Information Asymmetry, Financialisation and Financial Access

Asongu, Simplice and Odhiambo, Nicholas

January 2018

A G D I Working Paper

WP/18/019

Information Asymmetry, Financialisation and Financial Access[1]

Forthcoming: International Finance

Simplice A. Asongu
Department of Economics, University of South Africa.
P. O. Box 392, UNISA 0003, Pretoria South Africa.
E-mails: asongusimplice@yahoo.com , asongus@afridev.org

Nicholas M. Odhiambo
Department of Economics, University of South Africa.
P. O. Box 392, UNISA 0003, Pretoria, South Africa.
Emails: odhianm@unisa.ac.za , nmbaya99@yahoo.com

[1]This working paper also appears in the Development Bank of Nigeria Working Paper Series.

Research Department

Information Asymmetry, Financialisation and Financial Access

Simplice A. Asongu & Nicholas M. Odhiambo

January 2018

Abstract

This study investigates whether information sharing channels that are meant to reduce information asymmetry have led to an increase in financial access. The study employs a Generalised Method of Moments technique using data from 53 African countries during the period from 2004-2011 to examine this linkage. Information sharing channels are theoretically designed to promote the formal financial sector and discourage the informal financial sector. The study uses two information sharing channels: private credit bureaus and public credit registries. The study found that both information sharing channels have a positive and significant impact on financial access. The study also found that public credit registries complement the formal financial sector to promote financial access. The policy implications are discussed.

JEL Classification: G20; G29; L96; O40; O55
Keywords: Information asymmetry; Financialisation; Financial Access; Africa

1. Introduction

Three main tendencies in policy and scholarly circles motivate this study: (i) the need for domestic finance (or access to credit) to accommodate the growing investment needs in Africa and the shortcomings in the literature on financial development; (ii) the postulated concerns of increasing information asymmetry (or the issues of the lack of information sharing between banks) and the surplus liquidity associated with financial institutions on the continent; and (iii) the gaps in the literature on financialisation (or the improvement of one financial sector to the detriment of other financial sectors).

First, a substantial bulk of African business literature is consistent with the position that a fundamental challenge to doing business on the continent is the lack of finance (Tuomi, 2011; Darley, 2012; Fanta, 2016). This position has recently been confirmed by Ndikumana and Blackson (2015), who have shown that domestic investment in Africa is more positively linked to domestic sources of capital when compared with external sources of capital. The authors recommended that African countries primarily look inward for "domestic savings mobilisation" as a sustainable mechanism to domestic investment instead of the over-reliance on imported capital.

This study incorporates this requirement of domestic sources of finance by conceiving and defining financial access as the ability of financial intermediaries to transform mobilised savings into credit for investment purposes. The motivation for emphasising this dimension of financial allocation efficiency also builds on the evidence that the literature has largely failed to appreciate financial development from the perspective of the bank's ability to fulfil its fundamental role of transforming mobilised financial resources into credit for investment purposes (Kablan, 2010; Batuo & Kupukile, 2010). For instance, most indicators of financial efficiency have focused on cost efficiency (Chen, 2009), data envelopment analysis (DEA) for technical efficiency (Kablan, 2009) and profit efficiency (Hauner & Peiris, 2005).

Second, the need for internal sources of finance unfortunately contrasts with the substantially documented concerns of excess liquidity in African financial institutions (Saxegaard, 2006; Asongu, 2014a). A fundamental reason for the surplus liquidity is the information asymmetry between lenders and borrowers. To tackle the concern of surplus liquidity, over the past decade, information sharing offices (ISOs), such as public credit registries (PCRs) and private credit bureaus (PCBs)[2], have been introduced across the continent (Triki & Gajigo, 2014). This study incorporates this dimension of the motivation by

[2] ISO is used interchangeably with 'PCR and PCB'.

considering a broad set of African countries and employing ISOs as a policy variable for reducing information asymmetry in order to enhance financial access. Moreover, the extant literature on ISOs has largely focused on developed countries and the emerging nations of Asia and Latin America, while by extension, the African continent has not received the scholarly attention that it deserves (Galindo & Miller, 2001; Love & Mylenko, 2003; Barth *et al.*, 2009).

The policy relevance of ISOs in the financial sector competition for financial access has not been covered in the literature. For instance, Love and Mylenko (2003) have concluded that private registries are linked to higher bank lending and lower financial access constraints, whereas the impact of public registries is not apparent. Singh *et al.* (2009) conclude that African nations with ISOs enjoy higher levels of access to finance. Triki and Gajigo (2014) have established that, compared to PCRs, PCBs are associated with higher levels of financial access. Asongu *et al.* (2016) show that ISOs have influenced access to finance negatively, whereas Asongu *et al.* (2017a) conclude that technology-driven information sharing is relevant in driving financial access. Muaza and Alagidede (2017) conclude that, compared to countries with French civil law traditions, their counterparts with English common law traditions are benefiting more from financial access from the introduction of ISOs. Kusi *et al.* (2017) have established that ISOs reduce bank credit risk in high- and low-income countries in Africa, while Kusi and Opoku- Mensah (2018) have concluded that the presence, quality and coverage of ISOs decreases funding costs in Africa.

Third, the concept of financialisation in the information asymmetry literature is sparse. Consistent with O'Toole (2014) and Asongu (2015a), the bulk of the literature has been restricted to more specific areas of financial development such as bank concentration and bank participation. We depart from this strand of literature by engaging financialisation measurements within the framework of financial sector competition. In so doing, we articulate a neglected informal financial sector. The introduction of the financialisation concepts (which are substantively discussed in Section 2) merges two branches of research by concurrently contributing to the literature on measuring development finance and to the economic development literature on the policy relevance of ISO in the financial sector competition for financial access. The simultaneous contribution provides a practical means for understanding the mechanisms by which financial access is influenced by the complementarity between various financial sectors and ISOs.

Building on the above, this study examines the role of ISOs in the financial competition for financial access using a panel of 53 African countries for the period from

2004-2011. The empirical evidence is based on the Generalised Method of Moments. The role of ISOs in modulating the effect of financial sector competition on financial access is assessed by means of interactive regressions in which the information sharing offices are policy variables, while the financial sector competition dynamics are factors to be modulated for financial access. This modelling approach is consistent with the recent literature, notably, the role of financial access in modulating the effect of education and lifelong learning on inequality (Tchamyou, 2018) and the role of information and communication technology (ICT) in modulating the effect of environmental degradation on inclusive development (Asongu *et al*., 2017b).

The following main finding is established. Public credit registries complement financial sector formalisation to enhance the financial access in the banking sector and financial system. The rest of the study is structured as follows. The theoretical underpinnings and clarification of concepts are covered in Section 2. Section 3 discusses the data and methodology. The empirical results are covered in Section 4, while Section 5 concludes with implications and future research directions.

2. Theoretical underpinnings and conceptual clarifications

2.1 Theoretical underpinnings: information asymmetry and financial access

This section on the theoretical underpinnings is discussed in two main strands: (i) the theoretical connection between reducing information asymmetry (by means of ISOs) and financial access, and (ii) the theoretical foundation motivating the interaction between financial sector competition and ISOs for financial access. In other words, while the former strand discusses the broad theoretical literature on the connection between information asymmetry and access to finance, the latter strand substantiates how the theoretical connection can be extended to the positioning of this study, notably, on the assessment of the role of ISOs in modulating the relevance of financial sector competition in financial access within a framework of interactive regressions.

The theoretical nexus between information asymmetry and financial access can be seen from three main perspectives. According to Jappelli and Pagano (2002) and Asongu and Nwachwukwu (2018), the exchange of information on borrowers in order to reduce information asymmetry has three theoretical or potential effects. First, from the perspectives of public credit registries and private credit bureaus, ISOs enable banks to establish a more accurate prediction of the repayment probabilities of borrowers. This is essentially because banks are better informed on borrowers' characteristics by means of these information sharing

mechanisms. Moreover, such information sharing reduces the adverse selection from a bank, which pushes banks to increase interest rates charged on loans in order to mitigate the risks associated with limited information on borrowers' characteristics.

Second, by sharing information on borrowers' features, ISOs reduce informational rents that would have been extracted from customers by banks. Hence, the sharing of information increases the competition between banks in the credit market. The characteristics of such competition include the following: loan pricing through interest rates, borrowers' incentives to repay, and competition between financial sectors.

Third, on the specific premise of incentives to repay, ISOs also play the role of disciplining borrowers on the imperative of complying with their debt-related financial obligations towards banks. Hence, by acting as a disciplining device, ISOs reduce the moral hazard on the part of borrowers by providing them with incentives to perform and repay. In essence, all borrowers are disciplined by ISOs on the fact that defaulting on their debts will give them limited access to credit markets on the one hand, and on the other make access to credit more difficult for them.

The discussed three perspectives on the link between information asymmetry and financial access can be summarised in terms of the issues confronting banks *ex ante* and *ex post* of the lending activity. These issues are, respectively, adverse selection on the part of banks and moral hazard on the part of borrowers. We substantiate these two major issues in chronological order.

The primary objective of decreasing information asymmetry builds on a model of pure adverse selection developed by Pagano and Jappelli (1993). According to the model, information sharing decreases borrower default, increases the number of borrowers and reduces "average interest rates". Moreover, the concern about adverse selection could result from the fact that banks have less information on the characteristics of a category of borrowers, such as immigrants compared to nationals. Hence, exchanging such information by means of ISOs can improve lending by banks to immigrants.

With regard to the impact on moral hazard, the sharing of information by ISOs enhances the incentives of borrowers not to default on their debts either through a discipline effect or via the reduction in the rents of banks. On the latter effect, exchanging information between financial institutions reduces informational rents that banks extract when lending to borrowers (Jappelli & Pagano, 2002) or erodes the rents enjoyed by the incumbent bank when access to hard information by the competing bank increases (Petersen & Rajan, 1995; Hauswald & Marquez, 2003). The former effect articulates the role of ISOs as a discipline

device on borrowers, notably, by providing incentives to borrowers to perform and comply with their financial obligations towards financial institutions.

The second part of this section focuses on the connection between information asymmetry, financial sector competition and financial access. Articulating such a connection is relevant in order to situate the relevance of the theoretical framework (covered in the first part) to the positioning of this study, notably on the role of information sharing offices in modulating the effect of the financial sector competition for financial access. The underlying connection is logical to follow in light of the established theoretical role of ISOs in stimulating financial sector competition that is discussed in the first part. Hence, within the framework of this study, ISOs can be used as a policy variable that stimulates the financial sector competition in order to increase financial access.

2.2 Propositions on financialisation

The propositions build on the insufficiencies in the conception and definition of the financial system by the International Financial Statistics (IFS), which does not incorporate the informal financial sector (Asongu, 2014b; IMF, 2008). The literature has substantially documented the role of the informal sector in development outcomes (Aryeetey, 2005; Adeusi *et al*., 2012). Therefore, the propositions in Table 1 challenge the existing IFS conception of the financial system from three principal dimensions, namely, by the following: (i) incorporating the informal financial sector into the definition and measurement of the financial system, (ii) disentangling the existing measurement into its semi-formal and formal components, and (iii) introducing the notion of financialisation within the framework of financial sector competition. The propositions are increasingly being employed in the financial development literature (Asongu, 2015a, 2015b).

Whereas Panel A of Table 1 presents financial development indicators that are based on Gross Domestic Product (GDP), the measurements provided in Panel B are those of the financial sector's importance. The latter framework articulates the concept of financialisation in the perspectives of formalisation, informalisation, semi-formalisation and non-formalisation. For example, financial semi-formalisation is the development of the semi-formal financial sector to the detriment of the formal and informal financial sectors. In other words, it implies that the semi-formal financial sector is experiencing an increase in money supply shares to the detriment of other financial sectors. In a nutshell, the concept of

financialisation denotes the improvement of the money supply shares in one financial sector to the detriment of other competing sectors.

Table 1: Summary of propositions

Propositions	Name(s)	Formula	Elucidation
Panel A: GDP-based financial development indicators			
Proposition 1	Formal financial development	Bank deposits/GDP	Bank deposits here refer to demand, time and saving deposits in deposit money banks.
Proposition 2	Semi-formal financial development	(Financial deposits – Bank deposits)/ GDP	Financial deposits are demand, time and saving deposits in deposit money banks and other financial institutions.
Proposition 3	Informal financial development	(Money Supply – Financial deposits)/GDP	
Proposition 4	Informal and semi-formal financial development	(Money Supply – Bank deposits)/GDP	
Panel B: Measures of financial sector importance			
Proposition 5	Financial intermediary formalisation	Bank deposits/ Money Supply (M2)	From 'informal and semi-formal' to *formal* financial development (formalisation).
Proposition 6	Financial intermediary 'semi-formalisation'	(Financial deposits - Bank deposits)/ Money Supply	From 'informal and formal' to *semi-formal* financial development (Semi-formalisation).
Proposition 7	Financial intermediary 'informalisation'	(Money Supply – Financial deposits)/ Money Supply	From 'formal and semi-formal' to *informal* financial development (Informalisation).
Proposition 8	Financial intermediary 'semi-formalisation and informalisation'	(Money Supply – Bank Deposits)/Money Supply	From 'formal' to *semi-formal* and *informal* financial development: (Semi-formalisation and informalisation)

N.B: Propositions 5, 6, and 7 add up to unity (one), which arithmetically spells out the underlying assumption of sector importance. Hence, when their time series properties are considered in the empirical analysis, the evolution of one sector is to the detriment of other sectors and vice versa.
Source: Asongu (2015a).

3. Data and Methodology

3.1 Data

The study examines a panel of 53 African countries with data from the African Development Indicators (ADI) and the Financial Development and Structure Database (FDSD) of the World Bank for the period from 2004-2011. The reasons for positioning the study on Africa have already been discussed in the introduction. The data on ISOs start from the year 2004, whereas the latest date in the FDSD is 2011 (at the time of the study). ISOs are public credit registries (PCR) and private credit bureaus (PCB) (Triki & Gajigo, 2014).

Two financial sector competition indicators are employed: Proposition 7 (or financial sector informalisation) and Proposition 5 (or financial sector formalisation). Whereas Proposition 6 (or financial sector semi-formalisation) is not used because of constraints in the

degrees of freedom, Proposition 8 (or financial sector non-formalisation) displays a substantial degree of substitution with Proposition 7.

Two sets of financial indicators that are consistent with the policy syndrome of surplus liquidity in financial institutions are employed. First, credit availability or financial allocation activity is measured with (i) banking system activity ("private domestic credit by deposit banks") and (ii) financial system activity ("private domestic credit by deposit banks and other financial institutions"). Second, financial allocation efficiency, which appreciates the ability to transform mobilised deposits into credit, is measured with (i) banking-system-efficiency ("banking system credit" on "banking system deposits") and (ii) financial-system-efficiency ("financial system credit" on "financial system deposits").

We account for the potential biases in omitted variables by using six control variables: the lagged dependent variable, GDP growth, inflation, foreign aid, trade and public investment (Osabuohein & Efobi, 2013; Asongu, 2014c). After a pilot assessment, controlling for more than six variables leads to instrument proliferation and the subsequent invalidity of the estimated models because the numbers of instruments are higher than the number of cross-sections in specifications. We discuss the expected signs in the light of empirical literature.

Trade openness is positively linked to financial development (Huang & Temple, 2005). Investment is also positively related to the outcome variable (Huang, 2011). Both empirical (Boyd *et al.*, 2001) and theoretical (Huybens & Smith, 1999) studies are in accordance with the perspective that countries with substantially high inflation are linked with smaller, less active and less efficient banks. There is also some consensus in the literature on the positive relationship between growth and the outcome variable (Jaffee & Levonian, 2001). This is essentially because economic growth is related to enhancing financial intermediation due to, *inter alia*, boosted competition and the availability of more funds for productive investments. Development assistance is, in principle, expected to increase financial development because it is theoretically meant to mitigate the savings-investment gaps in less-developed countries (Easterly, 2005). The definitions of variables, summary statistics and the correlation matrix are available upon request.

3.2 Methodology

3.2.1 Specification

A Generalised Method of Moments (GMM) with forward orthogonal deviations is adopted as the empirical strategy. The specification is the Roodman (2009ab) extension of Arellano and Bover (1995), which limits instrument proliferation and controls for cross-

sectional dependence. Moreover, the two primary conditions for the employment of the GMM technique are satisfied because of the following: (i) the financial access dependent variables are persistent, given that their correlations with corresponding lags are higher than the rule of thumb threshold of 0.800 and (ii) the number of time series (T=8) is less than the number of cross sections (N=53). Therefore, N>T (Tchamyou *et al*., 2018).

The following equations of the levels (1) and the first difference (2) summarise the estimation procedure.

$$Fin_{i,t} = \sigma_0 + \sigma_1 Fin_{i,t-\tau} + \sigma_2 FSC_{i,t} + \sigma_3 ISO_{i,t} + \sigma_4 Inter_{i,t} + \sum_{h=1}^{5} \delta_j W_{h,i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$\begin{aligned} Fin_{i,t} - Fin_{i,t-\tau} &= \partial_1 (Fin_{i,t-\tau} - Fin_{i,t-2\tau}) + \partial_2 (FSC_{i,t} - FSC_{i,t-\tau}) + \partial_3 (ISO_{i,t} - ISO_{i,t-\tau}) \\ &+ \partial_4 (Inter_{i,t} - Inter_{i,t-\tau}) + \sum_{h=1}^{5} \delta_j (W_{h,i,t-\tau} - W_{h,i,t-2\tau}) + (\xi_t - \xi_{t-\tau}) + \varepsilon_{i,t-\tau} \end{aligned} \quad , \quad (2)$$

where $Fin_{i,t}$ is the financial access (financial allocation activity or efficiency)[3] of country i at period t, $FSC_{i,t}$ is the financial sector competition (financial formalisation and informalisation) of country i at period t, ISO represents the information sharing offices (public credit registries or private credit bureaus), $Inter$ represents the interaction between FSCs and ISOs, W is the vector of five control variables (*inflation, foreign aid, trade, public investment,* and *GDP growth*), σ_0 is a constant, τ represents the coefficient of autoregression, which is one in this case, η_i is the country-specific effect, ξ_t is the time-specific constant and $\varepsilon_{i,t}$ is the error term. A *two-step* specification is adopted instead of the *one-step* approach because it accounts for heteroscedasticity.

Consistent with Brambor *et al.* (2006), all constitutive terms are involved in the specification and the interactive estimates are interpreted as marginal impacts. As discussed in the introduction, an interactive empirical strategy is adopted because it enables the study to investigate the main concern motivating the study: the role of information sharing offices in modulating the effect of financial sector competition on financial access.

3.2.2 Identification and exclusion restrictions

All independent variables are suspected to be endogenous or predetermined (Tchamyou & Asongu, 2017b; Boateng *et al*., 2018). Therefore, whereas the *gmmstyle* is employed for the predetermined indicators, only the years are treated as strictly exogenous,

[3] In the study, financial access is proxied with financial activity and financial allocation efficiency.

and the procedure for treating the *ivstyle* (years) is 'iv(years, eq(diff))' because it is not very likely for the years to become endogenous in the first-difference (Roodman, 2009b).

To tackle the concern of simultaneity, lagged regressors are employed as instruments for forward-differenced variables. Accordingly, fixed effects are removed because they can influence the investigated nexuses. Helmet transformations that are performed entail the forward mean-differencing of the variables in which the mean of future observations are subtracted from the variables instead of subtracting the previous observations from those that are contemporary (Asongu & De Moor, 2017). Orthogonal and parallel conditions between lagged values and forward-differenced variables are ensured with the underlying transformations.

On the exclusion restriction, the years that are treated as strictly exogenous are expected to influence the outcome variable exclusively via endogenous explanatory variables. The statistical relevance of the exclusion restriction is investigated with the Difference in Hansen Test (DHT) for instrumental exogeneity. In essence, the alternative hypothesis of the test should be rejected for the instruments to elucidate the dependent variable exclusively via the endogenous explaining variables.

It is relevant to note that in the standard instrumental variable (IV) procedure, rejecting the alternative hypothesis of the Sargan Overidentifying Restrictions (OIR) test implies that the instruments elucidate the outcome variable exclusively via the examined mechanisms or the explanatory variables. While this information criterion has been employed in the literature using an IV estimation technique (Beck *et al.*, 2003; Asongu & Nwachukwu, 2016), in the adopted GMM procedure, the DHT is employed to examine whether the years exhibit strict exogeneity by explaining financial access exclusively via the proposed endogenous explaining variable or channels. In the light of the above, the validity of the exclusion restriction in the findings is confirmed if the alternative DHT hypothesis related to IV (year, eq(diff)) is rejected.

4. Empirical results

4.1 Presentation of results

The empirical analysis is presented in two levels. Table 2 shows the findings related to financial allocation activity, while Table 3 reveals those that are related to financial allocation efficiency. Four post-estimation diagnostic tests are used to assess the validity of the models

(Asongu & De Moor, 2017)[4]. The findings are discussed in three stages, notably in terms of the marginal impacts, the net effects and the thresholds at which the marginal impacts with ISOs change the sign of the unconditional financialisation impact. Moreover, for an investigated threshold to have any economic significance, it is supposed to be within the range of the corresponding minimum to maximum values provided by the summary statistics. For instance, in the last specification of Table 2, (i) the marginal effect of PCBs on financial informalisation for financial system activity is 0.136, (ii) the corresponding net effect is -15.397 ([4.223 ×0.136] -15.972)[5] and (iii) the threshold at which the positive marginal effect changes the unconditional negative effect of financial informalisation (-15.972) from negative to positive is 117.441 (15.972/0.136). Unfortunately, the positive threshold is not within the PCB range (0.000 to 64.80) that is disclosed in the summary statistics.

The following findings can be established for Table 2 on the linkages between financial activity, financialisation and information asymmetry. First, on the left-hand-side (LHS) related to banking system activity, (i) the PCRs interact with financial formalisation to produce a positive marginal effect, (ii) the corresponding net effect is positive, while (iii) a positive synergy is apparent instead of a threshold because both the unconditional and conditional effects are positive. Second, still on the LHS, (i) the PCBs interact with financial informalisation to produce a positive marginal impact, (ii) the corresponding net effect is negative, and (iii) the positive threshold is not within the range. Third, the findings on the LHS of the banking system activity are confirmed by those on the right-hand side (RHS) of the financial system activity. Fourth, the significant control variables have the expected signs.

In Table 3, on the linkages between financial efficiency, financialisation and information asymmetry, no valid inferences can be derived from the RHS at the 1% significance level because the post-estimation diagnostic tests reveal the presence of autocorrelation in the residuals. On the LHS, the two specifications in which post-estimation autocorrelation are absent have either an unconditional or a conditional effect that is insignificant.

---

[4] "*First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR(2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second, the Sargan and Hansen Overidentification Restrictions (OIR) tests should not be significant because their null hypotheses are that the instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but is not weakened by the instruments, the Hansen OIR is robust but is weakened by instruments. In order to restrict the identification or limit the proliferation of instruments, we have ensured that the instruments are lower than the number of cross-sections in most specifications. Third, the Difference in Hansen Test (DHT) for the exogeneity of instruments is also employed to assess the validity of the results from the Hansen OIR test. Fourth, a Fischer test for the joint validity of the estimated coefficients is also provided*" (Asongu & De Moor, 2017, p. 200).

[5] 4.223 is the mean value of PCBs.

Table 2: Financial Activity, Financial Sector Competition and Information Asymmetry

	Financial Activity							
	Banking System Activity (Pcrb)				Financial System Activity (Pcrbof)			
	Proposition 5		Proposition 7		Proposition 5		Proposition 7	
	PCR	PCB	PCR	PCB	PCR	PCB	PCR	PCB
Constant	**-22.324*** **	**-11.701*** **	-0.548	**3.174*** **	**-20.150*** **	**-11.311*** **	1.379	**3.894*** **
	(0.000)	**(0.000)**	(0.619)	**(0.007)**	**(0.000)**	**(0.000)**	(0.193)	**(0.002)**
Banking System Activity (-1)	**1.004*** **	**1.027*** **	**1.012*** **	**0.995*** **	---	---	---	---
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**				
Financial System Activity (-1)	---	---	---	---	**1.020*** **	**1.043*** **	**1.061*** **	**1.008*** **
					(0.000)	**(0.000)**	**(0.000)**	**(0.000)**
Public Credit Registries (PCR)	**-0.278** *	---	-0.007	---	**-0.367** *	---	**-0.063** **	---
	(0.047)		(0.773)		**(0.055)**		**(0.020)**	
Private Credit Bureaus (PCB)	---	0.019	---	**-0.065*** **	---	-0.004	---	**-0.068*** **
		(0.795)		**(0.000)**		(0.958)		**(0.000)**
Proposition 5	**24.944*** **	**13.259*** **	---	---	**20.668*** **	**13.087*** **	---	---
	(0.000)	**(0.000)**			**(0.000)**	**(0.000)**		
Proposition 7	---	---	**-5.126*** **	**-16.860*** **	---	---	**-5.945** **	**-15.972*** **
			(0.001)	**(0.000)**			**(0.019)**	**(0.000)**
PCR×Proposition 5	**0.290** **	---	---	---	**0.372** *	---	---	---
	(0.037)				**(0.064)**			
PCB×Proposition 5	---	-0.090	---	---	---	-0.069	---	---
		(0.255)				(0.460)		
PCR×Proposition 7	---	---	0.167	---	---	---	0.449	---
			(0.630)				(0.172)	
PCB×Proposition 7	---	---	---	**0.164*** **	---	---	---	**0.136** **
				(0.001)				**(0.013)**
GDP growth	**-0.057** *	**-0.032** **	0.004	**-0.061*** **	-0.028	-0.027	-0.0002	**-0.053** **
	(0.074)	**(0.042)**	(0.796)	**(0.004)**	(0.417)	(0.177)	(0.991)	**(0.026)**
Inflation	-0.003	-0.008	-0.010	-0.022	-0.010	-0.009	-0.022	-0.021
	(0.843)	(0.440)	(0.395)	(0.214)	(0.487)	(0.536)	(0.151)	(0.148)
Public Investment	**0.135*** **	**0.082*** **	**0.042** *	0.037	**0.140*** **	**0.075*** **	**0.097*** **	**0.047** **
	(0.000)	**(0.000)**	**(0.089)**	(0.117)	**(0.000)**	**(0.0001)**	**(0.000)**	**(0.039)**
Foreign Aid	**0.080*** **	**0.045** *	0.034	**0.061** **	**0.074** **	**0.044** *	-0.022	**0.059*** **
	(0.002)	**(0.072)**	(0.121)	**(0.012)**	**(0.015)**	**(0.068)**	(0.435)	**(0.008)**
Trade	**0.024** *	0.009	0.017	**0.017** *	**0.025** **	0.002	**-0.015** *	0.003
	(0.069)	(0.174)	(0.144)	**(0.064)**	**(0.016)**	(0.680)	**(0.075)**	(0.760)
Net Effect with PCR	25.568	---	na	---	24.469	---	na	---
Net Effect with PCB	---	na	---	-16.167	---	na	---	-15.397
Thresholds (-/+) (of ISO)	Synergy(+)	na	na	102.804(+)	Synergy(+)	na	na	117.441(+)
AR(1)	(0.040)	(0.015)	(0.015)	(0.014)	(0.063)	(0.026)	(0.039)	(0.020)
AR(2)	**(0.809)**	**(0.332)**	**(0.443)**	**(0.375)**	**(0.446)**	**(0.317)**	**(0.244)**	**(0.361)**
Sargan OIR	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hansen OIR	**(0.289)**	**(0.197)**	(0.090)	**(0.155)**	**(0.202)**	**(0.142)**	**(0.265)**	**(0.196)**
DHT for instruments								
(a)Instruments in levels								
H excluding group	**(0.343)**	**(0.274)**	**(0.302)**	**(0.442)**	**(0.295)**	**(0.228)**	**(0.321)**	**(0.416)**
Dif(null, H=exogenous)	**(0.304)**	**(0.231)**	**(0.087)**	**(0.114)**	**(0.225)**	**(0.185)**	**(0.289)**	**(0.163)**
(b) IV (years, eq(diff))								
H excluding group	**(0.583)**	**(0.283)**	**(0.314)**	**(0.362)**	**(0.372)**	**(0.254)**	**(0.367)**	**(0.311)**
Dif(null, H=exogenous)	(0.079)	**(0.188)**	(0.036)	(0.073)	**(0.115)**	**(0.128)**	**(0.203)**	**(0.157)**
Fisher	**30120*** **	**55281*** **	**34645*** **	**35105*** **	**87129*** **	**119244*** **	**72114*** **	**76451*** **
Instruments	41	41	41	41	41	41	41	41
Countries	45	45	45	45	45	45	45	45
Observations	260	260	260	260	260	260	260	260

*, **, and ***: significance levels of 10%, 5% and 1%, respectively. DHT: Difference in Hansen Test for the Exogeneity of Instruments' Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold: 1) The significance of the estimated coefficients, the Hausman test and the Fisher statistics, and 2) The failure to reject the null hypotheses of a) no autocorrelation in the AR(1) and AR(2) tests, and b) the validity of the instruments in the Sargan and Hansen OIR tests. GDP: Gross Domestic Product. Proposition 5: Financial Sector Formalisation. Proposition 7: Financial Sector Informalisation.

Table 3: Financial Efficiency, Financial Sector Competition and Information Asymmetry

	Financial Efficiency							
	Banking System Efficiency (BcBd)				Financial System Efficiency (FcFd)			
	Proposition 5		Proposition 7		Proposition 5		Proposition 7	
	PCR	PCB	PCR	PCB	PCR	PCB	PCR	PCB
Constant	**14.808***	**20.753*****	**13.071*****	**26.516*****	**-32.250*****	**-25.956*****	**21.094*****	**31.415*****
	(0.071)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**
Banking System Efficiency (-1)	**0.888*****	**0.873*****	**0.915*****	**0.862*****	---	---	---	---
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**				
Financial System Efficiency (-1)	---	---	---	---	**0.913***	**0.912*****	**0.879*****	**0.869*****
					(0.053)	**(0.000)**	**(0.000)**	**(0.000)**
Public Credit Registries (PCR)	-0.998	---	**0.349*****	---	**0.857***	---	**-0.187****	---
	(0.303)		**(0.000)**		**(0.053)**		**(0.011)**	
Private Credit Bureaus (PCB)	---	-0.253	---	-0.002	---	-0.444	---	**-0.249*****
		(0.574)		(0.916)		(0.253)		**(0.000)**
Proposition 5	9.529	3.664	---	---	**57.349*****	**49.770*****	---	---
	(0.170)	(0.395)			**(0.000)**	**(0.000)**		
Proposition 7	---	---	3.588	**9.411***	---	---	**-33.790*****	**-46.780*****
			(0.507)	**(0.079)**			**(0.000)**	**(0.000)**
PCR×Proposition 5	1.349	---	---	---	**-0.941***	---	---	---
	(0.202)				**(0.053)**			
PCB× Proposition 5	---	**0.496*****	---	---	---	0.225	---	---
		(0.000)				(0.602)		
PCR× Proposition 7	---	---	**-1.941****	---	---	---	**2.226*****	---
			(0.030)				**(0.000)**	
PCB×Proposition 7	---	---	---	-0.056	---	---	---	-0.027
				(0.737)				(0.823)
GDP growth	**0.414*****	**0.496*****	**0.547*****	**0.351*****	**0.351*****	**0.265*****	**0.367*****	**0.181*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.009)**
Inflation	**-0.133*****	**-0.081****	**-0.112*****	**-0.131*****	**-0.092****	**-0.075***	**-0.089****	**-0.114****
	(0.001)	**(0.037)**	**(0.005)**	**(0.000)**	**(0.029)**	**(0.099)**	**(0.013)**	**(0.012)**
Public Investment	-0.106	**-0.167***	-0.084	-0.096	0.074	-0.054	-0.021	-0.024
	(0.280)	**(0.077)**	(0.414)	(0.500)	(0.302)	(0.430)	(0.719)	(0.734)
Foreign Aid	-0.153	-0.125	-0.102	-0.158	0.015	0.051	-0.038	-0.055
	(0.220)	(0.160)	(0.363)	(0.136)	(0.863)	(0.586)	(0.605)	(0.503)
Trade	**-0.141*****	**-0.116*****	**-0.081*****	**-0.151*****	**-0.058****	**-0.048****	**1.336***	**-0.100*****
	(0.000)	**(0.000)**	**(0.004)**	**(0.000)**	**(0.019)**	**(0.035)**	**(0.075)**	**(0.003)**
Net Effect with PCR	na	---	na	---	55.321	---	-28.992	---
Net Effect with PCB	---	na	---	na	---	na	---	na
Thresholds of ISO (-/+)	na	7.378(+)	1.848(-)	na	-60.944(-)	na	15.179(+)	na
AR(1)	(0.001)	(0.001)	(0.001)	(0.001)	**(0.126)**	(0.058)	(0.093)	(0.046)
AR(2)	(0.095)	**(0.112)**	(0.099)	**(0.111)**	(0.018)	(0.018)	(0.021)	(0.017)
Sargan OIR	**(0.596)**	**(0.141)**	**(0.467)**	**(0.198)**	**(0.153)**	(0.011)	(0.001)	(0.000)
Hansen OIR	**(0.586)**	**(0.708)**	**(0.732)**	**(0.413)**	**(0.337)**	**(0.171)**	**(0.331)**	**(0.472)**
DHT for instruments								
(a)Instruments in levels								
H excluding group	**(0.817)**	**(0.545)**	**(0.794)**	**(0.342)**	**(0.257)**	(0.073)	(0.083)	**(0.133)**
Dif(null, H=exogenous)	**(0.362)**	**(0.682)**	**(0.551)**	**(0.461)**	**(0.436)**	**(0.440)**	**(0.698)**	**(0.776)**
(b) IV (years, eq(diff))								
H excluding group	**(0.622)**	**(0.369)**	**(0.659)**	**(0.376)**	**(0.346)**	**(0.188)**	**(0.215)**	**(0.523)**
Dif(null, H=exogenous)	**(0.387)**	**(1.000)**	**(0.637)**	**(0.471)**	**(0.364)**	**(0.291)**	**(0.677)**	**(0.337)**
Fisher	**332.86*****	**1067.06*****	**182.71*****	**454.76*****	**376.69*****	**21340*****	**593.02*****	**2871.28*****
Instruments	41	41	41	41	41	41	41	41
Countries	45	45	45	45	45	45	45	45
Observations	263	263	263	263	260	260	260	260

*, **, and ***: significance levels of 10%, 5% and 1%, respectively. DHT: Difference in Hansen Test for the Exogeneity of Instruments' Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold: 1) The significance of the estimated coefficients, the Hausman test and the Fisher statistics, and 2) The failure to reject the null hypotheses of a) no autocorrelation in the AR(1) and AR(2) tests, and b) the validity of the instruments in the Sargan and Hansen OIR tests. GDP: Gross Domestic Product. Proposition 5: Financial Sector Formalisation. Proposition 7: Financial Sector Informalisation.

4.2 Discussion of results

This section on the discussion of the results is covered in three main strands: (i) the comparatively high coefficient of Proposition 5, (ii) the relevance of the findings in the light of the contending strands in the more general literature, and (iii) the comparison of the results with the African-centric literature. The points are substantiated in chronological order.

First, the comparatively high coefficient corresponding to Proposition 5 can be explained by the weight of the formal financial sector compared to the informal financial sector in the money supply. It is important to note that Proposition 5 represents the progress of the formal financial sector to the detriment of the semi-formal and informal financial sectors, whereas Proportion 7 denotes the evolution of the informal financial sector at the expense of the formal and semi-formal financial sectors. Given that the effects are also contingent on the conditioning information set, it is also reasonable to extend the explanation to the fact that the formal financial sector is more associated with elements of the conditioning information set when compared with the informal financial sector.

Second, with regard to the connection of the findings with broad strands of the literature, it is reasonable to infer that the findings on financial activity are largely consistent with the stream of literature supporting the positive role of ISOs in stimulating financial access (Padilla & Pagano, 2000; Jappelli & Pagano, 2002, 2006; Bennardo *et al*., 2015; Asongu *et al*. 2017a, 2018), whereas the results on financial allocation efficiency are largely in line with the contrasting stream on the negatives of ISOs (Karapetyan & Stacescu, 2014a; Jappelli & Pagano, 2006; Karapetyan & Stacescu, 2014b; Asongu *et al*., 2016). It is important to note that this comparative emphasis in light of the extant conflicting literature is exclusively based on the significant findings from regressions related to financial activity relative to insignificant results pertaining to financial allocation efficiency.

The conception and measurement of the financial access variables can also elucidate their relative significance in the empirics. While financial activity can be considered as a *de facto* measurement of financial access because it represents the access to credit in real terms, financial allocation efficiency can be conceived as a *de jure* measurement of financial access because access to credit is contingent on the ability of banks to transform their mobilised deposits into credit for economic operators. Unfortunately, financial constraints are less associated with financial activity compared to financial allocation efficiency, such as the determinants of surplus liquidity in financial institutions that are not exclusively limited to information asymmetry. For instance, while there are voluntary and involuntary motives for

holding surplus liquidity in banks, asymmetric information is only one aspect of the involuntary motive (Asongu, 2014c, p. 70).

Third, we now discuss how the findings reflect the African-specific literature as covered in the introduction. The findings are broadly consistent with Singh *et al.* (2009), who have concluded that African countries with ISOs for financial institutions enjoy higher levels of financial development. They are also in line with Galindo and Miller (2001) in the perspective that credit registries are more positively associated with financial access compared to credit bureaus. Conversely, the findings run counter to Love and Mylenko (2003), who have shown that, whereas the presence of private registries is linked to a higher share of bank lending and lower constraints in finance, public registries do not have a significant effect on financing constraints. Our results also do not align with Triki and Gajigo (2014), who have concluded that PCBs are more positively connected to financial access compared to PCRs. While the consistency of the established results in the light of the extant African literature on information asymmetry may be explained by the common anticipated theoretical benefits of ISOs in enhancing financial access, the contrasting findings can be explained from both the methodological and periodicity frameworks. From the methodological view, we have used the GMM, which is not employed by any of the comparative studies. On the other hand, the sampled periodicity in this paper is more updated.

5. Concluding implications and future research directions

This study investigates whether information sharing channels that are meant to reduce information asymmetry have led to an increase in financial access. The study employs a Generalised Method of Moments technique using data from 53 African countries during the period from 2004-2011. Information sharing channels are theoretically designed to promote the formal financial sector and discourage the informal financial sector. The study uses two information sharing channels: private credit bureaus and public credit registries. The study found that public credit registries complement the formal financial sector to promote financial access. Moreover, there is a synergy effect from such a complementarity because both the independent effect of the formal financial sector and the combined effect (between public credit registries and the formal financial sector) are positive on access to credit.

The main implication of the finding is that information sharing offices (ISO) should be encouraged as a means of information sharing for access to credit. ISOs also play the role of a disciplining device by discouraging borrowers from resorting to the informal financial sector

as a viable alternative to the formal financial sector (Coccorese & Pellecchia, 2010; Coccorese, 2012). The synergy between public credit registries and the formal financial sector for access to credit is further evidence of the fact that the introduction of ISOs should be combined with policies of formal financial sector development.

The introduction of concepts of financial sector competition merges two branches of research by concurrently contributing to the literature on measuring development finance and the economic development literature on the mechanisms by which ISOs can stimulate financial sector competition for access to credit. The simultaneous contribution provides a practical means to understanding the mechanisms by which access to credit is influenced by the complementarity between various financial sectors and ISOs.

The extant literature can be improved by investigating the established linkages throughout the conditional distribution of the access to credit variables. The intuition for this recommendation is that policies on the complementary between ISOs and competition within the financial sector may be contingent on the initial levels of access to credit. Hence, blanket policies may be ineffective unless they are contingent on the initial levels of the access to credit and are tailored differently across countries with low, intermediate and high levels of access to credit. Moreover, other dimensions of access to credit can be explored, given that allocative efficiency goes beyond the transformation of deposits into credit. This is essentially because it also entails efficient pricing mechanisms and opportunities for risk sharing.

References

Adeusi, S. O., Azeez, B. A., & Olanrewaju, H. A., (2012). "The Effect of Financial Liberalization on the Performance of Informal Capital Market", *Research Journal of Finance and Accounting*, 3(6), pp. 1-16.

Allen, F., Otchere, I., & Senbet, L. W., (2011). "African financial systems: a review", *Review of Development Finance*, 1(2), pp. 79-113.

Asongu, S. A., (2014a). "Knowledge Economy and Financial Sector Competition in African Countries", *African Development Review*, 26(2), pp. 333-346.

Asongu, S. A., (2014b). "Financial development dynamic thresholds of financial globalisation: evidence from Africa", *Journal of Economic Studies*, 41(2), pp. 166-195.

Asongu, S. A., (2014c). "Correcting Inflation with Financial Dynamic Fundamentals: Which Adjustments Matter in Africa?", *Journal of African Business*, 15(1), 64–73.

Asongu, S. A., (2015a). "Liberalisation and Financial Sector Competition: A Critical Contribution to the Empirics with an African Assessment", *South African Journal of Economics*, 83(3), pp. 425-451.

Asongu, S. A., (2015b). "Financial Sector Competition and Knowledge Economy: Evidence from SSA and MENA Countries", *Journal of the Knowledge Economy*, 6(4), pp. 717-748.

Asongu, S. A., Anyanwu, J. C., & Tchamyou, S. V., (2017a). "Technology-driven information sharing and conditional financial development in Africa", *Information Technology for Development.* DOI: 10.1080/02681102.2017.1311833.

Asongu S. A. & De Moor, L., (2017). "Financial globalisation dynamic thresholds for financial development: evidence from Africa", *European Journal of Development Research*, 29(1), pp. 192–212.

Asongu, S. A., Le Roux, S., & Biekpe, N., (2017b). "Environmental degradation, ICT and inclusive development in Sub-Saharan Africa", *Energy Policy*, 111(December), pp. 353-361.

Asongu, S. A., Le Roux, S., & Tchamyou, V. S., (2018). "Essential Information Sharing Thresholds for Reducing Market Power in Financial Access: A Study of the African Banking Industry", *Journal of Banking Regulation*. DOI: 10.1057/s41261-018-0065-4.

Asongu, S. A, & Nwachukwu, J. C., (2016). "Foreign aid and governance in Africa", *International Review of Applied Economics*, 30(1), pp. 69-88.

Asongu, S. A, & Nwachukwu, J. C., (2018). "Bank size, information sharing and financial access in Africa", *International Journal of Managerial Finance*. DOI: 10.1108/IJMF-08-2017-0179.

Asongu, S. A., Nwachukwu, J., & Tchamyou, S. V., (2016). "Information Asymmetry and Financial Development Dynamics in Africa", *Review of Development Finance,* 6(2), pp. 126-138.

Arellano, M., & Bover, O., (1995). "Another Look at the Instrumental Variable Estimation of Error Component Model" .*Journal of Econometrics*, 68(1), pp. 29-52.

Aryeetey, E., (2005). "Informal Finance and Private Sector Development in Africa", *Journal of Microfinance*, 7(1), pp. 13-37.

Barth, J., Lin, C., Lin, P., & Song, F., (2009), "Corruption in bank lending to firms: cross-country micro evidence on the beneficial role of competition and information sharing", *Journal of Financial Economics*, 99(3), pp. 361-368.

Batuo, M. E., & Kupukile, M., (2010), "How can economic and political liberalization improve financial development in African countries?", *Journal of Financial Economic Policy*, 2(1), pp. 35-59.

Beck, T., Demirgüç-Kunt, A., & Levine, R., (2003), "Law and finance: why does legal origin matter?", *Journal of Comparative Economics*, 31(4), pp. 653-675.

Bennardo, A., Pagano, M., & Piccolo, S., (2015). "Multiple-bank lending, creditor rights, and information sharing", *Review of Finance*, 19(2), pp.519-570.

Boateng, A., Asongu, S. A., Akamavi, R., & Tchamyou, V. S., (2018). "Information Asymmetry and Market Power in the African Banking Industry", *Journal of Multinational Financial Management*, 44(March), pp. 69-83.

Boyd, J. H., Levine, R., & Smith, B. D., (2001), "The impact of inflation on financial sector performance", *Journal of Monetary Economics*, 47, pp. 221-248.

Brambor, T., Clark, W. M., & Golder, M., (2006). "Understanding Interaction Models: Improving Empirical Analyses", *Political Analysis*, 14(1), pp. 63-82.

Chen, C., (2009). "Bank Efficiency in Sub-Saharan African Middle-Income Countries", *IMF Working Paper*, No. WP/09/14, Washington.

Coccorese, P., (2012), "Information sharing, market competition and antitrust intervention: a lesson from the Italian insurance sector", *Applied Economics*, 44(3), pp. 351-359.

Coccorese, P., & Pellecchia, A., (2010), "Testing the 'Quiet Life' Hypothesis in the Italian Banking Industry", *Economic Notes by Banca dei Paschi di Siena SpA*, 39(3), pp. 173-202.

Daniel, A., (2017). "Introduction to the financial services in Africa special issue", *African Journal of Economic and Management Studies*, 8(1), pp. 2-7.

Darley, W. K., (2012), "Increasing Sub-Saharan Africa's Share of Foreign Direct Investment: Public Policy Challenges, Strategies, and Implications", *Journal of African Business*, 13(1), pp. 62-69.

Easterly, W., (2005). "What did structural adjustment adjust? The association of policies and growth with repeated IMF and World Bank adjustment loans," *Journal of Development Economics*, 76(1), pp. 1-22.

Fanta, A. B., (2016). "Complementarity between Relationship Lending and Collateral in SME Access to Bank Credit: Evidence from Ethiopia", *Journal of African Business*, 17(3), pp. 308-318.

Fowowe, B., (2014). "Law and Finance Revisited: Evidence from African Countries", *South African Journal of Economics*, 82(2), pp. 193–208.

Galindo, A., & Miller, M., (2001), "Can Credit Registries Reduce Credit Constraints? Empirical Evidence on the Role of Credit Registries in Firm Investment Decisions", *Inter-American Development Bank Working Paper,* Washington.

Hauner, D., & Peiris, S. J., (2005). "Bank Efficiency and Competition in Low-Income Countries: The Case of Uganda", *IMF Working Paper*, No. WP/05/240, Washington.

Hauswald, R & Marquez, R. (2003). "Information technology and financial services competition", *Review of Financial Studies*, 16(3), pp. 921-948.

Huang, Y., (2011). "Private Investment and financial development in a globalised world", *Empirical Economics*, 41(1), pp. 43-56.

Huang, Y., & Temple, J. R. W., (2005), "Does external trade promote financial development?" *CEPR Discussion Paper* No. 5150, London.

Huybens, E., & Smith, B. D., (1999), "Inflation, financial markets and long-run real activity", *Journal of Monetary Economics*, 43(2), pp. 283-315.

IMF (2008, October). "International Financial Statistics Yearbook, 2008", IMF Statistics Department.

Iyke, B., N., & Odiambo, N. M., (2017). "Foreign exchange markets and the purchasing power parity theory: Evidence from two Southern African countries", *African Journal of Economic and Management Studies*, 8(1), pp. 89-102.

Jaffee, D., & Levonian, M., (2001), "Structure of banking systems in developed and transition economies", *European Financial Management*, 7 (2), pp. 161-181.

Jappelli, T., & Pagano, M., (2002), "Information sharing, lending and default: Cross-country evidence", *Journal of Banking & Finance*, 26(10), pp. 2017–2045.

Jappelli, T., & Pagano, M., (2006). Role and effects of credit information sharing. In Bertola, G., Disney, R., & Grant, C. (Eds.), The Economics of Consumer Credit, MIT Press, Cambridge, pp. 347-371.

Kablan, S., (2009). "Mesure de l'Efficacité des Banques dans les Pays en Voie de Développement: Le Cas de l'Union Economique et Monetaire Ouest Africaine (UEMOA) ", *African Development Review*, 21(2), pp. 367-369.

Kablan, S., (2010). "Banking efficiency and financial development in Sub-Saharan Africa", *IMF Working Paper* No.10/136, Washington.

Karapetyan, A., & Stacescu, B., (2014a). "Information Sharing and Information Acquisition in Credit Markets", *Review of Finance*, 18(6), pp. 2247-2281.

Karapetyan, A., & Stacescu, B., (2014b). "Does information sharing reduce the role of collateral as a screening device?", *Journal of Banking and Finance*, 43(C), pp. 48-57.

Kusi, B. A., Agbloyor, E. K., Ansah-Adu, K., & Gyeke-Dako, A. (2017). "Bank credit risk and credit information sharing in Africa: Does credit information sharing institutions and context matter?" *Research in International Business and Finance*, 42(December), pp.1123-1136.

Kusi, B. A., & Opoku- Mensah, M. (2018). "Does credit information sharing affect funding cost of banks? Evidence from African banks". *International Journal of Finance & Economics*, 23(1), pp. 19- 28.

Love, I., & Mylenko, N., (2003), "Credit reporting and financing constraints", *World Bank Policy Research Working Paper Series* No. 3142.

Muazu, I., & Alagidede, P., (2017). "Financial Development, Growth Volatility and Information Asymmetry in sub–Saharan Africa: Does Law Matter?", *South African Journal of Economics*, 84(4), pp. 570-588.

Ndikumana, L., & Blackson, T. M., (2015). "Financing Domestic Investment in African Countries: Does the Source of Financing Matter?", *Journal of African Development*, 17(2), pp. 19-48.

Obeng, S. K., & Sakyi, D., (2017). "Macroeconomic determinants of interest rate spreads in Ghana", *African Journal of Economic and Management Studies*, 8(1), pp. 76-88.

Osabuohien, E. S., & Efobi, E. R., (2013). "Africa's Money in Africa", *South African Journal of Economics*, 81(2), pp. 292-306.

Osah, O., & Kyobe, M., (2017). "Predicting user continuance intention towards M-pesa in Kenya", *African Journal of Economic and Management Studies*, 8(1), pp. 36-50.

O'Toole, C. M., (2014). "Does Financial Liberalization Improve Access to Investment Finance in Developing Countries?", *Journal of Globalization and Development,* 5(1), pp. 41-74.

Padilla, A. J., & Pagano, M., (2000), "Sharing default information as a borrower discipline device". *European Economic Review,* 44(10), pp. 1951–1980.

Petersen, M.A & Rajan, R. (1995). "The effect of credit market competition on lending relationship", *Quarterly Journal of Economics,* 110(2), pp.407-443.

Roodman, D., (2009a). "A Note on the Theme of Too Many Instruments", *Oxford Bulletin of Economics and Statistics*, 71(1), pp. 135-158.

Roodman, D., (2009b). "How to do xtabond2: An introduction to difference and system GMM in Stata", *Stata Journal*, 9(1), pp. 86-136.

Saxegaard, M., (2006), "Excess liquidity and effectiveness of monetary policy: evidence from sub-Saharan Africa", *IMF Working Paper* No. 06/115, Washington.

Singh, R. J, Kpodar, K., & Ghura, D., (2009), "Financial deepening in the CFA zone: the role of institutions", *IMF Working Paper* No. 09/113, Washington.

Tchamyou, V. S., (2018). "Education, Lifelong learning, Inequality and Financial access: Evidence from African countries", *Contemporary Social Science*. DOI: 10.1080/21582041.2018.1433314.

Tchamyou, V. S., & Asongu, S. A., (2017a). "Conditional market timing in the mutual fund industry", *Research in International Business and Finance*, 42(December), pp. 1355-1366.

Tchamyou, V. S., & Asongu, S. A., (2017b). "Information Sharing and Financial Sector Development in Africa", *Journal of African Business*, 18(1) pp. 24-49.

Tchamyou, V. S., Asongu, S. A., & Nwachukwu, J. C., (2018). "Effects of asymmetric information on market timing in the mutual fund industry", *International Journal of Managerial Finance*. DOI: 10.1108/IJMF-09-2017-0187.

Triki, T., & Gajigo, O., (2014), "Credit Bureaus and Registries and Access to Finance: New Evidence from 42 African Countries", *Journal of African Development,* 16(2), pp.73-101.

Tuomi, K., (2011), "The Role of the Investment Climate and Tax Incentives in the Foreign Direct Investment Decision: Evidence from South Africa", *Journal of African Business*, 12(1), pp. 133-147.