighteen operational stock exchanges and two non-operational, being the Khartoum and Maputo exchanges stock exchanges, in Africa (Misati and Nyamongo, 2011). These African operational exchanges are small in size and low in liquidity (Alagidede, 2009). As a result, significant efforts have been undertaken by African governments to develop and accelerate the process of global integration of their local bourses. In 1993, the African Stock Exchanges Association (ASEA) was established to bring closer co-operation between the existing African bourses through the development of regional economic blocks (Alagidede, 2009) that would unify countries independent exchanges into one larger and more liquid regional exchange.

Currently, many African markets have investment ceilings. Very few are included in international emerging market indeces, and most don't list American Depository Receipts. Since South Africa's inclusion into the International Finance Corporation's Investable index significant international investment has flowed into the equity market increasing the expected level of integration of the South African equity market into the global financial economy (Collins and Biekpe, 2003). Thus the researcher hypothesised that this market will most likely experience contagion in a financial crisis, while the smaller African countries that are possibly less integrated, will experience less contagion (Collins and Biekpe, 2003). The premise of these researchers is that the level of contagion in a financial system from an external crisis will determine the level of integration experienced in that economy.

Wang et al., (2003) examined integration among five major African stock markets, namely South Africa, Egypt, Morocco, Nigeria and Zimbabwe. Using the US markets as a proxy for the rest of the world, they examined global and regional integration of these African stock markets. They divided their data sample into two sub-periods, taking account of the potential impact of the 1997/1998 emerging market crisis, as they were interested in investigating inter-country stock market dependencies outside of periods of financial turmoil. The results indicated that the

US had a significant influence on South Africa's and Zimbabwe's markets in both sub-periods. Some influence was noted on Egypt's and Morocco's markets with there being no notable influence on Nigeria's market (Wang et al., 2003). Regionally, the authors noted, that the South African market was responsive to influences from Morocco and Nigeria before the crisis. However, after the crisis South Africa became more independent and dominant in the region, showing no response to influences from the region post the crisis (Wang et al., 2003). The results of Wang et al., *(*2003*)* study showed that South Africa became the regional leader after the crisis, due to its influence over the other African markets after 1998 which was not discernible before the start of the turmoil in 1997. By 2005, South Africa accounted for over 90% of the market capitalisation of Africa (Irving, 2005). These reports demonstrate that the level of integration of markets can and does change over time, especially during periods of financial crisis (Wang et al., 2003; Irving, 2005).

Most African exchanges have experienced one or more impediments to their growth, development and effectiveness in allocating capital (Irving, 2005). These impediments are attributable to a small number of listings, low levels of shares traded in relation to the overall listing size (liquidity) and poor infrastructure (Irving, 2005). Recently, notwithstanding the substantial risk premium which has increased the cost of equity for listed domestic firms and deterred some potential investors (Hearn, 2008), performance of these African exchanges measured against global markets, has been good.

2.4.1 *Size of Financial Markets*

Stock markets in some African countries have begun to exert some influence (Adjasi and Biekpe, 2006) on domestic economics and their financing activity by offering instant liquidity and access to capital in order to facilitate capital allocation, diversify risk, supply information about companies, corporate governance, investment and growth. This influence, visible through global stock markets has been noted to assume a similar developmental role in their economies (Adjasi and Biekpe, 2006).

Table 3 below, the Misati and Nyamongo (2011) sample illustrates that African stock market capitalisation increased in ten of the markets between 1995 and 2003 and, in addition, stock market capitalisation, as a share of gross domestic product, increased in fourteen of the eighteen countries in the Mitsati and Nyamongo (2011) sample. Misati and Nyamongo (2011) argued that the impressive growth in these African economies and stock exchanges was attributable to the privatisation of the state enterprises through the stock exchanges and the need for investors to obtain alternative sources of financing outside of the oligopolistic nature of the commercial banking environment.

Table 3: *Trends in private investment and financial market development in selected countries (Misati and Nyamongo, 2011)*

	Private investment as % of GDP				**Market capitalisation**						**Annual % growth 2004–2008**
	% Growth 1995–1998	**% Growth 1999–2003**	**% Growth 1995–2003**	**% Growth 2004–2008**	**Volume $ US Millions**		**As a % GDP**				
					1995	**2003**	**1995**	**2003**	**2008**	**Annual % growth 1995–2003**	
Botswana	−0.3	13.2	7.57	2	397	2131	9.2	28.3	27	17.07	3.84
Ghana	14.7	7.26	15.07	4	1680	1426	26.6	18.7	21	−0.478	30.0
Kenya	11.5	−6.7	0.51	−1	1889	4178	20.8	29.1	32	11.68	25
Mauritius	−2	−4.486	−2.08	17	1381	1955	35.2	37.4	40	2.774	2.56
Nigeria	5	14.25	8.22	20	2033	9494	7.6	16.3	23	10.84	43.7
S. Africa	−1.2	3.29	0.66	34	280,526	267,745	206.2	167.5	178	7.3	−15
Zimbabwe	−6.9	−50	−34.35	−18	2038	4975	31.2	87.9		34.602	130.7
Cote D' Ivoire	−6.329	−4.46	−1.62	2	867	1650	8.6	12	30	6.01	0
Namibia	3.4	2.39	0.44	0	189	442	6.2	7.2	7	16.2	30
Swaziland	14.02	7.43	6.39	7	339	172	26.85	9.3		−2.54	100
Zambia	2.44	1.33	2.63	7	19	217	6.8	6		9.68	58.3
Malawi	3.67	5.49	5.46	−6	–	156	0.97	9.2	41	72.05	0
Tanzania	2.63	16.55	10.11	6	–	398	–	4.2	6	11.38	0
Uganda	−8.8	16.95	11.53	6	–	36	–	4.2	74	66.6	68.18
Morocco	−16.7	−17.47	−9.71	27	4376	13152	14.4	30.1	53	12.02	8.16
Egypt	−10.42	−1.57	−3.35	−17	8088	27073	17.1	32.8		8.96	
Tunisia	−1.55	3.47	3.39	2	4006	2464	22.3	9.8		−7.01	
Algeria	−2.99	6.38	2.89	−17	–	145	–	–		−18.85	

Research has indicated that not all stock markets play a significant role in economic development. This benefit is only witnessed when high levels of liquidity and active trading are present (Adjasi and Biekpe, 2006). The stock market's role in the development of an economy is only present in African countries that can be classified as upper to middle income based on market capitalization to GDP (Adjasi and Biekpe, 2006). Thus, the development of these markets is a complex process that can be linked to mining, financial and industrial companies and their desired exposure to domestic shares (Adjasi and Biekpe, 2006). South Africa has demonstrated relative success in using its stock exchange to facilitate growth and access to capital (Adjasi and Biekpe, 2006).

While financial market development is important in stimulating economic growth, it is not sufficient, in developing economies, as the only focus, but should rather be studied in conjunction with trade policies, market risks and regulations (Hassan, Sanchez and Yu, 2011).

2.4.2 *Liquidity and Risk of African Markets*

Emerging market investments are accepted as highly volatile, promising high returns while having low correlations with each other and other global market factors (Kabir Hassan, Maroney, Monir El-Sady and Telfah, 2003). Thus, it may be argued that, by investing in Africa, the global investor could successfully exploit additional diversification and improve returns (Kabir Hassan et al., 2003). Confidence, as a key in determining an investor's perception of risk, happens more slowly in emerging than in developed markets (Bourbakri and Hamza, 2007). This confidence is gained by the gradual stability in policies, the promotion of an equity culture (Bourbakri and Hamza, 2007) and the ability to enter and exit an investment.

Market liquidity has been shown to affect asset returns in the US market (Kuan-Hui, 2011). The author investigated asset pricing relations with liquidity using a sample of 30,000 stocks from 50 countries from around the world, including Africa, for a period of 20 years. He found that a security's required return depends on the covariance of its own liquidity with the aggregate local market liquidity, as well as

on the covariance of its own liquidity with local and global market returns, implying that investors continue to regard liquidity as an important factor when investing or structuring a global portfolio of stocks.

Low levels of liquidity increase the cost of equity, thus increasing the discount factor to be applied to projects and investments, producing a substantial increase in the cost and availability of investments in Africa (Hearn, 2008). Hearn (2008) compared key countries in Africa and reported the following in table 4:

Table 4: *Cost of Equity Estimates (Hearn, 2008)*

	Cost of Equity
Cost of Equity / Expected return = Ro + Total Risk Premium	
London (FTSE100)	9.73%
South Africa	30.75%
Egypt	24.13%
Morocco	9.91%
Kenya	20.12%

This indicates, therefore that there is considerable evidence of divergence in African emerging markets as indicated by the differences in the costs of equity. Hearn (2008) noted that it is important to incorporate size and liquidity premiums into models so that distinctions between these markets can be highlighted and equity portfolio investment and foreign direct investment can be facilitated.

2.4.3 *Promotion of African stock exchanges*

African governments, over the past two decades have noted considerable growth and benefits in functioning financial markets due to the reformation of legal and policy frameworks in their countries (Bourbakri and Hamza, 2007). However, while Africa has witnessed significant economic and financial development, trade and capital flows have remained marginal (Alagidede, 2009). This is likely a continuation of the observation by Piesse and Hearn (2005) that participation by foreigners in African stock markets has remained quite low due to pessimism about social, economic and political uncertainties.

African governments perceive stock markets as a symbol of integration into the global economy (Mlambo and Biekpe, 2007). A stock market is often seen as a symbol of national pride and progress, similar to an airline or a national anthem (Mlambo and Biekpe, 2007). Thus, it may be that the continued emergence of stock markets in Africa is an explicit response to the African governments' desire to be included in world affairs (Mlambo and Biekpe, 2007). The importance attached to a domestic stock exchange has seen, since the mid 1990s, a movement to improve coordination for financial market integration and cooperation in Africa (Chinzara, 2009).

Unfortunately, due to the poor level of development of equity markets in Africa, previous researchers have done very few studies on analysing the interdependence among these markets or between them and the developed markets **(Chinzara, 2009)**. African policy makers have increasingly turned to the donor agencies of the International Monetary Fund and the World Bank, who have advised on policies that aim to develop financial markets by supporting the privatisation of state assets and structural adjustment programmes (Bourbakri and Hamza, 2007). These programmes have encouraged:

i.) the deregulation of the financial markets (Piesse and Hearn, 2005);

ii.) the development of equity markets with efficient dissemination of stock price information(Piesse and Hearn, 2005);

iii.) the reduction in exchange controls on inbound portfolio investments that has encouraged some cross border listings and improved regional links between capital markets (Irving, 2005);

iv.) the privatisation of government enterprises (Chinzara, 2009);

v.) attempts to remove barriers allowing the free movement of people, goods, services and capital within the various sub-African regions which is gaining some support with the local governments (Irving, 2005);

vi.) the removal of capital controls which has allowed the flow of funds from developed and industrialised countries (Chinzara, 2009) into the developing world;

vii.) the introduction of new financial instruments. For example, mutual funds(Irving, 2005); and

viii.) attempts to migrate manual trading platforms to automatic exchanges (Irving, 2005).

For these processes to be successful in attracting development capital and ensuring long term economic growth, African countries must guarantee investor protection (Bourbakri and Hamza, 2007).

With a limited number of tradable and liquid companies on the various exchanges in Africa, some countries have attempted to implement initiatives to promote financial market integration. SADC, the Committee of Stock Exchanges (COSSE) and the New Partnership for Africa's Development (NEPAD) propose to create a regional financial hub that integrates cross border regions. However, successful integration of African markets along the lines suggested, requires agreement on macroeconomic policies to ensure effective interaction of settlement systems (Hearn and Piesse, 2010). Strategic alliances have also been explored and formed, for example, Johannesburg and London have adopted the same electronic trading platforms and the JSE stock exchange has also benefited from marketing the South African FTSE investment indices (Hearn and Piesse, 2010).

2.5 Research Question

Determine the extent to which the level of integration in the following scenarios, as compared pre and post 2008, has changed in the wake of the global financial crisis:

a. South Africa's Johannesburg Stock Exchange compared against a developed market index represented by the S&P 500 in the United States;

b. South Africa's Johannesburg Stock Exchange compared against the global benchmark MSCI EAFE Index;

c. Egypt's Egyptian Stock Exchange compared to a developed market index represented by the S&P 500 in the United States;

d. Egypt's Egyptian Stock Exchange compared to the traditional Middle Eastern markets index of the MSCI GCC Index;

e. Morocco's Casablanca Stock Exchange in comparison to developed market index represented by the S&P 500 in the United States;

f. Morocco's Casablanca Stock Exchange compared to the global agricultural index using the MSCI Food and Staples Index;

g. Nigeria's Nigerian Stock Exchange in comparison to developed market index represented by the S&P 500 in the United States;

h. Nigeria's Nigerian Stock Exchange compared to the global oil and energy market using the MSCI World Oil and Energy Index;

i. Kenya's Nairobi Securities Exchange versus a developed market index represented by the S&P 500 in the United States;

j. Kenya's Nairobi Securities Exchange versus the global agricultural index using the MSCI Food and Staples Index;

2.6 Conclusion of Literature Review

African markets due to their size, liquidity, exclusion from emerging market indices and failure to have American Depository Receipts are less accessible to foreign investors. Given that the degree of foreign participation in each of the markets within the sample is low, it can be expected that the degree of contagion is minimal. It follows that, if investor participation is a prerequisite to contagion, it is unlikely that these markets would show evidence of integration. Understanding financial market correlations and how country-specific shocks are transmitted to other markets will assist asset managers in better hedging their risk through international diversification. It is argued, in the literature, that the stock market of a country should be more receptive to changing economic conditions of another country especially if such event/s have a large impact on the economy of the country or if there is a high degree of bi-lateral trade between the two countries (Singh, 1997). Further, it was argued by Singh (1997) that stock market development has played an important role in both internal and external financial liberalisation of developing countries. However he argued that this development is unlikely to aid long-term economic growth as interactions between the stock market and the broader economy may exaggerate macroeconomic instability. If international market integration results in changes in the stability of the relationships between markets, or leads to a change in the relationship of prices among markets, this can and will have major implications for the flow of investment between countries (Cowen, 1950). This is of particular significance for Africa as increasing liberalization of its economies and its growing importance among the global investment community predicts that the degree of integration will improve over time (Cowen, 1950).

The above literature review appears to indicate that, over time, researchers have begun to accumulate evidence of increasing levels of integration across global stock markets. There is, however, a need to provide an understanding of the degree to which Africa's markets have become integrated.

3 RESEARCH METHODOLOGY

The choice of research designs as well as the methods of data collection for any study will be influenced by the research problem defined by that study as various research questions will yield different types of information (Leedy and Ormrod, 2005). The choice of sample, research design, data collection and interpretation will be discussed in detail below.

3.1 Research methodology / paradigm

This section refers to the strategy developed by a researcher in order to address a research problem by defining the procedures for sampling, data collection and analyses (Leedy and Ormrod, 2005). The research problem in this study is the determination of the level of integration into the global financial system of African stock markets. Quantitative research will be used to answer questions about relationships among measured variables in order to explain, predict and measure the integration phenomena (Leedy and Ormrod, 2005). Thus the method of research employed in this paper will be quantitative mathematical modelling.

3.2 Research Design

This research will incorporate data captured before the financial crisis of 2008 and compared to data captured after 2008 for the MSCI indices encapsulating the Casablanca Stock Exchange, Egyptian Stock Exchange, Nairobi Stock Exchange and Nigerian Stock Exchange while data from the Johannesburg Stock Exchange will incorporate the data from the FTSE/JSE Top40 Index. This will then be compared to the matching period data for the S&P 500 index in the United States. The S&P 500 will provide the study with a proxy for developed market movements. The sample country indices will then be compared to MSCI sectorial indices where the sample countries' economies and markets have a dominant exposure. Nigeria will be studied against the MSCI global Oil and Gas index, Egypt will be compared to the Islamic index, the JSE will be compared to the MSCI EAFE global index and both the Casablanca and Kenyan markets will be

compared to the MSCI agricultural index. The selection will be limited by the availability of historical data for the comparative indices.

3.3 Population and sample

3.3.1 *Population*

At the time this study was carried out, there were 20 stock markets in Africa. This paper studies the most developed equity markets, with the highest market capitalisation in Africa and those that act as 'hub' markets in their respective regions. Johannesburg dominates the Southern African Development Community (SADC), Kenya is the centre of the East African Union, Lagos represents West Africa, and Egypt covers the North Africa and Maghreb region. Morocco (the Bourse de Casablanca) is included as this is the only other major equity market in Africa. The other markets have been excluded due to their small size and limited liquidity. With the exception of the JSE, most are relatively small in terms of capitalisation, turnover and number of stocks. All, including the JSE, are illiquid in global terms. Against this backdrop, I will use 5 stock price indices relating to exchanges in Africa formulated by the MSCI as these indices are considered by global investors as robust in terms of data validity and compilation. The S&P500 will be used as a representative for the global market. This proxy is suitable as it has no dual listings of companies of the countries in the sample, a high level of liquidity and has been shown to have a high degree of integration with all other developed markets. Further, comparisons will be done with five MSCI sectorial indices representing oil and gas, agriculture, general mining, Islamic and general global, all of which have a price history of longer than 3 years. All index prices not already represented in US$, will for the purpose of this research be converted to US$ using the published daily exchange rate for each data point in the sample. Market indices will meet the requirement as a measure of stock market performance. These indicators will quantify movements in stock prices and will be used as a standard in evaluating returns on stock market investments. All 5 of these markets have attracted international investors and multinational enterprises,

for example, Anglo American, AngloGold Ashanti, Old Mutual, Standard Bank, Standard Chartered, Barclays, Societé General, and BNP Paribas.

3.3.2 *Sample*

The integration literature widely employs the Morgan Stanley Capital International (MSCI) indices for their degree of comparability, the avoidance of dual listings and their breadth and scope of index formulation (Marashdeh and Shrestha, 2010).

The Johannesburg Stock Exchange is the most developed and best regulated market on the continent(Piesse and Hearn, 2005).

African stock exchanges have evolved rapidly during the past two decades (Piesse and Hearn, 2005). The older and more established markets, such as those in South Africa, Egypt, Morocco, Nigeria and Kenya have restructured and expanded (Piesse and Hearn, 2005). Further, proposals for regional integration have progressed between Kenya, Tanzania and Uganda, with Kenya taking a leading position (Piesse and Hearn, 2005) in the East Africa block. A similar model is being studied with Nigeria as the leader in the West of Africa.

a. *Egypt - Egyptian Stock Exchange*

The Egyptian stock exchange has two locations, the main function of the bourse is located in Cairo and a smaller exchange in Alexandria. This is one of the oldest exchanges in Africa, with the Alexandria floor having functioned since 1899 when used primarily for trading commodities and cotton. Today, these sites are integrated and share both an electronic trading platform and settlement facilities. Both can be remotely accessed by licensed stockbrokers. The exchange functions between 10h30 EET and 14h30 EET daily, with a fully compliant and integrated depository and settlement facility supported by a network of well-capitalised domestic and international custodian banks (Hearn, 2008).

Egypt's strategic location has made this nation a major North African economic power and a cultural leader of the Arab world. The country has a diverse terrain, with a long coastline across the Red Sea and the Mediterranean Sea. A large

portion of the Sahara Desert falls within the borders of Egypt. Egypt is the 30th largest country in the world.

Statics available from the International Monetary Fund indicate that until 2000 Egypt's economy was highly centralised due to the economic policies of the previous governments. During 2004-2008, the country experienced major economic reforms targeted towards attracting foreign direct investment. The 2008 global financial crisis, however stopped the reforms and the economy remains relatively closed with the major force, the military, dominating many industries. The military holds monopolistic control of many sectors including water, construction, hotels and, the all-important, oil industry. This repressive environment was the main reason for the political uprising in the country during 2011.

In 2010, the International Monetary Fund reported that the Egyptian GDP (on a Purchasing Power Parity basis) was $498.1 billion, making this the 26th biggest economy in the world. However, political instability has negatively affected capital flows and tourism receipts in 2011, so this figure may fall.

Egypt's economy is largely dependent on petrochemical exports to Europe and other African nations.

b. *Kenya - Nairobi Securities Exchange*

The Nairobi securities exchange is the largest market in the East African Community (EAC), incorporating Kenya, Tanzania and Uganda. It is the only one of this group to open its markets to foreign investors (Hearn, 2008). Trading takes place daily using a central electronic order book entry system on the floor of the exchange between 10h00 EAT and 12h00 EAT. The market is dominated by large block trading with a small float available to minor public investors. Trading is controlled by licensed stock brokers and there is no formal corporate governance legislation although Hearn (2008) suggests that the larger corporations follow

some of the best practice and core principles as set down in the United Kingdom's Cadbury Report.

According to the U.S. Department of State, Kenya is the largest economy in East Africa and is a regional financial and transportation hub. Kenya promotes economic growth through public investment, encouragement of small holder agricultural production, and incentivises private (often foreign) industrial investment (State, 2011a). Following the 2008 financial crisis, the International Monetary Fund approved a disbursement of approximately $200 million under its Exogenous Shock Facility (ESF) which was designed to provide policy support and financial assistance in times of exogenous but temporary shocks (State, 2011a). The ESF resources were meant to help Kenya recover from the negative impact of higher food and international fuel and fertilizer costs as well as the slowdown in external demand associated with the global financial crisis. Despite the post 2007 election crisis, Nairobi continues to be the primary communication and financial hub of East Africa and maintains the region's best transportation linkages, communications infrastructure, and trained personnel (State, 2011a).

In 2010, the International Monetary Fund reported that the Kenyan GDP (on a Purchasing Power Parity basis) was $32 billion.

Informal dealing in shares began as far back as the 1920's. With the absence of formal regulations, transactions were concluded through a 'gentleman's agreement'. By 1954, the Nairobi Stock Exchange was constituted as a voluntary association of stockbrokers; however, trading in equities was reserved for the resident European community (exchange, 2011a). Africans and Asians were permitted to participate in activities only after independence was gained in 1963. As from 2011, 57 companies were listed, with a total market capitalisation of US$57 billion. This exchange has a daily trading volume of around US$5 million. Foreign investor ownership limit is 75% and there are no foreign exchange controls in Kenya or capital gains tax (exchange, 2011a). This exchange works in co-operation with the Ugandan Securities Exchange and the Dar es Salaam Stock Exchange.

c. *Morocco – Casablanca Stock Exchange*

The Moroccan stock market is located in Casablanca and was established in 1929. This exchange uses a decentralised electronic trading platform allowing member brokers to place orders from their offices. This exchange has a fully compliant and integrated settlement and securities depository. Trading takes place between 10h00 GMT and 15h30 GMT. Hearn (2008) notes that stock exchange awareness is high in Morocco, used as a successful conduit for domestic listings, while attracting a broad retail and institutional base of investors.

Morocco's economy operates a large market based economy with stable macroeconomic policies, which has benefitted from the country's relatively low labour costs, low inflation and close proximity to Europe. These factors have been a key driver in the sectors of agriculture and tourism, which according to the International Monetary Fund makes up about 50% of employment. With a semi-arid climate, consistent and predictable output in this sector is impossible to ascertain. Thus, the government of Morocco is successfully promoting its development as the world's largest exporter of phosphate. This now provides a new source of export earnings and economic stability for the country. In 2006, Morocco entered a Free Trade Agreement (FTA) with the US and in 2008 entered an advanced status in its 2000 Association Agreement with the EU. However, poverty, illiteracy, and unemployment rates remain high. Morocco's trade and budget deficits widened in 2010, hence, reducing government spending (Hajji, 2008). Apart from the previous challenge, Morocco's long-term challenges include improving education and job prospects for young Moroccans, overcoming the disparity in wealth between the rich and the poor, confronting corruption and expanding and diversifying exports beyond phosphates and low-value-added products (Hajji, 2008). According to the International Monetary Fund, Morocco's GDP in 2010 was US$ 154 billion (on a Purchasing Power Parity) basis, making it the world's 58th largest country (Casablanca, 2008).

The Casablanca Stock Exchange is the third largest African stock exchange, after Nigeria and South Africa, with a market capitalisation of $64bn (Hajji, 2008). This

exchange was privatised in 1993 and installed an electronic trading system that organised the exchange into three different markets: A main market, development market and high growth market, with each one having different listing rules (Casablanca, 2008). In 1997 the exchange began a central a script depository. The services sector comprises just over half of the exchange with industry, comprising mining, construction and manufacturing, making up a quarter of the exchange (Hajji, 2008). The bourse has invested in new technology to encourage growth. The current modern electronic trading platform is being offered to other countries in the region while, in addition, the exchange is offering the opportunity to companies outside of Morocco to list on its exchange (Hajji, 2008).

d. *Nigeria – Nigerian Stock Exchange*

According to the U.S. Department of State, nearly half of Nigeria's daily oil production is imported into the U.S. These petroleum imports make Nigeria the United States' largest trading partner in sub-Saharan Africa and the 13th-largest trading partner of the United States in 2010 (State, 2011b). The oil boom of the 1970s led Nigeria to neglect its strong agricultural and light manufacturing bases in favour of crude oil (State, 2011b). Oil and gas exports now account for more than 95% of export earnings and over 80% of government revenue. Following the 2008 financial crisis, Nigeria took significant steps to strengthen its banking sector. After completing financial audits of all 24 national banks, the Central Bank found 10 of the Nigerian banks to be undercapitalised or suffering from illiquidity (University, 2011). Nigeria has made progress toward establishing a market-based economy. It has privatised government-owned petrochemical companies and sold its interest in eight oil service companies (State, 2011b).

In 2010, the International Monetary Fund reported that Nigerian GDP (on a Purchasing Power Parity basis) was $339 billion.

Situated in Lagos, this exchange was officially launched in 1960 and named the Lagos Stock Exchange, with branches across the country including Abuja, Kano, Kaduna, Onitsha, Ibadan, Port Harcourt and Yola (Exchange, 2011b). It began

with 19 securities listed and as of 2011, 283 companies listed, with a total market capitalization of US$ 125 billion. The Nigerian Stock Exchange has been operating an Automated Trading System (ATS) since April 27, 1999, with dealers trading through a network of connected computers (Exchange, 2011b). Trading on the exchange takes place between 11h00 WAT to 13h00 WAT. Foreigners may participate in the Nigerian capital market both as operators and investors and there are no longer any limits to the percentage of foreign holdings in any company registered in Nigeria (Exchange, 2011b).

e. *South Africa – Johannesburg Stock Exchange*

The Johannesburg Stock Exchange is the most developed and regulated exchange on the continent (Hearn, 2008). Since 2002, the JSE has used an electronic trading platform developed by the London Stock exchange to facilitate it on market activities. Trading takes place daily and the market has a pre-open call auction before 09h00 SAST, continuous trading between 09h00 SAST and 17h00 SAST. There is considerable institutional investor participation and ownership is well diversified. Formal legislation (King III) ensures that good levels of corporate governance are maintained.

The U.S. department of State describe the South African economy as ‘two-tiered’, In other words, it is a productive and industrialised economy that exhibits many characteristics associated with developing countries, including a division of labour between the formal and informal sectors and uneven distribution of wealth. The formal sector, based on mining, manufacturing, services, and agriculture, is well developed (State, 2011c). The financial structure is sophisticated with a large active stock exchange that ranks 17th in the world in terms of total market capitalisation (State, 2011c). The country operates in a similar fashion to Western economies with an independent central bank that controls interest rates and liquidity provided to the private banking sector (State, 2011c).

South Africa has rich mineral resources. It is the world's largest producer and exporter of platinum and mines gold, manganese, chrome, vanadium, and

titanium and coal. The value-added processing of minerals to produce ferroalloys, stainless steels and similar products is a major industry and an important growth area. The country's manufacturing industry is a world leader in several sectors, including the automotive industry, synthetic fuels, mining equipment and machinery (State, 2011c).

In 2010, the International Monetary Fund reported that South African GDP (on a Purchasing Power Parity basis) was $358 billion.

As the most highly developed stock market in Africa, established in 1887, after the discovery of gold on the Witwatersrand, it is still dominated by mining firms. Regulations allowing foreign investment were relaxed in 1990 allowing additional inflow of liquidity. Trading is executed by means of a fully electronic platform. Over 400 companies are listed on the exchange, with a total market capitalisation of over US$182 billion, resulting in it being included in the world's top 20 exchanges in terms of market capitalisation. This index is calculated as a market capitalisation based index that is adjusted for the total available free float of each component.

3.3.3 *Sample and sampling method*

Researchers in the finance field of study have identified various methods of investigating integration. The three main factors related in such investigations are the frequency of data, the currency denomination of stock prices and the sample period (Raj and Dhal, 2009). As both long and short run data are important for market integration, daily data would help the researcher capture the speed of information transmission (Hassan and Naka, 1996). In thinly traded stock markets, the daily closing price as used by Hassan and Naka (1996) may lead to distortions in the data as the daily data is often the last traded price on that day. However, those prices may have not all occurred simultaneously at the close of the market as the statistical research may assume. In order to avoid these issues of non-synchronous trading it was suggested by Cha and Oh (2000) that weekly stock return data be used. Blackman, Holden and Thomas(1994) argued that

research should use monthly and quarterly data since economic fundamentals such as output, inflation and dividends are the primary drivers of stock prices.

It is on these findings that the researcher has selected the data that he will investigate in this paper. Raj and Dhal (2009) argued that to maintain a robustness of empirical analysis, serial correlation and common lag length problems associated with co-integration models, it would be useful to use a comparative analysis of daily and weekly period data. Since African exchange liquidity is often lacking, and to avoid distortions common in daily data arising from non-trading and non-synchronous trading, weekly data is used.

Since it is mainly foreign investors who are the dominant participants in portfolio diversification and arbitrage activity in emerging markets, stock prices are measured in a common currency, typically the US dollar, which is used as the basis for trade and investment globally (Bachman and et al., 1996). Further, studies that use domestic currency distort returns as currencies often devalue during times of crises, altering the results (Raj and Dhal, 2009). Thus for the purpose of this study all data will be converted to US dollars.

It is important to decide whether, a.) to use long-run sample period data over a number of years, or b.) a large sample of observations with high frequency daily or weekly data for only a few years, when analysing the integration of markets. Raj and Dhal (2009) found that over very long time horizons (such as a decade), the study may be influenced by structural changes resulting from changes in policy and the general economic environment. Thus the period under review will be the three years prior to the 2008 financial crisis compared to the three years post the 2008 financial crisis.

As table 5 below illustrates, each country in the sample will be compared to the S&P 500 Index as a proxy for global market performance to determine that specific country's overall level of integration into the global market place. In addition, each country in the sample will be compared to the MSCI index, representing the dominant economic influence in that country's economy. Egypt will be compared to the MSCI GCC countries index. Morocco and Kenya will be

compared to the MSCI agriculture and food chain index. This index is designed to help investors compare the global investable universe of companies operating across the agricultural and food industries. Nigeria will be compared to the MSCI World Oil and Energy index. This index is designed to help investors compare the global investable energy universe of companies. South Africa will be compared against the MSCI EAFE index. This index is considered to be a leading indicator of global equity performance outside the United States and comprises of global companies in the materials, industrial, consumer, health care, financial, IT, telecommunication and utilities sectors.

Table 5: *Weekly data table: Egypt, Kenya, Morocco, Nigeria and South Africa*

Date	Index comparisons	Egypt	Kenya	Morocco	Nigeria	South Africa
	Global	S&P 500 index	S&P 500 Index	S&P 500 Index	S&P 500 Index	S&P 500 Index
	Economic influences	MSCI GCC countries	MSCI Agriculture and Food	MSCI Agriculture and Food	MSCI World Energy	MSCI EAFE

3.4 The research instrument

As discussed in the literature review, the most effective way to model integration will be with the use of a co-integration model. This model distinguishes and captures the interaction between the long-run and short-run nature of financial market linkages (Raj and Dhal, 2009). The co-integration hypothesis uses non-stationary variables with a time varying mean and variance properties (Raj and Dhal, 2009).

3.5 Procedure for data collection

The sample comprises weekly stock market indices at closing times as collected from Bloomberg. Accordingly, my data series will consist of the closing weekly index value as at last trading day of each week. The last trading day of each

week will be determined by examining the data set and verifying it against a calendar and list of public holidays. No shares that are included in the index will be excluded. In general, index acronyms will be used as column headers. Appendix B illustrates the data corresponding to the 5 country indices, 5 comparative indices and 314 weekly closing levels that are used for all indices except for the MSCI GCC index comparisons, where 279 weekly closing levels will be used, due to the limited availability of historical data.

3.6 Data analysis and interpretation

The co-integration theory has become a popular concept when studying relationships of non-stationary time series data. The null hypothesis of this method is that is that all linear combinations of variables are non-stationary or integrated in the order of one (Haug, 1992). The alternative hypothesis is that at least one linear combination is stationary or rather, we could conclude, that the variables are co-integrated. The Phillips-Ouliaris co-integration test allows for a departure from equilibrium in the short run but not in the long run. Phillips and Ouliaris (1990) argue that the test is more robust that earlier tests such as the Augmented Dickey-Fuller test, as the result does not depend on the value at the origin of the sample and it has superior power properties in samples below 500 (Phillips and Ouliaris, 1990). The Phillips-Ouliaris residual-based test are used in the same way as a unit root test, except that the data used is from the residuals of the co-integrating regression (Ssekuma, 2011) . This test is based on residuals (differences between observed and expected values) of the first order auto regression equation.

If the non-stationary variables are integrated then they may follow a path of equilibrium in the long-run or share a co-integrated relationship (Raj and Dhal, 2009). It was noted that a co-integrated environment may not be unique and there may be ‘r’ co-integrating relationships among ‘n’ non-stationary variables (1979). In the extreme case, if $r = 0$ then the variables would not be co-integrated and thus would not follow a long-run equilibrium path. In the converse, if $r = n$, then the co-integration techniques would be irrelevant for this population of

variables (Raj and Dhal, 2009). In practice, Raj and Dhal (2009) found that *r<n>0* thus enabling the use of the Phillips-Ouliaris co-integration test for this data set.

3.6.1 *The Phillips-Ouliaris co-integration test*

The Phillips-Ouliaris multivariate statistic(Ssekuma, 2011) is defined as:

$\hat{P}_z = Ttr(\hat{\Omega}M_{zz}^{-1})$ With *T* being the number of observations, $M_{zz}^{-1} = t^{-1}\sum_{t=1}^{T} z_t z_t'$, and $\hat{\Omega}$

$$\hat{\Omega} = T^{-1}\sum_{t=1}^{T}\hat{\xi}_t'\hat{\xi}_t + T^{-1}\sum_{s=1}^{L}\omega_{sl}\sum_{t=1}^{T}(\hat{\xi}_t\hat{\xi}_{t-s} + \hat{\xi}_{t-s}\hat{\xi}_t')$$

is estimated by:

3.7 Limitations of the study

The industry mix in market indices varies between countries, causing similarities or differences in the weighting of the different sectors to influence the level of market integration. It follows that regions with similar industries would be more correlated to developed markets that have high exposure to these business types as well. An adjustment that corrects different index composition is beyond the scope of this study. Current political turmoil in the North African region, due to economic dissatisfaction of the unemployed masses will not be considered.

3.8 Validity and reliability

The methodology that is used is numerically exact and therefore stable and equivalent.

Equity markets globally are broadly structured in similar ways. This analysis will focus on the integration of these markets and will be based on medium term data as described in similar studies by (Blackman et al., 1994; Bachman and et al., 1996; Hassan and Naka, 1996; Cha and Oh, 2000; Raj and Dhal, 2009).

3.8.1 *External validity*

The level of external validity in a problem is the extent to which generalisations from the results of a study could be interpreted in other areas (Leedy and Ormrod, 2005). The result of this study may prove to be a valuable tool when making inferences regarding similarities or differences of other emerging market stock exchanges, as to whether Africa should be interpreted as one investment region or divided along regional or national boundaries and whether portfolio managers or investors may be able to exploit diversification opportunities.

3.8.2 *Internal validity*

Internal validity of a study is the extent to which accurate conclusions may be drawn from its outcome (Leedy and Ormrod, 2005). The results from this study will be based purely on the level of integration derived from a selection technique that will be representative and inclusive.

3.8.3 *Reliability*

Reliability reviews the consistency of the results within a study (Leedy and Ormrod, 2005). Although this study will use a consistent and correct application of the models, despite rapid development, African markets are a long way from being mature. Typically, most trading on these bourses occurs in a few stocks that account for a considerable amount of total capitalisation and turnover. If these counters are excluded from the research, there will be serious information and disclosure irregularities in the remaining counters (Singh, 1997). Singh (1997) argued that, the more under-developed a market, the greater the number of deficits which exist.

4 PRESENTATION AND INTERPRETATION OF RESULTS

4.1 Introduction

This chapter will detail my findings about the potential change in co-integration of African market indices with the developed market using the S&P 500 Index as well as the change in the co-integration of African market indices with a global index representing each African country's largest economic contributor. The results will indicate a change in the medium term degree of co-integration and whether the financial crisis has had a sustained influence on these markets. Further, the results will also indicate the change in the degree of co-integration of weekly index movements between both the developed market index of the S&P 500 and the global index representing the largest economic contributor to each African country's economy. The result of this test will indicate whether short term global influences affect African stock markets.

4.2 Results for South Africa

Table 6: Phillips-Ouliaris Co-integration Test for South African markets vs. Global markets

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-6.172	0.15
Pre Crisis – Index Movement	-171.602	0.01
Post Crisis – Index Data	-23.4275	0.03
Post Crisis – Movement	-167.0484	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

Table 7: Phillips-Ouliaris Co-integration Test for South African markets vs. MSCI EAFE Index

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-5.1426	0.15
Pre Crisis – Index Movement	-177.768	0.01
Post Crisis – Index Data	-21.225	0.05
Post Crisis – Movement	-179.444	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

4.3 Results for Egypt

Table 8: Phillips-Ouliaris Co-integration Test for Egyptian markets vs. Global markets

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-1.6151	0.15
Pre Crisis – Index Movement	-141.6178	0.01
Post Crisis – Index Data	-5.2692	0.15
Post Crisis – Movement	-161.6209	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

Table 9: Phillips-Ouliaris Co-integration Test for Egyptian markets vs. MSCI GCC Index

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-13.0502	0.15
Pre Crisis – Index Movement	-125.8103	0.01
Post Crisis – Index Data	-4.8273	0.15
Post Crisis – Movement	-162.1801	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

4.4 Results for Morocco:

Table 10: Phillips-Ouliaris Co-integration Test for Moroccan markets vs. Global markets

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-0.0426	0.15
Pre Crisis – Index Movement	-154.7893	0.01
Post Crisis – Index Data	-23.0055	0.03
Post Crisis – Movement	-157.2659	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

Table 11: Phillips-Ouliaris Co-integration Test for Moroccan markets vs. MSCI Food and Staples Index

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-3.3225	0.15
Pre Crisis – Index Movement	-156.0125	0.01
Post Crisis – Index Data	-21.5773	0.05
Post Crisis – Movement	-157.6349	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

4.5 Results for Nigeria:

Table 12: Phillips-Ouliaris Co-integration Test for Nigerian markets vs. Global markets

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-1.8685	0.15
Pre Crisis – Index Movement	-175.5151	0.01
Post Crisis – Index Data	-19.7767	0.05
Post Crisis – Movement	-125.1292	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

Table 13: Phillips-Ouliaris Co-integration Test for Nigerian markets vs. MSCI World Oil and Energy Index

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-16.8723	0.10
Pre Crisis – Index Movement	-174.5789	0.01
Post Crisis – Index Data	-19.7245	0.05
Post Crisis – Movement	-124.9817	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

4.6 Results for Kenya:

Table 14: Phillips-Ouliaris Co-integration Test for Kenyan markets vs. Global markets

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-3.619	0.15
Pre Crisis – Index Movement	-175.1239	0.01
Post Crisis – Index Data	-13.0994	0.15
Post Crisis – Movement	-135.6942	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

Table 15: Phillips-Ouliaris Co-integration Test for Kenyan markets vs. MSCI Food and Staples Index

	Level of co-integration	
	Phillips-Ouliaris demeaned	confidence (p)
Pre Crisis – Index Data	-12.4587	0.15
Pre Crisis – Index Movement	-175.8076	0.01
Post Crisis – Index Data	-11.6816	0.15
Post Crisis – Movement	-139.2212	0.01

Truncation lag parameter = 1; If p-value is smaller than 0.05, co-integration exists at a 95% confidence level.

The research results are explained in this chapter, with reference to the related problems, sub-problems and literature review. The raw data is graphically represented in Appendix A.

4.7 Analysis of results

The researcher tests that the stock market indices are co-integrated. The researcher applied the Philips-Ouliaris co-integration test to the data. The results are expressed in Table 6 for South Africa, Table 8 for Egypt, Table 10 for Morocco, Table 12 for Nigeria and Table 14 for Kenya. The research indicates that the null hypothesis of no co-integration being present in the sample of African countries stock markets and the developed stock markets using the S&P 500 index as a proxy, prior to the 2008 financial crisis cannot be rejected at the 5% significance level. This indicates that there exists no co-integrated equilibrium relationship among these stock market indices prior to the 2008 financial crisis.

Post the 2008 crisis, the Philips-Ouliaris statistical co-integration test applied by the researcher indicates that the null hypothesis of no co-integration present at a 95% confidence level, in the sample of South African, Moroccan and Nigerian stock markets as shown in Table 6, Table 10 and Table 12, when tested against global developed stock markets using the S&P 500 index as a proxy, the researcher is able to reject the null hypothesis, thus indicating that post the crisis, co-integration has developed among these countries and the global market. The low value of the Phillips-Ouliaris statistic (demeaned) indicates that the co-integration between these indicess is limited. Further, the results for Egypt shown in Table 8 and Kenya, shown in Table 14 indicate that the researcher is not able to reject the null hypothesis at 95% confidence level and as a result these countries still do not exhibit a distinguishable co-integrated relationship after the crisis.

To gain further insight into the potential co-integration of African markets, the researcher examined stock market indices whose components are representative of the economic drivers of their individual economies. The results are expressed in Table 7 for South Africa, Table 9 for Egypt, Table 11 for Morocco, Table 13 for Nigeria and Table 15 for Kenya. The research indicates that the null hypothesis of no co-integration at a 95% confidence level in the sample of African countries stock markets pre the 2008 financial crisis cannot be rejected for all countries. We can conclude that no co-integration was present between these African countries and indicess that represent their economic drivers. However, when testing at a 90% confidence level, the results indicate that the null hypothesis of no co-integration can be rejected for Nigeria when compared against the MSCI Oil and Energy Index. The low value of the Phillips-Ouliaris statistic (demeaned) indicates that there is limited co-integration between Nigeria and the MSCI oil and energy index.

Post the 2008 crisis, the Philips-Ouliaris statistical co-integration test applied by the researcher indicates that the null hypothesis of no co-integration present at a 95% confidence level, in the sample of South African, Moroccan and Nigerian stock markets as shown in Table 7, Table 11 and Table 13, when tested against

indices representing each country's economic drivers, the researcher is able to reject the null hypothesis. Thus indicating that post the crisis, co-integration has developed between South Africa and the MSCI EAFE index, Morocco and MSCI Food and Staples index and Nigeria and the MSCI World Oil and Energy index. The low value of the Phillips-Ouliaris statistic (demeaned) indicates that the co-integration between these indices is limited. Further, the results for Egypt shown in Table 9, and Kenya, shown in Table 15 indicate that the researcher is not able to reject the null hypothesis at 95% confidence level and as a result these countries still do not exhibit a distinguishable co-integrated relationship with the MSCI GCC index and MSCI Food and Staples index respectively, after the crisis.

The researcher finds that compared to the index representing each country's economic driving force as well as the global market, the crisis has integrated South Africa, Morocco and Nigerian markets. However due to the limited nature of this co-integration, Africa still demonstrates significant degrees of risk diversification for a global investment portfolio.

When collecting the data, the researcher noted that it appeared that weekly directional movements of the exchanges appeared to have some integrated relationship. Therefore to establish if there would be any co-integrated relationship when medium term market trend was removed from the sample, the researcher applied movement data to the econometric Philips-Ouliaris co-integration test.

The results expressed in Table 6 for South Africa, Table 8 for Egypt, Table 10 for Morocco, Table 12 for Nigeria and Table 14 for Kenya, indicate that the null hypothesis of no co-integration being present in the sample of weekly directional index movements among the African countries stock markets indices with the weekly directional movements of the developed stock markets using the S&P 500 Index as a proxy, can be rejected before and after the 2008 financial crisis, with a confidence level of 99%. All markets demonstrated a stable and strong level of co-integration before and after the crisis period under review as demonstrated by the high Phillips-Ouliaris co-integration statistic (demeaned). Kenya did, however, demonstrate a small reduction in the level of the co-integration statistic. The researcher concluded that African market movements are influenced in the short

term by global financial and economic changes that are expressed through the global stock exchanges.

The results of further comparisons of the weekly movement between African countries and the indices representing each country's dominant economic force, are expressed in Table 7 for South Africa, Table 9 for Egypt, Table 11 for Morocco, Table 13 for Nigeria and Table 15 for Kenya. They indicate that the null hypothesis of no co-integration being present in the sample can be rejected before and after the 2008 financial crisis, with a confidence level of 99%. All markets demonstrated a stable and strong level of co-integration before and after the crisis period under review as demonstrated by the high Phillips-Ouliaris co-integration statistic (demeaned). Kenya and Nigeria did, however demonstrate a reduction in the level of the co-integration statistic, while Egypt became more co-integrated after the crisis. The researcher concluded that African markets continue after the crisis to be directionally influenced in the short term by global financial and economic changes that are expressed through the global stock exchanges.

4.8 Interpretation of results

Africa is rarely referred to as influential in the global financial environment. Wars, political turmoil, economic instability and institutional underdevelopment have all impeded investment and analysis of the region. For decades, African nationalisation movements and the importance attached to independence has been mirrored by a multitude of different national development plans, all of which have been have been viewed, by their respective African governments as one of the key aspects of national sovereignty.

Using the information contained in the literature review and the findings contained herein, the researcher has identified that the factors influencing the degree of Africa's integration and inclusion into the global economy can be distinguished by the following:

4.8.1 *Size of Financial Markets*

Post the 1990 economic reforms some African countries have begun to show substantial growth in both their banking sectors and capital markets (Misati and Nyamongo, 2011). African countries have yet to emerge as an economic power, however, recent global turmoil has encouraged significant economic and financial development with a focus on increased openness to foreign investment. Egypt, Kenya and Nigeria have been progressively lifting foreign investors' ownership, capital and dividend repatriation restrictions as well as the listing of international funds and trusts. This economic development has formed part of the increase in the degree of integration detailed by the researcher. An important implication of this paper is whether African financial markets should be treated as a block in a globally diversified portfolio. The relative global isolation of this region may lead an investor to assume that these economies operate independently from the rest of the world and are hence less susceptible to global shocks. Most African markets do not fit the mould of the traditional emerging markets of Latin America, India or Asia. Strong trade ties with the developed world have kept these countries' economies and capital markets relatively well integrated.

African markets have been the subject of many political and economic shocks especially pre the financial crisis of 2008. The researcher notes that his findings are consistent with the argument that these shocks and the resultant instability may have resulted in Africa being considered as a stand-alone asset class in a globally diversified portfolio, and thus would lack any integration with the rest of the world.

Moves post the 2008 financial crisis, by some African governments to liberalise the banking sector, have allowed the gap between the deposit and lending rates to become the subject of market forces with the expectation that this gap will temper economic growth (Misati and Nyamongo, 2011). It has been observed that the interest rate margin in these countries had unexpectedly increased. This may be explained due to the oligopolistic nature of bank ownership resulting in limited competition (Misati and Nyamongo, 2011). The researcher noted that in

addition high reserve requirements and huge public sector borrowings continue to have an adverse impact on the interest rate margin.

4.8.2 *Appetite for Risk*

a. *African Investors*

An energetic private sector economy was argued by (Misati and Nyamongo, 2011) as key to triggering economic vitality, enhancing productivity, developing new industrial technologies, maintaining competitiveness and resulting in the nurturing and development of entrepreneurship. Although this commonly accepted foundation for robust economic development appears to be valid in most developed and developing economies, Africa, which has experienced rapid stock market growth in recent years, boasts an average capitalisation (excluding South Africa) of only 27% of GDP compared to other emerging markets with a capitalisation ratio averaging 160% (Misati and Nyamongo, 2011). Thus these markets are still in the beginning stages of global market integration, with the researcher expecting increasing market capitalisation to increase the level of integration over time. Misati and Nyamongo (2011), sighting the continued oligopolistic nature of the banking sector and the limited scope of securities also relevantly noted that private investors in Africa (excluding South Africa) still rely on the informal sector for their investments, supporting the assertion that only as free market forces improve the availability of capital through formal stock exchanges, will the degree of integration improve. These observations on private sector investment into stock exchanges must also be noted in context of limited availability of listings on these exchanges as many companies in Africa are too small to qualify for a stock exchange membership.

b. *Offshore Investors*

A well-functioning stock exchange is a fundamental vehicle for the local and international sourcing of capital necessary to stimulate domestic economic growth. The development of stock exchanges has led to the investor benefitting by diversification of risk, enhanced corporate governance methods, efficient access

to information by investors and the effective use of savings in the economy to facilitate growth.

Foreign investors remain concerned that corruption and the lack of checks and balances measured, as through the corruption perception index, is having a negative effect on private enterprise and investment in Africa. Although, the literature review notes that improvements have been made in some African companies and countries, in order to realise the full benefit of financial market freedom, there is a pressing need to address the quality of institutions and their management teams. Tangible advances in the area will continue to improve the degree of integration that these markets enjoy with the rest of the world. The researcher's results indicate that a gradual improvement in integration is more evident in countries that have an increased and improving track record in corporate governance and investor access to information. As a result, investors are looking to countries where policies are directed at improving and supporting the relationship between the informal and formal sectors of the economy thus supporting their comparative advantages and specialisation (Misati and Nyamongo, 2011).

4.8.3 *Liquidity*

All five African markets investigated by the researcher have low levels of liquidity compared to the developed world, but this is particularly evident in Kenya and Morocco, which are the two smallest markets in the sample. International investors continue to site liquidity risks as a reason for avoiding participation in African stock markets. This is another reason for the resultant low degree of integration.

The lack of liquidity in financial markets also increases the cost of capital for companies seeking to raise domestic funds. Given the obvious need for finance, in order to promote economic growth and development, it is important for these markets to attract inexpensive capital and, in doing so, increase the level of integration. Hearn (2008) notes that a further drawback of low market liquidity is that the high cost of equity, faced by indigenous African companies seeking to

raise finance in the domestic market, means that any attempt to finance international expansion or projects is severely hampered as the cost of equity is substantially higher. In summary, profit margins (given similar operating costs) of African firms would have to be considerably higher than their competitors who are able to raise lower rate finance in developed markets.

4.8.4 *Rules and Regulations*

Since the 1970s, African governments have been developing and building economic control regimes. Some nations have implemented wide-reaching price regulations which have given little incentive to private competition. For example, in Kenya, a new business had to get letters of 'no objection' from existing producers in order to get a business licence and, in an attempt to protect regional producers, the government banned the inter-district trade in food. This type of government intervention undermines the effective functioning and development of the economy resulting in minimal foreign investment, keeping the levels of global integration low. As these governments have recently moved to replace these ineffective regulations with free-market policies, it is evidenced by this research that some degree of global integration is observed as foreign investment returns.

Misati and Nyamongo (2011) observed that a number of countries in Africa had eliminated controls of interest rates and credit in favour of market determined policies, resulting in monetary policy focus shifting towards open market operations. These shifts in policies were most likely made to increase the private sector's access to credit, further enhancing economic growth in the region.

Ultimately, it is the government that enforces ownership rights and contracts and, in so doing, provides an efficient legal system, providing a stable and attractive investment environment. In practice it appears that government, in more unstable or polarized societies, invest little or nothing in the legal system resulting in low levels of domestic investment (Svensson, 1998). The question of why developing countries, with rational and progressive governments, do not invest in an efficient legal structure, with the aim of providing a competent and robust legal system that

will improve international investor confidence and the degree of financial integration, needs to be addressed.

4.8.5 *Trade*

For the past 40 years most African countries have maintained restrictive policies on trade. Policies used have included, among others, foreign exchange controls or import restrictions. Countries have used trade policies as a macroeconomic tool that could be liberalised or restricted according to the balance of payments at the time. Hence, restrictions have been unpredictable for investors making these restrictions an important factor in the weak economic development of Africa (Collier and Gunning, 1995). The recent policy reforms undertaken by many African countries have focused much of their energy in liberalising their trade policies (Collier and Gunning, 1995). The authors give the example of Zimbabwe, Kenya, Uganda and Ghana that have all introduced convertible currencies for current account transactions. In addition to these trade reforms, some governments have liberalised the financial instructions in an attempt to create an environment where trade can flow freely. There is still room for improvement as in many African countries economic growth and efficiency gains could be substantially improved through the removal of import controls (Collier and Gunning, 1995). As benefits from increased trade liberalisation are realised, it is inevitable that, due to increased global trade, the economies of Africa and the rest of the world will become more closely linked resulting in the degree of integration among African and global financial markets increasing.

4.9 Additional Findings

There are a number of factors that countries may not be able to effect in trying to establish a greater degree of financial or economic integration with global markets. These factors may prevent high levels of integration becoming possible.

4.9.1 *Geographic location*

Africa has several geographic characteristics that may predispose it to slower growth. Slow African economic growth may be attributable, according to Collier (1999), to the “curse of the tropics”, in which the author suggests that the adverse African climate results in poor health, with diseases like malaria reducing life expectancy and thus creating a disadvantage for development. Unreliable rainfall, which restricts commercial agriculture and makes the environment hostile to livestock, has potentially also had a negative impact on its economic development. Other constraints noted include large degrees of ethnic diversity and a very low population density in Africa making the development of an interconnected economy more complex (Collier and Gunning, 1999).

Although Africa is well located for Asian, eastern United States and European trade, most of the population live far from the coast and face greater logistical challenges and higher transportation costs than other developing nations when transporting goods. In addition, many countries are landlocked, thus the problem of transport is compounded by political tensions among nations (Collier and Gunning, 1999).

4.9.2 *Social*

As countries become richer, their population growth rates tend to slow and the value of their human capital increases. Unfortunately Africa’s poverty may have kept its birth rates high and, with the application of basic health care, the population has exploded upwards with very little investment in education and skills’ development. The high rate of poverty and dissatisfaction among populations has also increased the occurrence of civil wars (Collier and Gunning, 1999) resulting in a reduction of foreign investment and an increased perception of instability across the continent (Collier and Gunning, 1999).

Further, the World Bank estimates that HIV infections in some African countries are as high as 25% and although adult mortality rates initially increased

substantially, advances in modern treatments have reduced the initial estimates sustaining high population levels.

4.9.3 *Political*

In the 1960s Africa's growth was impressive. The continent was outperforming per capita GDP growth in Asia; economic restrictions of colonialism were quickly disappearing, as political self-determination and economic growth appeared to be working hand-in-hand (Collier and Gunning, 1999). Unfortunately growth collapsed during the 1970s, as the new African governments deteriorated into dictatorships riddled with corruption (Collier and Gunning, 1999). These countries were, as a result, succeeded by their developing market peers of Asia and Latin America who had managed to avoid these failures.

Research shows that corruption reduces investment and/or slows economic growth (Rock and Bonnett, 2004). The results of Rock and Bonnett (2004) indicate that this damage is more likely to occur in small developing economies than in larger developed economies. This significance of this finding implies that domestic governments and regional development agencies would gain significant growth benefits from directing their policies and networks to remove corruption.

For most of the post-colonial period, African governments have been undemocratic and controlled by the educated urban resident population with no agricultural or commercial interests (Collier and Gunning, 1999). These governments expanded public employment significantly. For example, in Ghana by the late 1970s the public sector accounted for 75% of formal wage employment (Ghana Central Bureau of Statistics, 1988), while the Kenyan Central Bureau of Statistics reported in 1996 that 50% of its formal employment was in the public sector (Collier and Gunning, 1999). Thus, the economy became an area where ethnic groups struggled for representation, with rewards being given to individuals with good social connections rather than skill, resulting in difficulty for managers to motivate staff to improve delivery.

5 DISCUSSION, CONCLUSION & RECOMMENDATIONS

5.1 Introduction

This chapter presents the final conclusions of the study. It summarises the finding of the research, particularly with reference to the context that was specified initially. Thereafter, recommendations are provided for each of the stakeholders identified at the outset. The chapter concludes with suggestions for further research.

5.2 Discussion

International business cycle linkages have increasingly become a focus of public interest. Investors and regulators are concerned that should a local crisis become unfairly disruptive on other markets, the allocation of capital will become distorted.

Financial crises are transmitted easily between developed markets as purchasing power parity and interest rate parity across countries influences trade and capital flow. Early research argued that the benefits of improvements in growth and output would outweigh the costs of financial contagion. The research confirms that the level of contagion during an external crisis will be related to the global integration experienced by the domestic economy. It is argued, in the literature, that the stock market of a country should be more receptive to changing economic conditions of another country especially if such event/s have a large impact on the economy of the country or if there is a high degree of bi-lateral trade between the two countries. However, in comparison to developed and emerging financial markets, the degree of integration remains low.

As stock markets play an important part in the development of frontier market economies, African governments have recognised the benefits and encouraged co-integration. The literature shows that some African countries have shown improvements in financial reporting and efficient dissemination of price information in global markets, which in turn has attracted a diverse group of investors,

resulting in the expectation of increased market linkages. Given that the degree of foreign participation in each of the markets within the sample is low, it can be expected that the degree of integration is minimal. It follows that, if investor participation is a prerequisite to co integration, it is unlikely that all African markets would show evidence of integration, rather we would observe that integration takes place in the markets that have the greatest degree of liquidity and exposure to global markets through international emerging market indices; political and economic stability or efficient and accurate financial reporting.

The findings of this report support the literature review in the expectation that liquid and investable markets would experience integration, while smaller, less integrated markets will experience less contagion. Further, this is of particular significance for Africa as increasing liberalization of its economies and its growing importance among the global investment community predicts that the degree of integration will improve over time. The research confirms that the level of contagion during an external crisis will be related to the global integration experienced by the domestic economy. In order to obtain the benefits of portfolio diversification it is important to be selective in the choice of African markets. The literature supports the author's research that, over time, frontier markets are showing increasing levels of integration across their global peers.

5.3 Conclusions of the study

This study is a continuation of research pertaining to the issue of African stock market integration and empirically investigates the co-integration relationship among five African Stock exchanges, the developed markets and indicess representing the economic drivers of their economies before and after the 2008 financial crisis. Using the results obtained in this study, five important conclusions, in the researcher's opinion are highlighted.

First, the empirical evidence supports that three years prior to the crisis, in terms of stock prices measured in US dollars, no integration was present with regard to the developed market in any of the regions under review indicating that these

indices are not co-integrated with one another. Therefore, these indices yielded international portfolio diversification benefits during this time; however, the contagion from the crisis has led to limited early stages of integration being observed between South Africa, Morocco and Nigeria with the developed markets, marginally limiting the benefits of portfolio diversification into these countries in the post crisis period.

The second outcome relates to the degree of co-integration of Africa. To a great extent the results show that these countries, while revealing some co-integration into the developed markets, are far less integrated with the global markets than other emerging markets as noted by Jeyanthi and Pandian (2008). Further, in 2010, the World Bank concluded that Africa attracted around 3.5% of total worldwide investment flow. This apparent marginalisation by investors coupled with weak or no integration among African countries and other international markets, suggests that Africa will continue to experience capital inflows as fund managers seek and are able to benefit from the international risk diversification that these markets offer.

The third conclusion reached was that that as a result of policy shifts by some of the countries in Africa towards global integration, it is no longer possible to view the African continent as one region, with different countries showing varying degrees of regulations, access to information and cross border co-operation levels. It is necessary for portfolio managers to understand the dynamics affecting different countries and regions when making portfolio investment decisions.

The fourth outcome raises a question of international stock market efficiency in the short term. When trend is removed from the data, African markets are strongly co-integrated with short term global influences. From an investment perspective, short term movements in their stock markets are influenced by global developments rather than the economic fundamentals of the country, allowing international investors to take advantage of short term pricing anomalies.

Finally, the evidence presented carries an important implication in that, the degree of integration between Africa and global markets tends to change over time,

especially around periods marked by financial crises. The results indicate that the rise in volatility in global markets during the financial crisis has caused a self-sustaining contagion effect on African stock markets since, despite important differences in economic prospects, market mechanisms and their prior degree of overvaluation, the resultant degree of integration has strengthened post the crisis. However, despite this improvement in the level of integration, these markets individually are not closely linked to either developed country stock markets or global economic drivers. The Johannesburg Stock Exchange is more closely linked than other stock markets in Africa, demonstrating co-integration with both the S&P 500 index and MSCI EAFE index post the 2008 financial crisis, which is likely due to its larger size and more efficient operation. This will make the JSE more vulnerable to portfolio re-adjustments and contagion effects from other markets.

The researcher suggests that over the next decade, as African governments adopt policy frameworks that favour competitiveness, efficiency and growth, an environment will be created where investors in Africa will be able to deduce information from simple price changes in global markets that may result in 'errors' in one market being transmitted to their markets. To ensure against this and other risks of integration, and for countries to benefit from market co-integration, supportive macroeconomic policies must be in place and constraints surrounding foreign shareholdings need to be abolished. Caution should, however, be exercised by policy makers in Africa when establishing frameworks, as there is not always a direct relationship between economic growth and economic independence.

5.4 Recommendations

Continued illiquidity and limited size of African markets remains a concern for International fund managers. The literature review revealed that from the perspective of the development of African stock markets, co-integration is an essential component of financial sector stability and development. In addition, it plays an important role in promoting the growth of African economies.

Internationally integrated African stock exchanges enable greater risk diversification, thus enabling a portfolio shift to lower risk portfolio investments with higher expected returns.

From a policy perspective, co-integration has been encouraged by African countries as a way to develop industry and enlarge its presence in the global economy. As these markets become more stable and more accessible to foreign investors, their predictability and segmentation will be beneficial in global portfolio asset diversification. Since the 2008 financial crisis, global portfolios remain dominated by developed market equities and bonds. Portfolio managers are now, more than ever, looking to spread risk across uncorrelated asset classes, seeking longer-term returns and greater downside protection. In the short-run the researcher expects markets will continue to be influenced by the portfolio diversification objective of foreign investors.

Since the late 1990s, average African economic and financial market growth has shown substantial improvement. Some countries such as Nigeria and Kenya have seen economic performance rapidly improve, while others have descended into chaos. Further, African stock markets have the greatest distribution of policies compared against other developing or developed markets and therefore they represent the most volatile and illiquid markets in the world. The greatest challenge to policy makers remains the attraction and retention of investment flows. Today the term “Africa” has lost its meaning as a category for investment: rather investors must be consider approaching it in terms of regional sustainable and predictable policy applications.

5.5 Suggestions for further research

There are three possible areas for future studies. The first is one which the researcher noted during the analysis and is related to the intraregional relationships between African markets and the potential for spillovers among the different African countries and regions. Exploratory research into the possibility of further regional integration of stock markets may have the effect of improving

liquidity, efficiency and competitiveness, thus resulting in greater international investor interest. The researcher suggests that analysis of this type would provide the investment community with a better understanding of how to diversify investments in Africa.

The second area that the researcher noted is, that the lack of benchmarks which provide pricing and risk measurement matrices for investors to use in order to evaluate their investment managers' performance may have resulted in a reduction in investor interest in the region. Research into the necessity of such yardsticks for the investment community and the potential development of new and more in-depth benchmarks for portfolio managers may improve the interest of investors into Africa.

Finally, the researcher suggests that additional research on this topic be conducted once longer term data is available to determine the validity of the final outcome in this study.

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APPENDIX A

Figure 1: Pre–crisis South Africa index vs. Global Markets index

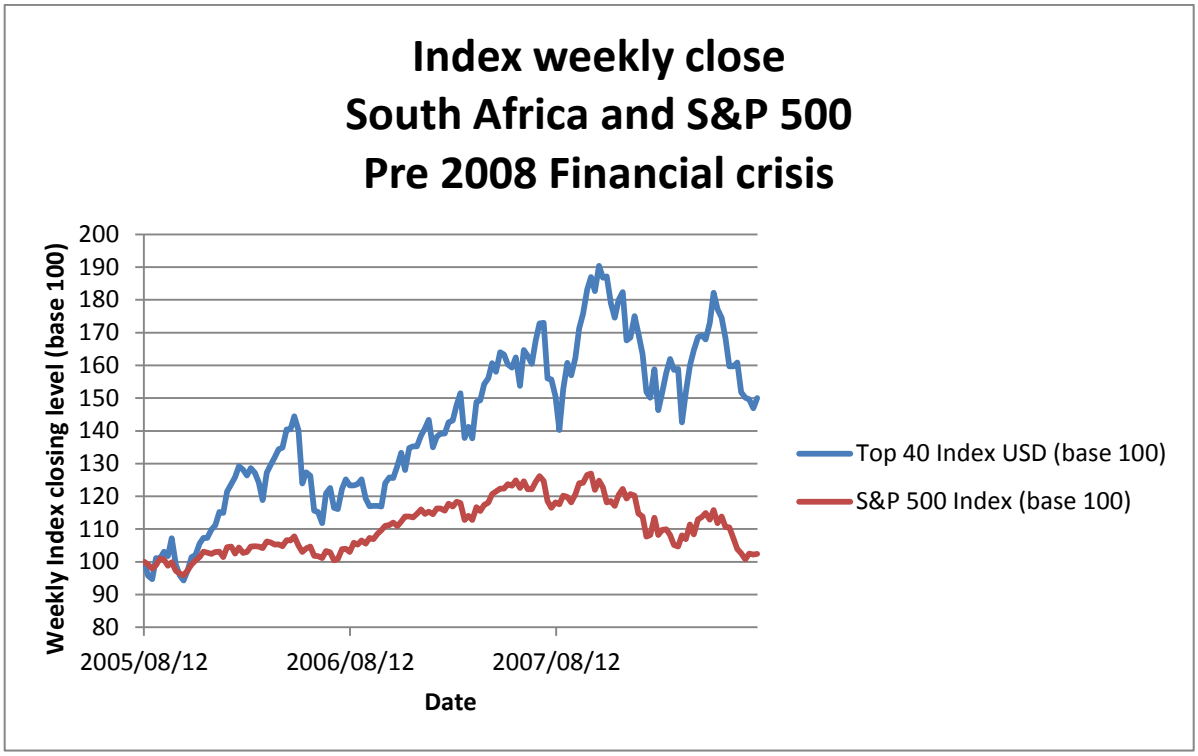


Figure 2: Post–crisis South Africa index vs. Global Markets index

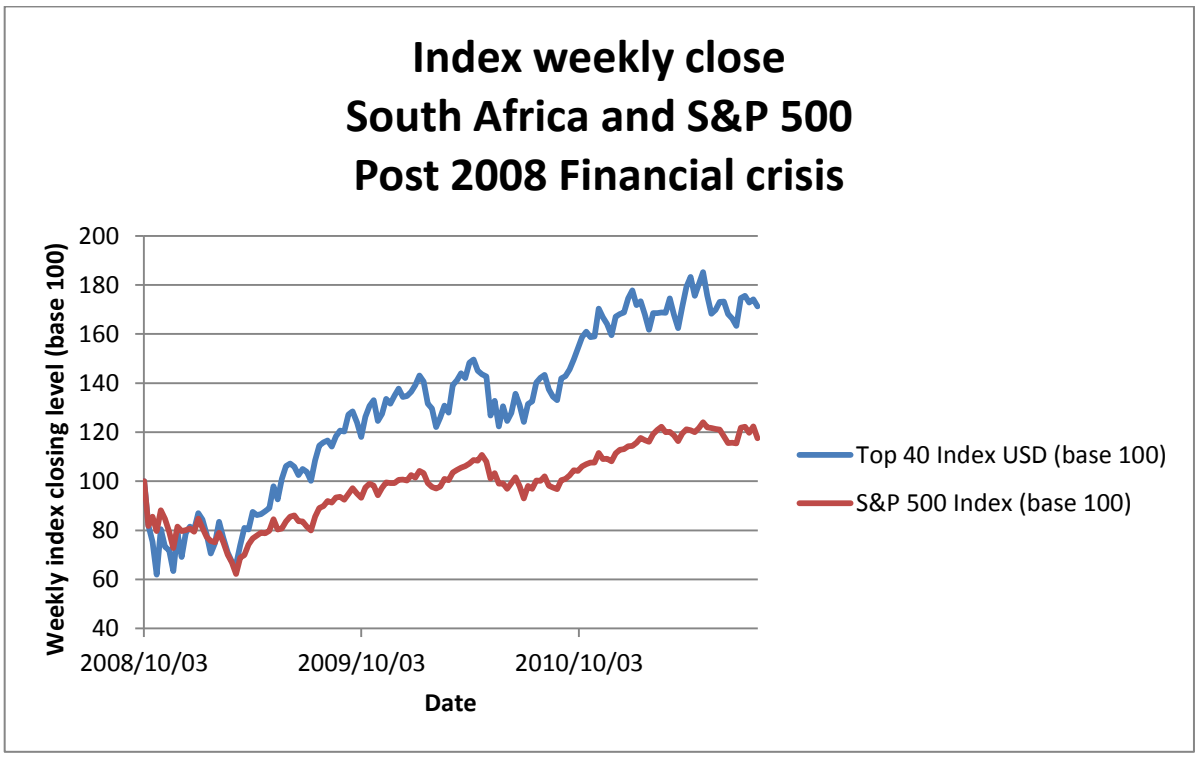


Figure 3: Pre–crisis South Africa index movement vs. Global Markets index movement

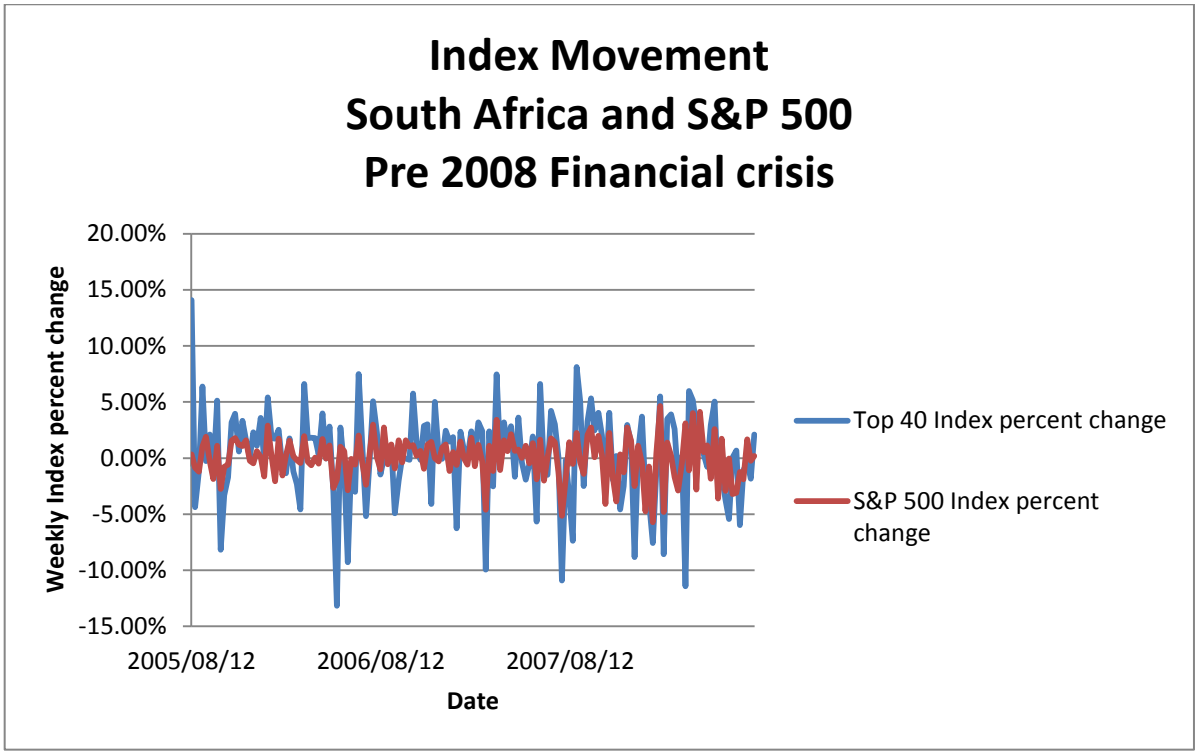


Figure 4: Post–crisis South Africa index movement vs. Global Markets index movement

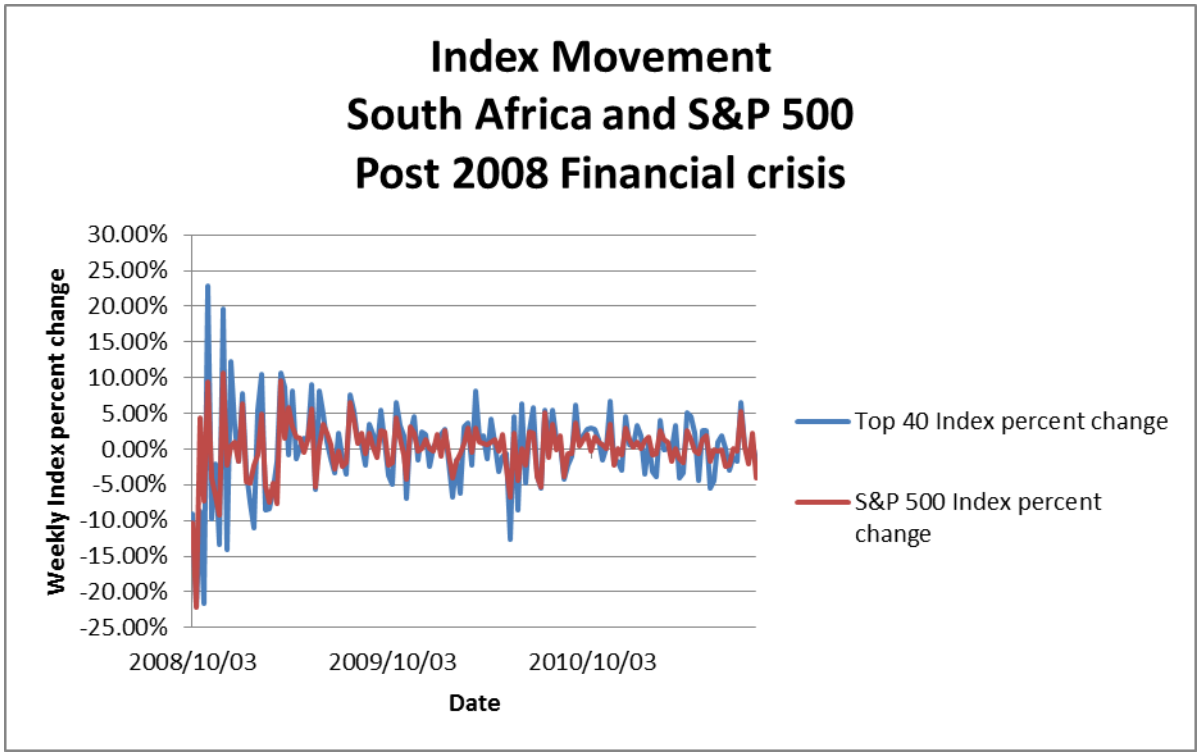


Figure 5: Pre–crisis South Africa index vs. MSCI EAFE index

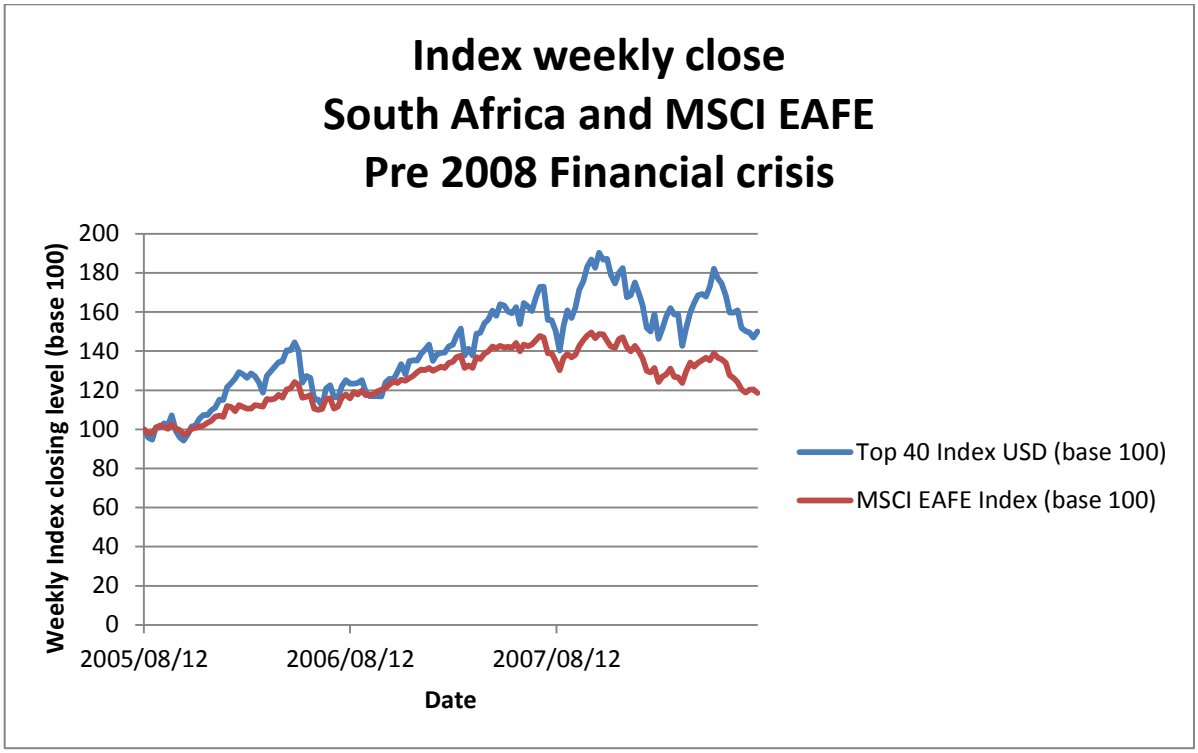


Figure 6: Post–crisis South Africa index vs. MSCI EAFE index

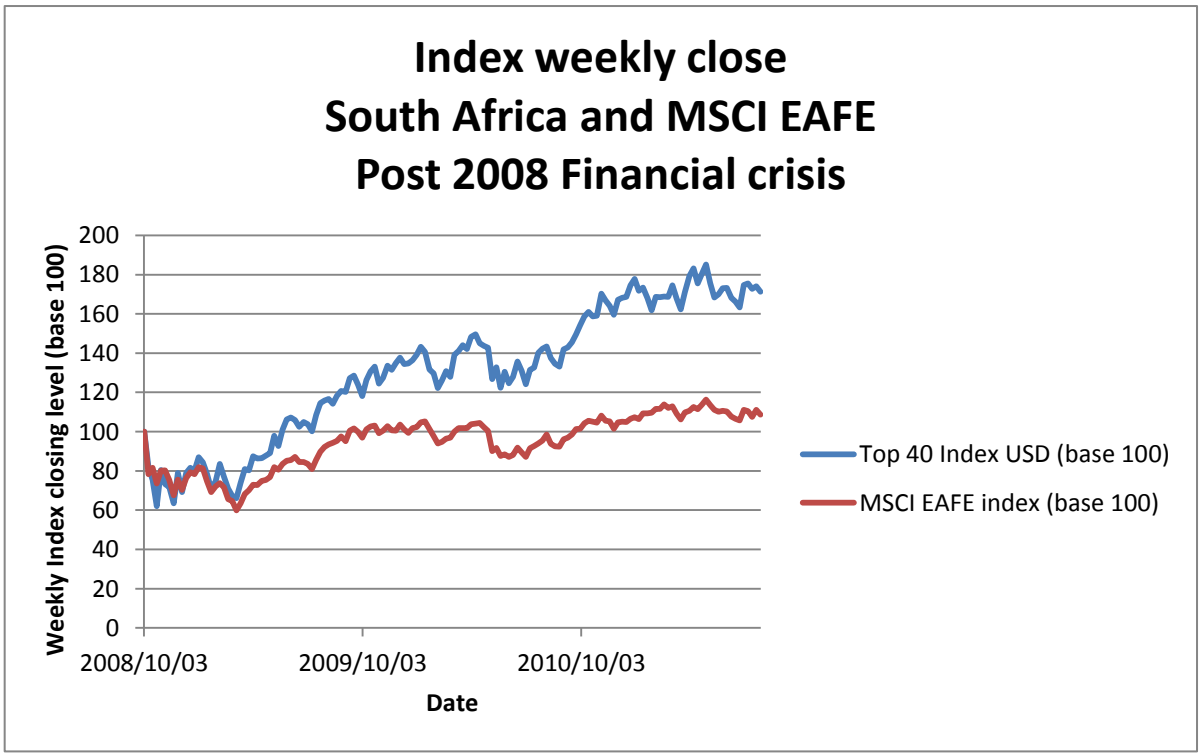


Figure 7: Pre–crisis South Africa index movement vs. MSCI EAFE index movement

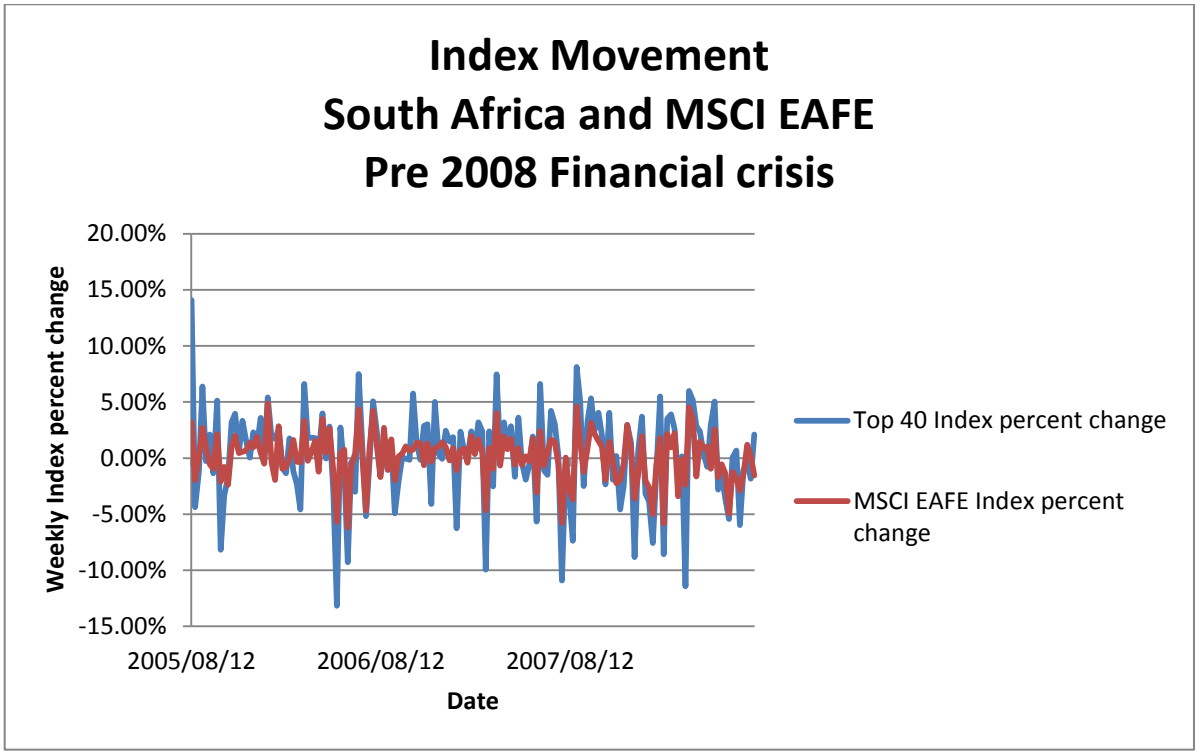


Figure 8: Post–crisis South Africa index movement vs. MSCI EAFE index movement

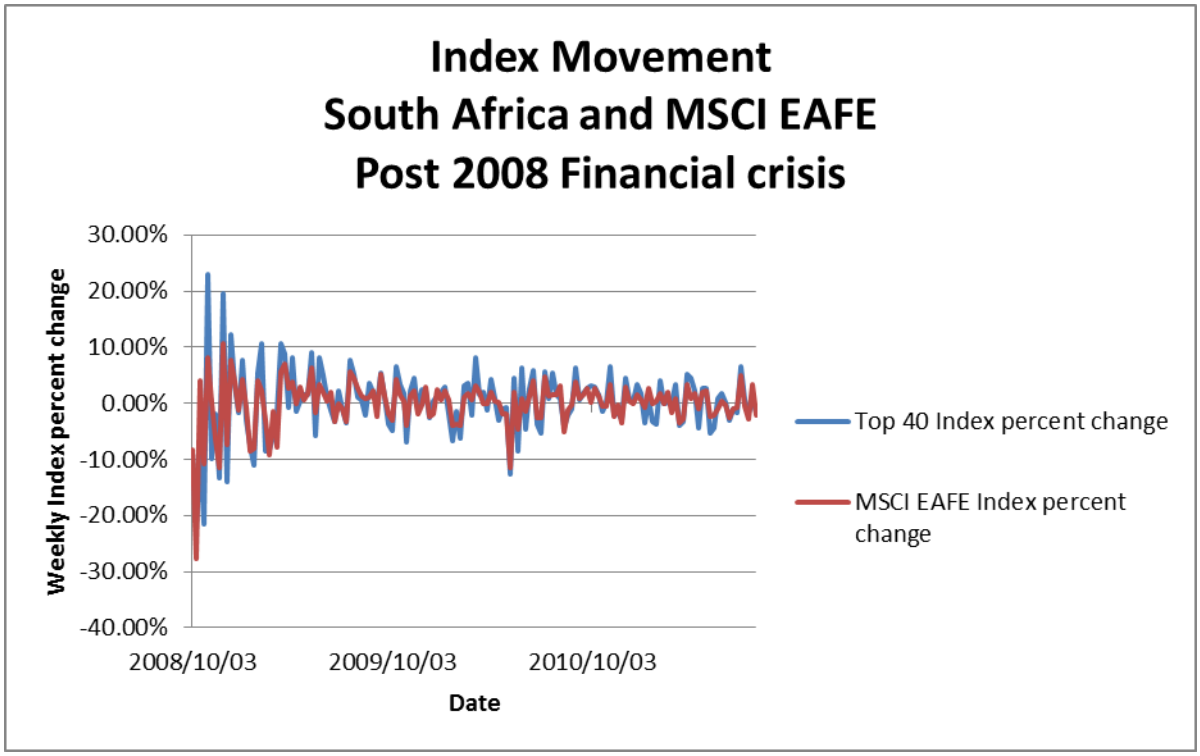


Figure 9: Pre–crisis MSCI Egypt index vs. Global market index

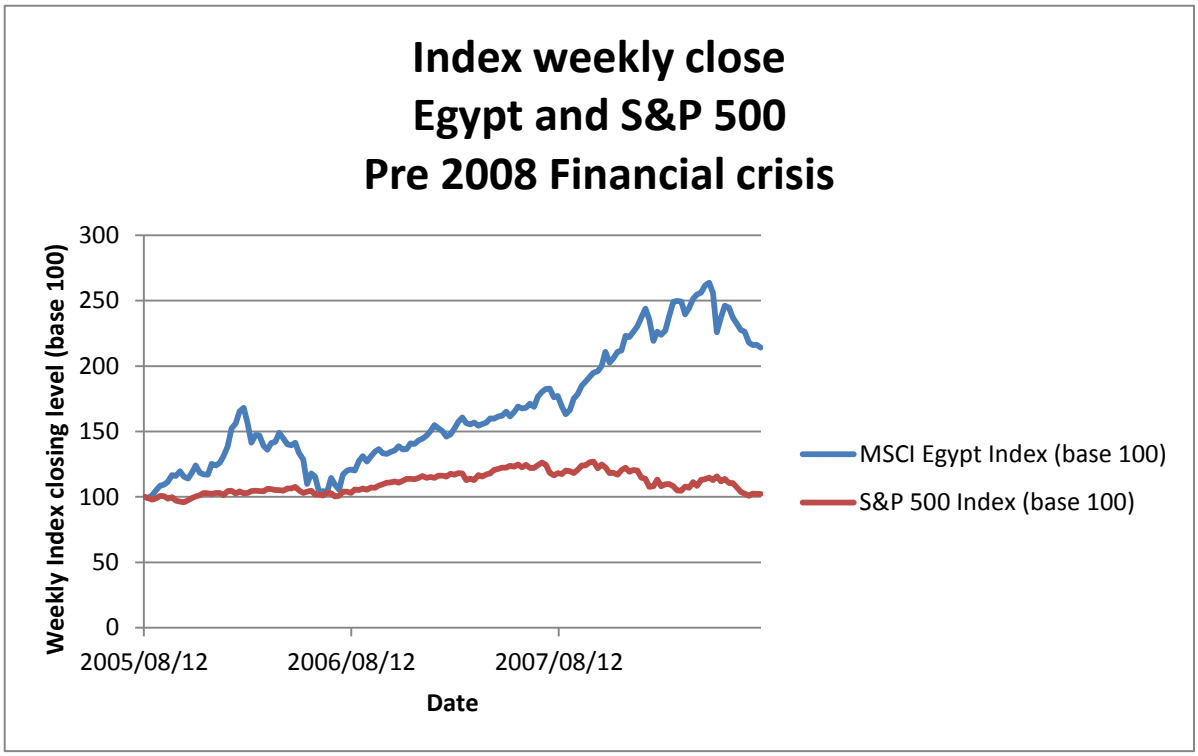


Figure 10: Post–crisis MSCI Egypt index vs. Global market index

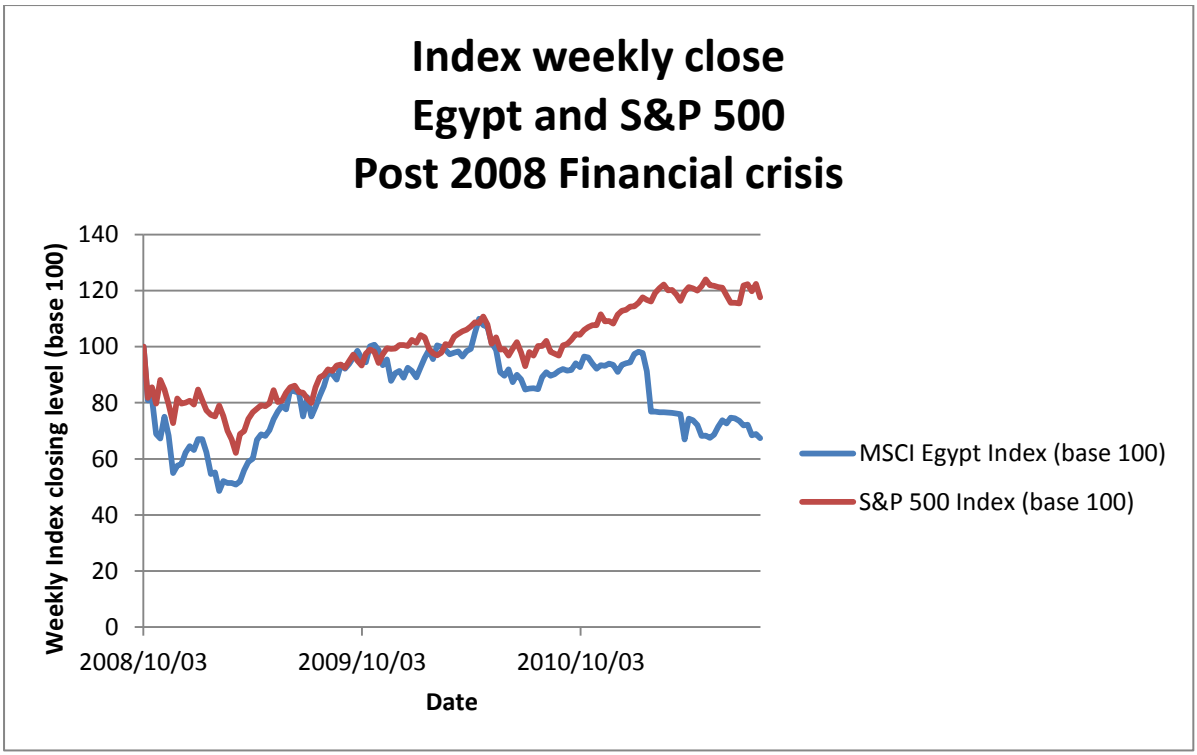


Figure 11: Pre–crisis MSCI Egypt index movement vs. Global market index movement

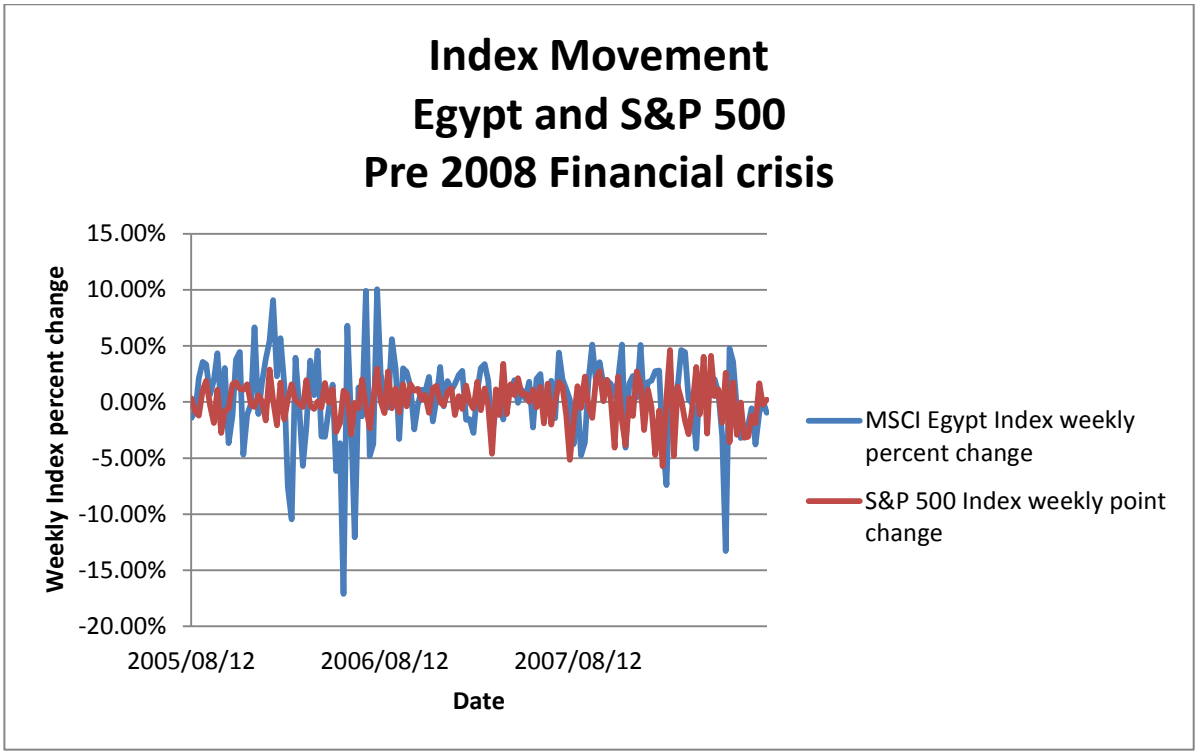


Figure 12: Post–crisis MSCI Egypt index movement vs. Global market index movement

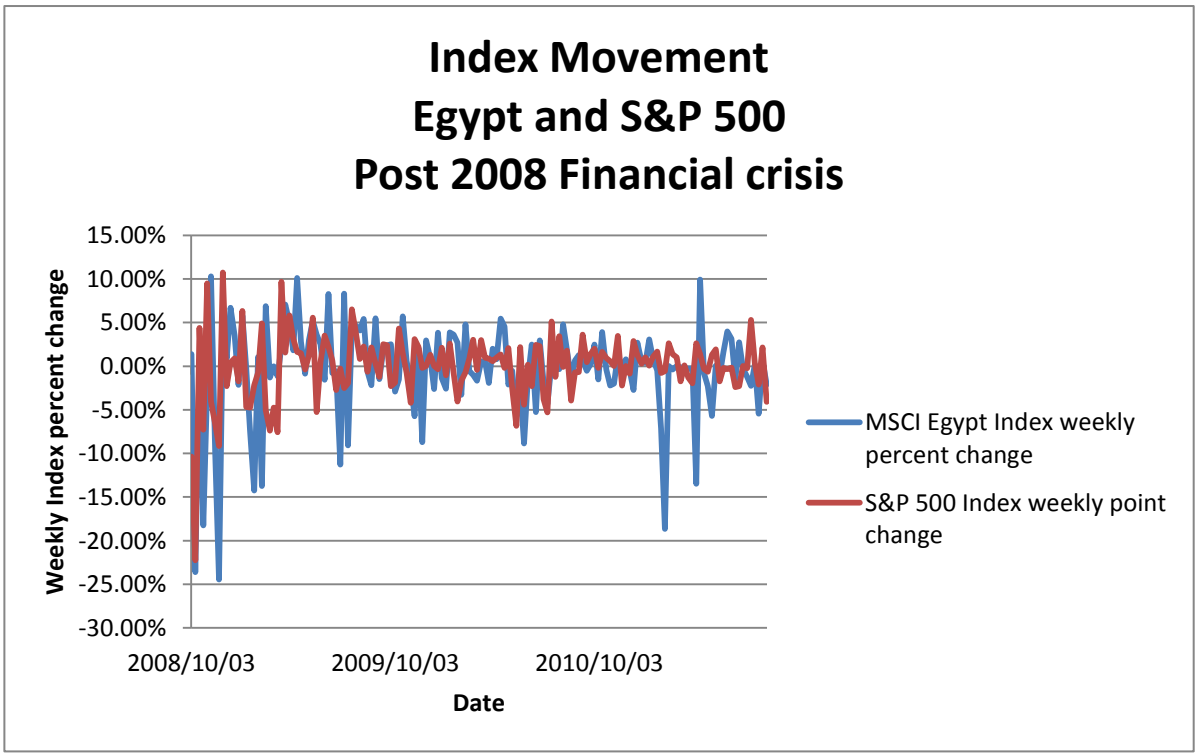


Figure 13: Pre–crisis MSCI Egypt index vs. MSCI GCC index

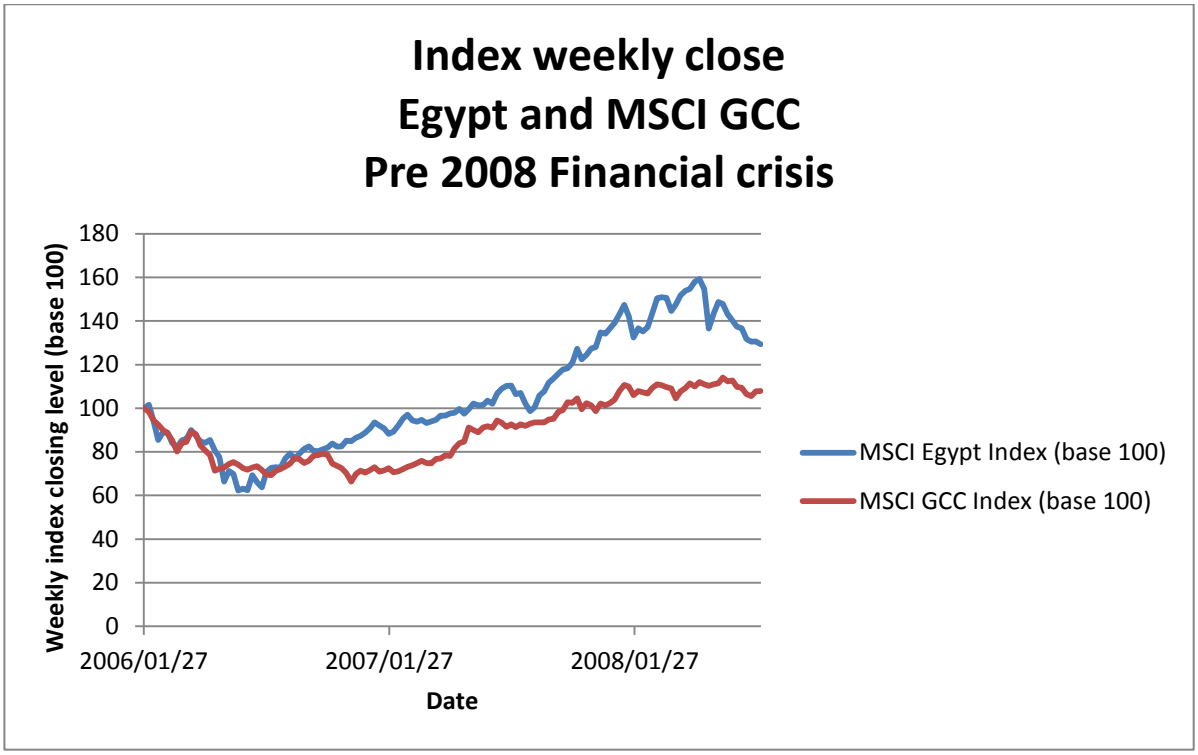


Figure 14: Post–crisis MSCI Egypt index vs. MSCI GCC index

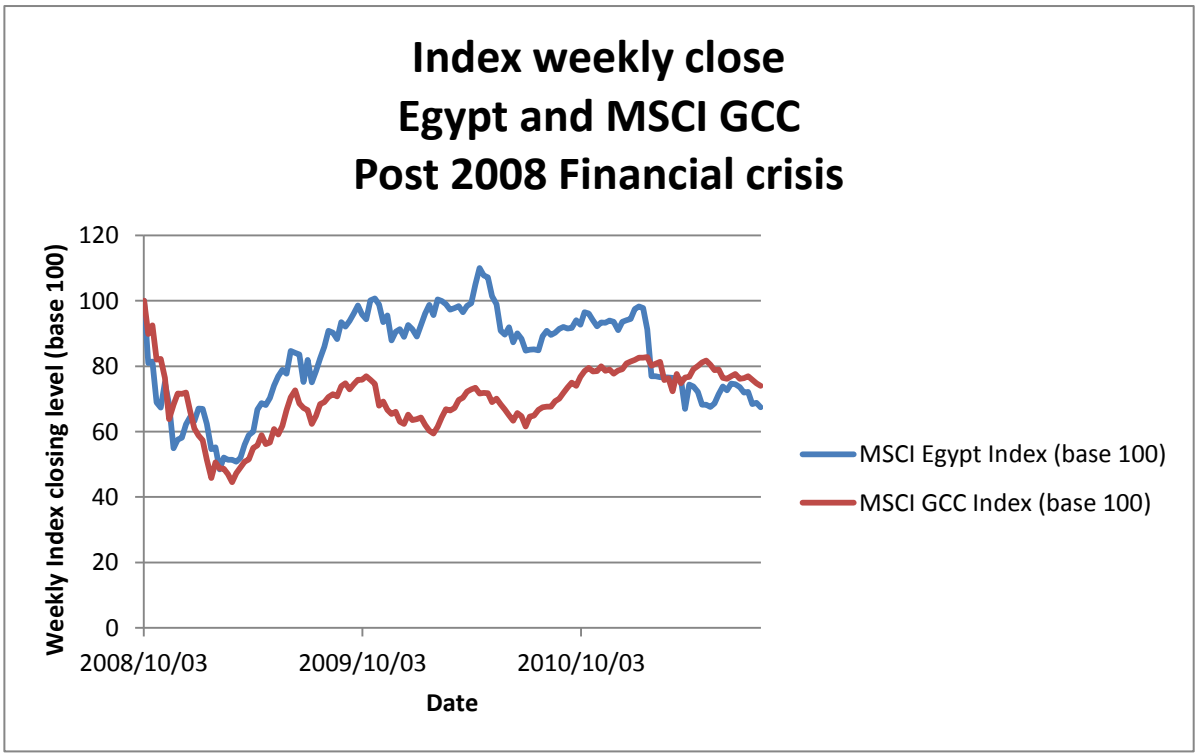


Figure 15: Pre–crisis MSCI Egypt index movement vs. MSCI GCC index movement

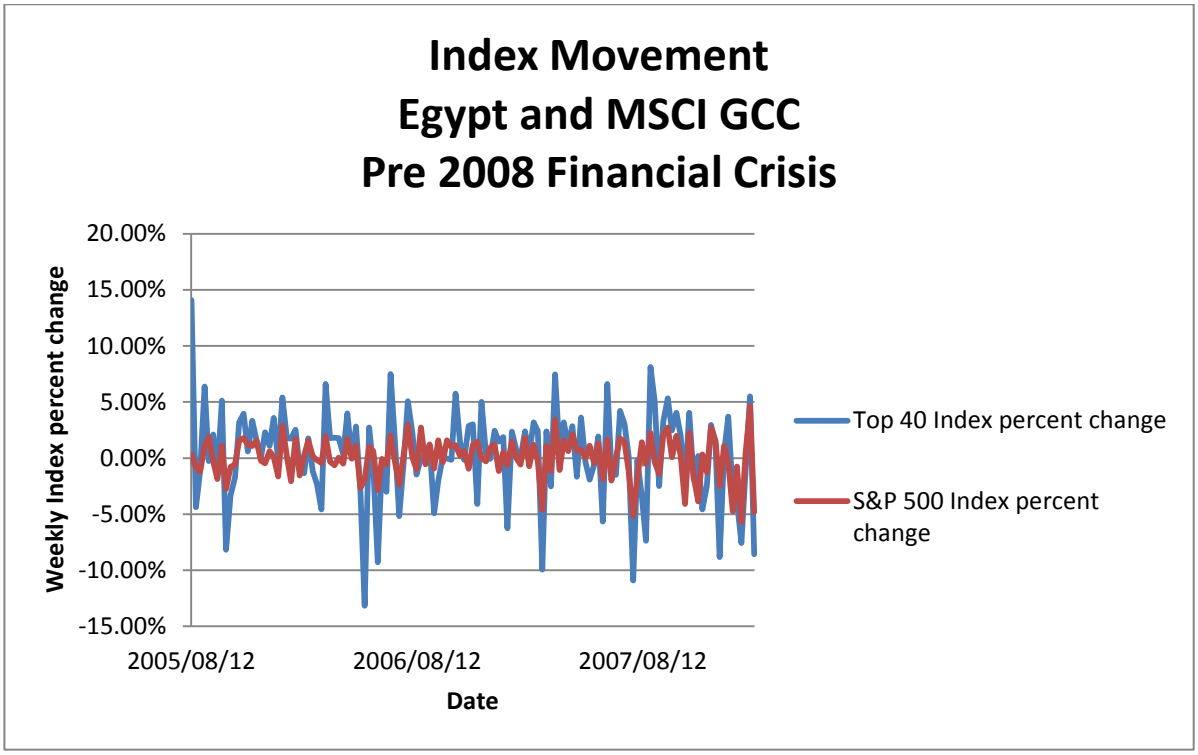


Figure 16: Post–crisis MSCI Egypt index movement vs. MSCI GCC index movement

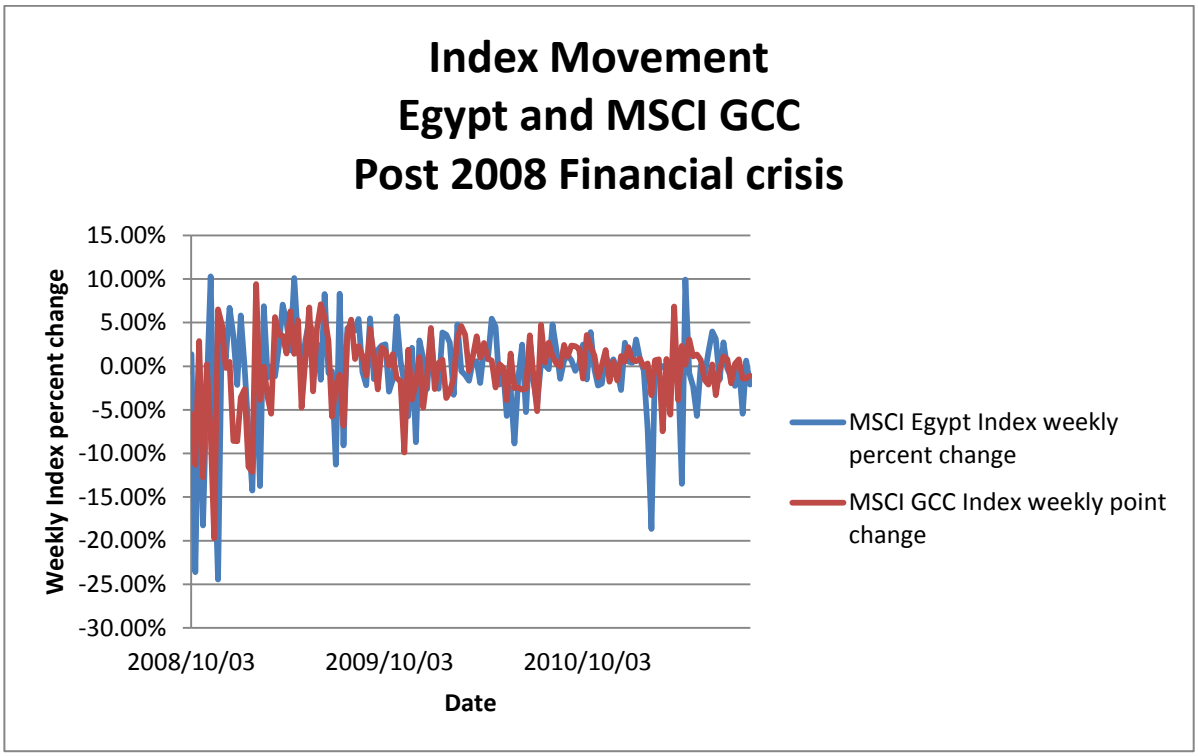


Figure 17: Pre–crisis MSCI Morocco index vs. Global market index

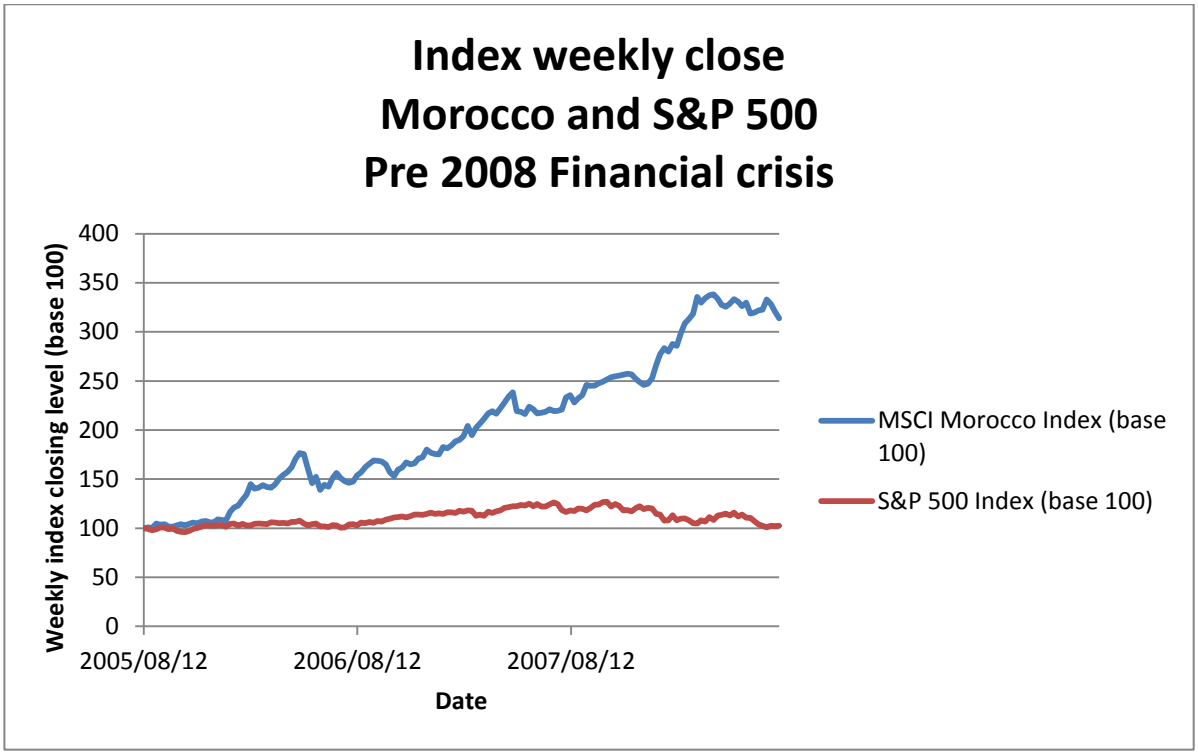


Figure 18: Post–crisis MSCI Morocco index vs. Global market index

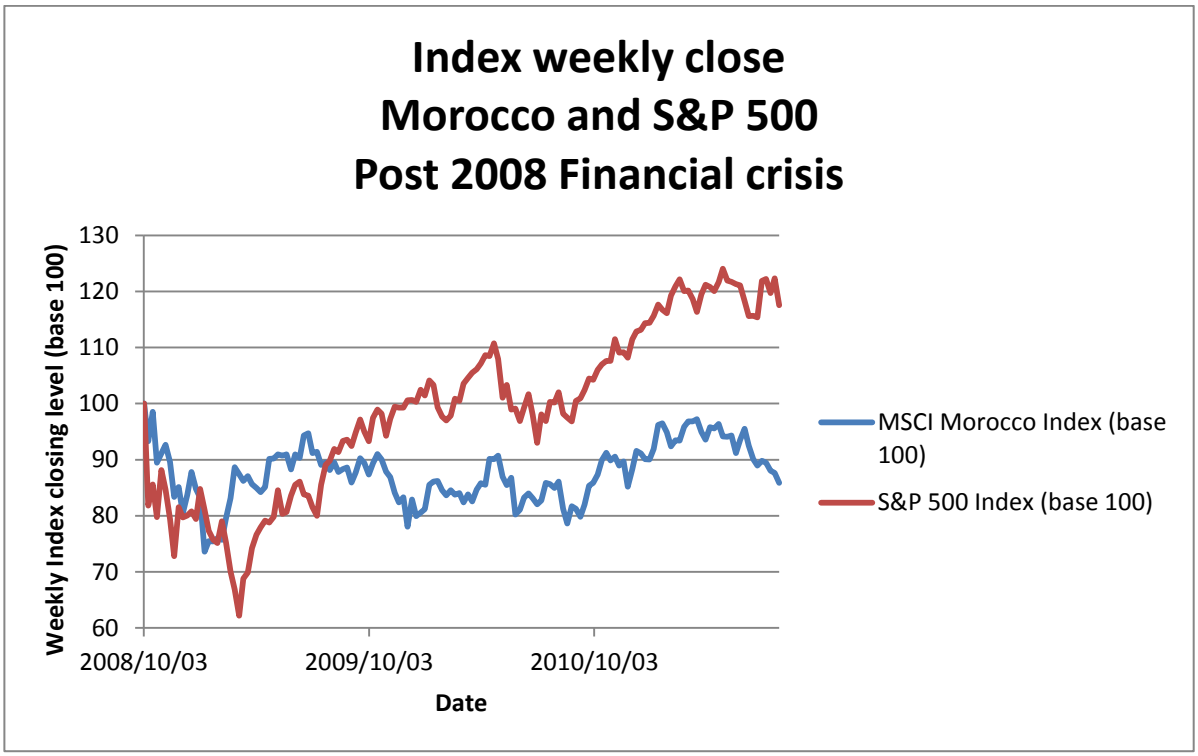


Figure 19: Pre–crisis MSCI Morocco index movement vs. Global market index movement

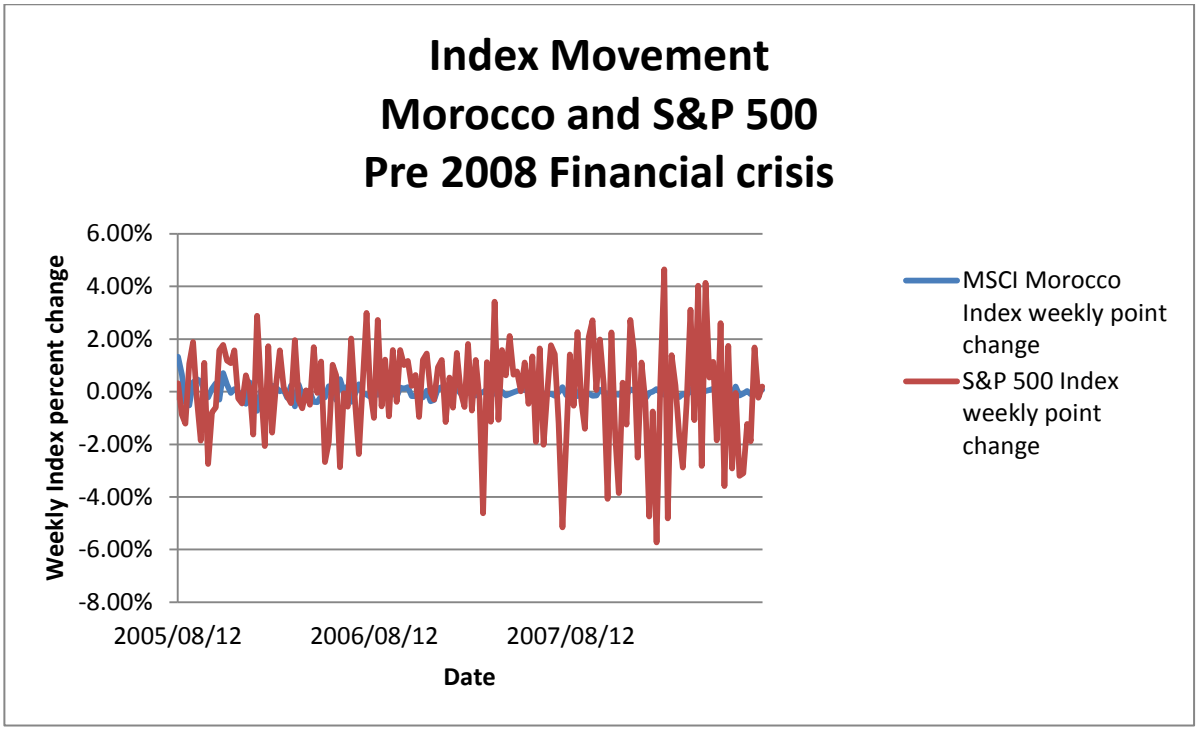


Figure 20: Post–crisis MSCI Morocco index movement vs. Global market index movement

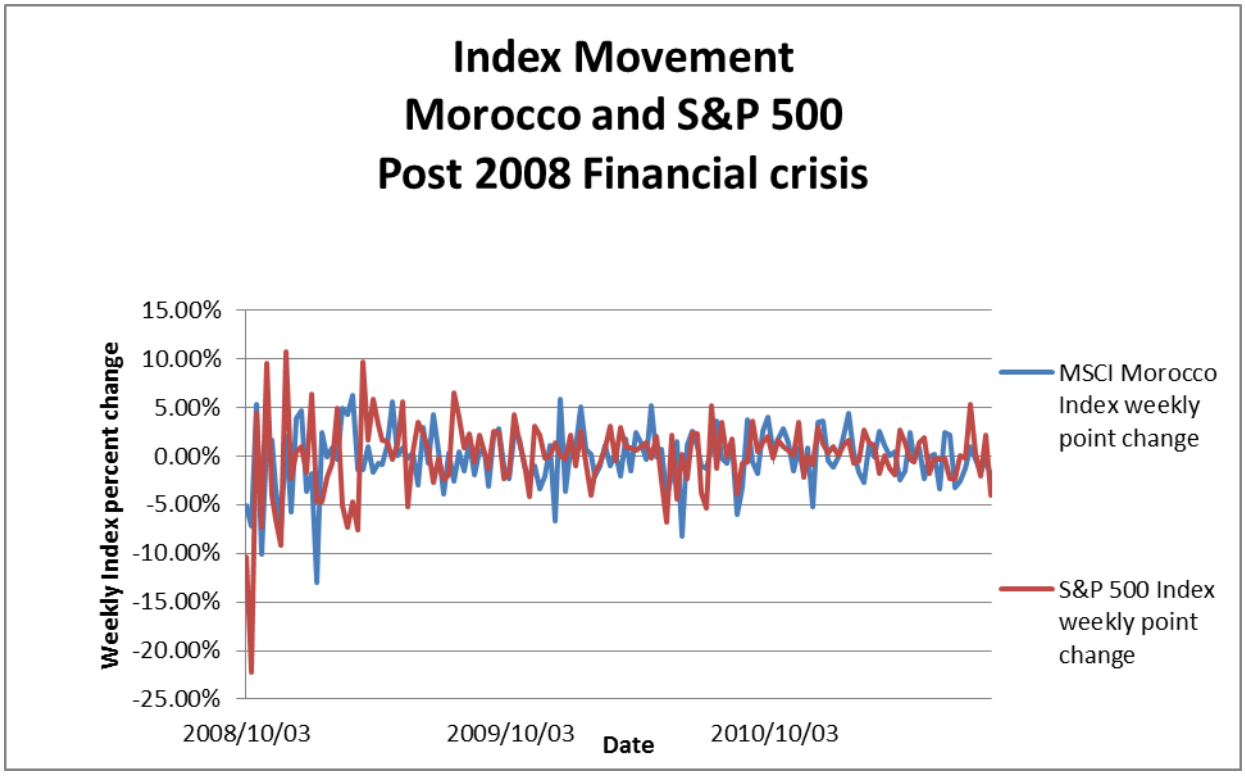


Figure 21: Pre–crisis MSCI Morocco index vs. MSCI Food and Staples index

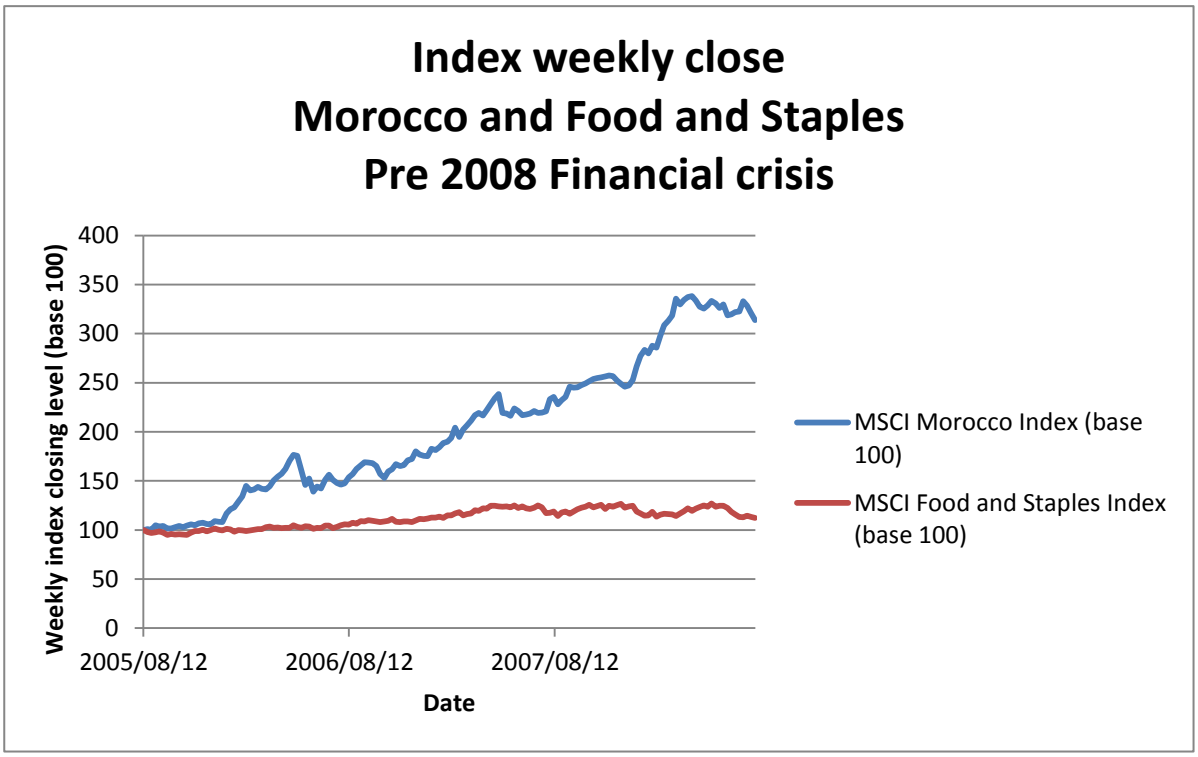


Figure 22: Post–crisis MSCI Morocco index vs. MSCI Food and Staples index

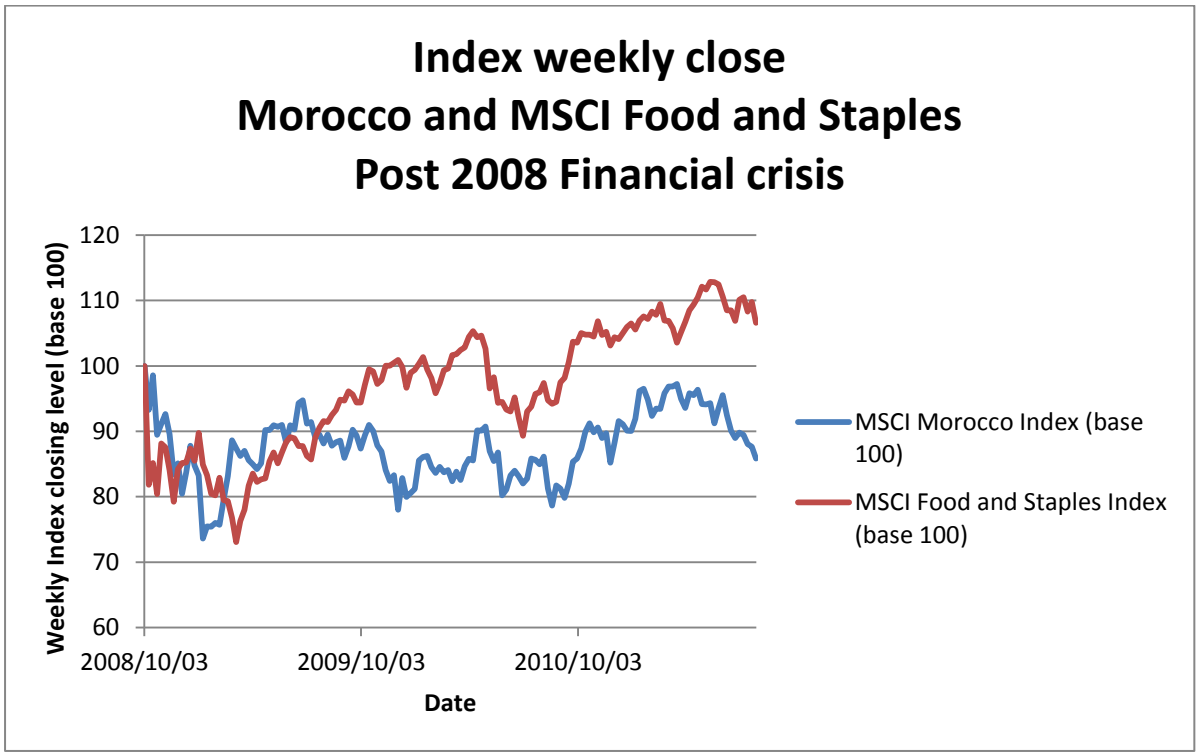


Figure 23: Pre–crisis MSCI Morocco index movement vs. MSCI Food and Staples index movement

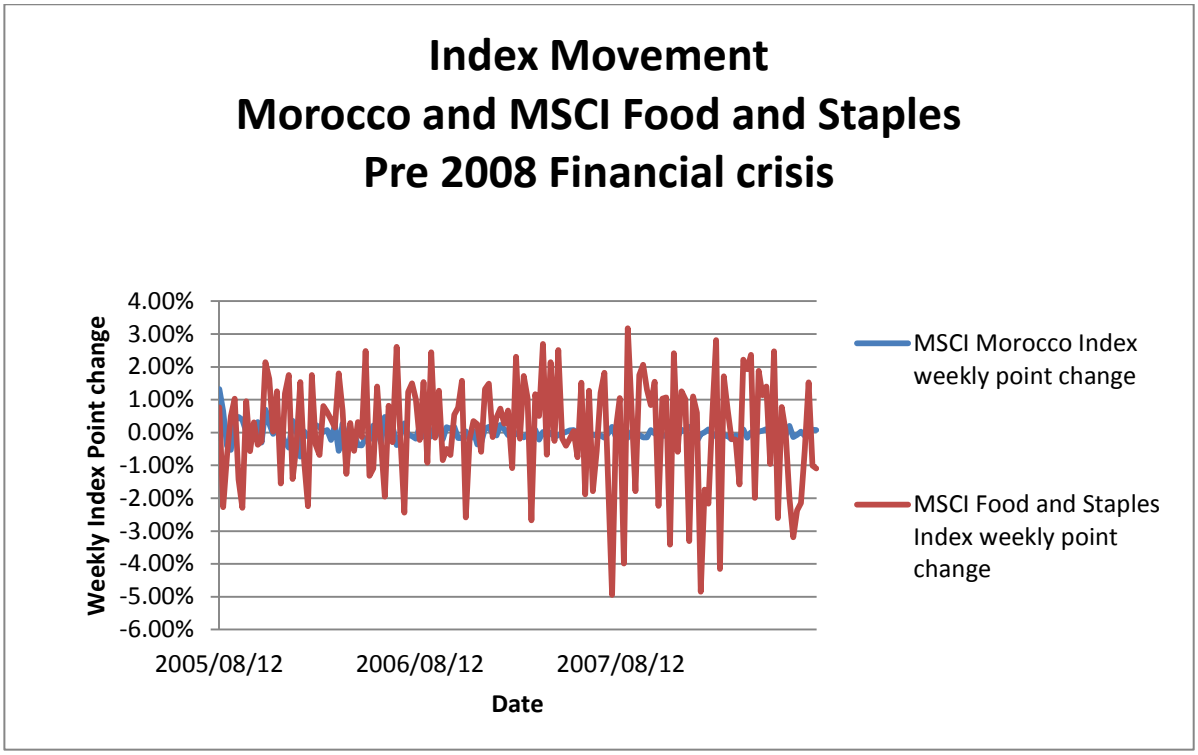


Figure 24: Post–crisis MSCI Morocco index movement vs. MSCI Food and Staples index movement

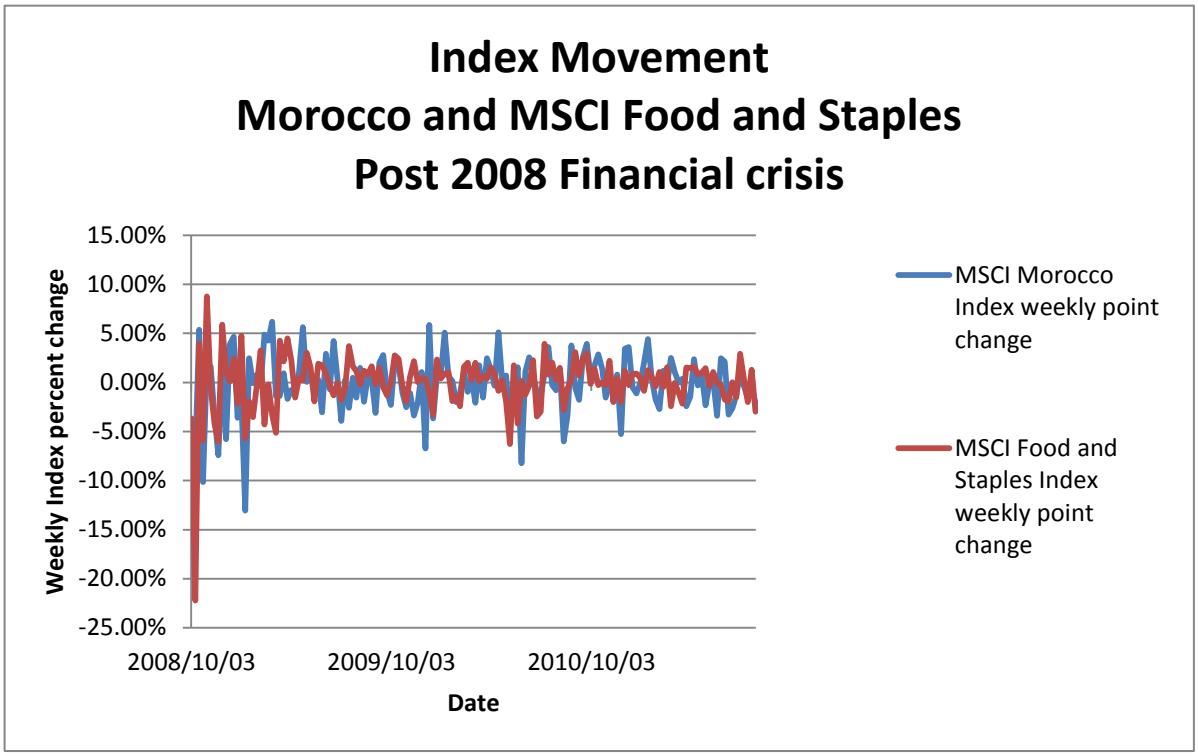


Figure 25: Pre–crisis MSCI Nigeria index vs. Global market index

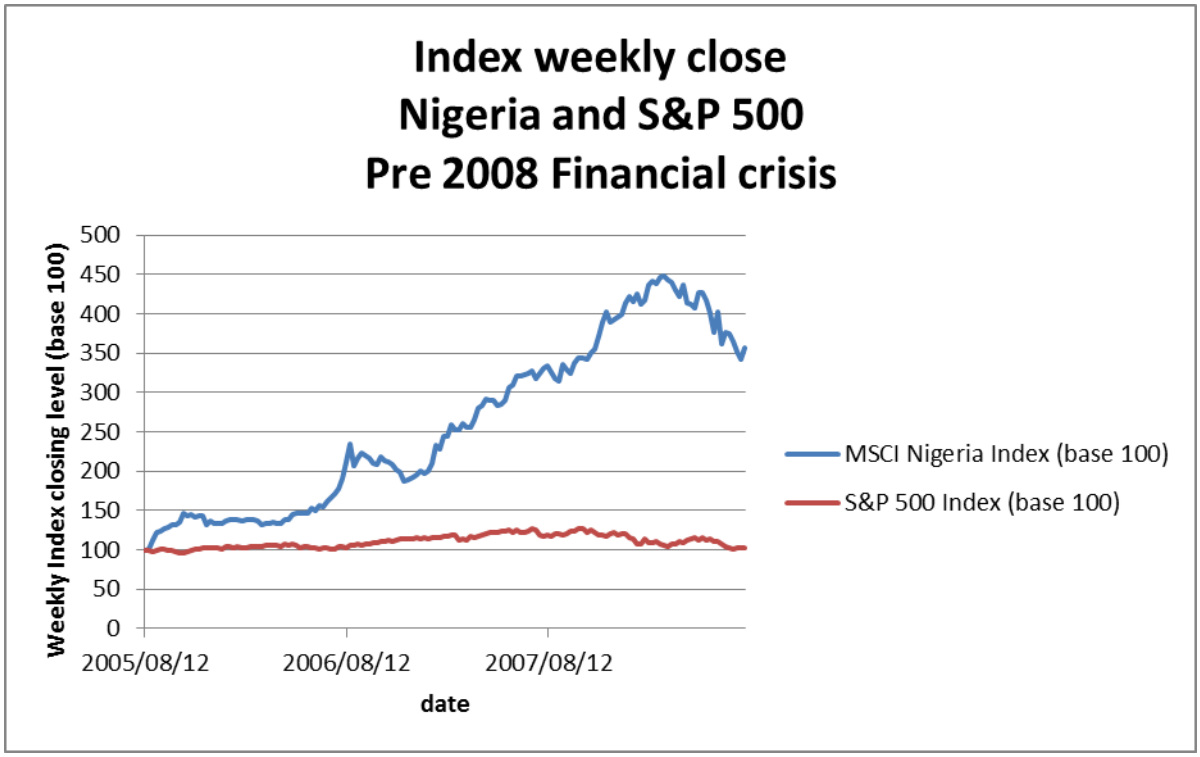


Figure 26: Post–crisis MSCI Nigeria index vs. Global market index

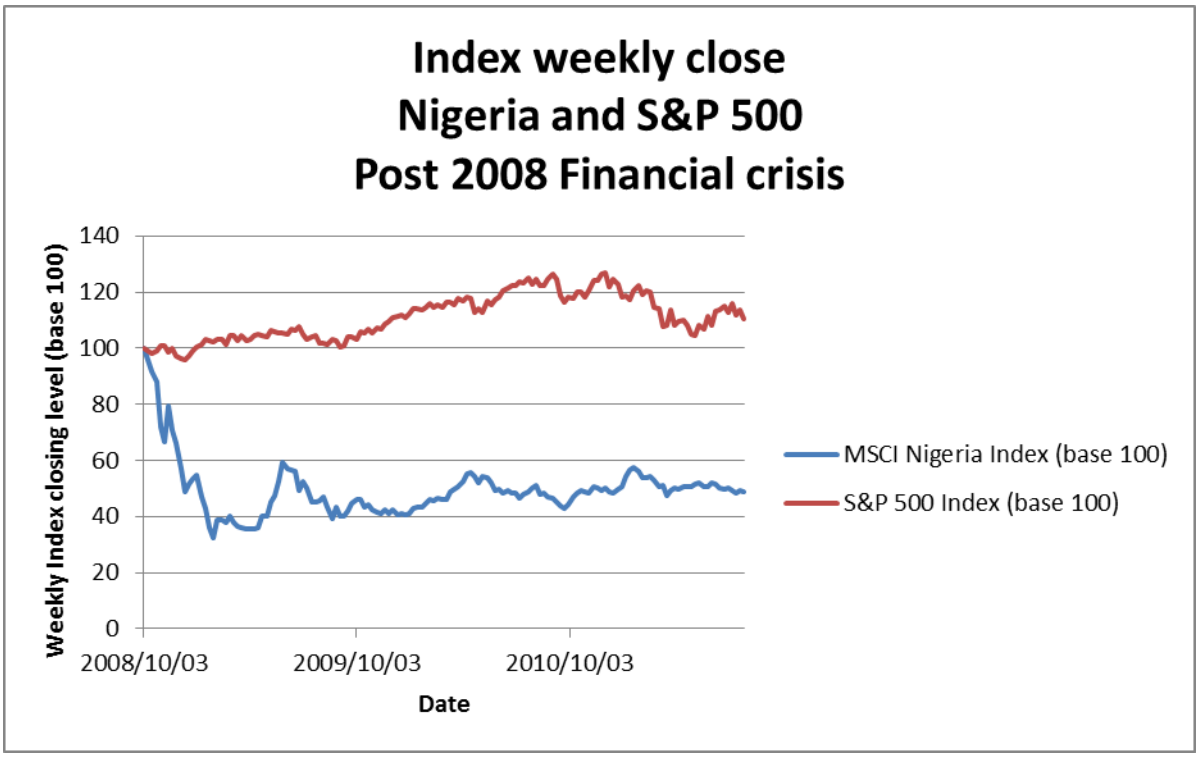


Figure 27: Pre–crisis MSCI Nigeria index movement vs. Global market index movement

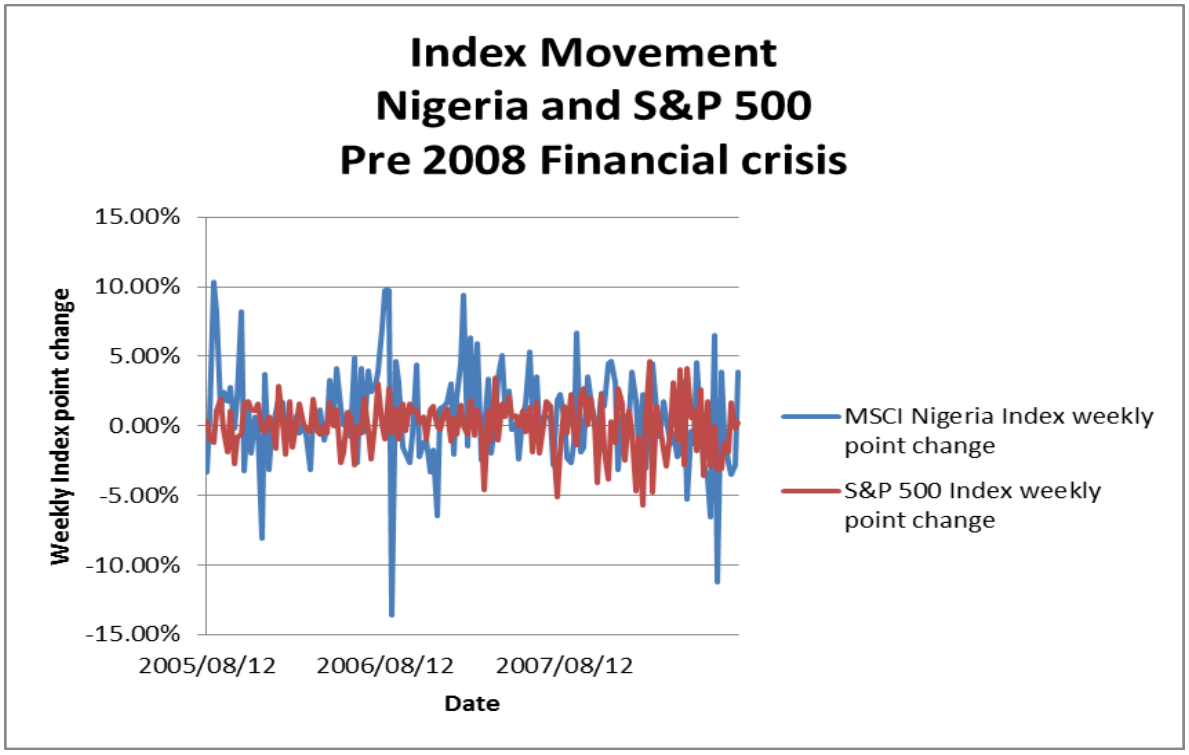


Figure 28: Post–crisis MSCI Nigeria index movement vs. Global market index movement

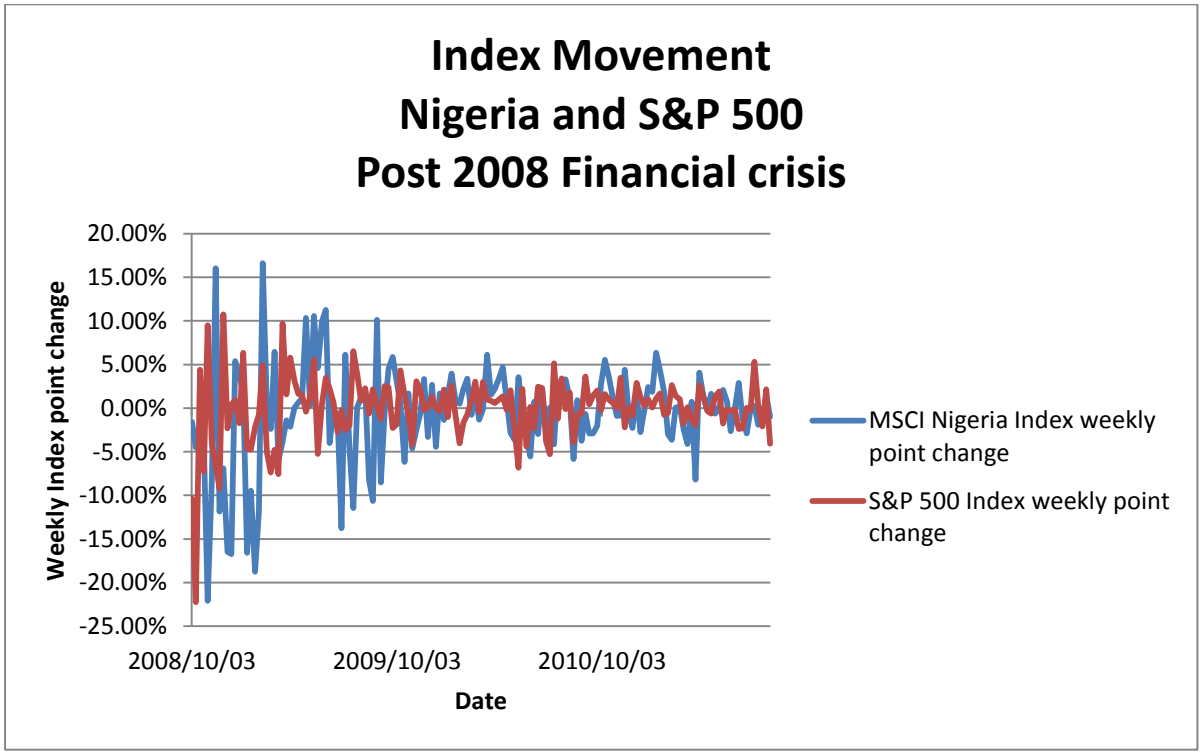


Figure 29: Pre–crisis MSCI Nigeria index vs. MSCI Oil and Energy index

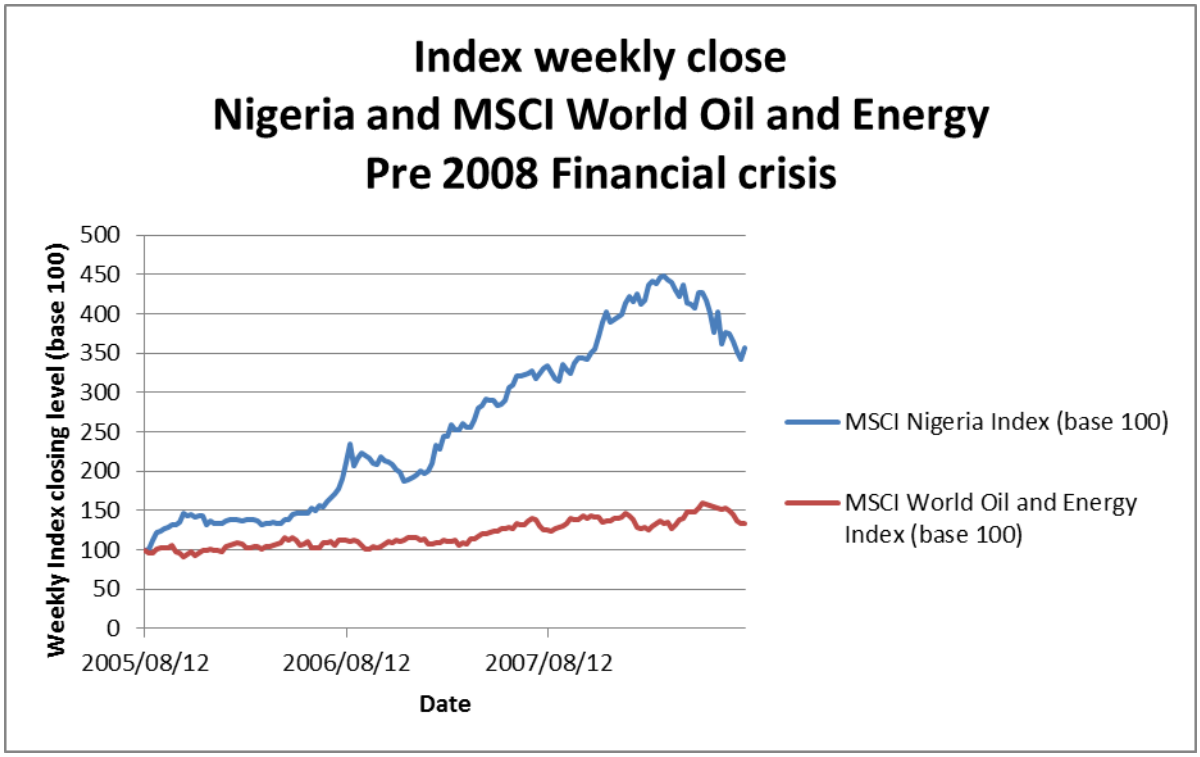


Figure 30: Post–crisis MSCI Nigeria index vs. MSCI Oil and Energy index

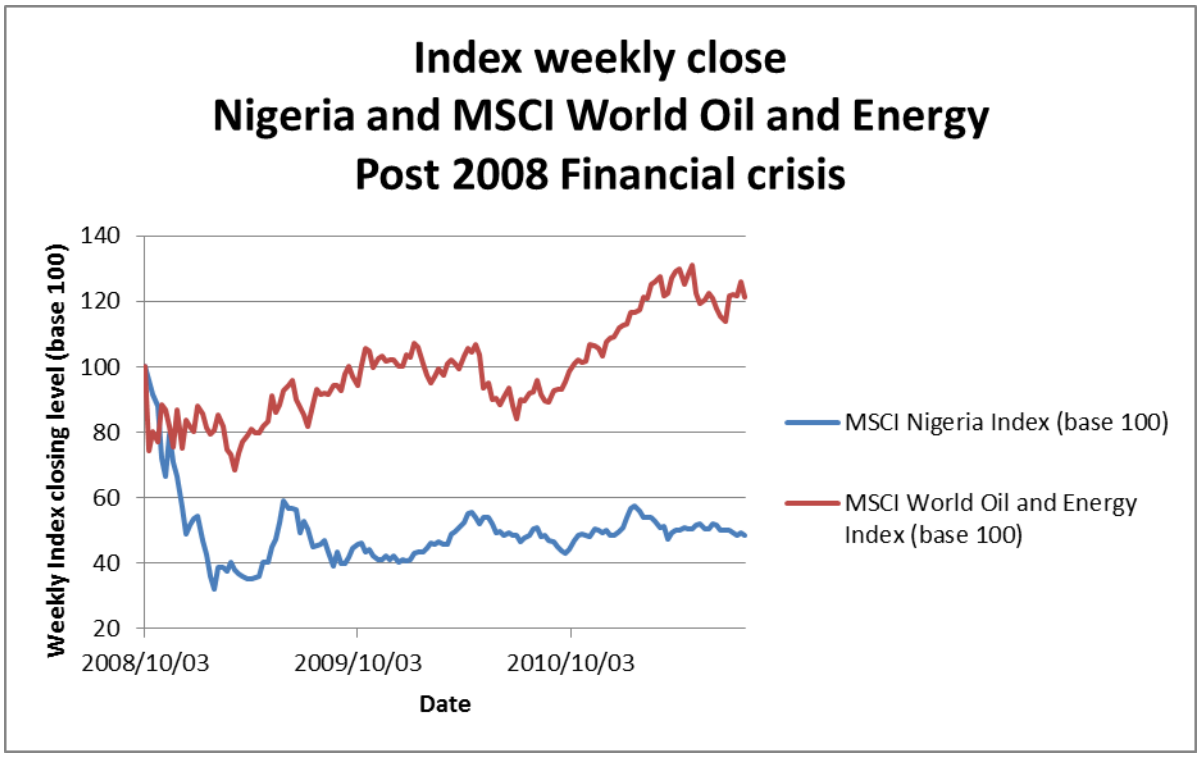


Figure 31: Pre–crisis MSCI Nigeria index movement vs. MSCI Oil and Energy index movement

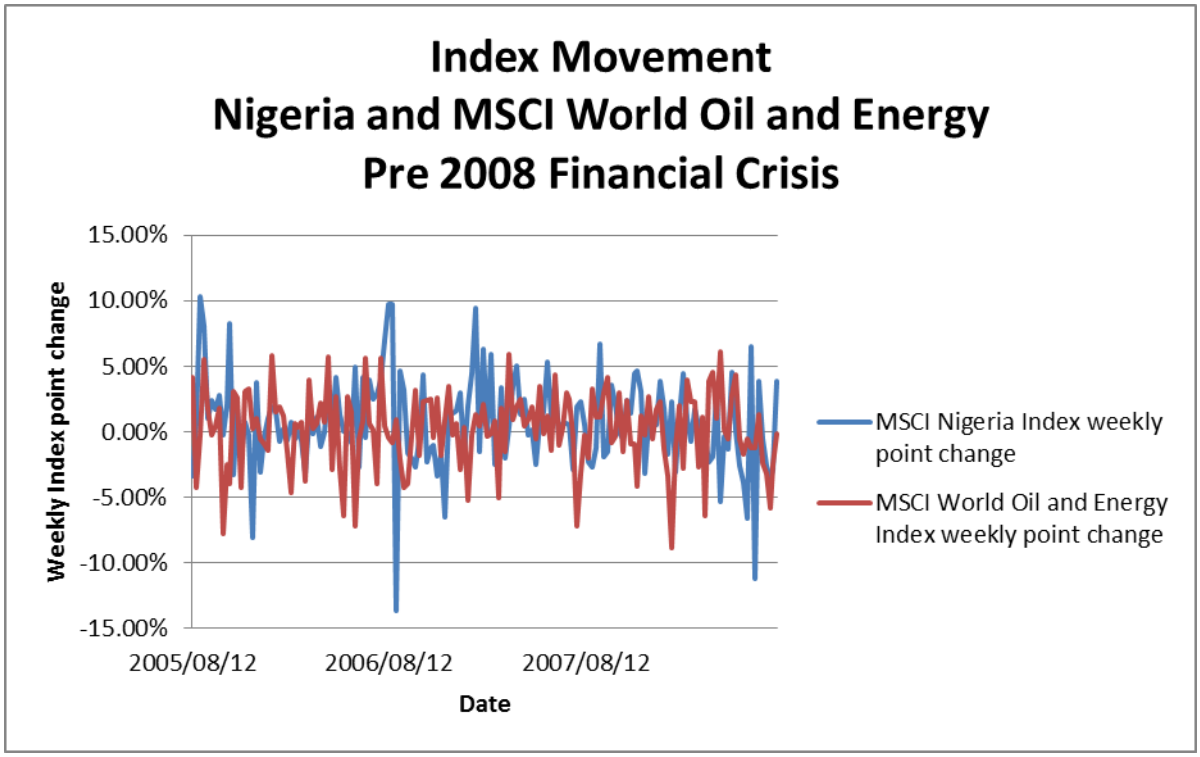


Figure 32: Post–crisis MSCI Nigeria index movement vs. MSCI Oil and Energy index movement

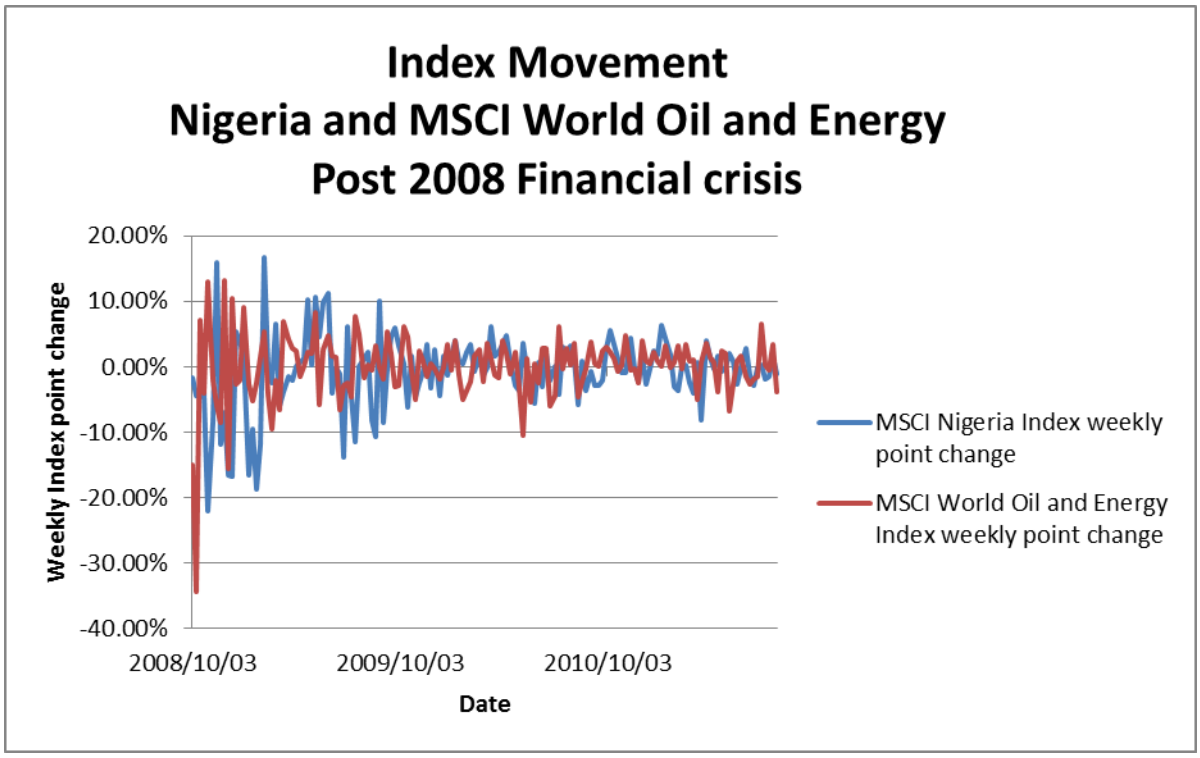


Figure 33: Pre–crisis MSCI Kenya index vs. Global market index

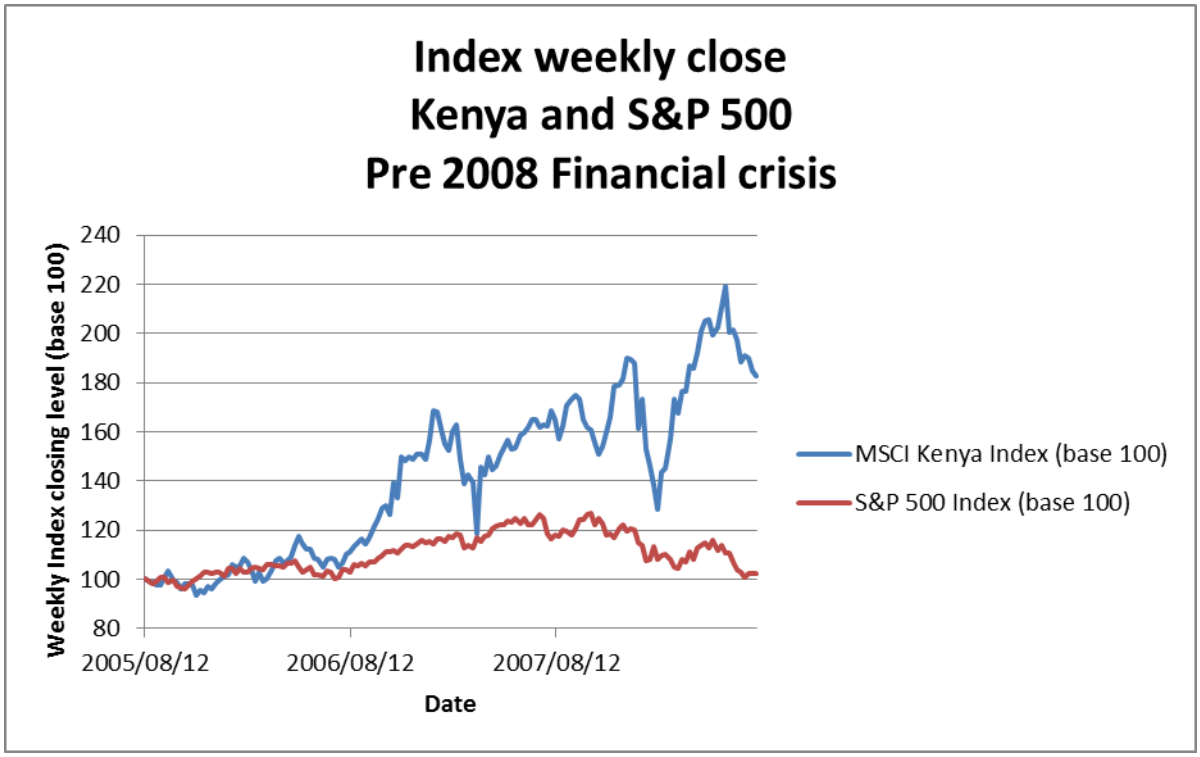


Figure 34: Post–crisis MSCI Kenya index vs. Global market index

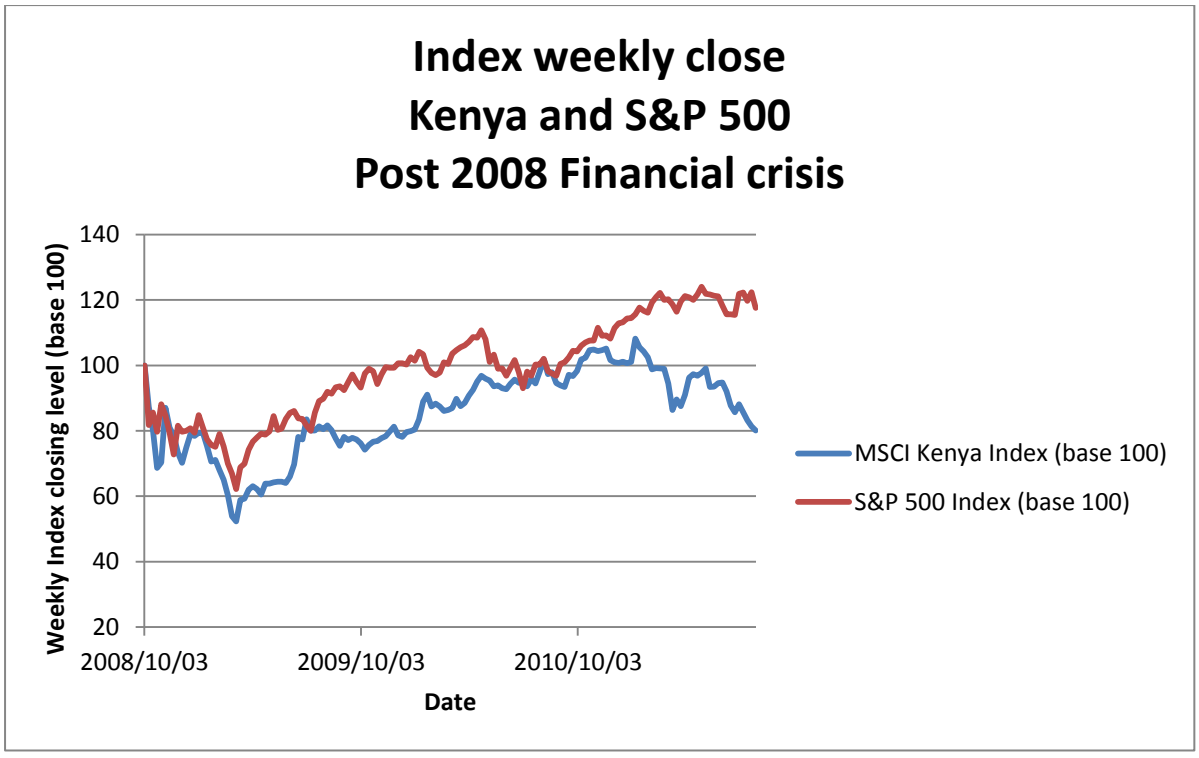


Figure 35: Pre–crisis MSCI Kenya index movement vs. Global market index movement

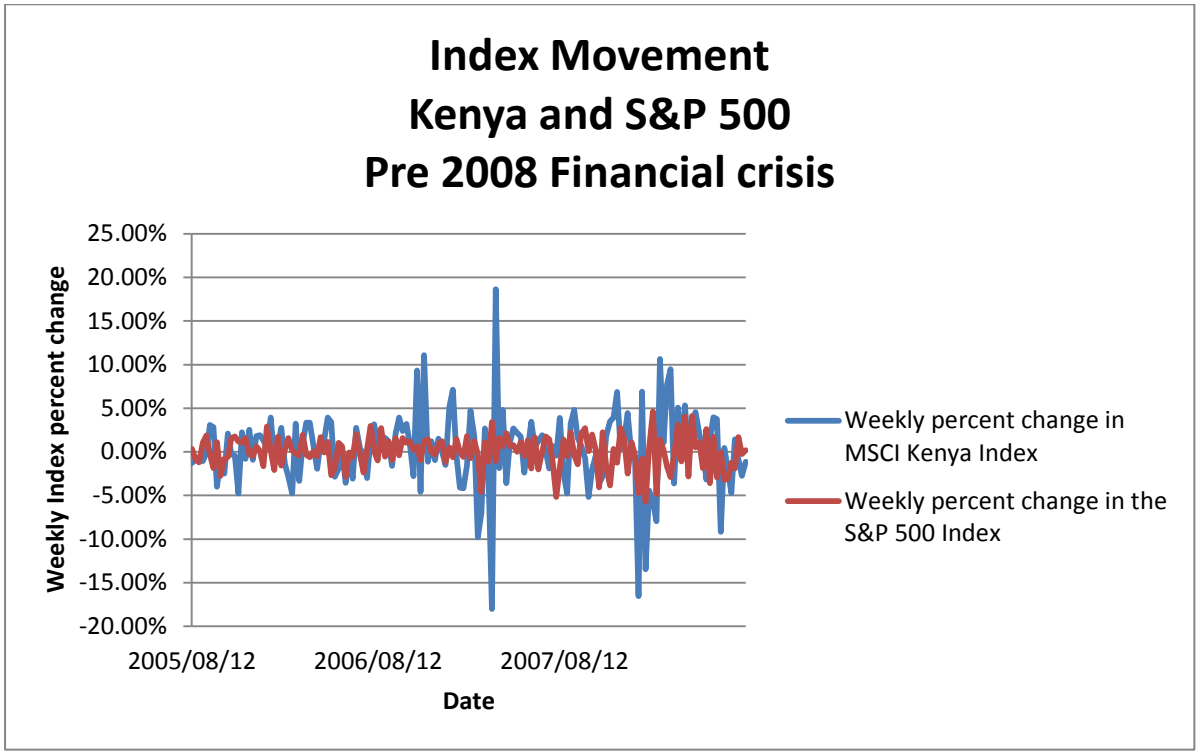


Figure 36: Pre–crisis MSCI Kenya index movement vs. Global market index movement

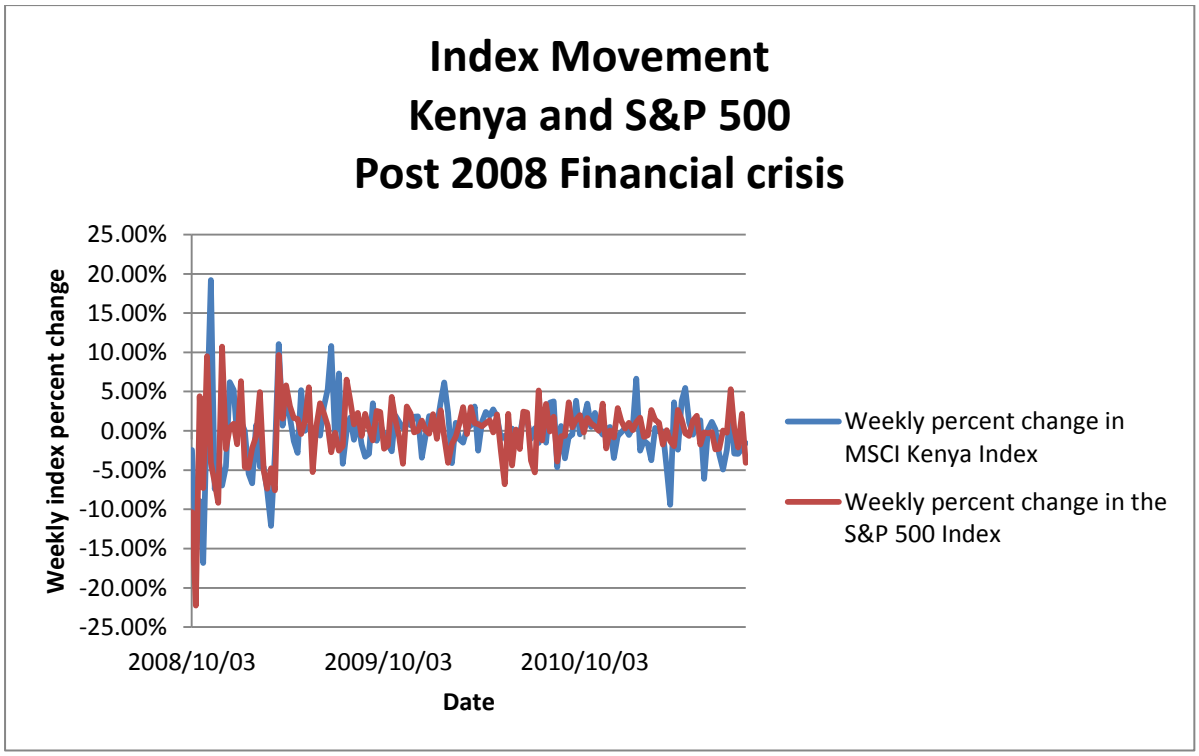


Figure 37: Pre–crisis MSCI Kenya index vs. MSCI Food and Staples index

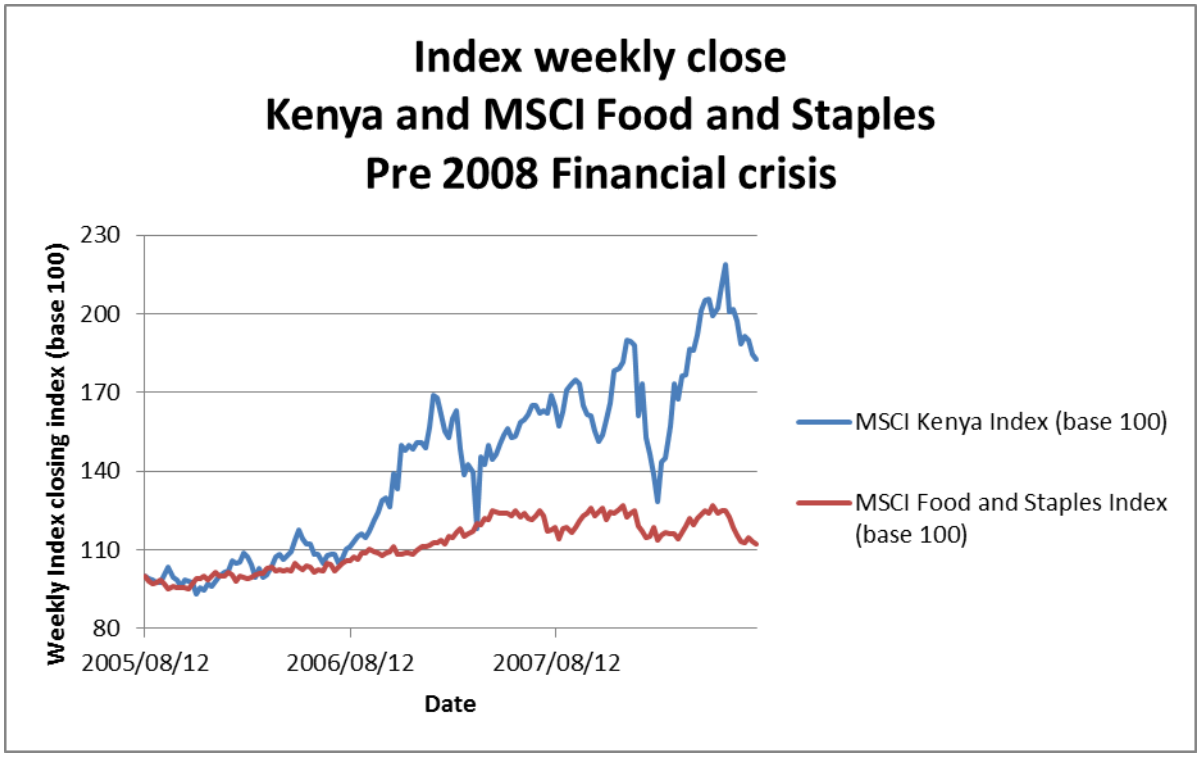


Figure 38: Post–crisis MSCI Kenya index vs. MSCI Food and Staples index

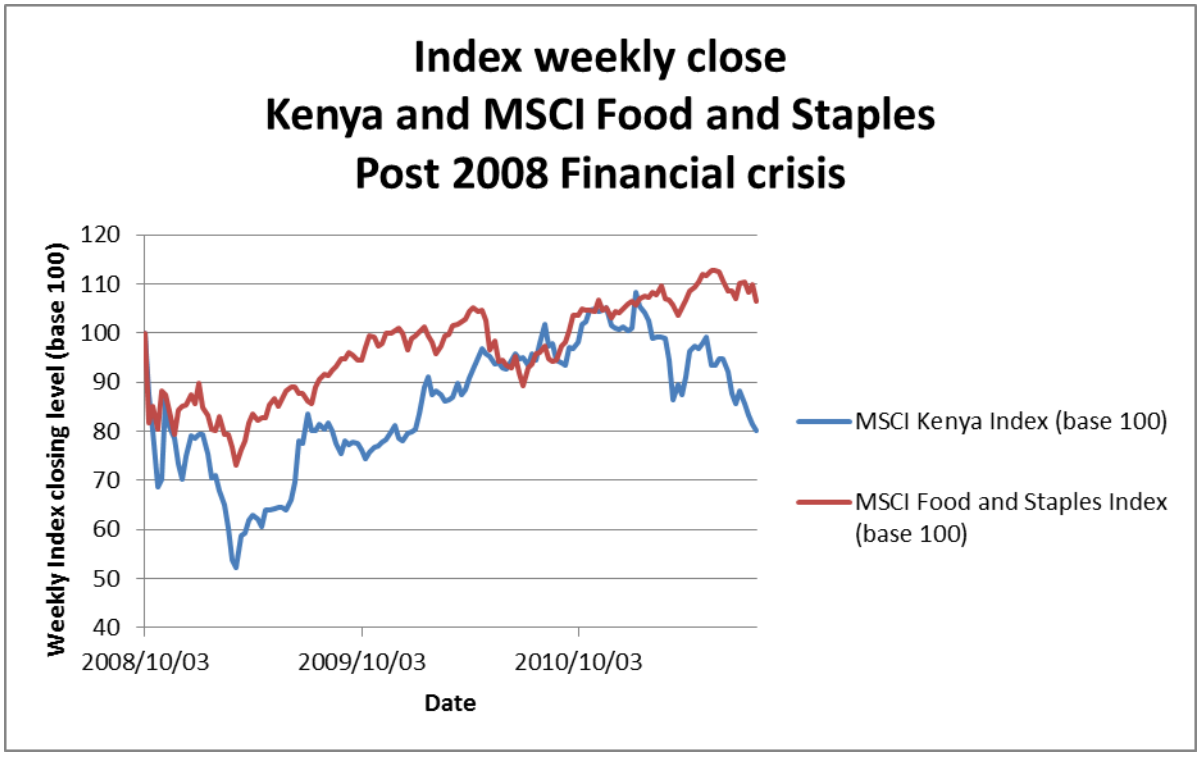


Figure 39: Pre–crisis MSCI Kenya index movement vs. MSCI Food and Staples index movement

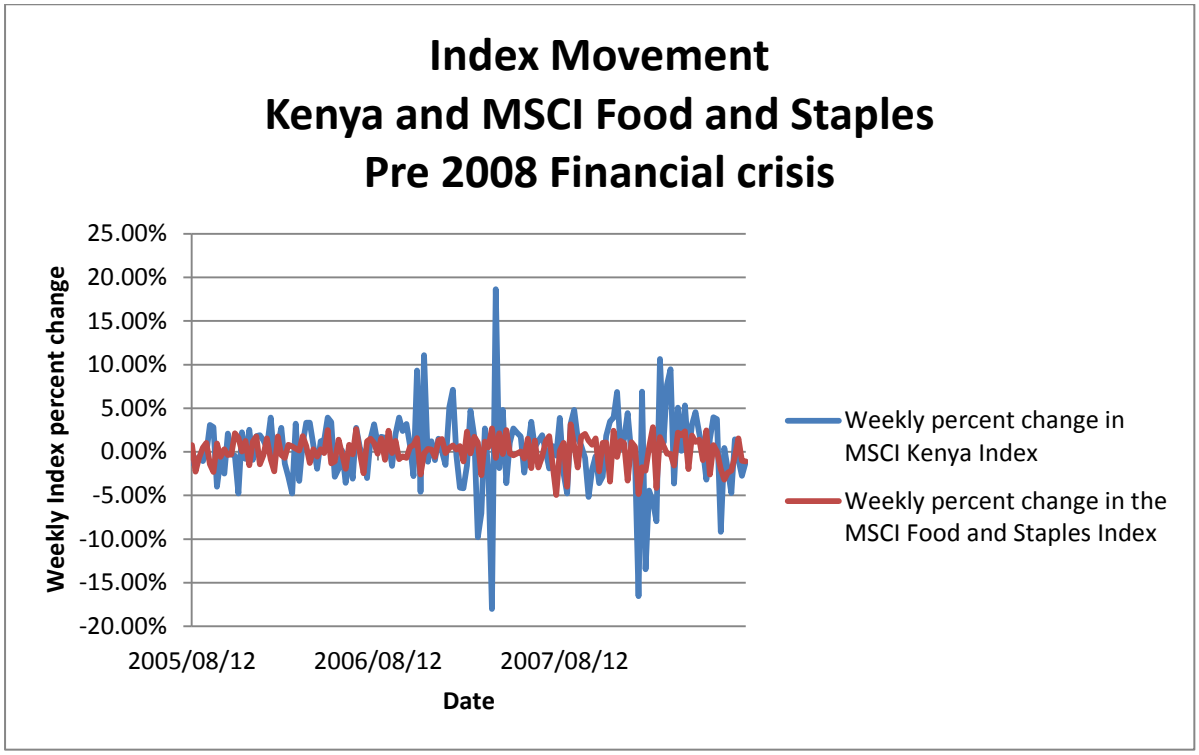
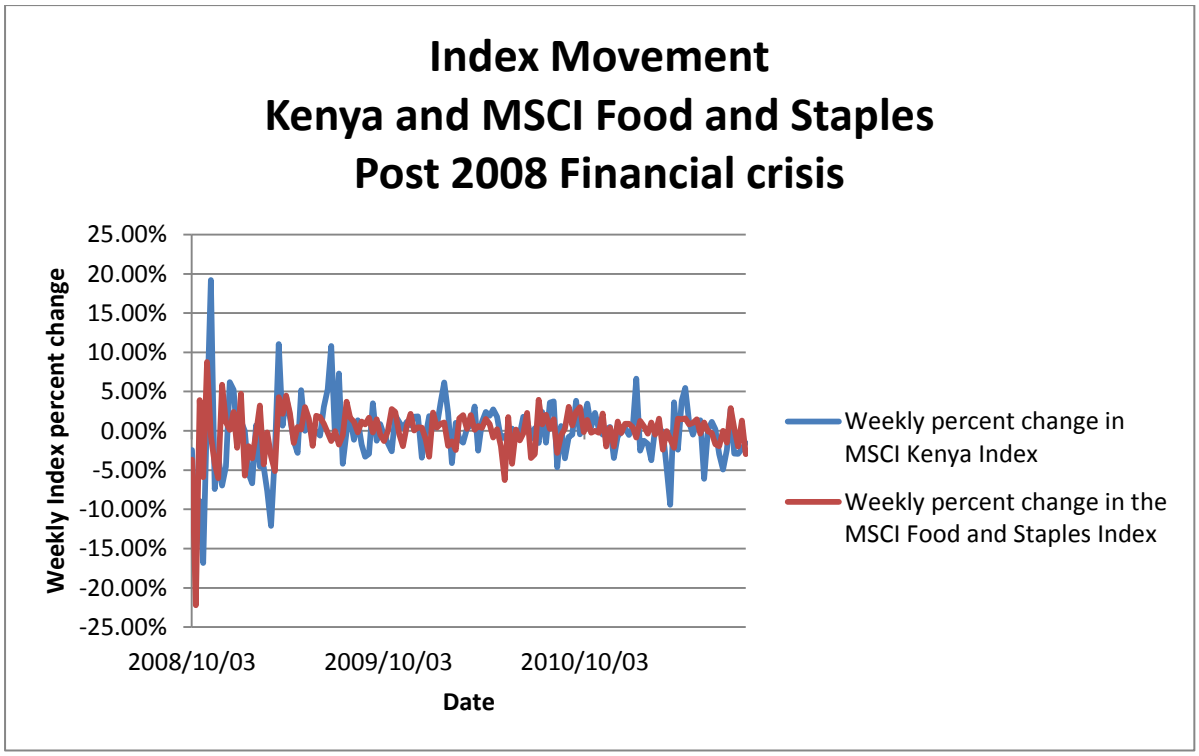


Figure 40: Post–crisis MSCI Kenya index movement vs. MSCI Food and Staples index movement



APPENDIX B

Data

Table 16: Data Source, Starting Date, and Number of Observations for each Series

Country	Source	Start coverage Pre crisis 2008	Number of Observations (Weekly)	Start coverage post crisis 2008	Number of Observations (Weekly)
MSCI Egypt	Bloomberg's	12 August 2005	156	3 October 2008	148
MSCI Kenya	Bloomberg's	12 August 2005	156	3 October 2005	148
MSCI Morocco	Bloomberg's	12 August 2005	156	3 October 2008	148
MSCI Nigeria	Bloomberg's	12 August 2005	156	3 October 2008	148
Top40 Index South Africa	Bloomberg's	12 August 2005	156	3 October 2008	148
United States S&P 500	Bloomberg's	12 August 2005	156	3 October 2008	148
MSCI Gulf Council Countries index (GCC)	Bloomberg's	27 January 2006	131	3 October 2008	148
MSCI Agricultural Index	Bloomberg's	12 August 2005	156	3 October 2008	148
MSCI World Energy Index	Bloomberg's	12 August 2005	156	3 October 2008	148
MSCI EAFE Global Index	Bloomberg's	12 August 2005	156	3 October 2008	148