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The Comparative African Regional Economics of Globalization in Financial Allocation Efficiency

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Abstract

The study assesses the role of globalization-fuelled regionalization policies on financial allocation efficiency in four economic and monetary regions in Africa for the period 1980 to 2008. Banking system and financial system efficiencies are used as dependent variables whereas seven bundled and unbundled globalization variables are employed as independent indicators. The bundling exercise is achieved by means of principal component analysis while the empirical evidence is based on interactive Fixed Effects regressions. The following findings are established. First, financial allocation efficiency is more sensitive to financial openness compared to trade openness and most sensitive to globalization. The relationship between allocation efficiency and globalization-fuelled regionalization policies is: (i) Kuznets or inverted U-shape in the UEMOA and CEMAC zones (evidence of decreasing returns to allocation efficiency from globalization-fuelled regionalization) and (ii) U-shape overwhelmingly in the COMESA and scantily in the EAC (increasing returns to allocation efficiency from globalization-fuelled regionalization). Established shapes are relevant to specific globalization dynamics within regions. 'Economic and monetary' regions are more prone to surplus liquidity than purely economic regions. Policy implications and measures of fighting surplus liquidity are discussed.

JEL Classification: A10 ; D60 ; E40 ; O10 ; P50
Keywords: Globalization; Financial Development; Regional Integration; Panel; Africa

1. Introduction

There are at least three motives for positioning an inquiry on the comparative African regional economics of globalization in financial allocation efficiency, notably: growing relevance of regional integration; substantially documented concerns of surplus liquidity and ongoing debates surrounding the effects of globalization[1].

First, consistent with Asongu (2013a), integrated economies have a plethora of advantages, namely: more efficiency in capital allocation (see Chen et al., 2002); stimulation of cross-border flow of funds, improved volumes of trade transactions, more market liquidity, lower cost for investors (Kim et al., 2005); financial stability owing to minimization of the probability for asymmetric shocks (see. Umutlu et al., 2010) and amelioration of the capacity of economies to absorb shocks (see. Yu et al., 2010). These advantages, *inter alia*, have motivated a growing stream of literature on economic integration in Africa (Njifen, 2014; Kayizzi-Mugerwa et al., 2014; Akpan, 2014)[2]. Second, financial intermediary development in Africa is seriously being limited by the substantially documented concerns of surplus liquidity that are constraining optimal transformation of mobilised deposits into credit for economic operators (see Saxegaard, 2006; Asongu, 2014a).

The recent global financial and European Monetary Unions (EMU) crises have reignited the debate about potential advantages from liberalisation and regionalisation, especially within the framework of financial allocation efficiency in developing countries (Asongu, 2013b). Some authors are of the position that the recent global financial crisis has substantially unravelled the drawbacks of regionalisation and liberalisation because, many developing economies which had previously experienced surges in inflows of foreign capital have had to also experience a sharp reversal in the same flows (Rodrik & Subramanian, 2009; Kose et al., 2011; Asongu, 2014b). In essence, financial channels that have fuelled the global economic turmoil have resurfaced issues surrounding the lofty appeals of globalisation and corresponding externalities (e.g. of volatility and growth) in undeveloped countries[3].

[1] Openness and globalisation are used interchangeably throughout the study.

[2] Other recent studies within this stream of literature include: Baricako and Ndongo (2014); Ebaidalla and Yahia (2014); Charaf-Eddine and Strauss (2014); Nshimbi and Fioramonti (2014); Ofa and Karingi (2014); Shuaibu (2015) and Tumwebaze and Ijjo (2015).

[3] The benefits of globalization to developing countries are still subject to heated debate. Though there is more consensus on the positive welfare effects of openness (Spatareanu & Manole, 2010; Welch & Romain, 2008), some authors still caution on the need to progressively lift trade barriers only in tandem with economic development (Henry, 2007). Capital and trade account openness (globalization) are perceived by many authors not only as a source of growth, but also as a means to financial development (Baltagi et al., 2009; Hanh, 2010).

The sceptical strand starkly contrasts with the theoretical appeals of globalisation and regionalisation, which are expected to be high in developing nations. From a theoretical perspective, globalisation/regionalisation should promote international/regional risk sharing and efficient allocation of capital. These potential rewards are expected to be higher in developing nations compared to their developed counterparts because poor countries are labour-rich but scarce in capital. Hence given their higher marginal productivity of capital, globalisation/regionalisation enables the flow of capital from capital-rich to capital-poor countries. Moreover, developing countries are also expected to enjoy higher welfare gains because they are characterised with more volatile output compared to their developed counterparts (Kose et al., 2011; Asongu, 2014b).

The current wave of regionalisation/globalisation efforts began in the 1980s with growing cross border trade and financial flows between advanced and developing nations. The integration processes were facilitated by the liberalisation of capital controls in many nations because it was estimated that growing cross-border flows would engender substantial rewards in capital allocation and enhanced international risk-sharing possibilities. According to Kose et al. (2006), many developing countries quickly embraced integration polices because the anticipated rewards were higher for developing countries compared to developed nations. Unfortunately, the surge in financial flows was associated with financial and currency crises in the late 1980s and 1990s.The pattern of these crises motivated a stream of scholars to start advocating that compared to developed countries, developing nations which liberalised their capital and trade accounts have been more affected by global crises (see Henry, 2007; Kose et al., 2011; Asongu, 2013b).

Contemporary literature on the effect of globalisation on financial development has failed to engage the comparative economics of regional integration in African countries. The Henry (2007) and Kose et al. (2011) hypothesis for initial financial development conditions for financial development benefits from financial globalisation has been investigated by Asongu (2014b) and Asongu and De Moor (2015ab) who have established threshold conditions for the rewards of financial globalisation in financial development. In the post-crisis literature, Price and Elu (2014) have concluded that credit contraction during the 2008-2009 financial crises has been associated with more adverse growth externalities in sub-Saharan African (SSA) nations that belong to the CFA (French African Colonies) currency union. Asongu (2013c) has investigated real and monetary policy convergence in the CFA zone in light of the EMU crisis and concluded on a substantial absence of the convergence needed for policy harmonization in common responses to serious disequilibria.

Motelle and Biekpe (2015) have examined whether enhanced financial integration is the source of domestic financial sector instability to confirm the Kose et al. (2011) hypothesis within the framework of the Southern African Development Community (SADC). Asongu et al. (2015a) have extended Price and Elu (2014) and Motelle and Biekpe (2015) in the context of pre- and post-crisis effects of financial globalization in domestic financial development to confirm the contemporary relevance of the debate on the rewards of liberalization.

In the 1980s and 1990s, most African countries embarked in a plethora of structural and policy adjustments that had as ultimate goal to stimulate financial development and economic growth (Janine & Elbadawi, 1992; Asongu, 2013b). In the first generation of reforms, the policies that were adopted consisted of: abolishing explicit controls on the allocation and price of credit, allowance of interest rates to be determined by the market, reduction of direct government intervention in bank credit decisions and relaxation of controls on international capital flows (see Asongu, 2013b). Second generation reforms targeted institutional and structural constraints, namely: (i) enhancement of regulatory, legal, institutional and supervisory environments; (ii) restoration of bank soundness and (iii) rehabilitation of financial infrastructure (Batuo et al., 2010; Batuo & Asongu, 2015).

Unfortunately, in spite of two decades of globalization-fuelled regionalization policies and reforms in the financial sector, African economies have not achieved remarkable progress in tackling substantially documented concerns of surplus liquidity (Saxegaard, 2006; Fouda, 2009; Asongu, 2014a). Hence, the positioning of this inquiry on financial allocation efficiency is justified by an apparent policy syndrome on the one hand and a missing link in the literature on the other hand. On the latter contribution, whereas a substantial body of the literature has investigated the effect of financial reforms on financial development (see Cho et al., 1986; Arestis et al., 2002; Batuo & Kupukile, 2010), to the best of our knowledge, literature on financial efficiency has been scarce. Moreover, the concept of financial efficiency has not been conceived within framework of the fundamental mission of banking institutions which is to transform mobilized deposits into credit for economic operators (see Ataullah et al., 2004; Saxegaard, 2006; Al-Obaidan, 2008; Kiyato, 2009; Kablan, 2010). Some mainstream measurements of financial efficiency in the African literature include: cost efficiency (see Chen, 2009; Mensah et al., 2012); profit efficiency (see Hauner & Peiris, 2005) and the Data Envelopment Analysis (DEA) for technical efficiency (see Kablan, 2009). Kukenova (2011, p.1) has suggested that may be the principal hurdle in assessing the nexus between

liberalization and allocation efficiency is traceable to the fact that capital allocation efficiency is not directly observable.

In the light of the above, the contribution of this study to the literature is twofold, notably, in the: (i) definition, conception and measurement of financial allocation efficiency and focus on a continent with severe concerns of surplus liquidity in financial institutions and (ii) comparative analysis of regionalization policies owing to ongoing efforts of regional integration across the continent. First, the conception of efficiency is contrary to the two mainstream measurements of financial allocation efficiency, namely: (i) the efficiency of decision making by means of DEA[4] and (ii) Overall Economic Efficiency (OEE) with regard to scale and technical efficiencies[5] or profitability- and cost-related perspectives[6]. In essence, the conception of allocation efficiency adopted in this study appreciates the ability of financial institutions to transform mobilized financial deposits into credit for economic operators. Hence, this measurement is consistent with the discussed policy syndrome of surplus liquidity in African financial institutions. Second, the study simultaneously contributes to the ongoing debate on the effects of globalization and the evolving stream of literature on regionalization in Africa by assessing the effects of regionalization policies on financial allocation efficiency. For this purpose, the timing of regionalization policies is specifically tailored to comparatively investigate whether regionalization has improved or reduced financial allocation efficiency.

The rest of the study is organized as follows. Section 2 discusses the debates on financial allocation. The data and methodology are covered in Section 3. Section 4 presents the empirical results while Section 5 concludes with implications and future directions.

[4] The interested reader can refer to, among others: Ataullah et al. (2004) who have employed the DEA approach to assess the scale and technical efficiencies of financial institutions in Pakistan and India. Also see Kablan (2009).

[5] We invite the interested reader to consult Al-Obaidan (2008) who has employed a composite indicator for banking system efficiency in the Gulf region to establish that openness improves technical efficiency.

[6] This is in accordance with recent literature on financial efficiency in Africa (see Kiyato, 2009; Kablan, 2010). Four main variables on financial efficiency have been discussed in the literature (Demirgüç-Kunt & Beck, 2009; Asongu, 2012ab). "*They include: the ratio of bank deposits (which measures the extent to which savings can fund private credit), the net interest margin (which is the accounting value of a bank's net interest revenues as a share of its total assets), overhead cost (or the accounting value of the bank's overhead cost as a share of its total assets) and, cost/income ratio (which assesses overhead costs relative to revenues)*" (Asongu, 2013b, p.665). Whereas the last-three are related to profitability, the concept of efficiency employed in this study is the first.

2. Brief debate on financial allocation efficiency

In accordance with Asongu (2013b), the decision on whether to adopt integration/ liberalization in order to facilitate financial allocation efficiency and enjoy benefits of regional/ international risk sharing has been much debated in policy and academic circles. In essence, there are two main narratives on the relevance of integration as a policy choice by developing nations in their attempts to benefit from capital allocation efficiency.

The first argument which supports the rewards of 'allocation efficiency' relies heavily on the predictions of neoclassical growth models from the seminal studies of Solow (1956). According to the neoclassical growth model, liberalization and integration policies enable efficient allocation of capital because resources flow from developed countries that are characterized with capital abundance to developing countries that are scarce in capital but rich in labour. Moreover, the return of capital is low (high) in developed (developing) countries. The bulk of literature on this perspective is broadly consistent with the advantages that developing countries might enjoy, namely: reduction of capital cost, improvements in investment and economic prosperity that ultimately enhance living standards permanently (see Fischer, 1998; Obstfeld, 1998; Rogoff, 1999; Summers, 2000; Batuo & Asongu, 2015). Hence, arguments on gains in 'allocation efficiency' have been used by developing countries to justify their adoptions of liberalization and regionalization policies, from Santiago to Seoul over the past decades (Asongu, 2014b).

The second strand is of the perspective that the argument of 'allocation efficiency' is a fanciful means by which to extend the gains from international trade in commodities to international trade in financial assets. According to this strand, the predictions of 'allocation efficiency' are apparent only in the absence of distortions from the free movement of capital. Hence, given the distortions experienced by developing countries during financial crises, there is some inconsistency between the reality of liberalization policies and the theoretical predictions of the neoclassical model. Within this framework, some notable studies that best articulate this perspective include: provocative titles like '*Who Needs Capital Account Convertibility?*' (Rodrik, 1998) and '*Why did financial globalization disappoint?*' (Rodrik & Subramanian, 2009). According to the narrative, the correlation between globalization and allocation efficiency is not very apparent because of costs incurred from recurrent financial crises which far outweigh potential benefits (Rodrik, 1998).

Rodrik and Subramanian (2009) have documented that in the wake of the recent sub-prime crisis, arguments about the externalities of financial engineering generating substantial gains in

developing countries are less plausible. According to the narrative, even without the financial crisis, at the international level, it is increasingly evident that the rewards of integration/globalization/ liberalization are not apparent[7]. The narrative further maintains that the postulated gains in terms of higher investment and growth in less developed countries are hard to find because countries that have been developing remarkably have been those that have relied less on liberalization. Therefore, globalization policies have not smoothened consumption and reduced volatility as hypothesized. Another perspective argues that: the rewards of globalization today are unpersuasive, speculative and indirect (Asongu, 2014b) and it is time for new paradigm shift in liberalization policies because more from globalization is not necessarily better (Asongu, 2013b). In the light of above literature, the hypothesis investigated by this study is as follows: the policy of regionalization increases financial allocation efficiency.

3. Data and Methodology

3.1 Data

3.1.1 Globalization, financial and control variables

We assess economic and monetary regional panels with data from the Financial Development and Structure Database (FDSD) and African Development Indicators (ADI) of the World Bank for the period 1980 to 2008. Financial variables are obtained from the FDSD whereas macroeconomic variables are from ADI. Two financial allocation efficiency indicators are used, namely: (i) banking system efficiency measured with 'banking system credit on banking system deposits' and (ii) financial system efficiency proxied with 'financial system credit on financial system deposits'. The allocation efficiency variables appreciate the ability of banks to transform mobilized deposits into credit for economic operators (see Demirgüç-Kunt et al., 1999; Demirgüç-Kunt & Beck, 2009; Asongu, 2013a).

Three openness indicators are used, namely: financial openness, trade openness and globalization. Trade openness consists of three measurements: Imports, Exports and 'Imports plus Exports'. Financial openness is made-up of Foreign Direct Investment (FDI), Private Capital Flows

[7] The position is still subject to intense debate. Some arguments include: (i) Leung (2003) concluding that increasing external debts in developing countries is worsening business cycles; (ii) Mulwa et al. (2009) suggesting that liberalization has not resulted in improved productivity and efficiency in developing countries and (iii) Kholdy and Sohrabian (2008) establishing that financial globalization may be associated with negative governance externalities in developing countries and (iv) Asongu et al. (2015b) concluding that globalization-driven debts are contributing to reducing inclusive human development in African countries.

(PCF) and a composite index from FDI and PCF. The globalization variable is the composite index of financial openness and trade openness. These composite indicators are derived by means of principal component analysis. The definitions and classification of variables in Appendices 1-2 are consistent with recent openness and finance literature. The financial openness variables are in line with Lane and Milesi-Ferreti (2006) and Baltagi et al. (2009) while the composite financial and trade openness indicators are in accordance with Gries et al. (2009) and Hanh (2010).

Selected control variables are consistent with recent financial development literature, namely: GDP growth, inflation, public investment and foreign aid (Asongu, 2014b; Asongu & De Moor, 2015). The relationship between economic growth and financial development has been substantially documented in the literature. First, a growing economy is linked to reduced cost of financial intermediation because of *inter alia*: availability of more funds for productive investments and competition (Greenwood & Jovanovic, 1990; Saint-Paul, 1992). This relationship has been confirmed in more contemporary literature (Levine, 1997, 2003ab). Second, both empirical (Boyd et al., 2001) and theoretical (Huybens & Smith, 1999) views maintain that higher levels of inflation are associated with less efficient, less active and smaller financial institutions. Essentially, macroeconomic policies conducive to low/stable inflation and higher levels of investment have been documented to be associated with higher levels of financial development (Asongu, 2014b; Asongu & De Moor, 2015). Third, a positive relationship between investment and financial development has also been established in the literature (Huang, 2011). Fourth, the theoretical basis supporting policies of development assistance towards developing countries is to mitigate the investment-financing gap (see Easterly, 2005). However, from a practical standpoint, the impact of foreign aid on domestic financial development can also be negative if a substantial chunk of donor funds is: (i) siphoned by corrupt officials in recipients nations and subsequently deposited in tax havens whose jurisdictions are traceable to the donor community and (ii) spent in donor countries.

The summary statistics and correlation matrices are disclosed in Appendix 3 and Appendix 4 respectively. From the summary statistics, it is apparent that the variables are quite comparable on the basis of means. Moreover, the substantial degree of variation from corresponding standard deviations is an indication that reasonable estimated linkages should be expected. Given that imports, exports and trade openness variables are in tens whereas some indicators are in decimals, we define the dependent variables both in ratio and percentage in order to account for this slight difference in

denomination. Hence, banking system efficiency is in ratio whereas financial system efficiency is in percentage.

This variation in the demonization of the dependent variables does not affect their degrees of substitutions in Appendix 4, since corresponding correlation coefficients of the two variables are: 98.50% (Panel A), 92.50% (Panel B), 89.90% (Panel C) and 94.20% (Panel D) for the UEMOA, CEMAC, COMESA and EAC respectively[8]. Hence, the purpose of the correlation matrices is to avoid concerns of multicollinearity. The concern in the financial development variables is not much of an issue because they are employed as dependent variables. Moreover, the concern in openness variables is addressed by employing them in distinct specifications. Given that the specification consists of interactive regressions, it is important to note that contrary to linear additive models, multicollinearity is an issue with interactive models (see Brambor et al., 2006; Asongu & De Moor, 2015ab). This is essentially because the effect of the interactive policy variable of regionalization is considered as a conditional marginal impact.

3.1.2 Categorization of regions and determination of regionalization policy dummies

As shown in Table 1 below, there are eleven main economic and/or monetary regions in Africa, namely, the: Economic Community of West African States *(ECOWAS); West African Economic and Monetary Union (UEMOA); Economic Community of Central African States (ECCAS); Economic and Monetary Community of Central Africa (CEMAC); Franc Zone (CEMAC plus UEMOA countries)*[9]*; South African Development Community (SADC); East African Community (EAC); South African Customs Union (SACU); Common Market for East and Southern Africa (COMESA); Intergovernmental Authority on Development (IGAD)* and *Arab Maghreb Union (UMA)*. The policy dummies are from the year when regionalization policies become effective.

ECOWAS, The Franc Zone, SADC, SACU, IGAD and UMA are not retained for our study because with respect to their creation dates, data was either unavailable or very limited for the application of a policy-time-dummy estimation technique. For the remaining economic and/or monetary unions, as shown in Table 2, we are further constrained by unavailability of data to narrow-down the number of countries in the database to the following: (i) Benin, Ivory Coast, Mali, Niger and Senegal are retained for the UEMOA region; (ii) Cameroon, Gabon and Congo Republic for the

[8] UEMOA: West African Economic and Monetary Union. CEMAC: Economic and Monetary Community of Central Africa. COMESA: Common Market for East and Southern Africa. EAC: East African Community.

[9] Whereas, the WAEMU and CEMAC are within the Franc Zone, we can take a minimalistic approach by also considering them are distinct economic/monetary zones because they have different central banks.

CEMAC zone; (iii) Kenya, Tanzania and Uganda make-up the EAC and (iv) Burundi, Kenya, Madagascar, Mauritius, Malawi, Rwanda, Sudan, Swaziland, Uganda and Zambia for the COMESA.

Table 1: Presentation of regions with corresponding balanced panels

Regions	Definition (Number of member states)	Constituent countries(Founding date)	Panel/ Dummy
ECOWAS (CDEAO)	Economic Community of West African States. (15)	Benin, Burkina Faso, Cape Verde(1976), Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone , Togo, *Mauritania(2000).* **(5/1975)**	**N/A**
UEMOA	West African Economic and Monetary Union(8)	Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau (5/1997) °, Mali, Niger, Senegal, and Togo. **(1/1994)**	**(80-08) /(94-08)**
ECCAS (UDEAC)*	Economic Community of Central African States(11)	Angola(1999)°, Burundi, Cameroon, Central African Republic, Chad, D.R.Congo, Equatorial Guinea, Gabon, Congo, Rwanda, Sao Tomé and Principe.**(1985)**	**(90-08)/ (99-08)**
CEMAC	Economic and Monetary Community of Central Africa(6)	Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, and Gabon. **(1999)**	**(90-08)/ (99-08)**
Franc ZONE	CEMAC plus UEMOA (14)	Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo**(9/1939)**	**N/A**
SADC	South African Development Community (15)	Angola, Botswana, D.R Congo(1997)°, Lesotho, Malawi, Mauritius(1995)°, Mozambique, Namibia (1990)°, Swaziland, Tanzania, Zambia, Zimbabwe, South Africa(1990)°, *Seychelles(2004-2007°)* and Madagascar(2005)° **(1980)**	**N/A**
SACU	South Africa Customs Union(4)	South Africa, Botswana, Lesotho and Swaziland. **(1970)**	**N/A**
EAC	East African Community (5)	Burundi (2007), Kenya, Rwanda (2007), Tanzania and Uganda. **(2001)**	**(90-08)/ (02-08)**
COMESA	Common Market for Eastern and Southern Africa (19)	Burundi, Comoros, D.R Congo, Djibouti, Egypt(1999)°, Eritrea, Ethiopia, Kenya, Libya(2006)°, Madagascar, Malawi, Mauritius, Rwanda, Seychelles(2001)°, Sudan, Swaziland, Uganda, Zambia, Zimbabwe**.(1994)**	**(80-08) /(95-08)**
IGAD	Intergovernmental Authority on Development (7)	Djibouti, Ethiopia, Eritrea (1993)°, Kenya, Somalia, Sudan, Uganda. **(1986)**	**N/A**
UMA	Arab Maghreb Union (5)	Algeria, Morocco, Tunisia, Libya, Mauritania **(1989)**	**N/A**

Countries with dates in brackets are non-founding members. Countries in Italics have withdrawn their membership. °: countries not considered for panel because they entered the region very late or withdrew over time. N/A; denotes the region cannot be include in the study because creation date renders data incompatible with application of a policy-time dummy technique.* Founded in 1985 but became effective only by 1999.

In the Economic Community of Central African States (ECCAS), Burundi, Cameroon, Congo Republic, Gabon and Rwanda are selected. However after analysis, we are unable to check for robustness because the financial-efficiency indicator used to assess results of the bank-efficiency proxy has a different degree of integration[10].

[10] From an empirical point of view, the high correlation (88%) between banking system efficiency and financial system efficiency for ECCAS is a necessary but insufficient condition for a robustness test application. Compatibility of integration orders in endogenous variables is also crucial for the robustness check.

Table 2: Selected regions and countries

Regions	Selected countries	Panel	Policy Dummy
UEMOA	Benin, Ivory Coast, Mali, Niger and Senegal	1980-08	1994-08
COMESA	Burundi, Kenya, Madagascar, Mauritius, Malawi, Rwanda, Sudan, Swaziland, Uganda, Zambia	1980-08	1995-08
CEMAC	Cameron, Gabon, Congo Republic	1990-08	1999-08
ECCAS	Burundi, Cameroon, Congo Republic, Gabon, Rwanda	1990-08	1999-08
EAC	Kenya, Tanzania, Uganda	1990-08	2002-08

UEMOA: West African Economic and Monetary Union. CEMAC: Central African Economic and Monetary Community. COMESA: Common Markets for Eastern and Southern Africa. EAC: East African Community. We dropped ECCAS because of incompatibility of robustness test.

3.2 Methodology

3.2.1 Principal Component Analysis (PCA)

Given the high degree of substitution between globalization variables, we are consistent with recent literature in employing principal component analysis (PCA) to derive composite indicators (Andrés et al., 2015; Tchamyou, 2015; Asongu & Nwachukwu, 2016). The PCA is a widely used technique to reduce a set of highly correlated variables into a smaller set of uncorrelated indicators called principal components (PCs) which represent a substantial proportion of information or variability in the constituent indicators. The criterion used to decide which information to retain is from Jolliffe (2002) and Kaiser (1974) who have recommended that PCs with an eigenvalue greater than the mean or one should be retained.

Table 3 shows the derivation of composite indices. The eigenvalues and corresponding variations of retained first PCs are consistent with the criterion highlighted above. For example the financial globalisation indicator (Finopex) in Panel A for the UEMOA region which consists of FDI and PCF has an eigenvalue of 1.898 and accounts for about 94.9% of information in the constituent indicators.

"*We use PCA because we aim to reduce the observed correlated variables into a smaller set of independent and/or uncorrelated composite variables. In other words, we wish to extract linear composites of observed variables. Factor analysis is inappropriate because we are not testing a theoretical model of latent factors causing observed variables. Accordingly, it is consistent with the test for a theoretical model of latent factors causing observed variables*" (Asongu, 2015, p. 12).

It is important to discuss the statistical relevance of the PC-derived globalisation indicators. These can be engaged at two levels, namely: general and specific points (Asongu & Nwachukwu, 2015ab). First, from a general perspective, Pagan (1984, p. 242) has documented an interesting analysis on concerns that could arise when regressors are obtained from initial estimations. The

underlying concerns are related to efficiency, consistency and inferential validity of estimated parameters. Whereas two-step estimators are reliable when it comes to consistency and efficiency, only few valid inferences may be provided by the underlying estimates. The concern about inferential validity has been confirmed by a stream of contemporary literature (Oxley & McAleer, 1993; Ba & Ng, 2006; McKenzie & McAleer, 1997; Westerlund & Urbain, 2013a).

Table 3: Derivation of Indices (Financial Openness and Globalization indices)

Principal Indicator	Indexes	Cor. coef. (t-stats)	Eigen Value	First PC variation	Component Matrix	
			Panel A: UEMOA			
Financial Openness	Finopex	0.898*** (23.53)	1.898	0.949	FDIgdp 0.707	PCFgdp 0.707
Globalization	Globex	0.199** (2.34)	1.199	0.599	Finopex 0.707	(I+X)gdp 0.707
			Panel B: COMESA			
Financial Openness	Finopex	0.981*** (82.51)	1.981	0.990	FDIgdp 0.707	PCFgdp 0.707
Globalization	Globex	0.250*** (4.15)	1.250	0.625	Finopex 0.707	(I+X)gdp 0.707
			Panel C: CEMAC			
Financial Openness	Finopex	0.994*** (64.94)	1.994	0.997	FDIgdp 0.707	PCFgdp 0.707
Globalization	Globex	0.360** (2.58)	1.360	0.680	Finopex 0.707	(I+X)gdp 0.707
			Panel D: EAC			
Financial Openness	Finopex	0.996*** (88.912)	1.996	0.998	FDIgdp 0.707	PCFgdp 0.707
Globalization	Globex	-0.352*** (-2.744)	1.352	0.676	Finopex -0.707	(I+X)gdp -0.707

Globex: Globalization Index. Finopex: Financial Openness Index. FDIgdp and PCFgdp are capital account openness indicators. (I+X) gdp is the trade openness variable. PC: Principal Component. Cor. Coef: Correlation coefficient. *, **, ***: are respectively 10%, 5% and 1% significance levels.

Second, on the specific angle, we are employing PC indicators within the framework of this study. Concerns about PC-derived variables have been documented by Westerlund and Urbain (2012, 2013b) who have built on previous works highlighted in the preceding paragraph as well as more contemporary literature on the subject, notably: Stock and Watson (2002); Pesaran (2006); Bai (2003, 2009) and Greenaway-McGrevy et al. (2012). The authors have cautioned that normal inferences can be made if PC-factor augmented estimators converge towards their values at the rate of $\sqrt{TN}$ (where N represents cross-section observations and T denotes the number of time series). Furthermore, Westerlund and Urbain (2012, 2013b) have argued that conditions for convergence required for good inferences from PC-derived estimators are more feasible when the sample is relatively large. Unfortunately, the authors have not disclosed how large should be large. Concerning

the sample used in the study, we can neither stretch T nor N for two reasons. First, N selected for the sampled economic and monetary regions is based data availability. Accordingly, economic regions by definition have a limited number of countries. Second, the adopted time series is tailored to increase T as much as possible. In essence, the policy time dummies are from the year when regionalization policies became effective. In addition to these clarifications, Asongu and Nwachukwu (2015a) have recently concluded on the feasibility of inferences from PC-augmented regressors using sub-samples that are comparatively lower in terms of T and N values.

3.2.2 Estimation technique

The objective of this study is to assess post-regionalization policy effects. This requires the application of policy-time dummies which is by definition consistent with a fixed effects (FE) regression. The economic relevance of the FE regression is that it accounts for the unobserved heterogeneity in the sub-samples. In panel data analysis, the estimator from FE is also called a 'within estimator'and there is an assumption of time independent impacts for every country that is potentially correlated with the regressors.

Moreover, Dummy or Fixed-effect (FE) regressions have the added advantage of not hypothetically assuming that explanatory variables are not correlated with residuals. Furthermore, the use of FE accounts for the unobserved heterogeneity between countries in the region. More generally, in the literature, when a panel consists of observations on a fixed and relatively small sets of interest units (say member states of a given region), there is a presumption in favor of FE (see Asongu, 2016).

In spite of this intuition for a FE estimator, we still employ the Hausman test to assess if the intuition for the estimation technique is consistent with the behavior of data. On whether Ordinary Least Squares (OLS) with FE or Generalized Least Squares (GLS) with FE should be applied, we opt for the latter and justify our choice after regression by testing for the significance of heteroskedasticity.

The adopted estimation is as follows in Eq. (1).

$$FE_{i,t} = \alpha_0 + \sigma_1 G_{i,t} + \sigma_2 P_{i,t} + \sigma_3 GP_{i,t} + \sum_{h=1}^{4} \delta_h W_{h,i,t} + \eta_i + \xi_t + \varepsilon_{i,t} \qquad (1)$$

Where: $FE_{i,t}$, is either 'banking system efficiency' and 'financial system efficiency' of country i at period t; $G_{i,t}$ is a globalisation indicator (imports, exports, trade openness, private capital flows,

foreign direct investment, financial globalisation (*Finopex*) and globalisation (*Globex*)); $P_{i,t}$ is a regionalisation policy variable that may either take the values of 0 (before the regionalisation) or 1 (after regionalisation) ; $PG_{i,t}$ is the interaction between globalisation and the regionalisation policy variable; α_0 is a constant; W is the vector of control variables (*GDP growth, inflation, public investment* and *foreign aid*), η_i is a country-specific effect, ξ_t is the time-specific constant and $\varepsilon_{i,t}$ the error term. The specifications are Heteroscedasticity and Autocorrelation Consistent (HAC) consistent in standard errors. Moreover, specifications are tailored to avoid the potential issues of multicollinearity associated with globalisation indicators.

4. Empirical analysis

4.1 Presentation of results

Tables 4-5 present estimated results. Whereas Table 4 discloses findings on the UEMOA (Panel A) and CEMAC (Panel B) regions, Table 5 shows results for the COMESA (Panel A) and EAC (Panel B) regions. Each panel consists of two sets of specifications, namely, regressions with: 'banking system efficiency' on the left-hand-side (LHS) and estimations with 'financial system efficiency' on the right-hand-side (RHS).

The following can be established from Panel A of Table 4 on the UEMOA region. First, whereas the effects imports, exports, trade openness and globalization are positive on banking system efficiency, the marginal effects from the interaction with regionalization are negative. This is evidence of decreasing returns to allocation efficiency from globalization-fuelled regionalization. Hence, it can be inferred that the effect of regionalization is likely to take a Kuznets or inverted U-shape because the unconditional globalization estimates are positively significant whereas the unconditional effects based on an interaction with regionalization policy are negative. This evidence is supported by the unconditional negative effect from regionalization policy. Second, most of the significant control variables have expected signs. Third, findings from financial system efficiency on the RHS are consistent with those of banking system efficiency on the LHS. Fourth, the Hausman test confirms that the data behavior is consistent with the intuition for adopting a FE regression technique because the null hypothesis which is the position of Random Effects (RE) or between estimators is overwhelmingly rejected.

In Panel B of the same table for the CEMAC region: (i) unconditional regionalization variables have negative effects on allocation efficiency; (ii) the marginal effect of globalization is negative on the LHS; (iii) most significant control variables display expected signs and (iv) the Hausman test does not validate the choice of a FE estimator.

We clarify two concerns, notably: the negative effect from GDP growth and the relevance of a threshold effect for a Kuznets shape relationship from globalization on the LHS even when the unconditional effect from globalization is not significant. First, the negative impact of GDP growth could be traceable to the lack of broad-based growth in Africa. Accordingly, whereas prior to the mid 1990s, the growth experienced by the continent was substantially low, the recent period of growth resurgence that began in the mid 1990s (Fosu, 2014, p. 44) has been very immiserizing because an April 2015 World Bank report has revealed that from the 1990s extreme poverty has been decreasing in all regions of the world with the exception of Africa (World Bank, 2015).

Second, the notion of threshold is in accordance with Cummins (2000) on a minimum level in language proficiency before a second-language speaker can begin reaping the benefits from a given language. Moreover, the definition of threshold is also consistent with the critical mass theory that has been substantially covered in economic development studies (e.g. Roller & Waverman, 2001; Ashraf & Galor, 2013). Batuo (2015) has recently applied the threshold or critical mass theory using interactive variables. Therefore, within the framework of this inquiry, the notion of threshold is similar to the : (i) critical mass for positive/negative effects (Roller & Waverman, 2001; Batuo, 2015); (ii) minimum requirement for enjoying of positive/negative effects (Cummins, 2000) and (iii) criteria for Kuznets and U shapes (Ashraf & Galor, 2013).

In Table 5 on the COMESA and EAC regions, the following findings are apparent. First, for the COMESA region, while the regionalisation policy coefficient is consistently negative, the marginal effects from interaction with globalisation are: (i) positive from trade globalisation and globalisation on the LHS and (ii) positive from all globalisation estimates on the RHS. The finding is exclusively consistent with the significant estimates from exports and trade openness on the LHS of Panel B on the EAC region. It follows that the relationship between banking efficiency and globalisation-fuelled regionalisation is likely to be U-shape for the COMESA and EAC regions. Third, the significant control variables display expected signs for the most part.

Table 4: Interactive regression results for UEMOA and CEMAC (Economic and Monetary Regions)

Panel A: The UEMOA Region

	Banking System Efficiency							Financial System Efficiency						
	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	Imports	Exports	Trade	FDI	PCF	Finopex	Globex
Constant	**1.138*** (0.000)**	**0.841*** (0.002)**	**0.780*** (0.000)**	**1.788*** (0.000)**	**1.758*** (0.000)**	**1.812*** (0.000)**	**1.808*** (0.000)**	**116.53*** (0.000)**	**63.756*** (0.008)**	**72.585*** (0.005)**	**178.583*** (0.000)**	**176.35*** (0.000)**	**179.92*** (0.000)**	**180.37*** (0.000)**
Imports	**0.019*** (0.002)**	---	---	---	---	---	---	**1.890*** (0.002)**	---	---	---	---	---	---
Exports	---	**0.031*** (0.000)**	---	---	---	---	---	---	**3.827*** (0.000)**	---	---	---	---	---
Trade	---	---	**0.015*** (0.000)**	---	---	---	---	---	---	**1.651*** (0.000)**	---	---	---	---
FDI	---	---	---	0.009 (0.870)	---	---	---	---	---	---	1.161 (0.826)	---	---	---
PCF	---	---	---	---	0.050 (0.302)	---	---	---	---	---	---	2.731 (0.557)	---	---
Finopex	---	---	---	---	---	0.043 (0.488)	---	---	---	---	---	---	2.795 (0.642)	---
Globex	---	---	---	---	---	---	**0.337*** (0.000)**	---	---	---	---	---	---	**32.717*** (0.000)**
Policy	0.316 (0.180)	0.032 (0.833)	**0.451** (0.037)**	**-0.706*** (0.000)**	**-0.718*** (0.000)**	**-0.720*** (0.000)**	**-0.769*** (0.000)**	22.064 (0.326)	7.074 (0.612)	**42.717** (0.035)**	**-69.760*** (0.000)**	**-71.30*** (0.000)**	**-70.42*** (0.000)**	**-76.40*** (0.000)**
Imports.Policy	**-0.030*** (0.000)**	---	---	---	---	---	---	**-2.720*** (0.000)**	---	---	---	---	---	---
Exports.Policy	---	**-0.028*** (0.000)**	---	---	---	---	---	---	**-2.986*** (0.000)**	---	---	---	---	---
Trade.Policy	---	---	**-0.018*** (0.000)**	---	---	---	---	---	---	**-1.847*** (0.000)**	---	---	---	---
FDI.Policy	---	---	---	0.016 (0.792)	---	---	---	---	---	---	0.961 (0.871)	---	---	---
PCF.Policy	---	---	---	---	-0.012 (0.811)	---	---	---	---	---	---	0.553 (0.913)	---	---
Finopex.Policy	---	---	---	---	---	-0.007 (0.909)	---	---	---	---	---	---	0.310 (0.962)	---
Globex.Policy	---	---	---	---	---	---	**-0.314*** (0.000)**	---	---	---	---	---	---	**-30.52*** (0.000)**
GDP growth	-0.00006 (0.992)	-0.001 (0.836)	-0.002 (0.733)	0.001 (0.831)	0.001 (0.835)	0.001 (0.842)	-0.0007 (0.899)	-0.548 (0.366)	-0.714 (0.205)	-0.758 (0.188)	-0.395 (0.544)	-0.411 (0.524)	-0.407 (0.530)	-0.618 (0.296)
Inflation	**0.007** (0.045)**	0.005 (0.110)	0.004 (0.221)	**0.013*** (0.000)**	**0.013*** (0.000)**	**0.013*** (0.000)**	0.005 (0.136)	**1.014*** (0.006)**	**0.671** (0.048)**	**0.645* (0.069)**	**1.588*** (0.000)**	**1.580*** (0.000)**	**1.583*** (0.000)**	**0.789** (0.027)**
Public Investment	0.013 (0.134)	**0.018** (0.040)**	**0.015* (0.064)**	0.016 (0.104)	0.015 (0.104)	0.015 (0.120)	0.009 (0.309)	1.111 (0.202)	**1.754** (0.029)**	**1.326* (0.094)**	1.350 (0.156)	1.398 (0.136)	1.336 (0.160)	0.666 (0.433)
Foreign Aid	**-0.031*** (0.000)**	**-0.021*** (0.009)**	**-0.023*** (0.003)**	**-0.036*** (0.000)**	**-0.034*** (0.000)**	**-0.035*** (0.000)**	**-0.021** (0.010)**	**-2.66*** (0.001)**	**-1.394* (0.058)**	**-1.875** (0.012)**	**-3.231*** (0.000)**	**-3.067*** (0.000)**	**-3.124*** (0.000)**	**-1.745** (0.026)**
Hausman test	**25.23*** **	**21.77*** **	**25.11*** **	**27.14*** **	**26.24*** **	**26.60*** **	**19.02*** **	**28.11*** **	**26.19*** **	**27.86*** **	**30.79*** **	**30.02*** **	**30.31*** **	**22.67*** **
R^2 within	0.718	0.729	0.731	0.664	0.673	0.669	0.722	0.736	0.773	0.757	0.688	0.693	0.691	0.744
Fisher	**37.84*** **	**40.12*** **	**42.06*** **	**29.14*** **	**30.38*** **	**29.74*** **	**38.23*** **	**41.58*** **	**50.68*** **	**48.15*** **	**32.45*** **	**33.35*** **	**32.91*** **	**42.85*** **
Observations	116	116	120	115	115	115	115	116	116	120	115	115	115	115

Panel B: The CEMAC Region

	Banking System Efficiency							Financial System Efficiency						
	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	Imports	Exports	Trade	FDI	PCF	Finopex	Globex
Constant	**0.731*** **	**1.148*** **	**1.183*** **	**1.031*** **	**1.040*** **	**1.079*** **	**1.138*** **	**91.805*** **	**122.03*** **	**126.75*** **	**103.02*** **	**103.42*** **	**105.15*** **	**107.47*** **
	(0.002)	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Imports	**0.012***	---	---	---	---	---	---	0.612	---	---	---	---	---	---
	(0.082)							(0.327)						
Exports	---	-0.001	---	---	---	---	---	---	-0.343	---	---	---	---	---
		(0.858)							(0.648))					
Trade	---	---	-0.001	---	---	---	---	---	---	-0.304	---	---	---	---
			(0.530)							(0.333)				
FDI	---	---	---	0.013	---	---	---	---	---	---	0.596	---	---	---
				(0.481)							(0.722)			
PCF	---	---	---	---	0.020	---	---	---	---	---	---	0.878	---	---
					(0.310)							(0.619)		
Finopex	---	---	---	---	---	0.084	---	---	---	---	---	---	3.781	---
						(0.387)							(0.667)	
Globex	---	---	---	---	---	---	0.084	---	---	---	---	---	---	0.080
							(0.518)							(0.994)
Policy	-0.237	-0.100	0.068	**-0.225** **	**-0.223** **	**-0.295*** **	**-0.314*** **	-17.473	-15.980	3.259	**-20.621** **	**-20.480** **	**-25.51*** **	**-25.610** **
	(0.237)	(0.595)	(0.733)	**(0.017)**	**(0.016)**	**(0.005)**	**(0.005)**	(0.322)	(0.329)	(0.848)	**(0.015)**	**(0.015)**	**(0.008)**	**(0.011)**
Imports.Policy	-0.0009	---	---	---	---	---	---	-0.287	---	---	---	---	---	---
	(0.867)							(0.558)						
Exports.Policy	---	-0.002	---	---	---	---	---	---	-0.132	---	---	---	---	---
		(0.568)							(0.740)					
Trade.Policy	---	---	-0.003	---	---	---	---	---	---	-0.278	---	---	---	---
			(0.156)							(0.154)				
FDI.Policy	---	---	---	-0.023	---	---	---	---	---	---	-1.711	---	---	---
				(0.224)							(0.310)			
PCF.Policy	---	---	---	---	-0.030	---	---	---	---	---	---	-2.025	---	---
					(0.130)							(0.251)		
Finopex.Policy	---	---	---	---	---	-0.135	---	---	---	---	---	---	-9.494	---
						(0.171)							(0.280)	
Globex.Policy	---	---	---	---	---	---	**-0.183***	---	---	---	---	---	---	-11.996
							(0.079)							(0.193)
GDP growth	**-0.026** **	**-0.029** **	**-0.032*** **	**-0.032*** **	**-0.033*** **	**-0.032*** **	**-0.038*** **	**-3.024*** **	**-2.975*** **	**-3.350*** **	**-3.556*** **	**-3.573*** **	**-3.560*** **	**-3.944*** **
	(0.011)	**(0.010)**	**(0.002)**	**(0.005)**	**(0.004)**	**(0.004)**	**(0.001)**	**(0.001)**	**(0.003)**	**(0.000)**	**(0.001)**	**(0.001)**	**(0.001)**	**(0.000)**
Inflation	**-0.010** **	-0.007	-0.007	-0.006	-0.006	-0.006	-0.007	**-0.923** **	**-0.696***	**-0.661***	-0.608	-0.596	-0.602	-0.612
	(0.019)	(0.117)	(0.114)	(0.185)	(0.195)	(0.190)	(0.151)	**(0.020)**	**(0.087)**	**(0.092)**	(0.170)	(0.176)	(0.173)	(0.161)
Public Investment	-0.020	-0.008	-0.001	0.0001	-0.001	-0.0005	-0.004	-1.361	-0.680	0.110	0.109	0.031	0.080	-0.108
	(0.168)	(0.585)	(0.926)	(0.995)	(0.923)	(0.975)	(0.800)	(0.293)	(0.618)	(0.938)	(0.948)	(0.985)	(0.961)	(0.948)
Foreign Aid	-0.003	-0.0004	0.0007	0.001	0.001	0.001	-0.001	-0.102	0.089	0.248	0.226	0.227	0.225	0.040
	(0.758)	(0.968)	(0.941)	(0.899)	(0.890)	(0.897)	(0.887)	(0.906)	(0.916)	(0.772)	(0.811)	(0.809)	(0.811)	(0.966)
Hausman test	1.48	0.79	2.70	0.35	0.35	0.33	1.37	0.92	1.55	3.51	0.81	0.82	0.80	2.15
R^2 within	0.432	0.409	0.458	0.400	0.413	0.406	0.432	0.507	0.508	0.558	0.468	0.474	0.471	0.486
Fisher	**4.78*** **	**4.35*** **	**5.45*** **	**3.34*** **	**3.53*** **	**3.43*** **	**3.81*** **	**6.17*** **	**6.21*** **	**7.76*** **	**4.28*** **	**4.38*** **	**4.33*** **	**4.60*** **
Observations	54	54	55	45	45	45	45	52	52	53	44	44	44	44

*, **, ***: significance levels of 10%, 5% and 1% respectively. Policy: Regionalisation Policy. Imports: Imports of Goods and Services. Exports: Exports of Goods and Services. Trade: Imports plus Exports of Goods and Services. FDI: Foreign Direct Investment. PCF: Private Capital Flows. Finopex: Financial Openness Index. Globex: Globalisation Index. GDPg: Gross Domestic Product Growth rate. Pub. Ivt: Public Investment. Aid: Foreign Aid or Development Assistance. UEMOA: West African Economic and Monetary Union. CEMAC: Central African Economic and Monetary Community.

Table 5: Interactive regression results for COMESA and EAC (Economic Regions)

Panel A: The COMESA Region

	Banking System Efficiency							Financial System Efficiency						
	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	Imports	Exports	Trade	FDI	PCF	Finopex	Globex
Constant	**1.048*** (0.000)**	**1.084*** (0.000)**	**1.109*** (0.000)**	**0.934*** (0.000)**	**0.964*** (0.000)**	**0.904*** (0.000)**	**0.890*** (0.000)**	**111.40*** (0.000)**	**113.60*** (0.000)**	**118.65*** (0.000)**	**97.826*** (0.000)**	**101.15*** (0.000)**	**94.285*** (0.000)**	**92.972*** (0.000)**
Imports	**-0.003* (0.081)**	---	---	---	---	---	---	**-0.523*** (0.007)**	---	---	---	---	---	---
Exports	---	**-0.005** (0.021)**	---	---	---	---	---	---	**-0.665*** (0.003)**	---	---	---	---	---
Trade	---	---	**-0.003** (0.014)**	---	---	---	---	---	---	**-0.390*** (0.001)**	---	---	---	---
FDI	---	---	---	**-0.022* (0.081)**	---	---	---	---	---	---	**-2.570** (0.028)**	---	---	---
PCF	---	---	---	---	**-0.021* (0.082)**	---	---	---	---	---	---	**-2.437** (0.030)**	---	---
Finopex	---	---	---	---	---	**-0.035* (0.074)**	---	---	---	---	---	---	**-4.079** (0.025)**	---
Globex	---	---	---	---	---	---	**-0.061** (0.020)**	---	---	---	---	---	---	**-6.790*** (0.005)**
Policy	**-0.187*** (0.001)**	**-0.213*** (0.000)**	**-0.198*** (0.000)**	**-0.127*** (0.000)**	**-0.119*** (0.000)**	**-0.098*** (0.001)**	**-0.100*** (0.001)**	**-19.74*** (0.000)**	**-22.81*** (0.000)**	**-21.97*** (0.000)**	**-14.72*** (0.000)**	**-13.84*** (0.000)**	**-10.96*** (0.000)**	**-11.27*** (0.000)**
Imports.Policy	**0.002* (0.059)**	---	---	---	---	---	---	**0.238** (0.023)**	---	---	---	---	---	---
Exports.Policy	---	**0.003*** (0.002)**	---	---	---	---	---	---	**0.399*** (0.000)**	---	---	---	---	---
Trade.Policy	---	---	**0.001** (0.014)**	---	---	---	---	---	---	**0.161*** (0.003)**	---	---	---	---
FDI.Policy	---	---	---	0.020 (0.167)	---	---	---	---	---	---	**2.658* (0.050)**	---	---	---
PCF.Policy	---	---	---	---	0.016 (0.236)	---	---	---	---	---	---	**2.260* (0.084)**	---	---
Finopex.Policy	---	---	---	---	---	0.031 (0.174)	---	---	---	---	---	---	**4.100* (0.054)**	---
Globex.Policy	---	---	---	---	---	---	**0.056** (0.022)**	---	---	---	---	---	---	**6.651*** (0.003)**
GDP growth	-0.002 (0.380)	-0.001 (0.585)	-0.001 (0.552)	-0.004 (0.176)	-0.003 (0.220)	-0.004 (0.180)	-0.003 (0.317)	-0.291 (0.300)	-0.199 (0.478)	-0.221 (0.438)	-0.406 (0.177)	-0.395 (0.183)	-0.402 (0.181)	-0.278 (0.355)
Inflation	**-0.001*** (0.000)**	**-0.001*** (0.000)**	**-0.001*** (0.000)**	**-0.001*** (0.000)**	**-0.001*** (0.001)**	**-0.001*** (0.001)**	**-0.001*** (0.000)**	**-0.194*** (0.000)**	**-0.198*** (0.000)**	**-0.200*** (0.000)**	**-0.207*** (0.000)**	**-0.212*** (0.000)**	**-0.208*** (0.000)**	**-0.219*** (0.000)**
Public Investment	-0.007 (0.134)	**-0.010** (0.044)**	-0.007 (0.176)	-0.006 (0.196)	**-0.008* (0.097)**	-0.006 (0.196)	-0.006 (0.217)	0.191 (0.692)	-0.131 (0.774)	0.230 (0.640)	-0.101 (0.836)	-0.239 (0.621)	-0.102 (0.836)	-0.065 (0.894)
Foreign Aid	-0.003 (0.137)	**-0.003* (0.072)**	-0.003 (0.103)	**-0.004* (0.051)**	**-0.005** (0.015)**	**-0.004* (0.050)**	-0.004 (0.107)	**-0.504** (0.017)**	**-0.601*** (0.002)**	**-0.630*** (0.002)**	**-0.774*** (0.001)**	**-0.878*** (0.000)**	**-0.778*** (0.001)**	**-0.685*** (0.003)**
Hausman test	6.67	9.73	7.44	7.81	9.06	7.30	9.73	7.44	4.16	6.70	5.91	18.28**	5.80	8.31
R^2 within	0.133	0.151	0.155	0.133	0.133	0.133	0.147	0.208	0.224	0.246	0.207	0.206	0.208	0.227
Fisher	**5.34***	**6.17***	**6.40***	**4.73***	**4.83***	**4.76***	**5.35***	**9.08***	**9.99***	**11.42***	**8.10***	**8.18***	**8.12***	**9.11***
Observations	259	259	261	233	237	233	233	259	259	261	233	237	233	233

Panel B: The EAC Region

	Banking System Efficiency							Financial System Efficiency						
	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	Imports	Exports	Trade	FDI	PCF	Finopex	Globex
Constant	**0.265****	**0.557*****	**0.426*****	**0.435*****	**0.424*****	**0.316*****	**0.239*****	14.870	**53.842*****	**34.199*****	**42.848*****	**41.931*****	**33.333*****	**28.188*****
	(0.039)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.009)**	(0.218)	**(0.000)**	**(0.003)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.002)**
Imports	0.0002	---	---	---	---	---	---	0.540	---	---	---	---	---	---
	(0.957)							(0.175)						
Exports	---	**-0.019*****	---	---	---	---	---	---	**-1.785*****	---	---	---	---	---
		(0.000)							**(0.000)**					
Trade	---	---	**-0.004****	---	---	---	---	---	---	-0.190	---	---	---	---
			(0.045)							(0.406)				
FDI	---	---	---	**-0.057*****	---	---	---	---	---	---	**-4.562****	---	---	---
				(0.002)							**(0.013)**			
PCF	---	---	---	---	**-0.057*****	---	---	---	---	---	---	**-4.541****	---	---
					(0.002)							**(0.012)**		
Finopex	---	---	---	---	---	**-0.075*****	---	---	---	---	---	---	**-6.003****	---
						(0.002)							**(0.012)**	
Globex	---	---	---	---	---	---	-0.017	---	---	---	---	---	---	-3.657
							(0.646)							(0.326)
Policy	-0.414	-0.165	**-0.372****	-0.034	-0.029	0.012	0.002	-17.746	7.914	-14.378	-2.236	-1.383	4.807	4.712
	(0.107)	(0.125)	**(0.012)**	(0.611)	(0.645)	(0.759)	(0.959)	(0.462)	(0.484)	(0.330)	(0.747)	(0.834)	(0.253)	(0.274)
Imports.Policy	0.013	---	---	---	---	---	---	0.698	---	---	---	---	---	---
	(0.125)							(0.401)						
Exports.Policy	---	**0.009***	---	---	---	---	---	---	0.014	---	---	---	---	---
		(0.060)							(0.980)					
Trade.Policy	---	---	**0.007*****	---	---	---	---	---	---	0.394	---	---	---	---
			(0.008)							(0.170)				
FDI.Policy	---	---	---	0.022	---	---	---	---	---	---	3.436	---	---	---
				(0.301)							(0.133)			
PCF.Policy	---	---	---	---	0.021	---	---	---	---	---	---	3.194	---	---
					(0.302)							(0.141)		
Finopex.Policy	---	---	---	---	---	0.029	---	---	---	---	---	---	4.367	---
						(0.300)							(0.136)	
Globex.Policy	---	---	---	---	---	---	-0.034	---	---	---	---	---	---	0.191
							(0.370)							(0.959)
GDP growth	0.006	**0.015****	0.008	**0.015***	**0.016***	**0.015***	0.013	0.171	1.040	0.221	0.583	0.629	0.607	0.580
	(0.491)	**(0.047)**	(0.366)	**(0.070)**	**(0.063)**	**(0.066)**	(0.156)	(0.856)	(0.193)	(0.812)	(0.505)	(0.471)	(0.487)	(0.526)
Inflation	0.0003	**0.003****	0.001	0.0006	0.0004	0.0005	0.001	0.075	**0.425****	0.183	0.120	0.113	0.117	0.135
	(0.875)	**(0.043)**	(0.472)	(0.780)	(0.832)	(0.806)	(0.656)	(0.750)	**(0.037)**	(0.436)	(0.603)	(0.623)	(0.613)	(0.589)
Public Investment	**0.047*****	**0.047*****	**0.047*****	**0.030****	**0.030****	**0.030****	**0.046*****	**4.212****	**3.781*****	**3.681*****	2.361	2.383	2.370	**3.538****
	(0.007)	**(0.000)**	**(0.001)**	**(0.047)**	**(0.047)**	**(0.047)**	**(0.008)**	**(0.010)**	**(0.006)**	**(0.007)**	(0.135)	(0.130)	(0.133)	**(0.036)**
Foreign Aid	0.001	-0.0007	0.003	-0.0003	0.0002	-0.00004	0.0005	0.448	0.587	0.885	0.638	0.669	0.652	0.622
	(0.849)	(0.903)	(0.602)	(0.962)	(0.968)	(0.995)	(0.942)	(0.554)	(0.349)	(0.194)	(0.380)	(0.355)	(0.369)	(0.420)
Hausman test	**5.73***	**18.96*****	**11.93*****	4.55	4.45	4.49	4.48	**12.31*****	**21.82*****	**17.28*****	**9.98*****	**9.75*****	**9.85*****	**10.84*****
R^2 within	0.406	0.655	0.490	0.520	0.524	0.522	0.406	0.496	0.634	0.478	0.523	0.525	0.524	0.469
Fisher	**4.40*****	**12.24*****	**6.45*****	**6.99*****	**7.08*****	**7.05*****	**4.41*****	**6.33*****	**11.16*****	**6.16*****	**7.06*****	**7.11*****	**7.09*****	**5.69*****
Observations	55	55	57	55	55	55	55	55	55	57	55	55	55	55

*, **, ***: significance levels of 10%, 5% and 1% respectively. Policy: Regionalisation Policy. Imports: Imports of Goods and Services. Exports: Exports of Goods and Services. Trade: Imports plus Exports of Goods and Services. FDI: Foreign Direct Investment. PCF: Private Capital Flows. Finopex: Financial Openness Index. Globex: Globalisation Index. GDPg: Gross Domestic Product Growth rate. Pub. Ivt: Public Investment. Aid: Foreign Aid or Development Assistance. COMESA: Common Markets for Eastern and Southern Africa. EAC: East African Community.

4.2 Robustness checks

We employ an alternative estimation technique to assess the robustness of established findings. This new technique is different from that used to obtain results in Tables 4-5 in three perspectives: (i) an after policy estimate and full sample estimate are directly compared to assess the effect of regionalization; (ii) regressions are based on some consistency in the degree of integration from unit root tests and (iii) dependent variables are both in ratios. Appendix 5, Appendix 6 and Appendix 7 present the 'unit root tests', 'UEMOA and CEMAC' and 'COMESA and EAC' findings respectively.

The purpose of the panel unit test is to ensure that variables of the same degree of integration (for the most part) within an economic or a monetary region are used in estimations. It is essentially to control for this factor that the ECCAS region selected in Table 2 has not been further retained because corresponding dependent variables do not have the same order of integration.

The choice of both homogenous (Levin, Lin & Chu, LLC-2002) and heterogeneous (Im, Pesaran & Shin, IPS-2003) panel unit tests is consistent with Hanh (2010). Following Liew (2004), optimal lags selection for LLC and IPS tests are determined by Hannan-Quinn Information Criterion (HQC) and Akaike Information Criterion (AIC) respectively[11]. Results are presented in Appendix 5, with variables without unit roots (stationary) in bold. In accordance with Asongu (2014c), the IPS test is given priority in event of conflict of interest[12].

The following can be established after comparing the results of the findings of Tables 4-5 with those of Appendices 6-7. First, from Appendix 6: (i) results on the LHS for UEMAO on a potential Kuznets shape are confirmed because the 'after policy' estimates have negative magnitudes while corresponding estimates for the 'whole sample' are positive and (ii) concerning findings on the RHS for the CEMAC zone, the previously scanty evidence of a Kuznets shape is now overwhelmingly confirmed. Second, from Appendix 7, results for COMESA on a potential U-shape are confirmed because the 'after policy estimates' have: (i) negative magnitudes of lower negative order while corresponding estimates for the 'whole sample' are negative with a

[11] While the AIC and Final Prediction Error (FPE) more efficiently estimate lags when observations are more or less 60, the HQC on the other hand, best avoids the underestimation of lags when observations are about 120 and above. It is important to disclose that the LLC is based on pooled data. The Schwarz Information Criterion (SIC) also known as the Bayesian Information Criterion (BIC) presents the short-coming of underestimating lags in the auto regression process.

[12] As articulated by Maddala and Wu (1999), the alternative hypothesis of the LLC test (on the absence of a common unit root) is too strong.

higher order of negative magnitude and (ii) positive magnitudes, while corresponding estimates for the 'whole sample' are negative. This conception of positive threshold based on decreasing negative magnitude is consistent with Asongu (2014b). The results for the EAC region are not significant.

4.3 Further discussion and implications

This section is discussed in five main strands, namely: the sensitivity of globalization dynamics; insights into the Rajan and Zingales (2003) hypothesis; increasing marginal effects; decreasing marginal impacts and policy tools towards fighting surplus liquidity in African financial institutions.

First, it is apparent from the findings that financial allocation efficiency is more sensitive to financial openness compared to trade openness and most sensitive to globalization. This may somewhat reflect the narrative in the literature on a less negative impact of trade openness on financial development, compared to financial openness. In essence, whereas there is some consensus in the literature on the beneficial effects of trade globalization, the impact of financial globalization on financial development remains an object of heated debate (see Asongu, 2014b).

Second, contrary to the Rajan and Zingales (2003) hypothesis which stipulates that the beneficial effects in financial development from globalization are more apparent when trade and capital accounts are liberalized simultaneously, we are consistent with Baltagi et al. (2009) and Hanh (2010) in partially rejecting the underlying hypothesis. Hence, we establish that trade openness and financial openness are independent significant determinants of bank sector efficiency or inefficiency.

Third, the increasing marginal effects from globalization-fuelled regionalization in financial allocation efficiency established from the COMESA region substantiates the stream of literature that has confirmed the importance of openness in financial development (Kandiero & Chitiga, 2003; Mbabazi et al., 2008; Kim et al., 2010). This includes African specific studies on the importance of regional integration in stock (Okeahalam, 2001; Irving, 2005; Yartey & Adjasi, 2007) and financial intermediary (Wakeman-Linn & Wagh, 2008) market developments.

Fourth, the increasing marginal effects supports the views of a strand of the literature which argues that regionalization has not increased banking competitive pressures to the benefit of regional banks (Claessens et al., 2001; Peria et al., 2003; Shumkler, 2004). According to this

argument, regionalization from a financial view-point has increased asymmetric information which remains an important concern for lenders (banks) who might not always have a good knowledge of what exactly economic operators intent to do with borrowed funds, especially if the project/activity is to be implemented across national borders. This has greatly affected intermediation efficiency because savings are not fully exploited by financial institutions. This discourse also aligns with the stream of literature suggesting that some initial conditions may be essential in order to materialize the financial development benefits from globalization (see Henry, 2007; Kose et al., 2011; Asongu, 2014b; Asongu & De Moor, 2015ab). As a policy implication, 'public information sharing' offices like 'public credit registries' and 'private credit bureaus' which contribute to reducing information asymmetry may be relevant initial conditions for the rewards in financial allocation efficiency from globalization-fuelled regionalization policies.

It is reasonable to infer from our findings that whereas for UEMOA and CEMAC, globalization-fuelled regionalization has decreased the ability of the financial intermediary sector to provide funds for investment projects, COMESA has experienced the opposite effect while findings for the EAC are inconclusive or insignificant. It follows that regionalization for the most part has not been instrumental in financial intermediary efficiency over the past decades. Hence, our results reveal 'economic and monetary' regions have more surplus liquidity than purely economic regions. Therefore, the impact of globalization may be more detrimental to 'economic and monetary' regions (UEMOA and CEMAC) than to purely economic regions (COMESA and EAC)[13]. This inference is consistent with documented issues of surplus liquidity in the FCFA zone (Saxegaard, 2006; Fouda, 2009) and recent findings from Price and Elu (2014) which have shown that African countries within the FCFA zone were more likely to experience credit contraction during the recent financial crisis.

Fifth, consistent with Asongu (2014a, p. 70), we provide some policy directions on how to fight surplus liquidity in sampled countries. In essence, the holding of excess cash could be either voluntary or involuntary. First, involuntary holding of surplus liquidity can be mitigated by: (i) reducing the lending inability of banks, especially in scenarios of regulated interest rates; (ii) providing an enabling environment that encourages the spread of reserves and bonds in order to enable commercial banks invest surplus cash in bond markets; (iii) establishing mechanisms that reduce information asymmetry and enhance competition in order to limit the unwillingness

[13] Should we increase the significance level for the EAC, the sign-effect of the globalization parameter would satisfy this inference.

of financial institutions to lend and (iv) developing regional stock markets that contribute towards availing more investment opportunities to commercial banks. Second, the voluntary holding of surplus liquidity can be reduced by: (i) easing constraints financial institutions face in tracking their positions within central banks, which may ultimately require them to hold cash above statutory limits; (ii) consolidating institutions that are favorable to interbank lending in order to facilitate interbank borrowing for contingency motives and (iii) improving infrastructure so that bank branches in remote areas are not obliged to hold excess cash because of logistical and infrastructural issues.

5. Conclusion and future directions

The study assesses the role of globalization-fuelled regionalization policies on financial allocation efficiency in four economic and monetary regions in Africa for the period 1980 to 2008. Banking system and financial system efficiencies are used as dependent variables whereas seven bundled and unbundled globalization variables are employed as independent indicators. The bundling exercise is achieved by means of principal component analysis while the empirical evidence is based on interactive Fixed Effects regressions. The following findings are established. First, financial allocation efficiency is more sensitive to financial openness compared to trade openness and most sensitive to globalization. The relationship between allocation efficiency and globalization-fuelled regionalization policies is: (i) Kuznets or inverted U-shape in the UEMOA and CEMAC zones (evidence of decreasing returns to allocation efficiency from globalization-fuelled regionalization) and (ii) U-shape overwhelmingly in the COMESA and scantily in the EAC (increasing returns to allocation efficiency from globalization-fuelled regionalization). Established shapes are relevant to specific globalization dynamics within regions. 'Economic and monetary' regions are more prone to surplus liquidity than purely economic regions. Policy implications and measures of fighting surplus liquidity have been discussed.

Further research devoted to enriching the extant literature could focus on directly assessing the interactive effect of trade openness and financial openness on financial allocation efficiency in order to investigate the hypothesis of simultaneous trade and financial liberalizations as an essential condition for rewards in financial allocation efficiency.

Appendices

Appendix 1: Definitions and Sources of Variables

Variable(s)	Definitions of Variables (Measurements)	Source(s)
Banking efficiency	Bank system credit on Financial system deposits	FDSD (World Bank)
Financial efficiency	Financial system credit on Financial system deposits (%)	
Imports	Imports of goods and services (% of GDP)	
Exports	Exports of goods and services (% of GDP)	
Trade Globalisation	Imports plus Exports of goods and services (% of GDP)	
Foreign investment	Gross Foreign Direct Investment (% of GDP)	
Private Capital Flows	Gross Private Capital Flows (% of GDP)	
Financial Globalisation	First PC of Foreign Investment and Private Capital Flows	ADI (World Bank)
Globalisation	First PC of Financial Globalisation and Trade Globalisation	
Economic growth	Gross Domestic Product (GDP) Growth (annual %)	
Inflation	Annual Consumer Price Index	
Public Investment	Gross Public Investment (% of GDP)	
Foreign Aid	Total Development Assistances (% of GDP)	

PC: Principal Component. FDSD: Financial Development and Structure Database. ADI: African Development Indicators

Appendix 2: Openness and financial data

Variables	Panel A: Globalization (Openness)					
	Financial Openness(F.O)			Trade Openness(T.O)		
	GPCFgdp	GFDIgdp	Finopex	Igdp	Xgdp	Tropex
Definitions	Gross Private Capital Flows on GDP	Gross Foreign Direct Investment on GDP	Financial Openness Index	Imports on GDP	Exports on GDP	Imports plus Exports on GDP
Sources	ADI	ADI	PCA	ADI	ADI	ADI
Usages in the Openness literature	Lane and Milesi-Ferreti (2006), Baltagi et al. (2009), Hanh(2010)		Gries et al.(2009)	Standard Proxies		Hanh(2010), Gries et al.(2009)
Variables	Panel B: Principal Financial Development Indicators					
	Depth	**E**fficiency	**S**ize	**A**ctivity		**DESA-1**
	llgdp	bcbd	dbacba	prdcgdp		Findex1
Definitions	Liquid liability on GDP	Bank Credit on Bank Deposits	Deposit bank assets on Total financial assets	Private credit by domestic banks on GDP		Financial development Index1
Sources	FDSD	FDSD	FDSD	FDSD		PCA
Usages in the Financial development literature	Hanh (2010), Gries et al.(2009)	Demirgüç-Kunt et al. (1999), Demirgüç-Kunt & Beck (2009)		Baltagi et al. (2009), Hanh(2010)		Gries et al.(2009)

Variables	Panel C: Robustness tests financial development Indicators				
	Depth	**E**fficiency	**S**ize	**A**ctivity	**DESA-2**
	fdgdp	prdcfsd	**?**	prdcofgdp	Findex 2
Definitions	Financial system deposits on GDP	Private domestic credit on financial system deposit		Private credit from domestic banks and other financial institutions	Financial development index
Sources	FDSD	FDSD	**?**	FDSD	PCA
Usages in the literature/ justification	Authors correlation analysis	Authors correlation analysis	**?**	Authors correlation analysis	Gries et al. (2009)

ADI: African Development Indicators. PCA: Principal Component Analysis. FDSD: Financial Development and Structure Database.

Appendix 3: Summary Statistics

	UEMOA					**CEMAC**				
	Mean	S.D	Min.	Max	Obs.	Mean	S.D	Min.	Max	Obs.
Banking System Efficiency	1.248	0.604	0.338	3.698	145	0.806	0.298	0.188	1.601	57
Financial System Efficiency	**117.52**	**48.413**	**41.300**	**234.39**	**125**	**79.493**	**27.865**	**22.20**	**160.70**	**53**
Imports	33.055	6.929	17.836	51.780	138	35.685	15.507	14.639	74.219	56
Exports	24.823	9.984	13.319	52.650	138	49.452	22.803	16.179	86.884	56
Trade Globalisation	59.015	13.678	32.781	95.007	142	86.026	36.722	31.745	156.861	57
Foreign Investment	1.018	1.421	-2.496	7.246	136	2.609	7.225	-8.629	34.507	47
Private Capital Flows	0.975	1.545	-2.517	8.849	135	2.665	7.065	-8.918	34.488	47
Financial Globalisation	-0.001	1.380	-2.929	6.701	135	0.000	1.412	-2.259	6.306	47
Globalisation	0.062	1.009	-1.973	4.032	135	-0.014	1.175	-1.285	3.762	47
Economic Growth	2.583	4.264	-16.825	12.100	145	2.203	3.549	-8.932	7.700	57
Inflation	4.571	7.486	-7.796	38.530	130	4.121	9.144	-11.686	42.439	55
Public Investment	6.758	3.093	1.853	20.358	123	4.733	2.902	0.759	13.716	57
Foreign Aid	11.361	5.645	0.557	28.823	145	4.449	4.591	-0.174	23.418	57

	COMESA					**EAC**				
	Mean	S.D	Min.	Max	Obs.	Mean	S.D	Min.	Max	Obs.
Banking System Efficiency	0.711	0.283	0.275	1.876	287	0.588	0.185	0.206	1.075	57
Financial System Efficiency	76.392	33.572	30.532	200.079	276	62.121	18.783	22.767	111.830	57
Imports	37.540	21.921	7.066	114.046	288	29.340	6.486	19.098	47.707	55
Exports	27.569	21.778	3.335	104.213	288	18.508	7.441	7.062	38.903	55
Trade Globalisation	64.424	42.170	11.087	202.849	290	48.225	13.260	26.609	72.858	57
Foreign Investment	1.429	2.222	-4.302	9.708	260	2.016	1.827	0.000	6.470	55
Private Capital Flows	1.415	2.271	-4.322	9.611	264	1.971	1.893	-0.253	6.688	55
Financial Globalisation	0.006	1.410	-3.610	5.186	260	0.000	1.413	-1.539	3.484	55
Globalisation	0.012	1.134	-1.498	4.366	260	-0.024	1.113	-1.903	2.876	55
Economic Growth	3.790	5.780	-50.248	35.224	286	4.974	2.732	-0.799	11.523	57
Inflation	21.859	32.028	-2.405	200.026	280	13.023	10.753	-0.287	45.978	57
Public Investment	6.999	3.410	0.000	17.451	268	5.559	1.851	2.492	10.452	57
Foreign Aid	12.015	10.534	-0.251	94.442	290	12.294	6.280	2.407	28.992	57

UEMOA: West African Economic and Monetary Union. CEMAC: Central African Economic and Monetary Community. COMESA: Common Markets for Eastern and Southern Africa. EAC: East African Community. S.D: Standard Deviation. Min: Minimum. Max: Maximum. Obs: Observations.

Appendix 4: Correlation matrices

Panel A: UEMOA

	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	GDPg	Pub. Ivt	Inflation	Aid	BcBd	FcFd
Imports	1.000												
Exports	0.520	1.000											
Trade	0.810	0.862	1.000										
FDI	0.313	0.290	0.375	1.000									
PCF	0.286	0.273	0.329	0.867	1.000								
Finopex	0.310	0.292	0.364	0.965	0.967	1.000							
Globex	0.661	0.699	0.773	0.831	0.819	0.854	1.000						
GDPg	0.099	-0.156	-0.010	0.203	0.167	0.191	0.092	1.000					
Pub. Ivt	0.105	-0.290	-0.168	0.081	0.047	0.066	-0.034	0.002	1.000				
Inflation	0.225	0.130	0.252	-0.030	-0.045	-0.039	0.089	-0.059	0.129	1.000			
Aid	-0.211	-0.627	-0.566	-0.156	-0.149	-0.158	-0.391	0.265	0.236	0.124	1.000		
BcBd	0.245	0.325	0.235	-0.208	-0.149	-0.184	0.061	-0.361	0.061	0.052	-0.356	1.000	
FcFd	0.243	0.344	0.241	-0.233	-0.182	-0.215	0.047	-0.400	0.048	0.094	-0.334	0.985	1.000

Panel B: CEMAC

	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	GDPg	Pub. Ivt	Inflation	Aid	BcBd	FcFd
Imports	1.000												
Exports	0.878	1.000											
Trade	0.935	0.967	1.000										
FDI	0.383	0.355	0.457	1.000									
PCF	0.395	0.369	0.473	0.994	1.000								
Finopex	0.390	0.363	0.466	0.998	0.998	1.000							
Globex	0.799	0.801	0.865	0.834	0.842	0.839	1.000						
GDPg	0.177	0.179	0.206	-0.015	0.004	-0.005	0.104	1.000					
Pub. Ivt	0.703	0.651	0.689	0.328	0.368	0.348	0.620	0.163	1.000				
Inflation	0.022	0.005	0.0007	-0.028	-0.033	-0.030	-0.011	0.073	-0.014	1.000			
Aid	0.060	-0.088	-0.008	0.093	0.078	0.085	0.032	0.219	0.0008	0.235	1.000		
BcBd	-0.076	-0.278	-0.279	-0.241	-0.249	-0.245	-0.274	-0.457	-0.080	-0.135	-0.024	1.000	
FcFd	-0.164	-0.317	-0.347	-0.285	-0.299	-0.292	-0.337	-0.493	-0.1264	-0.114	-0.014	0.925	1.000

Panel C: COMESA

	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	GDPg	Pub. Ivt	Inflation	Aid	BcBd	FcFd
Imports	1.000												
Exports	0.944	1.000											
Trade	0.979	0.985	1.000										
FDI	0.221	0.241	0.235	1.000									
PCF	0.214	0.234	0.229	0.980	1.000								
Finopex	0.218	0.238	0.233	0.995	0.995	1.000							
Globex	0.772	0.784	0.787	0.778	0.774	0.780	1.000						
GDPg	0.114	0.116	0.130	0.244	0.245	0.246	0.230	1.000					
Pub. Ivt	0.165	0.082	0.133	-0.043	-0.033	-0.038	0.056	-0.083	1.000				
Inflation	-0.225	0.199	-0.212	-0.107	-0.103	-0.106	-0.205	-0.070	-0.230	1.000			
Aid	-0.317	-0.464	-0.408	-0.106	-0.091	-0.099	-0.317	-0.157	0.372	-0.001	1.000		
BcBd	0.056	0.036	0.043	-0.256	-0.264	-0.261	-0.135	-0.205	-0.205	0.087	-0.058	1.000	
FcFd	-0.032	-0.079	-0.062	-0.282	-0.288	-0.286	-0.217	-0.238	0.191	-0.305	0.087	0.899	1.000

Panel D: EAC

	Imports	Exports	Trade	FDI	PCF	Finopex	Globex	GDPg	Pub. Ivt	Inflation	Aid	BcBd	FcFd
Imports	1.000												
Exports	0.567	1.000											
Trade	0.857	0.879	1.000										
FDI	-0.311	-0.258	-0.328	1.000									
PCF	-0.319	-0.283	-0.349	0.996	1.000								
Finopex	-0.316	-0.271	-0.339	0.999	0.999	1.000							
Globex	-0.689	-0.679	-0.768	0.848	0.859	0.854	1.000						
GDPg	-0.397	-0.424	-0.421	0.549	0.558	0.554	0.628	1.000					
Pub. Ivt	0.204	0.033	0.149	-0.397	-0.378	-0.388	-0.331	-0.278	1.000				
Inflation	0.409	0.191	0.335	-0.413	-0.406	-0.410	-0.457	-0.425	0.499	1.000			
Aid	0.040	-0.502	-0.274	0.074	0.111	0.093	0.218	0.091	0.544	0.493	1.000		
BcBd	0.358	0.295	0.403	-0.712	-0.719	-0.716	-0.683	-0.344	0.483	0.318	-0.135	1.000	
FcFd	0.393	0.267	0.420	-0.617	-0.624	-0.621	-0.620	-0.317	0.521	0.346	-0.057	0.942	1.000

Imports: Imports of Goods and Services. Exports: Exports of Goods and Services. Trade: Imports plus Exports of Goods and Services. FDI: Foreign Direct Investment. PCF: Private Capital Flows. Finopex: Financial Openness Index. Globex: Globalisation Index. GDPg: Gross Domestic Product Growth rate. Pub. Ivt: Public Investment. Aid: Foreign Aid or Development Assistance. BcBd: Banking system credit on banking system deposits for Banking System Efficiency. FcFd: Financial system credit on financial system deposits for Financial System Efficiency. UEMOA:

West African Economic and Monetary Union. CEMAC: Central African Economic and Monetary Community. COMESA: Common Markets for Eastern and Southern Africa. EAC: East African Community.

Appendix 5: Homogenous and heterogeneous panel unit root tests

Zones	Vbles	Homogenous(LLC) tests				Heterogeneous(IPS) tests				Homogenous(LLC) tests				Heterogeneous(IPS) tests			
		Level		First diff.		Level		First diff.		Level		First diff.		Level		First diff.	
		c	ct	c	ct	c	ct	c	ct	c	ct	c	ct	c	ct	c	ct
UEMOA	FDIgdp	**-2.90*** **	**-3.01*** **	n.a	n.a	**-3.89*** **	**-4.68*** **	n.a	n.a	CEMAC	-1.78**	-2.97***	n.a	n.a	-1.18	-1.16	**-6.24*** **	**-5.05*** **
	PCFgdp	**-2.86*** **	**-2.79*** **	n.a	n.a	**-4.87*** **	**-4.92*** **	n.a	n.a		-1.83**	-2.92***	n.a	n.a	-0.73	-0.67	**-5.09*** **	**-3.29*** **
	Finopex	**-1.90****	**-2.46*** **	n.a	n.a	**-3.40*** **	**-4.26*** **	n.a	n.a		-1.72**	-3.10***	n.a	n.a	-0.91	-0.88	**-5.62*** **	**-4.40*** **
	Igdp	**-1.55***	**-2.34*** **	n.a	n.a	**-2.24****	**-1.60***	n.a	n.a		-1.36*	-1.87**	n.a	n.a	-0.60	-0.83	**-3.94*** **	**-4.35*** **
	Xgdp	**-2.42*** **	**-3.03*** **	n.a	n.a	**-1.57***	**-1.42***	n.a	n.a		-0.32	0.86	**-4.06*** **	**-3.71*** **	0.09	0.17	**-4.38*** **	**-3.26*** **
	Tropex	2.05	1.53	**-9.47*** **	**-6.67*** **	0.96	1.74	**-7.03*** **	**-5.67*** **		3.18	4.31	**-1.43***	-1.19	1.17	2.31	**-2.31****	**-1.42***
	Globex	-1.100	-0.720	-9.72***	-8.91***	**-1.90****	**-1.40***	n.a	n.a		-1.98**	-3.32***	n.a	n.a	-0.78	-1.35*	**-5.99*** **	**-4.66*** **
	GDPg	**-8.52*** **	**-6.84*** **	n.a	n.a	**-7.20*** **	**-6.18*** **	n.a	n.a		**-3.52*** **	**-1.82****	n.a	n.a	**-3.66*** **	**-2.16****	n.a	n.a
	GDPpcg	**-6.70*** **	**-6.89*** **	n.a	n.a	**-6.94*** **	**-6.12*** **	n.a	n.a		**-3.45*** **	**-1.77****	n.a	n.a	**-3.61*** **	**-2.05****	n.a	n.a
	bcbd	**-5.76*** **	**-6.22*** **	n.a	n.a	**-6.49*** **	**-4.67*** **	n.a	n.a		**-1.37***	3.37	n.a	n.a	**-1.46***	-0.82	n.a	n.a
	prdcfsd	**-2.02****	0.18	n.a	n.a	-0.55	0.63	n.a	n.a		**-3.25*** **	**-5.63*** **	n.a	n.a	**-2.37*** **	**-4.79*** **	n.a	n.a
COMESA	FDIgdp	-1.04	**-2.90****	21.58	-4.38***	**-2.97*** **	**-4.10*** **	n.a	n.a	EAC	-1.58*	-1.58*	n.a	n.a	-1.40*	-0.77	**-4.43*** **	**-3.12*** **
	PCFgdp	**-1.87****	**-3.54*** **	n.a	n.a	**-3.15*** **	**-4.60*** **	n.a	n.a		-1.54*	-2.16**	n.a	n.a	-1.11	-0.93	**-5.14*** **	**-3.85*** **
	Finopex	**-1.41***	**-3.18*** **	n.a	n.a	**-3.04*** **	**-3.97*** **	n.a	n.a		**-1.63***	**-2.53*** **	n.a	n.a	**-4.46*** **	**-3.08*** **	n.a	n.a
	Igdp	**-1.09**	**-3.04*** **	-12.0***	-9.78***	**-1.32***	**-2.92*** **	n.a	n.a		2.05	0.06	**-4.17*** **	**-2.90*** **	2.13	0.19	**-4.45*** **	**-3.61*** **
	Xgdp	**-2.03****	**-3.52*** **	n.a	n.a	**-3.14*** **	**-3.45*** **	n.a	n.a		-0.12	-0.55	**-5.13*** **	**-5.17*** **	-0.66	-1.55*	**-5.38*** **	**-4.95*** **
	Tropex	-0.79	**-5.29*** **	-9.16***	-4.91***	**-2.59*** **	**-4.96*** **	n.a	n.a		2.45	-0.30	**-4.32*** **	**-2.64*** **	2.06	-0.95	**-5.06*** **	**-4.37*** **
	Globex	2.21	8.66	27.08	-6.45***	**-1.89****	**-4.33*** **	n.a	n.a		-1.02	-1.58*	**-3.05*** **	**-2.39*** **	-0.59	-1.45*	**-3.48*** **	**-2.09****
	GDPg	**-9.62*** **	**-8.63*** **	n.a	n.a	**-9.17*** **	**-9.30*** **	n.a	n.a		**-1.61***	**-1.71****	n.a	n.a	**-1.45***	**-2.57*** **	n.a	n.a
	GDPpcg	**-8.61*** **	**-6.25*** **	n.a	n.a	**-8.98*** **	**-9.40*** **	n.a	n.a		**-1.49***	**-4.49*** **	n.a	n.a	**-1.25**	**-3.95*** **	-7.09***	-5.48***
	bcbd	**-8.48*** **	**-6.05*** **	n.a	n.a	**-8.98*** **	**-9.36*** **	n.a	n.a		**-2.58*** **	-0.10	n.a	n.a	**-2.18****	1.85	n.a	n.a
	prdcfsd	**-2.88*** **	4.76	n.a	n.a	**-2.61*** **	-0.90	n.a	n.a		**-3.17*** **	**-1.75****	n.a	n.a	**-2.51*** **	0.15	n.a	n.a

*, **, *** denote significance at 10%, 5% and 1% respectively. Optimal lag selection is governed by AIC and H&Q for IPS and LLC tests respectively. Maximum lags applied are based on time series length: with 3 for 'UEMOA and COMESA' and 2 for 'CEMAC, ECCAS and EAC'. 7 lags are applied on ' prdcfsd' for COMESA . 'c' and 'ct': 'constant' and 'constant and trend' ;respectively. n.a: not applicable. Stationary series are in bold and decision rule depends on both tests but priority is given the IPS in case of conflict of interest. LLC; Levin, Lin and Chu (2002). IPS: Im, Pesaran and Shin (2003). First diff: First difference. Vbles: variables.

Appendix 6: Regressions results for UEMOA and CEMAC (Economic and Monetary Regions)

Regions	UEMOA								CEMAC							
Estimated	Main Models (Banking System Efficiency)				Robustness tests (Financial System Efficiency)				Main Models (Banking System Efficiency)				Robustness tests(Financial System Efficiency)			
Parameters	Model 1	Model 2	Model 3	Model 4	Model1*	Model2*	Model3*	Model4*	Model 1	Model 2	Model 3	Model 4	Model1*	Model2*	Model3*	Model4*
Constant	**0.945*** **	**1.106*** **	**1.52*** **	**1.23*** **	**0.632*** **	**0.544*** **	**1.51*** **	**1.36*** **	**0.90*** **	**0.90*** **	**0.93*** **	**0.78*** **	**1.01*** **	**1.02*** **	**1.03*** **	**0.86*** **
	(3.947)	(4.508)	(25.01)	(22.73)	(4.328)	(4.100)	(30.40)	(29.41)	(16.09)	(17.08)	(17.84)	(20.37)	(14.57)	(14.21)	(14.98)	(17.90)
FDIgdp	---	-0.025	---	---	---	0.009	---	---	---	0.011	---	---	---	0.006	---	---
		(-0.559)				(0.298)				(1.324)				(0.801)		
a *FDIgdp*	---	0.025	---	---	---	0.023	---	---	---	**-0.023** **	---	---	---	**-0.015***	---	---
		(0.385)				(0.580)				**(-2.528)**				**(-1.759)**		
PCFgdp	-0.029	---	---	---	-0.008	---	---	---	**0.017***	---	---	---	0.011	---	---	---
	(-0.698)				(-0.242)				**(1.990)**				(1.420)			
a*PCFgdp*	0.059	---	---	---	0.042	---	---	---	**-0,02*** **	---	---	---	**-0.022** **	---	---	---
	(1.036)				(1.046)				**(-2.732)**				**(-2.489)**			
Finop	---	---	-0.041	---	---	---	0.009	---	---	---	**0.079***	---	---	---	0.035	---
			(-0.895)				(0.216)				**(1.945)**				(0.894)	
a*Finop*	---	---	0.093	---	---	---	0.049	---	---	---	**-0.15*** **	---	---	---	**-0.113** **	---
			(1.483)				(0.939)				**(-3.338)**				**(-2.412)**	
Igdp	**0.020*** **	---	---	---	**0.029*** **	---	---	---	-0.006	---	---	---	**-0.012***	---	---	---
	(2.83)				**(6.350)**				(-0.888)				**(-1.823)**			
a*Igdp*	**-0.02*** **	---	---	---	**-0.02*** **	---	---	---	**-0.004***	---	---	---	**-0.006** **	---	---	---
	(-8.41)				**(-11.85)**				**-1.748**				**(-2.380)**			
Xgdp	---	**0.021***	---	---	---	**0.040*** **	---	---	---	-0.009	---	---	---	0.001	---	---
		(1.943)				**(7.380)**				(-1.263)				(0.187)		
a*Xgdp*	---	**-0.02*** **	---	---	---	**-0.03*** **	---	---	---	**-0.001***	---	---	---	**-0.004** **	---	---
		(-6.557)				**(-13.69)**				**(-1.802)**				**(-2.456)**		
Tropex	---	---	0.003	---	---	---	**0.006***	---	---	---	**-0.014** **	---	---	---	**-0.01***	---
			(0.764)				**(1.855)**				**(-2.359)**				**(-1.699)**	
a*Tropex*	---	---	**-0.01*** **	---	---	---	**-0.01*** **	---	---	---	**-0.002*** **	---	---	---	**-0.003*** **	---
			(-8.040)				**(-9.37)**				**(-3.542)**				**(-3.125)**	
Globex	---	---	---	-0.147	---	---	---	**0.18** **	---	---	---	0.089	---	---	---	-0.000
				(-1.504)				**(2.244)**				(1.093)				(-0.008)
a*Globex*	---	---	---	(-0.032)	---	---	---	**-0.27*** **	---	---	---	**-0.164** **	---			-0.096
				0.027				**(-3.034)**				**(-2.438)**		---	---	(-1.230)
GDPg	---	---	---	---	**-0.02*** **	**-0.016** **	**-0.017** **	-0.013	---	---	---	---	**-0.037** **	**-0.042** **	**-0.040*** **	-0.022
					(-3.081)	**(-2.528)**	**(-1.983)**	(-1.202)					**(-2.532)**	**(-2.716)**	**(-2,749)**	(-1.567)
a*GDPg*	---	---	---	---	**0.032** **	**0.018***	0.020	**-0.05*** **	---	---	---	---	0.013	0.015	0.014	---
					(2.599)	**(1.664)**	(1.503)	**(-3.24)**					(0.678)	(0.762)	(0.719)	
GDPpcg	**-0.03*** **	**-0.027** **	**-0.021***	**-0.05*** **	---	---	---	---	-0.019	-0.021	-0.021	**-0.028***	---	---	---	---
	(-2.75)	**(-2.36)**	**(-1.893)**	**(-3.97)**					(-1.261)	(-1.439)	(-1.471)	**(-1.714)**				
a*GDPpcg*	0.034	0.014	0.021	0.027	---	---	---	---	-0.016	-0.016	-0.015	-0.009	---	---	---	---
	(1.49)	(0,592)	(0.980)	(0.960)					(-0.738)	(-0.783)	(-0.763)	(-0.414)				
R^2 ajust.	0.51	0.45	0.47	0.19	0.77	0.80	0.69	0.45	0.26	0.29	0.37	0.15	0.33	0.28	0.34	0.14
F-Stats	**14.87*** **	**12.08*** **	**12.72*** **	**5.11*** **	**39.63*** **	**48.01*** **	**27.13*** **	**13.29*** **	**2.96** **	**3.25*** **	**4.21*** **	**2.32***	**3.55*** **	**3.01** **	**3.68*** **	**2.17***

*, **, *** denote respectively, 10%, 5% and 1% significance levels. Estimated parameters with '**a**' represent after policy implications to banking and financial system efficiencies. UEMOA: West African Economic and Monetary Union. CEMAC: Central African Economic and Monetary Community.

Appendix 7: Regression results for COMESA and EAC (Economic regions)

Regions	COMESA								EAC							
Estimated	**Main Models(Banking System Efficiency)**				**Robustness tests (Financial System Efficiency)**				**Main Models(Banking System Efficiency)**				**Robustness tests(Financial System Efficiency)**			
Parameters	Model 1	Model 2	Model 3	Model 4	Model1*	Model2*	Model3*	Model4*	Model1	Model2	Model 3	Model 4	Model1*	Model2*	Model3*	Model4*
Constant	**0.89*** **	**0.85*** **	**0.84*** **	**0.70*** **	**1.02*** **	**0.94*** **	**0.93*** **	**0.76*** **	**0.59*** **	**0.59*** **	**0.55*** **	**0.58*** **	**0.68*** **	**0.68*** **	**0.61*** **	**0.67*** **
	(12.45)	(12.95)	(10.80)	(49.61)	(15.30)	(15.02)	(12.68)	(41.88)	(24.68)	(24.29)	(24.88)	(25.50)	(14.13)	(13.78)	(14.31)	(14.54)
FDIgdp	---	-0.015	---	---	---	-0.015	---	---	---	-0.007	---	---	---	-0.003	---	---
		(-1.049)				(-1.094)				(-0.430)				(-0.20)		
a *FDIgdp*	---	0.013	---	---	---	0.021	---	---	---	-0.023	---	---	---	-0.006	---	---
		(0.865)				(1.378)				(-0.912)				(-0.193)		
PCFgdp	**-0.026** **	---	---	---	**-0.027** **	---	---	---	-0.004	---	---	---	-0.000	---	---	---
	(-2.00)				**(-2.232)**				(-0.245)				(-0.008)			
a*PCFgdp*	**0.028***	---	---	---	**0.035** **	---	---	---	-0.018	---	---	---	-0.009	---	---	---
	(1.909)				**(2.57)**				(-0.756)				(-0.318)			
Finop	---	---	**-0.05*** **	---	---	---	**-0.05*** **	---	---	---	**-0.08*** **	---	---	---	**-0.08*** **	---
			(-2.684)				**(-3.101)**				**(-4,189)**				**(-4.438)**	
a*Finop*	---	---	**0.064*** **	---	---	---	**0.08*** **	---	---	---	0.047	---	---	--	0.056	---
			(2.868)				**(3.925)**				(1.325)				(1.510)	
Igdp	**-0.003***	---	---	---	**-0.005*** **	---	---	---	0.006	---	---	---	0.006	---	---	---
	(-1.759)				**(-2.716)**				(1.152)				(1.251)			
a*Igdp*	**-0.001** **	---	---	---	**-0.002*** **	---		---	-0.000	---	---	---	-0.001	---	---	---
	(-2.586)				**(-2.837)**				(-0.255)				(-0.412)			
Xgdp	---	**-0.004***	---	---	---	**-0.005** **	---	---	---	0.001	---	---	---	0.005	---	---
		(-1.703)				**(-2.048)**				(0.248)				(0.796)		
a*Xgdp*	---	-0.001	---	---	---	-0.000	---	---	---	0.000	---	---	---	-0.000	---	---
		(-1.012)				(-0.544)				(0.094)				(-0.176)		
Tropex	---	---	-0.001	---	---		**-0.002** **	---	---	---	-0.000	---	---	---	0.000	---
			(-1.619)				**(-2.056)**				(-0.279)				(0.203)	
a*Tropex*	---	---	-0.000	---	---		-0.000	---	---	---	-0.000	---	---	---	-0.000	---
			(-1.565)				(-1.164)				(-0.226)				(-0.384)	
Globex	---	---	---	**-0.08*** **	---			**-0.08*** **	---	---	---	0.003	---	---	---	-0.002
				(-3.319)				**(-3.608)**				(0.108)				(-0.064)
a*Globex*	---	---	----	**0.06*** **	---			**0.10*** **	---	---	---	1.544	---	---	---	0.011
				(2.773)				**(4.239)**				(0.000)				(0.357)
GDPg	---	---	---	---	-0.006	-0.003	-0.004	8,10	---	---	---	---	**-0.018***	-0.017	-0.007	-0.017
					(-1.642)	(-0.874)	(-1.082)	(0.021)					**(-1.751)**	(-1.613)	(-0.769)	(-1.679)
a*GDPg*	---	---	---	---	0.002	-0.006	-0.001	**-0.008***	---	---	---	---	0.005	0.000	0.005	-0.003
					(0.416)	(-1.186)	(-0.304)	**(-1.809)**					(0.207)	(0.021)	(0.271)	(-0.508)
GDPpcg	**-0.01*** **	**-0.01*** **	**-0.01*** **	**-0.008***	---	---	---	---	-0.014	-0.016	-0.001	-0.013	---	---	---	---
	(-2.805)	**(-2.735)**	**(-2.601)**	**(-1.917)**					(-1.386)	(-1.526)	(-0.113)	(-1.278)				
a*GDPpcg*	**0.01*** **	**0.012** **	**0.012** **	0.008	---	---	---	---	0.017	0.021	0.010	0.003	---	---	---	---
	(2.602)	**(2.104)**	**(2.255)**	(1.451)					(0.643)	(0.789)	(0.470)	(0.267)				
R^2 ajust.	0.46	0.44	0.45	0.44	0.64	0.63	0.62	0.61	0.50	0.49	0.62	0.48	0.56	0.54	0.68	0.54
F-Stats	**15.70*** **	**14.28*** **	**15.31*** **	**16.86*** **	**31.24*** **	**25.72*** **	**27.60*** **	**31.10*** **	**7.41*** **	**7.03*** **	**11.56*** **	**8.86*** **	**9.03*** **	**8.62*** **	**14.68*** **	**11.36*** **

*, **, *** denote respectively, 10%, 5% and 1% significance levels. Estimated parameters with '**a**' represent after policy implications to banking and financial system efficiencies. COMESA: Common Markets for Eastern and Southern Africa. EAC: East African Community.

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