New financial intermediary development indicators for developing countries

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Abstract

Financial development indicators are often applied to countries/regions without taking into account specific financial development realities. Financial depth in the perspective of monetary base is not equal to liquid liabilities in every development context. This paper introduces complementary indicators to the existing Financial Development and Structure Database (FDSD). These new measures can easily be computed from the FDSD. We present absolute as well as relative measures which are robust to the finance-growth nexus. When all financial sectors are taken into account in the definition and usage of liquid liabilities: (1) the formal and non-formal/informal financial sectors are inherently mutually antagonistic and should not be assimilated to the monetary base without distinction; (2) equating formal banking sector liquid liabilities to monetary base significantly undermines the formal banking system elasticity of growth; (3) there is a trade-off between growth and welfare from one financial sector to another; (4) non-formal and informal financial sectors are independent significant growth determinants.

1. Motivation

Financial development indicators have been universally applied without taking into account regional/country specific financial development needs and realities. Usage of some indicators for instance is based on the presumption that they are generally valid (Gries et al., 2009)[1]; not withstanding empirical evidence that not all indicators may matter in financial development (Asongu, 2010a). Furthermore the absence of a consensus on the superiority of financial development indicators; especially the widely used proxy for financial depth (Gries et al., 2009) is desirous of research attention. As far as we have perused related literature, we suppose that the absence of any study that focuses on the quality of financial development indicators with respect to contextual development concerns is enough inspiration to search for the missing link. It is therefore our objective in this paper to verify the validity of the financial depth indicator as applied to developing countries and hence decompose it to new measures that best address financial development challenges in developing countries. The underlying impetus of our study is the misleading assumption that liquid liabilities can be proxied by the monetary base (financial depth) in developing countries. Our study could be interesting to policy makers and researchers because, the absence of sound fundamentals in a financial indicator might bias estimations and result in unhealthy policy recommendations. The paper will be structured in the following manner: section two examines related literature; new indicators are proposed in section three; data and methodology are presented and outlined respectively in section four; section five focuses on empirical analysis; we conclude in section six.

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[1] Gries et al. (2003) state: "In the related literature several proxies for financial deepening have been suggested, for example, monetary aggregates such as M2 on GDP. To date there is no consensus on the on the superiority of any indicator" (page 1851).

2. Related Literature

2.1 Monetary base as a biased indicator of liquid liabilities in developing countries

2.1.1 Theoretical basis

Liquid liabilities expressed in terms of monetary base are without distinction of financial sectors and rest on the assumption that almost all currency held is linked to a financial sector deposit. Beck et al., (1999) on presenting a new database on financial development and structure pointed-out: "Since many researchers have focused on the liability side of the balance sheet, we include a measure of absolute size based on liabilities. Liquid liabilities to GDP equal currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP. This is the broadest available indicator of financial intermediation, since it includes all three financial sectors....Liquid liability is a typical measure of financial depth and thus the overall size of the financial sector without distinguishing between financial sectors of the use of liabilities"(page 11). It is worth emphasizing that almost no distinction is made between different financial sectors in the FDSD; and the hypothesis of all constituents of the monetary base linked to the liability side of the balance sheet is questionable for developing countries. Almost all currency held for transaction motives in developed countries are still recycled in banks[2]. However, this is subject to controversy in the underdeveloped world and therefore distinction between formal, non-formal and informal banking sectors is imperative.

A bias in the definition of financial system deposits (aka liquid liabilities) by the International Monetary Fund (IMF) is deserving of examination. According to International Financial Statistics (hence IFS), the financial system is made up of the formal and semi-formal (non-formal) sectors; that is deposit money banks and other financial institutions (see lines 24, 25 and 45 of IFS, October 2008). While this definition could be quasi-true for developed countries, it fails to take account of the informal financial sector in developing and

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[2] Bank deposits are liquid liabilities.

underdeveloped countries. This leaves us with some concern over the role of the informal sector in financial intermediary development and growth.

2.1.2 Empirical framework

Though the monetary base (M2/GDP) which represents the money stock has been widely used as a standard measure of liquid liabilities in many studies (World, 1989; King and Levine, 1993), in developing countries a large part of the monetary base stock consists of currency held outside banks. As such, an improvement in the M2/GDP ratio may reflect an extensive use of currency rather than an increase in bank deposits. In an attempt to curtail this shortcoming, Demetriades and Hussein (1996) suggested the subtraction of currency outside banks from M2 in the measure of liquidity liabilities in developing countries. Abu-Bader and Abu-Qarn (2008) amongst others have recently adjusted M2 in like manner.

Some authors have sought to address the issue by determining a broad variable that is indicative of financial depth. They use the first principal component of M2/GDP and a combination of one or more financial indicators (Khumbhakar and Mavrotas, 2005; Ang and McKibbin, 2007). By so doing they decrease the dimensionality of the set of variables without losing much information on the one hand; and on the other hand decrease problems related to the quality of M2 as a measure of liquid liabilities.

Despite the partial awareness of this challenge, literature is inundated with works on financial development in developing countries that do not distinguish between components in M2 held by banks and currency held outside of the formal financial sector. We argue that probing the distinction between formal, non-formal and informal banking sectors could be interesting in mastering the finance-growth nexus.

2.2 Why the concept of financial intermediary formalization is crucial in economic development?

In Africa, on average less than 20% of households have access to formal financial services[3]. The issue is further evident with low population densities, poor transport and limited communications infrastructure; which inhibit formal financial intermediation. Even where such services are available, small and medium size businesses, and low income individuals could find it difficult meeting-up with eligibility criteria such as strict documentation requirements and/or collaterals. Beside constraints of physical access and eligibility, cost barrier in the form of high transaction fees or considerable minimum requirements for savings balances or loan amounts present another stumbling block.

2.2.1 Distinction between formal, non-formal and informal financial intermediaries

Firstly, formal finance refers to services that are regulated by the central bank and other supervisory authorities. Secondly, non-formal or semi-formal finance is a distinction between formal and informal finance. This is finance that occurs in a formal financial environment but not formally recognized. An eloquent example is micro-finance. Thirdly, informal finance is one that is not arranged through formal agreements and not enforced through the legal system. The last two types of saving and lending are very common in developing countries, particularly among the financially excluded or those on low incomes.

Table 1 inspired by Steel (2006) clearly expatiates the role of non-formal and informal banks in the financial system of developing countries. Therefore, the role of Credit Unions and Micro Finance NGOs (non-formal finance) as well as elements of the last category cannot be undermined in the finance-led-growth nexus: such is the goal of our paper.

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[3] Making Finance work for Africa : http://www.mfw4a.org/access-to-finance/access-to-finance.html

Table 1: Segments of the financial system by degree of formality in Paper's context

Paper's context	Tiers	Definitions	Institutions	Principal Clients
Formal Financial sector (Deposit Banks)	Formal banks	Licensed by central bank	Commercial and development banks	Large businesses, Government
Non-formal financial sector (Other Financial Institutions)	Specialized non-bank financial institutions		Rural banks, Post banks, Saving and Loan Companies, Deposit taking Micro Finance banks	Large rural enterprises, Salaried Workers, Small and medium enterprises
	Semi-formal banks	Legally registered but not licensed as financial institution by central bank and government	Credit Unions, Micro Finance NGOs	Microenterprises, Entrepreneurial poor
Informal financial sector	Informal banks	Not legally registered at national level(though may be linked to a registered association)	Savings collectors, Savings and credit associations, Money lenders	Self-employed poor

Source (author)

2.2.2 Imperative of decomposing financial depth into formal, non-formal and informal components in financial intermediary development.

Hitherto, from a general macroeconomic perspective, the imperative of specifically determining the role of non-formal and informal banks in financial intermediary development has been marginal. We argue that stopping short of this would be gross injustice to the two later categories (see table 1) which represent quite a significant part of the financial sector in developing countries. The spirit of decomposing financial depth into essential constituents could be expressed in the following hypotheses:

Hypothesis 1: The IMF definition of the financial system is limited to the formal and semi-formal (non-formal) sectors; that is deposits money banks and other financial institutions (see

lines 24, 25 and 45 of International Financial Statistics, October 2008). While this could be quasi true for developed countries, this definition holds less ground in developing and underdeveloped worlds where, the informal financial sector takes a toll on the financial system and plays an important role in economic growth and development.

Hypothesis 2: Contrary to mainstream literature, in developing countries money in circulation plus transaction and account deposits (M2) is not equal to liquid liabilities. This suggests that, equating financial depth to liquid liabilities would be synonymous to assuming the inexistence and/or insignificance of non-formal and informal financial sectors. Money in circulation withheld by the informal and non-formal financial sectors does not always transit through the banking system. Therefore such currency cannot be considered as formal bank sector deposits or liquid liabilities.

Hypothesis 3: Less than 20% of population in some developing countries (e.g. Africa) has access to the formal banking system[4]. This further strengthens hypothesis 1. In effect, sidelining the role of majority of the population in financial development is gross bias.

Hypothesis 4: The informal and non-formal financial sectors are statistically significant contributions to M2 and economic growth. We shall endeavor to substantiate this in the empirical side of this paper.

Hypothesis 5: Understanding competition between afore three forms of financial intermediation through relative measures in the context of hypothesis 1[5] could provide more insight in the finance-growth nexus. To put this in other terms, the need to evaluate how one

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[4] Access to Finance in Making Finance work for Africa: http://www.mfw4a.org/access-to-finance/access-to-finance.html

[5] Liquidity liability in the context of Hypothesis one equals transaction (demand) and account (time) deposits. We emphasis that liquidity liability should not be only measured in absolute terms (that is divided by GDP), it should also be appreciated relatively to other components of the monetary base.

financial sector develops at the expense of another and vice-versa could be crucial in orienting policy-making.

Above hypotheses (with exclusive respect to components of M2) inspire propositions based on absolute and relative measures of financial intermediary development.

3. Proposition of new indicators

3.1 Absolute Measures

3.1.1 Formal financial development

Proposition 1: Formal financial development could be defined as:

$$\operatorname{Pr}op.1 = \frac{Bank\_deposits}{GDP}$$

Bank deposits[6] here refer to demand, time and saving deposits in deposit money banks.

3.1.2 Non-formal financial development

Proposition 2: Non-formal financial development could be appreciated as:

$$\operatorname{Pr}op.2 = \frac{Financial\_deposits - Bank\_deposits}{GDP}$$

Financial deposits[7] are demand, time and saving deposits in deposit money banks and other financial institutions.

3.1.3 Informal financial development

Proposition 3: Informal financial development can be conceived as:

$$\operatorname{Pr}op.3 = \frac{Monetary\_Base(M2) - Financial\_deposits}{GDP}$$

3.1.4 Informal and non-formal financial development

Proposition 4: Informal and non-formal financial development can be defined as:

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[6] Lines 24 and 25 of International Financial Statistics (IFS); October 2008.
[7] Lines 24, 25 and 45 of IFS, October, 2008.

$$\Pr{op}.4 = \frac{Monetary\_Base(M2) - Bank\_deposits}{GDP}$$

3.2 Relative Measures

3.2.1 Financial intermediary formalization

Proposition 5: From 'informal and non-formal' to *formal* financial development (formalization)

$$\Pr{op}.5 = \frac{Bank\_deposits}{Monetary\_Base(M2)}$$

In undeveloped countries M2 is not equal to liquid liabilities (liquid liabilities equal bank deposits: bd). Whereas in undeveloped countries bd/M2<1, in developed countries bd/M2 is almost equal to 1. This indicator measures the rate at which money in circulation is absorbed by the banking system. Financial development here is defined as the propensity of the formal banking system to absorb money in circulation.

3.2.2 Financial intermediary 'non-formalization'

Proposition 6: From 'informal and formal' to *non-formal* financial development (Non-formalization)

$$\Pr{op}.6 = \frac{Financial\_deposits - Bank\_deposits}{Monetary\_Base(M2)}$$

This indicator measures the level at which the non-formal financial sector evolves to the detriment of formal and informal sectors.

3.2.3 Financial intermediary 'informalization'

Proposition 7: From 'formal and non-formal' to *informal* financial development (Informalisation)

$$\Pr{op}.7 = \frac{Monetary\_Base(M2) - Financial\_deposits}{Monetary\_Base(M2)}$$

This proposition shows the rate at which the informal financial sector is developing at the cost of formal and non-formal sectors.

3.2.4 Financial intermediary 'semi-informalization/non-formalization'

Proposition 8: Formal to '*informal and non-formal*' financial development: (Semi-informalisation or semi-non-formalization)

$$\Pr op.8 = \frac{Monetary\_Base(M2) - Bank\_deposits}{Monetary\_Base(M2)}$$

The proposition appreciates the deterioration of the formal banking sector to the benefit of other sectors (informal and non-formal)

3.2.5 Linkages between absolute measures, financial depth and liquid liabilities

Liquid liabilities are equal to the Monetary base (M2) in developing countries only when all three sectors of finance are considered:

Proposition 9: Liquid liabilities = M2;   if and only if:

$$Liquid\_liabilities(M2) = \Pr op.1 + \Pr op.2 + \Pr op.3$$

Hence the empirical side of this work based on the equation of M2 to liquid liabilities.

4. Data and Methodology

4.1 Data

Since this paper is methodological oriented, justification of a broad database in the choice of data is not much of a constraint. African Development Indicators (ADI) of the World Bank and the Financial Development and Structure Database (FDSD) are our main data sources. We limit ourselves to developing countries of the Economic and Monetary Union of Central African States (CEMAC). Due to data unavailability, our panel is made up of Cameroon, Gabon and Congo Republic spanning from 1990 to 2008. Selected variables from ADI include: GDP per capita growth, GDP growth (Dependent and control variables),

and Exports on GDP (complementary independent variable). Remaining independent variables (Propositions from section 3) originate from transformations in the FDSD.

4.2 Methodology

4.2.1 Correlation Analysis

We perform two types of correlation analysis. The first as presented on table 2 aims to investigate if suggested propositions are exogenous to M2. Results show all propositions are significant determinants of M2 and therefore could be paramount in the finance-growth nexus. The second in the appendix shapes our expectations on the linkages between growth and propositions on the one hand; and on the other hand, enable plausible model specifications in a bid to avoid problems linked to multicolinearity and overparametization.

Table 2: Correlation analysis between financial depth (M2) and Propositions

Props	Prop. 1	Prop.2	Prop.3	Prop.4	Prop.5	Prop.6	Prop.7	Prop.8
C. Coef	0.85***	-0.32**	0.26*	0.24*	0.29**	-0.32**	-0.27**	-0.29**
t-stats	11.69	-2.47	1.95	1.81	2.19	-2.43	-2.06	-2.19

C.Coef: Correlation coefficient. Props: propositions. t-stats: student statistics. *,**,***; significance levels of 10%, 5% and 1% respectively.

4.2.2 Unit root tests

Since we seek to employ a model that assumes a particular functional distribution in data analysis, we begin by investigating the stationary properties of our variables at level[8] and first difference[9]. Among existing panel unit root tests we prefer the first generation(cross sectional independence) to the second generation(cross sectional dependence) because the number of periods in each cross section is superior to the number to cross sections(T>N).[10] Among existing first generational tests, we opt for Levin, Lin and Chu (LLC, 2002) and Im, Pesaran and Shin (IPS, 2003) for homogenous and heterogeneous tests respectively. Borrowing from Asongu (2011) and Khim (2004) we specify both the LLC and IPS tests by

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[8] I (0): stationary or absence of unit root at level series.
[9] I (1): stationary at first difference or first order integration.
[10] Cross section dependence tests can only be applied when the number of cross sections(N) exceed the number of periods (T).

Akaike Information Criterion (AIC)[11]. Maddala and Wu (1999) shape our decisions on integration properties in event of a conflict of interest between LLC and IPS tests[12]. Table 3 shows stationary properties of variables in bold.

Table 3: Homogenous and heterogeneous panel unit root tests

Variables	Homogenous(LLC) tests				Heterogeneous(IPS) tests			
	Level		First difference		Level		First difference	
	c	ct	c	ct	c	ct	c	ct
Prop(1)	2.92	1.65	-0.00	**-4.90***	1.52	3.43	0.17	**-3.15***
Prop(2)	v.s	v.s	n.a	n.a	v.s	v.s	n.a	n.a
Prop(3)	**-1.81**	-0.81	n.a	n.a	**-2.63***	**-1.52***	n.a	n.a
Prop(4)	**-1.66**	-0.79	n.a	n.a	**-2.57***	**-1.49***	n.a	n.a
Prop(5)	-1.22	**-1.74**	-6.29***	-5.82***	**-1.76**	**-2.64***	n.a	n.a
Prop(6)	v.s	v.s	n.a	n.a	v.s	v.s	n.a	n.a
Prop(7)	**-2.15**	2.46	25.70	-2.66***	**-1.65**	1.29	8.09	-1.47*
Prop(8)	**-1.95**	1.86	2.20	-2.58***	**-1.51***	1.15	0.25	-1.49*
LL(M2)	0.56	0.78	**-1.47***	**-4.19***	0.27	2.49	-1.00	**-2.86***
Xgdp	**-2.42***	**-3.03***	n.a	n.a	**-1.57***	**-1.42***	n.a	n.a
GDPg	**-8.52***	**-6.84***	n.a	n.a	**-7.20***	**-6.18***	n.a	n.a
GDPpcg	**-6.70***	**-6.89***	n.a	n.a	**-6.94***	**-6.12***	n.a	n.a

*, **, *** denote significance at 10%, 5% and 1% respectively. Optimal lag selection is governed by AIC. Maximum lags applied are 3. 'c' and 'ct': 'constant' and 'constant and trend' ;respectively. n.a: not applicable v.s: visual stationary. 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). *Xgdp*: Exports on GDP. *LL*: Liquid liabilities on GDP. *GDPg*: GDP growth rate. *GDPpcg*: GDP per capita growth rate. Prop (h): Propositions.

4.2.3 Model specification tests

Following Asongu (2010b) we opt for Generalized Least Squares (GLS) with Fixed Effects (FE) and do not perform the Hausman test to determine if regressions would be by Fixed Effects or Random Effects[13] . FE regressions also have the advantage of taking into account unobserved heterogeneity and does not rest on the assumption of the absence of correlation between the variables and the error term. Upon regression, we justify our choice of GLS instead of Ordinary Least Squares (OLS) with a Wald statistics for heteroscedasticity.

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[11] Panel observations are less than 60. With respect to Khim (2004), optimal lag selection for goodness of fit is best with AIC or Final Prediction Error (FPE) when observations are less than 60.

[12] According to Maddala and Wu (1999), the alternative hypothesis (for the absence of a common unit) of Levin, Lin and Chu (LLC) test is too strong. Following Asongu (2011) we based our decisions on results of IPS test in case of conflict of interest.

[13] A priori, the Fixed Effect regression is plausible as cross sections are member states of a given economic and monetary region that are not randomly selected.

4.2.4 Model formulation

Models (1) and (2) are based on the finance-led-growth nexus. The later checks the former and "t" ranges from 1990 to 2008 for each cross section.

$$GDPg_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 \Pr op(h)_{it} + \gamma_3 GDPpcg_{it} + \varepsilon_{it} \qquad (1)$$

For robustness check

$$GDPpcg_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 \Pr op(h)_{it} + \gamma_3 GDPg_{it} + \varepsilon_{it} \qquad (2)$$

Where; X, Prop, GDPpcg and GDPg represent Exports, Propositions, GDP per capita growth and GDP growth respectively.

Above models are replicated for propositions 1 to 8. For proposed parameters that fail to significantly explain the dependent variable, transmission mechanism models are applied to verify their effect on growth via M2(propositions two, three, four and six),

4.2.5 Transmission mechanisms

$$LL_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 \Pr op(h)_{it} + \gamma_3 GDPpcg_{it} + \varepsilon_{it} \qquad (3)$$

Robustness tests

$$LL_{it} = \gamma_0 + \gamma_1 X_{it} + \gamma_2 \Pr op(h)_{it} + \gamma_3 GDPg_{it} + \varepsilon_{it} \qquad (4)$$

Where; LL, X, Prop, GDPpcg and GDPg denote Liquid liabilities or M2, Exports, Propositions, GDP per capita growth and GDP growth respectively. We verify the validity of M2 as a transmission channel in the finance-led-growth nexus for each proposition. The later equation (4) checks the former (3) with "t" ranging from 1990 to 2008 for each cross section.

5. Empirical Results

Results from the first part of table 4 empirically justify Propositions 1, 5, 7, 8 with respect to the finance-led-welfare nexus. These findings are robust to finance-led-growth nexus on the second part of the table. As concerns the third section, with regard to M2 as a transmission channel, Propositions 2, 3, 4 and 6 are equally valid with respect to afore nexuses. The Fisher and Wald statistics for respectively the significance of overall model and justification of the use of GLS are significant for all regressions. Explanatory powers of estimated parameters expressed by the adjusted coefficient of regression (Adj.R²) are impressive.

5.1 Opposing financial sectors in the financial system

First and foremost, results of correlations analysis from table 2 seem to suggest non-formal financial development (Prop.2), financial non-formalization (prop.6), informalisation (prop.7) and semi-informalisation (prop.8) are negatively correlated with the monetary base (M2); which preliminarily suggest formal financial intermediary development and financial formalization should be prioritized when policy seeks to improve M2 . Put in other terms, there is a significant antagonism between banking formalization and non-formalization/informalisation; suggesting deposits held by the banking sector (at the expense of other sectors) are more favorable to a positive monetary base (M2) than those held by non-banking sectors (at the expense of the banking sector), everything being equal. However, the rationale for using non-formal and informal finance indicators could be perceived in the trade-off between welfare and growth in the finance-growth nexus.

Table 4: Regression results

	Initial models with Propositions: Prop(h)….(Equation 1)								
	LL(M2)°	Prop (1)°	Prop(2)	Prop(3)	Prop(4)	Prop(5)	Prop(6)	Prop(7)	Prop(8)
constant	**3.29*****	**3.26*****	**3.51*****	**3.43*****	**3.43*****	**5.83*****	**3.39*****	**2.85*****	**2.85*****
	11.76	11.70	12.73	11.26	11.28	4.92	12.36	7.13	7.12
Exports	**-0.01*****	**-0.01*****	**-0.02*****	**-0.02*****	**-0.02*****	**-0.02*****	**-0.01*****	**-0.02*****	**-0.02*****
	-3.13	-3.05	-3.96	-4.39	-4.39	-4.57	-3.44	-4.58	-4.57
Prop(h)	---	**-8.50****	-299.49	3.08	3.04	**-2.97****	-79.99	**2.97****	**2.97****
	---	-2.40	-1.04	1.01	1.00	-2.03	-1.23	2.05	2.03
M2(LL)	**-6.29****	---	---	---	---	---	---	---	---
	-2.27	---	---	---	---	---	---	---	---
GDPpcg	**1.01*****	**1.01*****	**1.01*****	**1.01*****	**1.01*****	**1,01*****	**1.01*****	**1.01*****	**1.01*****
	66.99	67.77	70.75	70.63	70.61	73.07	71.34	73.11	73.07
Hetero	**23,09*****	**20.90*****	**25.72*****	**28.61*****	**28.54*****	**21.84*****	**26.05*****	**21.99*****	**21.84*****
Adj. R²	0.99	0.99	0.98	0.98	0.99	0.99	0.99	0.99	0.99
Fisher	**1038*****	**1051*****	**1058*****	**1057*****	**1056*****	**1138*****	**1079*****	**1139*****	**1138*****

	Robustness test models with Propositions: Prop(h)….(Equation 2)								
	LL(M2)°	Prop (1)°	Prop(2)	Prop(3)	Prop(4)	Prop(5)	Prop(6)	Prop(7)	Prop(8)
constant	**-3.25*****	**-3.23*****	**-3.48*****	**-3.39*****	**-3.39*****	**-5.72*****	**-3.36*****	**-2.85*****	**-2.85*****
	-12.37	-12.29	-13.36	-11.62	-11.64	-4.90	-12.94	-7.38	-7.37
Exports	**0.01*****	**0.01*****	**0.02*****	**0.02*****	**0.02*****	**0.02*****	**0.01*****	**0.02*****	**0.02*****
	3.35	3.26	4.20	4.64	4.64	4.75	3.65	4.76	4.75
Prop(h)	---	**8.74****	286.61	-3.17	-3.13	**2.86***	77.25	**-2.86***	**-2.86****
	---	2.54	1.01	-1.07	-1.05	1.98	1.20	-2.00	-1.98
M2(LL)	**6.53****	---	---	---	---	---	---	---	---
	2.43	---	---	---	---	---	---	---	---
GDPg	0.97	**0.97*****	**0.97*****	**0.97*****	**0.97*****	**0.97*****	**0.97*****	**0.97*****	**0.97*****
	66.99	67.77	70.75	70.63	70.61	73.07	71.34	73.11	73.07
Hetero	**12.92*****	**11.80*****	**13.35*****	**15.66*****	**15.61*****	**12.21*****	**15.53*****	**12.31*****	**12.21*****
Adj. R²	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fisher	**1095*****	**1107*****	**1096*****	**1098*****	**1098*****	**1171*****	**1114*****	**1173*****	**1171*****

Transmission Channel(s) via LL°(M2)

	Initial Models (Equation 3)				Robustness test models(Equation 4)			
	Prop(2)	Prop(3)	Prop(4)	Prop(6)	Prop(2)	Prop(3)	Prop(4)	Prop(6)
constant	**0.21*****	**-0.10*****	**-0.10*****	**0.21*****	**0.22*****	**-0.11*****	**-0.11*****	**0.22*****
	13.75	-4.96	-4.96	13.74	14.87	-5.17	-5.18	14.86
Exports	**-0.001*****	0.000	0.000	**-0.001*****	**-0.001*****	**0.0004***	0.000	**-0.001*****
	-3.87	1.48	1.42	-3.86	-4.07	1.72	1.67	-4.06
Prop(h)	**83.11*****	**1.95*****	**1.93*****	**19.06*****	**82.22*****	**1.94*****	**1.93*****	**18.86*****
	5.04	5.42	5.44	5.04	5.02	5.29	5.31	5.02
GDPpcg	**-0.002*****	**0.002*****	**0.002*****	**-0.002*****	---	---	---	---
	-2.93	3.67	3.68	-2.96	---	---	---	---
GDPg	---	---	---	---	**-0.002*****	**0.002*****	**0.002*****	**-0.002*****
	---	---	---	---	-3.06	3.40	3.40	-3.10
Hetero	2.51	1,99	2.04	2.42	2.12	1.58	1.62	2.04
Adj. R²	0.46	0.40	0.41	0.46	0.47	0.38	0.39	0.47
Fisher	**10.10*****	**7.64*****	**7.69*****	**10.10*****	**10.39*****	**7.07*****	**7.13*****	**10.39*****

°: first difference. *, **, ***: denote significance levels of 10%, 5% and 1% respectively. Prop: propositions. GDPpcg: GDP per capita growth. GDPg: GDP growth. LL (M2): Liquid Liabilities on GDP. Hetero: Wald Chi-Square statistics for heteroscedasticity. Adj. R²: Adjusted Coefficient of determination. Fisher: Fisher statistics. In transmission channel regressions, LL for propositions 2 and 6 is on level data for the sake of model significance.

5.2 Trade-off between welfare and growth

Results on table 4 suggest the decision between formal and informal finance (or financial formalization and informalisation/non-formalization) is synonymous to a trade-off between growth and welfare. While formal finance is favorable to welfare, it portrays a negative finance-led-growth nexus. On the contrary, informal and non-formal finance appear to diminish welfare but favorable to the finance-led-growth nexus. As a whole, the monetary base seems to tie more with formal than informal/non formal finance in the trade-off between growth and welfare.

It is important to note, these results are only valid for sampled countries in the CEMAC region. We argue that for samples where GDP growth rate is higher than population growth rate, the thesis for such a trade-off between welfare and growth could be improved. Nonetheless, formal and informal finance are diametrically opposed and are independent significant determinants of growth in GDP and per capita.

5.3 Retrospect to hypotheses

Hypothesis 1: Limitation of IMFs financial system definition to formal and semi-formal financial sectors[14]

Based on our analysis, propositions 3, 4, 7 and 8 have been empirically verified as substantial constituents of the financial system as well as significant determinants of growth and welfare.

Hypothesis 2: The Monetary Base is not equal to bank liquid liabilities in developing countries[15]

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[14] The IMF definition of the financial system is limited to the formal and semi-formal (non-formal) sectors; that is deposits money banks and other financial institutions (see lines 24, 25 and 45 of International Financial Statistics, October 2008). While this could be quasi true for developed countries, this definition hold less ground in developing and underdeveloped worlds where, the informal financial sector takes a toll on the financial system and plays an important role in economic growth and development.

[15] Contrary to mainstream literature, in developing countries money in circulation plus transaction and account deposits (M2) is not equal to liquid liabilities. This suggests that, equating financial depth to liquid liabilities would be synonymous to assuming the in-existence and/or insignificance of non-formal and informal financial sectors. Money in circulation withheld by the informal and non-formal financial sectors does not always transit

Non-formal and informal liquid liabilities are equally relevant in developing countries; as currency is significantly held by non-banking sectors as well. This is evident from results or correlation analysis on table 2. From a more detailed perspective, regression coefficients from table 4 seem to suggest that, equation of bank sector liquidity liabilities to M2 in developing countries only dilutes the finance effect on growth('-8.50+6.29' for finance-led-GDP growth and '8.74-6.53' for finance-led-GDP per capita growth). It follows that equating formal banking sector liquid liabilities to the monetary base significantly undermines the formal banking system elasticity of growth.

Hypothesis 4: The informal and non-formal financial sectors are statistically significant contributions to M2 and economic growth.

Results of table 4 confirm this hypothesis in supporting that non-banking financial sectors are independent significant determinants of the finance-led-growth nexus.

Hypothesis 5: Understanding competition between financial sectors could be important in policy-orientation.

For sampled countries under investigation, the trade-offs between one form of financial sector with another(absolute measures); as well as growth of one form at the expense of the other and vice-versa (relative indicators), could significantly affect policy orientation in matters related to growth and welfare.

6. Conclusion

Financial development indicators are often applied to countries/regions without taking into account specific financial development realities. Financial depth in the perspective of monetary base is not equal to liquid liabilities in every development context. This paper has introduced complementary indicators to the existing Financial Development and Structure Database (FDSD). These new measures can easily be computed from the FDSD.

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through the banking system. Therefore such currency cannot be considered as bank sector deposits or liquid liabilities.

When all financial sectors are taking into account in the definition and usage of liquid liabilities: (1) the formal and non-formal/informal financial sectors are inherently mutually antagonistic and should not be assimilated to the monetary base ; (2) equating formal banking system liquid liabilities to monetary base significantly undermines the formal banking system elasticity of growth; (3) there is a trade-off between growth and welfare depending on financial sectors; (4) non-formal and informal financial sectors are independent significant determinants of growth and welfare.

Appendices

Appendix 1: Correlation Analysis

Xgdp	GDPg	GDPpcg	LL(M2)	Prop.1	Prop.2	Prop.3	Prop.4	Prop.5	Prop.6	Prop.7	Prop.8	
1.00	0.12	0.16	-0.23	-0.49	0.11	0.30	0.30	-0.63	0.10	0.63	0.63	Xgdp
	1.00	0.99	-0.32	-0.29	-0.12	-0.002	-0.009	-0.12	-0.12	0.12	0.12	GDPg
		1.00	-0.31	-0.30	-0.13	0.006	-0.002	-0.14	-0.13	0.15	0.14	GDPpcg
			1.00	0.85	-0.32	0.26	0.24	0.29	-0.32	-0.27	-0.29	LL(M2)
				1.00	-0.41	-0.28	-0.30	0.74	-0.14	-0.73	-0.74	Prop.1
					1.00	-0.33	-0.28	0.08	0.99	-0.12	-0.08	Prop.2
						1.00	0.99	-0.82	-0.38	0.84	0.82	Prop.3
							1.00	-0.84	-0.32	0.85	0.84	Prop.4
								1.00	0.08	-0.99	-1.00	Prop.5
									1.00	-0.13	-0.08	Prop.6
										1.00	0.99	Prop.7
											1.00	Prop.8

Xgdp: Exports; GDPg:GDP growth; GDPpcg: GDP per capita growth; LL(M2): Liquid Liabilities on GDP; Prop.1:Proposition 1; Prop.2: Proposition 2; Prop.3:Proposition 3; Prop.4:Proposition 4; Prop.5:Proposition 5 ; Prop.6 : Proposition 6 ; Prop.7 :Proposition 7 ; Prop.8 ; Proposition 8.

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