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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 SSA 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. Introduction

Economic policy makers have expressed profound interest in the issue of whether African countries lagging in financial development are catching-up with forerunners in the continent(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 by these studies for the most part: (1) if undeveloped countries converge to developed countries and in cases where convergence apply; (2) the 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; Orłowski, 2005; Kim et al.,2005, 2006; Elyasiani et al.,2007; Eun & Lee, 2010; Su et al., 2010; Narayan et al., 2011).

This paper analyses 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. The following specific characteristics make-up the panels: 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 it is the first paper to empirically examine convergence in African stock markets. Secondly, we employ different aggregate measures of stock markets performance, contrary to Narayan et al.(2011): a study closest to the current paper in the literature. Thirdly, emphasis on 11 homogenous panels provides detail insights on the phenomenon in the African continent. Fourthly, this work is not only concerned with the existence or not 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 methodology are presented and outlined respectively in Section 4. Empirical analysis is covered in Section 5. Section 6 concludes.

2. Conflicts in the literature

According to 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 side 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 coupled with the rethinking of the role of finance after the recent financial crisis (Baltagi & Demetriades, 2011) have prompted growing studies on the difference 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. 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; Rajan & Zingales, 2003; Holzl, 2006). 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, where-in 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 mirrored in 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).

This paper shall attempt to discriminate between these two views from an African standpoint in a financial market perspective. Findings could have substantial policy implications given the motivations for financial market convergence in the continent.

3. Motivation 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 strife 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 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 arbitrated 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 draws on the tenets of arbitrage and the hypothesis proffered by 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). These works have for the most part considered short-run linkages of stock markets and have found the existence of short-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 short-run relationships which depict some form of convergence in stock markets.

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 fetched from the later source. Due to constraints in data availability, dataset spans from 1991 to 2009. Details of summary statistics(Appendix 1), correlation analysis (Appendix 2), variable definitions(Appendix 3) and presentation of countries(Appendix 4) are found in the appendices.

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).

4.2 Model and estimation approach

Following Fung(2009) Eqs.(1) and (2) below are the standard approaches in the literature for testing conditional convergence if $W_{i,t}$ is taken as 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 height 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 where 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, we borrow from Narayan et al.(2011) in using a 3 year non-overlapping interval such that we have six time intervals: 1992-1994; 1995-1996 and so on. This implies in our regression, 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. The 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.

5. Empirical analysis

This sections 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 are 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 Arrellano 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: AR(2) test 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

A summary of the results from tables 2-3 is presented in Table 1. This includes findings for Absolute Convergence(AC), Conditional Conditional(CC), the Speed of Absolute

Convergence(SAC) as well as the Speed of Conditional Convergence(SCC). We notice that of 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 and; (4) two 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.

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%	---
Income Levels	Low Income	No	No	---	---	No	No	---	---
	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(%)
Income Levels	Low Income	No	No	---	---	No	No	---	---
	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.

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 17.96 yrs); 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: 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 convergence, then only SSA meets this requirement with respect to per capita number of listed companies.

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 (0.615)	0.865*** (0.004)	0.310 (0.358)	0.708*** (0.000)	0.697*** (0.000)	0.338 (0.305)	0.704 (0.562)	0.425 (0.111)	0.523 (0.228)	0.239 (0.730)	0.533** (0.033)
2 nd 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*** (0.000)	0.283 (0.306)	0.380** (0.018)	0.501** (0.045)	0.069 (0.890)	0.481*** (0.000)	0.175 (0.388)	0.404*** (0.003)	0.53*** (0.008)	0.093 (0.827)	0.452*** (0.000)
2 nd 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 (0.572)	-0.161 (0.659)	0.047 (0.856)	0.414 (0.384)	-0.205 (0.691)	0.146 (0.535)	-1.28*** (0.005)	0.154 (0.546)	0.140 (0.706)	0.234 (0.568)	0.166 (0.434)
2 nd 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** (0.021)	0.312 (0.601)	0.408*** (0.009)	0.202 (0.579)	0.256 (0.608)	0.405*** (0.009)	0.515 (0.781)	0.229 (0.487)	0.358 (0.418)	0.319 (0.430)	0.396 (0.140)
2 nd 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

***, **, *: significance levels of 1%, 5% and 10% 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 (0.984)	-3.086* (0.055)	-0.010 (0.976)	-0.118 (0.878)	-0.028 (0.975)	0.175 (0.592)	34.49 (0.215)	-0.032 (0.900)	-0.289 (0.612)	-2.424 (0.432)	0.158 (0.455)
Trade	-0.004 (0.122)	-0.079** (0.023)	-0.005*** (0.008)	-0.007 (0.816)	---	-0.005** (0.018)	0.145 (0.211)	-0.004 (0.251)	-0.008 (0.132)	0.068 (0.242)	-0.003 (0.282)
Inflation	0.003*** (0.000)	-0.119** (0.047)	0.003*** (0.000)	---	---	0.003*** (0.000)	0.025 (0.164)	0.002 (0.828)	-0.004 (0.460)	-0.522 (0.222)	0.003*** (0.000)
Intercept	0.140 (0.219)	0.684** (0.015)	0.181** (0.037)	0.277 (0.140)	0.342 (0.439)	0.151** (0.030)	-6.767 (0.240)	0.216*** (0.002)	0.251** (0.027)	0.419*** (0.000)	0.180*** (0.001)
2 nd 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 (0.346)	-5.219** (0.048)	0.390 (0.196)	-11.369 (0.106)	-0.178 (0.672)	0.153 (0.478)	-2.033 (0.216)	0.056 (0.811)	-0.429 (0.726)	-2.424 (0.432)	0.167 (0.360)
Trade	-0.013** (0.036)	-0.366* (0.073)	-0.012*** (0.003)	-0.952 (0.111)	---	-0.012** (0.049)	-0.031 (0.243)	-0.006 (0.436)	-0.014 (0.149)	0.068 (0.242)	-0.006 (0.491)
Inflation	0.003*** (0.002)	-0.322* (0.057)	0.004*** (0.000)	-0.236* (0.081)	---	0.003** (0.013)	-0.001 (0.780)	-0.019 (0.406)	-0.036 (0.261)	-0.522 (0.222)	0.003*** (0.002)
Intercept	0.203 (0.304)	3.286** (0.037)	0.078 (0.660)	4.791* (0.072)	0.377 (0.602)	0.263* (0.088)	0.775 (0.216)	0.328* (0.071)	0.296 (0.447)	0.419*** (0.000)	0.214 (0.133)
2 nd 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 (0.982)	-1.731* (0.087)	0.062 (0.839)	1.201 (0.518)	-0.433 (0.467)	-0.118 (0.765)	1.698 (0.500)	-0.115 (0.657)	-0.300 (0.814)	0.085 (0.905)	0.022 (0.939)
Trade	-0.014* (0.096)	-0.050 (0.335)	-0.011 (0.120)	0.133 (0.341)	---	-0.012 (0.256)	-0.025 (0.384)	-0.006 (0.490)	-0.001 (0.988)	-0.011 (0.813)	-0.011 (0.198)
Inflation	-0.001*** (0.006)	-0.064 (0.239)	-0.001* (0.068)	-0.022 (0.336)	---	-0.001*** (0.007)	-0.001 (0.261)	-0.03*** (0.004)	-0.017 (0.319)	-0.112 (0.371)	-0.001** (0.012)
Intercept	0.133 (0.465)	0.302 (0.359)	-0.007 (0.965)	0.052 (0.824)	-0.014 (0.982)	0.078 (0.643)	-0.420 (0.694)	0.126 (0.410)	-0.107 (0.850)	0.298 (0.334)	0.104 (0.541)
2 nd 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 (0.146)	-0.228 (0.751)	0.754 (0.116)	8.567 (0.540)	0.017 (0.984)	0.592*** (0.006)	-16.29 (0.184)	0.293 (0.399)	0.104 (0.858)	1.188 (0.536)	0.751** (0.021)
Trade	-0.002* (0.062)	-0.005 (0.594)	-0.001 (0.477)	0.006 (0.704)	---	-0.001 (0.331)	0.034 (0.204)	-0.0002 (0.903)	-0.000 (0.999)	0.011 (0.538)	-0.002 (0.231)
Inflation	0.000 (0.798)	-0.012 (0.593)	-0.000 (0.768)	0.011 (0.621)	---	0.000 (0.898)	0.002 (0.197)	-0.004 (0.687)	-0.004 (0.685)	-0.016 (0.630)	0.000 (0.975)
Intercept	-0.017 (0.108)	0.085 (0.536)	-0.021* (0.067)	-0.638 (0.525)	0.026 (0.853)	-0.02*** (0.008)	0.178 (0.398)	-0.028 (0.490)	-0.023 (0.737)	-0.123 (0.129)	-0.021 (0.468)
2 nd 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

***, **, *: significance levels of 1%, 5% and 10% 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.

5.4 Discussion and policy implication

Before we dive into the discussion 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 improved 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 communication and information technology; this has facilitated absolute convergence. 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.

On the other hand, conditional convergence is that which is contingent on structural and institutional characteristics. Borrowing from 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 (Narayan 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; Narayan et al., 2011). 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 (control of corruption, political stability, rule of law, regulation quality, democracy...etc) among countries could lead to this deficiency in conditional convergence.

On a general note, African financial markets still 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.

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 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.

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)

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