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African Financial Development Dynamics: Big Time Convergence

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 WP/12/003

AGDI Working Paper

Research Department

African Financial Development Dynamics: Big Time Convergence

Simplice A. Asongu[1]

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Abstract

Purpose - Assessment of African financial development dynamic convergences in money, credit, efficiency and size.

Design/Methodology - 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). We examine convergence in financial intermediary dynamics of depth, efficiency, activity and size.

Findings - Findings suggest that countries with small-sized financial intermediary depth, efficiency, activity and size are catching-up countries with large-sized financial intermediary depth, efficiency, activity and size respectively. We also provide the speeds of convergence and time necessary to achieve a full (100%) convergence.

Practical implications - The presence of strong links among African banking sectors may present little opportunity for portfolio diversification. The convergence patterns show positive steps towards regional integration. As a policy implication, African governments should not relent in structural and institutional reforms.

Originality/value - It is the first critical assessment of convergence in financial intermediary development dynamics in the African continent.

JEL Classification: F15; F36; F42; O55; P52
Keywords: Convergence; Policy Coordination; Banking; Africa

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1. Introduction

Evidence of financial integration and convergence are considered of utmost importance in assessing the outcome of deregulation policies aimed at improving the performance and efficiency of the financial intermediary sector (Casu & Girardone, 2010). Financial and economic integrations in Africa are expected to provide gains in growth by favoring competition and efficiency in the banking sector. These gains result from price reductions in financial services, leading to direct gains for consumers and indirect benefits through the reduction of loan rates that favor investment (Weill, 2009).

One of the most important economic developments of the past quarter century has been the convergence of previously separated segments of financial markets in developed countries (Asongu, 2012). A convergence that has coincided with the growing globalization of the financial markets in Europe, the United States and Asia. Although a number of papers have focused on the dynamic interdependence of equity markets worldwide, the emphasis has often been on developed economies and the emerging markets of Latin America and Asia. However, with increasing deregulation of financial services, financial reforms, emergence of new risks and advances in computer modeling and telecommunication technologies, Africa has recently experienced significant economic and financial development.

In light of the above, coupled with motivations for financial convergence[2] and the current debate on financial integration in Africa, investigating financial intermediary convergence is

[2]Financial theory acknowledges integrated markets to be relatively more efficient in terms of capital allocation compared to divergent ones (Chen et al., 2002); financial stability due to minimization of the probability for asymmetric shocks (Umutlu et al., 2010); convergence in stock market performance dynamics will stimulate cross-border flow of funds, improve trading volume which will in-turn improve market liquidity; lower cost of capital for firms and lower transaction cost for investors (Kim et al., 2005); 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).

therefore relevant for the continent. To the best of our knowledge, this is the first assessment of convergence in the African banking sector. The critical assessment is based on 11 different panels depicting: middle income, upper middle income, lower middle income, low income, English common-law, French civil-law, North African, sub-Saharan African, Christian-dominated and Moslem-oriented countries. The richness of our dataset and the employment of financial intermediary dynamics of depth, efficiency, activity and size in the investigation provide a robust account of the state of financial convergence in Africa. An added appeal of this seminal work is that, it provides the rate of convergence as well as the time required to achieve full (100%) convergence which are relevant guidelines in policy making. The rest this study is structured as follows. Section 2 presents the intuition, summarizes conflicts in the literature and discusses the motivations for stock market convergence in Africa. Data and methodology are presented and outlined respectively in Section 3. Empirical analysis is covered in Section 4. Section 5 concludes.

2. Intuition and existing literature

2.1 Intuition

With respect to Narayan et al. (2011), whereas there is a theory and vast empirical work on per capita income convergence, there is as yet not a theory on financial system convergence. Owing to 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. Therefore, we side with Costantini & Lupi (2005) in the position that, applied econometrics has other tasks than merely validating or refuting economic theories. Hence, the need to understand the economic intuition motivating convergence in the financial intermediary sector. Within the framework of this paper,

convergence may either be absolute (in the absence of other variables) or conditional (in the presence of other variables).

On the one hand, absolute convergence in financial intermediary markets occurs when countries share similar fundamental characteristics with respect to their banking sectors, such that the only difference across countries is in the initial level of financial market development. Absolute convergence for instance arises from factors such as the creation of monetary unions and adoption of a single currency, inter alia. 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 the developing countries (Asongu, 2012). 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 investment and trade; thus, obviates the need for investor preference for one market over the other. Financial markets are increasingly becoming synchronized with advances in information and communication technologies (ICTs). A direct 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 soared). Due to the above factors, absolute convergence in financial markets will take place. When full (100%) 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 the same vein, it is the possibility of similar yields for financial assets of similar risk and

liquidity, regardless of nationality and locality. Ultimately, portfolio diversification becomes unlikely to be beneficial to investors.

On the other hand, 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 Asongu (2012), in motivating our idea of conditional convergence, we argue that when financial intermediary markets across countries differ in terms of factors relating to the performance of their financial markets, there will be conditional convergence. Financial transactions influence prices due to reasons of information and liquidity and by validating quotes from other markets trading can promote price-convergence. In the same vein, the opposite effect of price-divergence is also probable because trading 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

The last three decades have come alongside paramount 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 a growing body of work on the similarities and differences between national financial systems (Bruno et al., 2011). This has led to two strands in the literature on the impact of openness (trade and capital) on financial market convergence. The third strand justifies our expectations with respect to the first-two conflicting strands while, the fourth strand discusses existing approaches to modeling convergence.

The first strand entails proponents asserting that openness, 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 bank-based and market-based systems is less relevant than in the past (Allen & Gale, 2000; Rajan & Zingales, 2003; Holzl, 2006). With regard to this thesis, financial structures have converged towards a model which combines characteristics of the Anglo-Saxon model (in which investment banks and markets prevail) with elements of the continental European systems (in which commercial banks are predominant). More so, from 1980 through 2005, most countries in the world adopted free market policies that have proven crucial 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 moved in tandem with real convergence. One dimension through which financial convergence can occur is via financial integration. This is grounded on the fact that, financial integration augments the supply of finance in the less financially developed countries. This process may be reflected in an expansion in the size of national financial systems with respect 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 could reflect a convergence trend in the aftermath of the common markets in 1993 and of the euro area in 1999 (Calcagnini et al., 2000).

On the contrary, another strand of 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 segment of countries does not necessarily imply their economic convergence

even in the distant future. Thus, the presence of different informal norms and enforcement features explain persistent diversity among countries. The recent financial meltdown and economic down-turn have affected different countries with varying intensities. The IMF financial development index (IMF, 2006) depicts a large difference between developed and developing countries without significant variations between 1995 and 2004. Some authors stress the path dependency of financial development and the role legal origins play in accounting for cross-country variations in stock market development. It is argued that, the institutional web of informal norms, formal rules and enforcement are characteristics of the economic and financial performances of a country (La Porta et al., 1988; North, 1990, 1994). This paper shall attempt to discriminate between these two views in Africa from a financial intermediary standpoint. Findings could have important policy implications given the motivations for financial system convergence in the continent.

A priori, we expect some form of convergence given common first and second generational financial reforms that have been implemented by countries in the sample. The goals of these financial reforms have been to give an impetus to economic growth as well as improve overall economic and financial efficiency (Janine & Elbadawi, 1992). In the first generational reforms, measures adopted included: abolishment of explicit controls on the pricing and allocation of credit, reduction of direct government intervention in bank credit decisions, relaxation of controls on international capital movements and, allowance of interest rates to be market determined. The second generation of reforms targeted structural and institutional constraints, improvement of legal, regulatory, supervisory and institutional environments; restoration of bank soundness and rehabilitation of the financial infrastructure (Batuo et al., 2010). These reforms should facilitate convergence in the financial intermediary sector.

Over the last two decades, a novel 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 total cross-sectional dispersion. According to Islam (2003), β-convergence is a necessary but not a 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 (Asongu, 2012). Initial empirical tests of the convergence hypothesis considered β-convergence in which; without additional control variables absolute (unconditional) convergence is investigated, whereas with additional control variables, conditional convergence is examined. An alternative view of convergence, the sigma (σ) convergence argues that a group of economies converge when the cross-sectional variance of the variable under investigation decreases across time. Beside β-convergence and σ-convergence, cointegration and unit root tests have also been employed. Justification for the choice of the β-convergence approach will be provided in the methodology section of the paper.

2.3 Financial intermediary market convergence and African business

2. 3.1 Motivations for convergence in African financial markets

The financial system plays a crucial role in modern economic literature debates (Scholtens & Naaborg, 2005). Firstly, it is believed to impact on the effectiveness of the transmission mechanism of monetary policy (Bondt, 2000). Secondly, it is thought to affect the channels through which financial development is linked to economic growth (Allen & Gale, 2000). The financial system interacts with the economy by producing information ex-ante about possible investments, allocation of capital, monitoring of investments, exertion of corporate

governance after providing finance, facilitating trading, diversifying and managing risk, mobilizing and pooling savings and, easing the exchange of goods and services (Levine, 2004).

Although a number of papers have assessed the dynamic interdependence of equity markets worldwide, the emphasis has often been on developed markets and the emerging economies of Latin America and Asia. According to Alagidede (2008), such neglect is far from surprising since African financial intermediary markets are perceived as excessively risky and have less developed operating institutional environments. Economic instability and political strife have plagued many African countries and continue to pose a threat to foreign investments and private capital flows (Kenyan post elections 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 yet risen to a significant economic power. This might partly elucidate the lack of academic research on the banking sector of the continent. However, Africa has recently witnessed significant economic and financial developments, thus assessing convergence from multidimensional financial perspectives in the continent could have important policy implications.

Convergence within the framework of the current paper simply put, implies the integration of banking sector market dynamics of: depth, efficiency, activity and size. Financial theory considers integrated markets to be relatively more efficient compared to divergent ones. An integrated financial intermediary market by virtue of stimulating cross-border flow of funds, augments trading volume which in-turn improves stock market liquidity. Integrated banking markets award investors with the opportunity to efficiently allocate capital (Chen et al., 2002). This leads to a lower cost of capital for firms and lower transaction costs for investors (Kim et al., 2005). An integrated banking market also has the positive rewards to financial stability as it

minimizes the probability of asymmetric shocks (Umutlu et al., 2010). Financial intermediary stability in-turn may reduce the risk of cross-border financial contagion (Beine et al., 2010) and ameliorate the capacity of economies to absorb shocks (Yu et al., 2010).

Financial intermediary dynamics may also converge to reflect the level of arbitrage activity. When they converge, it implies there is a common force such as arbitrage activity that brings the markets together. In other words it indicates that, through market convergence the potential for making above normal profits via international diversification will be limited as supernormal profits are arbitraged away (Von Furstenberg & Jeon, 1989). In the same vein, 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 locality and nationality (Von Furstenberg & Jeon, 1989).

The need for convergence in African stock markets has foundations in arbitrage and the hypotheses proposed in the portfolio theory. The motivations for convergence of financial markets has premises in the literature of banking sector interdependence and portfolio diversification (Grubel., 1968; Levy & Sarnat, 1970). These works have (for the most part) considered short-run relationships of stock markets and have found the existence of short-term financial market co-movements. The findings have been extended to cover co-movements of financial markets over the long-run (Bessler & Yang, 2003). Majority of these works have shown evidence of cointegration[3] as well as short-run relationships which depict some form of convergence in financial markets.

[3] 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; Asongu, 2012). However, when for a financial intermediary development 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; Asongu, 2012).

2.3.2 Financial intermediary market convergence and African business

According to Asongu (2012), 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. 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; Asongu, 2012). There are positive signs that regional integration and financial convergence would provide the necessary continental solution. African governments are now focusing on the importance of moving towards more market-oriented economies and development of the financial infrastructure to mobilize funds both for public and private sectors (Gray & Bythewood, 2001).

Reforms are drivers of financial market convergence, hence first and second generational reforms will favor convergence and the ease of doing business (Bossone & Honohan, 2003; Clark, 2003; Ngugi et al., 2003; Mutenheri & Green, 2003). Bossone & Honohan have recommended reforms towards more regional cooperation as a possible way of alleviating concerns originating from small financial systems. Issues over standardized rules and regulations in reforms for stock markets have also been raised (Clark, 2003). In response, Ngugi et al. (2003) have examined how African stock markets have responded to the reform process and identified three main types of reforms implemented in these markets since the 1990s, notably: modernization of trading systems, revitalization of the regulatory framework 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. Mutenheri & Green (2003) have confirmed this strand on reforms in a Zimbabwean context. They have examined

financial reforms and financing decisions of listed firms in the country to find out that, the reforms achieved some success in opening-up the capital markets and improving the transparency of firm financing behavior[4]. These all constitute drivers of financial intermediary market convergence.

Convergence in African financial intermediary markets will therefore provide efficient alternative forms of investment in compensation for the failed privatization projects. SSA's share of Foreign Direct Investment (FDI) unfortunately averages only 1% of global flows (Bartels et al., 2009). A strand of issues in the African business literature also focuses on how to improve Africa's share of Foreign Direct Investment (FDI). In view of the Rolfe & Woodward (2004) recommendation (for African countries to attract investment through other channels), private capital flows from financial markets and domestic banks are complementary to FDI. The low level of private capital flows into Africa has been largely due to political economy considerations, regulatory uncertainty, skills, labor, regulation and exchange rate volatility (Bartels et al., 2009; Tuomi, 2011). More recently, Darley (2012) has suggested the expansion of regional trading arrangements as key to looking outside the traditional inflows of FDI to Africa. Implementation of this recommendation will ease financial intermediary market convergence across the continent.

3. Data and methodology

3.1 Data

We examine a sample of 34 African countries with data from African Development Indicators (ADI) and the Financial Development and Structure Database (FDSD) of the World Bank. While openness, inflation, public investment and GDP growth indicators are obtained

[4] The variation is between the pre-reform and post-reform era.

from the former source, financial intermediary dynamics are fetched from the latter. Due to constraints in data availability, dataset spans from 1991 to 2009. We are consistent with Narayan et al. (2011) in asserting that, one is unlikely to find convergence in financial intermediary markets within a very heterogeneous set of countries. According to Mayer-Foulkes (2010) economic development is a complex process with historical, political, economic, institutional and geographical determinants that do not conform to some simple linear model. We thus 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 four-level income distribution is in accordance with the World Bank Income group setting which includes: low income, $1,005 or less; lower middle income, $1,006 - $3,975; upper middle income, $3,976 - $12,275; and high income, $12,276 or more. Religious dominations are obtained from the World Factbook (CIA, 2007).

3.1.1 Endogenous financial intermediation variables

a) Financial depth

Borrowing from the FDSD and recent finance literature (Asongu, 2011abcd), this paper measures financial depth both from overall-economic and financial system perspectives with indicators of broad money supply (*M2/GDP*) and financial system deposits (*Fdgdp*) respectively. While the former denotes the monetary base plus demand, saving and time deposits, the latter represents liquid liabilities. Since we are dealing exclusively with developing countries, we distinguish liquid liabilities from money supply because a great proportion of the monetary base does not transit through the banking sector (Asongu, 2011e). The two indicators are in ratios of

GDP (see Appendix 3) and both can robustly cross-check each other as either account for over 97% of information in the other (see Appendix 2).

b) Financial efficiency

By financial intermediation efficiency here, the paper neither refers to the profitability-oriented concept nor to the production efficiency of decision making units in the financial sector (through Data Envelopment Analysis: DEA). What we seek to highlight is the ability of banks to effectively fulfill their fundamental role of transforming mobilized deposits into credit for economic operators. We employ proxies for banking-system-efficiency and financial-system-efficiency (respectively 'bank credit on bank deposits: *Bcbd'* and 'financial system credit on financial system deposits: *Fcfd'*). Like with financial depth, these two financial allocation efficiency proxies can cross-check each other as they represent more than 87% of variability in one another (see Appendix 2).

c) Financial size

With respect to the FDSD, we appreciate financial intermediary size as the ratio of "deposit bank assets" to the "total assets" (deposit bank assets on central bank assets plus deposit bank assets: *Dbacba*).

d) Financial activity

By financial intermediary activity here, the work highlights the ability of banks to grant credit to economic operators. We proxy for both banking intermediary activity and financial intermediary activity with "private domestic credit by deposit banks: *Pcrb*" and "private credit by domestic banks and other financial institutions: *Pcrbof*" respectively. The latter measure

cross-checks the former as it represents more than 92% of information in the former (see Appendix 2).

The choice of above endogenous variables is because they are directly linked to first and second generational financial reforms which targeted their improvements in one way or the other. How these reforms intuitively represent fundamental characteristics for the convergence process has been highlighted in Appendix 5.

3.1.2 Control variables

In the literature on convergence in per capita incomes, countries identical in structural characteristics such as preferences in technologies, economic performance, government policies and price stability have the tendency to converge to one another if their initial conditions are dissimilar (Prichett, 1997). In this paper we proxy for these preferences in technology, economic performance, government policy and price stability with openness (trade), GDP growth, public investment and inflation respectively (Bruno et al., 2011; Narayan et al., 2011).

Descriptive statistics is presented in Appendix 1. From it, 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 observed 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 estimation technique. Correlation analysis presented in Appendix 2 helps us in two ways. On the one hand, it provides us with a foresight on possible linkage-signs between various indicators. On the other hand, it enables us avoid issues linked to multicolinearity and overparametization. Definition of variables 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, annual growth rate (inflation) or ratios (efficiency and size measures). Two facts result from this definition of variables. On the one hand, comparability of the variables is ensured. On the other hand, macroeconomic and structural differences between countries are taken into account, hence providing a solid basis for a convergence analysis.

3.2 Model and estimation approach

The estimation strategy will be based on β-convergence because of constraints in the data set. The use of cointegration and unit root tests are not convenient because of limited degrees of freedom in homogenous panels. Additionally, 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 decreases is also inappropriate because the structure of data set is panel. Our estimation strategy 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 studies of Baumol (1986), Barro & Sala-i-Martin (1992, 1995) and Mankiw et al. (1992). The theoretical underpinnings of income convergence as highlighted in Section 2.1 are abundant in the empirical growth literature (Solow, 1956; Swan, 1956).

Borrowing from Fung (2009; 3) the two equations below are the standard approaches in the literature for investigating conditional convergence if $W_{i,t}$ is taken as strictly exogenous.

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

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

Where σ = 1+ β, $Y_{i,t}$ is the proxy for per capita financial intermediary development in country *i* at period *t*. $W_{i,t}$ is a vector of determinants of per capita finance, 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 per capita growth will experience a slowdown in growth of the per capita banking development, known as conditional convergence (Narayan et al., 2011; 2). Also, in accordance with Fung (2009; 3), if $0 < |\sigma| < 1$ in Eq. (2) , then $Y_{i,t}$ is dynamically stable around the path with a trend growth rate the same as that of W_t, and with a rate relative to the level of W_t. The variables contained in $W_{i,t-\tau}$ and the individual effect η_i are measures of the long-term level the market is converging to. Therefore, the country specific-effect η_i denotes the existence of other determinants of a country's steady state not captured by $W_{i,t-\tau}$.

Conditions for convergence elucidated above are valid if and only if $W_{i,t}$ is strictly exogenous. Unfortunately, this is not the case in the real world because, while inflation, trade, public investment and GDP growth (components of $W_{i,t}$) influence per capita financial development, the reverse effect is also true. Thus we are confronted here with the issue of endogeneity where inflation, openness (trade), public investment and GDP growth 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 dependent variables included in the equations. A way of dealing with the problem of the correlation between the individual specific-effect and the lagged dependent variables involves eliminating the individual effect by first differencing. Therefore 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, estimation by Ordinary Least Square (OLS) is still biased because there remains a correlation between the lagged endogenous independent variable and the disturbance term. Arellano & Bond (1991) suggested an application of the Generalized Method of Moments (GMM) exploiting all the orthogonality conditions between the lagged dependent variables and the error term. This GMM approach has been extensively used in the convergence literature; and recently applied by Narayan et al. (2011). While Narayan et al. (2011) use Eq. (1) in the absence of fixed effects, this paper applies Eq. (3) instead; in line with Fung (2009) and Asongu (2012). We opt for the *two-step* GMM because it corrects the residuals for heteroscedasticity. In the *one-step* the residuals are assumed to be homoscedastic. The assumption of no auto-correlation in the residuals is crucial as past lagged variables are to be used as instruments for the dependent variables. Also, the estimation depends on the assumption that the lagged values of the dependent variable and other independent variables are valid instruments in the regression. When 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: *AR(2)* should not be. The validity of the instruments is assessed with the Sargan over-identifying restrictions (OIR) test.

As emphasized by Islam (1995; 14), yearly time spans are too short to be appropriate for studying convergence, as short-run disturbances may loom substantially in such brief time spans. Therefore considering the data span of 28 years, consistent with Narayan et al. (2011) we use a 4 year non-overlapping interval such that we have seven time intervals: 1982-1985; 1986-1989 and so on. This implies in our analysis, τ is set to 4.

We also compute the implied rate of convergence by calculating (σ/4) which is the equivalent of the Narayan et al. (2011) computation with (1+β)/4. Thus, we divide the estimated coefficient of the lagged differenced endogenous variable by 4 because we have used a four year interval to absorb short-term disturbances. When the absolute value of the derived autoregressive coefficient is greater than zero but less than one ($0<|\sigma|<1$), we conclude the existence of convergence. A broader interpretation suggests that, past differences have a less proportionate impact on future differences. By implication, the variation on the left hand side of Eq. (3) is decreasing overtime as the country is converging to a steady state.

4. Empirical analysis

This section addresses three principal concerns: (1) investigation of the existence of convergence; (2) assessment of the speed of convergence and; determination of the time required to achieve a full (100%) convergence. Table 1 presents a summary of overall findings and addresses the first two concerns, while Tables 2-3 and Tables 4-7 disclose results for absolute and conditional convergence respectively.

Absolute (unconditional) convergence is estimated with only the lagged difference of the endogenous variable as exogenous variable while, conditional convergence is in respect of Eq. (3). Thus, unconditional convergence is modeled without $W_{i,t}$: vector of determinants (openness, GDP growth, public investment and inflation) of per capita finance. To investigate the validity of the model and the corresponding convergence hypothesis, we carry-out two tests, namely the Sargan test which examines 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 correlated with the error term in the estimated equation. Its null hypothesis is the stance that the instruments as a group are strictly exogenous (are not

victim of endogeneity), which is needed for the validity of the GMM estimates. We also report the Wald statistics which examines the joint significance of estimated coefficients. The autocorrelation, Sargan and Wald tests statistics with corresponding p-values are reported in the tables. The Sargan test statistics for the most part appear with a p-value greater than 0.10, hence its null hypothesis is not rejected for the most part. We only report the second-order autocorrelation test: *AR(2)* since it is more important than AR (1) as it tests for autocorrelation in levels. For most estimated models, we are unable to rule-out (reject) the AR(2) null hypothesis of no autocorrelation. There is thus substantial evidence that most of the models are free from autocorrelation at the 1% significance level.

4.1 Summary of results

Before we tackle 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 (Asongu, 2012). Absolute convergence therefore results from factors such as the formulation of monetary unions and adoption of a unique currency, inter alia. This form of 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 Financial Institutions (IFIs). These reforms have included financial liberalization with objective to reduce barriers to trade and investment and particularly, financial reforms have been credited for the impressive performance of capital markets in African countries (Asongu, 2012). This is because, the financial reforms have obviated the need for investor preferences for one market over another.

Changes in information technology have also improved synchronization in financial markets such that, the adjustment of shocks across markets is much faster. This has facilitated convergence because, the speed at which shocks are transmitted from one market to another has increased with improvements in ICTs.

On the other hand, conditional convergence is that which depends on structural and institutional characteristics (Asongu, 2012). Consistent with the economic growth literature (Barro, 1991), conditional convergence depicts the kind of convergence whereby, one's own long-term steady state (equilibrium) depends 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 (or control for). Due to constraints in data availability and degrees of freedom required for the OIR test, we could not condition the analysis beyond four macroeconomic variables: consistent with the convergence literature (Bruno et al., 2011)[5].

Table 1 reports a summary of our results which are based on details presented in Tables 2-7. For every financial dynamic AC, CC, SAC, SCC; represent Absolute Convergence, Conditional Convergence, Speed of Absolute Convergence and Speed of Conditional Convergence respectively. At first glance, we notice overwhelming evidence of convergence both in absolute and conditional terms in most panels. More than 80% of significant results are at the 1% significance levels. This integration is most significant in financial size regressions, followed by a tie between financial efficiency and financial activity and lastly by financial depth.

[5] Bruno et al. (2011) have used only two control variables.

Table 1: Summary of results on convergence

		Financial Depth							
		Money Supply				Liquid Liability			
		AC	CC	SAC	SCC	AC	CC	SAC	SCC
Legal origins	English Common Law	Yes(1%)	Yes(10%)	15.95%	16.70%	Yes(1%)	Yes(1%)	20.27%	19.47%
	French Civil Law	Yes(10%)	No	10.32%	---	Yes(5%)	No	12.40%	---
Religions	Christianity	Yes(1%)	Yes(1%)	20.32%	17.70%	No	Yes(1%)	---	22.97%
	Islam	No	No	---	---	No	No	---	---
Regions	North Africa	No	No	---	---	No	No	---	---
	Sub Saharan Africa	Yes(1%)	Yes(1%)	14.85%	14.27%	Yes(1%)	Yes(1%)	23.72%	15.60%
	Low Income	Yes(1%)	No	21.25%	---	No	No	---	---
Income Levels	Middle Income	Yes(1%)	Yes(1%)	7.72%	12.00%	Yes(1%)	No	7.5%	---
	Lower Middle Income	No	No	---	---	No	No	---	---
	Upper Middle Income	Yes(1%)	No	11.75%	---	Yes(10%)	No	18.42%	---
	Africa	Yes(1%)	Yes(1%)	15.25%	12.00%	Yes(1%)	No	23.50%	---

		Financial Intermediation Efficiency							
		Banking System Efficiency				Financial System Efficiency			
		AC	CC	SAC	SCC	AC	CC	SAC	SCC
Legal origins	English Common Law	Yes(1%)	No	7.47%	---	Yes(10%)	No	8.10%	---
	French Civil Law	Yes(1%)	Yes(1%)	17.80%	15.17%	Yes(1%)	Yes(5%)	17.00%	10.07%
Religions	Christianity	Yes(1%)	Yes(1%)	12.85%	13.02%	Yes(1%)	Yes(5%)	13.35%	10.62%
	Islam	Yes(1%)	No	16.27%	---	Yes(1%)	No	16.72%	---
Regions	North Africa	No	No	---	---	Yes(1%)	No	14.12%	---
	Sub Saharan Africa	Yes(1%)	Yes(1%)	14.67%	15.40%	Yes(1%)	Yes(1%)	14.15%	11.30%
	Low Income	Yes(1%)	Yes(1%)	12.00%	13.27%	Yes(1%)	No	10.25%	---
Income Levels	Middle Income	Yes(1%)	Yes(1%)	18.25%	17.00%	Yes(1%)	No	13.60%	---
	Lower Middle Income	Yes(1%)	No	16.50%	---	Yes(5%)	No	9.10%	---
	Upper Middle Income	Yes(1%)	No	14.25%	---	Yes(1%)	No	20.25%	---
	Africa	Yes(1%)	Yes(1%)	15.25%	16.00%	Yes(1%)	Yes(1%)	15.75%	14.00%

		Financial Activity							
		Banking System Activity				Financial System Activity			
		AC	CC	SAC	SCC	AC	CC	SAC	SCC
Legal origins	English Common Law	Yes(1%)	No	15.20%	---	Yes(1%)	No	19.57%	---
	French Civil Law	Yes(1%)	Yes(1%)	11.80%	20.17%	Yes(1%)	Yes(5%)	9.80%	13.65%
Religions	Christianity	Yes(1%)	Yes(1%)	21.32%	17.47%	Yes(1%)	Yes(1%)	14.12%	12.50%
	Islam	Yes(5%)	No	10.60%	---	Yes(1%)	No	11.32%	---
Regions	North Africa	No	No	---	---	Yes(5%)	No	9.32%	---
	Sub Saharan Africa	Yes(1%)	Yes(1%)	14.90%	19.45%	Yes(5%)	Yes(5%)	10.00%	14.55%
	Low Income	No	Yes(1%)	---	19.00%	Yes(1%)	Yes(1%)	12.50%	13.75%
Income Levels	Middle Income	Yes(5%)	No	7.62%	---	Yes(10%)	No	7.02%	---
	Lower Middle Income	No	No	---	---	No	No	---	---
	Upper Middle Income	Yes(5%)	No	8.45%	---	No	No	---	---
	Africa	Yes(1%)	Yes(1%)	15.50%	19.75%	Yes(5%)	Yes(1%)	10.77%	17.25%

		Financial Size			
		AC	CC	SAC	SCC
Legal origins	English Common Law	Yes(1%)	Yes(1%)	15.00%	13.22%
	French Civil Law	Yes(5%)	Yes(1%)	14.65%	14.92%
Religions	Christianity	Yes(1%)	Yes(1%)	17.10%	16.47%
	Islam	Yes(1%)	Yes(1%)	12.67%	14.90%
Regions	North Africa	Yes(1%)	No	22.80%	---
	Sub Saharan Africa	Yes(1%)	Yes(1%)	15.77%	15.22%
	Low Income	Yes(1%)	Yes(1%)	16.25%	15.40%
Income Levels	Middle Income	Yes(1%)	Yes(1%)	13.00%	12.50%
	Lower Middle Income	Yes(1%)	Yes(1%)	13.50%	11.67%
	Upper Middle Income	Yes(10%)	No	5.05%	---
	Africa	Yes(1%)	Yes(1%)	16.50%	14.75%

AC: Absolute Convergence. CC: Conditional Convergence. SAC : Speed of Absolute Convergence. SCC: Speed of Conditional Convergence. Yes: presence of convergence. No: absence of convergence. (X%): Significance level of convergence.

The lowest and highest convergence rates are respectively 5.05% and 22.08% per annum (p.a) and pertain to financial size regressions. Panels with the least support for convergence are (in decreasing order): North Africa; Lower middle income; Islam; Upper middle income; and English common-law countries. Based on overall findings, results for AC are more significant than those of CC. If results are to be based on a 100% significance in all regressions, then only SSA countries reflect convergence in all financial dynamics both in absolute and relative terms.

4.2 Results of absolute convergence (AC)

Tables 2-3 below report results of absolute convergence regressions. The first impression we have of almost all models is that, the instruments are valid as the null hypotheses of the AR(2) and Sargan OIR tests are not rejected. Where the retarded endogenous estimated coefficient is significant, the Wald statistics is also significant. We expected this outcome for the Wald statistic because only one endogenous regressor is used in the absolute convergence regressions.

For financial depth, with respect to money supply we notice convergence in eight of the 11 panels with the following speeds of (and time for full) convergence: English (15.95% p.a for 25.07yrs); French (10.32% p.a for 38.75yrs); Christian (20.32% p.a for 19.68yrs); SSA (14.85% p.a for 26.93yrs); Low income (21.25% p.a for 18.82yrs); Middle income (7.72% p.a for 51.81yrs); Upper middle income (11.75% p.a for 34.04yrs) and Africa (15.25% p.a for 26.22yrs). These results are robust to the liquid liability dimension of financial depth, with the speeds of (and time for full) convergence as follows: English (20.27% p.a for 19.75yrs); French (12.40% p.a for 32.25yrs); SSA (23.72% p.a for 16.86yrs); Middle income (7.5% p.a for 53.33yrs); Upper middle income (18.42% p.a for 21.71yrs) and Africa (23.50% p.a for 17.02yrs).

Table 2: Absolute convergence in financial depth and efficiency

Financial Depth

Money Supply(M2)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.638*** **	**0.413* **	**0.813*** **	0.143	0.165	**0.594*** **	**0.85*** **	**0.30*** **	0.237	**0.47*** **	**0.61*** **
	(0.006)	**(0.086)**	**(0.000)**	(0.644)	(0.847)	**(0.000)**	**(0.000)**	**(0.004)**	(0.165)	**(0.000)**	**(0.000)**
2nd Auto	1.170	-0.049	0.664	0.408	-0.224	1.126	-0.074	1.118	0.923	1.129	1.087
	(0.241)	(0.960)	(0.506)	(0.683)	(0.822)	(0.259)	(0.940)	(0.263)	(0.355)	(0.258)	(0.277)
OIR	13.413	18.885	19.518	12.263	3.139	25.00	17.166	15.981	8.859	4.955	27.566
	(0.858)	(0.529)	(0.488)	(0.906)	(0.999)	(0.201)	(0.642)	(0.717)	(0.984)	(0.999)	(0.120)
Wald	**7.494*** **	**2.937* **	**33.28*** **	0.212	0.036	**15.78*** **	**27.2*** **	**7.90*** **	1.924	**207*** **	**17.9*** **
	(0.006)	**(0.086)**	**(0.000)**	(0.644)	(0.847)	**(0.000)**	**(0.000)**	**(0.004)**	(0.165)	**(0.000)**	**(0.000)**
Countries	15	19	21	13	4	30	18	16	10	6	34
Obser	77	101	107	71	22	156	92	86	54	32	178

Liquid Liabilities(Fdgdp)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.811*** **	**0.496** **	**1.041*** **	0.205	0.540	**0.949*** **	**1.18*** **	**0.30*** **	0.137	**0.737* **	**0.94*** **
	(0.000)	**(0.015)**	**(0.000)**	(0.360)	(0.561)	**(0.000)**	**(0.000)**	**(0.002)**	(0.413)	**(0.093)**	**(0.000)**
2nd Auto	1.242	-0.774	-0.543	0.836	-0.488	1.032	-1.363	1.280	0.898	0.823	0.889
	(0.214)	(0.438)	(0.586)	(0.402)	(0.624)	(0.301)	(0.172)	(0.200)	(0.369)	(0.410)	(0.374)
OIR	14.99	18.060	20.797	12.927	3.967	26.780	17.898	15.819	9.939	5.997	**29.39* **
	(0.776)	(0.583)	(0.409)	(0.880)	(0.999)	(0.141)	(0.594)	(0.727)	(0.969)	(0.998)	**(0.080)**
Wald	**21.92*** **	**5.865** **	**22.22*** **	0.835	0.336	**13.10*** **	**44.1*** **	**9.35*** **	0.669	**2.810* **	**12.2*** **
	(0.000)	**(0.015)**	**(0.000)**	(0.360)	(0.561)	**(0.000)**	**(0.000)**	**(0.002)**	(0.413)	**(0.093)**	**(0.000)**
Countries	15	19	21	13	4	30	18	16	10	6	34
Obser	79	102	110	71	22	159	95	86	54	32	181

Financial Intermediation Efficiency

Banking System Efficiency(BcBd)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.299*** **	**0.712*** **	**0.514*** **	**0.651*** **	0.131	**0.578*** **	**0.48*** **	**0.73*** **	**0.66*** **	**0.57*** **	**0.61*** **
	(0.000)	**(0.000)**	**(0.001)**	**(0.000)**	(0.860)	**(0.000)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
2nd Auto	-1.301	-0.753	**-1.689* **	0.202	-1.118	-1.164	-1.228	-0.689	-0.200	-1.087	-1.439
	(0.193)	(0.450)	**(0.091)**	(0.839)	(0.263)	(0.244)	(0.219)	(0.490)	(0.840)	(0.276)	(0.150)
OIR	14.619	17.696	18.779	12.581	3.52	19.649	17.574	15.797	9.786	4.871	19.422
	(0.797)	(0.607)	(0.536)	(0.894)	(0.999)	(0.480)	(0.615)	(0.729)	(0.971)	(0.999)	(0.494)
Wald	**13.79*** **	**52.11*** **	**10.46*** **	**38.83*** **	0.030	**20.43*** **	**9.15*** **	**57.06*** **	**31.5*** **	**17.5*** **	**27.2*** **
	(0.000)	**(0.000)**	**(0.001)**	**(0.000)**	(0.860)	**(0.000)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Countries	15	19	21	13	4	30	16	16	10	6	34
Obser	89	110	123	76	22	177	106	93	58	35	199

Financial System Efficiency(FcFd)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.324* **	**0.680*** **	**0.534*** **	**0.669*** **	**0.565*** **	**0.566*** **	**0.41*** **	**0.544*** **	**0.364** **	**0.81*** **	**0.63*** **
	(0.081)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.009)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.016)**	**(0.007)**	**(0.000)**
2nd Auto	0.050	0.068	0.104	0.144	-0.089	0.168	-0.558	0.621	0.533	0.101	0.156
	(0.960)	(0.945)	(0.916)	(0.884)	(0.928)	(0.866)	(0.576)	(0.534)	(0.593)	(0.919)	(0.876)
OIR	12.394	17.989	20.405	12.449	3.317	20.409	17.833	14.402	9.963	3.975	20.493
	(0.901)	(0.588)	(0.432)	(0.899)	(0.999)	(0.432)	(0.598)	(0.809)	(0.968)	(1.000)	(0.427)
Wald	**3.043* **	**74.34*** **	**12.48*** **	**20.79*** **	**6.803*** **	**24.09*** **	**14.5*** **	**15.11*** **	**5.77** **	**7.19*** **	**29.3*** **
	(0.081)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.009)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.016)**	**(0.007)**	**(0.000)**
Countries	15	19	21	13	4	30	18	16	10	6	34
Obser	79	102	110	71	22	159	95	86	54	32	181

Notes: ***,**,*: 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 financial development estimated coefficient.

Given the detailed nature of our database, it is space consuming to discuss all the details of speed of and time for full convergence. The speeds are already summarized in Table 1 and

computing their corresponding time spans for 100% convergence is basic arithmetic as elucidated above for financial depth results. We thus provide a snapshot of results for the other financial dynamics. But for the North African panel in the banking efficiency regressions, all other panels reflect AC in both dimensions of financial intermediary efficiency.

Table 3 summarizes the AC results of financial intermediary activity and size. While nine of the eleven panels in both dimensions of financial activity reveal AC, all panels converge in financial size.

Table 3: Absolute convergence in financial activity and size

	Financial Activity										
	Banking System Activity (Pcrb)										
	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.608*** **	**0.472*** **	**0.853*** **	**0.424** **	0.103	**0.596*** **	**1.00*** **	**0.305** **	0.218	**0.338** **	**0.62*** **
	(0.004)	**(0.000)**	**(0.000)**	**(0.017)**	(0.820)	**(0.001)**	**(0.000)**	**(0.025)**	(0.276)	**(0.032)**	**(0.000)**
2nd Auto	1.342	-1.310	-0.272	-0.353	-0.623	0.566	-0.549	0.004	-0.109	0.069	-0.233
	(0.179)	(0.190)	(0.785)	(0.723)	(0.532)	(0.570)	(0.582)	(0.996)	(0.913)	(0.944)	(0.815)
OIR	14.499	17.914	20.331	12.187	3.306	26.223	17.952	15.43	8.232	5.006	26.881
	(0.804)	(0.593)	(0.437)	(0.909)	(0.999)	(0.158)	(0.590)	(0.751)	(0.990)	(0.999)	(0.138)
Wald	**8.018*** **	**11.95*** **	**24.00*** **	**5.629** **	0.051	**9.903*** **	**34.0*** **	**4.96** **	1.186	**4.58** **	**11.0*** **
	(0.004)	**(0.000)**	**(0.000)**	**(0.017)**	(0.820)	**(0.001)**	**(0.000)**	**(0.025)**	(0.276)	**(0.032)**	**(0.000)**
Countries	15	19	21	13	4	30	18	16	10	6	34
Obser	79	100	110	69	20	159	95	84	52	32	179
	Financial System Activity(Pcrbof)										
	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.783*** **	**0.392*** **	**0.565*** **	**0.453*** **	**0.373** **	**0.400** **	**0.50*** **	**0.281***	0.287	0.188	**0.431** **
	(0.000)	**(0.011)**	**(0.004)**	**(0.005)**	**(0.019)**	**(0.023)**	**(0.007)**	**(0.070)**	(0.123)	(0.563)	**(0.016)**
2nd Auto	1.612	-1.038	0.855	-0.152	-0.938	1.120	0.628	0.068	-0.006	0.084	0.485
	(0.106)	(0.299)	(0.392)	(0.878)	(0.348)	(0.262)	(0.529)	(0.945)	(0.995)	(0.932)	(0.627)
OIR	13.454	18.911	20.633	12.692	2.930	28.135	17.989	15.99	9.180	4.664	27.811
	(0.857)	(0.527)	(0.419)	(0.890)	(0.999)	**(0.106)**	(0.588)	(0.716)	(0.980)	(0.999)	(0.113)
Wald	**11.03*** **	**6.378** **	**8.12*** **	**7.75*** **	**5.422** **	**5.147** **	**7.10*** **	**3.280***	2.370	0.334	**5.78** **
	(0.000)	**(0.011)**	**(0.004)**	**(0.005)**	**(0.019)**	(0.023)	**(0.007)**	**(0.070)**	(0.123)	(0.563)	**(0.016)**
Countries	15	19	21	13	4	30	18	16	10	6	34
Obser	79	102	110	71	22	159	95	86	54	32	181
	Financial Size(Dbacba)										
	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.60*** **	**0.586** **	**0.684*** **	**0.507*** **	**0.912*** **	**0.631*** **	**0.65*** **	**0.52*** **	**0.54*** **	**0.202***	**0.66*** **
	(0.000)	**(0.039)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.073)**	**(0.000)**
2nd Auto	-1.153	**-1.813***	**-1.652***	-1.159	-0.931	-1.276	-1.125	-1.099	-1.017	-1.088	-1.293
	(0.248)	**(0.069)**	**(0.098)**	(0.246)	(0.351)	(0.201)	(0.260)	(0.271)	(0.308)	(0.276)	(0.195)
OIR	13.806	18.010	19.119	12.141	3.028	22.152	16.105	14.091	9.026	4.996	21.902
	(0.840)	(0.586)	(0.514)	(0.911)	(0.999)	(0.332)	(0.710)	(0.825)	(0.982)	(0.999)	(0.345)
Wald	**47.58*** **	**4.237** **	**8.91*** **	**53.65*** **	**22.01*** **	**55.41*** **	**14.9*** **	**44.98*** **	**78.2*** **	**3.207***	**53.3*** **
	(0.000)	**(0.039)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.073)**	**(0.000)**
Countries	15	19	21	13	4	30	18	16	10	6	34
Obser	82	108	112	78	24	166	103	87	60	27	190

Notes: ***,**,*: 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 financial development estimated coefficient.

4.3 Results of conditional convergence (CC)

Tables 4, 5, 6 and 7 below reveal results of conditional convergence in financial depth, financial efficiency, financial activity and financial size respectively. Like in the preceding tables we notice an overwhelming validity of the instruments and estimated coefficients in the models because the null hypotheses of the AR(2) and Sargan OIR tests are not rejected for the most part. In almost all cases where the lagged endogenous estimated coefficient is significant, we also find evidence of a significant Wald statistics.

For the financial depth regressions in Table 4, while 5 panels converge in money supply, 3 converge in liquid liabilities. With regard to financial efficiency in Table 5, whereas 6 panels converge relative to banking system efficiency, 4 do with regard to financial system efficiency. In Table 6, the same number of panels (5 in total) converge in banking activity and financial activity. In Table 7, nine of the eleven panels converge in financial activity.

Table 4: Conditional convergence in financial depth

Financial Depth

Money Supply (M2)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.668***	0.004	**0.708*****	0.042	-0.533	**0.571*****	0.116	**0.48*****	0.416	-2.722	**0.48*****
	(0.050)	(0.983)	**(0.000)**	(0.891)	(0.586)	**(0.000)**	(0.552)	**(0.008)**	(0.326)	(0.186)	**(0.003)**
Constant	-0.0006	0.027	0.006	0.044	0.091	**0.023***	**0.065****	0.009	0.002	**0.166***	0.017
	(0.984)	(0.176)	(0.747)	(0.259)	(0.163)	**(0.079)**	**(0.014)**	(0.519)	(0.937)	**(0.076)**	(0.301)
Trade	**0.004*****	0.002	**0.004****	0.002	0.004	**0.004*****	**0.003***	**0.005****	0.001	-0.009	**0.004*****
	(0.001)	(0.200)	**(0.021)**	(0.477)	(0.257)	**(0.000)**	**(0.064)**	**(0.018)**	(0.721)	(0.270)	**(0.000)**
Inflation	-0.003	-0.003	-0.005	0.003	0.009	-0.003	-0.004	0.0007	-0.002	**0.017***	-0.001
	(0.448)	(0.317)	(0.307)	(0.574)	(0.391)	(0.460)	(0.313)	(0.611)	(0.584)	**(0.065)**	(0.683)
Pub. Invt	0.006	0.004	0.0006	0.020	---	0.006	0.011	0.002	-0.004	-0.012	0.005
	(0.718)	(0.374)	(0.942)	(0.306)		(0.454)	(0.307)	(0.753)	(0.573)	(0.448)	(0.401)
GDPg	-0.013	**-0.01*****	**-0.011***	**-0.023*****	---	**-0.01*****	**-0.01*****	**-0.01****	-0.0009	**-0.01*****	**-0.01*****
	(0.246)	**(0.000)**	**(0.061)**	**(0.005)**		**(0.000)**	**(0.004)**	**(0.033)**	(0.966)	**(0.000)**	**(0.001)**
2nd Auto	0.514	-0.914	0.993	-1.256	-0.980	-0.329	0.297	-0.681	-1.189	-0.932	-0.380
	(0.606)	(0.360)	(0.320)	(0.208)	(0.326)	(0.742)	(0.765)	(0.495)	(0.234)	(0.351)	(0.703)
OIR	9.397	14.147	18.002	6.062	0.000	24.904	9.939	10.205	4.489	---	24.049
	(0.977)	(0.822)	(0.587)	(0.998)	(1.000)	(0.205)	(0.969)	(0.964)	(0.999)		(0.240)
Wald	**18.33*****	**89.83*****	**38.07*****	**86.10*****	**18.39*****	**31.96*****	**15.36*****	**20.2*****	**57.76*****	**81.3*****	**53.7*****
	(0.002)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.008)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	62	91	101	52	22	134	78	75	43	32	153

Liquid Liabilities (Fdgdp)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.779*****	0.022	**0.919*****	0.054	-1.375	**0.624*****	0.406	0.366	0.342	-3.210	0.376
	(0.001)	(0.860)	**(0.000)**	(0.847)	(0.443)	**(0.006)**	(0.122)	(0.184)	(0.580)	(0.161)	(0.141)
Constant	0.013	**0.042****	0.012	0.070	0.260	0.028	**0.057***	0.032	0.010	0.009	**0.038***
	(0.732)	**(0.048)**	(0.472)	(0.160)	(0.214)	(0.182)	**(0.091)**	(0.217)	(0.724)	(0.878)	**(0.088)**
Trade	**0.004*****	0.002	**0.006****	0.004	0.000	**0.005*****	**0.006****	**0.005****	0.004	-0.007	**0.004*****
	(0.003)	(0.101)	**(0.016)**	(0.242)	(0.999)	**(0.000)**	**(0.035)**	**(0.015)**	(0.245)	(0.323)	**(0.001)**
Inflation	**-0.005****	**-0.004***	**-0.007*****	0.001	0.018	-0.003	**-0.004****	0.001	-0.0002	0.004	-0.002
	(0.046)	**(0.070)**	**(0.000)**	(0.755)	(0.387)	(0.104)	**(0.020)**	(0.633)	(0.964)	(0.553)	(0.178)
Pub. Invt	0.008	0.005	0.003	0.012	---	0.013	0.006	0.003	0.0003	-0.022	0.012
	(0.676)	(0.401)	(0.705)	(0.480)		(0.217)	(0.646)	(0.709)	(0.984)	(0.445)	(0.145)
GDPg	-0.021	**-0.01*****	**-0.016***	**-0.020***	---	**-0.01*****	**-0.015***	**-0.02*****	-0.008	**-0.01***	**-0.01*****
	(0.266)	**(0.000)**	**(0.057)**	**(0.084)**		**(0.000)**	**(0.050)**	**(0.007)**	(0.725)	**(0.073)**	**(0.000)**
2nd Auto	0.353	-1.188	0.278	-1.354	-0.884	-0.435	-0.516	-0.415	-1.086	-0.686	-0.479
	(0.723)	(0.234)	(0.780)	(0.175)	(0.376)	(0.663)	(0.605)	(0.677)	(0.277)	(0.492)	(0.631)
OIR	10.21	14.185	18.813	6.429	0.000	24.60	12.153	11.407	5.152	---	23.590
	(0.964)	(0.820)	(0.534)	(0.996)	(1.000)	(0.217)	(0.910)	(0.935)	(0.999)		(0.260)
Wald	**24.89*****	**33.42*****	**42.35*****	**11.329****	**46.01*****	**28.45*****	**9.594***	**25.4*****	5.442	**111*****	**25.8*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.045)**	**(0.000)**	**(0.000)**	**(0.087)**	**(0.000)**	(0.364)	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	64	92	104	52	22	137	81	75	43	32	156

Notes: ***,**,*: 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. Pub.Invt: Public Investment. GDPg: GDP growth. Initial: lagged financial development estimated coefficient.

Table 5 : Conditional convergence in financial efficiency

Financial Intermediation Efficiency

Banking System Efficiency (BcBd)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	0.568	**0.607*** **	**0.521*** **	0.121	0.501	**0.616*** **	**0.531*** **	**0.68*** **	-0.301	-0.906	**0.64*** **
	(0.130)	**(0.000)**	**(0.000)**	(0.753)	(0.440)	**(0.000)**	**(0.000)**	**(0.000)**	(0.375)	(0.487)	**(0.000)**
Constant	0.015	0.003	0.013	-0.059	0.014	0.004	0.003	0.018	-0.024	-0.120	0.002
	(0.440)	(0.818)	(0.384)	(0.258)	(0.891)	(0.759)	(0.879)	(0.215)	(0.434)	(0.146)	(0.856)
Trade	-0.001	-0.0002	0.0006	-0.001	-0.007	0.0006	-0.002	-0.0002	**-0.004*** **	-0.005	0.0003
	(0.575)	(0.875)	(0.555)	(0.605)	(0.564)	(0.726)	(0.527)	(0.895)	**(0.001)**	(0.431)	(0.883)
Inflation	**-0.001***	**-0.019***	**-0.002*** **	**-0.008** **	-0.062	**-0.002*** **	**-0.002*** **	-0.005	**-0.004*** **	0.006	**-0.003** **
	(0.077)	**(0.078)**	**(0.000)**	**(0.041)**	(0.185)	**(0.000)**	**(0.035)**	(0.179)	**(0.002)**	(0.924)	**(0.018)**
Pub. Invt	0.004	0.0008	-0.001	0.010	---	-0.003	-0.003	0.004	0.004	0.003	0.002
	(0.823)	(0.920)	(0.895)	(0.629)		(0.647)	(0.799)	(0.598)	(0.494)	(0.867)	(0.744)
GDPg	0.004	**0.008** **	**0.004***	0.011	---	0.002	-0.0008	**0.01*** **	**-0.013** **	0.011	0.004
	(0.562)	**(0.027)**	**(0.064)**	(0.310)		(0.515)	(0.818)	**(0.000)**	**(0.046)**	(0.182)	(0.236)
2nd Auto	-0.388	-0.051	**-2.085***	0.180	-0.670	-0.153	-0.059	-0.586	0.983	-0.421	-0.571
	(0.697)	(0.959)	**(0.037)**	(0.856)	(0.502)	(0.878)	(0.952)	(0.557)	(0.325)	(0.673)	(0.567)
OIR	8.717	12.069	15.884	6.074	---	24.262	12.024	10.529	1.056	---	25.500
	(0.986)	(0.913)	(0.723)	(0.998)		(0.231)	(0.915)	(0.957)	(1.00)		(0.183)
Wald	**12.48** **	**53.55*** **	**29.52*** **	5.700	**11.01** **	**54.77*** **	**33.33*** **	**78.2*** **	**36.52*** **	**31.2*** **	**93.1*** **
	(0.028)	**(0.000)**	**(0.000)**	(0.336)	**(0.011)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	69	97	111	55	22	147	86	80	47	33	166

Financial System Efficiency (FcFd)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	0.500	**0.403** **	**0.425** **	0.260	-1.120	**0.452*** **	0.427	0.362	0.300	-4.109	**0.56*** **
	(0.375)	**(0.015)**	**(0.010)**	(0.543)	(0.361)	**(0.004)**	(0.136)	(0.110)	(0.421)	(0.447)	**(0.000)**
Constant	0.016	-0.026	-0.001	-0.084	-0.194	-0.011	-0.031	-0.013	-0.022	-0.166	-0.008
	(0.555)	(0.213)	(0.921)	(0.156)	(0.202)	(0.498)	(0.207)	(0.696)	(0.765)	(0.215)	(0.555)
Trade	-0.003	**-0.004** **	**-0.003** **	-0.000	0.005	-0.001	0.0003	-0.003	-0.005	0.002	**-0.002** **
	(0.451)	**(0.037)**	**(0.010)**	(0.992)	(0.811)	(0.176)	(0.933)	(0.243)	(0.478)	(0.551)	**(0.026)**
Inflation	-0.0004	-0.012	-0.0001	-0.017	0.003	-0.0009	-0.001	-0.008	**-0.007** **	0.073	-0.001
	(0.800)	(0.130)	(0.919)	(0.114)	(0.947)	(0.490)	(0.583)	(0.223)	**(0.016)**	(0.654)	(0.363)
Pub. Invt	0.004	0.0007	0.001	-0.001	---	0.005	0.009	0.011	**0.022***	-0.024	0.008
	(0.789)	(0.960)	(0.916)	(0.925)		(0.487)	(0.626)	(0.262)	**(0.058)**	(0.529)	(0.321)
GDPg	-0.003	0.001	-0.001	0.008	---	-0.005	-0.004	-0.0007	0.003	**-0.01** **	-0.003
	(0.744)	(0.776)	(0.690)	(0.481)		(0.106)	(0.419)	(0.932)	(0.817)	**(0.017)**	(0.376)
2nd Auto	0.025	0.453	-0.826	-1.240	-0.823	-0.167	-1.037	0.336	0.510	---	0.0002
	(0.979)	(0.650)	(0.408)	(0.214)	(0.410)	(0.866)	(0.299)	(0.736)	(0.609)		(0.999)
OIR	10.184	15.283	16.541	4.795	0.000	17.412	14.577	9.764	6.297	0.115	17.992
	(0.964)	(0.760)	(0.682)	(0.999)	(1.000)	(0.626)	(0.800)	(0.972)	(0.997)	(0.907)	(0.587)
Wald	1.794	**101.0*** **	**43.37*** **	6.867	2.863	**55.98*** **	4.866	**59.6*** **	**12.53** **	**48.7*** **	**62.2*** **
	(0.876)	**(0.000)**	**(0.000)**	(0.230)	(0.413)	**(0.000)**	(0.432)	**(0.000)**	**(0.028)**	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	64	92	104	52	22	137	81	75	43	32	156

Notes: ***,**,*: 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. Pub.Invt: Public Investment. GDPg: GDP growth. Initial: lagged financial development estimated coefficient.

Table 6 : Conditional convergence in financial activity

Financial Activity

Banking System Activity (Pcrb)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	0.174	**0.807*** **	**0.699*** **	0.627	-2.634	**0.778*** **	**0.76*** **	0.321	-0.158	0.965	**0.79*** **
	(0.704)	**(0.000)**	**(0.000)**	(0.238)	(0.386)	**(0.000)**	**(0.000)**	(0.271)	(0.901)	(0.714)	**(0.000)**
Constant	**0.065***	**0.063*** **	**0.052****	0.017	0.232	**0.050*** **	**0.062***	0.002	-0.047	0.253	**0.04*** **
	(0.070)	**(0.007)**	**(0.034)**	(0.851)	(0.336)	**(0.002)**	**(0.085)**	(0.955)	(0.769)	(0.536)	**(0.004)**
Trade	0.002	0.0005	0.002	-0.0009	-0.010	0.002	0.002	0.0004	-0.002	0.003	0.002
	(0.586)	(0.845)	(0.497)	(0.835)	(0.727)	(0.352)	(0.542)	(0.902)	(0.762)	(0.559)	(0.368)
Inflation	**-0.003***	-0.021	**-0.006*** **	-0.017	-0.026	**-0.006*** **	**-0.006*** **	-0.011	-0.007	-0.065	**-0.007*** **
	(0.071)	(0.109)	**(0.000)**	(0.399)	(0.697)	**(0.000)**	**(0.000)**	(0.260)	(0.366)	(0.490)	**(0.001)**
Pub. Invt	0.008	0.019	0.009	0.049	---	0.017	0.009	0.007	0.029	0.006	0.016
	(0.604)	(0.222)	(0.517)	(0.221)		(0.185)	(0.687)	(0.406)	(0.106)	(0.873)	(0.242)
GDPg	-0.025	-0.008	**-0.020****	0.008	---	**-0.01*** **	**-0.01****	-0.016	-0.028	**-0.02*** **	**-0.01****
	(0.253)	(0.401)	**(0.011)**	(0.762)		**(0.001)**	**(0.038)**	(0.149)	(0.373)	**(0.000)**	**(0.014)**
2nd Auto	-0.272	-1.346	-0.305	-1.116	-0.844	-0.646	-0.787	-1.110	-0.324	0.030	-1.197
	(0.785)	(0.178)	(0.760)	0.264	(0.398)	(0.518)	(0.430)	(0.266)	(0.745)	(0.975)	(0.231)
OIR	9.019	15.472	19.734	7.994	0.000	26.141	11.066	10.581	6.494	0.000	27.339
	(0.982)	(0.748)	(0.474)	(0.991)	(1.000)	(0.161)	(0.944)	(0.956)	(0.996)	(1.000)	(0.126)
Wald	**10.41***	**78.39*** **	**83.82*** **	**34.32*** **	1.027	**73.44*** **	**35.50*** **	**192*** **	**16.74*** **	**655*** **	**79.5*** **
	(0.064)	**(0.000)**	**(0.000)**	**(0.000)**	(0.794)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.005)**	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	64	90	104	50	20	137	81	73	41	32	154

Financial System Activity (Pcrbof)

	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	0.233	**0.546****	**0.500*** **	0.387	-0.825	**0.582****	**0.55*** **	0.199	-0.285	0.395	**0.69*** **
	(0.590)	**(0.021)**	**(0.001)**	(0.505)	(0.589)	**(0.010)**	**(0.000)**	(0.393)	(0.705)	(0.818)	**(0.000)**
Constant	0.063	0.021	**0.042***	-0.002	0.118	**0.036****	0.044	0.001	-0.046	0.260	**0.037****
	(0.129)	(0.327)	**(0.072)**	(0.975)	(0.490)	**(0.028)**	(0.165)	(0.974)	(0.449)	(0.496)	**(0.041)**
Trade	0.003	0.002	0.001	0.002	0.003	0.001	0.003	0.001	-0.001	0.001	0.002
	(0.486)	(0.511)	(0.483)	(0.750)	(0.865)	(0.534)	(0.462)	(0.729)	(0.755)	(0.708)	(0.394)
Inflation	**-0.003****	-0.014	**-0.006*** **	-0.013	0.006	**-0.005*** **	**-0.005*** **	-0.009	-0.004	-0.044	**-0.007*** **
	(0.015)	(0.252)	**(0.000)**	(0.366)	(0.921)	**(0.001)**	**(0.006)**	(0.190)	(0.415)	(0.431)	**(0.001)**
Pub. Invt	0.012	0.015	0.003	0.019	---	0.012	0.014	0.009	**0.034***	-0.007	0.014
	(0.545)	(0.224)	(0.815)	(0.713)		(0.413)	(0.515)	(0.231)	**(0.065)**	(0.794)	(0.333)
GDPg	-0.025	**-0.015***	**-0.020*** **	-0.005	---	**-0.01*** **	**-0.015***	**-0.017***	-0.019	**-0.02*** **	**-0.017****
	(0.300)	**(0.062)**	**(0.002)**	(0.581)		**(0.008)**	**(0.092)**	**(0.065)**	(0.472)	**(0.000)**	**(0.013)**
2nd Auto	-0.056	-0.608	0.309	-1.245	-0.861	-0.308	-0.203	-0.856	-0.936	0.459	-0.456
	(0.955)	(0.543)	(0.756)	(0.213)	(0.388)	(0.758)	(0.839)	(0.392)	(0.349)	(0.645)	(0.647)
OIR	9.918	15.202	18.439	8.826	0.000	25.180	15.137	10.923	3.241	---	26.781
	(0.969)	(0.764)	(0.558)	(0.976)	(1.000)	(0.194)	(0.768)	(0.948)	(1.000)		(0.141)
Wald	**12.93****	**53.84*** **	**93.73*** **	**48.0*** **	1.085	**64.0*** **	**31.7*** **	**183*** **	**10.69***	**494*** **	**64.7*** **
	(0.024)	**(0.000)**	**(0.000)**	**(0.000)**	(0.780)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.057)**	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	64	92	104	52	24	137	81	75	43	36	156

Notes: ***,**,*: 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. Pub.Invt: Public Investment. GDPg: GDP growth. Initial: lagged financial development estimated coefficient.

Table 7: Conditional convergence in financial size

	Financial Size (Dbacba)										
	English	French	Christ	Islam	N.Africa	SSAfrica	Low.I	Middle I	LMI	UMI	Africa
Initial	**0.529*** **	**0.597*** **	**0.659*** **	**0.596*** **	-1.116	**0.609*** **	**0.616*** **	**0.50*** **	**0.467*** **	0.332	**0.59*** **
	(0.000)	**(0.001)**	**(0.000)**	**(0.000)**	(0.345)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	(0.562)	**(0.000)**
Constant	**0.056*** **	0.013	**0.034*** **	0.008	0.109	**0.024***	**0.042*** **	0.013	0.016	0.090	**0.022** **
	(0.000)	(0.155)	**(0.008)**	(0.741)	(0.110)	**(0.078)**	**(0.003)**	(0.525)	(0.388)	(0.220)	**(0.028)**
Trade	0.0009	**0.006*** **	**0.005** **	0.0001	-0.002	**0.007** **	0.0001	**0.011** **	0.003	0.008	**0.006** **
	(0.916)	**(0.005)**	**(0.019)**	(0.969)	(0.697)	**(0.047)**	(0.959)	**(0.037)**	(0.672)	(0.146)	**(0.050)**
Inflation	**-0.007***	-0.002	**-0.003** **	**-0.03*** **	**-0.009** **	**-0.008***	**-0.005** **	-0.015	-0.012	0.003	**-0.008***
	(0.061)	(0.467)	**(0.036)**	**(0.000)**	**(0.048)**	**(0.087)**	**(0.027)**	(0.165)	(0.391)	(0.734)	**(0.094)**
Pub. Invt	-0.021	0.004	**-0.015***	-0.016	---	-0.014	0.0002	-0.012	-0.000	-0.007	-0.009
	(0.131)	(0.647)	**(0.068)**	(0.464)		(0.238)	(0.985)	(0.401)	(0.986)	(0.490)	(0.519)
GDPg	0.014	0.002	0.003	**0.018** **	---	0.002	0.012	-0.009	-0.001	-0.005	0.004
	(0.480)	(0.635)	(0.544)	**(0.028)**		(0.716)	(0.236)	(0.426)	(0.901)	(0.300)	(0.536)
2nd Auto	-1.087	**-2.062** **	-1.462	-1.633	0.319	-1.229	**-1.916***	-0.658	-0.717	-0.748	-1.224
	(0.276)	**(0.039)**	(0.143)	(0.102)	(0.749)	(0.218)	**(0.055)**	(0.510)	(0.473)	(0.454)	(0.220)
OIR	6.100	15.128	18.234	4.069	---	22.521	13.042	9.291	2.506	0.000	21.479
	(0.998)	(0.769)	(0.572)	(0.999)		(0.312)	(0.875)	(0.979)	(1.000)	(1.000)	(0.369)
Wald	**62.27*** **	**20.07*** **	**33.46*** **	**373.9*** **	**10.51** **	**303.1*** **	**92.59*** **	**335*** **	**76.95*** **	**5882*** **	**291*** **
	(0.000)	**(0.001)**	**(0.000)**	**(0.000)**	**(0.014)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Countries	13	19	21	11	4	28	17	15	9	6	32
Obser	62	96	101	57	24	137	83	75	49	26	158

Notes: ***,**,*: 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. Pub.Invt: Public Investment. GDPg: GDP growth. Initial: lagged financial development estimated coefficient.

4.4 Discussion, policy implications and caveats

4. 4.1 Discussion of results

The overwhelming absolute convergence in financial intermediary dynamics implies countries share the same fundamental characteristics with respect to the banking sector such that the only difference across countries is in initial levels of financial intermediary sector development. Hence, the broad similarity in absolute convergence is due to common fundamental characteristics largely credited to policies of structural adjustment imposed by the IFIs on African countries. Since the mid 1980s, many countries in Africa have undertaken structural reform programs engineered by the IMF which include financial liberalization for the most part. The objective of such reforms has been to reduce barriers to trade and increase foreign investment. Common currency union arrangements in Africa are gaining momentum with the

East African Community (EAC) and Economic Community of West African States (ECOWAS) planning to launch single currencies in 2012 and by 2020 respectively. These emerging monetary unions are also the result of common structural reforms imposed by the IMF. Capital control and control on exchange rate transactions are being substantially eased as the projected deadlines for the potential monetary unions draw nigh. With advances in ICTs, the African banking industry is increasingly becoming synchronized; implying the rate at which one bank adjusts when there is a shock in another is growing. All these factors have facilitated absolute convergence.

Our analysis on conditional convergence in dynamics of the banking sector is contingent on variables which we have observed and empirically tested (or modeled); implying the findings of this paper are conditional on the macro economic variables we have used. It is worth noting that, owing to constraints in data availability and degrees of freedom imperative for the OIR test, we have conditioned our analysis on four macroeconomic variables: consistent with the convergence literature (Prichett, 1997; Bruno et al., 2011; Narayan et al., 2011). The natural inference from the conditioning information set we have used is that, countries have different structural characteristics in trade (openness), GDP growth, public investment and inflation. This is because, when financial intermediary markets across countries differ in terms of factors relating to the performance of their markets, there could be conditional convergence (Narayan et al., 2011). Given the overwhelming nature of conditional convergence (and the homogenous nature of the panels), the line of interpretation could be extended to institutional factors. Hence, it could be said that, reduction in cross-country institutional differences (that determine the performance of the financial intermediary sector) have facilitated conditional convergence. Ultimately, countries with small-sized financial intermediary depth, efficiency, activity and size are catching-up countries with large-sized financial intermediary depth, efficiency, activity and

size respectively. As a policy implication African governments should not relent in structural and institutional reforms.

4.4.2 Policy implications and caveats

The findings have policy implications for *regional integration*, *first and second generational financial reforms, portfolio diversification*, inter alia.

Our findings are highly relevant for policy makers in terms of *regional integration* as they 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. Efforts at financial integration from an intermediary standpoint may not all together have been futile. Hence, income thresholds, religious domination, legal origins and geographical proximity are necessary but not sufficient conditions for financial convergence. As a corollary to the above, one might be tempted to suggest first and second generational financial reforms implemented by African countries have facilitated convergence in the financial intermediary sector and eased the process of regional integration.

The presence of strong links among African banking sectors present very little opportunity for *portfolio diversification*. The practical implication for investors on is that, they may not gain significantly by holding banking sector portfolios with assets from different countries. To the degree that convergence in the banking industry occurs, the gains from international portfolio diversification will decrease. The presence of convergence further implies that, risk-adjusted returns denominated in a common currency are equal in all countries throughout a given homogenous panel. In other words, there is a possibility for 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. The countervailing view

on convergence however argues that, certain economies retain their individual national economic and financial characteristics, which will prevent full convergence (Adler & Dumas, 1983). In other words, impediments to the free-flow of capital, tendencies for a home bias, inter alia, would maintain some gains from portfolio diversification.

It is also interesting to highlight other implications by discussing how convergence could further be accelerated. In line 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 2.3.2 above on the literature on 'financial market convergence and African business' has already substantially covered reforms that are necessary to improve cross-border flow of investment and ease the doing of business in the continent. It could also be worthwhile to consider the drivers of financial convergence proposed by Cummins & Weiss (2009). Firstly, development of holistic or enterprise-wide risk management (ERM), whereby traditionally distinct 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, favoring conditions for the reinsurance underwriting cycle. Thirdly, advances in ICTs. Fourthly, a substantial driver of financial convergence which primarily reflects market imperfections are various regulatory, accounting, tax and rating agency factors (RATs).

Before concluding, it would be interesting to retain three main caveats: negative spillovers due to convergence, absence of a theoretical basis and, shortcomings of the estimation approach. First and foremost, 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 (Asongu, 2012). Secondly,

using econometrics to accomplish more than just testing theory is not without some 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 intermediary market convergence (Asongu, 2012). Thirdly, as we have already outlined in the first paragraph of Section 3.2, the choice of the converge approach which is based on constraints in data structure also has its shortcomings. According to Apergis et al. (2008), critics of β-convergence dispute 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-term as all countries converge to the same long-run path. If, on the other hand, 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 (with respect to their final equilibrium) will depend on the initial distribution of the variable under investigation. Overall, the approach suffers from specific deficiencies associated with the data structure (Caporale et al., 2009; Asongu, 2012).

6. Concluding remarks

In the first critical assessment of convergence in financial development in the African continent, we find overwhelming support for integration. 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). We have examined convergence in financial intermediary dynamics of depth, efficiency, activity and size. A broader interpretation of findings suggests that; countries with small-sized financial intermediary depth, efficiency,

activity and size are catching-up countries with large-sized financial intermediary depth, efficiency, activity and size respectively. Policy implications have been discussed.

Appendices

Appendix 1: Summary statistics

		Mean	S.D	Minimum	Maximum	Observations
Financial Depth	Money Supply	0.306	0.194	0.046	1.141	248
	Liquid Liabilities	0.234	0.180	0.026	0.948	250
Financial Efficiency	Banking Efficiency	0.854	0.490	0.086	3.671	268
	Financial Efficiency	0.890	0.482	0.181	2.606	250
Financial Activity	Banking Activity	0.180	0.161	0.015	0.869	249
	Financial Activity	0.205	0.221	0.015	1.739	250
Fin. Size	Financial Size	0.701	0.240	0.021	1.609	260
Control Variables	Openness(Trade)	68.224	37.119	10.079	224.19	263
	Inflation	11.979	22.802	-100.00	183.31	256
	Public Investment	7.695	4.132	0.000	27.523	233
	GDP growth	3.976	7.402	-16.740	71.188	266

Notes: S.D: Standard Deviation. GDP: Gross Domestic Product.

Appendix 2: Correlation analysis

Financial Depth		Financial Efficiency		Financial Activity		Fin. Size	Control Variables				
M2	Fdgdp	BcBd	FcFd	Prcb	Prcbof	Dbacba	Trade	Inflation	PubInvt.	GDPg	
1.000	0.971	-0.116	-0.081	0.737	0.606	0.409	0.165	-0.119	0.152	-0.122	M2
	1.000	-0.119	-0.044	0.791	0.697	0.469	0.216	-0.127	0.148	-0.113	Fdgdp
		1.000	0.873	0.376	0.316	0.251	-0.038	-0.218	-0.075	-0.022	BcBd
			1.000	0.469	0.544	0.260	-0.103	-0.218	-0.090	-0.015	FcFd
				1.000	0.925	0.532	0.153	-0.184	0.040	-0.097	Prcb
					1.000	0.463	0.064	-0.148	-0.016	-0.101	Prcbof
						1.000	0.413	-0.423	0.128	0.024	Dbacba
							1.000	-0.165	0.299	0.301	Trade
								1.000	-0.152	-0.058	Inflation
									1.000	0.001	PubInvt.
										1.000	GDPg

Notes: M2 :Money Supply. Fdgdp : Liquid liabilities. BcBd : Bank credit on Bank deposit. FcFd: Financial credit on Financial deposit. Prcb: Private domestic credit by deposit banks. Prcbof: Private domestic credit by deposit banks and other financial institutions. Dbacba: Deposit bank assets on deposit bank assets plus central bank assets. PubInvt: Public Investment. GDPg: GDP growth.

Appendix 3: Variable definitions

Variables	Signs	Variable definitions	Sources
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)
Public Investment	PubI	Gross Public Investment (% of GDP)	World Bank (WDI)
Growth of GDP	GDPg	Average annual GDP growth rate	World Bank (WDI)
Economic financial depth(Money Supply)	M2	Monetary Base plus demand, saving and time deposits (% of GDP)	World Bank(FDSD)
Financial system depth(Liquid liabilities)	Fdgdp	Financial system deposits (% of GDP)	World Bank (FDSD)
Banking system allocation efficiency	BcBd	Bank credit on Bank deposits	World Bank (FDSD)
Financial system allocation efficiency	FcFd	Financial system credit on Financial system deposits	World Bank (FDSD)
Banking system activity	Pcrb	Private credit by deposit banks (% of GDP)	World Bank (FDSD)
Financial system activity	Pcrbof	Private credit by deposit banks and other financial institutions (% of GDP)	World Bank (FDSD)
Financial size	Dbacba	Deposit bank assets on Central banks assets plus deposit bank assets	World Bank (FDSD)

Notes: M2: Money Supply. Fdgdp: Liquid liabilities. BcBd: Bank credit on Bank deposits. FcFd: Financial system credit on Financial system deposits. Pcrb: Private domestic credit by deposit banks. Pcrbof: Private domestic credit by deposit banks and other financial institutions. Dbacba: Deposit bank assets on Central bank assets plus deposit bank assets. WDI: World Development Indicators. FDSD: Financial Development and Structure Database.

Appendix 4: Presentation of countries

Group	Group category	Countries	Num
Legal origin	English Common-Law	Botswana, The Gambia, Ghana, Kenya, Lesotho, Malawi, Mauritius, Nigeria, Sierra Leone, South Africa, Sudan, Swaziland, Uganda, Zambia, Tanzania.	15
	French Civil-Law	Algeria, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Ivory Coast, Egypt, Equatorial Guinea, Ethiopia, Gabon, Madagascar, Mali, Morocco, Niger, Rwanda, Senegal, Togo, Tunisia.	19
Religions	Christianity	Botswana, Burundi, Cameroon, Central African Republic, Ivory Coast, Equatorial Guinea, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Rwanda, South Africa, Swaziland, Togo, Uganda, Zambia, Tanzania.	21
	Islam	Algeria, Burkina Faso, Chad, Egypt, The Gambia, Mali, Morocco, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Tunisia.	13
Regions	Sub-Saharan Africa	Botswana, The Gambia, Ghana, Kenya, Lesotho, Malawi, Mauritius, Nigeria, Sierra Leone, South Africa, Sudan, Swaziland, Uganda, Zambia, Tanzania, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Ivory Coast, Equatorial Guinea, Ethiopia, Gabon, Madagascar, Mali, Niger, Rwanda, Senegal, Togo.	30
	North Africa	Algeria, Egypt, Morocco, Tunisia.	4
Income Levels	Low Income	Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, The Gambia, Ghana, Kenya, Madagascar, Malawi, Mali, Niger, Rwanda, Sierra Leone, Togo, Uganda, Zambia, Tanzania.	18
	Middle Income	Algeria ,Botswana, Cameroon, Ivory Coast, Egypt, Equatorial Guinea, Gabon, Lesotho, Mauritius, Morocco, Nigeria, Senegal, South Africa, Sudan, Swaziland, Tunisia.	16
	Lower Middle Income	Cameroon, Ivory Coast, Egypt, Lesotho, Morocco, Nigeria, Senegal, Sudan, Swaziland, Tunisia.	10
	Upper Middle Income	Algeria, Botswana, Equatorial Guinea, Gabon, Mauritius, South Africa.	6

Notes: Num: Number of cross sections (countries)

Appendix 5: How financial reforms influence the choice of endogenous variables

Reform type	Financial reforms	Targeted endogenous variables
First generational financial reforms	Abolishment of explicit controls on the pricing and allocation of credit.	Improvements in financial depth, financial efficiency, financial activity and financial size to facilitate convergence.
	Reduction of direct government intervention in bank credit decisions.	
	Relaxation of controls on international capital movements.	
	Allowance of interest rates to be market determined.	
Second generational financial reforms	Improvement of legal, regulatory, supervisory and institutional environments.	
	Restoration of bank soundness and rehabilitation the financial infrastructure.	

Notes: These reforms are fundamental characteristics that could lead to financial convergence.

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