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Linkages between Financial Development and Openness: panel evidence from  
developing countries.

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## **Abstract**

In this paper, we contribute to existing literature on financial development and openness by, sampling twenty-nine African countries with data spanning from 1987 to 2008. Using panel empirical techniques, we provide evidence of bi-directional causality between trade openness and financial openness; albeit, the former, bearing much more impact on the later. Neither capital openness nor trade openness, significantly account for financial development. Our results are robust to variable interaction via Principal Component Analysis. For sampled countries, policy towards trade openness should be effective in view of inviting private capital flows.

Keywords: Trade Openness, Financial Openness, Financial Development, Panel, Africa.

## 1. INTRODUCTION

At the advent of globalization, the issue of linkages between finance and openness become more apparent. Beyond this truism, the success of China as an export driven economy; following her joining the World Trade Organization (WTO) at the beginning of the millennium, has achieved considerable trade and/or financial openness and economic growth. Its quick recovery from the 2008 global economic downturn and financial melt-down; amid struggling western nations, point to the great role, this emerging country will have on the global business arena in the 21<sup>st</sup> century. Any right minded policy maker should of consequence, be nursing the concern of knowing how, openness has led to financial development and growth in other developing countries. This has been confirmed by many a study, which point to the existence of a positive bearing of trade openness on growth: Spatareanu and Manole(2010) who find out; less trade protection is associated with higher per capita<sup>1</sup>, Welch and Romain(2008) show that, over the 1950-98 time frame, economies with liberalized trade regimes experienced higher growth rates.

Dornbusch (1992) presented the case for trade liberalization for developing countries in which, he spelled out the need for service-trade liberalization and regional trade agreements; in an effort to achieve vested economic development. He asserted; trading restrictions should be gradually lifted with progress in development. Rajan and Zingales(2003), via a panel of twenty-four countries(industrialized for the most part) show that, simultaneous opening of trade and capital accounts is key to financial development; especially financial market development, when cross-border capital flows are free. This hypothesis is partially confirmed by Baltagi et al. (2009), who investigate the premise put forward by Rajan and Zingales. From a bank sector development perspective, their findings, indicate; on an independent basis, both trade openness and financial openness bring about

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<sup>1</sup> Using data from 131 developed and developing countries.

financial development; thus slightly disagreeing with Rajan and Zingales (2003). However, interactions of trade and financial openness suggest a negative marginal effect; implying closed economies could benefit by opening both their trade and financial accounts<sup>2</sup>. This thesis is further confirmed by Hanh(2010), whose study on twenty-nine Asian countries, shows the existence of bi-directional causality between trade(financial) openness and financial development. Kim et al.(2010) using Pooled Mean Group on eighty-eight countries; spanning from 1960-2005, show a positive long run relationship between trade openness and financial development; albeit, coexistence of negative short run coefficients.

A number of studies have been focused exclusively on Africa in the investigation of this relationship; albeit, 'growth' oriented for the most part. Such are the likes of Mbabazi et al. (2008), whom, via cross-section and panel econometric techniques, investigate the link between growth, inequality and openness from forty-four sub-Saharan African(SSA) countries on data spanning from 1970-95. Their results provide evidence of a positive association between openness and growth. Kandiero and Chitiga(2003) probe into linkages between openness and Foreign Direct Investment(FDI) in the continent and discover FDI to GDP responds well to increased openness for the economy in general and the service sector in particular. Suffice here to mention that, FDI: with respect to Lane and Milesi-Ferreti (2006), is an appreciator of financial openness. Thus, in a nutshell shell, their conclusion could be revised as; trade account openness lead to capital account openness; in other words, trade openness breeds financial openness.

In this paper, our concern will be to investigate the effects of trade (financial) openness on the financial intermediary sector development of selected African countries. In plainer terms, we shall seek to discover what impact, opening-up the goods and services markets in the continent, has had on finance. Our motivation for this line of research is embedded on the facts that: (1) we didn't find existing literature dwelling directly on the

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<sup>2</sup> "Interaction" as defined by Rajan and Zingales (2003). In our robustness test, we shall use First Principal Components from Principal Components Analysis as a form of interaction.

subject matter; (2) beyond this objective perspective, investigating this link in an exclusively African context, could be desirous of examination for policy making; amid current debates on globalization, free trade and poverty.

## 2. DATA and METHODOLOGY

### 2.1 Data

**Table 1: Data collection summary**

	Definition of Proxy and( source)	Sign of Proxy	Justification of choices	Usage in Literature
Financial Development (FD)	Private Credit by deposit money banks on GDP (FDSB).	PCRgdp	These indicators from the FDSB have been widely acclaimed and used in recent literature. Among available proxies, these are chosen based on data availability. For the control variables; GDPpcg also helps to access welfare impact. We also introduce complimentary indicators for control <sup>3</sup> .	Baltagi et al. (2009), Hanh(2010)
	Liquid Liabilities on GDP(FDSB)	LLgdp		Hanh(2010), Gries et al. (2009)
Financial Openness (FO)	Foreign Direct Investment on GDP(ADI)	FDIgdp		Lane and Milesi-Ferreti (2006), Baltagi et al. (2009), Hanh(2010)
	Gross Private Capital Flows on GDP(ADI)	PCFgdp		
Trade Openness(TO)	Imports + Exports on GDP(ADI)	IXgdp		Hanh(2010)
Control Variable(s)	GDP per capita growth(ADI)	GDPpcg		

FDSB: Financial Development and Structure Database. ADI: African Development Indicators.

<sup>3</sup> For instance, in a model where Financial Openness is the dependent variable; in estimating PCFgdp, FDIgdp is used as a control variable and vice-versa. This also applies to Financial Development regressions.

## 2.2 Methodology

### 2.2.1 Principal Component Analysis (PCA)

**Table 2: Derivation of Indexes (Financial Development Index and Financial Openness Index)**

Principal Components	Indexes	Correlation	Eigen Value	P.C%	Component Matrix	
Financial Development	FinDIndex	0.812	1.812	90.65%	LLgdp	PCRgdp
					0.707	0.707
Financial Openness	FinOIndex	0.977	1.977	98.87%	PCFgdp	FDIgdp
					0.707	0.707

PC: Principal Component

We use PCA to derive two indexes for F.D and T.O. This is done by reducing the data set dimension while retaining as much initial information as possible. Based on Kaiser 1 criterion(Kaiser, 1960), we're able to retain only the first Principal Components(PC) that reflect 90.65% and 98.87% of total variation in F.D and T.O proxies, respectively. This indexes (aka PCs) will serve for robustness tests upon empirical analysis.

### 2.2.2 Unit root tests

As illustrated by tables 3 and 4, we employ Levin, Lin and Chu (LLC-2002) and Im, Pesaran and Shin (IPS-2003) panel unit root tests, to investigate the stationary properties of our data at both level and first difference series. In respective cases, when there's exhibition of unit root at level series: absence of 'stationarity:  $I(0)$ ', we endeavor to further investigate if the series is integrated in the first order:  $I(1)$ . While the LLC test is a homogenous one that assumes a common unit root for all cross sections (and therefore within variation), the IPS test is based on heterogeneous unit roots (between variation). Suffice to mention here that, both tests are first generational unit root tests that have 'cross sectional independence' as premise. We assume cross sectional independence because; our proxies are macroeconomic indicators from countries with independent economic policies. Beyond this truism, the absence of a common monetary union further boosts our justification. We avoid elucidating mechanics of

these tests because; they're widely used and constitute just an exploratory side of our analysis. From results presented on tables 3 and 4, only LLgdp and PCRgdp are stationary at first difference. In the conflict of interest between LLC and IPS over if, PCRgdp is integrated at level series or first difference, we base our decisions on the later test, because in the former (LLC), the alternative hypothesis of autoregressive parameter being less than one is stronger than the null (all autoregressive coefficients equal zero). Since unit root tests are autoregressions processes, optimal lag selection is crucial for efficiency of results. Goodness of fit is ensured by the Akaike Information Criterion (AIC) because, as shown by Khim and Liew(2004), when the number of observations are below 60, AIC most optimally specifies which number of lags produce a model that fits the data structure. However, when observations exceed 60, the Hannan-Quin Criterion (HQC) is best. We therefore adopt AIC and HQC for IPS and LLC tests, respectively.

**Table 3: LLC Unit Root Test**

		IXgdp	FDIgdg	PCFgdp	LLgdp	PCRgdp	GDPpcg
Level	c	-2.788***	-5.517***	-4.267***	0.696	-2.451***	-11.79***
	ct	-5.173***	-7.043***	-6.441***	-0.289	-1.401***	-11.95***
First difference	c				-9.933***		
	ct				-9.108***		

\*, \*\*, \*\*\* denote significance at 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.

**Table 4: IPS Unit Root Test**

		IXgdp	FDIgdg	PCFgdp	LLgdp	PCRgdp	GDPpcg
Level	c	-1.736***	-5.609***	-4.717***	0.336	0.207	-11.96***
	ct	-4.001***	-5.283***	-5.343***	1.285	-0.425	-11.05***
First difference	c				-10.01***	-6.744***	
	ct				-7.351***	-5.121***	

\*, \*\*, \*\*\* denote significance at 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.



### 2.2.3 Model specification tests

By virtue of Hausman(H) and Breusch Pagan(BP) tests, we're able to determine if, specific cross sectional effects, affect estimators or not(fixed or random effect) and whether variance of residuals affect independent variables; respectively. While the null hypothesis of H-test argues for a random effect model (both estimators are consistent and only the constant is efficient), the BP equivalent, assumes homoscedasticity. As indicated on table 5, we adopt for instance 'Generalized Least Squares with Fixed Effect(GLS with FE)' because, cross sectional effects play a role in the outcome of estimators and, variance of residuals is not constant(second column for example). For 'Ordinary Least Squares with Random Effect (OLS with RE)' as model, the contrary is evident: homoscedasticity and absence of consistency in constant estimator (fourth column).

**Table 5 : Panel Model Specification**

Model Specification	Dependent Variables				
	Financial Openness		Trade Open.	Financial Development	
Tests	FDI <sub>gdp</sub>	PCF <sub>gdp</sub>	IX <sub>gdp</sub>	d LL <sub>gdp</sub>	d PCR <sub>gdp</sub>
Hausman T.	23.85***	20.58***	14.29**	6.88	32.12***
Breusch P. T.	108.94***	122.29***	2321.4***	0.93	15.16***
Model	GLS with FE	GLS with FE	GLS with FE	OLS with RE	GLS with FE

Breusch Pagan and Hausman tests all follow a chi-square distribution. \*, \*\*, \*\*\* denote significance levels at 10%, 5% and 1% respectively. GLS: Generalized Least Squares. OLS: Ordinary Least Squares. FE: Fixed Effect.

### 2.2.4 Model Formulation

Let's consider the following equations :

$$FDI_{it} = \gamma_{10i} + \gamma_{11}PCR_{it} + \gamma_{12}LL_{it} + \gamma_{13}IX_{it} + \gamma_{14}PCF_{it} + \gamma_{15}GDPpcg_{it} + \varepsilon_{1it} \quad (1)$$

$$PCF_{it} = \gamma_{20i} + \gamma_{21}PCR_{it} + \gamma_{22}LL_{it} + \gamma_{23}IX_{it} + \gamma_{24}FDI_{it} + \gamma_{25}GDPpcg_{it} + \varepsilon_{2it} \quad (2)$$

$$LL_{it} = \gamma_{30i} + \gamma_{31}PCF_{it} + \gamma_{32}FDI_{it} + \gamma_{33}IX_{it} + \gamma_{34}PCR_{it} + \gamma_{35}GDPpcg_{it} + \varepsilon_{3it} \quad (3)$$

$$PCR_{it} = \gamma_{40i} + \gamma_{41}PCF_{it} + \gamma_{42}FDI_{it} + \gamma_{43}IX_{it} + \gamma_{44}LL_{it} + \gamma_{45}GDPpcg_{it} + \varepsilon_{4it} \quad (4)$$

$$IX_{it} = \gamma_{50i} + \gamma_{51}PCF_{it} + \gamma_{52}FDI_{it} + \gamma_{53}PCR_{it} + \gamma_{54}LL_{it} + \gamma_{55}GDPpcg_{it} + \varepsilon_{5it} \quad (5)$$

$$FinDIndex_{it} = \gamma_{60i} + \gamma_{61}FinOIndex_{it} + \gamma_{62}IXgdp_{it} + \varepsilon_{6it} \quad (6)$$

$$FinOIndex_{it} = \gamma_{70i} + \gamma_{71}FinDIndex_{it} + \gamma_{72}IXgdp_{it} + \varepsilon_{7it} \quad (7)$$

$$IXgdp_{it} = \gamma_{80i} + \gamma_{81}FinOIndex_{it} + \gamma_{82}FinDIndex_{it} + \varepsilon_{8it} \quad (8)$$

With:  $i = 1, 2, \dots, 29$  countries; over time  $t = 1, 2, \dots, 20$ ; IX is same as IXgdp. But for variables in equations 6, 7 and 8, and GDPpcg; all proxies are on GDP (see table 1). While the first five 5 equations are initial/original models, the last three emanating from principal component analysis are robustness tests: in the nutshell the last three check the first five.

### 3. EMPIRICAL ANALYSIS

#### 3.1 Empirical Results

**Table 6: Trade Openness, Financial Openness and Financial Development**

Independent Variables	Dependent Variables				
	Financial Openness(FO)		Trade O(TO)	Financial Development(FD)	
	FDIgdp	PCFgdp	IXgdp	d_LLgdp	d_PCRgdp
IXgdp	-0.97(-1.55)	1.96(3.07)***	---	0.013(0.25)	-0.005(-0.46)
FDIgdp	---	0.98(80.02)***	-0.005(-1.55)	0.000(0.49)	-0.001(-1.87)*
PCFgdp	0.94(80.02)***	---	0.010(3.07)***	-0.000(0.57)	0.001(1.61)
d_LLgdp	-0.79(-0.38)	0.55(0.25)	0.18(1.21)	---	0.37(11.19)***
d_PCRgdp	-4.89(-1.87)*	4.29(1.61)	-0.09(-0.46)	0.60(12.93)***	---
GDPpcg	-0.003 (-0.29)	-0.002(-0.16)	0.001(1.17)	-0.001(-3.2)***	-0.000(-0.79)
constant	0.52(2.11)**	-0.72(-2.89)***	0.38(87.76)***	0.002(1.05)	0.004(1.05)
Adjusted.R <sup>2</sup>	0.958	0.958	0.881		0.316

\*, \*\*, \*\*\* denote significance levels at 10%, 5% and 1% respectively. R<sup>2</sup>: Coefficient of determination.

Results as presented on table 6 suggest that: (1) private domestic credit (FD) decreases foreign domestic investment (TO) and vice-versa; (2) private capital flows (F.O) improve trade openness and vice-versa; (3) growth in GDP per capita negatively affects liquidity liabilities.

### 3.2 Robustness tests

**Table 7 : Presentation of robustness test results**

Independent Variables	Dependent Variables		
	Financial Openness FinOIndex	Trade Openness IXgdp	Financial Development FinDIndex
FinOIndex	---	0.18(6.05)***	-0.009(-1.43)
IXgdp	3.95(6.05)***	---	0.09(0.09)
FinDIndex	-0.46(-1.43)	0.02(0.95)	---
GDPpcg	-0.02(-1.83)*	0.000(1.13)	-0.007(-4.07)***
Constant	-1.53(5.81)***	0.39(107.7)***	-0.001(-0.035)
Adjusted.R <sup>2</sup>	0.383	0.880	0.114
Model Used	H: 10.72** B.P: 149.1*** GLS with FE	H: 13.02*** B.P: 2346.72*** GLS with FE	H:13.86*** B.P: 38.11*** GLS with FE

\*, \*\*, \*\*\* denote significance levels at 10%, 5% and 1% respectively. R<sup>2</sup>: Coefficient of determination, H: Hausman Test, B.P: Breusch Pagan, GLS: Generalised Least Squares.

Based on robustness tests from aggregated variables (in reduced dimension) from PCA: (1) trade openness leads to financial openness and vice versa; (2) financial development has no significant link with any indicator of openness and vice-versa; (3) improvement in welfare decreases financial openness and development. The hypothesis of financial openness (via foreign direct investment) decreasing financial development (through private credit) is not confirmed from robustness check, probably because; its significance level is 10%. Thus, basing our analysis entirely on 1% and 5% significance levels, we can firmly established that, for sampled countries; opening of trade accounts will leads to increase in financial accounts and vice-versa. These significant results confirm those of Kandiero and Chitiga (2003), Baltagi et al. (2009) and Hanh (2010). However, detail interpretation suggest: trade openness leads more to financial openness; in our case the trade openness elasticity of financial openness(3.95) is about twenty times higher than the financial openness elasticity of trade openness(0.18). Our robustness checks also confirm failure of financial development to breed openness. What is quite puzzling is the fact that, growth per capita only decreases financial openness and development. Some explanation to this could be: (1) unequal distribution of national wealth, with the rich investing much of their wealth abroad; (2) high degree of

corruption associated with GDP growth, where-by; a great part of siphoned funds is deposited abroad in an attempt to evade detection.

For policy implication, sampled countries should be aware of the irresponsiveness of financial development to openness and vice-versa. Given that, from common sense and to some extent economic theory, we cannot completely rule-out the finance led openness nexus, we suggest further findings on the African continent be based on: (1) distinction between closed and open countries; (2) classification of low and middle income countries;(3) verification if interaction of openness indicators as defined by of Baltagi et al. (2009), is the prime and only condition for financial development: as was the basis and frame work of Rajan and Zingales (2003).

#### **4. CONCLUSION**

Our modest contribution to existing literature on the openness-financial development nexus has confirmed the existence of bi-directional causality between openness indicators (financial and trade). However we fail to find any significant link between financial development and both qualities of openness. It is our earnest hope that, more empirical studies be tilted towards recommendations for future research outlined afore.

## Appendix A: List of African Countries

Regions	Countries
East Africa	Burundi, Kenya, Rwanda, Tanzania, Uganda, Sudan.
West Africa	Côte d'Ivoire, Ghana, Senegal, Sierra Leon, Mali, Togo, Nigeria.
Central Africa	Congo Republic, Gabon, Cameroon.
North Africa	Egypt, Morocco, Tunisia.
Southern Africa	Swaziland, South Africa, Angola, Zambia, Botswana, Mauritius, Madagascar, Mozambique, Lesotho, Malawi.

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
PCFgdp	ADI	% GDP	2.63	5.08	-9.10	42.49	22.23	3.96	556
LLgdp	FDS	% GDP	0.29	0.19	0.04	0.97	2.07	1.67	550
PCRgdp	FDS	% GDP	0.17	0.16	0.011	0.75	1.84	1.62	547
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

IXgdp : Import plus Export on GDP, FDIgdp :Foreign Direct Investment, PCFgdp:Private Capital Flows on GDP, LLgdp: Liquid Liabilities on GDP, PCRgdp: Private Credit on GDP, GDPpcg: GDP per capita growth, M.Unit: Measurement Unit, S.D: Standard Deviation, Min:Minimum , Max:Maximum, Kurt:Kurtosis, Skew: Skewness, Observ: Observations. PCA: Principal Component Analysis, ADI : African Development Indicators, FDS :Financial Development and Structure Database.

## Appendix C: Correlation Matrix

	IXgdp	FDIgdp	PCFgdp	LLgdp	PCRgdp	GDPpcg
IXgdp	1.000					
FDIgdp	0.469	1.000				
PCFgdp	0.462	0.977	1.000			
LLgdp	0.129	-0.048	-0.032	1.000		
PCRgdp	0.062	-0.113	-0.077	0.812	1.000	
GDPpcg	0.075	0.046	0.035	0.084	0.021	1.000

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