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Abstract

This chapter complements exiting African liberalization literature by providing fresh patterns of two main areas. First, it assesses whether African banking institutions have benefited from liberalization policies in terms of bank returns. Second, it models bank return and return uncertainty in the context of openness policies to examine fresh patterns for the feasibility of common policy initiatives. The empirical evidence is based on 28 African countries for the period 1999-2010. Varying non-overlapping intervals and autoregressive orders are employed for robustness purposes. The findings show that, while trade openness has increased bank returns and return uncertainties, financial openness and institutional liberalization have decreased bank returns and reduced return uncertainty respectively. But for some scanty evidence of convergence in return on equity, there is overwhelming absence of catch-up among sampled countries. Implications for regional integration and portfolio diversification are discussed.

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1. Introduction

The 2008 financial crisis was not a shock that was later accompanied by struggles from rational actors. Instead, it shows the crucial relevance of social conventions like risk management models adopted to cope with uncertainty. The failure of economists and political scientists to predict the crisis is both dismal and embarrassing. The crisis has further reminded scholars that we live in a world of uncertainty and risk. In a risky world, the hypothesis that agents adopt rational, instrumental and consistent decision rules is logical. However when parameters are quite unstable to forecast future events, this hypothesis becomes untenable. This has prompted policy makers and market players to depend on certain social conventions that render uncertain environments stable (Nelson & Katzenstein, 2011).

With the recent financial crisis, the appealing ambitions of globalization policies and their implications for development have been questioned, with more emphasis placed on developing countries. According to some policy makers, the crisis has substantially exposed the drawbacks of liberalization policies (Kose et al., 2006; Kose et al., 2011; Asongu, 2014a). This is essentially because emerging markets which experienced substantial inflows of capital over the last decade have been faced with the daunting task of managing macroeconomic shocks resulting from a considerable decline in the same flows. Owing to the theoretical motivations of financial globalization, the economic downturn has unraveled the debate on the effects of globalization in developing countries[2].

In the 1980s when the current trend of globalization began, developed and developing countries experienced rising cross-border financial flows. The surges in financial transactions were followed by a spade of currency crises. These developments reignited the debated

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[2] According to theoretical postulations, financial globalization is expected to promote international risk sharing and ease the efficient international allocation of capital. Developing countries should reap higher rewards because they are relatively labor rich and capital scarce. In addition, developing countries are more volatile in terms of output than their industrial counterparts which increases investment, growth and the potential welfare gains resulting from international risk sharing (Asongu, 2013a, b; Kose et al., 2011).

among scholars over the benefits of openness, with some affirming that developing countries which opened their capital accounts have been more adversely affected and increasingly vulnerable to the shocks than their industrial counterparts (Kose et al., 2011; Henry, 2007; Asongu, 2014a). Among items of the debate, whereas the concern about the positive rewards for trade openness have reached a consensus (Kose et al., 2006), the incidence of financial openness has intensified with more polarization (Asongu, 2014a).

The wave of structural and policy adjustments that began in most African countries in the 1980s can be classified into two main strands: first generation and second generation reforms (Janine & Elbadawi, 1992; Batuo & Asongu, 2014a). Adopted policy initiatives in the first generation of reforms entailed: the abolishment of explicit control on allocation of credit and pricing, reduction of direct government intervention decisions, allowance of credit to be determined by market forces and, relaxation of control over international financial flows. Second generation reforms that focused on institutional and structural constraints included, inter alia: restoration of bank soundness, financial infrastructure rehabilitation and amelioration of the institutional, regulatory, legal and supervisor environments (Batuo et al., 2010; Asongu, 2013a).

Unfortunately, in spite of over two decades of reforms, African banks are still substantially suffering from surplus liquidity issues that affect profits and returns (Saxegaard, 2006; Fouda, 2009; Coccorese & Pellecchia, 2010; Asongu, 2012a; 2013c, 2014bc; Nguena, 2014). Three natural concerns arise from the bulk of empirical evidence above. (1) The temptation of inquiring whether African financial institutions have in fact benefited from the liberalization policies in terms of bank returns. (2) Owing to the uncertainty of the global financial environment, an analogue concern is how the liberalization policies have affected uncertainty in bank returns. (3) The issue of patterns on which common policies on bank return and return uncertainty can be adopted. While a great chunk of the literature has focused

on the incidence of reforms on financial development (Cho et al., 1986; Ndikumana, 1999; 2000, 2005; Arestis et al., 2002; Batuo & Kupukile, 2010; Asongu, 2012a; Kose et al., 2006; Al-Obaidan, 2008; Kiyato, 2009; Kablan, 2010; Kukenova, 2011), as far as we have reviewed there is yet no study has the investigated the second and third concerns above.

Against this background, the present chapter steers clear of past studies in three perspectives: effect of liberalization policies on bank return uncertainty; feasibility of common policies for bank return and return uncertainties and; usage of updated data for more focused or fresh policies implications. First, given the recent debate on the lofty ambitions of globalization policies (due to the recent financial crises), we assess the effects of liberalization policies on return uncertainty. The assessment is important because, financial crises are characterized by high uncertainties in return and hence, policy makers should be as much concerned about profitability as uncertainty in profitability. Second, the adoption of common policy initiatives is feasible when there is some form of convergence in bank return or return uncertainty. This intuition has theoretical underpinnings in income convergence that has been substantially documented in catch-up literature (Solow, 1956; Swan, 1956; Baumol, 1986; Barro, 1991; Mankiw et al., 1992; Barro & Sala-i-Martin, 1992, 1995). Third, the use of very recent data enables us to provide results with updated policy implications. Accordingly, the periodicity (1999-2010) is intended to capture second generation reforms for fresh policy implications.

The rest of the chapter is organized as follows. Section 2 presents the theoretical highlights and a brief literature. Data and methodology are discussed in Section 3. Section 4 covers the empirical analysis. We conclude with Section 5.

2. Brief literature and theoretical highlights

2.1 Allocation efficiency, bank return and uncertainty

The decision to adopt liberalization and achieve the benefits of international risk sharing, bank return and efficient financial resource allocation has been subject to a lot of heated debate in academic and policy making circles. Consistent with Asongu (2013b, 2014a), there are two strands in the literature on the interest of liberalization as a policy initiative for African countries in their objective to achieve efficient allocation of resources and bank returns.

The first strand relies on the theoretical underpinnings of the seminal work of Solow (1956) on the rewards of allocation efficiency and bank return. According to the neoclassical growth model, liberalization has a lot of positive effects, especially in terms of efficiency and profitability. In essence, there is a flow of resources from developed countries that are capital abundant with low capital return to developing countries with high return in capital. Many developing countries have liberalized their economies with the objective of reaping the benefits discussed above. They have been motivated by the arguments that the movement of capital from resource-abundant to resource-poor countries mitigates the cost of capital, raises return to investment and economic prosperity that ultimately improve living standards (Obstfeld, 1998; Fischer, 1998; Rogoff, 1999; Summers, 2000; Asongu, 2013ab, 2014a).

On the other hand, the benefits highlighted above are viewed in the second strand as a fanciful attempt to extend the benefits of international trade in goods to assets. According to the strand, the appealing sides above find any substance only when economies do not suffer from distortions apart from the undisturbed flow of capital resources. Hence, in light of the distortions arising from the recent financial crisis, the second strand sustains that the theoretical predictions of liberalization policies from the neoclassical growth model are unrealistic. Before the beginning of the century and a decade later, Rodrik (1998) and Rodrik

& Subramanian (2009) supported this strand: respectively writing papers with provocative titles like "Who Needs Capital Account Convertibility" and "Why did financial globalization disappoint?" (Asongu, 2013b). From a broad standpoint, the authors sustain that there seems to be no real correlation between the amount invested in (or the growth rate of an economy) and capital account openness. In line with this narrative, the rewards of financial openness are not really visible. However the consistent reoccurrence of crises have evidently confirmed the costs (Rodrik, 1998). Rodrik & Subramanian (2009) have emphasized that in the wake of the recent global financial crisis, the thesis that financial engineering has brought about the gains discussed in the first strand sound less plausible. They have argued that financial liberalization has failed to improve growth and investment in developing countries. According to them, countries that have witnessed substantial economic prosperity have been those that are less reliant on capital inflows. In their view, globalization has not reduced volatility and smoothened consumption. Asongu (2013b, 2014a) has joined in hypothesizing that the benefits of liberalization are speculative, indirect and unpersuasive. This further reflects the uncertain dimension of bank returns in developing countries.

We devote space to briefly discussing risk transfer and insurance. Consistent with Cummins & Weiss (2009, p. 493), over the past decade, a strand of the economic development literature has focused on the assessment of convergence in the financial market industry, especially in reinsurance sectors and capital markets. According to the narrative, convergence has been facilitated by a plethora of factors: the emergence of enterprise risk management, increase in the severity and frequency of catastrophic risks, advances in information and communication technologies (ICTs), (re) insurance underwriting cycles due to market inefficiencies, inter alia. In this vein, hybrid financial/insurance instruments have resulted from the developments. The literature on development and evolution of instruments,

institutions and risk-transfer markets can be summarized in three main strands: market inception period, market evolutionary period and market take-off period.

First, on the market inception period, scholarly focus on insurance securities and reinsurance-financial products has been quite recent. According Cummins & Weiss, it was triggered by Hurricane Andrew in 1992 and the later the introduction of options and insurance futures. The interesting literature from D'Arcy & France (1992), Cox & Schwebach (1992) and Niehaus & Mann (1992) has covered much territory on this strand. However, this early literature left most of the identified issues unsolved. Such include, inter alia: trade-off between basis risk and moral hazard, magnitude of risk premia, counterparty credit risk and insurer acceptance of new contracts. Second, the market evolution period which approximately varies from 1994 to 2004 is the tolerance during which the market tried different capital instruments. While a plethora of financial instruments are tried during this span, a substantial number of them are unsuccessful. Third, the market take-off period spans from expansion of the market for Cat bonds. An exhaustive literature review on the development and evolution of instruments, institutions and risk-transfer markets is documented by Cummins & Weiss (2009).

2.2 Theoretical highlights and intuition

The concept of catch-up sprouted from the demise of Keynesianism and the rise of the neoclassical revolution in which new theories of economic prosperity predicted absolute convergence as an extension of market equilibrium or policies of free market competition (Mayer-Foulkes, 2010; Asongu, 2014d). According to the neoclassical growth model, convergence occurs to each country's long-term equilibrium or to a country's steady state. On the other hand, another strand of the literature postulates that it is not feasible for income-convergence to occur for two principal reasons: differences in initial endowments between

countries and the possibility of multiple equilibria. In the latter stance, divergence in initial income studies (Barro, 1991) has been confirmed in the long-run (Pritchett, 1997).

As we have highlighted above, the empirical strategy is in accordance with the substantial bulk of literature that has focused on cross-country income catch-up (Solow, 1956; Swan, 1956; Baumol, 1986; Barro, 1991; Mankiw et al., 1992; Barro & Sala-i-Martin, 1992, 1995; Narayan et al., 2011; Asongu, 2013d, 2014d). While this underlying theory has not yet met some consensus, there is currently a growing body of studies using the theoretical underpinnings of catch-up literature in many other development fields. According to this narrative, scholarly reporting of facts is a useful scientific activity even without some formal theoretical underpinning. In this light, we join the strand in asserting that 'applied econometrics' has other tasks than merely validating or refuting economic theories (Costantini & Lupi, 2005; Narayan et al., 2011; Asongu, 2013d).

Putting the theoretical underpinnings into context, we postulate that the presence of catch-up among African countries (in terms of return and return uncertainty) means some common policies to mitigate the effects of globalization are feasible. On the other hand, full catch-up implies that such feasible policies can be implemented without distinction of locality or nationality within sampled countries. This is because in such a scenario where convergence does not occur, investor can gain by holding portfolios originating from different countries. In this light, to the degree that convergence occurs, the benefits from international portfolio diversification are mitigated. Hence, a direct consequence of full convergence is that there are similar yields for financial assets of similar liquidity and risk, regardless of locality and nationality. This intuition is in accordance with an interesting bulk of recent literature on the modeling and timing of intellectual property rights (IPRs) harmonization against software piracy (Andrés & Asongu, 2013; Asongu, 2013d); common initiatives against African capital flight (Asongu, 2014g); the future of knowledge economy (Asongu, 2013g,h); health of

financial markets (Bruno et al., 2012; Narayan et al., 2011; Asongu, 2013e, 2014e) and currency areas (Asongu, 2013f, 2014f), inter alia.

3. Data and methodology

3.1 Data

We examine a panel of 28 African countries with annual data from World Development Indicators (WDI) and the Financial Development and Structure Database (FDSD) of the World Bank for the period 1999 to 2010. There is a fourfold justification for this periodicity: (1) variables on institutional liberalization are only available from 1996; (2) the interest of capturing second generation reforms for fresh policies discussed in the introduction; (3) data availability constraints in bank returns and; (4) the computation of uncertainty in returns that is accompanied with losses in degrees of freedom.

The dependent variables are: return on assets (ROA), return on equity (ROE), uncertainty in ROA (UROA) and uncertainty in ROE (UROE). The computation of return uncertainties is discussed in *Section 3.2.1* below. The main independent variables include: trade, financial and institutional liberalization measures. These respectively are trade openness, foreign direct investment (FDI) and institutional quality index. The institutional index obtained from principal component analysis (PCA) is discussed in *Section 3.2.2*. We also control for other macroeconomic and structural characteristics, notably: inflation, government expenditure and economic prosperity. Inflation can decrease bank returns (if not well incorporated into interest rates) and increase uncertainty in the returns. Government expenditure should intuitively have some effect on the dependent variables though the expected sign remains ambiguous. We expect economic prosperity to increase bank returns as well as uncertainty in these returns. The expected signs for inflation and economic prosperity are consistent with Asongu (2011).

The intuition for the choice of the control variables is based on the theoretical underpinnings of conditional convergence. Accordingly, it is possible for conditional convergence to take place when countries differ in macroeconomic and structural characteristics that determine bank return and return uncertainty. Consistent with Asongu (2013b, 2014a), we control for globalization in terms of trade, financial and institutional liberalization with trade openness, foreign direct investment, and the institutional liberalization index respectively. From intuition and common sense, bank return naturally depends on inflation and economic prosperity (GDP growth). We also control for government intervention in the economy with government's final consumption expenditure (Norden et al., 2012).

The definition of variables (and their corresponding sources), presentation of the sampled countries (with the summary statistics) and correlation analysis are detailed in Appendix 1, Appendix 2 and Appendix 3 respectively. While Appendix 2 shows that there is quite some variation in the data employed such that reasonable estimated linkages could emerge, Appendix 3 serves to control for potential issues of overparametization and multicollinearity that could substantially bias estimated coefficients.

3.2 Methodology

3.2.1 Computing return uncertainty

When agents are faced with uncertainty, conditional proxies for volatility are better measures (Kangoye, 2013). Accordingly, GARCH-based approaches are appropriate to model uncertainty. The variance of return contingent on past information is specified by a GARCH (p,q) model. Unfortunately, GARCH-based approaches have a better fit with high frequency data. Since, we are employing annual data; we use first- and second-order autoregressive processes of the return variables. The uncertainties in the returns are then proxied by the standard deviation of the corresponding residuals. In the computation of the standard errors

(uncertainties) we used three-year and four-year non-overlapping intervals for first-order and second-order autoregressive processes respectively.

3.2.2 Principal component analysis (PCA)

Consistent with Asongu (2013b), the high degree of substitution (correlation) among government quality variables means some information will be redundant if all the indicators were considered simultaneously. Thus we employ PCA to reduce the dimensions and retain only common factors that reflect much of the information or variability in the initial dataset. PCA has been substantially used to reduce a set of highly correlated variables into a smaller set of uncorrelated variables called principal components (PCs). The criteria used to retain the common factors is from Kaiser (1974) and Jolliffe (2002) who have recommended that only PCs with an eigenvalue of more than one should be retained. Hence, from Table 1, it can be noticed that the first PC represents more than 78% of common information and has an eigenvalue of 4.70. We call this composite indicator the institutional index (instidex).

Table 1: Principal Component Analysis (PCA) for Institutional Index (Instidex)

Principal Components	Component Matrix(Loadings)						Proportion	Cumulative Proportion	Eigen Value
	V & A	**R.L**	**R.Q**	**G.E**	**PS**	**CC**			
First P.C	0.369	0.435	0.412	0.425	0.388	0.416	0.784	0.784	4.705
Second P.C	-0.690	0.103	0.258	0.436	-0.453	0.227	0.083	0.867	0.499
Third P.C	0.591	-0.187	0.299	0.051	-0.724	-0.002	0.054	0.922	0.327

P.C: Principal Component. V& A: Voice & Accountability. R.L: Rule of Law. R.Q: Regulation Quality. GE: Government Effectiveness. PS: Political Stability. CC: Control of Corruption.

3.2.3 Model specification and estimation technique

As documented in recent literature (Asongu, 2014d) from Islam (2003), there are a plethora of ways to understand and apply the concept of convergence: convergence across economies versus (vs) convergence within an economy; convergence in terms of income vs. convergence in terms of growth rate; *sigma*-convergence vs. *beta*-convergence; conditional convergence vs. unconditional (absolute) convergence; local or club-convergence vs. global-

convergence; TFP (total factor productivity)-convergence vs. income-convergence and; stochastic convergence vs. deterministic-convergence.

Some matches between the definitions of convergence and methodologies employed have also been documented. These matches are not unique because *beta*-convergence has either conditionally or unconditionally been assessed with a plethora of approaches: time series, panel-based as well as formal and informal cross-sectional approaches. Most of the documented techniques have been positioned on per capita income across countries. In addition, the panel-focused strategy and cross-sectional techniques have also been employed to investigate TFP and club convergences. While the cross-sectional strategy has even been used for sigma-convergence, the time-series technique has been employed to investigate catch-up within and across countries. The distribution technique has investigated beyond *sigma*-convergence by assessing the whole shape of intra-distribution and dynamics of distributions.

In line with Asongu (2014d), the *beta*-convergence approach is in line with growth rate and income-level investigations. It originates from the hypothesis of decreasing returns representing a greater capital marginal productivity in capital-poor countries. According to the intuition, with comparable savings rates, less developed countries would experience higher levels in economic prosperity. Under this scenario, there is a negative nexus between the initial level of income and the subsequent growth rate. Beta catch-up is used to qualify this form of convergence. However, a draw-back to this technique is that a non-positive *beta* coefficient from the initial growth level may not necessarily imply diminishing dispersion. The downside has resulted in the concept of *sigma*-convergence, in which *sigma* denotes the standard deviation of cross-sectional distributions. In spite of this drawback emphasizing that *beta*-convergence is not a sufficient but a necessary condition for *sigma*-convergence, researchers have continuously employed it because it conveys information on structural

parameters of growth models. Accordingly, such information is not usually provided by the distribution technique.

As discussed in the 'theoretical highlights and intuition for the empirics' section above, this *beta*(β)-convergence estimation strategy is broadly in line with a recent strand of a methodological innovation in the investigation of catch-up. According to the narrative, the following two equations are the standard processes for assessing *beta*-convergence (Fung, 2009; Asongu, 2013d). Eq. (1) is plausible if $W_{i,t}$ is strictly exogenous.

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

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

Where $a = 1+\beta$, $Y_{i,t}$ is the measure of bank return or corresponding uncertainty in country *i* at period *t*. $W_{i,t}$ is a vector of determinants of the dependent variables, η_i is a country-specific effect, ξ_t is a time- specific constant and $\varepsilon_{i,t}$ an error term. According to the neoclassical growth model, when the estimated *beta* coefficient in Eq (1) is statistically and negatively significant, it implies that countries relatively near their steady state in bank returns will experience a slowdown in the progress of return (and their corresponding uncertainty) known as conditional convergence (Narayan et al., 2011, p. 2773). On the other hands, if $0 < |a| < 1$ in Eq. (2), then $Y_{i,t}$ is dynamically stable around the path with a trend growth rate similar to that of W_t, and with a height relative to the level of W_t (Fung, 2009, p. 59). The individual effect η_i and variables contained in $W_{i,t-\tau}$ are proxies for the long-run level returns in the financial intermediation market are converging to. The former measures characteristics affecting the country's steady state that are not reflected by $W_{i,t-\tau}$.

The criteria for convergence discussed above are satisfied only when $W_{i,t}$ is strictly exogenous. Unfortunately in the real world, this is a subject to controversy due to the inherent

possibility of reverse-causality. In essence, while liberalization policies could affect bank returns and their corresponding uncertainties, the reverse effect cannot be ruled-out because the state of domestic financial institutions also influences openness policies adopted by a country. A means of tackling the concern of endogeneity consists of eliminating the country-specific effects by first differencing. Therefore, Eq (2) becomes:

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

We further use the Arellano & Bond (1991) method or the Generalized Method of Moments (GMM) that exploits all the orthogonality conditions between the error term and the lagged dependent variables. This is essentially because, even after first differencing to eliminate the country-specific effect, there is still some correlation between the error term and the lagged endogenous variable. Consistent with the underpinning empirical literature (Asongu, 2013d), we are concur with Bond et al. (2001, pp. 3-4)[3] in preferring the *System* GMM estimation (Arellano & Bover, 1995; Blundell & Bond, 1998) to the *Difference* GMM estimation (Arellano & Bond, 1991). It is a combination of Eqs (2) and (3) which has been substantially employed in recently documented catch-up literature. We specify a *two*-step GMM instead of a *one*-step because it is heteroscedascity-consistent. The Arellano & Bond autocorrelation and Sargan overidentifying (OIR) tests are used to assess the absence of autocorrelation in the residuals and validity of the instruments respectively.

The empirics of catch-up have consistently sustained that yearly times are too short to be appropriate for investigating convergence because short-run disturbances may loom substantially in such brief time spans (Islam, 1995, p. 323). Hence, given the 11 years period

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[3] "*We also demonstrate that more plausible results can be achieved using a system GMM estimator suggested by Arellano & Bover (1995) and Blundell & Bond (1998). The system estimator exploits an assumption about the initial conditions to obtain moment conditions that remain informative even for persistent series, and it has been shown to perform well in simulations. The necessary restrictions on the initial conditions are potentially consistent with standard growth frameworks, and appear to be both valid and highly informative in our empirical application. Hence we recommend this system GMM estimator for consideration in subsequent empirical growth research*". Bond et al. (2001, pp. 3-4).

(1999-2010) we use three-year and four-year non-overlapping intervals (NOI)[4]. We cannot use two-year NOI because of constraints in computing the standard errors (standard deviation of the residuals). On the other hand, we cannot employ more than four-year non-overlapping intervals due to constraints in degrees of freedom required for conditional convergence modeling. In essence, higher NOI orders have an inverse relationship with degrees of freedom.

We compute the implied rate of convergence by computing $a/3$ and $a/4$ respectively for the three-year and four-year NOI because we have used 3 and 4 years to mitigate short-run disturbances. The criterion employed to assess the existence of convergence is : $0 < |a| < 1$. It implies convergence occurs when the absolute value of the estimated lagged return variable is less than one but greater than zero. In other words, past variations have a less proportionate impact on future differences, implying the difference on the left hand side of Eq. (3) is diminishing overtime or the country is moving to a steady state (Prochniak & Witkowski, 2012a, p. 20; Prochniak & Witkowski, 2012b, p. 23; Asongu, 2014d, p. 10).

Before presenting the results, it is interesting to briefly discuss the economic intuitions motivating the assessments of absolute and conditional convergence in bank return. Consistent with Asongu (2013e), absolute convergence in market return occurs when countries share the same fundamental characteristics in relation to bank return such that only differences in initial levels of bank return exist. Hence, this form of convergence is the result of factors like the adoption of a unique currency, creation of monetary unions, inter alia. Absolute convergence could also take place due to adjustments that are common to many nations. For example, as highlighted in the introduction, many African countries engaged in a plethora of structural and institutional reforms from the 1980s under the umbrella of Bretton

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[4] There are four three-year NOI: 1999-2001; 2002-2004; 2005-2007 & 2008-2010. We also have three four-year NOI: 1999-2002; 2003-2006 & 2007-2010.

Woods institutions (International Monetary Fund and World Bank for instance). The implemented reforms included liberalization policies with the objective to mitigate barriers to investment and trade. These reforms have been given credit for the impressive performance of the financial intermediary markets in Africa, essentially because they theoretically obviate the preferences for specific markets by investors. Other factors that could facilitate absolute convergence are the improvements in ICTs that have ameliorated synchronization in the financial intermediary market such that, cross-market shock adjustments are much faster. In this logic, the speed at which cross-market shocks occur has increased with ICT growth and hence, eased absolute convergence.

Conversely, as we have already highlighted in the third paragraph of Section 3.1, conditional convergence is the type of catch-up which is contingent on institutional and structural characteristics. Hence, in line with theoretical underpinnings, this form of convergence is one in which a country's long-term equilibrium (or steady state) is conditional on fundamentals of the market/economy and structural characteristics (Narayan et al., 2011). Hence, this form is conditioned on the macroeconomic (institutional and structural) variables we choose and empirically test.

4. Empirical analysis

4.1 Presentation of results

This section assesses three main issues underlying the motivation of the chapter: (1) examining catch-up in returns and return uncertainties, (2) computing the rate of catch-up and, (3) investigating the time needed for full (100%) convergence. While tackling the first-two concerns informs us on the feasibility of common policies in bank return and uncertainties, the third concern provides the timeline during which such common policy initiatives can be implemented without distinction of locality or nationality.

Table 2 below summarizes the results presented in Table 3. Absolute (or unconditional) convergence is computed with only the lagged value of the dependent variable as independent variable whereas, conditional convergence is modeled with the vector of determinants ($W_{i,t}$). In order to assess the validity of the estimations and indeed the convergence hypotheses, we perform two tests. First, the Arellano and Bond test for autocorrelation which examines the null hypothesis of the absence of autocorrelation. Second, the Sargan test that investigates the overidentification restrictions. We also report the Wald test for the joint significance of estimated coefficients. The models are overwhelmingly valid because for the most part: (1) the null hypotheses for the Sargan and autocorrelation tests are not rejected and; (2) the null hypothesis of the Wald test is rejected in the presence of significant coefficients. For some models, the autocorrelation test is not reported because of issues in degrees of freedom.

We also devote some space to discussing the computation of the values in Table 2: rate of catch-up and time for full (100%) catch-up. Given an initial value of 0.903 that is significant with valid instruments and no autocorrelation in the residuals: (1) the catch-up rate is 30.10% ((0.903/3)*100) and; (2) the length of time required for full catch-up is 9.96 years (300%/30.10%). Therefore, 9 years (yrs) and about 350 days are needed to achieve 100% catch-up for a lagged value of 0.903 that is in accordance with the information criterion: $0 < |a| < 1$.

The findings in Table 2 reflect only scanty evidence of convergence in ROE for the three-year NOI (Panel A). The rate is 30.10% for absolute convergence (AC) and 26.23% for conditional convergence (CC) with corresponding timelines to full convergence of 9.96 years (yrs) and 11.43 years respectively. There is no evidence of catch-up in return uncertainties (Panel B).

Table 2: Summary of the results

	Panel A: Returns							
	Absolute Convergence				Conditional Convergence			
	Three-Year NOI		Four-Year NOI		Three-Year NOI		Four-Year NOI	
	ROA	ROE	ROA	ROE	ROA	ROE	ROA	ROE
Convergence?	No	Yes	No	No	No	Yes	No	No
Rate of Convergence	n.a	30.10%	n.a	n.a	n.a	26.23%	n.a	n.a
Time to Full Convergence	n.a	9.96Yrs	n.a	n.a	n.a	11.43Yrs	n.a	n.a

	Panel B: Uncertainty in Returns							
	Absolute Convergence				Conditional Convergence			
	AR(1) &Three-Year NOI		AR(2) & Four-Year NOI		AR(1) &Three-Year NOI		AR(2) & Four-Year NOI	
	UROA	UROE	UROA	UROE	UROA	UROE	UROA	UROE
Convergence?	No	No	No	No	No	No	No	No
Rate of Convergence	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Time to Full Convergence	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a

ROA: Return on Assets. ROE: Return on Equity. UROA: Uncertainty in ROA. UROE: Uncertainty in ROE. FDI: Foreign Direct Investment. Trade: Trade Openness. Gov. Exp: Government Expenditure. GDPg: Gross Domestic Growth rate. Instidex: Institutional Index. NOI: Non-Overlapping Intervals. n.a: not applicable due to the absence of convergence. Yrs: years. AR(1): First Order Autoregression. AR(2): Second Order Autoregression. Autoregression is on the Return variables (ROA & ROE).

Most of the significant control variables in Table 3 have the expected signs. (1) While the benefits in terms of bank return and allocation efficiency from trade liberalization are apparent, those of financial openness are negative. This is consistent with the substantial bulk of documented evidence discussed in the introduction (Kose et al., 2006; Kose et al., 2011; Asongu, 2012a, 2014a). (2) Inflation could improve bank return when interest rates are adjusted for expected price increases. (3) Economic prosperity implies banks are making some profits since they are increasingly lending-out to economic agents. (4) The presence of good institutions should mitigate uncertainties since government quality has been established to positively affect the performance of African financial markets (Asongu, 2012b).

Table 3: Two-step System GMM for Returns and Return Uncertainty

Panel A: Returns

	Absolute Convergence				Conditional Convergence			
	Three-Year NOI		Four-Year NOI		Three-Year NOI		Four-Year NOI	
	ROA	ROE	ROA	ROE	ROA	ROE	ROA	ROE
Initial	**1.074****	**0.903***	**1.959****	0.770	0.359	**0.787****	0.201	-0.447
	(0.021)	**(0.054)**	**(0.012)**	(0.433)	(0.163)	**(0.030)**	(0.617)	(0.560)
Constant	---	---	---	---	-0.389	-14.099	0.105	21.147
					(0.575)	(0.206)	(0.847)	(0.299)
FDI	---	---	---	---	-0.049	**-0.777***	-0.046	1.051
					(0.356)	**(0.060)**	(0.557)	(0.687)
Trade	---	---	---	---	0.007	**0.136****	0.005	-0.036
					(0.232)	**(0.019)**	(0.338)	(0.823)
Inflation	---	---	---	---	0.030	-0.039	**0.063****	0.499
					(0.364)	(0.891)	**(0.045)**	(0.599)
Gov. Exp.	---	---	---	---	**0.032***	**0.338****	0.0008	-0.002
					(0.091)	**(0.018)**	(0.972)	(0.996)
GDPg	---	---	---	---	**0.184*****	**2.236*****	**0.143***	0.933
					(0.000)	**(0.000)**	**(0.066)**	(0.674)
Instidex	---	---	---	---	-0.003	-0.571	0.012	1.663
					(0.967)	(0.212)	(0.874)	(0.507)
Auto	**-1.149**	**-1.110**	n.a	n.a	**-1.153**	**-1.089**	n.a	n.a
	(0.250)	**(0.266)**			**(0.248)**	**(0.276)**		
Sargan OIR	**2.829**	**3.462**	**0.222**	**2.413**	**1.668**	**1.682**	**0.105**	**0.611**
	(0.586)	**(0.483)**	**(0.637)**	**(0.120)**	**(0.796)**	**(0.794)**	**(0.745)**	**(0.434)**
Wald	**5.267****	**3.688***	**6.306****	0.613	**145.39*****	**70.374*****	**130.46*****	5.972
	(0.021)	**(0.054)**	**(0.012)**	(0.433)	**(0.000)**	**(0.000)**	**(0.000)**	(0.543)
Countries	28	28	28	28	18	18	15	15
Observations	84	84	56	56	49	49	30	30

Panel B: Uncertainty in Returns

	Absolute Convergence				Conditional Convergence			
	AR(1) &Three-Year NOI		AR(2) & Four-Year NOI		AR(1) &Three-Year NOI		AR(2) & Four-Year NOI	
	UROA	UROE	UROA	UROE	UROA	UROE	UROA	UROE
Initial	0.074	0.231	-0.555	-0.051	0.082	0.252	0.177	-0.418
	(0.596)	(0.127)	(0.341)	(0.883)	(0.631)	(0.295)	(0.357)	(0.484)
Constant	---	---	---	---	0.240	2.118	-0.238	-2.878
					(0.659)	(0.674)	(0.268)	(0.401)
FDI	---	---	---	---	-0.014	0.204	0.012	0.157
					(0.669)	(0.684)	(0.747)	(0.768)
Trade	---	---	---	---	0.003	0.006	**0.004***	0.061
					(0.501)	(0.897)	**(0.098)**	(0.284)
Inflation	---	---	---	---	0.001	-0.025	0.012	0.031
					(0.914)	(0.876)	(0.407)	(0.889)
Gov. Exp.	---	---	---	---	**0.017***	0.143	0.014	0.226
					(0.083)	(0.222)	(0.212)	(0.164)
GDPg	---	---	---	---	-0.018	0.033	0.031	0.864
					(0.773)	(0.960)	(0.372)	(0.115)
Instidex	---	---	---	---	-0.020	0.150	**-0.025***	0.104
					(0.518)	(0.645)	**(0.075)**	(0.814)
Auto	**-0.329**	**-1.515**	n.a	n.a	**-1.306**	**-1.085**	n.a	n.a
	(0.741)	**(0.129)**			**(0.191)**	**(0.277)**		
Sargan OIR	**3.467**	**3.312**	**0.051**	**0.096**	**5.560**	**4.807**	**2.045**	3.664*
	(0.482)	**(0.506)**	**(0.820)**	**(0.755)**	**(0.234)**	**(0.307)**	**(0.152)**	(0.055)
Wald	0.280	2.318	0.903	0.021	**18.211****	**28.82*****	**88.99*****	**14.434****
	(0.596)	(0.127)	(0.341)	(0.883)	**(0.011)**	**(0.000)**	**(0.000)**	**(0.044)**
Countries	26	26	26	26	18	18	15	15
Observations	78	78	52	52	49	49	30	30

ROA: Return on Assets. ROE: Return on Equity. UROA: Uncertainty in ROA. UROE: Uncertainty in ROE. FDI: Foreign Direct Investment. Trade: Trade Openness. Gov. Exp: Government Expenditure. GDPg: Gross Domestic Growth rate. Instidex: Institutional Index. *,**,**: significance levels of 10%, 5% and 1% respectively. Initial: Lagged dependent variable. Auto: Autocorrelation test. OIR: Overidentifying Restrictions test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the Auto tests and; b) the validity of the instruments in the Sargan OIR test. P-values in brackets. AR(1): First Order Autoregression. AR(2): Second Order Autoregression. Autoregression is on the Return variables.

4.2 Discussion of results, policy implications and caveats

4.2.1 Discussion of results

The absence of absolute convergence (AC) implies that there are substantial differences in initial levels (endowments) of return and return uncertainty. On the other hand, the presence of AC in ROE means that beyond the possibility of dissimilar initial conditions, there are some common factors (without the control of the sampled countries) that are enabling countries with low-levels in ROE to catch-up their counterparts with higher levels. On the other hand, dissimilarity in initial ROE levels is influenced by various factors such as leverage and capital requirements, inter alia. It is interesting to understand that AC is principally the end of common factors, among others: the adoption of monetary unions like single currency areas.

On the other hand, the presence of conditional convergence (CC) in ROE further implies that there are substantial differences among countries in factors that determine ROE. It should also be noted that this form of catch-up is contingent on the variables we choose and empirically test which may not reflect all the determinants of ROE. We have used six control variables in the conditioning information set. Liberalization (trade, capital and institutional) and three other macroeconomic characteristics (inflation, government expenditure and economic prosperity) have constituted the conditioning information set. However, we could not constraint the conditional assessment beyond these control variables due to issues in degrees of freedom. Accordingly, some models in the literature are not conditioned beyond two macroeconomic variables (Bruno et al., 2012).

4.2.2 Policy implications

4.2.2.1 Implications for regional integration

Consistent with Asongu (2013e), the findings are relevant in terms of regional integration. The overwhelming absence of catch-up could indicate the existence of non-

homogenous financial intermediation markets. Hence, policy makers should reconsider adopted measures to achieve a higher degree of catch-up in the African banking market. This invites the question of if policies implemented this far by the sampled countries to promote financial integration have yielded the desired effects. Within the framework of bank returns and return expectations, the convergence patterns indicate that such effects are not noticeable. Whereas from an economic perspective, integration is taking place, it is not yet evident with respect to the dependent variables used in this chapter. While it would be premature to conclude that efforts furnished at integrating the African intermediary financial market have been largely futile, it is nonetheless tempting to infer that geographical proximity is necessary but not sufficient for integration.

4. 2.2.2 Implications for portfolio diversification

As Asongu (2013e) has emphasized that, the absence of strong nexuses among African markets provides opportunities for portfolio diversification. Since our findings overwhelmingly support the absence of convergence, a practical implication for investors in the African continent is that holding portfolios in different countries will be profitable. Hence, to the extent that convergence in the banking industry takes place, the rewards from international portfolio diversification will be mitigated. The countervailing perspective sustains that certain nations retain their country-specific financial and economic characteristics which will inhibit the financial intermediary market from full convergence (Adler & Dumas, 1983). In other words, from an African context the tendencies for home bias, impediments to the free flow of capital, (inter alia) will preserve the benefits from international diversification. The absence of catch-up further means that there is no possibility of similar yields for financial assets of similar liquidity and risk, regardless of locality and nationality. In this context, portfolio diversification will benefit investors.

Accordingly, financial intermediation theories consider integrated markets to be more efficient relative to divergent ones. This is essentially because markets that are integrated stimulate the flow of funds across borders and increase liquidity after improving the volume of trade. In essence, due to the lower transaction cost for investors and lower cost of capital for firms (Kim et al., 2005), integrated banking markets provide investors with the opportunity of allocating capital efficiently. Integrated financial intermediary markets have the appealing rewards to financial stability since they mitigate the possibility of asymmetric shocks (Umutlu et al., 2010).

The need for convergence in the banking industry could also be explained by the level of arbitrage activity. Hence, when markets are converging, the implication is that common forces contained in arbitrage activity attract markets together. A further implication is that the potential for international diversification and above-normal profits is limited because supernormal profits are arbitraged away (Von Furstenberg & Jeon, 1989).

In the same light, when potential walls or barriers generating exchange rate premiums and country risks are absent, the direct consequence is similar yields for financial assets of similar liquidity and risk regardless of locality and nationality (Von Furstenberg & Jeon, 1989). In summary, the need for convergence in the African financial intermediary industry has basis in arbitrage and the hypotheses underpinning portfolio theory. Hence, the motivations for catch-up in the banking sector has basis in the literature of portfolio diversification and stock market interdependence (Grubel, 1968; Levy & Sarnat, 1970).

4.2.2.3 Other implications

It is worthwhile discussing how convergence can be facilitated. As sustained by Alagidede (2008) and Asongu (2013e), it could be improved by deregulation and elimination of restrictions on banking and securities dealings, amelioration of information and communication technologies (ICTs), relaxation of controls on capital movements and foreign

exchange transactions, inter alia. Cummins & Weiss (2009) have recommended the following drivers of financial market convergence. First, major wheels of financial convergence which mainly reflect market imperfections are various accounting, regulatory, tax and rating agency factors (RATs). Second, favoring conditions and circumstances for the reinsurance underwriting cycle. Third, advances in ICTs. Fourth, developing holistic or enterprise-wide risk management (ERM) in which traditionally separated functions like the management of insurable risks, currency risks, commodity risks, interest rate risks and other risks start to merge under a single risk-management umbrella.

4.2.3 Caveats

Three main caveats have been retained from the study. First, while return on assets could easily be understood as a measure of bank returns, return on equity may not be a safe measure because it is influenced by various factors such as capital requirements, leverage, inter alia. Second, there are risks involved when econometrics is employed beyond testing theory. However, we have already provided a solid basis for the empirics in the motivation of the chapter. Moreover, conditional convergence is based on the variables we choice and empirically test, which may not directly reflect cross-country institutional and structural differences that could drive bank return and return uncertainty. Third, the possibility of multiple equilibria and initial endowments may limit the feasibility of convergence (Miller & Upadhyay, 2002; Apergis et al., 2008; Caporale et al., 2009; Asongu, 2013e).

5. Conclusion

The recent financial crisis has brought about renewed interest in the debate over the lofty ambitions of globalization and its implications for financial development, with greater intensity in developing countries. This chapter has complemented exiting African liberalization literature by providing fresh nexuses and patterns in two main areas. First, it has

assessed whether African financial institutions have benefited from liberalization policies in terms of bank returns. Results from this investigation have shown that, while trade openness has increased bank returns and return uncertainties, financial openness and institutional liberalization have decreased bank returns and reduced return uncertainty respectively. Second, we have modeled bank returns and return uncertainty in the context of liberalization policies to assess fresh patterns for the feasibility of common policy initiatives. But for some scanty evidence of convergence in return on equity, there is overwhelming absence of catch-up among sampled countries. Implications for regional integration and portfolio diversification have been discussed.

Appendices

Appendix 1: Definition of variables

Variables	Signs	Definitions	Sources
Return on Assets	ROA	Average Return on Assets (Net Income/Total Assets)	FDSD (WB)
Return on Equity	ROE	Average Return on Equity (Net Income/Total Equity)	FDSD (WB)
Uncertainty in ROA	UROA	Uncertainty in Average Return on Assets	Author
Uncertainty in ROE	UROE	Uncertainty in Average Return on Equity	Author
Foreign Direct Investment	FDI	Net Foreign Direct Investment (% of GDP)	WDI (WB)
Trade Openness	Trade	Exports plus Import of Commodities (% of GDP)	WDI (WB)
Inflation	Inflation	Consumer Price Inflation (Annual %)	WDI (WB)
Government Expenditure	Gov. Exp	Government Final Consumption Expenditure (% of GDP)	WDI (WB)
Economic Prosperity	GDPg	Gross Domestic Product Growth (Annual %)	WDI (WB)
Institutional Index	Instidex	First Principal Component of Good Governance Indicators: VA, RL, RQ, PolSta, CC, GE	PCA

FDSD: Financial Development and Structure Database. WB: World Bank. WDI: World Development Indicators. GDP: Gross Domestic Product. VA: Voice & Accountability. RL: Rule of Law. RQ: Regulation Quality. PolSta: Political Stability. CC: Corruption-Control. GE: Government Effectiveness. PCA: Principal Component Analysis.

Appendix 2: Summary statistics (3 year NOI) and presentation of countries

	Panel A: Summary Statistics				
	Mean	SD	Minimum	Maximum	Observations
Return on Assets (ROA)	2.189	1.655	-2.391	9.452	112
Return on Equity (ROE)	21.349	14.324	-2.669	63.550	112
Uncertainty in ROA (UROA)	0.771	1.249	-1.462	11.420	109
Uncertainty in ROE (UROE)	6.946	6.976	-6.953	38.911	109
Foreign Direct Investment (FDI)	2.842	2.887	-2.751	17.897	99
Trade Openness (Trade)	70.045	29.429	26.326	175.87	108
Inflation	7.102	5.843	-1.742	32.362	107
Government Expenditure	4.242	6.869	-17.387	26.226	82
Economic Prosperity	4.337	2.445	-2.894	14.755	112
Institutional Quality (Instidex)	0.078	2.163	-4.028	5.060	108

Panel B: Presentation of Countries (28)

Botswana, Burkina Faso, Burundi, Central African Republic, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Tanzania, Tunisia, Uganda, Zambia

SD: Standard Deviation. NOI: Non-Overlapping Intervals.

Appendix 3: Correlation analysis

ROA	ROE	UROA	UROE	FDI	Trade	Inflation	Gov.Exp	GDPg	Instidex	
1.000	0.847	0.0005	0.265	0.043	0.027	0.367	0.096	0.246	-0.025	ROA
	1.000	0.094	0.295	0.121	0.017	0.331	0.133	0.231	0108	ROE
		1.000	0.508	0.048	-0.027	0.137	0.085	0.082	-0.291	UROA
			1.000	0.107	-0.069	0.101	0.116	0.024	-0.217	UROE
				1.000	0.432	0.113	0.126	0.152	0.091	FDI
					1.000	0.077	0.030	-0.151	0.439	Trade
						1.000	0.146	0.169	0.010	Inflation
							1.000	0.305	0.034	Gov. Exp
								1.000	0.114	GDPg
									1.000	Instidex

ROA: Return on Assets. ROE: Return on Equity. UROA: Uncertainty in ROA. UROE: Uncertainty in ROE. FDI: Foreign Direct Investment. Trade: Trade Openness. Gov. Exp: Government Expenditure. GDPg: Gross Domestic Growth rate. Instidex: Institutional Index.

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