# Financial development, trade openness and financial openness: do income levels matter for developing countries?

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# Abstract

Using a panel of 29 African middle and low income countries with data spanning from 1988 to 2007, we analyze linkages between openness and financial intermediary development when income levels matter. Main findings are four: firstly, openness in the last two decades has not been the effect of growth and welfare, but of structural adjustment policies imposed by the IMF and World Bank; secondly, but for the positive impact of trade openness on the financial depth of low income countries, openness in sampled countries fail to bring about financial intermediary development; thirdly, financial openness brings trade openness for both income levels, but the reverse is true only for middle income countries; lastly, low income countries will benefit more from trade openness through financial deepening and financial openness than their middle income counterparts.

# 1. INTRODUCTION

Globalization and free trade have marked the last decades. At the turn of the 80's, structural adjustment policies imposed by the International Monetary Fund (IMF) and the World Bank (WB) were common place in developing countries. Free-market programs that were governed by privatization, deregulation, and reduction of trade barriers were presented as a cure to poverty and underdevelopment. The measures which rotated around liberalization were aimed at reducing dependence of poor countries on foreign debt aid and debt. Opening-up of capital and trade accounts in a bid to invite development became policy in many African countries. Two decades on, the concern of knowing how those measures put in place have reduced debt dependence through financial development becomes imperative. It is therefore the goal of this study to probe into effects of such measures from a finance stand-point. By the same token, we also seek to evaluate the other way round; that is, how financial development(F.D) could affect openness. Mindful, literature has addressed this issue substantially; we deviate from mainstream methodology by basing our study on income levels so as to capture much policy implications. More so, the debate on deepening gaps between the rich and poor over such policies justifies our need to use welfare levels as an analysis criterion. We therefore seek to establish linkages between openness and financial development when income levels matter.

# 2. LITERATURE REVIEW

## 2.1 Openness-growth literature

The openness led growth nexus has much been covered in literature. Harrison (1994) using cross country and time series analysis of developing countries, establish a positive association between them. Lloyd and MacLaren (2000) in a study on Asian countries show,

economies that opened early experienced faster growth than those that did late. One very striking historic case is a study by Buch and Toubal (2009) dedicated to the impact of the fall of the Berlin wall (openness) on growth. Findings there-from indicate, openness leads to growth per capita and geographic variables also play a role. This thesis is confirmed by a more recent literature from Chandran and Munusamy (2009). Using the Granger causality methodology, they establish that, openness leads to growth in Malaysia. One very important concern we could draw from their work is the fact, pin-pointing causality from specific sector analysis is more helpful in policy making.

Contrary to mainstream literature on openness-led-growth hypothesis, some studies have found the opposite. Yanikkaya (2002), show that trade liberalization does not necessarily impact positively on growth. Using a plethora of openness measures for cross section countries spanning from three decades, he provides evidence that, trade barriers could be positively associated with growth and thus questions the openness-growth nexus.

Regarding openness-growth transmission channels, Chang et al. (2009) conclude that, growth effects of openness could be more significant if certain complementary reforms are taken. Some structural characteristics that could improve welfare include: investment in education, financial depth, public infrastructure, labor market flexibility, inflation stabilization and governance, ease of firm exit and ease of firm entry.


**2.2 Openness-finance literature**

In presenting a case for liberalization , Dornbusch (1992) urges developing countries to free service-trade and undertake regional agreements in view of achieving economic development(aka financial development). He also cautions that these trade restrictions be lifted pace-wise with growth and development. Using a panel of twenty-four countries, Rajan and Zingales(2003), establish that, a combination of trade and account openness is prime for

financial development; especially financial market development when cross-border capital flows are free. Baltagi et al. (2009) verify the hypothesis of Rajan and Zingales (2003) from a bank sector development view. Their findings suggest, both financial openness and trade openness can independently lead to financial development. In a more recent literature, Hanh(2010) see with Baltagi et al., and further shows the existence of bi-directional causality between openness(trade and financial) and F.D. From a long run perspective, most recently, Kim et al. (2010), using Pooled Mean Group on eighty-eight countries with data spanning from 1960 to 2005 , establish a positive long run link between trade openness and F.D. They however stressed the coexistence of negative short run coefficients.

As concerns openness-finance literature that has been focused exclusively on Africa, Mbabazi et al.(2008) use cross section and panel econometric techniques to investigate the link between growth, inequality and openness from forty-four sub-Saharan African(SSA) countries on data varying from 1970-95. Results show a positive link between openness and growth. The relationship between Foreign Direct Investment (FDI) and openness in the continent was earlier investigated by Kandiero and Chitiga (2003). Their results show, FDI responds well to increased trade openness for the economy in general and service sector in particular. Following Milesi-Ferreti (2006), FDI is an indicator of financial openness. Thus results of Kandiero and Chitiga (2003) could be reformulated as 'trade openness brings financial account openness'.


## 2.3 Why income levels?

Simply studying the relation between openness and finance without some specificities have less policy implications. This has been pointed out in literature by Chandran and Munusamy (2009) on the use of sector analysis. Also, Buch and Toubal (2009) address the influence of geographical factors on openness effect. Per capita income in most African

countries is lamentable and as such, with respect to ongoing debates on deepening gaps between the rich and poor and  consequences of trade liberalisation on  poor economies, the need to asses poor(low income) and average per capita(middle income) countries becomes even more crucial.

Our present work will deviate from literature by: (1) specifying our analysis at incomes levels for better policy implications (corollary of suggestion by Chandran and Munusamy, 2009); (2) using indexes from principal component analysis to control for interaction of variables ;  (3) making use of data spanning from 1988 to 2007 to capture effects of structural adjustment policies imposed on African countries in the mid 1980's; (4) controlling with growth and growth per capita to capture the 'growth-led-openness/finance' nexus.


## 3. DATA

Our limitation to 29 countries(see appendix A) is based on data availability; with 16 low income countries(LICs) and 13 middle income countries(MICs). Data ranges from 1988 to 2007 so as to capture as much as possible the effects of structural adjustment policies that cropped-up in the late 80's.

### 3.1 Synthesis of data collection

Table 1 below presents a summary of data collection with definition of variables and corresponding proxies, signs ,sources as well as usages in recent openness literature.

**Table 1: Summary of data collection**

| Variables | Definition of Proxies | Signs of Proxies | Sources | Usages in Openness literature/ Justifications |
|---|---|---|---|---|
| Financial Development (FD) | Liquid liability on GDP | LLgdp | FDSD | Hanh(2010), Gries et al.(2009) |
| | Private domestic credit on GDP | PCRgdp | FDSD | Baltagi et al. (2009), Hanh(2010) |
| | F.D Index | Findev | PCA | For robustness checks |
| Financial Openness(FO) | Foreign Direct Investment on GDP | FDIgdp | ADI | Lane and Milesi-Ferreti (2006), Baltagi et al. (2009), Hanh(2010) |
| | Gross Private Capital Flows on GDP | PCFgdp | ADI | |
| | F.O Index | Finop | PCA | For robustness checks |
| Trade Openness(TO) | Sum of Exports plus Imports on GDP | XIgdp | ADI | Hanh(2010) |
| Control Variables | GDP per capita growth | GDPpcg | ADI | Used to verify the growth-led-finance/openness nexus |
| | GDP growth | GDPg | ADI | Used to verify the growth-led-finance/openness nexus |
| | Foreign Direct Investment on GDP | FDIgdp | ADI | Used in *Finop* and Private credit models |
| | Gross Private Capital Flows on GDP | PCFgdp | ADI | Used in *Finop* and Foreign Direct Investment models |
| | Liquid liabilities on GDP | LLgdp | FDSD | Used in *Findev* and Private credit models |
| | Private Domestic Credit on GDP | PCRgdp | FDSD | Used in *Findev* and Liquid liability models |

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

Having synthesized our data collection framework, it is worth while laying some emphasis on chosen variables.

**3.2 Elucidation of selected variables**

*3.2.1 Liquid liabilities (LL/GDP)*

Liquid liabilities to GDP are a traditional indicator of financial depth. First used by King and Levine (1993). It is the sum of currency plus demand and interest bearing liabilities in banks and other financial intermediaries divided by GDP: *M3/GDP*. While it is generally defined as *M3/GDP*, for under developed and developing countries where financial markets

are not well developed, this proxy is limited to Money and quasi money and a percentage of GDP: *M2/GDP*. Therefore, we have adopted the later measure for our study. In recent finance-openness literature, this indicator has been used by Gries et al. (2009) and Hanh (2010).

### *3.2.2 Private domestic credit (PCR/GDP)*

A credit allocation indicator as a measure of F.D represents private credit by deposit money banks. In order words, this represents private credit given domestic operators by domestic banks. This is a standard indicator in finance-growth literature, with countries that have higher levels of it experiencing faster growth rates and poverty reduction (Beck et al., 2000). In recent finance/openness literature, this measure has been applied by Baltagi et al. (2009) and Hanh (2010).

### *3.3.3 Financial development index (Findev)*

A reduced dimension of a combination of F.D proxies, derived from PCA is essential for robustness checks. A recent application of this in financial deepening-openness literature can be found in Gries et al. (2009).

### *3.3.3 Foreign direct investment (FDI/GDP)*

This is standard measure of financial openness in literature. Lane and Milesi-Ferreti (2006), Baltagi et al. (2009), and Hanh (2010) have applied it most recently.

### *3.3.4 Private capital flows (PCF/GDP)*

Private capital flows is synonymous to FDI. As shown on table 1, its usage as a proxy for financial openness is common place in literature.

*3.3.5 Financial openness index (Finop)*

Like the F.D index(*findev*), we also derive a financial openness principal component for the purpose of robustness checks.

*3.3.6 Export plus Imports on GDP(XIGDP)*

The most widely used indicators of trade openness are exports on GDP(*X/GDP*), imports on GDP (*I/GDP*) or exports plus imports on GDP (*XIGDP*). While the first two are somewhat one-sided measures of openness, the last is a generalized measure. *XIGDP* is the preferable measure in literature; which we shall adopt.

*3.3.7 Control variables*

Two main control variables are GDP per capita growth and GDP growth. These are chosen to verify the growth-led-finance/openness nexus. For each regression, we shall use two control variables; one based on GDP and the other an alternative or synonym of the dependent variable to be regressed[1].

## 4. METHODOLOGY and EMPIRICAL ANALYSIS

## 4.1 Principal Component Analysis (PCA)

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

| Principal Components | Index | Correlation | Eigen Value | P.C% | Component Matrix | |
|---|---|---|---|---|---|---|
| Financial Development | | | | | LLgdp | PCRgdp |
| | Findev | 0.812 | 1.812 | 90.65% | 0.707 | 0.707 |
| Financial Openness | | | | | PCFgdp | FDIgdp |
| | Finop | 0.977 | 1.977 | 98.87% | 0.707 | 0.707 |

PC: Principal Component

As summarized on table 2. The goal of PCA is to reduce the dimensionality of chosen variables while retaining as much initial information (variation) as possible. We stop at

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[1] For instance, in regressing Liquid liabilities on GDP (endogenous variable), we shall use another indicator of financial development as control variable (private credit on GDP).

choosing first principal components based on Kaiser 1 criterion (Kaiser, 1960). Eigen values of resulting indexes are above one and their corresponding initial variations are 90.65% and 98.87% for F.D and F.O respectively. This implies our new indexes represent more than 90% of information in combined indexes.

## 4.2 Unit root tests

Since our goal is use a parametric panel method (OLS or GLS) that assumes a given functional distribution, testing for absence of unit roots is imperative. There are many panel unit root tests. As shown by Hanh (2009), the most widely used for macro economic variables are the Levin, Lin and Chu (LLC, 2002) and Im, Pesaran and Shin (IPS, 2003). While the first assumes the presence of a common unit root as null hypothesis (within variation), the alternative hypothesis of the second argues for the absence of individual unit roots (between variations).In our study, we shall test every series at level for stationarity: I(0) or absence of unit root. When a test at level series exhibit unit root, we shall difference the series once and performed another test at first difference: I(1). In case of a conflict of interest between both types of tests (as it is the case of PCRgdp), for benefit of doubt, we shall based our decision on the IPS test because the alternative hypothesis of the LLC test is too strong. Another very important point to take into account is the fact that, unit root tests are autoregressive processes. Therefore, the right choice of optimal lags is crucial for goodness of fit (so that unit root model fits series data structure). As pointed out by Khim and Liew(2004), when observations are below 60, the AIC(Akaike Information Criterion) and Final Prediction Error(FPE) are best at specifying optimal lags. However, when observations exceed 60 and are more or less 120, the HQC (Hannan-Quinn Criterion) is best. We shall therefore adopt HQC and AIC for unit root test specification in LLC and IPS tests respectively. Results are summarized on tables 3 and 4; they show, but for F.D indicators, all variables have stationary distributions at level series.

## Table 3: LLC Panel Unit root test

|       |     | Findev | Finop | XIgdp | LLgdp | PCRgdp | PCFgdp | FDIgdp | GDPpcg | GDPg |
|-------|-----|--------|-------|-------|-------|--------|--------|--------|--------|------|
| Level | c   | 0.168  | -4.74*** | -2.78*** | 0.696 | -2.45*** | -4.26*** | -5.51*** | -11.79*** | -12.48*** |
|       | ct  | -1.30* | -7.22*** | -5.17*** | -0.289 | -1.40*** | -6.44*** | -7.04*** | -11.95*** | -12.41*** |
| First diff. | c | -10.3*** |   |   | -9.93*** |   |   |   |   |   |
|       | ct  | -8.30*** |   |   | -9.10*** |   |   |   |   |   |

*,**,*** denote significance levels 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 Panel Unit root test

|       |     | Findev | Finop | XIgdp | LLgdp | PCRgdp | PCFgdp | FDIgdp | GDPpcg | GDPg |
|-------|-----|--------|-------|-------|-------|--------|--------|--------|--------|------|
| Level | c   | 1.207  | -4.97*** | -1.73*** | 0.336 | 0.207 | -4.71*** | -5.60*** | -11.9*** | -12.2*** |
|       | ct  | 0.20   | -5.45*** | -4.00*** | 1.285 | -0.425 | -5.34*** | -5.28*** | -11.0*** | -11.2*** |
| First diff. | c | -10.2*** |   |   | -10.0*** | -6.74*** |   |   |   |   |
|       | ct  | -5.92*** |   |   | -7.35*** | -5.12*** |   |   |   |   |

*,**,*** denote significance levels at 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.


## 4.3 Model specification tests

Panel data model specification requires a series of preliminary tests. The question of if we should use OLS or GLS on the one hand and whether the least squares would be with fixed or random effects on the other hand, can be addressed with Breusch-Pagan(BP) and Hausman(H) tests respectively. While the null hypothesis of BP test argues for homoscedasticity, that of Hausman represents estimation with random effects. For example where both tests are insignificant, we adopt OLS estimation with random effects. In case both are significant the resulting model is a GLS with fixed effects. Detailed accounts of these tests for all three types of regressions are presented on tables 5, 6 and 7.


## Table 5: Model specification tests for Financial Development regressions

| Model Specification Tests | Dependent Variables(first difference) | | | | | |
|---|---|---|---|---|---|---|
|  | Initial Models | | | | Robustness checks | |
|  | d_LLgdp | d_LLgdp | d_PCRgdp | d_PCRgdp | d_Findev | d_Findev |
| Hausman T. | 15.56** | 15.46* | 10.66 | 7.30 | 14.91* | 18.62** |
| Breusch P.T. | 2.60 | 2.62 | 5.14** | 5.65** | 6.676*** | 3.59* |
| Model s Adopted | OLS with Fixed Effects | OLS with Fixed Effects | GLS with Random Effect | GLS with Random Effect | GLS with Fixed Effects | GLS with Fixed Effects |

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 Effects. R.E: Random Effects.

**Table 6: Model specification tests for Financial Openness regressions**

| Model Specification Tests | Dependent Variables(level) | | | | | |
|---|---|---|---|---|---|---|
| | Initial Models | | | | Robustness checks | |
| | FDIgdp | FDIgdp | PCFgdp | PCFgdp | Finop | Finop |
| Hausman T. | 22.02*** | 25.68*** | 21.65*** | 25.47*** | 22.02*** | 25.40*** |
| Breusch P.T. | 45.89*** | 82.15*** | 60.46*** | 88.02*** | 45.89*** | 87.86*** |
| Models Adopted | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects |

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

**Table 7: Model specification for Trade Openness regressions**

| Model Specification Tests | Dependent Variables(level) | | | | | |
|---|---|---|---|---|---|---|
| | Initial Models | | | | Robustness tests | |
| | XIgdp | XIgdp | XIgdp | XIgdp | XIgdp | XIgdp |
| Hausman T. | 27.71*** | 22.70*** | 24.85*** | 2562.8*** | 23.33*** | 28.80*** |
| Breusch P.T. | 2436.92*** | 2550.58*** | 2468.99*** | 20.58*** | 2454.45*** | 2548.84*** |
| Models Adopted | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects | GLS with Fixed Effects |

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

## 4.4 Model formulation

Let's consider the following binary multivariate dummy models:

*4.4.1 Financial development models*

$$\Delta LL_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}FDI_{it} + \gamma_{2m}M_{it}FDI_{it} + \gamma_{3l}L_{it}PCR_{it} +$$
$$\gamma_{3m}M_{it}PCR_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it} \tag{1}$$

$$\Delta LL_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}PCF_{it} + \gamma_{2m}M_{it}PCF_{it} + \gamma_{3l}L_{it}PCR_{it} +$$
$$\gamma_{3m}M_{it}PCR_{it} + \gamma_{4l}L_{it}GDPg_{it} + \gamma_{4m}M_{it}GDPg_{it} + \varepsilon_{it} \tag{2}$$

$$\Delta PCR_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}FDI_{it} + \gamma_{2m}M_{it}FDI_{it} + \gamma_{3l}L_{it}LL_{it} +$$
$$\gamma_{3m}M_{it}LL_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it} \tag{3}$$

$$\Delta PCR_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}PCF_{it} + \gamma_{2m}M_{it}PCF_{it} + \gamma_{3l}L_{it}LL_{it} + \gamma_{3m}M_{it}LL_{it} + \gamma_{4l}L_{it}GDPg_{it} + \gamma_{4m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(4)

$$\Delta Findev_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}FDI_{it} + \gamma_{2m}M_{it}FDI_{it} + \gamma_{3l}L_{it}PCR_{it} + \gamma_{3m}M_{it}PCR_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it}$$

(5)

$$\Delta Findev_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}PCF_{it} + \gamma_{2m}M_{it}PCF_{it} + \gamma_{3l}L_{it}LL_{it} + \gamma_{3m}M_{it}LL_{it} + \gamma_{5l}L_{it}GDPg_{it} + \gamma_{5m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(6)

### 4.4.2 Financial openness models

$$FDI_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}PCF_{it} + \gamma_{2m}M_{it}PCF_{it} + \gamma_{3l}L_{it}PCR_{it} + \gamma_{3m}M_{it}PCR_{it} + \gamma_{4l}L_{it}GDPg_{it} + \gamma_{4m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(7)

$$FDI_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}PCF_{it} + \gamma_{2m}M_{it}PCF_{it} + \gamma_{3l}L_{it}LL_{it} + \gamma_{3m}M_{it}LL_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it}$$

(8)

$$PCF_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}FDI_{it} + \gamma_{2m}M_{it}FDI_{it} + \gamma_{3l}L_{it}PCR_{it} + \gamma_{3m}M_{it}PCR_{it} + \gamma_{4l}L_{it}GDPg_{it} + \gamma_{4m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(9)

$$PCF_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}FDI_{it} + \gamma_{2m}M_{it}FDI_{it} + \gamma_{3l}L_{it}LL_{it} + \gamma_{3m}M_{it}LL_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it}$$

(10)

$$Finop_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}PCF_{it} + \gamma_{2m}M_{it}PCF_{it} + \gamma_{3l}L_{it}PCR_{it} + \gamma_{3m}M_{it}PCR_{it} + \gamma_{4l}L_{it}GDPg_{it} + \gamma_{4m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(11)

$$Finop_{it} = \gamma_0 + \gamma_{1l}L_{it}XI_{it} + \gamma_{1m}M_{it}XI_{it} + \gamma_{2l}L_{it}FDI_{it} + \gamma_{2m}M_{it}FDI_{it} + \gamma_{3l}L_{it}LL_{it} + \gamma_{3m}M_{it}LL_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it}$$

(12)

### 4.4.3 Trade Openness models

$$XI_{it} = \gamma_0 + \gamma_{1l}L_{it}FDI_{it} + \gamma_{1m}M_{it}FDI_{it} + \gamma_{2l}L_{it}LL_{it} + \gamma_{2m}M_{it}LL_{it} + \gamma_{3l}L_{it}GDPpcg_{it} + \gamma_{3m}M_{it}GDPpcg_{it} + \varepsilon_{it}$$

(13)

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

(14)

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

(15)

$$XI_{it} = \gamma_0 + \gamma_{1l}L_{it}Finop_{it} + \gamma_{1m}M_{it}Finop_{it} + \gamma_{2l}L_{it}Findev_{it} + \gamma_{2m}M_{it}Findev_{it} + \gamma_{3l}L_{it}GDPg_{it} + \gamma_{3m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(16)

$$XI_{it} = \gamma_0 + \gamma_{1l}L_{it}FDI_{it} + \gamma_{1m}M_{it}FDI_{it} + \gamma_{2l}L_{it}Findev_{it} + \gamma_{2m}M_{it}Findev_{it} + \gamma_{4l}L_{it}GDPpcg_{it} + \gamma_{4m}M_{it}GDPpcg_{it} + \varepsilon_{it}$$

(17)

$$XI_{it} = \gamma_0 + \gamma_{1l}L_{it}Finop_{it} + \gamma_{1m}M_{it}Finop_{it} + \gamma_{2l}L_{it}LL_{it} + \gamma_{2m}M_{it}LL_{it} + \gamma_{3l}L_{it}GDPg_{it} + \gamma_{3m}M_{it}GDPg_{it} + \varepsilon_{it}$$

(18)

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, PCR, LL and PCF are all on GDP.

For ease in interpretation of estimators upon regression, parameters of the model in estimated form are represented as: constant, *li_XIgdp, mi_XIgdp, li_FDIgdp, mi_FDIgdp, li_PCFgdp, mi_PCFgdp, li_PCRgdp, mi_PCRgdp, li_LLgdp, mi_LLgdp, li_GDPpcg, mi_GDPpcg, li_GDPg, mi_GDPg, li_Finop, mi_Finop, li_Findev, mi_Findev.*

## 4.5 Empirical results

**Table 8: Regressions for Financial Development**

| Independent variables | Dependent variables(Models 1 to 6) | | | | | |
|---|---|---|---|---|---|---|
| | Initial models | | | | Robustness check models | |
| | ΔLLgdp | ΔLLgdp | ΔPCRgdp | ΔPCRgdp | ΔFindev | ΔFindev |
| constant | -0.01 | -0.007 | -0.004 | -0.003 | -0.077* | -0.152*** |
| | (-1.459 ) | (-1.048) | (-1.226) | (-0.994) | (-1.745) | (-2.884) |
| li_XIgdp | 0.040** | 0.039** | -0.002 | -0.003 | 0.128 | 0.003 |
| | (2.105) | (2.053) | (-0.230) | (-0.373) | (1.088) | (0.030) |
| mi_XIgdp | -0.009 | -0.012 | 0.000 | -0.000 | 0.044 | 0.003 |
| | (-0.410) | (-0.506) | (-0.011) | (-0.074) | (0.300) | (0.022) |
| li_FDIgdp | 0.001 | --- | 0.000 | --- | 0.004 | --- |
| | (1.135) | | (0.529) | | (0.840) | |
| mi_FDIgdp | -0.000 | --- | -0.000 | --- | -0.003 | --- |
| | (-1.082) | | (-1.325) | | (-1.54) | |
| li_PCFgdp | --- | 0.001 | --- | 0.000 | --- | 0.004 |
| | | (1.591) | | (0.954) | | (0.912) |
| mi_PCFgdp | --- | -0.000 | --- | -0.000 | --- | -0.002 |
| | | (-0.915) | | (-1.032) | | (-1.250) |
| li_LLgdp | --- | --- | 0.023 | 0.027 | --- | 0.760*** |
| | | | (1.362) | (1.503) | | (3.123) |
| mi_LLgdp | --- | --- | 0.028*** | 0.028*** | --- | 0.595*** |
| | | | (4.56) | (4.397) | | (3.452) |
| li_PCRgdp | 0.069* | 0.076** | --- | --- | 0.474** | --- |
| | (1.782) | (1.976) | | | (1.975) | |
| mi_PCRgdp | 0.033** | 0.032** | --- | --- | 0.381*** | --- |
| | (2.035) | (1.981) | | | (2.770) | |
| li_GDPpcg | -0.001*** | --- | -0.0005** | --- | -0.006 *** | --- |
| | (-3.293) | | (-1.996) | | (-3.234) | |
| mi_GDPpcg | -0.001** | --- | 0.0001 | --- | -0.004 | --- |
| | (-2.322) | | (0.404) | | (-1.554) | |
| li_GDPg | --- | -0.001*** | --- | -0.0004* | --- | -0.005*** |
| | | (-3.141) | | (-1.801) | | (-3.048) |
| mi_GDPg | --- | -0.001*** | --- | 0.000 | --- | -0.005 |
| | | (-2.743) | | (-0.166) | | (-1.751)* |
| Adj. R² | 0.065 | 0.068 | | | 0.115 | 0.133 |
| Fisher | 1.999*** | 2.053*** | n.a | n.a | 2.856*** | 3.177*** |

*,**,*** denote significance levels at 10%, 5% and 1% respectively. Adj.R²: Adjusted coefficient of determination. "mi_" represents middle income countries while "li_" shows low income countries. Values in bracket () are the t-statistics.

**Table 9: Regressions for Financial Openness**

| Independent variables | Dependent variables(Model 7 to 12) | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Initial models | | | | Robustness check models | |
| | FDIgdp | FDIgdp | PCFgdp | PCFgdp | Finop | Finop |
| constant | 0.248 | -0.162 | -0.366 | 0.020 | -0.699*** | -0.731*** |
| | (1.101) | (-0.645) | (-1.61) | (0.079) | (-22.09) | (-20.46) |
| li_XIgdp | 0.243 | -0.046 | 0.429 | 0.672 | 0.034 | 0.094 |
| | (0.324) | (-0.061) | (0.576) | (0.881) | (0.324) | (0.878) |
| mi_XIgdp | -0.930 | -1.161* | 1.92*** | 2.155*** | -0.130 | 0.299*** |
| | (-1.324) | (-1.650 ) | (2.70) | (3.031) | (-1.324) | (3.019) |
| li_FDIgdp | --- | --- | 1.02*** | 1.033*** | --- | 0.284*** |
| | | | (28.38) | (28.68) | | (56.43) |
| mi_FDIgdp | --- | --- | 0.979*** | 0.978*** | --- | 0.276*** |
| | | | (85.01) | (85.71) | | (173.4) |
| li_PCFgdp | 0.865*** | 0.861*** | --- | --- | 0.260*** | --- |
| | (26.53) | (26.63) | | | (56.88) | |
| mi_PCFgdp | 0.965*** | 0.966*** | --- | --- | 0.274*** | --- |
| | (85.90) | (86.71) | | | (174.0) | |
| li_LLgdp | --- | 2.27** | --- | -2.055* | --- | -0.286* |
| | | (2.009) | | (-1.77) | | (-1.772) |
| mi_LLgdp | --- | 1.806** | --- | -1.83** | --- | -0.254** |
| | | (2.193) | | (-2.183) | | (-2.174) |
| li_PCRgdp | 0.112 | --- | -0.410 | --- | 0.015 | --- |
| | (0.083) | | (-0.302) | | (0.083) | |
| mi_PCRgdp | 0.365 | --- | -0.254 | --- | 0.051 | --- |
| | (0.592) | | (-0.405) | | (0.592) | |
| li_GDPpcg | --- | 0.005 | --- | 0.000 | --- | 3.547 |
| | | (0.459) | | (0.014) | | (0.020) |
| mi_GDPpcg | --- | 0.008 | --- | -0.016 | --- | -0.002 |
| | | (0.577) | | (-1.069) | | (-1.065) |
| li_GDPg | 0.004 | --- | 0.001 | --- | 0.000 | --- |
| | (0.378) | | (0.104) | | (0.378) | |
| mi_GDPg | 0.004 | --- | -0.011 | --- | 0.000 | --- |
| | (0.310) | | (-0.785) | | (0.310) | |
| Adj. R² | 0.963 | 0.963 | 0.962 | 0.963 | 0.990 | 0.990 |
| Fisher | 402.64*** | 409.85*** | 398.94*** | 405.81*** | 1638.99*** | 1627.28*** |

*,**,*** denote significance levels at 10%, 5% and 1% respectively. Adj.R²: Adjusted coefficient of determination. "mi_" represents middle income countries while "li_" shows low income countries. Values in bracket () are the t-statistics.

**Table 10: Regressions for Trade Openness**

| Independent variables | Dependent variables(Models 13 to 18) | | | | | |
|---|---|---|---|---|---|---|
| | Initial models | | | | Robustness check models | |
| | XIgdp | XIgdp | XIgdp | XIgdp | XIgdp | XIgdp |
| constant | 0.334*** (20.76) | 0.331*** (20.52) | 0.376*** (36.06) | 0.419 *** (60.61) | 0.398*** (57.26) | 0.352*** (21.64) |
| li_Finop | --- | --- | --- | 0.045*** (4.672) | --- | 0.043*** (4.332) |
| mi_Finop | ---- | --- | --- | 0.016*** (5.049) | --- | 0.016*** (4.955) |
| li_FDIgdp | 0.009*** (3.304) | --- | --- | --- | 0.010*** (3.909) | --- |
| mi_FDIgdp | 0.004*** (4.739) | --- | --- | --- | 0.004*** (4.855) | --- |
| li_PCFgdp | --- | 0.009*** (3.497) | 0.009*** (3.805) | --- | --- | --- |
| mi_PCFgdp | --- | 0.004*** (5.14) | 0.004*** (5.137) | --- | --- | --- |
| li_LLgdp | 0.151 (1.605) | 0.173* (1.872) | --- | --- | --- | 0.163* (1.774) |
| mi_LLgdp | 0.175** (2.474) | 0.004*** (5.147) | --- | --- | --- | 0.179** (2.547) |
| li_PCRgdp | --- | --- | -0.049 (-0.424) | --- | --- | --- |
| mi_PCRgdp | --- | --- | 0.051 (0.955) | --- | --- | --- |
| li_Findev | --- | --- | --- | 0.061*** (3.905) | 0.063*** (3.999) | --- |
| mi_Findev | --- | --- | --- | -0.006 (-0.783) | -0.006 (-0.741) | --- |
| li_GDPpcg | -0.001 (-1.555) | --- | -0.001 (-1.581) | --- | -0.001 (-1.280) | --- |
| mi_GDPpcg | 0.000 (0.707) | --- | 0.001 (0.954) | --- | 0.001 (0.824) | --- |
| li_GDPg | --- | -0.001 (-1.572) | --- | -0.000 (-1.192) | --- | -0.001 (-1.544) |
| mi_GDPg | --- | 0.000 (0.519) | --- | 0.000 (0.607) | --- | 0.000 (0.527) |
| Adj. R² | 0.844 | 0.845 | 0.843 | 0.848 | 0.846 | 0.846 |
| Fisher | 93.41*** | 94.39*** | 92.72*** | 96.51*** | 94.96*** | 95.26*** |

*,**,*** denote significance levels at 10%, 5% and 1% respectively. Adj.R²: Adjusted coefficient of determination. "mi_" represents middle income countries while "li_" shows low income countries. Values in bracket () are the t-statistics.

## 4.6 Discussion

Results presented on tables 8, 9 and 10 could be summarized as follows:

*4.6.1 Financial development results.*

Table 8 indicates: (1) while trade openness increases liquid liabilities in low income countries, it is not significant for middle income countries; (2) trade openness does not affect

private credit development in sampled countries, irrespective of income levels; (3) financial openness has no impact on finance for both income levels; (4) surprisingly for both classes of income, welfare and growth seem to affect F.D negatively.

*4.6.2 Financial openness results*

From table 9 on financial openness regressions: (5) trade openness improves private capital flows only in MICs; (6) for both income levels, financial depth improves FDI but reduces private capital flows. However, financial depth reduces financial openness (with FDI and PCFs combined); (7) growth and welfare have no bearing on financial openness;

*4.6.3 Trade openness results*

Concerning effects on trade openness:(8) financial openness brings trade openness with the impact much higher in LICs than MICs; (9) financial depth improves trade openness in both cases, however the combined effect of both financial indicators is significant only for LICs; (10) trade openness is insensitive to growth and welfare.

*4.6.4 Comparison with recent openness literature*

Like Baltagi et al. (2009), we join Hanh(2009) in partially rejecting the hypothesis of Rajan and Zingales(2003) on simultaneous opening of trade and capital accounts as a precondition for financial development to take place in relatively closed economies. The absence of any significant link between growth and openness could to some extend confirm the caution Yanikkaya(2003) gave on the unambiguous establishment of a definite link between growth and liberalization. He even found that, in certain economies, trade restrictions were positively associated with growth. The point that liquid liabilities negatively impacts

financial openness is in view with Hanh(2009). Our findings on the link between both openness measures are also consistent with Baltagi et al. (2009) and Hanh(2009).

Concerning studies focused exclusively on Africa, our findings deviate from those of Kandiero and Chitiga (2003) who established that, opening of trade accounts leads to foreign investment. We found a positive association between trade accounts openness and private capital flows only in MICs; effects on FDI weren't significant. We account for this disparity in differences of data span. Their study was carried-out with data spanning from 1980 to 2001 and based on 51 African countries.

## 5. CONCLUSION

Our goal for this study has been to probe into linkages between finance and openness in selected African countries when income levels matter. As we have spelled-out in the discussion of findings above, an alarming discovery is that; growth and welfare have no effect on openness and negatively affect financial development: negative growth-finance nexus. An explanation to the financial linkage could be based on two points; firstly, concentration of wealth within a small percentage of the population, with most of the wealth deposited abroad; secondly, high corruption rate with a great part of siphoned GDP deposited abroad. More so, an elucidation of the insignificant growth linkage with openness could be captured from the perspective that, openness in the last two decades has been imposed by the IMF and World Bank and not growth-led. The absence a any link between growth and openness also suggests, the common unambiguous assumption of growth and welfare moving hand-in-glove with openness be treated with extreme caution.

The fact that for both income levels, trade openness has no impact on private domestic credit, and financial openness doesn't affect financial development is very worrying. This could set a precedence for sound testimony to the fact that, structural adjustment policies

based on trade liberalization and privatization which have marked the last two decades have neither improved domestic private credit nor ameliorated financial intermediary development. This affirmation is hypothetical and object of further research.

Lessons to be drawn for policy purposes are; (1)but for the positive impact of trade openness on the financial depth of low income countries, openness in sampled countries fail to bring about financial intermediary development; (2) growth and welfare fail to bring about financial development as well; (3) financial openness would lead to trade openness for both incomes level, but trade openness will lead to financial openness only in middle income countries; (4) financial depth should decrease financial openness but improve trade openness; (5) low income countries will benefit more from trade openness through financial deepening and financial openness than their middle income counterparts.

**Appendices**

Appendix A: List of African Countries

| Income Levels | Countries |
|---|---|
| Low Income | Burundi, Côte d'Ivoire, 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. |

Appendix B: Summary Statistics

| Variables | Source | M. Unit | Mean | S.D | Min. | Max. | Kurtosis | Skewness | Observ. |
|---|---|---|---|---|---|---|---|---|---|
| Findev. | PCA | %GDP | -0.005 | 1.345 | -1,602 | 4.875 | 1.3471 | 1.505 | 545 |
| Finop. | PCA | %GDP | 0.002 | 1.408 | -3.185 | 11.139 | 23.31 | 4.11 | 552 |
| XIgdp | ADI | %GDP | 0.396 | 0.215 | 0.000 | 1.373 | 4.151 | 1.817 | 580 |
| LLgdp | FDSD | %GDP | 0.29 | 0.19 | 0.04 | 0.97 | 2.07 | 1.67 | 550 |
| PCRgdp | FDSD | %GDP | 0.17 | 0.16 | 0.011 | 0.75 | 1.84 | 1.62 | 547 |
| PCFgdp | ADI | %GDP | 2.63 | 5.08 | -9.10 | 42.49 | 22.23 | 3.96 | 556 |
| FDIgdp | ADI | %GDP | 2.61 | 5.03 | -8.62 | 42.49 | 23.44 | 4.14 | 552 |
| 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. PCA: Principal Component Analysis, ADI: African Development Indicators, FDSD: Financial Development and Structure Database.

Appendix C: Correlation Matrix

| Variables | Findev | Finop | XIgdp | LLgdp | PCRgdp | PCFgdp | FDIgdp | GDPpcg | GDPg |
|---|---|---|---|---|---|---|---|---|---|
| Findev. | 1 | | | | | | | | |
| Finop. | -0.069 | 1 | | | | | | | |
| XIgdp | 0.105 | 0.468 | 1 | | | | | | |
| LLgdp | 0.952 | -0.041 | 0.129 | 1 | | | | | |
| PCRgdp | 0.952 | -0.096 | 0.062 | 0.812 | 1 | | | | |
| PCFgdp | -0.055 | 0.994 | 0.462 | -0.032 | -0.077 | 1 | | | |
| FDIgdp | -0.082 | 0.994 | 0.469 | -0.048 | -0.113 | 0.977 | 1 | | |
| GDPpcg | 0.056 | 0.040 | 0.075 | 0.084 | 0.021 | 0.035 | 0.046 | 1 | |
| GDPg | -0.021 | 0.027 | 0.032 | 0.008 | -0.051 | 0.025 | 0.033 | 0.972 | 1 |

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