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Bank Efficiency and Openness in Africa: Do Income Levels Matter?

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Abstract

This paper integrates a previously missing wealth-effect component in the openness-finance debate. From a panel of 29 low and middle income African countries with data spanning from 1987 to 2008, we provide evidence that openness (trade and financial) triggers less bank efficiency in low income countries than in their middle income counterparts. These findings justify the absence of a banking comparative advantage and consequently, the issue of over-liquidity resulting from low funding of economic operators with mobilized financial deposits. In terms of policy implications, globalization increases economic cost of banks in sampled countries, with trade openness more detrimental than financial openness. Banks in middle income countries play a greater role in financing activities resulting from trade openness than those in low income countries. Also, a lot needs to be done on the improvement of infrastructures that curtails information asymmetry in the banking industry.

Keywords: Banking; Intermediation Efficiency; Openness; Panel Data; Africa
JEL codes: F10; G20; I30

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1. INTRODUCTION

Liquidity remains stubbornly high in African banks in spite of more than two decades of trade and financial liberalization efforts by the International Monetary Fund (IMF) and the World Bank to improve financial intermediation efficiency. This has led to increasing debates among scholars on the allocation efficiency benefits of openness to developing countries. A typical characteristic of most African countries' banking sectors is the high concentration ratio with a large share of assets held by a few banks. Such an oligopolistic banking sector has negative consequences, among which are high interest rate spreads which crowd out credit to the private sector by making loans very expensive. In this context, banks tend to favor government assets, therefore resulting in low intermediation rates and a smaller share of credit allocated to the private sector.

A large number of empirical studies support the existence of a positive relationship between openness and financial intermediation (Rajan and Zingales, 2003; Baltagi et al., 2009; Hanh, 2010). A significant bulk of the literature establish that competitive pressures created by foreign banks lead to improvements in financial system efficiency by lowering operating cost and smaller margins between lending and deposit interest rates (Claessens et al., 2001; Peria et al., 2003). However most of these studies assume a uniform openness-financial intermediation relationship. In this paper we assess the importance of wealth-effects on the contribution of openness to financial intermediation efficiency. This previously missing income-level component in the debate is important because, it separates the effects of openness from other country and country-group characteristics that may have an asymmetric effect on financial intermediation for different income groups. Findings resulting from the introduction of this wealth (income) dimension could elucidate some issues on over liquidity in the continent. Therefore this works contributes to existing literature by assessing the wealth-effects of the openness-finance nexus in Africa.

The rest of the paper is organized as follows. We review existing literature in Section 2. Section 3 describes the data and outlines the panel-dummy methodology based on Generalized Least Squares with Fixed Effects respectively. Empirical analysis and discussion are presented in Section 4. Section 5 concludes.

2. LITERATURE REVIEW

The debate over financial development (FD) and openness has been the object of numerous recent studies. However, many of such studies fail to pinpoint what aspects of financial development are tied to openness. In this work, we shall limit ourselves exclusively to bank efficiency in financial intermediary development.

Most research on bank efficiency in developing countries has been based on Data Envelopment Analysis (DEA) which is a non parametric method in operations research used for estimating production efficiency of decision making units: production frontiers. Though this method has the advantage of not assuming a particular functional form (non parametric approach), it presents the shortcoming of being unable to provide a link between output and input (endogenous and exogenous variables). Sathye (2003) for instance, uses the DEA method to measure differing efficiency of Indian banks across sectors. Results based on data from 1997-1998 show that the mean efficiency score of Indian banks is quite comparable with that of banks in other countries. Also, the efficiency of private sector's commercial banks, as a group, is lower than that of foreign and public banks. While this study could be relevant in presenting a case against privatization of commercial banks, its policy implication remains purely qualitative. This thesis, of state-owned firms being more efficient, is confirmed by Staub et al. (2010). Still using DEA, they probe into technical and 'allocative' efficiency of Brazilian banks from 2000-2007. Their findings reveal that compared to banks in Europe and the USA, Brazilian banks have lower levels of efficiency (economic cost). Also, state-owned

banks are significantly more cost efficient than those with foreign, private-domestic and private with foreign participation.

Many studies have focused on openness as well. While some authors distinguish between financial and trade openness, others don't. As to what concerns the link between openness and financial development, Rajan and Zingales (2003) put forth a hypothesis that only through the interaction of trade openness and financial openness can financial development be possible. They use of a panel of twenty four countries and their results show, closed economies will more likely benefit from financial development (particularly stock market development) if there were a free cross border capital flow. The premise of interaction between openness indicators is later verified by Baltagi et al. (2009). Their findings reject the hypothesis that both types of openness are necessary for financial development to take place. More recently, in a study of twenty nine Asian countries, Hanh (2010) confirms the results brought forth by Baltagi et al. (2009). This work finds existence of bi-directional causality between openness and financial development. Using a Pooled Mean Group analysis on 28 countries, with data from 1960 to 2005, Kim et al. (2010) establish a long-run link between trade openness and finance. It suffices to mention here that indicators of financial development mostly used by these authors are the ratio of liquid liabilities to GDP and private domestic credit on GDP, which are indicators of financial intermediary depth and activity respectively. In our work, we shall approach this concept exclusively from the perspective of 'bank credit on bank deposit ratio'; which is a macro economic indicator of financial intermediary efficiency (Demirgüç-Kunt and Beck, 2009).

Beside the use of DEA for efficiency measurement (as elucidated above), some authors look at banking sector's efficiency from an Overall Economic Efficiency (OEE) perspective (product of Technical Efficiency and Scale Efficiency). An example of such studies is Al-Obaidan (2008) who, using a composite indicator for the efficiency of the

banking industry in the Gulf region, shows with deterministic and stochastic analyses that openness enhances technical efficiency. Apart from the use of OEE, recent studies dedicated to efficiency of banks in Africa have been tilted towards cost and profit efficiency concepts (Kiyota, 2009; Kablan, 2010).

As concerns literature on efficiency, according to Demirgüç-Kunt and Beck (2009), there are four main indicators of financial intermediary efficiency:

- the ratio of bank credit to 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: the accounting value of the bank's overhead cost as a share of its total assets;

-cost/income ratio; which assesses overhead costs relative to gross revenues.

While the last three indicators are profitability-oriented, our concept of efficiency in this study is best defined by the first. We therefore seek to evaluate how well "private sector credit" is funded by "deposits". This implies a high loan to deposit ratio will indicate high intermediation efficiency. By the same token, this concept of efficiency also enables us to verify the hypothesis of the existence of surplus liquidity in the African banking sector; a low loan-deposit ratio should reflect overwhelming liquidity.

Our present research agenda will therefore differ from those of previous authors by: (1) distinguishing between trade openness and financial openness (contrary to Al-Obaidan, 2008)[2]; (2) limiting ourselves to the African region; (3) using an aggregate indicator for bank sector efficiency, unlike Baltagi et al. (2009) and Hanh (2010); (4) not employing DEA, contrary to Sathye (2003) and Staub et al. (2010); (5) considering efficiency as the degree to which deposits finance loans (contrary to the profit efficiency concept in the literature: see,

[2] This author however fails to establish foreign direct investment as an indicator of financial openness. Just qualifying this proxy as in indicator of openness without specifying what sort of openness may be misleading.

for instance, Kiyota, 2009; Kablan, 2010); (6) integrating two welfare variables in a bid to control for the 'growth-led-finance nexus'.

3. DATA and METHODOLOGY

3.1 Data

Our data spans from 1987 to 2008 because we endeavor to capture the bank efficiency implications of structural adjustment policies that cropped from the mid 1980's as much as possible. Also, we are limited to 29 countries because of data availability. Regarding the quality of our proxies and data sources, we have provided justification from literature, as detailed in table 1 below. The list of countries can be found in appendix A.

Table 1: Data collection summary

Variables	Proxies	Sources	Studies that employed it
Bank Efficiency	Bank credit/ Bank deposits(BcBd)	FDSD	Demirgüç-Kunt and Beck (2009)
	[3]Private domestic credit/financial system deposits(prdcfsd)	FDSD	Derived from: Demirgüç-Kunt et al. (1999), Demirgüç-Kunt and Beck (2009)
Trade Openness	(Import + Export)/GDP(IXgdp)	ADI	Hanh (2010)
Financial Openness	-Foreign Direct Investment/GDP(FDIgdp)	ADI	Lane and Milesi-Ferreti (2006), Baltagi et al. (2009), Hanh (2010)
	-Gross Private Capital Flows/GDP(PCFgdp)	ADI	
Control Variables	GDP growth(GDPg)	ADI	Hanh (2010)
	GDP growth per capita(GDPpcg)	ADI	

Notes: FDSB: Financial Development and Structure Database. ADI: African Development Indicators.
Source: author's synthesis.

3.2 Methodology

[3] This second indicator of financial efficiency is employed for conducting a robustness test.

Borrowing from Asongu (2010b, 2011) we use dummy variables to differentiate between low and middle income countries. Since our aim is to use a panel estimation technique that assumes a particular functional distribution, testing the stationarity properties of variables is essential. Estimation will be based on Generalized Least Squares (GLS) to avoid issues resulting from heteroscedasticity in the Ordinary Least Squares (OLS) assumption. Between the random effects (RE) and fixed effects (FE) models, we opt for the later because: firstly, it does not hypothetically assume explanatory variables are not correlated with the residuals and secondly, the use of FE accounts for the unobserved heterogeneity between countries. Also, based on the motivation of the paper, country and country-group specific income characteristics are accounted for by the FE regressions.

3.2.1 Unit root tests

The objective here is to test the stationarity properties of our series. When a series is not stationary in levels we check for first difference stationarity[4]. There are generally two types of panel unit root tests. While the first generation of tests assume independence across sectional units, the second is founded on the premise of cross sectional dependence. We opt for the first on the basis that, besides their wide application in the literature focusing on macroeconomic variables (Hanh, 2010), exploratory correlation analysis of cross sections reveals weak dependency. Beyond this fact, sampled countries have independent economic policies. With regard to this choice, there are two types of unit root tests: one that is homogenous and assumes a common unit root (therefore 'within' variation) and another that is heterogeneous and premised on individual unit roots (therefore 'between' variation); they are respectively, Levin, Lin and Chu (LLC-2002) and Im, Pesaran and Shin (IPS-2003); amongst others. In this study, we shall perform both tests but base our decisions on the later in case of conflict of interest. Our choice in event of conflict of interest is founded on the

[4] A level or first difference order of integration, respectively I(0) or I(1), indicate if a series is stationary. The order of integration refers to the number of times a series can be differenced before it is stationary.

ground that the alternative hypothesis of the LLC test is too powerful[5]. Another important consideration to take into account in unit root tests is the autoregressive character of their processes. Consequently, optimal lag selection for goodness of fit is crucial for efficiency of tests. As pointed out by Khim (2004), when the number of observations is below 60, the AIC (Akaike Information Criterion) and FPE (Final Prediction Error) criteria are best at selecting optimal lags. On the other hand, when the number of observations exceeds 60 and is more or less 120, the Hannan-Quin Criterion (HQC) is best. Therefore, our LLC and IPS models will be specified by HQC and AIC respectively. Results are summarized in tables 2 and 3 below.

Table 2: LLC Unit root test

		IXgdp	FDIgdp	PCFgdp	BcBd	GDPpcg	GDPg	Prdcfsd
Level	c	-2.788***	-5.517***	-4.267***	-2.764***	-11.79***	-12.48***	-6.07***
	ct	-5.173***	-7.043***	-6.441***	-3.012***	-11.95***	-12.41***	-1.83**
First	c	n.a	n.a	n.a	n.a	n.a	n.a	n.a
difference	ct	n.a	n.a	n.a	n.a	n.a	n.a	n.a

*,**,*** denote significance levels of 10%, 5% and 1% respectively. Maximum lag is 2 and optimal lags are chosen via HQC. 'c' and 'ct': 'constant' and 'constant and trend' respectively. n.a: not applicable.

Table 3: IPS Unit root test

		IXgdp	FDIgdp	PCFgdp	BcBd	GDPpcg	GDPg	Prdcfsd
Level	c	-1.736***	-5.609***	-4.717***	-1.360*	-11.96***	-12.23***	-4.30***
	ct	-4.001***	-5.283***	-5.343***	-0.498	-11.05***	-11.21***	-1.88**
First	c	n.a	n.a	n.a	n.a	n.a	n.a	n.a
difference	ct	n.a	n.a	n.a	n.a	n.a	n.a	n.a

*,**,*** denote significance levels of 10%, 5% and 1% respectively. Maximum lag is 2 and optimal lags are chosen via AIC. 'c' and 'ct': 'constant' and 'constant and trend' respectively. n.a: not applicable.

3.2.2 Model Specification

Summary statistics and correlation analysis that somewhat guided the manner in which our models are specified can be found in appendices B and C respectively. We consider the following models:

[5] Maddala and Wu (1999) argue that the alternative hypothesis of the absence of a common unit root is too strong.

$$BcBd_{it} = \gamma_0 + \gamma_{1l} L_{it} XI_{it} + \gamma_{1m} M_{it} XI_{it} + \gamma_{2l} L_{it} PCF_{it} + \gamma_{2m} M_{it} PCF_{it} + \gamma_{3l} L_{it} GDPpcg_{it} + \gamma_{3m} M_{it} GDPpcg_{it} + \varepsilon_{it} \quad (1)$$

$$BcBd_{it} = \gamma_0 + \gamma_{1l} L_{it} XI_{it} + \gamma_{1m} M_{it} XI_{it} + \gamma_{2l} L_{it} FDI_{it} + \gamma_{2m} M_{it} FDI_{i\,t} + \gamma_{3l} L_{it} GDPpcg_{it} + \gamma_{3m} M_{it} GDPpcg_{it} + \varepsilon_{it} \quad (2)$$

The robustness of models (1) and (2) will be checked with models (3) and (4) which have different dependent and control variables.

$$prdcfsd_{it} = \gamma_0 + \gamma_{1l} L_{it} XI_{it} + \gamma_{1m} M_{it} XI_{it} + \gamma_{2l} L_{it} PCF_{it} + \gamma_{2m} M_{it} PCF_{it} + \gamma_{3l} L_{it} GDPg_{it} + \gamma_{3m} M_{it} GDPg_{it} + \varepsilon_{it} \quad (3)$$

$$prdcfsd_{it} = \gamma_0 + \gamma_{1l} L_{it} XI_{it} + \gamma_{1m} M_{it} XI_{it} + \gamma_{2l} L_{it} FDI_{it} + \gamma_{2m} M_{it} FDI_{i\,t} + \gamma_{3l} L_{it} GDPg_{it} + \gamma_{3m} M_{it} GDPg_{it} + \varepsilon_{it} \quad (4)$$

where:

- Countries $i = 1,2,...,29$; time $t = 1,2,...,20$

-for Low Income countries; $L_{it} = 1 / M_{it} = 0$

-for Middle Income countries; $M_{it} = 1 / L_{it} = 0$

-XI, FDI and PCF are all expressed as ratios to the GDP.

For ease in interpretation of estimators upon regression, parameters of the model in estimated form are represented as:

-constant, *liXIgdp, miXIgdp, liPCFgdp, miPCFgdp, liGDPpcg, miGDPpcg* (Model 1)

-constant, *liXIgdp, miXIgdp, liFDIgdp, miFDIgdp, liGDPpcg, miGDPpcg* (Model 2);

-constant, *liXIgdp, miXIgdp, , liPCFgdp, miPCFgdp, liGDPg, miGDPg* (Model 3);

-constant, *liXIgdp, miXIgdp, liFDIgdp, miFDIgdp, liGDPg, miGDPg* (Model 4)

4. EMPIRICAL ANALYSIS

4.1 Empirical Results

Estimated results as summarized in table 4 indicate the following: (1) trade openness and financial openness decrease bank efficiency in low income countries; (2) in middle income countries, only the detrimental effect of financial openness is significant; (3) the trade openness elasticity to bank efficiency is greater than financial openness elasticity to bank efficiency; (4) foreign direct investment is more significant as an indicator of financial openness than private capital flows; (5) growth and welfare decrease efficiency with the effects more felt in middle income countries.

Table 4: Presentation of empirical results

Independent Variables	Dependent variables (Level)			
	Initial model(s)		Robustness check model(s)	
	BcBd (Bank system efficiency)		Prdcfsd (Financial system efficiency)	
	Model 1	Model 2	Model 3	Model 4
Constant	**0.86(20.79)*** **	**0.87(20.95)*** **	**0.91(18.70)*** **	**0.88(20.83)*** **
liXIgdp	**-0.43(-3.12)*** **	**-0.41(-3.00)*** **	**-0.35(-2.34)** **	**-0.40(-2.94)*** **
miXIgdp	-0.04(-0.27)	-0.06(-0.39)	0.01(0.05)	-0.07(-0.46)
liFDIgdp	---	**-0.01(-1.95)***	---	**-0.01(-2.02)** **
miFDIgdp	---	**-0.005(-2.21)** **	---	**-0.005(-2.18)** **
liPCFgdp	-0.009(-1.44)	---	**-0.01(-1.76)***	---
miPCFgdp	**-0.005(-2.37)** **	---	**-0.004(-1.67)***	---
liGDPpcg	**-0.003(-1.78)***	**-0.003(-1.70)***	---	---
miGDPpcg	**-0.010(-2.89)*** **	**-0.01(2.86)*** **	---	---
liGDPg	---	---	-0.003(-1.46)	-0.002(-1.19)
miGDPg	---	---	**-0.009(-2.47)** **	**-0.009(-2.73)*** **
Adjusted R^2	0.63	0.63	0.78	0.78
Fisher	**29.97*** **	**30.06*** **	**59.60*** **	**59.82*** **

*, **, *** denote significance levels at 10%, 5% and 1% respectively. t statistics in brackets (). R^2: coefficient of determination.

4.2 Discussion of Results

Results appear to support the thesis that, with globalization, openness and free trade, bank efficiency in African countries is at stake. Openness could benefit sampled countries in areas where they have a comparative advantage, like the primary sector. However, tertiary sectors, with bank services would relatively be to the benefit of more developed and advanced

economies. These findings partially confirm those of Asongu (2010a) which did not find any linkage between financial development and openness in African countries. We join Baltagi et al. (2009) and Hanh (2010) in partially supporting the Rajan and Zingales (2003) hypothesis on the benefits of openness. Though a country could benefit more by simultaneously opening its trade and capital accounts, with respect to income levels trade openness and capital openness are independent significant determinants of bank efficiency. A possible explanation as to why growth and per capita growth decrease bank efficiency could be derived from common sense: the more people earn, the more they deposit and loans resulting from those deposits are less[6].

An elucidation as to why financial intermediary inefficiency is felt more in low income countries than in their middle income counterparts when trade accounts open could be captured from the perspective that banks of latter countries play a greater role in the financing of activities resulting from trade openness than those of low income countries.

4.3 Growth, inequality and poverty implications

As we have highlighted in the motivation of the paper, over two decades of structural adjustment programs and policy reforms in favour of trade and financial liberalization by the IMF and the World Bank have sought to reduce debt dependency, accelerate growth and mitigate inequality (poverty) issues in African countries. There is a relevant bulk of the literature that establishes the benefits of globalization to financial allocation efficiency (Claessens et al., 2001; Peria et al., 2003). However based on the findings of this paper the rewards of openness through financial intermediation seem to be greater in higher income countries than in their lower income counterparts. Thus from a national level, globalization has a negative income redistributive effect. It follows that countries with higher income brackets will benefit more in growth prospects while poor countries will grow poorer.

[6] Loans granted by domestic banks.

5. Conclusion

The purpose of this paper has been to integrate a previously missing wealth-effect component in the openness-finance debate. We have assessed the relationship between openness and bank efficiency in selected African counties and found that globalization is more detrimental to low income countries than their middle income counterparts. Our negative results meet expectations for low income countries in the continent because their banking sectors have a competitive disadvantage. What is important to point out is that completely opening-up the financial intermediary sector would be to the detriment of bank sector efficiency. As we have pointed out earlier, our conception and definition of bank efficiency in this study could be assimilated to the degree by which savings can fund loans. Deteriorating efficiency with openness simply implies domestic credit is funded by foreign banks. Financial operations resulting from investment and trading activities for the most part are foreign financed. These findings support the 'common-sense' of proponents who believe that completely opening-up African economies to the tertiary sector would not be of any good to the tertiary domestic industry. The dimensions of comparative advantage and potential effect on domestic sectors should be carefully considered before complete financial and trade liberalization become policy. A recommendation to governments of sampled countries is that they should relax restrictions on openness progressively with growth and development. More so, if domestic banks should relax conditions for granting loans to economic operators, the degree by which deposits could finance credit would increase, thereby improving allocation efficiency and tackling the problem of over liquidity. A lot needs to be done on the improvement of infrastructures that curtails information asymmetry in the banking industry.

Improving financial development in Africa should not only be considered from an intermediary standpoint. Disintermediation with the advent of globalization is quite crucial for

long term finance. However, stock markets in Africa have been very slow to pick-up, with just a few running smoothly. Whether openness would affect stock market efficiency in the same manner should be subject to further research. Also, another important dimension of a future study could be to investigate if this financial intermediary inefficiency is most felt by state-owned, foreign, private-domestic or private-foreign banks.

Appendices

Appendix A: List of African Countries

Income Levels	Countries
Low Income	Burundi, Ivory Coast, Ghana, Kenya, Madagascar, Mali, Togo, Mozambique, Malawi, Nigeria, Rwanda, Senegal, Sierra Leon, Tanzania, Uganda, Zambia.
Middle Income	Angola, Botswana, Cameroon, Congo Republic, Egypt, Gabon, Lesotho, Morocco, Mauritius, Sudan, Swaziland, Tunisia, South Africa.

Source (author)

Appendix B: Summary Statistics (1988-2007; countries: 29)

Variables	**Source**	**M.Unit**	**Mean**	**S.D**	**Min.**	**Max.**	**Kurt.**	**Skew.**	**Observ.**
IXgdp	ADI	% GDP	0.39	0.21	0.00	1.37	4.15	1.81	580
FDIgdp	ADI	% GDP	2.61	5.03	-8.62	42.49	23.44	4.14	552
prdcfsd	FDSD	ratio	0.80	0.43	0.13	2.60	3.55	1.65	550
BcBd	FDSD	ratio	0.74	0.32	0.13	1.84	0.46	0.75	567
GDPpcg	ADI	%	1.45	5.18	-46.89	37.83	19.27	-1.26	579
GDPg	ADI	%	3.84	5.38	-50.24	35.22	21.88	-1.84	579

M.Unit: Measurement Unit, S.D: Standard Deviation, Min:Minimun , Max:Maximum, Kurt:Kurtosis, Skew: Skewness, Observ: Observations, ADI : African Development Indicators, FDSD :Financial Development and Structure Database.

Appendix C: Correlation Analysis

	IXgdp	FDIgdp	PCFgdp	prdcfsd	BcBd	GDPpcg	GDPg
IXgdp	1						
FDIgdp	0.46	1					
PCFgdp	0.46	0.97	1				
prdcfsd	-0.17	-0.22	-0.17	1			
BcBd	-0.12	-0.22	-0.20	0.88	1		
GDPpcg	0.07	0.04	0.03	-0.19	-0.19	1	
GDPg	0.03	0.03	0.02	-0.20	-0.18	0.97	1

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