African Stock Market Performance Dynamics: A Multidimensional Convergence Assessment

Simplice A, Asongu

19 January 2012

African Stock Market Performance Dynamics: A Multidimensional Convergence Assessment

(Forthcoming: Journal of African Business)[1]

Abstract

This paper dissects with great acuteness, the issues of convergence in financial performance dynamics in the African continent through the lenses of stock market capitalization, value traded, turnover and number of listed companies. The empirical evidence is premised on 11 homogenous panels based on regions (sub-Saharan and North Africa), income-levels (Low, Middle, Lower-middle and Upper-middle), legal-origins (English common-law and French civil-law) and religious dominations (Christianity and Islam). Findings provide partial support for the existence of absolute convergence in some dynamics. Only sub-Saharan Africa reveals conditional convergence in relation to per capita number of listed companies. The speed of convergence for the most part is between 12% and 28% per annum. As a policy implication, countries should work towards adopting common institutional and structural characteristics that favor stock market development.

JEL Classification: F30; G10; G20; O16; P50

Keywords: Convergence; Stock markets; Panel; Africa

[1] Citation: Asongu, S. A. (2012). African Stock Market Performance Dynamics: A Multidimensional Convergence Assessment. Journal of African Business: Forthcoming.

1. Introduction

One of the most important economic developments of the past quarter century has been the convergence of previously separated segments of the financial markets in developed countries. Convergence has coincided with the increasing globalization of financial markets in Europe, the United States and Asia. 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 Latin America and Asia. The neglect of the African continent is far from surprising as Africa's markets are perceived as excessively risky and highly illiquid, with less developed operating institutional environments (Alagidede, 2008). The lack of academic research on the capital markets of Africa could be explained from the fact that, but for South Africa, no African country has emerged as an economic power with a financial market of Western standard.

However, with increasing deregulation of financial services, financial reforms, emergence of new risks and advances in computer modeling and telecommunication technologies, Africa has recently witnessed significant economic and financial development. Financial markets in the continent are increasingly relinquishing inherent conservatism, information asymmetries and the resulting market inertia that play a substantial role in impeding convergence. With these developments, policy markers have expressed profound interest in whether African countries lagging in financial development are meeting-up with the performing standards of their advanced counterparts (or whether the best performing countries can maintain their lead in the future). Comparison of cross-country financial performance is central to addressing this concern. Divergence in relative productivity levels, income levels and living

standards is the dominant feature of modern economic history (Pritchett, 1997). This divergence could be the result of very different patterns in long-run economic performance.

It has been well documented that, there is a close connection between financial development and the level of economic performance (Goldsmith, 1969; Levine, 1997). For more than two decades now, since the seminal work of Baumol (1986), the convergence hypothesis has been widely applied in growth empirics. Two concerns have been addressed: (1) whether undeveloped countries converge to developed countries and in cases where convergence applies; (2) the corresponding speed of convergence (Barro, 1991; Barro & Sala-i-Martin, 1992). Whereas, this convergence hypothesis has been widely tested in the economic growth dimension, recent applications to financial markets is gaining ground and becoming increasingly popular (Brada et al., 2005; Orlowski, 2005; Kim et al., 2005, 2006; Elyasiani et al., 2007; Eun & Lee, 2010; Su et al., 2010; Narayan et al., 2011).

In the light of above points, this paper analyzes financial market convergence in Africa and attempts to discriminate between conflicting strands in the literature. Specifically, it tests the hypothesis of convergence in 11 different homogenous panels from four dimensions: stock market capitalization, total value traded, turnover and number of listed companies. Findings could have substantial policy implications given the motivations for financial market convergence in the continent: financial theory deems integrated markets to be relatively more efficient in terms of capital allocation compared to divergent ones (Chen et al., 2002); convergence in stock market performance dynamics will stimulate cross-border flow of funds, improve trading volume which will in-turn increase market liquidity; lower cost of capital for firms and lower transaction cost for investors (Kim et al., 2005); financial stability due to minimization of the probability for asymmetric shocks (Umutlu et al., 2010); reduction of the

risk of cross-border financial contagion (Beine et al., 2010) and improvement of capacities of economies to absorb shocks (Yu et al., 2010); elimination of the potential for making above normal profits as supernormal profits are arbitraged away and; the possibility of similar yields for financial assets of similar risk and liquidity, regardless of nationality and locality (Von Furstenberg & Jeon, 1989).

Specific characteristics making-up the panels that will be investigated include: low income, middle income, lower middle income, upper middle income, Christianity, Islam, North Africa, sub-Saharan Africa, English common-law and French civil-law. By addressing the issue of whether the religious, legal-origin, income-level or regional dimensions of countries matter in the achievement of convergence, this work explicitly provides insights into research questions which are particularly relevant in policy making. In dissecting with great acuteness the convergence of stock markets in Africa, this paper adds to existing literature in the following. Firstly, to the best of our knowledge, this is the first study to empirically examine convergence in African stock markets. Secondly, we employ different aggregate measures of stock market performance, contrary to Narayan et al. (2011): a study closest to the current paper in the literature[2]. Thirdly, emphasis on 11 homogenous panels provides detail insights into the phenomenon in the African continent. Fourthly, this work is not only concerned with the assessment of financial market convergence; rather, in addition we have a dual concern, which involves computing the speed of convergence and correspondingly, the time required to achieved full (100%) convergence.

The rest of the paper is structured as follows. Section 2 summarizes conflicts in the literature. Section 3 discusses the motivations for stock market convergence in Africa. Data and

[2]This paper steers clear of Narayan et al. (2011) from five standpoints: exclusive focus on Africa; disaggregation of the African continent into 11 homogenous panels; addition of two stock market performance dynamics; alternative estimation approach and; difference in data spans.

methodology are presented and outlined respectively in Section 4. Empirical analysis is covered in Section 5. Section 6 concludes.

2. Intuition and existing literature

2.1 Intuition

It is important at the outset to understand the economic intuition motivating convergence in financial markets. In the context of this paper, convergence may either be absolute (in the absence of other variables) or conditional (in the presence of other variables).

Absolute convergence of financial markets occurs when countries share similar fundamental characteristics with respect to their financial markets, such that the only difference across countries is in the initial level of financial market development. Absolute convergence for instance is the result of factors such as the creation of monetary unions and adoption of a single currency, among others. In a monetary union (led by a single currency, a single central bank and a single monetary policy for example), there are advantages like risk-reduction and lowering of cross-border currency conversion costs, promotion of flow of trade and investment among member states…etc. Financial reforms have been largely credited with the performance of financial markets in developing countries. This is because, (holding other things constant such as political instability, market isolation and macroeconomic conditions) financial liberalization (in large part promoted and facilitated by the International Monetary Fund: IMF), reduces barriers to trade and investment and obviates the need for investor preference for one market over the other. Financial markets are becoming increasingly synchronized with advances in information and communication technologies (ICTs). The implication of this synchronization has been an increase in the speed of adjustment to shocks (that is, the speed at which shocks are transmitted from one market to another has increased). Absolute convergence in financial markets will take

place due to the above factors. When full convergence takes place, it implies that risk-adjusted stock returns denominated in a common currency are equal in all countries throughout the homogenous panel. In other words, it is the possibility of similar yields for financial assets of similar risk and liquidity, regardless of nationality and locality. Hence, portfolio diversification becomes unlikely to be beneficial to investors.

Conversely, conditional convergence is one whereby, convergence to one's own long-term steady-state (equilibrium) is contingent on different structural characteristics or fundamentals of each market. Consistent with Narayan et al. (2011), in motivating our idea of conditional convergence, we argue that when financial markets across countries differ in terms of factors relating to the performance of their financial markets, there will be conditional convergence. Financial transactions affect prices due to reasons of information and liquidity and, trades can promote price-convergence by validating quotes from other markets. In the same vein, the opposite effect of price-divergence is also likely because trades can exert price pressure in the local market (Kaul & Mehrotra, 2007). Hence, the convergence of financial markets is contingent on factors that are observed and tested in the model.

2.2 Existing literature

In the last two decades, a new literature has been developed on the concepts of σ-convergence and β-convergence, introduced by Barro & Sala-i-Martin (1991, 1992). The presence of β-convergence implies mean reversion for the panel unit, whilst σ-convergence is a reduction in overall cross-section dispersion. Islam (2003) has shown that, β-convergence is a necessary but not sufficient condition for σ-convergence, but has a more natural interpretation in the context of growth models. The existing literature uses several alternative approaches to identify whether and when convergence occurs (Bruno et al., 2011). Initial empirical tests of the

convergence hypothesis considered β-convergence. Without additional control variables, the test considered absolute (unconditional) convergence, whereas with additional control variables, the test examined conditional convergence. An alternative view of convergence, the sigma (σ) convergence argues that a group of economies converge when the cross-section variance of the variable under consideration declines across time. Apart from β-convergence and σ-convergence, cointegration and unit root tests have also been used. We shall justify the choice of the β-convergence approach in the methodology section of the paper.

According to the convergence literature (Bruno et al., 2011; Narayan et al., 2011), while there is a theory and vast empirical work on per capita income convergence, there is as yet not a theory on financial system convergence. Given this reality, like in Narayan et al. (2011) we are aware of the risks of "doing measurement without theory" and assert that reporting facts, even in the absence of a formal theoretical model may be a useful scientific activity. Thus, we concur with Costantini & Lupi (2005) in further asserting that applied econometrics has other tasks than merely validating or refuting economic theories.

The last three decades have witnessed important changes in financial structure and institutions in Africa due to liberalization, privatization, innovation and globalization. These events and a rethinking of the role of finance after the recent financial crisis (Baltagi & Demetriades, 2011) have prompted a growing number of studies focused on the differences and similarities between national financial systems (Bruno et al., 2011). These have culminated in two growing strands in the literature on the impact of globalization on financial market convergence.

Some proponents assert that globalization, deregulation, economic integration, harmonization of regulation and corporate governance rules have led to the convergence of

financial market characteristics (Allen & Gale, 2000; Rajan & Zingales, 2003; Holzl, 2006; Balcerowicz & Fischer, 2006; Shleifer, 2009). To this end, a number of studies have confirmed that European continental financial systems have become more similar to Anglo-Saxon ones and that, the classical distinction between market-based and bank-based systems is less relevant than in the past (Allen & Gale, 2000; Calcagnini et al., 2000; Giannetti et al., 2002; Rajan & Zingales, 2003; Rodrik, 2006; Holzl, 2006; Rodrik, 2011). With respect to this strand, financial structures have converged towards a model which combines characteristics of the Anglo-Saxon model, where markets and investment banks prevail with elements of the continental European system, in which commercial banks are predominant. More so, from 1980 through 2005, most countries in the world adopted free market policies that have proved pertinent in ensuring economic growth and real convergence (Balcerowicz & Fischer, 2006; Shleifer, 2009; Rodrik, 2006, 2011). The free market reforms have also influenced financial sectors of the economies but it is unclear whether financial convergence has come alongside real convergence. One dimension via which financial convergence can take place is through financial integration. This rests on the fact that, financial integration increases the supply of finance in the less financially developed countries. This process may be reflected on an expansion in the size of national financial systems (relative to domestic GDP), in those countries with less developed financial markets (Giannetti et al., 2002). In the context of the European Union, the different financial systems may exhibit a convergence trend in the aftermath of: common markets in 1993 and; the euro area in 1999 (Calcagnini et al., 2000).

Conversely, another strand in the literature stresses that domestic financial markets remain heterogeneous in spite of integration and globalization. The adoption of a common set of formal rules in a group of countries does not necessarily imply their economic convergence even

in the distant future. Thus, the presence of different informal norms and enforcement features account for persistent diversity among countries. The recent financial meltdown and economic down-turn have hit different countries with different intensities. The IMF financial development index (IMF, 2006) shows that, there is a large difference between developed and developing countries without significant variations between 1995 and 2004. Some authors emphasize the path dependency of financial development and the role legal origins play in accounting for cross-country differences in stock market development. It is argued that the institutional web of informal norms, formal rules and, enforcement characteristics affect the financial and economic performances of a country (La Porta et al., 1988; North, 1990, 1994).

3. Financial market convergence and African business

3.1 Motivations for convergence in African financial markets

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 Latin America and Asia. According to Alagidede (2008), such neglect is far from surprising as Africa's markets are perceived as excessively risky, highly illiquid with less developed operating institutional environments. Economic instability and political unrest have plagued many African countries and continue to pose a threat to foreign investments (Kenyan post election crises in 2007/2008, Zimbabwe's economic meltdown, Nigeria's marred transition in 2008 and currently the unending Egyptian revolution). But for South Africa, no African country has emerged as an economic power. This might partly elucidate the lack of academic research on the capital markets of Africa. Africa has recently witnessed significant economic and financial development, thus investigating multidimensional convergence in the continent could have important policy implications.

Financial theory deems integrated markets to be relatively more efficient compared to divergent ones. An integrated stock market stimulates cross-border flow of funds, improves trading volume which in-turn increases stock market liquidity. Integrated markets grant investors the opportunity to efficiently allocate capital (Chen et al., 2002). This results in a lower cost of capital for firms and lower transaction cost for investors (Kim et al., 2005). An integrated financial market has the positive rewards to financial stability as it minimizes the probability of asymmetric shocks (Umutlu et al., 2010). Financial stability in-turn may reduce the risk of cross-border financial contagion (Beine et al., 2010) and improve the capacity of economies to absorb shocks (Yu et al., 2010).

It is also worth pointing out that, stock markets may also converge to reflect the level of arbitrage activity. When markets converge, it denotes there is a common force such as arbitrage activity that attracts the markets together. It further implies that convergence in markets will mean the potential for making above normal profits and international diversification will be limited as supernormal profits are arbitraged away (Von Furstenberg & Jeon, 1989). Likewise, if barriers or potential barriers generating country risks and exchange rate premiums are absent, the consequence is similar yields for financial assets of similar risk and liquidity regardless of nationality and locality (Von Furstenberg & Jeon, 1989).

Therefore, the need for convergence in African stock markets has foundations in arbitrage and the hypotheses proposed in the portfolio theory. This implies, the motivations for convergence in financial markets has premises in the literature of stock market interdependence and portfolio diversification (Grubel, 1968; Levy & Sarnat, 1970)[3]. These works have for the most part considered short-run linkages of stock markets and have found the existence of short-

[3] In the absence of convergence, the practical implication for investors on the African continent is that, they can gain by holding portfolios from different countries. To the extent that convergence in financial markets occurs, the gains from international portfolio diversification will decrease. The consequence of full convergence, will be similar yields for financial assets of similar risk and liquidity regardless of nationality and locality.

run stock market co-movements. The findings have been extended to cover co-movements of stock markets over the long-run (Bessler & Yang, 2003). Majority of studies have also revealed evidence of cointegration as well as short-run relationships which depict some form of convergence in stock markets. In particular, cointegration which represents a long-run equilibrium between a stock market performance dynamic (time series) of different countries in a homogenous panel is a necessary, although not a sufficient condition for convergence to occur (Cellini & Scorcu, 1995; 2). However, when for a stock market performance dynamic, different countries share a long-run and short-run relationship (that is they are highly correlated), it implies that convergence of stock markets is possible. Convergence also implies that markets are integrated (Narayan et al., 2011).

3.2 Financial market convergence and African business

The world is looking to Africa as its next investment and growth frontier, but in order to secure sustainable growth, Africa needs long-term financial solutions to its investment needs. There are positive signs of regional integration among African countries. Issues of finance in small and medium-size enterprises (SMEs) in the continent have dominated the research agenda at various policy levels (Quartey, 2003; Biekpe, 2004). There are positive signs that regional integration and financial market convergence will be the necessary continental solution. African governments are now focusing on the importance of moving towards more market-oriented economies and development of the financial market infrastructure to mobilize funds both for public and private sectors (Gray & Bythewood, 2001).

Reforms are drivers of financial market convergence, hence African stock market reforms will favor convergence and the ease of doing business (Bossone & Honohan, 2003; Clark, 2003; Ngugi et al., 2003; Mutenheri & Green, 2003). Bossone & Honohan (2003) have

recommended reforms toward more regional cooperation as a possible way of alleviating issues resulting from small financial systems. Concerns over standardized rules and regulations in reforms for stock markets have also been raised (Clark, 2003). In response, Ngugi et al. (2003) have assessed how African stock markets have responded to the reform process and identified three main types of reforms implemented in these markets since the 1990s, namely: revitalization of the regulatory framework, modernization of trading systems and, relaxation of restrictions on foreign investors. A comparative analysis across sampled countries has shown that markets with advanced trading technology, tight regulatory systems and relaxed foreign investors' participation show greater efficiency and lower market volatility. This strand on reforms has been supported by Mutenheri & Green (2003) in a Zimbabwean context. They have examined financial reforms and financing decisions of listed firms in the country to find out that, the variation between the pre-reform and post-reform era suggest that the reforms achieved some success in opening-up the capital markets and improving the transparency of firm financing behavior. These all constitute drivers of financial market convergence.

Convergence in African stocks markets will therefore provide efficient alternative forms of investment in compensation for the failed privatization projects. Sub-Saharan Africa's (SSA's) share of Foreign Direct Investment (FDI) averages 1% of global flows (Bartels et al., 2009). A strand of issues in African business focuses on how to improve Africa's share of FDI. Private capital flows from financial markets are complementary to FDI, in view of the Rolfe & Woodward (2004) recommendation for African countries to attract investment through other channels. The low level of FDI in Africa has been largely due to political economy considerations, regulatory uncertainty, skills, labor, regulation and exchange rate volatility (Bartels et al., 2009; Toumi, 2011). Much recently, Darley (2012) has suggested the expansion of

regional trading arrangements as key to looking outside the traditional flow of FDI to Africa. Implementation of this recommendation will ease financial market convergence across the continent.

4. Data and methodology

4.1 Data

We examine a sample of 14 African countries with data from African Development Indicators (ADI) and the Financial Development and Structure Database (FDSD) of the World Bank. While openness and inflation indicators are obtained from the former, stock market performance measures are gathered from the later source. The stock market performance dynamic measures include: stock market capitalization, value traded, turnover ratio and per capital number of listed companies. Two questions arise over how one could measure the degree of stock market convergence and, whether global and local factors determining stock market performance are contained in the chosen indicators. We have selected both price-based and quantity-based indicators, which in principle should be appropriate. Convergence of financial systems has traditionally been studied using three types of indicators: price, news and quantity-based measures (Bruno et al., 2011). Price-based measures look at the differences in prices or returns of stock markets while, quantity-based measures are used to quantify the effects of frictions on demand and supply in investment opportunities. News-based indicators analyze the impact of common factors: for instance the availability of new public information and its incidence on asset price dynamics. This paper uses both price-based and quantity-based indicators. While the former is appreciated by the 'turnover ratio', other indicators we have disclosed make-up the later.

Many papers have looked at convergence without a priori theory (Bruno et al., 2011; Narayan et al., 2011) and have relied on quantity-based measures of convergence to draw conclusions on the general features of financial structures. The simple intuition of convergence in financial markets is that, the convergence of two (or more) markets would imply that the potential for making above normal profits through international diversification will be limited. In the same line of intuition, full (100%) convergence will imply, similar yields for financial assets of similar risk and liquidity, regardless of nationality and locality.

As far as we have read, in principle the four stock market measures to be tested provide valid evidence of true financial market convergence for three reasons. (1) Previous studies on financial market convergence have used the same indicators (Narayan et al., 2011)[4]. (2) Convergence in financial markets has traditionally been assessed using three types of indicators: price, news and quantity-based measures (Bruno et al., 2011). Only news-based measures are absent in our dataset. (3) Definition of variables used take account of structural and macroeconomic differences. That is, variables are in % of GDP, % of population growth….etc.

We concur with Narayan et al. (2011) in postulating that one is unlikely to find the convergence of stock markets within a very heterogeneous set of countries. We therefore disaggregate countries into homogenous panels based on regions (SSA and North Africa), income-levels (Low-income, Middle-income, Lower middle-income and Upper middle-income), legal-origins (English common-law and French civil-law) and religious-dominations (Christianity and Islam). The choice of these homogenous panels is consistent with the exogenous growth model. According to the neoclassical (or exogenous) growth theory, convergence in stock-market (or real) per capita to each country's steady-state (or a common

[4] Narayan et al. (2011) is based on stock market capitalization and stock value traded. To these measures of financial market performance, we have added, the turnover ratio and per capita number of listed companies.

steady-state) will occur if countries share the same fundamental characteristics (Kumo, 2011). These fundamental characteristics could be regional (SSA and North Africa), religious (Christianity and Islam), legal (English common-law and French civil-law) or developmental (income levels).

Due to constraints in data availability, dataset spans from 1991 to 2009. Descriptive statistics and country-specific stock market performance averages are presented in Appendix 1 and Appendix 5 respectively. From them, two facts can be noted. (1) The variables used in the panel regressions show that, there is quite a degree of variation in the data utilized so that one should be confident that reasonable estimated relationships should emerge. (2) It could be noted that, an estimated approach that directly assumes a particular form of distribution is inappropriate and would produce biased and inconsistent estimates. Hence, the need for at least a semi-parametric approach. Correlation analysis presented in Appendix 2 has two main objectives. On the one hand, it enables us avoid issues linked to multicolinearity and overparametization. On the other hand, it provides us with a foresight on possible linkage-signs between various indicators. Variable definitions and presentation of countries making-up the homogenous panels are presented in Appendix 3 and Appendix 4 respectively. In Appendix 3, it could be observed that the variables are either in percentage of GDP (stock market capitalization, value traded and trade), percentage of population (number of listed companies), ratio (turnover) or annual percentage growth rate (inflation). The interest of defining the variables in ratios of GDP, population…etc, is to take account of macroeconomic and structural differences between countries.

4.2 Model and estimation approach

The estimation approach will be based on β-convergence owing to constraints in the data set. The use of cointegration and unit roots are not convenient because of limited degrees of freedom in homogenous panels. More so, the alternative view of convergence (σ-convergence) which argues that a group of economies converge when the cross-section variance of the variable under consideration declines, is also inappropriate because our data structure is panel. Our estimation procedure typically follows the evidence of income convergence across countries which has been investigated in the context of neoclassical growth models, originally developed by the pioneering works of Baumol (1986), Barro & Sala-i-Martin (1992, 1995) and Mankiw et al. (1992). The theoretical underpinnings of income convergence are abundant in the empirical growth literature (Solow, 1956; Swan, 1956).

Following Fung (2009) Eqs. (1) and (2) below are the standard approaches in the literature for testing conditional convergence if $W_{i,t}$ representing the explaining variables is taken as strictly exogenous.

$$\ln(Y_{i,t}) - \ln(Y_{i,t-\tau}) = \beta \ln(Y_{i,t-\tau}) + \delta W_{i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$\ln(Y_{i,t}) = \sigma \ln(Y_{i,t-\tau}) + \delta W_{i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (2)$$

Where $\sigma = 1 + \beta$, $Y_{i,t}$ is the measure of a stock market performance dynamic in country *i* at period *t*. $W_{i,t-\tau}$ is a vector of determinants of growth in stock market capitalization, value traded, turnover and number of listed companies, η_i is a country-specific effect, ξ_t is a time-specific constant and $\varepsilon_{i,t}$ an error term. Consistent with the neo-classical growth model, a statistically significant negative coefficient on β in Eq. (1) suggests that countries relatively close to their

steady state of stock market development will experience a slowdown in growth of the financial sector, known as conditional convergence (Narayan et al., 2011; 2). Also, in line with Fung (2009; 3), if $0 < |\sigma| < 1$ in Eq. (2), then $Y_{i,t}$ is dynamically stable with a trend growth rate the same as that of W_t, and with a rate depending on the level of W_t. The variables contained in $W_{i,t-\tau}$ and the individual effect η_i are proxies for the long-run level the market is converging to. Thus, the country-specific effect η_i captures the existence of other determinants of a country's steady state not captured by $W_{i,t-\tau}$.

Conditions for convergence highlighted above are valid if $W_{i,t}$ is strictly exogenous. Unfortunately, this is not the case in the real world because, while inflation and trade (components of $W_{i,t}$) influence stock market performance dynamics, the reverse effect cannot be ruled-out. Thus, we are faced with the issue of endogeneity in which inflation and openness (trade) are correlated with the error term ($\varepsilon_{i,t}$). Also, country and time specific effects could be correlated with other variables in the model, which is often the case with lagged endogenous variables applying to the equations. A way of dealing with the problem of the correlation between the individual specific-effect and the lagged endogenous variables consists in eliminating the individual effect by first differencing. Thus Eq. (2) becomes:

$$\ln(Y_{i,t}) - \ln(Y_{i,t-\tau}) = \sigma \ln(Y_{i,t-\tau} - Y_{i,t-2\tau}) + \delta (W_{i,t-\tau} - W_{i,t-2\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}) \quad (3)$$

However, Ordinary Least Square (OLS) estimators are still biased because there remains a correlation between the lagged endogenous independent variable and the error term. Arellano & Bond (1991) proposed an application of the Generalized Method of Moments (GMM),

exploiting all the orthogonality conditions between the endogenous lagged variables and the error term. This GMM approach has been widely used in the convergence literature; as recently applied by Narayan et al. (2011). While Narayan et al. (2011) use Eq. (1) without the presence of fixed effects, this paper instead applies Eq. (3) following Fung (2009) in a bid to check the consistency the results for SSA. We use the *second-step* GMM because it corrects the residuals for heteroscedasticity. The *first-step* assumes that the residuals are homoscedastic. The assumption of no auto-correlation in residuals is important as past lagged variables are to be used as instruments for the endogenous variables. However the estimation depends on the assumption that the lagged values of the dependent variable and other exogenous variables are valid instruments in the regression. If the error terms of the level equation are not auto-correlated, the first-order auto-correlation of the differenced residuals should be significant while their second-order auto-correlation should not be. The validity of the instruments is tested with the Sargan over-identification restrictions test (OIR).

As pointed-out by Islam (1995; 14), yearly time spans are too short to be appropriate for studying convergence, as short-run disturbances may loom large in such brief time spans. Thus considering the data span of 21 years, consistent with Narayan et al. (2011) we use a 3 year non-overlapping interval such that we have six time intervals: 1992-1994; 1995-1997 and so on. This implies in our regressions, τ is set to 3.

We also compute the implied rate of convergence by calculating ($\sigma/3$) which is same as the Narayan et al. (2011) computation of $(1+\beta)/3$. Thus, we divide the estimated coefficient of the lagged endogenous variable by 3 because we have used a three year interval to mitigate short term disturbances. If the absolute value of this coefficient is greater than zero but less than one ($0 < |\sigma| < 1$), we conclude the existence of convergence. A broader interpretation suggests, past

differences have a less proportionate impact on future differences, implying the variation on the left hand side of Eq. (3) is decreasing overtime as the country is approaching a steady state.

As we have pointed-out earlier, the Arellano & Bond (1991) and Blundell & Bond (1998) techniques proposed, exploit all the orthogonality conditions between the endogenous lagged variables and the error term. In so doing, the problem of endogeneity owing to reverse causality and omitted variables is addressed.

5. Empirical analysis

This section looks at three principal issues: (1) investigation of the presence of convergence; (2) computation of the speed of convergence and, (3) determination of the time needed for full (100%) convergence. The summary of overall results is presented in Table 1 where-in the first two issues are addressed. Findings for absolute (unconditional) and conditional convergence are presented in Table 2 and Table 3 respectively.

Absolute convergence is estimated with just the lagged difference of the endogenous variable as independent variable while conditional convergence is with respect to Eq. (3). Thus, unconditional convergence is estimated in the absence of $W_{i,t}$: vector of determinants (inflation and trade) of per capita finance. To examine the validity of the model and indeed the convergence hypothesis, we perform two tests, namely the Sargan-test which assesses the over-identification restrictions and the Arellano and Bond test for autocorrelation which examines the null hypothesis of no autocorrelation. The Sargan-test investigates if the instruments are uncorrelated with the error term in the equation of interest. The null hypothesis is the position that the instruments as a group are strictly exogenous (do not suffer from endogeneity), which is needed for the validity of the GMM estimates. The p-values of estimated coefficients are presented in brackets in the line following the reported values of the coefficients. We notice that

the Sargan-test statistics often appear with a p-value greater than 0.10, hence its null hypothesis is not rejected in almost all the regressions. We only report the second order autocorrelation test: AR(2), in first difference because it is more important than AR(1) as it detects autocorrelation in levels. For most estimated models, we are unable to reject the AR(2) null hypothesis for the absence of autocorrelation. There is therefore robust evidence that most of the models are deficient of autocorrelation at the 1% significance level.

5.1 Synthesis of results

Before we dive into the presentation of results, it is important at the outset to understand the economic intuition motivating absolute and conditional convergence in financial markets of the African continent. Absolute convergence in financial markets occurs when countries share similar fundamental characteristics with regard to their financial market such that only variations across countries in initial levels of financial market development exist. Absolute convergence therefore results from factors such as the formulation of monetary unions and adoption of a unique currency, among others.

Absolute convergence also occurs because of adjustments common to many countries. For instance since the 1980s, many countries have undertaken structural reform programs engineered by the International Monetary Fund (IMF) and the World Bank (WB). These reforms have included financial liberalization with objective to reduce barriers to trade and investment. Financial reforms have been credited for the impressive performance of capital markets in African countries. This is because, they obviate the need for investor preferences for one market over another. Improvements in information technology have also ameliorated synchronization in financial markets such that the adjustment of shocks across markets is much faster. Thus, the

speed at which shocks are transmitted from one market to another has increased with improvements in ICTs; which has facilitated absolute convergence.

On the other hand, conditional convergence is that which is contingent on structural and institutional characteristics. Consistent with the economic growth literature (Barro, 1991), conditional convergence depicts the kind of convergence whereby, one's own long-term steady state (equilibrium) is contingent on structural characteristics and fundamentals of its economy or market (Nayaran et al., 2011). Therefore findings are conditional on the macro economic variables we empirically test. Owing to constraints in data availability and degrees of freedom required for the OIR test, we could not condition the analysis beyond two macroeconomic variables: consistent with the convergence literature (Prichett, 1997; Bruno et al., 2011).

A summary of the results from Tables 2-3 is presented in Table 1. This includes findings for Absolute Convergence (AC), Conditional Convergence (CC), the Speed of Absolute Convergence (SAC) as well as the Speed of Conditional Convergence (SCC). We notice the following for the 11 panels. (1) There is no evidence for any form of convergence in stock market turnover. (2) Only four panels reveal AC but with no corresponding CC in stock market capitalization. (3) Seven panels show evidence of AC without CC. (4) Two panels show evidence of AC without CC, one reveals support for CC with no corresponding AC while, SSA is the sole panel with both types of convergences in the number of per capita listed companies.

5.2 Results of absolute convergence (AC)

In Table 2 below, we report the results of AC. Firstly, we notice that for almost all models, the instruments are valid as the alternative hypotheses of the AR (2) and Sargan OIR tests are rejected. In a bid to ease readership, years (yrs) and per annum (p.a) are abbreviated.

For the stock market capitalization analysis, we notice AC in four panels, with the following convergence rates and periods necessary to achieve 100% convergence: French (28.83% p.a for 10.40yrs); Islam (23.60% p.a for 12.71yrs); North Africa (23.23% p.a for 12.91yrs) and; Africa (17.76% p.a for 16.89 yrs). In the case of stock market value traded, there is support for AC in seven panels, with the following convergence speeds and time required for 100% convergence: English (14.63% p.a for 20.50yrs); Christian (12.66% p.a for 23.69yrs); Islam (16.70% p.a for 17.96yrs); SSA (16.03% p.a for 18.71yrs); Middle income (13.46% p.a for 22.28yrs); Lower middle income (17.66% p.a for 16.98 yrs) and; Africa (15.06% p.a for 19.92 yrs). We find no indication for any form of AC in the case of stock market turnover. Turning to the number of listed companies per capita, we notice AC in English, Christian, and SSA, with respective speeds (time) of (for full) convergence: 12.66% p.a (23.69yrs); 13.06% p.a (22.97yrs) and 13.05% p.a (22.98yrs).

5.3 Results of conditional convergence (CC)

In Table 3 below which reports findings for CC, we observe significant results only in two panels. These are, SSA and Africa with speeds (time) of (for full) convergence: 19.73% p.a (15.20yrs); 25.03% p.a (11.98yrs) respectively. If we are to validate overall results based on significance in both types of convergences, then only SSA meets this requirement with respect to per capita number of listed companies.

5.4 Discussion, policy implications and caveats

5.4.1 Discussion of results

The absence of absolute convergence in stock market turnover points to the fact that, fundamental characteristics in this financial market performance dynamic are dissimilar across

countries. This is also partially the case for other measures of stock market performance (market capitalization, per capita listed companies and value traded), with respect to certain panels. But for two panels in the 'per capita listed companies' analysis, our findings do not broadly support the existence of conditional convergence. The significant results imply stock markets with fewer listed companies in SSA are catching-up with their counterparts which have more listed companies. The overwhelming absence of conditional convergence for the remaining panels is due to cross-country differences in structural and institutional characteristics that explain stock market performance dynamics. Thus, differences in macroeconomic policies and government quality among countries could lead to this deficiency in conditional convergence.

The broad absence of convergence implies the following for African financial markets. (1) Less efficiency, low cross-border flow of funds, little trading volume (and consequently less liquidity). (2) Since investors do not have the opportunity to efficiently allocate capital, this leads to a higher cost of capital for firms as well as a higher transaction cost for investors (Chen et al., 2002; Kim et al., 2005). (3) There is no common force such as arbitrage activity attracting the markets together, which implies the potential for making above normal profits and international diversification are not limited by arbitrage activity (Von Furstenberg & Jeon, 1989). In other words supernormal profits are not arbitraged away.

On a general note, African financial markets have very heterogeneous initial conditions as well as fundamental, institutional and structural characteristics of development. As a policy implication, countries should work towards adopting common institutional and structural characteristics that favor stock market development. These institutional characteristics include government-quality dynamics of rule of law, regulation quality, corruption-control, government

effectiveness, political stability (no violence), democracy, voice & accountability and press-freedom.

5.4.2 Implications for regional integration

Our findings are highly relevant for policy makers in terms of regional integration. On the one hand, the absence of convergence in equity markets could be an indication of non-homogenous financial areas. In this case, policy makers should reconsider the measures to adopt to achieve a higher degree of convergence in financial markets. This bring us to the question of whether the policies implemented by African countries to promote financial integration have had any noticeable effects on the observed convergence patterns. Though from an economic sense, integration may be occurring, it is not yet very noticeable from a financial market standpoint. It is tempting to conclude that geographical proximity is neither a necessary nor a sufficient condition for African stock markets to converge, which could further suggest that efforts at integrating African stock markets have remained largely futile to date.

5. 4.3 Implications for portfolio diversification

The lack of strong links among African markets present an opportunity for portfolio diversification. Our results are tilted towards the absence of convergence for the most part and the practical implication for investors on the African continent is that, they can gain by holding portfolios from different countries. To the extent that convergence in financial markets occurs, the gains from international portfolio diversification will decrease. The countervailing view argues that certain economies retain their individual national economic and financial characteristics, which will prevent financial markets from full convergence (Adler & Dumas, 1983). In other words, impediments to the free flow of capital, tendencies for a home bias and so on, will maintain the gains from international portfolio diversification in the African context. The

absence of convergence further implies that, risk-adjusted stock returns denominated in a common currency are unequal in all countries throughout the homogenous panel. In other words, there is no possibility of similar yields for financial assets of similar risk and liquidity, regardless of nationality and locality. Hence, portfolio diversification becomes likely to be beneficial to investors.

5.4.4 Panel focused implications

Now we shall devote space to extending our line of inquiry and discuss panel-focused implications. For clarity in presentation, the following could be established. (1) English common-law countries have the same convergence tendencies as Christian dominated countries. This establishment holds for both types of convergences in every stock market performance dynamic. This conclusion is evident, since stock markets of English common-law countries are south of the Sahara where Christianity is the dominant religion. (2) But for AC in 'stock market value traded', Islamic and North African countries have the same convergence tendencies. This inference is corollary to the above. (3) Surprisingly, contrary to mainstream literature (La Porta et al., 1998; North, 1990, 1994), we do not find evidence of overwhelming dominance of English common-law countries from a financial market convergence standpoint. This could be due to regional co-operations which have diluted legal-origin oriented laws over time. Hence the argument that the institutional web of informal norms, formal rules and enforcement characteristics affect financial and economic performance is not visible from a financial market convergence perspective. (4) In comparison to North African countries, SSA countries are experiencing more convergence. This is largely to the credit of English common-law countries.

5.4.5 Other implications

It is also interesting to discuss how convergence could be further accelerated. Consistent with Alagidede (2008), the phenomenon could be improved by relaxation of controls on capital movements and foreign exchange transactions, deregulation and elimination of restrictions on banking and securities dealings and, amelioration of ICTs. Section 3.2 above on the literature of financial market convergence and African business has already substantially covered reforms that are necessary to improve cross-border flow of investment and hence, ease the doing of business in the continent. It could also be worthwhile to consider the drivers of financial market convergence suggested by Cummins & Weiss (2009). Firstly, development of holistic or enterprise-wide risk management (ERM), whereby traditionally separated functions such as the management of insurable risks, commodity risks, currency risks, interest rate risks and other risks begin to merge under a single risk-management umbrella. Secondly, a major driver of financial convergence which primarily reflects market imperfections are various regulatory, accounting, tax and rating agency factors (RATs). Thirdly, favoring conditions for the reinsurance underwriting cycle. Fourthly, advances in ICTs.

5. 4. 6 Caveats

Three main caveats have been retained: negative spillovers due to convergence, the absence of a theoretical basis and, draw-backs in the methodology. Firstly, during financial convergence periods, policy makers should be aware that financial markets are subject to spillover effects and a shock emerging from a certain country/industry might spread quickly to other countries/industries. Secondly, using econometrics to accomplish more than just testing theory is not without risks. The intuition basis of the work implies, results should be interpreted with caution as the model is conditioned on the variables we choose and empirically test, which may

not directly reflect implemented policies that drive financial market convergence. Thirdly, as we have already outlined in the first paragraph of Section 4.2, the choice of the converge approach which is based on constraints in data structure also has its draw-backs. Consistent with Apergis et al. (2008), critics of β-convergence argue that if countries converge to a common equilibrium with identical internal structures, then the dispersion of the variable under study should disappear in the long-run as all countries converge to the same long-run path. If, however, countries converge to 'convergence clubs' or to their own unique equilibrium, the dispersion of this indicator will not approach zero (Miller & Upadhyay, 2002). Moreover, in the latter case of country-specific equilibrium, the movements of the dispersion will depend on the initial distribution of the variable under investigation with respect to their final long-run outcomes. Overall, as sustained by Caporale et al. (2009), the approach suffers from specific estimation deficiencies associated with the data structure.

6. Concluding remarks

This paper has dissected with great acuteness, the issues of convergence in financial performance dynamics in the African continent through the lenses of stock market capitalization, value traded, turnover and number of listed companies. The empirical evidence is premised on 11 homogenous panels based on regions (Sub-Saharan and North Africa), income-levels (Low, Middle, Lower-middle and Upper-middle), legal-origins (English common-law and French civil-law) and religious dominations (Christianity and Islam). With the exception of stock market turnover, findings have provided only partial support for the existence of absolute convergence in other stock market dynamics for some panels. Only SSA reveals conditional convergence in relation to per capita number of listed companies. The overwhelming absence of conditional convergence for the remaining panels is due to cross-country differences in structural and

institutional characteristics that explain stock market performance dynamics. Thus, differences in macroeconomic policies and government quality (control of corruption, political stability, rule of law, regulation quality, democracy…etc) among countries could lead to this deficiency in conditional convergence. The speed of convergence for the most part is between 12% and 28%.

As a policy implication, countries should work towards adopting common institutional and structural characteristics that favor stock market development.

Table 1: Summary of results on convergence

		Stock Market Capitalization				Stock Market Value Traded			
		AC	CC	SAC	SCC	AC	CC	SAC	SCC
Legal origins	English Common Law	No	No	---	---	Yes(1%)	No	14.63%	---
	French Civil Law	Yes(1%)	No	28.83%	---	No	No	---	---
Religions	Christianity	No	No	---	---	Yes(5%)	No	12.66%	---
	Islam	Yes(1%)	No	23.60%	---	Yes(5%)	No	16.70%	---
Regions	North Africa	Yes(1%)	No	23.23%	---	No	No	---	---
	Sub Saharan Africa	No	No	---	---	Yes(1%)	No	16.03%	---
	Low Income	No	No	---	---	No	No	---	---
Income Levels	Middle Income	No	No	---	---	Yes(1%)	No	13.46%	---
	Lower Middle Income	No	No	---	---	Yes(1%)	No	17.66%	---
	Upper Middle Income	No	No	---	---	No	No	---	---
	Africa	Yes(5%)	No	17.76%	---	Yes(1%)	No	15.06%	---

		Stock Market Turnover				Number of Listed Companies			
		AC	CC	SAC	SCC	AC	CC	SAC	SCC
Legal origins	English Common Law	No	No	---	---	Yes(5%)	No	12.66%	---
	French Civil Law	No	No	---	---	No	No	---	---
Religions	Christianity	No	No	---	---	Yes(1%)	No	13.06%	---
	Islam	No	No	---	---	No	No	---	---
Regions	North Africa	No	No	---	---	No	No	---	---
	Sub Saharan Africa	No	No	---	---	Yes(1%)	Yes(1%)	13.05%	19.73(%)
	Low Income	No	No	---	---	No	No	---	---
Income Levels	Middle Income	No	No	---	---	No	No	---	---
	Lower Middle Income	No	No	---	---	No	No	---	---
	Upper Middle Income	No	No	---	---	No	No	---	---
	Africa	No	No	---	---	No	Yes(5%)	---	25.03%

AC: Absolute Convergence. CC: Conditional Convergence. SAC: Speed of Absolute Convergence. SCC: Speed of Conditional Convergence.

Table 2: Absolute convergence in stock market performance dynamics

Stock Market Capitalization

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	0.116	**0.865*** **	0.310	**0.708*** **	**0.697*** **	0.338	0.704	0.425	0.523	0.239	**0.533** **
	(0.615)	**(0.004)**	(0.358)	**(0.000)**	**(0.000)**	(0.305)	(0.562)	(0.111)	(0.228)	(0.730)	**(0.033)**
2nd Auto	-0.233	-1.825*	-0.939	-1.564	-1.510	-1.035	-0.353	-2.09**	-1.927*	-0.786	-1.850*
OIR	8.227	3.681	7.885	3.689	2.720	8.844	3.758	8.813	5.641	3.822	11.832
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	42	20	43	19	15	47	15	47	29	18	62

Stock Market Value Traded

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.439*** **	0.283	**0.380** **	**0.501** **	0.069	**0.481*** **	0.175	**0.404*** **	**0.53*** **	0.093	**0.452*** **
	(0.000)	(0.306)	**(0.018)**	**(0.045)**	(0.890)	**(0.000)**	(0.388)	**(0.003)**	**(0.008)**	(0.827)	**(0.000)**
2nd Auto	-0.171	0.732	-0.254	0.926	0.162	-0.127	-0.334	1.178	1.083	-0.117	0.509
OIR	9.814	3.988	9.619	3.396	2.859	10.765	2.671	9.380	5.604	3.999	13.993
Countries	10	4	10	4	3	5	4	10	6	4	14
Obser	38	19	39	18	14	43	13	44	26	18	57

Stock Market Turnover

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	0.153	-0.161	0.047	0.414	-0.205	0.146	**-1.28*** **	0.154	0.140	0.234	0.166
	(0.572)	(0.659)	(0.856)	(0.384)	(0.691)	(0.535)	**(0.005)**	(0.546)	(0.706)	(0.568)	(0.434)
2nd Auto	1.196	0.446	1.180	1.572	-0.184	1.393	0.544	1.800*	1.543	0.977	1.692*
OIR	9.837	3.685	9.681	3.941	2.700	10.825	1.855	9.922	5.843	2.821	13.876
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	41	20	42	19	15	46	15	46	27	19	61

Number of Listed Companies

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.380** **	0.312	**0.408*** **	0.202	0.256	**0.405*** **	0.515	0.229	0.358	0.319	0.396
	(0.021)	(0.601)	**(0.009)**	(0.579)	(0.608)	**(0.009)**	(0.781)	(0.487)	(0.418)	(0.430)	(0.140)
2nd Auto	0.848	1.050	0.871	0.797	0.869	0.870	-0.085	1.005	1.077	-0.450	1.153
OIR	9.653	1.409	9.435	1.575	0.841	10.698	1.964	8.820	3.197	2.437	13.965
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	46	19	46	19	14	51	18	47	29	18	65

The first figure in each cell is the regression coefficient. P-values based on robust standard errors are reported in the brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively..English: Common-Law. French: Civil-Law. Christ: Christians. N.Africa: North Africa. SSA: Sub-Saharan Africa. Low I: Low Income. Middle I: Middle Income. LMI: Lower Middle Income. UMI: Upper Middle Income. 2nd Auto: Second Order Autocorrelation test. OIR: Overidentifying Restrictions test. Obser: Observations. Initial: lagged endogenous estimated coefficient.

Table 3: Conditional convergence in stock market performance dynamics

Stock Market Capitalization

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	0.006	**-3.086***	-0.010	-0.118	-0.028	0.175	34.49	-0.032	-0.289	-2.424	0.158
	(0.984)	**(0.055)**	(0.976)	(0.878)	(0.975)	(0.592)	(0.215)	(0.900)	(0.612)	(0.432)	(0.455)
Trade	-0.004	**-0.079****	**-0.005*****	-0.007	---	**-0.005****	0.145	-0.004	-0.008	0.068	-0.003
	(0.122)	**(0.023)**	**(0.008)**	(0.816)		**(0.018)**	(0.211)	(0.251)	(0.132)	(0.242)	(0.282)
Inflation	**0.003*****	**-0.119****	**0.003*****	---	---	**0.003*****	0.025	0.002	-0.004	-0.522	**0.003*****
	(0.000)	**(0.047)**	**(0.000)**			**(0.000)**	(0.164)	(0.828)	(0.460)	(0.222)	**(0.000)**
Intercept	0.140	**0.684****	**0.181****	0.277	0.342	**0.151****	-6.767	**0.216*****	**0.251****	**0.419*****	**0.180*****
	(0.219)	**(0.015)**	**(0.037)**	(0.140)	(0.439)	**(0.030)**	(0.240)	**(0.002)**	**(0.027)**	**(0.000)**	**(0.001)**
2nd Auto	-0.387	-1.027	-0.840	-1.193	-1.335	-1.343	---	-1.382	-0.734	---	-1.817*
OIR	7.305	0.000	6.559	3.238	2.429	8.560	---	6.892	3.194	---	11.294
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	40	20	41	19	15	45	15	45	29	16	60

Stock Market Value Traded

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	0.297	**-5.219****	0.390	-11.369	-0.178	0.153	-2.033	0.056	-0.429	-2.424	0.167
	(0.346)	**(0.048)**	(0.196)	(0.106)	(0.672)	(0.478)	(0.216)	(0.811)	(0.726)	(0.432)	(0.360)
Trade	**-0.013****	**-0.366***	**-0.012*****	-0.952	---	**-0.012****	-0.031	-0.006	-0.014	0.068	-0.006
	(0.036)	**(0.073)**	**(0.003)**	(0.111)		**(0.049)**	(0.243)	(0.436)	(0.149)	(0.242)	(0.491)
Inflation	**0.003*****	**-0.322***	**0.004*****	**-0.236***	---	**0.003****	-0.001	-0.019	-0.036	-0.522	**0.003*****
	(0.002)	**(0.057)**	**(0.000)**	**(0.081)**		**(0.013)**	(0.780)	(0.406)	(0.261)	(0.222)	**(0.002)**
Intercept	0.203	**3.286****	0.078	**4.791***	0.377	**0.263***	0.775	**0.328***	0.296	**0.419*****	0.214
	(0.304)	**(0.037)**	(0.660)	**(0.072)**	(0.602)	**(0.088)**	(0.216)	**(0.071)**	(0.447)	**(0.000)**	(0.133)
2nd Auto	-0.580	-0.949	-0.666	-0.381	-0.742	-0.433	-0.605	0.465	-0.369	---	0.034
OIR	8.604	0.000	6.080	0.000	2.954	10.650	---	7.600	3.671	---	12.887
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	36	19	37	18	14	41	13	42	26	16	55

Stock Market Turnover

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	-0.008	**-1.731***	0.062	1.201	-0.433	-0.118	1.698	-0.115	-0.300	0.085	0.022
	(0.982)	**(0.087)**	(0.839)	(0.518)	(0.467)	(0.765)	(0.500)	(0.657)	(0.814)	(0.905)	(0.939)
Trade	**-0.014***	-0.050	-0.011	0.133	---	-0.012	-0.025	-0.006	-0.001	-0.011	-0.011
	(0.096)	(0.335)	(0.120)	(0.341)		(0.256)	(0.384)	(0.490)	(0.988)	(0.813)	(0.198)
Inflation	**-0.001*****	-0.064	**-0.001***	-0.022	---	**-0.001*****	-0.001	**-0.03*****	-0.017	-0.112	**-0.001****
	(0.006)	(0.239)	**(0.068)**	(0.336)		**(0.007)**	(0.261)	**(0.004)**	(0.319)	(0.371)	**(0.012)**
Intercept	0.133	0.302	-0.007	0.052	-0.014	0.078	-0.420	0.126	-0.107	0.298	0.104
	(0.465)	(0.359)	(0.965)	(0.824)	(0.982)	(0.643)	(0.694)	(0.410)	(0.850)	(0.334)	(0.541)
2nd Auto	0.292	-1.246	0.694	1.918*	-0.913	0.747	0.097	1.068	0.094	0.728	1.184
OIR	8.078	0.000	6.352	---	2.583	9.637	---	6.408	0.308	---	13.822
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	39	20	40	19	15	44	15	44	27	16	59

Number of Listed Companies

	English	French	Christ	Islam	N.Africa	SSA	Low.I	Middle I	LMI	UMI	Africa
Initial	0.569	-0.228	0.754	8.567	0.017	**0.592*****	-16.29	0.293	0.104	1.188	**0.751****
	(0.146)	(0.751)	(0.116)	(0.540)	(0.984)	**(0.006)**	(0.184)	(0.399)	(0.858)	(0.536)	**(0.021)**
Trade	**-0.002***	-0.005	-0.001	0.006	---	-0.001	0.034	-0.0002	-0.000	0.011	-0.002
	(0.062)	(0.594)	(0.477)	(0.704)		(0.331)	(0.204)	(0.903)	(0.999)	(0.538)	(0.231)
Inflation	0.000	-0.012	-0.000	0.011	---	0.000	0.002	-0.004	-0.004	-0.016	0.000
	(0.798)	(0.593)	(0.768)	(0.621)		(0.898)	(0.197)	(0.687)	(0.685)	(0.630)	(0.975)
Intercept	-0.017	0.085	**-0.021***	-0.638	0.026	**-0.02*****	0.178	-0.028	-0.023	-0.123	-0.021
	(0.108)	(0.536)	**(0.067)**	(0.525)	(0.853)	**(0.008)**	(0.398)	(0.490)	(0.737)	(0.129)	(0.468)
2nd Auto	0.537	0.475	0.583	-0.761	-0.068	0.533	---	0.677	0.759	-1.307	0.912
OIR	6.365	---	7.320	---	0.651	7.987	---	6.411	2.448	---	13.495
Countries	10	4	10	4	3	11	4	10	6	4	14
Obser	43	19	43	19	14	48	17	45	29	16	62

The first figure in each cell is the regression coefficient. P-values based on robust standard errors are reported in the brackets. ***, **, and * indicate significance at 1%, 5% and 10% levels respectively. English: Common-Law. French: Civil-Law. Christ: Christians. N.Africa: North Africa. SSA: Sub-

Saharan Africa. Low I: Low Income. Middle I: Middle Income. LMI: Lower Middle Income. UMI: Upper Middle Income. 2nd Auto: Second Order Autocorrelation test. OIR: Overidentifying Restrictions test. Obser: Observations. Initial: lagged endogenous estimated coefficient.

Appendices

Appendix 1: Summary statistics

		Mean	S.D	Minimum	Maximum	Observations
Stock Market (SM)Performance	SM Capitalisation	0.396	0.585	0.024	3.382	90
	SM Value Traded	0.091	0.323	0.000	2.591	85
	SM Turnover	0.103	0.134	0.000	0.704	89
	Listed Companies	0.065	0.076	0.007	0.348	93
Control Variables	Inflation	28.723	120.89	0.995	1096.7	93
	Trade	82.709	30.414	39.018	209.41	98

S.D: Standard Deviation.

Appendix 2: Correlation analysis

Capitalisation	Value Traded	Turnover	Listed Companies	Inflation	Trade	
1.000	0.855	0.740	0.219	0.141	-0.271	Capitalisation
	1.000	0.788	0.093	0.005	-0.209	Value Traded
		1.000	0.100	-0.023	-0.330	Turnover
			1.000	-0.024	0.215	Listed Companies
				1.000	-0.007	Inflation
					1.000	Traded

Appendix 3: Variable definitions

Variables	Sign	Variable definitions	Sources
Stock Market Capitalization	SMC	Stock Market Capitalization(% of GDP)	World Bank(FDSD)
Stock Market Value Traded	SMVT	Stock Market Total Value Traded(% of GDP)	World Bank(FDSD)
Stock Market Turnover	SMT	Stock Market Turnover Ratio	World Bank(FDSD)
Listed Companies	ListC	Number of Listed Companies Per(% of Population)	World Bank(FDSD)
Inflation	Infl.	Consumer Prices (Annual %)	World Bank(WDI)
Openness	Trade	Imports(of goods and services) plus Exports(of goods and services) on GDP	World Bank(WDI)

FDSD: Financial Development and Structure Database. WDI: World Bank Development Indicators.

Appendix 4: Presentation of countries

Groups	Group category	Countries	Num
Legal Origin	English Common-Law	Botswana, Ghana, Kenya, Mauritius, Namibia, Nigeria, South Africa, Swaziland, Zambia, Zimbabwe.	10
	French Civil-Law	Ivory Coast, Egypt, Morocco, Tunisia.	4
Religions	Christianity	Botswana, Ivory Coast, Ghana, Kenya, Mauritius, Namibia, South Africa, Swaziland, Zambia, Zimbabwe.	10
	Islam	Egypt, Morocco, Nigeria, Tunisia.	4
Regions	Sub-Saharan Africa	Botswana, Ghana, Kenya, Mauritius, Namibia, Nigeria, South Africa, Swaziland, Zambia, Zimbabwe. Ivory Coast.	11
	North Africa	Egypt, Morocco, Tunisia.	3
Income Levels	Low-Income	Ghana, Kenya, Zambia, Zimbabwe.	4
	Middle-Income	Botswana, Ivory Coast, Egypt, Mauritius, Morocco, Namibia, Nigeria, South Africa, Swaziland, Tunisia.	10
	Lower-Middle-Income	Ivory Coast, Egypt, Morocco, Nigeria, Senegal, Sudan, Swaziland, Tunisia.	8
	Upper-Middle-Income	Botswana, Mauritius, Namibia, South Africa.	4

Num: Number of cross sections(countries)

Appendix 5: Averages of country-specific stock market performance dynamics

	Stock market performance dynamics			
Countries	SM Capitalization	SM Value Traded	SM Turnover	Listed Companies
Botswana	0.288	0.009	0.047	0.085
Egypt	0.421	0.150	0.249	0.105
Ghana	0.170	0.006	0.030	0.011
Ivory Coast	0.230	0.004	0.019	0.020
Kenya	0.238	0.017	0.053	0.017
Morocco	0.494	0.051	0.188	0.022
Mauritius	0.525	0.019	0.071	0.306
Namibia	0.102	0.004	0.044	0.057
Nigeria	0.101	0.007	0.051	0.015
South Africa	1.913	0.785	0.316	0.133
Swaziland	0.113	0.0004	0.002	0.045
Tunisia	0.126	0.016	0.115	0.042
Zambia	0.150	0.002	0.034	0.010
Zimbabwe	0.507	0.063	0.140	0.057
Total Average	**0.384**	**0.081**	**0.097**	**0.066**

SM:Stock Market

Acknowledgement

The author is highly indebted to the editor and referees for their very useful comments.

References

Adler, M., & Dumas, B. (1983). International Portfolio Choice and Corporation Finance: A Synthesis, *Journal of Finance*, 38, 925-984.

Alagidede, P. (2008). African Stock Market Integration: Implications for Portfolio Diversification and International Risk Sharing. *Proceedings of the African Economic Conferences* 2008.

Allen, F. & Gale, D. (2000). *Comparing Financial Systems*. The MIT Press, Cambridge, MA.

Apergis, N., Christou, C., & Miller, S. M. (2010). Country and Industry Convergence in Equity Markets: International Evidence from Club Convergence and Clustering. Department of Banking and Financial Management, University of Piraeus, Greece

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58, 277-297.

Balcerowicz, L., & Fischer, S. (2006). *Living standards and the wealth of nations. Successes and failures in real convergence*. The MIT Press.

Baltagi, B. H., & Demetriades, P. (2011). Introduction to the special issue on new perspectives on finance and development, *Empirical Economics*, 41, 1-5.

Barro, R. J. (1991). Economic growth in a cross section of countries", *Quarterly Journal of Economics*, 106, 407-443.

Barro, R. J., & Sala-i-Martin, X. (1991). Convergence across States and Regions, *Brookings Papers on Economic Activity*, 22 (1991-1), 107-182.

Barro, R. J., & Sala-i-Martin, X. (1992). Convergence, *Journal of Political Economy*, 100, 223-251.

Barro, R. J., & Sala-i-Martin, X. (1995). *Economic Growth*. The MIT Press, Cambridge, MA.

Bartels, F. L., Alladina, S. N., & Lederer, S. (2009). Foreign Direct Investment in Sub-Saharan Africa: Motivating Factors and Policy Issues, *Journal of African Business*, 10(2), 141-162.

Baumol, W. J. (1986). Productivity, growth, convergence and welfare: what the long run data show, *American Economic Review*, 76, 1072-1085.

Beine, M., Cosma, A., & Vermeulen, R. (2010). The dark side of global integration: increasing tail dependence, *Journal of Banking and Finance*, 34, 184-192.

Bessler, D. A., & Yang, J. (2003). The structure of interdependence in international stock markets", *Journal of International Money and Finance*, 22, 261-287.

Biekpe, N. (2004). Financing Small Businesses in Sub-Saharan Africa: Review of Some Key Credit Lending Models and Impact of Venture Capital Provision, *Journal of African Business*, 5 (1), 29-44.

Bliss, C. (2000). Galton's Fallacy and Economic Convergence: A Reply to Cannon and Duck, *Oxford Economic Papers*, 52, 420-422.

Bliss, C. (1999). Galton's Fallacy and Economic Convergence: A Reply to Cannon and Duck, *Oxford Economic Papers*, 51, 4-14.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics*, 87(1), 115-143.

Bossone, B., & Honohan, P. (2003). Coping with a Small Financial System. Policy Issues for Africa, *Journal of African Business*, 4(2), 5-20.

Brada, J. C., Kutan, A. M., & Zhou, S. (2005). Real and monetary convergence between European Union's core and recent member countries: a rolling cointegration approach, *Journal of Banking and Finance*, 29, 249-270.

Bruno, G., De Bonis, R., & Silvestrini, A. (2011). Do financial systems converge? New evidence from financial assets in OECD countries, *Journal of Comparative Economics*: Forthcoming.

Calcagnini, G., Farabullini, F., & Hester, D. D. (2000). Financial Convergence in the European Monetary Union? *SSRI Working Paper Series 2022*, University of Wisconsin, Madison.

Caporale, G. M., Erdogan, B., & Kuzin, V. (2009). Testing for Convergence in Stock markets: A Non-Linear Factor Approach. *Discussion Paper* No. 932, Deutsches Institut fur Wirtschaftsforschung, Berlin.

Cellini, R., & Scorcu, A. E. (1995). How many Italies? What data show about growth and convergence across Italian regions 1970-91. Miemo, University of Bologna.

Chen, G-M., Firth, M., & Rui, O. M. (2002). Stock market linkages: evidence from Latin America*, Journal of Banking and Finance*, 26, 1113-1141.

Clark, R. A. (2003). African Securities Market Designs, *Journal of African Business*, 4(3), 83-102.

Costantini, M., & Lupi, C. (2005). Stochastic Convergence among European Economies. *Economics Bulletin*, 3(38), 1-17.

Cummins, J. D., & Weiss, M. A. (2009). Convergence of insurance and financial markets: hybrid and securitized risk-transfer solutions, *The Journal of Risk and Insurance*, 76(3), 493-545.

Darley, W. K. (2012). Increasing Sub-Saharan Africa's Share of Foreign Direct Investment: Public Policy Challenges, Strategies, and Implications, *Journal of African Business*, 13(1), 62-69.

Elyasiani, E., Mansur, I., & Pagano, M. S. (2007). Convergence and risk-return linkages across financial service firms, *Journal of Banking and Finance*, 31, 1167-1190.

Eun, C. S., & Lee, J. (2010). Mean-variance around the world, *Journal of Banking and Finance*, 34, 856-870.

Fung, M. K. (2009). Financial development and economic growth: convergence or divergence?, *Journal of International Money and Finance*, 28, 56-67.

Giannetti, M., Guiso, L., Jappelli, T., Padula, M., & Pagano, M. (2002). Financial Market Integration, Corporate Financial and Economic Growth, *European Commission Economic Papers* No. 179, Brussels.

Goldsmith, R. W. (1969). *Financial Structure and Development*. Yale University Press, New Haven, CT.

Gray, K. R., & Bythewood, C. (2001). Emerging Securities Exchanges in Africa. International Characteristics of the Nairobi Stock Exchange, *Journal of African Business*, 2(3), 65-73.

Grubel, H. (1968). Internationally diversified portfolio: welfare gains in capital flows, *American Economic Review*, 58, 89-94.

Holzl, W. (2006). Convergence of financial system: towards an evolutionary perspective, *Journal of Institutional Economics*, 2, 67-90.

International Monetary Fund (2006). How do financial systems affect economic cycles?, *World Economic Outlook*, September (Chapter 4).

Islam, N. (1995). Growth Empirics: A Panel Data Approach, *The Quarterly Journal of Economics*, 110, (4), 1127-1170.

Islam, N. (2003). What have We Learnt from the Convergence Debate?, *Journal of Economic Surveys*, 17 (3), 309-362.

Kaul, A., Mehrotra, V. (2007). The role of trades in price convergence: a study of dual-listed Canadian stocks, *Journal of Empirical Finance*, 14, 196-219.

Kim, S. J., Moshirian, F., & Wu, E. (2005). Dynamic stock market integration driven by the European Monetary Union: an empirical analysis, *Journal of Banking and Finance*, 29, 2475-2502.

Kim, S. J., Moshirian, F., & Wu, E. (2006). Evolution of international stock and bond market integration: influence of the European Monetary Union, *Journal of Banking and Finance*, 30, 1507-1534.

Kumo, W. L. (2011). Growth and Macroeconomic Convergence in Southern Africa, *African Development Banking Working Paper 130*, Tunis, Tunisia.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and finance, *Journal of Political Economy*, 106, 1113-1155.

Levine, R. (1997). Financial Development and Economic Growth: views and agenda, *Journal of Economic Literature*, 35, 688-726.

Levy, H., & Sarnat, M. (1970). International diversification of investment portfolios, *American Economic Review*, 60, 668-675.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth, *Quarterly Journal of Economics*, 107, 407–437.

Miller, S. M., & Upadhyay, M. P. (2002). Total factor productivity and the convergence hypothesis. *Journal of Macroeconomics* 24, 267-286.

Mutenheri, E., & Green, C. J. (2003). Financial Reform and Financing Decisions of Listed Firms in Zimbabwe, *Journal of African Business*, 4(2), 155-170.

Narayan, P. K., Mishra, S., & Narayan, S. (2011). Do market capitalization and stocks traded converge? New global evidence, *Journal of Banking and Finance*, 35, 2771-2781.

Ngugi, R. W., Murinde, V., & Green, C. J. (2003). How Have the Emerging Stock Exchanges in Africa Responded to Market Reforms?, *Journal of African Business*, 4(2), 89-127.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge, UK.

North, D. C. (1994). Economic performance through time, *American Economic Review*, 84, 359-368.

Orlowski, L. T. (2005). Monetary convergence of the E.U accession countries to the eurozone: a theoretical framework and policy implications, *Journal of Banking and Finance*, 29, 203-225.

Pritchett, L. (1997). Divergence, Big Time, *Journal of Economic Perspectives*, 11(3), 3-17.

Quartey, P. (2003). Financing Small and Medium Enterprises (SMEs) in Ghana, *Journal of African Business*, 4(1), 37-55.

Rajan, R., & Zingales, L. (2003). Banks and Markets: The Changing Character of European Finance, *NBER Working Paper* No. 9595.

Rodrik, D. (2006). Goodbye Washington consensus. Hello Washington confusion? A review of the World Bank's economic growth in the 1990s: Learning from a decade of reform, *Journal of Economic Literature*, 44, 973-987.

Rodrik, D. (2011). The Future of Economic Convergence, *NBER Working Paper* No. 17400.

Rolfe, R. J., & Woodward, D. P. (2004). Attracting foreign investment through privatization: the Zambian experience, *Journal of African Business*, 5(1), 5-27.

Shleifer, A. (2009). The age of Milton Friedman, *Journal of Economic Literature*, 47, 123-135.

Solow, R. M. (1956). A contribution to the theory of economic growth, *Quarterly Journal of Economics*, 70, 65-94.

Su, Y-C., Huang, H-C., Hsu, M-W. (2010). " Convergence to market efficiency of top gainers", *Journal of Banking and Finance*, 34, 2230-2237.

Swan, T. (1956). Economic growth and capital accumulation. *Economic Record*, 32, 334–361.

Toumi, K. (2011). The Role of the Investment Climate and Tax Incentives in the Foreign Direct Investment Decision: Evidence from South Africa, *Journal of African Business*, 12(1), 133-147.

Umutlu, M., Akdeniz, L., & Altag-Salih, A. (2010). The degree of financial liberalisation and aggregated stock-return volatility in emerging markets, *Journal of Banking and Finance*, 34(3), 509-521.

Von Furstenberg, G. M., & Jeon, B. N. (1989). International stock price movements: links and messages, *Brookings Papers on Economic Activity*, 1, 125-179.

Yu, I-W., Fung, K-P., & Tam, C-S. (2010). Assessing the financial market integration in Asia-equity markets, *Journal of Banking and Finance*, 34, 2874-2885.