

The Role of Formal and Informal Finance in Economic Development



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ABSTRACT: There is an apparent assumption amongst policymakers despite evidence of heavy and increasing reliance on informal finance, the co-existence of formal and informal financial markets, and linkages between informal finance and economic outcomes that, formal rather than informal finance, is needed for economic development. The objective of this study is to examine the role of formal and informal finance in Economic Development. We use White Heteroscedasticity Adjusted and Two-Stage Least Squares Regression for the estimation, with measures of the regulatory framework for protecting financial consumers as instruments. We find that, while access to formal financial services has a positive effect on economic development irrespective of a country's income status, access to informal financial services may positively or negatively affect economic development depending on its source. Further, while formal finance on economic development is positive irrespective of a country's level of development, informal finance is unfavourable for high and middle-income economies. Our findings indicate that the policy choice of broadening access to formal rather than informal financial services is in the right direction. Policymakers should thus intensify efforts at expanding access to formal financial services for enhanced economic development. Nevertheless, policymakers should be mindful of the source contingent impact of informal finance on economic development.

KEYWORDS: Economic Development, Financial Access, Formal Finance, Informal Finance.

1. INTRODUCTION

A fundamental argument in the finance-growth literature is formal and informal finance in the economic development process. According to one strand of the literature, formal finance is what is needed for economic development. This view finds evidence primarily in the microfinance literature linking access to formal financial services to development outcomes.

Access to formal savings, credit and insurance has led to investment in income-generating activities (Cameron and Ananga 2015). Women empowerment and improved welfare (Ashraf, Karlan, and Yin, 2010), poverty reduction (Miled and Rejeb 2015), increased investment and production (Cole, Giné, and Vickery 2013), reduced health-related out-of-pocket spending (Msuya *et al.* 2004) and enhanced societal welfare (Wang *et al.* 2009).

Concurrent to formal access, a large body of empirical evidence links to access to informal finance to economic development through its impact on welfare, savings mobilisation, promoting access to credit and investment and firm growth. Informal finance has been found to enhance the efficiency of resource allocation by mobilising household savings and financing small business activities beyond the formal system's reach (Ghate 1988). It alleviates economic hardships among low-income households by enabling them to mobilise savings, use it to earn income and obtain loans (Chipeta and Mkandawire 1991; Steel, Aryeetey, Hettige, and Nisanke 1997). Further, it promotes the growth of small firms due to reduced reliance on collateral and reputation and relationships (Kislat, Menkhoff and Neuberger 2013; Allen, Qian and Qian 2005).

However, policymakers have an apparent assumption as depicted in recent policy documents and initiatives aimed at alleviating poverty and reducing inequality, such as the Sustainable Development Goals and Financial Inclusion. Formal rather than informal finance is needed for economic development. The focus of financial inclusion, for instance, is to increase the proportion of the population with access to formal financial services. Accordingly, existing measures of Financial Access have tended to be formal and bank-based.

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The number of individuals and firms with an account at a formal financial institution or who borrow or save using a formal financial institution is mainly used as Financial Access measures. Informal sources of finance such as family and friends, private moneylenders and Rotating Savings and Credit Associations (ROSCAs) are ignored as also evident in current efforts aimed at constructing composite indices of financial access to take account of its multi-dimensional nature (see Amidžić, Massara and Mailou 2014; Sarma and Pais 2011). Hence, questioning the adequacy of these measures for measuring financial access in developing and emerging economies has rekindled the formal-informal finance debate that dates back to the 1970s. The fundamental question is whether formal or informal access to financial services is needed for economic development.

This study thus seeks to contribute to the debate by examining the link between financial access and economic development, incorporating informal non-bank sources of finance in measuring financial access. Using the PCA approach, we construct formal and informal financial access indices using cross-country, individual-level 'user side data from the Global Findex Database. Subsequently, we use White's Heteroscedasticity Adjusted Least Squares and the Two-Stage Least Squares (2SLS) instrumental variable estimation technique with measures of the regulatory framework for protecting financial consumers as an instrument for the estimation. Our results indicate that while access to formal financial services positively impacts economic development, access to informal finance may have a positive or negative impact depending on its source. Further, while formal finance on economic development is positive irrespective of a country's level of development, informal finance is negative for high and middle-income countries.

We contribute to the literature by constructing an index of financial access that incorporates informal finance so far ignored in the construction of indices of financial access (see Amidžić, Massara and Mailou 2014; Sarma and Pais 2011). Secondly, we contribute by using the PCA approach, which has the advantage of avoiding aggregation and weighting controversies that plague traditional approaches to index construction, adopted so far in constructing existing composite indices of financial access. Thirdly, our indices are based on 'user-side data rather than 'supplier-side data that have the likelihood of overestimating financial access. Fourthly, we provide cross-country evidence on the formal-informal finance debate. Most of the current evidence has been country based limiting the applicability of the findings. Fifthly, we introduce a new instrument for financial access- the regulatory framework for protecting financial consumers. The remainder of the paper is structured as follows; Section 2.2 discusses the literature on the role of formal and informal financial access and economic development. Section 2.3 presents variables and methodology adopted for the study. We present and discuss our results in section 2.4 and present conclusions in section 2.5.

II. LITERATURE REVIEW

A. Formal finance and economic development

The link between access to formal financial services, including savings and payment services, credit and insurance, and economic development has been examined at the micro (individual, household, and firm) and macro level. Access to formal credit has led to investment in income-generating activities (Cameron and Ananga 2015), an increase in the number of start-ups and an improvement in the profitability of existing ones (Banerjee, Duflo, Glennerster, and Kinnan 2010). Menon and Rodgers (2011), using a pooled sample of household survey data collected by India's National Sample Survey Organization between 1983 and 2000, found that greater access to formal credit services can augment self-employment and thus reduce the extent of unemployment and underemployment. Rahman, Luo, and Minjuan (2015) examined the welfare impacts of microcredit and NGO microfinance providers in Shaanxi, China and found that microcredit participants had increased income, general expenditure and savings. Further existing evidence indicates that it promotes consumption smoothing (Gertler, Levine, and Moretti 2009), enhances the empowerment of women (Weber and Ahmand 2014), facilitates a reduction in child labour, increases child education (Islam and Choe 2013), reduces poverty (Miled and Rejeb 2015) and has a positive effect on certain mental frames of mind and health (Ashraf, Karlan, and Yin 2010).

Much empirical evidence using mostly Randomised Control Trials and Field Experiments also show that, individuals' access to savings, promotes productive investment (Dupas and Robinson 2013) consumption (Dupas and Robinson, 2009; Ashraf, Karlan, and Yin 2010), increases savings (Ashraf, Karlan and Yin, 2006 2010), promotes women's empowerment (Ashraf et al. 2010) and facilitates capital accumulation and investment in health and education (Prina 2012). Flory (2011) used a natural field experiment in Malawi to find that formal savings adoption increased wealth transfers to the worst-off households and improved their welfare. Ashraf et al. (2010) found that individually held commitment to savings in the Philippines resulted in women's empowerment, as shown in a shift towards purchasing female-oriented durable goods in the household. Prina (2012), using a field experiment in Nepal, found that access to savings by micro-enterprises promotes economic development by aiding microenterprise owners to accumulate resources to purchase additional capital. Dupas and Robinson (2013) also found in rural

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western Kenya that access to savings led to increased total savings, investment and daily private expenditure. Access to insurance (mainly agriculture and health) has also been linked to development outcomes such as productivity (Cai, Chen, Fang and Zhou 2015; Cole, Gine and Vickery 2013), savings (Msuya, Jutting, & Asfaw 2004) and welfare (Wang, Yip, Zhang, and Hsiao 2009).

Concurrent to formal access, a large body of empirical evidence links access to informal finance to economic development through its impact on welfare, savings mobilisation, access to credit and investment and firm growth (Chipeta and Mkandawire 1991). In Ghana, access to informal finance was found to promote household savings and the financing of small businesses ignored by banks (Steel, Aryeetey, Hettige, and Nisanke 1997). Access to informal credit has been found to promote the growth of small firms (Allen, Qian and Qian 2005; Degryse, Lu, and Ongena 2013). Allen, Qian, and Xie (2013) show that informal finance from family members, friends and suppliers enhances firm growth in China. Trade credit has also been a significant source of finance for many firms in developing countries due to inadequate formal finance (Ayyagari et al., 2010). According to Demirgüç-Kunt and Maksimovic (1999), it is an essential source of financing for firms, small or large, around the world. Fisman and Love (2003) also indicate that trade credit provides an alternative form of funds in countries with underdeveloped financial markets, allowing higher growth rates in industries.

B. The formal-informal finance debate

While there is consensus on the pivotal role of broad access to financial services in economic development, a fundamental argument in this literature is the role of formal as opposed to informal finance for economic development. The formal-informal finance debate dates back to the financial repression hypothesis (Mckinnon 1973; Shaw 1973), which served as a blueprint for the International Financial Institutions in their lending and advisory policies for developing countries.

In this framework, the existence of informal financial markets in developing economies was seen as the result of excessive government intervention and repression policies, causing fragmentation and unsatisfied demand and credit rationing, culminating in the emergence of informal financial markets. The informal financial market was thus deemed as a substitute for the formal and something that will eventually wither away once financial systems were liberalised and deepened. Economic dualism was viewed as stifling for allocative efficiency, equity and economic development (Taylor 1983). Accordingly, the policy prescription was removing repressionist policies via interest rate liberalisation, which enabled financial deepening and greater access to formal finance by previously alienated groups, lower the gap between borrowing and lending rates, diminish the role, and eventually eliminate informal financial markets. In line with this view, formal financial intermediaries are argued to be more efficient in intermediation (Shahin 1996), less usurious, suffer less information asymmetry and moral hazard problems, have access to a larger pool of funds and be capable of giving more extensive and more long term loans as compared to informal providers who lack capacity and can only give small short-term loans (Ayyagari, Demirguc-Kunt and Maksimovic 2010).

However, the financial repressionist hypothesis was rejected by the neo- structuralist criticism (see Taylor 1983), which incorporated informal, unorganised or unregulated loan markets in economic models and argued that unorganised loan markets are fully efficient in channelling funds in the financial intermediation process. Jain and Mansuri (2003) argue that, given their ability to gather information about their borrowers and to monitor them, informal lenders are more efficient than formal lenders. Steel, Aryeetey, Hettige and Nisanke (1997) also argue that because they are more able to reduce risk occurrence probability, informal savings and credit associations have the potential to mitigate the problem of information asymmetry and the associated problems of moral hazard, adverse selection, high unit transaction costs, idiosyncratic risks and lack of collateral.

Refuting the financial repression stance on financial dualism, Pischke (1991) argues that, the co-existence of informal finance serving predominantly private, low-income, small-scale and rural populations can be seen as 'healthy and dynamic, permitting more people to participate in financial markets. Similarly, the substitution hypothesis is challenged by evidence of financial dualism in many developing economies where there is co-existence of formal and informal financial markets (Ngawala and Nicole 2013; Tressel 2003). Again, contrary to the hypothesis, empirical evidence indicates that, after more than a decade of the proliferation of formal finance via microfinance institutions, this has not led to the demise of informal finance. Khalily (2002) reports that in Bangladesh, despite the injection of \$700 million microcredit through a network of over 3000 branches over 1000 microfinance institutions and the injection of almost the same amount via a network of commercial and development banks throughout 5yrs, the share of informal finance remained more or less the same.

In recent times, the debate on formal and informal finance in the economic development process has been rekindled due to evidence from China suggesting that formal finance has played a minimal role in financing Chinese economic growth. According to Allen, Qian, and Qian (2005), informal finance is the bulwark of small private firms, which provides most of the economic growth in China. This view was, however, challenged by Ayyagari, Demirgüç-Kunt, and Maksimovic (2010). They

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provide evidence that formal finance is associated with higher firm growth for the average firm, while informal finance is not. However, Degryse, Lu, & Ongena (2013), who examined the relationship between different modes of external financing (informal, formal and co-funding) and firm growth, using a survey dataset of privately owned Chinese firms, argue that Ayyagari, Demirgüç-Kunt and Maksimovic (2010) used the average firm which hides a vital heterogeneity. They find that informal finance is associated with a higher sales growth rate for small firms but not for large firms. Allen, Qian and Xie (2013), however, argue that whether informal finance will impact firm growth or not depends on the source of the informal finance.

They show that while informal finance from moneylenders endangers firm growth, informal finance from family members, friends and suppliers enhances firm growth in China. Some authors, however, suggest that the everyday use of formal and informal finance rather than the sole use of either constitutes a more optimal financing mix (see Allen and Qian 2010; Degryse, Lu and Ongena 2013). Degryse, Lu and Ongena (2013), for instance, found that, co-funding results in higher sales growth of small firms and hence better propels the growth of small firms. According to the study, this is attributable to complementarities between formal and informal finance, which leads to enhanced benefits when both are used jointly. In light of the above, it is evident that the debate is inconclusive, indicating that more empirical evidence needs to be gathered to understand better the role of formal versus informal finance in economic development.

III. METHODOLOGY

This study uses cross-country data from the UNDP, World Bank's World Development Indicator (WDI) and Global Financial Inclusion Index (Global Findex) databases for the year 2014. Our sample consists of 143 countries included in the Global Findex surveys (2014) listed in Appendix A.

A. Model Specification

Following cross country growth models in the finance–growth literature, we specify the relationship between financial access and economic development as done in Beck, Levine, and Loayza (2000) and Gohou and Soumare (2012) as follows;

$$EDev_i = f(x_i, z_i) \dots\dots\dots (1)$$

$$EDev_i = \alpha_0 + \alpha_i Finance_i + Z_i' \beta + \varepsilon_i \dots\dots\dots (2)$$

Where ' $EDev_i$ ' denotes to economic development for country 'i'; $Finance_i$ denotes financial access for country 'i'; Z_i' denotes a vector of conditioning variables for country 'i'; α_0 , α_i , β are coefficients and ε_i is the error term.

B. Variables

' $EDev_i$ ' in our model is the dependant variable and denotes economic development for country 'i'. It is measured by four proxy variables – Human Development Index (HDI), Inequality Adjusted Human Development Index (IHDI). Higher HDI and IHDI indicate better economic development. We thus expect a positive relationship with financial access.

' $Finance_i$ ' in the model is the primary explanatory variable. It denotes access to formal and informal finance, proxied by two indices: the Formal Financial Access Index (FFAI) and the Informal Financial Access Index (IFAI). The Indices are constructed using fourteen indicators measuring access to credit, savings, transactions and insurance services from formal and informal sources based on the Global Findex's core set of indicators and sub-indicators of financial inclusion, as set out in Table 1.

' Z_i ' denotes a vector of conditioning variables for country 'i'. In line with the finance-growth literature, we include conditioning variables that determine the impact of finance on economic development: investment, the openness of an economy, financial development, macroeconomic stability, institutional quality, and population. For investment, we use gross savings to GDP (GS) as a proxy. Higher savings promote economic development through its effect on capital accumulation and output or increased investment (Solow 1956). Hence, we expect gross savings to be positively related to economic development. The population is measured as the growth rate in the total number of people in the country. The effect of population on growth could be positive or negative. Petrakos, Arvanitidis, and Pavleas (2007) indicate that a high population growth rate could negatively impact economic growth by impacting the dependency ratio, investment and savings behaviour, and quality of human capital. However, Pritchett (2001) finds no correlation between economic growth and demographic trends. Financial development is proxied by domestic credit to the private sector as a percentage of GDP (DC). Domestic credit provided to the private sector is seen as an engine for economic growth. Schumpeter (1912) posits that investment, financed mainly by domestic credit, is the origin of economic growth. Hence, we hypothesise a positive relation between Domestic credit provided to the private sector and economic development.

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TABLE I: Indicators of formal and informal financial access

Indicator	Description
FFAI	Formal Financial Access Index <i>Access to credit</i>
BFI	○ % of adults 15+ who over the past 12 months borrowed from a financial institution
OM	○ % of adults 15+ who over the past 12 months have an outstanding mortgage
FS	<i>Access to savings</i> ○ % of adults 15+ who over the past 12 months saved using a formal financial institution
MS	<i>Access to transaction services</i> ○ % of adults 15+ who over the past 12 months sent money via a mobile phone
MR	○ % of adults 15+ who over the past 12 months received money via a mobile phone
MUB	○ % of adults 15+ who over the past 12 months paid utility bills via a mobile phone
SR	○ % of adults 15+ who over the past 12 months sent domestic remittances via a financial institution
RR	○ % of adults 15+ who over the past 12 months received domestic remittances via a financial institution
GT	○ % of adults 15+ who over the past 12 months received government transfers via a financial institution
RW	○ % of adults 15+ who over the past 12 months received wages via a financial institution
IFAI	Informal Financial Access Index <i>Access to credit</i> ○ % of adults 15+ who over the past 12 months borrowed from a private moneylender
BPML	○ % of adults 15+ who over the past 12 months borrowed by buying on credit from a store
SC	○ % of adults 15+ who over the past 12 months borrowed from family and/or friends
BFF	<i>Access to savings</i> % of adults 15+ who over the past 12 months saved with a person outside the family
IS	

As a proxy for macroeconomic stability, we use the ratio of government expenditure to GDP (GC). Government expenditure can affect growth negatively or positively. High government expenditure can put a heavy burden on the economy if it is financed via high taxes. The resources are used to finance bloated bureaucracy, ineffective public programs, distort market incentives, and assume roles more appropriate for the private sector (Loayza and Soto 2002). On the other hand, it can play a beneficial role for the economy. For many developing countries, citizens' basic needs such as education and health are provided via government expenditure (Gohou and Soumare 2012). To account for institutional quality, we use the civil liberties index (CL). The political environment, such as political instability, political and civil freedom, and institutional frameworks such as the rule of law, the risk of expropriation and property rights, is key to its economic development (Acemoglu, Johnson and Robinson 2002). Investors will only invest where their rights are protected and their investments are secure (Djankov, McLiesha and Shleifer 2007). The higher the civil liberties index, the weaker the institutional quality. Hence, we expect a negative relationship between the civil liberties index and economic development. To proxy for the degree of openness of the economy, we use the sum of exports and imports to GDP (TT). Trade openness promotes economic development by exploiting comparative advantage, technology transfer, and diffusion of knowledge, increasing scale economies and competition. For high-income countries, however, due to large domestic markets, trade openness could increase exposure to international shocks. Empirical evidence of

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its link with economic development is hence mixed. While some find that it leads to faster growth, others find it has no significant effect on growth (Prichett 2001). The list of variables, their description and data source are presented in Table 2.

To investigate whether the role of formal-informal finance varies according to the level of development, we classify our sample into three groups using the World Bank's country classification by income, namely, high, upper middle, lower middle, and low income.

TABLE II: Dependent explanatory and conditioning variables and data source

Dependant Variable		
<i>Edev</i>	Economic development	
<i>HDI</i>	Human Development Index	UNDP, 2014
<i>IHDI</i>	Inequality-Adjusted Human Development Index	UNDP, 2014
<i>GII</i>	Gender Inequality Index	UNDP, 2014
<i>GDI</i>	Gender Development Index	UNDP, 2014
Explanatory Variables		
	Formal financial access index	Formal financial access index
<i>FFAI</i>	Informal financial access index	Authors computation
<i>IFAI</i>		
Conditioning variables		
<i>Investment</i>		
GS	Gross savings /GDP	WDI, 2014
<i>Financial Development</i>		
DC	Domestic credit/GDP	WDI, 2014
<i>Macroeconomic Stability</i>		
GC	Final Government consumption expenditure/GDP	WDI, 2014 WDI, 2014
<i>Political Environment</i>		
CL	Civil liberties index ^a	Freedom House
<i>Openness of the economy</i>		
TT	The sum of imports and exports of goods and services/ GDP	
	Population growth rate	WDI, 2014
POP		WDI, 2014

This classification is based on countries GNI per capita. Countries with GNI per capita of below \$995 are low income, those with GNI per capita between \$996 and \$3895 are lower-middle, those with GNI per capita between & \$3896 and \$12,055 are upper-middle. In contrast, those with GNI per capita exceeding \$12,055 are high income. For the sake of sample size issues, we divide the countries in our sample into high, middle and low levels of development, merging the lower-middle-income countries with the low-income countries.

C. Index Construction

Indices of formal and informal financial access to capture the various dimensions of access to financial services-formal and informal credit, savings, payments and insurance are constructed by multiplying the Principal Components Analysis (PCA) generated weights, also referred to as component loadings, by the indicators of financial access in line with the approach of Pradhan et al. (2014) as follows;

$$IFAI_i = \sum_{j=1}^4 X_i^{**} w_j \quad (3)$$

$$= BPML_i * w_1 + BFF_i * w_2 + SC_i * w_3 + IS_i * w_4 \quad (4)$$

Where $IFAI_i$ denotes informal financial access index for country 'i'; X_i^{**} denotes indicators of informal financial access for country 'i'; w_j Denotes weight of variable X about principal component 'j'.

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$$FFAI_i = \sum_{j=1}^{10} X_i^* w_j \quad (5)$$

$$= OM_i * w_1 + BFI_i * w_2 + FS_i * w_3 + GT_i * w_4 + RW_i * w_5 + RR_i * w_6 + SR_i * w_7 + MS_i * w_8 + FIA_i * w_9 + MUB_i * w_{10} \quad (6)$$

Where FFAI denotes formal financial access index; w_j Denotes weight of variable X about principal component 'j'; X_i^* denotes indicators of formal financial access for country 'i'. A detailed description of these indicators is presented in Table 1.

IV. RESULTS AND DISCUSSION

A. Summary statistics

Table III: Summary statistics- dependant, explanatory, and conditioning variables

Variable	Obs.	Mean	Std.Dev.	Min	Max
HDI	136	0.7072	0.1573	0.3483	0.9439
IHDI	122	0.5696	0.1907	0.2355	0.8932
FFAI	143	0.0000	0.8991	-1.5910	2.3897
IFAI	143	0.0000	0.7206	-0.9333	2.5096
DC	135	58.1018	49.1808	0.0000	250.6176
GS	123	21.1614	10.6968	-7.2519	49.6565
GC	139	16.0752	6.5219	5.3375	63.9353
POP	142	1.3441	1.2579	-1.6328	5.9675
TT	140	91.3425	60.8332	0.0000	438.7612
CL	141	3.3759	1.8652	1.0000	7.0000

HDI- human development index; IHDI- inequality-adjusted human development index; FFAI-formal financial access index IFAI- informal financial access index; DC- domestic credit to private sector/GDP; GS- gross savings; POP- population; CL- civil liberties index; TT- sum of exports and imports /GDP; GC government consumption expenditure/GDP

Descriptive statistics and correlation matrix are presented in Tables 3 & 4. In table (4), the correlations matrix shows a positive correlation between our measures of formal financial access (FFAI) and economic development (HDI, IHDI), while informal financial access (IFAI) has a negative correlation with economic development. The correlations give first glance evidence that formal financial access enhances economic development, while informal finance does not.

TABLE IV: Correlation matrix –dependent, explanatory and conditioning variables

	HDI	IHDI	FFAI	IFAI	DC	GS	POP	CL	TT	GC
HDI	1									
IHDI	0.9751*	1								
FFAI	0.7538*	0.7301*	1							
IFAI	-0.3746*	-0.4613*	-0.1892*	1						
DC	0.6281*	0.6245*	0.5227*	-0.269*	1					
GS	0.3447*	0.2718*	0.292*	0.0531	0.1936*	1				
POP	-0.6314*	-0.7079*	-0.4546*	0.3626*	-0.327*	-0.0962	1			
CL	-0.324*	-0.3008*	-0.2541*	0.1529	-0.1989*	-0.1563	0.193*	1		
TT	0.3298*	0.3397*	0.2694*	-0.271*	0.3452*	0.1612	-0.1608	-0.1595	1	
GC	0.1296	0.1242	0.1292	-0.055	0.0965	-0.0463	-0.0252	0.0935	0.058	1

HDI- human development index; IHDI- inequality-adjusted human development index; FFAI-formal financial access index IFAI- informal financial access index; DC- domestic credit to private sector/GDP; GS- gross savings; POP- population; CL- civil liberties index; TT- sum of exports and imports /GDP; GC government consumption expenditure/GDP

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B. Results of White Adjusted Least Squares Estimation

TABLE 5: White Adjusted Least Squares results - formal and informal finance and economic development in high, middle and low income economies

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	HDI Full	HDI HI	HDI LI	HDI MI	IHDI Full	IHDI HI	IHDI LI	IHDI MI
FFAI	0.0813*** (0.0107)	0.0362*** (0.0095)	0.0590*** (0.0089)	0.0234 (0.0156)	0.0907*** (0.0126)	0.0566*** (0.0123)	0.0645*** (0.0155)	0.0620 (0.0500)
IFAI	-0.0444*** (0.0137)	-0.0356** (0.0131)	-0.0137 (0.0138)	- 0.0318*** (0.0010)	-0.0709*** (0.0162)	-0.0584*** (0.0168)	0.0066 (0.0194)	-0.0735** (0.0303)
DC	0.0006*** (0.0002)	0.0003** (0.0001)	0.0002 (0.0007)	7.32e-05 (0.0002)	0.0017* (0.0009)	0.0003 (0.0002)	0.0006 (0.0009)	0.0001 (0.0005)
GS	0.0027*** (0.0009)	0.0003 (0.0008)	0.0012 (0.0010)	0.0010 (0.0011)	0.0004 (0.0010)	0.0006 (0.0010)	-0.0005 (0.0014)	-0.0010 (0.0024)
GC	0.0012 (0.0012)	0.0025** (0.0010)	0.0010** (0.0005)	-0.0057** (0.0027)	-0.0514*** (0.0119)	0.0029* (0.0016)	0.0017** (0.0007)	-0.0111** (0.0053)
POP	-0.0334*** (0.0092)	0.0067 (0.0056)	-0.0609*** (0.0010)	-0.0197 (0.0119)	0.0003 (0.0002)	-0.0077 (0.0110)	-0.0731*** (0.0139)	-0.0381* (0.0199)
TT	2.96e-05 (0.0001)	-3.18e-05 (4.35e-05)	0.0001 (0.0003)	0.0002 (0.0003)	-0.0013 (0.0048)	9.97e-05 (0.0002)	0.0001 (0.0005)	0.0007 (0.0005)
CL	-0.0046 (0.0043)	-0.0006 (0.0031)	0.0011 (0.0052)	-0.0101 (0.00963)	0.533*** (0.0397)	0.0010 (0.0048)	0.00141 (0.0071)	-0.0098 (0.0141)
Constant	0.648*** (0.0359)	0.751*** (0.0252)	0.651*** (0.0446)	0.841*** (0.0696)	0.0907*** (0.0126)	0.606*** (0.0418)	0.537*** (0.0702)	0.787*** (0.129)
Observations	113	41	38	34	102	35	37	30
R-squared	0.786	0.672	0.841	0.412	0.811	0.611	0.783	0.536

Note: Dependent variable here is HDI- Human development index. FFAI-formal financial access index; DC- domestic credit to private sector/GDP; GS- gross savings; POP- population; CL- civil liberties index; TT- sum of exports and imports /GDP; GC government consumption expenditure/GDP; HI- High income countries;LI- Low income countries; MI- middle income countries Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results of the White Adjusted Least Squares estimations are presented in Table 3. Results presented in columns (1) and (5) show that formal financial access (FFAI) has a significant positive relationship with economic development irrespective of whether the latter is measured as HDI or IHDI. In columns (1) and (5), a 1 % rise in access to formal finance is associated with an increase of approx—8%, 9%, in HDI and IHDI, respectively. On the other hand, regressing access to informal finance on economic development shows that informal finance (IFAI) has a significant negative relationship with economic development. As indicated in columns (1) and (5), the signs of the co-efficient of the informal financial access index (IFAI) is negative, whether economic development is measured as HDI or IHDI. A 1 % rise in access to informal finance is associated with a decrease of approx—4%, 7%, in HDI and IHDI, respectively.

These findings are in line with Cheng and Degryse (2010) findings, Ayyagari, Demirgüç-Kunt and Maksimovic (2010) and the financial repression hypothesis, which indicates that formal rather than informal finance promotes economic development. According to the financial repression hypothesis, informal credit markets suffer inefficiencies and have monopolistic features; hence, loans channelled through informal channels may be primarily used to support suboptimal and inefficient investments (Shahin 1996). Formal finance through the banking system rather than informal finance thus constitutes the most efficient financial intermediation channel. However, the negative association between informal finance and economic development is contrary to recent evidence that links access to informal finance to development outcomes (see Allen, Qian and Qian 2005; Dupas and Robinson 2013).

C. Does the role of formal-informal finance vary according to the level of development?

Our results also show that formal finance on economic development is positive for high income (column 2,6) and low income (column 3,7) economies. The effect of informal finance on economic development, on the other hand, is negative for high (column 2,6) and middle-income countries (column 4,8). This indicates that formal finance is positively associated with economic development irrespective of the level of development. In contrast, the effect of informal finance on economic development may depend on the level of development. The finding that the effect of formal finance on economic development

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is positive for high and low-income economies is in line with the findings of Deidda and Fattouh (2002) and Huang and Lin (2009). They find a positive link between finance and economic development in high- and low-income countries, respectively. In terms of the macroeconomic determinants of economic development, the results in columns (1) and (5) show overall. In contrast, the level of financial development and investment matter for economic development; increased population growth is inimical to economic development.

D. Does the source of informal finance matter for economic development?

To gain deeper insight into why informal finance could hurt economic development, we decomposed the informal financial access index (IFAI). We examined the effect of its constituent indicators on economic development. Accordingly, we examined the effect of informal savings, borrowing from family and friends, borrowing from a private moneylender and store credit on economic development. Results presented in Table 6 indicate that, apart from the store credit, informal finance from family and friends, a private money lender, and informal savings are negatively related to economic development.

The positive association between store credit and economic development is understandable given that store credit effectively provides short-term, interest-free financing for income generation, which enhances economic development. Fisman and Love (2003) noted that it is an alternative form of finance, allowing a higher growth rate in industries. The negative relationship between informal savings and economic development is, however, contrary to expectation as informal savings schemes such as ROSCSAs have been found to promote the mobilisation of savings for investment(s) which is needed for economic development. However, a possible reason could be that informal savings lack scale and are limited in maturity transformation as they are usually organised around the membership of a group and hardly mobilise funds from third parties (Ghate, 1992). The lack of scale could also explain the negative relationship between borrowing from family and friends and economic development. These loans are usually interest and collateral-free and expected to enhance economic development. In the case of borrowings from a private moneylender, the negative association with economic development is intuitive, given that the interest charges tend to be usurious. Ultimately, our finding is in line with the findings of Allen, Qian, and Xie (2013), which suggests that the economic outcome of informal finance may be contingent upon its source.

TABLE VI: Sources of informal finance and economic development

VARIABLES	(1) HDI	(2) HDI	(3) HDI	(4) HDI
BFF	-0.0035*** (0.0007)			
SC		0.0028* (0.0016)		
BPML			-0.0054** (0.0026)	
IS				-0.0065*** (0.0012)
DC	0.0010*** (0.0002)	0.0011*** (0.0002)	0.0011*** (0.0002)	0.0009*** (0.0002)
GS	0.0035*** (0.0010)	0.0027*** (0.0010)	0.0036*** (0.0010)	0.0022** (0.0009)
GC	0.0023* (0.0013)	0.0030* (0.0015)	0.0025 (0.0015)	0.0013 (0.0013)
POP	-0.0424*** (0.0085)	-0.0527*** (0.0096)	-0.0498*** (0.0104)	-0.0336*** (0.0079)
TT	6.28e-05 (0.0002)	0.0003 (0.0002)	0.0001 (0.0002)	0.0002 (0.0001)
CL	-0.0054 (0.0049)	-0.0078 (0.0049)	-0.0085 (0.0054)	-0.0098** (0.0045)
Constant	0.696*** (0.0391)	0.586*** (0.0441)	0.633*** (0.0439)	0.714*** (0.0375)
Observations	113	113	113	113

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R-squared	0.702	0.649	0.655	0.740
F-Statistic	53.40***	32.39***	38.65***	55.76***

Note: IFAI-informal financial access index; DC- domestic credit to private sector/GDP; GS- gross savings; POP- population; CL- civil liberties index; TT- sum of exports and imports /GDP; GC government consumption expenditure/GDP; BFF-borrowing from family and friends; SC-store credit; BPML-borrowing from private money lender; IS- informal savings. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

E. Robustness test -Instrumental variable estimation

While financial access influences economic development, access to financial services could also be determined by the level of economic development. In light of this, we conducted an instrumental variable estimation to address the potential endogeneity bias arising from the possible reverse causality between access to finance and economic development with measures of the regulatory framework for the protection of financial consumers as instruments as FFS;

$$y_1 = y_2\beta_1 + x_1\beta_2 + u \quad (8)$$

Where y_1 is the dependent variable, economic development, y_2 , is the predicted value of our endogenous variable, financial access and x_1 denotes the exogenous variables.

At the first stage, we estimate

$$y_2 = x_1 y_1 + x_2 y_2 + e \quad (9)$$

And subsequently, incorporate the estimated value for y_2 into our equation (8).

F. Choice of instruments

Several instruments have been used in the Finance-Growth literature to control for reverse causality between finance and growth, including legal origin (Beck, Demirguc-Kunt, and Levine 2006), risk aversion, ethnic fractionalisation (Beck *et al.* 2006) and percentage of years that the country has been independent since 1776 (e.g., Beck *et al.* 2006). Following Beck, Lin and Yue (2014) and Fowowe (2017), who used measures of the banking regulatory and supervisory structure as instrumental variables, we used measures of the regulatory framework for the protection of financial consumers as instruments. It is expected that having an appropriate consumer protection regulatory framework in place will ensure that financial markets are efficient and fair, which will instil confidence in consumers and make them willing to participate in the market while being orthogonal to economic development.

Since we use robust standard errors for our regressions, we do the Woolridge Robust and Robust Score tests to examine the endogeneity of the access to finance variables. First stage regressions indicate that our instruments are significantly positively correlated with our endogenous variable. The F-statistic of the first-stage regressions is also above 10, thereby suggesting that our instruments are vital. For informal finance, the Woolridge robust and the Robust regressions tests indicate no endogeneity between access to informal finance and economic development; accordingly, we can rely on our OLS results, which show that informal finance has a negative impact relationship with economic development.

G Robustness Tests Results --2SLS

Our instrumental variable estimation results presented in Table 5 indicate that, after controlling for endogeneity, formal, financial access still shows a significantly positive relationship with economic development, confirming our initial findings.

TABLE VII: 2SLS Results- Formal Financial Access & Economic Development

VARIABLES	(1)	(2)
	HDI	IHDI
FFAI	0.214** (0.0852)	0.254*** (0.0659)
DC	-8.92e-05 (0.0005)	-0.0002 (0.0006)
GS	0.0004 (0.0016)	-0.0024 (0.0019)
GC	-0.0002	-0.0014

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VARIABLES	(1) HDI	(2) IHDI
	(0.0018)	(0.0019)
POP	-0.0140	-0.0317
	(0.0200)	(0.0197)
TT	3.81e-05	0.0002
	(0.0002)	(0.0003)
CL	0.0002	0.0023
	(0.0065)	(0.0070)
Constant	0.711***	0.666***
	(0.0650)	(0.0826)
Observations	113	102
R-squared	0.416	0.458
Wald Chi2	173.99	221.10
Woolridge's Rob	5.7146**	14.1806***
Rob Reg.	5.1410**	14.4519***
F-first stage	13.42	19.15
Co-eff. instrument	0.0917*	0.1531***

Note: FFAI-formal financial access index; DC- domestic credit to private sector/GDP; GS- gross savings; POP- population; CL- civil liberties index; TT- sum of exports and imports /GDP; GC government consumption expenditure/GDP; Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

V. CONCLUSIONS

There is consensus on the pivotal role of broad access to financial services to reduce persistent income inequality, suboptimal growth and poverty in developing countries. However, a primary argument in the literature is formal and informal finance in economic development. This argument has been rekindled in recent times due to increasing evidence from developing and emerging economies, especially China, linking informal finance to economic development outcomes. This study examined the link between formal and informal access to financial services and economic development. Using the White Heteroscedasticity adjusted OLS Regression, we estimated the link between PCA constructed indices of financial access and economic development. For robustness, we used the 2SLS with measures of the regulatory framework to protect financial consumers as instruments to account for possible endogeneity between financial access and economic development. Our results indicate that, while access to formal financial services positively impacts economic development, access to informal finance may have a positive or negative impact depending on its source.

Further, while the effect of formal finance on economic development is positive irrespective of a country's level of development, informal finance is unfavourable for high and middle-income countries. These findings have important policy implications. The finding that formal finance promotes economic development lends support to the financial inclusion agenda of increasing access to formal financial services. Policymakers should thus intensify efforts aimed at expanding access to formal finance for enhanced economic development. Nevertheless, policymakers should be mindful of the source contingent impact of informal finance on economic development.

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