How integrated are Africa's stock markets with the rest of the world?

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Abstract

This paper addresses integration of African stock markets into the global financial system and the implications for investment decisions and risk sharing. First, we show that African countries are not well integrated with each other. Thus, numerous attempts at regionalism are yet to yield the necessary results. Secondly, we find few cases of long-run relationship between African markets and the rest of the world. Using impulse responses we find that while African markets are not completely isolated from the global financial system, shocks are mainly driven from within.

Key Words: Integration, Diversification, Convergence, Interdependence and African Stock Markets

JEL: C22, C52, G10

1. Introduction

The rapid integration of financial markets over the past three decades has made capital flows across national boundaries easier and faster. This phenomenon, produced by the relaxation of controls on capital movements and foreign exchange transactions, deregulation and elimination of restrictions on banking and securities dealings, and communications and technological changes that have occurred in the world economy, have increased cross-border investment activity and accelerated the flow of resources between national economies. The increasing importance of developing countries in the globalisation process has attracted the attention of fund managers as an opportunity for portfolio diversification, particularly in the light of the introduction of innovative financial products such as American Depository Rights (ADRs) and Country Funds.

Equity market integration plays a crucial role in development. Finance theory suggests that an integrated stock market is more efficient than segmented national capital markets. Asset pricing models also predict that integrated markets tend to respond more to global events than to local factors, although the reverse is also true (see Errunza and Losq, 1985). Evidence by Obstfeld (1995), Bracker et al (1999) and Stulz (1999), among others, shows that, by dismantling investment restrictions, integration allows for international risk sharing, which can affect long-term economic growth by altering resource allocation and savings rates. Bekaert (1995), Bekaert and Harvey (1995, 2000) and Kim and Singal (2000) argue that a higher degree of market segmentation will increase the level of risk, and this will inevitably affect the local cost of capital, with ramifications for company financing and, hence, economic growth[1].

Although a number of papers have investigated the dynamic interdependence of equity markets worldwide, the emphasis has often been on developed economies and the emerging markets of Asia and Latin America. Africa, however, has recently witnessed significant economic and financial development, although its

[1] Admittedly, however, integration may entail significant short-term costs. The stock market crash of 1987, the collapse of the Mexican peso in 1994, and the emerging markets crisis of the late 1990s all suggest that growing interdependence could result in crises spilling over from one country or market to several regions/or markets.

trade and capital flows remain minor by global standards. Additionally, risk perceptions and institutional underdevelopment remain obstacles to increased access to capital markets. Political strife and economic instability has plagued many African countries. Currently Zimbabwe is undergoing an economic meltdown, while unrest in the Niger delta region of Nigeria continues to pose a threat to foreign investments. With the exception of South Africa, no African country has emerged as an economic power. This might partly explain the lack of academic research on the capital markets of Africa.

Since the beginning of the 1990s, a number of developing countries have established organised stock exchanges, partly to satisfy their quest for new capital and to encourage indigenisation, and partly to incorporate elements of market capitalism into their economies[2]. Sub-Saharan Africa has also participated in this trend, with South Africa rising into the ranks of the leading destination of emerging markets and with a number of regional funds specifically targeting the continent. At the behest of national governments, and with donor support, Africa has expanded its domestic stock exchanges from six in the late 1980s to 21 today. The stock markets in Africa present institutional and regulatory circumstances that set them apart from markets in other regions. They are small, highly illiquid, and are mostly not properly regulated. Thus, a substantial amount of research is required to provide a better understanding of the many relevant issues.

This chapter contributes to the literature on global financial integration by investigating the dynamic interdependence of the major equity markets in Africa (South Africa, Egypt, Nigeria and Kenya).

The study is unique for a number of reasons. First, the four countries represent the largest markets on the African continent and have common colonial experience. The markets are working towards a pan-African stock exchange through the African Stock Exchanges Association (ASEA) and integration with the world economy. All markets are open to foreign investments, have implemented free market reforms, and have changed drastically over the past

[2] See Singh (1999), Kim and Singal (2000).

decade. There have been various common policies, such as harmonising trading practices, encouraging cross-border listing of shares, developing computerised trading systems and promoting greater inter and intra regional trade. These efforts, benign as they may be, have important implications for market efficiency, risk diversification and asset allocation.

Second, this paper is unique in the sense that it analyses not only the linkages that exist among African countries, but also those between African markets and the rest of the world. We study both long-run relationships and short-term dynamics. The former is achieved through cointegration. Following Engle and Granger (1987) and Johansen (1991, 1995), cointegration has been widely used to explore long-run relationships between markets. A priori, one would expect that the removal of restrictions on the movement of capital around the world would bring national economies together. Second, theory suggests that, if stock prices are cointegrated, the underlying fundamentals may equally be cointegrated (see Kasa, 1992, and also Engsted and Lund, 1997). Thirdly, geographical proximity, international trade agreements and/or historical ties tend to drive markets together (see Portes and Rey, 2002).

Our results indicate that the average monthly stock return correlation between Africa and the developed countries is 14% (this is similar to the evidence reported by Harvey, 1995); that between Africa and the emerging markets (in Latin America and Asia) is only 13%. Through cointegration analysis, African markets share weak stochastic trends with both the rest of the world and with each other. With the exception of South Africa, the African markets in our sample appear almost completely segmented, and to respond more to local information than global events. These facts suggest that the integration of Africa's markets with the global economy remains at the most rudimentary level. Although African countries have made significant efforts to attract portfolio capital, the response of the international investor community has been less enthusiastic. This, in turn, could be attributed to a myriad of factors: home bias attitude of foreign investors, lack of information on African companies, poor accounting and auditing standards, minimal investor protection and perceptions of excessive risk in African markets. Policy response through the establishment of strong institutional agreements among African equity markets,

policy coordination through the exchange rate mechanism and intensive trade, and other cooperation among national governments is required to remove existing impediments that inhibit the flow of investment funds across the African continent. A strong will towards the ideals of a pan-African stock market would prove useful in the end.

The rest of the paper is organised as follows: we outline the cointegration methodology in section 2. The data and their time series properties are covered in section 3. Section 4 examines the empirical results. The short-run dynamics of our model are presented in section 5.

2. Cointegration

The early literature (for example, Engle and Granger, 1987, and Taylor and Tonks, 1989) argued that the existence of cointegration in a speculative market implies a violation of market efficiency, since information in past prices could be used to improve forecasts of current prices (that is, an error correction mechanism exists). It is now generally accepted that evidence of a cointegrating relationship among stock prices need not imply market inefficiency: if fundamentals are cointegrated, then stock prices will also be cointegrated. Essentially, the Johansen maximum likelihood procedure provides a unified framework for the estimation of multivariate cointegrating systems based on the error correction mechanism of the VAR(k) model with Gaussian errors and its usefulness in the analysis of convergence issues would be described as follows:

Define X_t as a set of I (1) variables consisting of n stock indices. A VAR(k) model, can be expressed as

$$X_t = \mu + A_1 X_{t-1} + A_2 X_{t-2} + ... + A_k X_{t-k} + \varepsilon_t \qquad (1)$$

where A_k is an $n \times n$ coefficient matrix, $t = 1,2,...,T$ and ε_t is a random error term.

Equation (1) may be reformulated into an error correction model as

$$\Delta X_t = \mu + \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \Pi_i X_{t-k} + \varepsilon_t \qquad (2)$$

where Δ is the first difference operator, Γ_i is an $n \times n$ coefficient matrix, defined as $\Gamma_i = -(I - A_1 - ... - A_i)$, which represents the short-run dynamics, and Π is an $n \times n$ matrix defined as $\Pi = -(I - A_1 - ... - A_k)$, where I is an identity

matrix, whose rank determines the number of distinct cointegrating vectors. The usefulness of this methodology in the current analysis essentially comes down to determining the rank of the matrix Π. If Π has rank r, then there are r cointegrating relationships between the X_t or $n-r$ common stochastic trends. The number of cointegrating vectors reveals the extent of integration across stock markets. If $n-r=0 \ (r=n)$(full rank), we have the absence of any stochastic trends, with all elements in X_t being stationary $[I(0)]$ and cointegration is not defined. If $n-r=n \ (r=0)$there are no stationary long-run relationships among the elements of X_t. This latter statement has implications for diversification across international equity markets, since a common trend implies relatively high cross-market correlation, thereby diluting any potential diversification benefit over the long-run. Reduced rank $(n>n-r>0)$ implies the existence of at least one common stochastic trend, and there will then exist $n\times r$ matrices α and β such that $\Pi=\alpha\beta'$. The β matrix gives the cointegrating vectors, while α gives the amount of each cointegrating vector entering each equation of the VECM, also known as the adjustment matrix. A finding of reduced rank would imply that, while long-run integration is not complete, the convergence process is underway, with the number of independent stochastic trends reflecting the extent of this convergence and any diversification and institutional issues arising from this.

The main advantage of Johansen's vector autoregressive estimation procedure is, however, in the testing and estimation of the multiple long-run equilibrium relationships. In addition, the testing of various economic hypotheses via linear restrictions in the cointegration space is possible when using Johansen's estimation method (e.g., Johansen and Juselius, 1990).

3. The Data and their Time Series Properties

The sample is made up of four African stock markets, which satisfy the definition of 'emerging market' (South Africa, Egypt, Nigeria and Kenya)[3]; first

[3] The Standards and Poor's Emerging Market Database classifies a stock market as 'emerging' if (i) it is located in a low or middle income economy (which, according to the World Bank high income economies, are those with Gross National Income (GNI) greater than $9,386 as of 2003) ;(ii) its investable market capitalisation is low relative to its most recent GNI figures, see S&P

the data in these countries is well reported and readily available. Second, these four countries represent the largest stock markets and could proxy for stock market movements in the rest of the African continent. We have two Latin American countries (Brazil and Mexico); one Asian economy (India) and three industrialized economies (United States, Japan and the United Kingdom). The data consist of monthly closing prices for all countries from January 1997 to February 2006. The data for Brazil, Mexico, India, Egypt and South Africa is the Morgan Stanley Capital International (MSCI) Index, computed based on market performance in global emerging markets.

The MSCI is designed to be directly comparable across national exchanges and is compiled on a value-weighted basis for freely investable shares. For Kenya and Nigeria, the MSCI is unavailable, so we utilise the Standards and Poor (S&P) and International Finance Corporation Global Indices (IFCG). The present coverage of the IFCG Index exceeds 75% of total market capitalisation, drawing on stocks in order of their liquidity. For the developed countries, we used the widely available stock indices, i.e., FTSE100 for UK, S&P 500 for US and Nikkei 225 for Japan. All the data are reported in US dollars. Calculating the returns in US dollars eliminates location inflation and thus makes the results more comparable. It also eliminates exchange rate risk and other trading costs associated with investing in developing economies, which may be overlooked when using local currency returns. Monthly data is used to circumvent the problem of non-synchronous trading, so common in emerging markets, and to avoid the possible effects of 'autocorrelation in volatility', a feature of high frequency data such as daily or weekly prices. All the indices were obtained from DataStream. Figure 3.1 presents each of the stock market series in their natural logarithm form. The exchanges of the three developed markets (UK, US and Japan) are the most advanced stock markets in the world and tend to move in response to events within the global economy. One can see the impact of the 2000 dotcom bubble on the three indices around 2000/2001, as shown in Figure 3.1. Mexico, South Africa, India and Brazil experienced a downward spike in their indices around 1998, with varying degrees of intensity.

(2005 p. 70). This definition effectively puts all the African, Asian and Latin American markets in our sample into the category of emerging market economies.

Egypt, Kenya and Nigeria appear to follow similar trends. After initial low values, the Egyptian and Kenyan indices began an upward trend in late 2003; Nigeria from 2001. In general, the trend in all markets seems to be upward after 2004.

Table 1 presents key valuation measures for the markets examined in this paper. These include market capitalisation, turn over ratio, dividend yields and price/earning ratios. The table shows that, using annual trading value and stock market capitalisation, the African countries (except South Africa) perform the worst. For instance, the turn over ratio for Kenya, Nigeria and Egypt in 2004 was 8.2%, 13.7% and 17.3% respectively. While these are comparable to India (10.3%), they are far less than their Latin American counterparts are: Mexico (29%) and Brazil (34.9%). South Africa is an exception, with a turn over ratio surpassed only by the developed economies. In terms of market capitalisation, outside South Africa, African markets are small compared to their counterparts in Asia and Latin America (see column 4).

Interestingly, Table 1 reveals that, ranked in terms of key valuation parameters, such as dividend yields, price-earning ratios and price-book value ratios, African markets compare very well with their counterparts elsewhere. With the exception of Kenya, the evidence in Table 1 (last column) indicates positive returns on all indices in 2004. Price/earning ratios for Nigeria (23.5%) and Egypt (21.8%) exceed those of Brazil, Mexico, and the developed markets (except Japan). Dividend yields have also been higher for African markets as of 2004.

Figure 1: Logarithms of Monthly Stock Prices

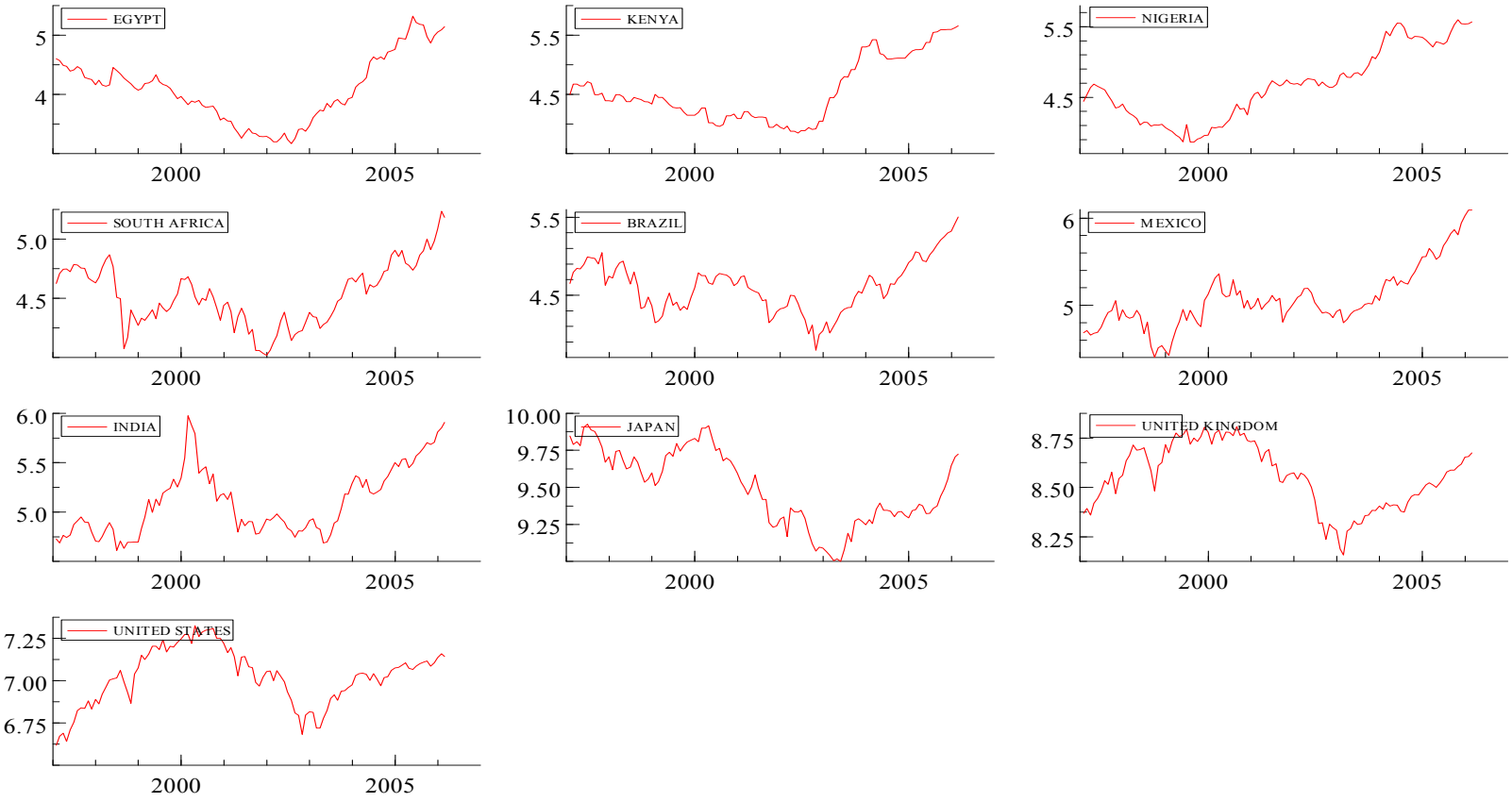


Table 1: Comparative Valuation

	Number of Companies		Turnover Ratio		Capitalisation (million$)		P/ E Ratio		P/B V Ratio		Dividend Yield		Change in Index (%)	
	1995	**2004**	**1995**	**2004**	**1995**	**2004**	**1995**	**2004**	**1995**	**2004**	**1995**	**2004**	**1995**	**2004**
Kenya	56	47	2.8	8.2	1886	3891	-	19	-	3.4	-	4.9	-	-10
Nigeria	181	207	0.8	13.7	2033	14464	12.5	23.5	3.6	3.2	5.6	3.7	-20.9	27.6
Egypt	746	792	10.9	17.3	8088	38515	-	21.8	-	4.4	-	1.5	-	114.0
S. Africa	640	403	6.5	47.4	28052	455536	18.8	16.2	2.5	2.5	2.3	3.1	17.8	55.9
Brazil	543	357	47.9	34.9	147636	330347	20.6	10.6	0.5	2.0	3.8	4.1	-18.6	40.3
Mexico	185	152	33.0	29.4	90,649	171940	26.7	15.5	1.8	2.5	1.1	1.8	-26.0	51.4
India	5553	4730	16.1	10.3	266443	387851	18.0	18.9	4.0	3.7	1.7	1.6	-2.2	8.9
Japan	2263	3220	33.3	105.1	3667292	3678262	139.1	29.2	2.3	1.6	0.7	1.1	-1.0	16.9
UK	2078	2486	39.0	142.2	1407737	2815928	16.0	23.8	2.4	2.3	4.2	3.1	23.2	21.3
US	7671	5231	85.7	126.6	6857622	16323726	18.7	20.7	2.9	3.0	2.3	1.9	37.0	12.5

Source: S&P (2005) Global Stock Market Factbook. P/E is price-earning ratio; P/B V is the price to book value ratio. For the developed markets these are calculated using S&P Citigroup Index while for the emerging markets, the S&P/IFCG index is used.

In addition to Table 1, since 1995 African stock indices have gained about 40%, with the value of stocks on the Nigerian stock market registering over a 100% increase in dollar terms. These facts indicate that investing in developing countries could provide high returns and thus aid in portfolio diversification, an issue we shall turn to shortly. Table 2 present summary statistics of the markets.

Table 2: Summary Statistics of Stock Returns: July 1997 to February 2006

	EGYPT	KENYA	NIGERIA	S.AFRICA	BRAZIL	MEXICO	INDIA	JAPAN	UK	US
Mean	0.005	0.013	0.012	0.003	0.007	0.012	0.011	-0.001	0.003	0.005
Maximum	0.297	0.228	0.243	0.233	0.204	0.301	0.426	0.195	0.128	0.173
Minimum	-0.198	-0.249	-0.248	-0.422	-0.417	-0.280	-0.401	-0.158	-0.119	-0.114
Std. Dev.	0.086	0.079	0.073	0.089	0.112	0.098	0.102	0.060	0.044	0.047
Skewness	0.738	0.061	0.239	-1.195	-1.145	-0.679	-0.407	0.295	-0.308	0.093
Kurtosis	3.88	4.93	4.26	6.72	4.67	3.99	6.73	3.35	3.61	3.79
JB	13.42**	18.38**	8.92**	94.4**	36.4	12.8**	66.4**	2.33	3.67	3.267
Prob	0.001	0.000	0.0115	0.000	0.000	0.001	0.000	0.3118	0.1592	0.195

The evidence from Table 2 shows that mean monthly returns during the sample period have been high for the emerging economies. The emerging process is

always accompanied by high returns. Overall, mean monthly returns are highest for Nigeria, Kenya, India and Mexico. The average monthly return for these countries is estimated to be 1.2%. This is higher than the corresponding average for the three developed economies (0.23%) over the same period. This finding indicates that holding the four emerging markets stocks over the period July 1997 to February 2006 paid returns of 97%, higher than the developed countries in our sample. However, Table 2 also indicates that emerging markets are relatively risky (for instance, they carry additional political, economic and currency risks). The standard deviation, which is a crude measure of risk, is highest for Brazil and lowest for UK. For the four emerging markets with the highest mean, the average standard deviation is 0.07, while that of the three advanced economies is estimated to be 0.05. An investor in emerging markets should therefore be willing to accept volatile returns, i.e., there is a chance for large profits at the risk of large losses.

The return distribution of the developing African and Asian countries is leptokurtic, with too many large returns to be consistent with a normal distribution. However, as the Jacque–Bera (J.B) statistics show, the return characteristics of the developed markets in Table 2 show less extreme behaviour.

3.1. Africa's Correlations with the World

One of the benefits of investing in emerging markets is that the security returns in these markets are not highly correlated with the returns of the developed markets (see Harvey, 1995). Therefore, adding emerging market securities to portfolios containing only securities from developed markets can reduce overall portfolio risk, even though securities from emerging markets are characterised by higher expected risk than developed markets. To address this we calculate the return correlations between each of the markets in our sample (see Table 3). Table 3 divides the sample into two. Table 3a shows the return correlations for the entire sample July 1997 to February 2006. The rationale for dividing the sample is two fold: first, to see whether the correlations between each pair of markets have changed over the ten year period and, second, to take into account any breaks in the series that could have occurred over the period.

Table 3a: Contemporaneous Correlations— July1997 to February 2006

	EGYPT	KENYA	NIGERIA	S. AFRICA	BRAZIL	MEXICO	INDIA	JAPAN	UK	US
EGYPT	1.000									
KENYA	0.830	1.000								
NIGERIA	0.267	0.555	1.000							
SAFRICA	0.802	0.733	0.330	1.000						
BRAZIL	0.688	0.567	0.246	0.869	1.000					
MEXICO	0.253	0.343	0.631	0.462	0.499	1.000				
INDIA	0.361	0.349	0.310	0.523	0.489	0.815	1.000			
JAPAN	0.298	-0.047	-0.612	0.361	0.473	-0.158	0.135	1.000		
UK	-0.049	-0.325	-0.632	0.002	0.211	0.038	0.299	0.685	1.000	
US	0.041	-0.106	-0.268	0.094	0.229	0.421	0.675	0.407	0.833	1.000

Table 3b Contemporaneous Correlations — July 1997 to February 2000

	EGYPT	KENYA	NIGERIA	SAFRICA	BRAZIL	MEXICO	INDIA	JAPAN	UK	US
EGYPT	1.000									
KENYA	0.821	1.000								
NIGERIA	0.337	0.428	1.000							
SAFRICA	0.338	0.402	0.591	1.000						
BRAZIL	0.277	0.369	0.739	0.844	1.000					
MEXICO	-0.589	-0.619	-0.039	0.259	0.307	1.000				
INDIA	-0.668	-0.678	-0.347	-0.030	-0.068	0.788	1.000			
JAPAN	0.127	0.071	0.182	0.548	0.480	0.400	0.426	1.000		
UK	-0.731	-0.802	-0.588	-0.354	-0.413	0.574	0.747	-0.038	1.000	
US	-0.849	-0.892	-0.541	-0.415	-0.336	0.655	0.792	-0.031	0.878	1.000

Table 3c Contemporaneous Correlations —March 2000 to February 2006

	EGYPT	KENYA	NIGERIA	SAFRICA	BRAZIL	MEXICO	INDIA	JAPAN	UK	US
EGYPT	1.000									
KENYA	0.924	1.000								
NIGERIA	0.821	0.833	1.000							
SAFRICA	0.910	0.896	0.811	1.000						
BRAZIL	0.774	0.798	0.654	0.865	1.000					
MEXICO	0.740	0.739	0.749	0.828	0.913	1.000				
INDIA	0.813	0.822	0.739	0.877	0.925	0.920	1.000			
JAPAN	0.310	0.358	0.260	0.473	0.728	0.667	0.585	1.000		
UK	0.103	0.172	0.000	0.221	0.601	0.506	0.432	0.801	1.000	
US	0.403	0.451	0.263	0.513	0.810	0.721	0.691	0.876	0.867	1.000

For instance, the decade under investigation witnessed the Far East financial crisis (following the speculative attack on the Thai baht in 1997). By 1998 the

contagion had spread to other emerging markets, such as Brazil and South Africa, with attendant depreciation of their currencies and dips in stock prices (see Figure 1 for evidence); hence the choice of the first sub-sample from July 1997 to February 2000. The second event is the dot com bubble in early 2000, mainly in developed countries. Given the links that exist between nations through trade, technology transfer and other forms of mutual agreements, these events are expected to have an impact on the extent to which countries interact through trade networks and technology diffusion; thus the second sub-sample from March 2000 to February 2006.

The returns of African markets show varying degrees of correlation with each other and with the emerging and developed markets. The return correlation between the markets was weaker during the period July 1997 to February 2000 than from March 2000 to February 2006. Table 3b shows that the returns from African markets typically had low or negative correlations with US and UK stock returns. During this period, Egypt had a return correlation of 0.13 with Japan, and was negatively correlated with the UK and US. Negative correlations with the developed and other emerging markets also appear for Kenya, Nigeria and South Africa. During the period March 2000 to February 2006 (Table 3c), the correlations between each pair of markets have been positive throughout. Several major changes occurred over time between each pair of markets. For example, as Table 3c shows, the correlation between the Egyptian market and the S&P index is 0.4, compared to -0.85 in Table 3b. This indicates that the Egyptian market has become more related to the US market, probably because of market reforms taking root during this period. The change from negative to positive correlation in Table 3c shows how volatile the relationship of emerging markets to developed markets can be.

For the entire sample (Table 3a), the average correlation among African stock markets is 0.58. This compares favourably with the average correlation of the three developed markets of 0.64, and emerging India and Latin America of 0.6. Thus, we observe quite strong correlations between African markets during the period July 1997 to February 2006. This is particularly the case for South Africa, Egypt and Kenya, which are strongly correlated. These correlations appear quite close to their counterparts in developed and emerging markets.

However, when one compares Africa and the rest of the world, a different picture emerges. The average return correlation between Africa and the developed countries is 0.14, while that between Africa and emerging India and the Latin American markets is only 0.13. On a pair wise basis, African markets show weak correlations with each other.

While the correlation coefficients presented in Table 3 provide some preliminary insight into the interdependence of the markets examined, it must be emphasized that these are static measures and, as such, do not reflect the dynamic relationships between the markets.

4. Stationarity and Cointegration

The empirical investigation of the relationship between African equity markets and the rest of the world begins with testing for the presence of unit roots. Three unit roots test are employed: ADF, PP and Breitung. The results suggest that all prices are I (1), evidence consistent with Figure 1(results available upon request). Thus, cointegration analysis is a valid method of exploring the stochastic trends in the system, or any pair of the series. The evidence here is based on the Johansen (1991, 1995) cointegration test to investigate the degree of linkage among the ten markets.

Intuitively, if financial markets share a common trend, then there should be no long-term gains to international diversification. We consider all African countries as a system; Africa and emerging markets as another system, and lastly Africa and the developed markets. The intuition is straightforward: we wish to examine how integrated African stock markets are with each other (regional integration), and to assess the trends between African markets and the rest of the world (global integration). The lag length was determined by Schwartz (SIC) and Akaike (AIC) Information Criterion using 10 lags in the general VAR model. The objective is to choose the number of parameters, which minimizes the value of the information criteria. The SIC has the tendency to underestimate the lag order, while adding more lags increases the penalty for the loss of degrees of freedom. However, since we are interested in making sure that there is no remaining autocorrelation in the VAR model, we shall adopt

the AIC (column 10 of Table 4 shows the lag length selected. Detailed results available on request).

Having selected the appropriate lags, we apply the Johansen cointegration approach. The coefficient for the deterministic trend in our data is restricted to zero. An intercept and no trend are specified for the cointegrating equation. We report the trace and max test statistics and their corresponding p-values from Doornik (1998) for the null and alternative hypothesis in Table 4 and 5.

The null hypothesis r=0 gives a trace statistic of 73.24 for African countries, which is significant at the 1% level. The max statistics has a value of 44.26, which also corresponds to the 1% level of significance. Using the small sample corrections the trace and max statistic are still significant at the 5% and 1% levels respectively.

The evidence for African and emerging markets indicates seven cointegrating vectors. With the AIC selecting, a lag length of 10 we find strong evidence of cointegration between African and emerging markets. However, applying the small sample corrections, the hypothesis that r=0 cannot be rejected using the trace and max test statistics.

The results presented in the last panel of Table 4 suggest that African and developed countries appear to have seven cointegrating relationships. However, the small sample corrections indicate just one cointegrating vector.

Table 4: Multivariate Johansen test

Rank	Trace test	[Prob]	Max test	[Prob]	Trace test	(T-nm)	Max test	(T-nm)	LAGS	LM (q)
Africa										
0	73.24	[0.006]**	44.26	[0.000]***	64.45	[0.043]**	38.95	[0.004]***	2	1.177[0.242]
1	28.97	[0.569]	15.09	[0.637]	25.49	[0.764]	13.28	[0.783]		
2	13.88	[0.671]	9.72	[0.655]	12.22	[0.796]	8.56	[0.768]		
3	4.16	[0.720]	4.16	[0.721]	3.66	[0.786]	3.66	[0.788]		
Africa/Emerging										
0	405.42	[0.000]***	109.11	[0.000]***	121.62	[0.636]	32.73	[0.831]	10	0.987[0.523]
1	296.31	[0.000]***	82.59	[0.000]***	88.89	[0.737]	24.78	[0.932]		
2	213.72	[0.000]***	69.28	[0.000]***	64.12	[0.730]	20.78	[0.904]		
3	144.45	[0.000]***	49.74	[0.000]***	43.33	[0.722]	14.92	[0.940]		
4	94.71	[0.000]***	45.58	[0.000]***	28.41	[0.602]	13.67	[0.753]		
5	49.13	[0.000]***	33.67	[0.000]***	14.74	[0.603]	10.1	[0.616]		
6	15.46	[0.014]**	15.46	[0.014]**	4.64	[0.654]	4.64	[0.655]		
Africa/Developed										
0	438.19	[0.000]***	157.66	[0.000]***	131.46	[0.076]*	47.3	[0.043]**	10	0.857[0.756]
1	280.53	[0.000]***	102.14	[0.000]***	84.16	[0.478]	30.64	[0.454]		
2	178.39	[0.000]***	77.23	[0.000]***	53.52	[0.741]	23.17	[0.597]		
3	101.16	[0.000]***	40.6	[0.000]***	30.35	[0.897]	12.18	[0.946]		
4	60.55	[0.000]***	35.77	[0.000]***	18.17	[0.828]	10.73	[0.772]		
5	24.78	[0.010]***	13.21	[0.128]	7.43	[0.863]	3.96	[0.948]		
6	11.57	[0.016]**	11.57	[0.016]**	3.47	[0.508]	3.47	[0.507]		

Note: *p*-values are based on Doornik (1998); *, **, *** denotes significance of the test statistic at the 10%, 5% and 1% level respectively. LM (q) denotes the Lagrange Multiplier Godfrey tests for residual autocorrelation of order q. (T-nm) are the small sample corrections.

It is evident from Table 4 that the Johansen test is susceptible to small sample bias. In a Monte Carlo study, Cheung and Lai (1993) find that, in small samples, the Johansen tests are biased more often than what asymptotic theory suggests. In a simulation study, Godbout and van Norden (1997) find considerable size distortions in the Johansen test for cointegration, especially in VAR models with many lagged variables. Our results suggest that the lag length of 10 for African/Emerging markets, and Africa/developed markets may affect the empirical distribution of the test statistics. To this end, we concentrate on the results based on the small sample corrections.

The results from Table 4 suggest that there are no independent linear combinations of the vector of stock price series, X_t, that are stationary for the set of African and emerging countries that we examine during the period 1997 to 2006. Concerning African markets and their developed counterparts, one stochastic trend in a system of seven countries is found for the entire sample. There is one cointegrating vector binding the African countries in our sample.

We use the evidence presented in Table 4 to address whether market convergence is occurring between Africa and the rest of the world. Further, we also address the issue of portfolio diversification within the cointegration literature. In developing stochastic definitions of convergence and common trends based on cointegration analysis, Bernard (1991) argues that a necessary (but not sufficient) condition for multi-country convergence is that there are n-1 cointegrating vectors for n countries. For time series data, this notion of convergence requires that, the expected difference between the series become arbitrarily small (or converges on some constant as time elapses. In the case of integrated series, stochastic convergence can be defined in terms of the differences between the series being of a lower order of integration than the original series). Clearly, from Table 4, this condition fails to hold for our sample. From these results, we can argue that there is some transmission of stock market shocks across the countries, but the rate of stock market performance has not been equalised through time.

A potential problem in interpreting the results presented in Tables 4 is that we cannot isolate the impact of cointegration on the various pairs of countries in our sample. We therefore investigate the issue on a pair-wise basis. With 10 countries in our sample, there can be 45 pairings. However, our interest is in the trends that exist between African countries and the emerging Asian and Latin American countries, and the developed markets. To this end, we present 30 pairings in Table 5.

Table 5: Bivariate Johansen Test

	Trace test	[Prob]	Trace test	[Prob]	Max test	[Prob]				
	H0:rank<0		H0:rank<1		H0:rank<0		H0:rank<1		LAGS	LM (q)
South Africa/Egypt	29.51	[0.015]**	7.49	[0.305]	22.02	[0.017]**	7.49	[0.306]	4	0.288 [0.96]
South Africa/Kenya	18.79	[0.300]	7.25	[0.329]	11.54	[0.472]	7.25	[0.330]	2	0.288 [0.96]
South Africa/Nigeria	17.45	[0.390]	3.58	[0.796]	13.87	[0.273]	3.58	[0.798]	2	1.274 [0.259]
South Africa/Brazil	19.78	[0.242]	8.27	[0.238]	11.51	[0.474]	8.27	[0.238]	2	1.354[0.219]
South Africa/Mexico	11.89	[0.817]	4.38	[0.689]	7.51	[0.855]	4.38	[0.690]	3	0.666 [0.721]
South Africa/India	7.93	[0.827]	1.26	[0.900]	6.67	[0.712]	1.26	[0.899]	2	0.433 [0.896]
South Africa/Japan	14.09	[0.655]	3.77	[0.772]	10.32	[0.594]	3.77	[0.774]	2	0.727 [0.667]
South Africa/UK	26.34	[0.042]**	6.58	[0.401]	19.76	[0.041]**	6.58	[0.402]	2	1.125 [0.349]
South Africa/US	16.73	[0.444]	4.11	[0.726]	12.61	[0.372]	4.11	[0.727]	3	0.920 [0.501]
Egypt/Kenya	22.33	[0.130]	7.85	[0.272]	14.49	[0.230]	7.85	[0.273]	2	0.878 [0.535]
Egypt/Nigeria	26.5	[0.040]**	8.06	[0.254]	18.44	[0.066]*	8.06	[0.254]	3	0.727 [0.667]
Egypt/Brazil	21.96	[0.143]	3.03	[0.862]	18.93	[0.056]*	3.03	[0.863]	2	1.559 [0.140]
Egypt/Mexico	18.62	[0.310]	2.13	[0.945]	16.48	[0.127]	2.13	[0.946]	2	1.432 [0.185]
Egypt/India	19	[0.287]	3.71	[0.779]	15.29	[0.183]	3.71	[0.781]	3	0.685 [0.704]
Egypt/Japan	19.24	[0.273]	4.2	[0.714]	15.04	[0.197]	4.2	[0.716]	2	1.379 [0.208]
Egypt/UK	25.61	[0.052]*	7.96	[0.263]	17.65	[0.087]*	7.96	[0.263]	2	1.638 [0.116]
Egypt/US	23.24	[0.102]	8.7	[0.205]	14.54	[0.227]	8.7	[0.205]	2	1.075 [0.382]
Kenya/Nigeria	18.35	[0.328]	2.12	[0.946]	16.23	[0.138]	2.12	[0.947]	2	1.031 [0.414]
Kenya/Japan	21.22	[0.172]	8.48	[0.221]	12.74	[0.361]	8.48	[0.221]	2	1.0576 [0.395]
Kenya/UK	26.52	[0.039]**	9.09	[0.179]	17.43	[0.094]*	9.09	[0.179]	2	0.360 [0.939]
Kenya/US	24.81	[0.066]*	9.09	[0.179]	15.72	[0.161]	9.09	[0.179]	4	0.751 [0.645]
Kenya/Brazil	18.02	[0.350]	3.71	[0.780]	14.31	[0.242]	3.71	[0.782]	3	1.603 [0.126]
Kenya/India	15.96	[0.504]	3.95	[0.748]	12.01	[0.427]	3.95	[0.749]	2	1.306 [0.242]
Kenya/Mexico	20.09	[0.225]	3.25	[0.836]	16.84	[0.114]	3.25	[0.838]	2	0.805 [0.598]
Nigeria/Japan	15.47	[0.543]	2.01	[0.954]	13.45	[0.303]	2.01	[0.955]	2	0.391 [0.923]
Nigeria/UK	15.62	[0.531]	2.74	[0.893]	12.88	[0.349]	2.74	[0.894]	2	0.507 [0.849]
Nigeria/US	17.17	[0.410]	4.58	[0.662]	12.6	[0.374]	4.58	[0.664]	2	0.912 [0.502]
Nigeria/Brazil	6.97	[0.893]	2.29	[0.720]	4.68	[0.903]	2.29	[0.719]	5	1.449 [0.179]
Nigeria/India	22.46	[0.126]	4.89	[0.618]	17.57	[0.089]*	4.89	[0.619]	3	1.192 [0.306]
Nigeria/Mexico	18.73	[0.303]	2.5	[0.916]	16.22	[0.138]	2.5	[0.917]	2	0.482 [0.867]

Note: p-values are based on Doornik (1998); *, **, *** denotes significance of the test statistic at the 10%, 5% and 1% level respectively. LM (q) denotes the Lagrange Multiplier Godfrey test for residual autocorrelation of order q.

The evidence from Table 5 fails to reject the null hypothesis of no cointegration for the vast majority of the pairings. Out of 30 pairings, 22 pairs are non-cointegrated. The max test is not rejected marginally for the following pairs: Egypt/Brazil, Nigeria/India and Kenya/US. However, we cannot reject the existence of long-run relations between the following pairs at the 5% level using the trace test: South Africa/Egypt, South Africa/UK, Nigeria/Egypt, and Kenya/UK.

The most interesting finding from Table 5 is that none of the African countries shares common trends with Mexico and Japan. There appear to be strong links between African markets and the UK, rather than with the US. This might be due to historical links and colonial ties with the former.

4.1. Implications for Regional and Global Integration

The cointegration test results can be used to address the issue of whether regional integration is occurring, and/or whether African countries are integrated globally. The evidence from Table 4 indicates that African markets are not integrated regionally. The evidence of a single stochastic trend suggests that the pace of integration is slow and at best driven only by the bigger markets. Thus, even in an economic sense, integration may be occurring but is not yet complete. It is tempting to conclude that geographical proximity is neither a necessary nor a sufficient condition for African stock markets to be integrated. This would further suggest that efforts at integrating African stock markets remain largely futile to date.

Globally, the evidence suggests that African markets remain segmented. As shown in Table 4, the rate of convergence between Africa and the developed markets has not equalized over time. The significant relationships that exist seem to be driven largely by South Africa and Egypt. The fundamental question is why is it that foreign investors shy away from the emerging markets in Africa? One may argue that foreign investors are not responding rationally to the continent's investment opportunities because of some hurdle: home bias or other concerns, such as lack of information on companies, poor auditing and accounting standards, minimal degree of investor protection and emerging markets specific risks (political, currency or macroeconomic policy risks, see Bekaert, 1995), systematically discourage investors from bringing their capital into Africa.

Second, one can also argue that liquidity or market size present an entry barrier to African markets. This is more compelling given that, with the exception of South Africa and Egypt, African markets are small compared to their emerging counterparts elsewhere. Evidence indicates that alternative routes to African

markets through American Drawing Rights (ADRs) and country funds are sometimes non-existent. A glance through the 94 global emerging market funds for which data are available shows that they all invest in South Africa, but almost none invest elsewhere on the continent (see Moss et al, 2007).

4.2. Implications for Portfolio Diversification

The lack of strong links among African markets, and between African markets and their counterparts in developed economies and Latin America and Asia, present an opportunity for portfolio diversification. With the exception of South Africa/Egypt and Nigeria/Egypt (Table 5), none of the African pairs is cointegrated. The practical implication for investors on the continent of Africa is that they can gain by holding portfolios from different countries. For instance, our results suggest the possibility of Kenyan investors being able to reduce portfolio risk by investing in South Africa, Nigeria or Egypt. For the international investor, the evidence shows that including African assets in a portfolio should significantly reduce risk. This is particularly useful in the context of the earlier finding of negative or low correlation between African markets and the developed countries (see Table 3). Not only are there low and sometimes negative correlations, but also African markets have shown increasing good performance compared to their counterparts in Asia and Latin America (Table 1).

The lack of long-run relationships between the African countries and the other emerging markets could also indicate that there are fewer spillovers of crises from emerging countries to Africa. This is instructive because, during the South Asia financial crisis in 1997/98, only South Africa suffered from the contagion (see Kamin, 1999).

To throw more light on the results in Table 4, we carried out recursive estimation. Recursive estimation provides a valuable tool for assessing constancy in the cointegrated models. The left hand side graphs of Figure 2A show the linear combinations $\hat{\beta}'X_t$, the next four graphs on the right hand side plot the long-run fitted and actual values. Two of the cointegration vectors look stationary, with the fitted and actual tracking each other reasonably closely.

The other two look less stationary, with not much relationship between fitted and actual. Figure 2B shows the recursively estimated eigenvalues[4].

The eigenvalues are relatively constant, the first three at non-zero values, and the fourth much smaller but visibly closer to zero throughout. For African/developed countries (Figure 3A), only one (perhaps two) of the cointegration vectors look stationary, with the fitted and actual values being quite close. The wide gap between actual and fitted for the rest of the countries in Figure 3A could provide supporting evidence to the finding of relative weak cointegration between African and developed markets when we employ the small sample corrections to our data.

[4] We used the R-representation (fixing the short run dynamics at their full sample values) for the recursive estimation (see Doornik and Henry, 1995).

Figure 2A: Unrestricted Relations— African Countries

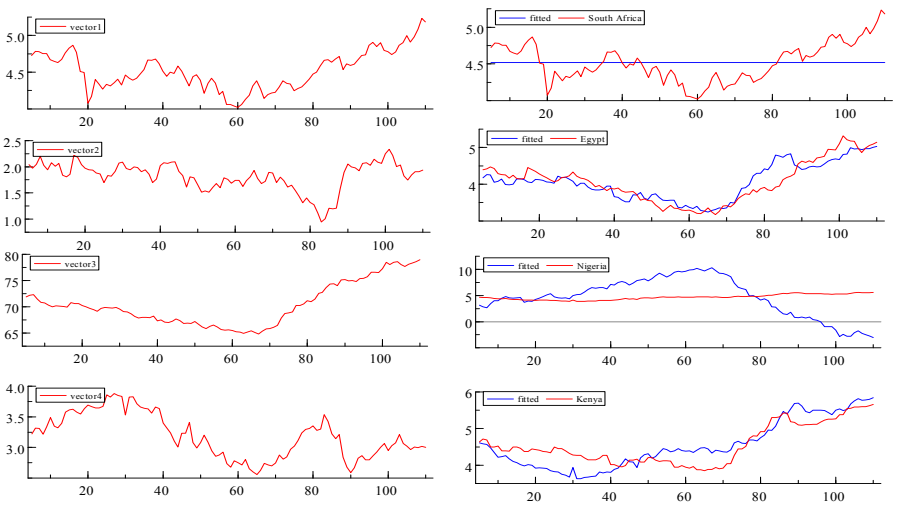


Figure 2B: Recursive Eigenvalues —African Countries

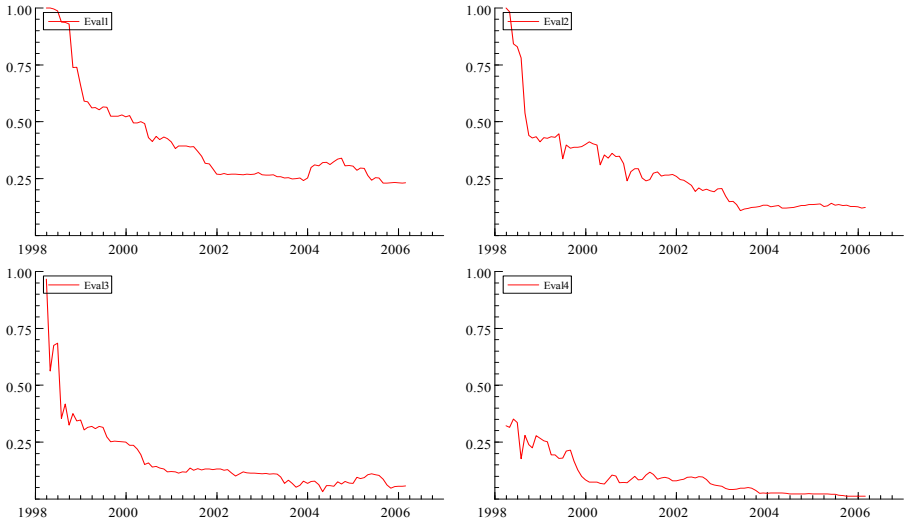


Figure 3A: Unrestricted Relations— Africa/Developed

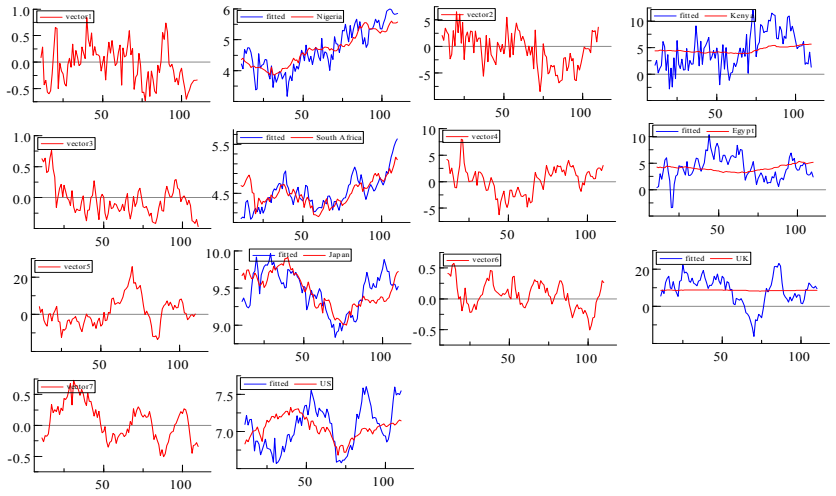
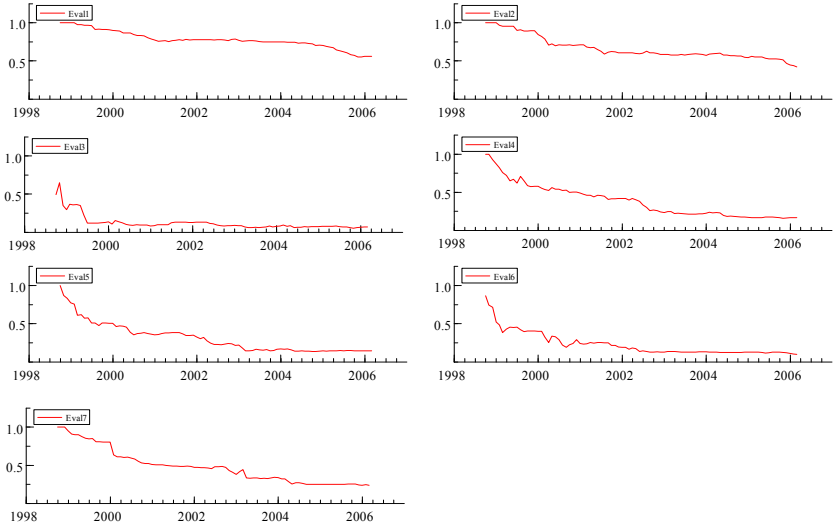


Figure 3B: Recursive Eigenvalues —Africa/Developed



5. Are African Stock Markets isolated from the rest of the World?

An important question worth addressing is whether African markets are completely segmented. To investigate further the dynamic relationship between African markets and the rest of the world, we estimate a VAR in first differences for the non-cointegrated markets (see Table 5). The advantage of using this model is that it estimates the dependence among the markets, and allows shocking a particular market and analysing how shocks perpetuate themselves through impulse responses.

In general, a *kth* order VAR in first differences for a 2x1 vector of jointly determined (endogenous) variables X_t is written as

$$\Delta X_t = \mu + \sum_{i=1}^{k} \Pi_i \Delta X_{t-i} + \varepsilon_t \qquad (3)$$

Here, the residual vector ε_t is said to be the innovation (shock) in X that cannot be predicted from past values of variables in the system. Then, either by polynomial lag division or by successive substitution, the corresponding moving average representation (MAR) is derived from the following equation[5]:

$$\Delta X_t = \Pi^{-1}(B)\varepsilon_t = \Psi(B)\varepsilon_t = \varepsilon_t + \sum_{i=1}^{\infty} \Psi_i \varepsilon_{t-i} \qquad (3)$$

where $\Psi_i = \sum_{j=1}^{i} \Pi_j \Psi_{i-j}$ and $\Psi_0 = I_n$

In this model, no distinction is made between endogenous and exogenous variables, so the Ψ_i matrices can be interpreted as the dynamic multipliers of the system, since they represent the model's response to a unit shock in each of the variables. While the estimated coefficients in the VAR system provide very little insight into the dynamic interaction among the series, the MAR presents information equivalent to that contained in the original estimates, but allows tracing out the time path of the various shocks on the return series (Sims, 1980).

We compute the dynamic response of each market return series to random shocks in other markets. This shows us how unexpected changes in each market

[5] As shown by Sims (1980), it is more informative to analyse the system's reaction to typical random shocks by tracing out the system's moving average representation rather than to continue with the complicated cross-equation feedbacks involved in the autoregressive representation.

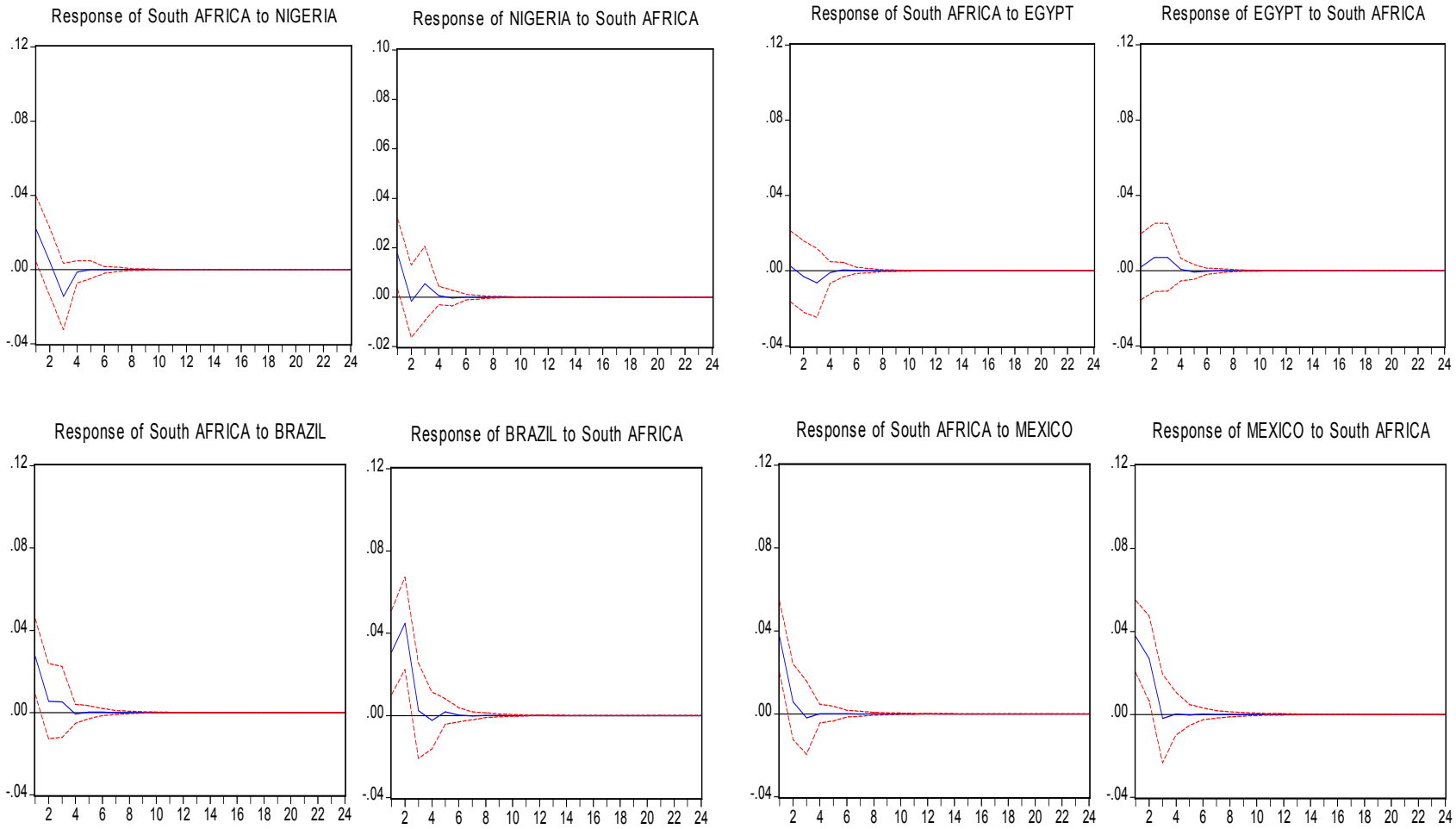
return change the returns of other markets over time. We apply the generalised impulse response function (GIRF)

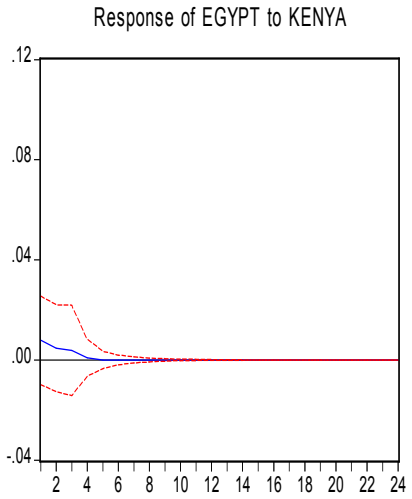
$$\mathrm{GIRF}\left(\mathrm{n},\varepsilon_{\mathrm{t}},\omega_{\mathrm{t\text{-}1}}\right)=\mathrm{E}\left[\mathrm{X}_{\mathrm{t+n}}\mid\varepsilon_{\mathrm{j,t}},\omega_{\mathrm{t\text{-}1}}\right]-\mathrm{E}\left[\mathrm{X}_{\mathrm{t+n}}\mid\varpi_{\mathrm{t\text{-}1}}\right]_{\mathrm{t}} \qquad (4)$$

We follow Pesaran and Shin (1997) by constructing orthogonal sets of innovations that do not depend on the VAR ordering. The GIRF from an innovation to the jth variable is derived by applying a variable specific Cholesky factor computed with the jth variable at the top of the Cholesky ordering. The evidence from Figure 4 gives the responses resulting from a one standard deviation shock to a pair of the non-cointegrated markets in Table 5 (we produced the impulse response of all the countries but, for the sake of brevity, we report only the interesting cases). Monte Carlo constructed 95% confidence bands are provided to judge the statistical significance of the impulse response functions.

From Figure 4, we observe minimal dynamic interactions between the markets. Indeed, the responses of Egypt and Nigeria to innovations in South Africa are immediate and subside toward zero quickly. The response of the South African market to innovations in Egypt is negative, but dies out in about eight months. The response of Egypt to Kenya and vice versa is positive. Admittedly, none of the responses is significant. The sensitivity to shocks from other markets is related to the degree of openness and to the level of macroeconomic coordination between countries. The results of the impulse response functions give further evidence that African markets do not appear to have strong links.

Figure 4: Generalised Impulse Responses




Response of EGYPT to KENYA
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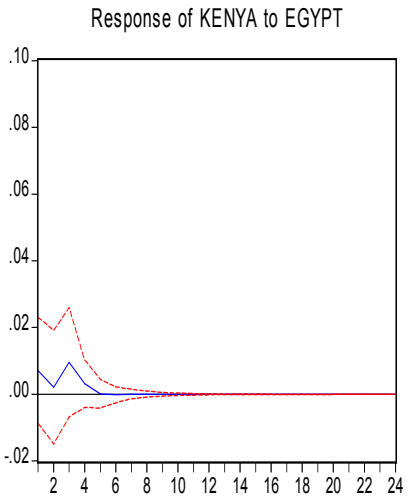
Response of KENYA to EGYPT
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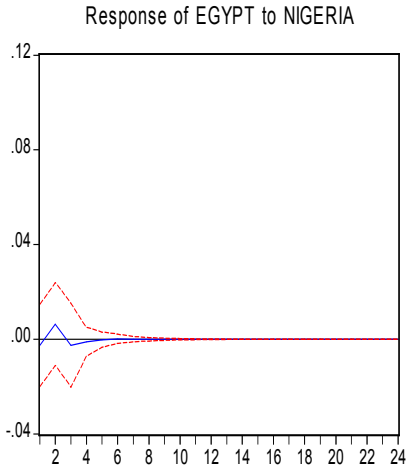
Response of EGYPT to NIGERIA
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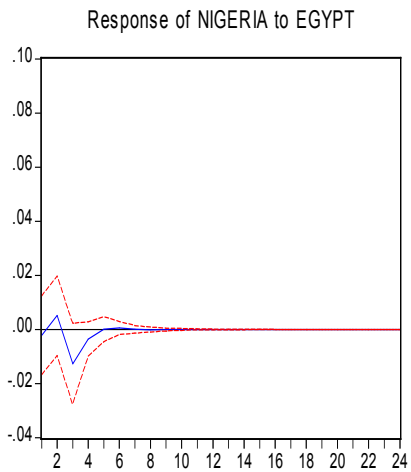
Response of NIGERIA to EGYPT
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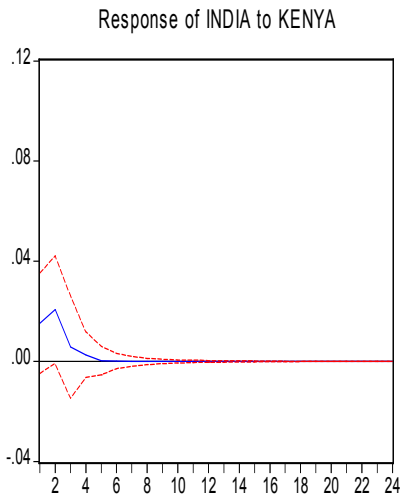
Response of INDIA to KENYA
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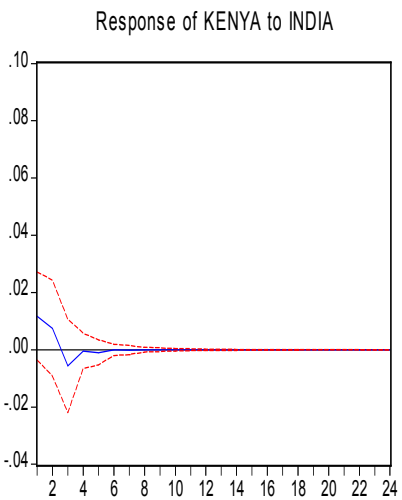
Response of KENYA to INDIA
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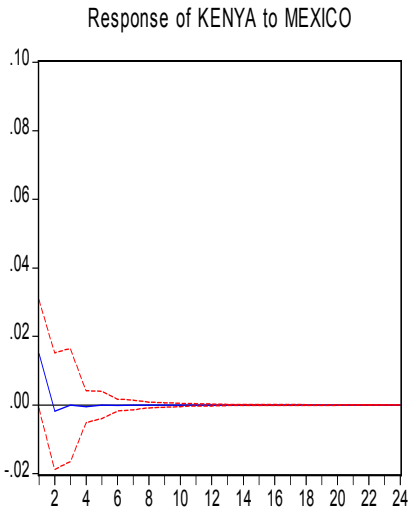
2 4 6 8 10 12 14 16 18 20 22 24


Response of KENYA to MEXICO
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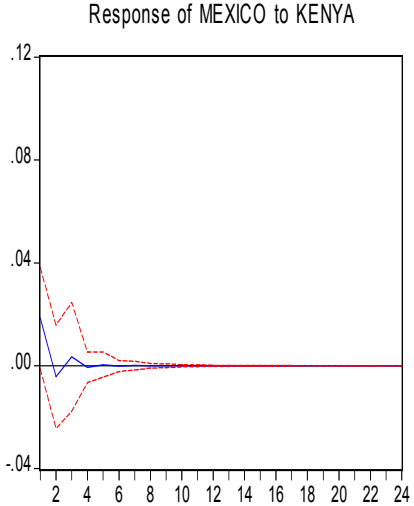
Response of MEXICO to KENYA
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The responses of the Brazilian market to the South African market appear positive and significant up to the fourth month. South Africa also responds positively to innovations in Mexico and vice versa. Given the size of these markets as emerging market economies, one would expect substantial interactions between them. The impulse responses between African countries and the developed countries are minimal and die out in less than six months. The general trend for the remaining responses is not very different. Evidence shows that shocks from Japan, UK and US are minimal in explaining shocks in South Africa and vice versa.

These results may be attributed to a low level of policy coordination among African countries. Although there have been attempts to encourage equity market integration through the Association of African Stock Exchanges, the evidence presented here indicates that the four markets would have to establish institutional agreements concerning equity markets: the exchange rate mechanism that might increase coordination among these countries has not yet been harmonized, and intensive trade and other cooperation among national governments is required to remove existing impediments that inhibit the flow of investment funds across the African continent. The weak linkage among African markets may also be due to the low proportion of intra-regional trade. Evidence from the WTO statistics indicates that inter African trade amounts to only 11% per annum. The direction of trade is highly influenced by colonial ties rather than continental allegiance. Thus, not only is equity market integration weak, but also overall economic integration remains a dream.

5.1. Independence and Interdependence

To further understand the dynamic relationship between the markets in our sample, we perform Granger causality tests using the VAR model. Causality tests seek to answer the question, do changes in African markets lead changes in developed and emerging markets in Asia and Latin America (or vice versa)? If this is the case, it follows that African markets must be important in explaining most of the movements in global markets. The evidence is reported in Table 6. Consistent with the results from the impulse responses, there appears to be little feedback between African countries. However, we find uni-directional causality

between the South African market and her emerging counterparts. The evidence from Table 6 shows that the South African market significantly influences India, Mexico and Brazil. Given the size of the Johannesburg stock exchange as the largest emerging market in our sample, one would expect movements in that market to affect movements in other developing stock markets.

Once again, in line with the impulse responses and cointegration tests, very little dynamic interaction is found between African markets, and between African markets and their developed counterparts.

Table 6: Granger Causality

	F-statistic	Prob		F-statistic	Prob
South—/→Nigeria	0.374	0.689	Egypt—/→Kenya	0.731	0.484
Nigeria—/→South Africa	1.310	0.274	Kenya—/→Egypt	0.167	0.846
Kenya—/→South Africa	0.318	0.728	Nigeria—/→Japan	0.545	0.461
South Africa-/Kenya	0.485	0.617	Japan—/→Nigeria	0.095	0.758
South Africa—/→Brazil	11.79**	0.000	Nigeria—/→UK	1.048	0.604
Brazil—/→South Africa	0.491	0.613	UK—/→Nigeria	0.506	0.354
South Africa—/→Mexico	4.42**	0.006	Nigeria—/→US	2.113	0.126
Mexico—/→South Africa	0.108	0.955	US—/→Nigeria	0.091	0.913
South Africa—/→US	1.556	0.1297	Nigeria—/→Brazil	1.290	0.280
US—/→South Africa	0.390	0.955	Brazil—/→Nigeria	0.748	0.476
South Africa—/→Japan	1.044	0.416	Nigeria—/→Mexico	1.515	0.225
Japan—/→South Africa	0.855	0.578	Mexico—/→Nigeria	0.624	0.538
South Africa—/→India	2.831*	0.095	Nigeria—/→Kenya	1.896	0.117
India—/→South Africa	1.548	0.216	Kenya—/→Nigeria	1.895	0.117
Egypt—/→US	1.216	0.294	Kenya—/→Japan	0.399	0.672
US—/→Egypt	1.269	0.263	Japan—/→Kenya	1.028	0.361
Egypt—/→India	0.278	0.758	Kenya—/→Brazil	0.803	0.451
India—/→Egypt	1.590	0.209	Brazil—/→Kenya	2.317	0.104
Egypt—/→Mexico	0.330	0.720	Kenya—/→India	2.153	0.121
Mexico—/→Egypt	0.620	0.540	India—/→Kenya	0.673	0.513
Egypt—/→Japan	1.438	0.179	Kenya—/→Mexico	0.029	0.856
Japan—/→Egypt	0.827	0.604	Mexico—/→Kenya	0.155	0.972

Note: —/→ denotes does not Granger cause. *, ** indicates rejection at the 1% and 5% levels respectively. The test is based on a bivariate VAR(k) model. Optimal lag length is based on the AIC(results available on request).

6. Summary and Conclusions

Since the late 1980s, a number of African countries have established organised stock exchanges, partly to satisfy their quest for new capital, to encourage indigenisation and to incorporate elements of market capitalism into their economies. Owing to their small size and low liquidity, significant efforts have been expended in integrating these equity markets. Through the African Stock Exchanges Association (ASEA), closer cooperation among African stock exchanges has been forged through the existing regional economic blocks. There has also been various policies aimed at integration, such as harmonizing trading practices, encouraging cross border listing of stocks, and promoting greater inter and intra regional trade. However, there is generally a dearth of empirical research on the state of integration of Africa's markets, both within the continent and with the rest of the world. Little is known about the opportunities and threats presented by these emerging markets. Again, little is known about the response of Africa's markets to global information factors, and whether disturbances in Africa matter for markets elsewhere.

The theme of this paper is centred on equity market integration and its implications for market efficiency, portfolio diversification and investment analysis. We first examined integration within Africa and then the relationship between African markets and other parts of the world. Our data set included four of the most developed African stock markets (South Africa, Nigeria, Egypt and Kenya), two Latin American countries (Brazil and Mexico), three developed markets (US, UK and Japan), and finally India. We employed cointegration analysis to examine the long-run relationships. Finally, we analysed the short-run dynamics to learn more about the propagation of stock market shocks.

Evidence from cointegration and correlation analysis indicates that African countries share weak trends with the rest of the world. On the one hand, the evidence suggests that, in spite of many years of collaboration and economic reforms, the African stock markets are not significantly influenced by each other or world stock markets. Thus, geographical proximity and/or economic ties do not matter for the integration of African markets. This would suggest that increased inter/intra regional trade, greater financial liberalisation, freer mobility of capital and more determined macroeconomic coordination should

precede any attempt at stock market regionalism. On the other hand, the overall results indicate that African assets are attractively valued and, given their low correlations and weak trends with the rest of the world, can play a significant role in international portfolio diversification (i.e., by widening the investment opportunity set and hence reducing risk).

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