

IMF Working Paper

Financial Deepening, Property Rights
and Poverty:
Evidence from Sub-Saharan Africa

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African Department

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Abstract

Recent studies on the relationship between financial development and poverty have been inconclusive. Some claim that, by allowing more entrepreneurs to obtain financing, financial development improves the allocation of capital, which has a particularly large impact on the poor. Others argue that it is primarily the rich and politically connected who benefit from improvements in the financial system. This paper looks at a sample of 37 countries in sub-Saharan Africa from 1992 through 2006. Its results suggest that financial deepening could narrow income inequality and reduce poverty, and that stronger property rights reinforce these effects. Interest rate and lending liberalization alone could, however, be detrimental to the poor if not accompanied by institutional reforms, in particular stronger property rights and wider access to creditor information.

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I. INTRODUCTION

While financial development and its effects on economic growth have attracted considerable attention in the literature, far less work has been done on the relationship between financial deepening and poverty. Theory provides conflicting predictions. Empirically, the results have been equally mixed. Yet, lack of access to finance has been argued to be one of the main factors behind persistent poverty.²

Moreover, little of the research that has been done has focused on Africa, despite the prevalence of poverty in this region. Cross-country studies have tended to favor larger samples and focus on developing countries at best. While using a broader sample increases the degrees of freedom, it may also introduce unwanted heterogeneity if factors explaining income distribution or poverty differ between country groups.

Furthermore, financial development is a complex process involving a number of intermediaries. Recent empirical studies have argued that, while necessary, financial liberalization may not be sufficient to foster an environment where the financial sector could function effectively. Institutional reforms related to property rights and creditor information are crucial. Yet the most common measure for financial development—private credit—does not directly capture these dimensions.

This paper aims to contribute to the literature in several ways. First, it looks specifically at sub-Saharan Africa (SSA), reaching more conclusive results on the role of financial deepening in the region than studies with global coverage. Second, it tries to capture explicitly the complexity of financial deepening and examines in particular the role of property rights. Its results suggest that financial deepening could narrow income inequalities and reduce poverty, and that stronger property rights reinforce these effects. However, liberalizing interest rates and lending alone could be detrimental to the poor if not accompanied by institutional reforms, in particular stronger property rights and wider access to creditor information.

In what follows, Section II reviews the literature; Section III discusses the data, describes the methodology, and presents the results; and Section IV draws some conclusions.

II. THEORETICAL BACKGROUND AND REVIEW OF THE LITERATURE

It has been argued that lack of access to finance is one of the main factors behind persistent poverty (Levine, 2008). Because of the high unit costs of small-scale lending and other

² There has also been a considerable literature on the impact of growth and poverty and on how best to reduce income inequality. This paper does not try to argue that financial deepening is the most effective and direct way to reduce poverty, but only discusses a possible association between these two variables.

imperfections, the poor cannot borrow against future earnings to invest. Jacoby (1994), for instance, finds that lack of access to credit perpetuates poverty in Peru because poor households cannot afford to provide their children with appropriate education. Jacoby and Skoufias (1997) show that households from Indian villages without access to credit markets tend to reduce their children's schooling when transitory shocks reduce their income. Similarly, Dehejia and Gatti (2003) and Beegle et al. (2003) show that child labor rates are higher in countries with poorly functioning financial systems.

Theory provides, however, conflicting predictions about the impact of financial development on income distribution and on the income of the poor. If financial markets were perfect, the availability of finance would allow individuals to fund education, training or business opportunities based only on their talent and initiatives, not on parental wealth. As financial markets grow deeper, and access to finance improves, households that did not previously have access to finance might be the main beneficiaries. In this framework, financial development would equalize opportunities by reducing the importance of initial wealth and hence would favor the poor.

Other theories suggest that financial deepening would favor the rich. Financial institutions operate in settings where complete information is often not available. Entrepreneurs seeking financing normally have more information about their projects than their banks do. In this setting, from the viewpoint of a financial institution projects that may have different probabilities of success are indistinguishable. This information asymmetry requires banks to screen applications so as to grant loans only to the most promising projects (Singh, 1992).

The lender cannot rely simply on increasing the interest rate, however. As Stiglitz and Weiss (1981) demonstrated, increases in the interest rate charged on loans may adversely affect the composition of the pool of borrowers. The expected return to the lender depends on the probability of repayment, so the lender would like to be able to identify borrowers who are more likely to repay. Those who are willing to borrow at high interest rates, however, may be riskier: they are willing to borrow at high interest rates because they perceive their probability of repaying the loan to be low. For a given expected return, an increase in interest rates will induce low-risk projects to drop out first, leaving only the riskier ones in the pool.

Loan providers could invest in gathering additional information on projects that would lead to a better perception of the probability of success for a given project (Devinney, 1986; Singh, 1994, 1997). Lensink (1996) observes, for instance, that most people in SSA countries make little use of formal lending institutions: they turn to lenders in the informal sector, who solve information problems by dealing with long-time clients who usually live in the same village. This superior knowledge allows the informal lender to discriminate between high- and low-risk borrowers and charge interest accordingly. In this environment, Lensink argues, liberalizing the formal financial sector could shift funds away from the better informed informal sector and reduce access of the poor to credit.

Alternatively, lenders could require collateral, which imposes a cost if the entrepreneur defaults. As the probability of failure is greater for high-risk projects, the same amount of collateral will reduce the expected profit of these projects by more than that of less risky ones. Bester (1985) demonstrated that lenders could design attractive contracts adapted to the various qualities of borrowers, leading to perfect sorting. In this setting, the poor, who have no formal collateral, would find it difficult to reap the benefits of a larger financial sector. Financial liberalization would thus favor the rich and increase income inequality if not accompanied by reforms to deal with information problems (Banerjee and Newman, 1993; Galor and Zeira, 1993; Piketty, 1997).

Efficient exchange of information can reduce the cost of screening borrowers. In advanced countries, databases centralizing information on borrowers are often established by the private sector or maintained by central banks. These registries collect information on the standing of borrowers in the financial system and make it available to lenders. The system improves transparency, rewarding good borrowers and increasing the cost of default, and could reduce the reliance of the poor on informal finance. Detragiache et al. (2005), Djankov et al. (2005), McDonald and Schumacher (2007), and Singh et al. (2009) all show that information-sharing is associated with greater financial development.

The law and finance literature has stressed the importance of legal institutions (especially those protecting private property rights) in explaining international differences in financial development. Where legal systems enforce private property rights, support private contracts, and protect the legal rights of investors, lenders tend to be more willing to finance firms—in other words, stronger creditor rights tend to promote financial development (Acemoglu and Johnson, 2005, Cottarelli et al., 2003, Dehesa et al., 2007, McDonald and Schumacher, 2007, Tressel and Detragiache, 2008, and Singh et al., 2009).

But how would clearer property rights help the poor? De Soto (2003) argues that the developing world has accumulated a great deal of wealth, but without legal institutions that establish and defend ownership and property rights, much of it is “dead capital” that cannot be sold or collateralized to back loans. The lack of such a legal framework makes it particularly difficult for the poor to leverage their informal ownership into capital.

Finally, the relationship between financial development and poverty may be nonlinear. Greenwood and Jovanovic (1990) present a model where income inequality first rises as the financial sector develops but then declines as more people gain access to the system. Rajan and Zingales (2003) point out that the financial system may acquire greater capacity and interest to bear the high costs of small credits as it becomes stronger and more competitive.

Empirically, the results have been equally mixed. Beck et al. (2007), Honohan (2004), and Jalilian and Kirkpatrick (2002) find that the degree of financial intermediation has a strong positive impact on the income of the poor. Jalilian and Kirkpatrick (2002) use the ratio of bank assets to GDP to measure financial intermediation in a sample of advanced and

developing economies. Beck et al. (2007) and Honohan (2004), looking only at developing countries, capture the role of finance by considering private sector credit.

In contrast, Dollar and Kraay (2002) find that financial development does not affect the poor. They examine the relationship between the average income of the poorest quintile in a sample of advanced and developing economies, and measure financial depth using the ratio of commercial bank assets to total bank assets. Kraay (2002) reaches similar results studying the association between the change in absolute poverty and the ratio of M2 to GDP in a sample of developing countries.

Finally, Guillaumont-Jeanneney and Kpodar (2008) find that the contribution of finance in alleviating poverty depends on the transmission channel. Looking at a sample of developing countries, they find a positive relationship between financial development and poverty if financial development is measured by the ratio of M3 to GDP. If private credit is used instead, the association turns out to be statistically insignificant. Their results suggest that the poor benefit primarily from the ability of the banking system to facilitate transactions and provide savings opportunities rather than reaping the benefit of greater access to credit.

The results on income distribution seem to be less ambiguous. In an analysis of income inequality, Li et al. (1998) find that financial depth contributes significantly to lowering inequality (Gini index). They measure the role of finance using the ratio of M2 to GDP in a sample of advanced and developing economies. Using private sector credit, Beck et al. (2007) and Clarke et al (2006) reach similar results for a similar sample.

Turning to the possibility of a nonlinear relationship between financial development and poverty, Beck et al. (2007) include the squared term of private credit, but the coefficient is never significant. Clarke et al. (2006), however, find some evidence that income inequality might increase at the very early stages of financial development, as suggested by Greenwood and Jovanovic (1990) and Rajan and Zingales (2003). Their results suggest that the turning point for private credit would be about 22 percent of GDP, but they are not robust across various model specifications.

III. EMPIRICAL ANALYSIS

A. Data

Poverty is a complex issue. It has many faces, often changing from place to place and across time. Though it is usually defined as having insufficient resources or income, in its extreme form poverty is a lack of basic human needs, such as adequate food, clothing, housing, clean water, or health services. It is also a lack of education or opportunity, and may be associated with insecurity and fears for the future, lack of representation and freedom.

The literature, which has generally focused on the economic aspect of poverty, mainly uses four related indicators of poverty: the headcount index, the poverty gap, the Gini coefficient, and the income of the poorest quintile. This paper adopts the same approach. The econometric analysis uses panel data for 37 SSA countries averaged over five-year periods from 1992 through 2006.³

The *headcount index* measures the percentage of the population living with per capita consumption or income below the poverty line, defined as US\$1 a day. This is the most popular measure of poverty because, though arbitrary, it provides a quantifiable metric of people living in what a society at one point in time considers unacceptable conditions.

The *poverty gap* takes into account the distance of the poor from the poverty line. This measure characterizes how far below the poverty line lies the average income of the poor and provides some sense of distribution. Unlike the headcount index, this indicator captures a decrease or increase in the income of the poor even when it does not cross the poverty line.

The *Gini coefficient*, the measure most commonly used to describe income disparity, offers a comparative measure of poverty. Indicators based on the poverty line tend to describe poverty in absolute terms. Yet studies suggest that an individual's welfare depends not only on absolute income but also on how his or her income compares with that of the rest of the population. Everyone could be above the poverty line, but the income distribution might be very skewed. The Gini coefficient is derived from the Lorenz curve, with larger values indicating greater income inequality.

The *income of the poorest quintile* is defined as the average per capita income of the poorest 20 percent of the population.

For the right-hand-side variables, the empirical literature has typically used a banking indicator to measure the degree of financial development. As mentioned above, some researchers have used the ratio of broad money to GDP. This measure includes, however, the liabilities of central banks as well as those of commercial banks and other financial intermediaries. It also covers credit to the government and state-owned enterprises. Others have looked at the ratio of commercial bank assets to total bank assets or to GDP, although central banks or governments could influence the flow of credit through moral suasion to favor some sectors of the economy.

More generally, broad money or bank liabilities capture the deposit-gathering activity of the financial system, but they may not be good indicators of the ability of the financial sector to fund the economy. In an environment characterized by rationing and involuntary savings or

³ The choice of period (1992-2006) is dictated by the availability of data on the institutional variables.

inappropriately developed institutions to support credit, looking at the credit to the private sector directly may be more appropriate. Thus some studies have turned to the amount of credit to the private sector in terms of GDP.

This indicator excludes credit to the government or state-owned enterprises, and captures the actual amount of credit channeled from savers to private firms through financial intermediaries. This paper will start by following this approach. We recognize, however, that private credit captures only the contribution of the formal financial sector, leaving out the potentially important role of the informal one, including microfinance. There are two reasons for this: (i) although the informal sector may represent a large number of institutions and loans, in the aggregate the credit it offers is usually dwarfed by that of formal financial institutions; and (ii) when informal financial arrangements become economically substantive, they tend to be integrated into the formal sector.

The research reviewed above suggests that developments in private credit are associated not only with a liberalization of interest rates but also with progress in strengthening property rights and widening access to creditor information. Following this literature, this paper examines the following institutional variables:

The financial liberalization index, constructed for SSA countries by McDonald and Schumacher (2007) based on an earlier study by Gelbard and Leite (1999). This aggregate index, bounded between 0 and 100, captures whether or not interest rates are liberalized, the number of years real lending and deposit rates have been positive, and the existence of a significant informal financial sector and directed credit allocation mechanisms.

The property rights index measures the ability of individuals to accumulate private property, secured by clear laws that the state fully enforces. It ranges between 0 and 100 and is compiled annually by the Heritage Foundation.

The information-sharing index, a dummy variable indicating the presence of either public or private credit registries, is taken from Djankov et al. (2005). A credit registry is defined as a database managed by a government agency or a private organization that collects information on the standing of borrowers in the financial system and makes it available to present and potential lenders.

Finally, in line with Dollar and Kraay (2002), we include a set of control variables that are commonly used as factors determining poverty: overall income per capita, to capture the contribution of economic development (*GDP per capita*); growth of the consumer price index, to control for the macroeconomic environment (*inflation*); the general legal environment, to assess institutional quality (*rule of law*); and the sum of exports and imports as a share of GDP, to capture the degree of international openness (*trade openness*).

Tables 1 and 2 present descriptive statistics and correlations for the sample period. Table 1 shows that there are wide cross-country differences in the prevalence of poverty. Similarly, the countries in the sample demonstrate important variations in financial sector development as measured by the private credit-to-GDP ratio.

Table 1. Descriptive Statistics, 1992-2006

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Headcount index (log)	70	3.62	0.657	0.588	4.39
Poverty gap (log)	70	2.56	0.914	-1.11	3.93
Gini coefficient (log)	76	3.81	0.168	3.50	4.29
Income of the poorest quintile (log)	68	2.50	0.516	0.895	3.69
Private credit over GDP (log)	76	-2.63	1.69	-9.34	-0.436
Financial liberalization	65	60.1	24.6	3.5	100
GDP per capita (log)	76	5.87	0.862	4.48	8.28
Inflation (log)	76	0.120	0.160	-0.0208	1.12
Rule of law	76	-0.633	0.597	-1.77	0.805
Trade openness (log)	76	4.14	0.478	2.98	5.17
Property rights (log)	70	3.70	0.407	2.30	4.25
Information sharing	76	0.558	0.489	0	1

Consistent with previous research, private credit to GDP is correlated positively with GDP per capita. It is also negatively correlated with the headcount index and the poverty gap, and positively with the income of the poorest quartile. Interestingly, there is a small positive correlation between private credit and the Gini coefficient. This result stems from the fact that changes in income distribution are not necessarily reflected in changes in absolute poverty. Changes in the Gini coefficient may be associated, for instance, with income redistributed from the top to the middle class without affecting the bottom quintile (Deininger and Squire, 1996). While the two poverty indicators based on the poverty line, the headcount index and the poverty gap, are strongly positively correlated, there is no strong relation between these two indicators and the Gini coefficient.

Table 2. Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	
Headcount index (log)	1	1.00											
Poverty gap (log)	2	0.98	1.00										
Gini coefficient (log)	3	-0.00	0.09	1.00									
Income of poorest 20% (log)	4	-0.85	-0.91	-0.29	1.00								
Private credit (log)	5	-0.37	-0.39	0.06	0.40	1.00							
Financial liberalization	6	-0.16	-0.17	-0.06	0.26	0.03	1.00						
GDP per capita (log)	7	-0.61	-0.56	0.51	0.37	0.31	0.12	1.00					
Inflation (log)	8	0.19	0.25	0.28	-0.32	-0.17	-0.36	-0.01	1.00				
Rule of law	9	-0.06	-0.06	0.23	-0.04	0.23	0.11	0.31	-0.24	1.00			
Trade openness (log)	10	-0.12	-0.01	0.39	-0.10	0.04	0.07	0.44	0.28	0.21	1.00		
Property rights (log)	11	-0.08	-0.07	0.20	-0.01	0.35	-0.19	0.20	-0.04	0.60	0.15	1.00	
Information sharing	12	-0.12	-0.16	-0.11	0.20	0.00	0.23	0.08	-0.17	-0.22	-0.16	-0.50	1.00

B. Methodology and Main Results

To examine the incidence of financial development on poverty, two exercises will be carried out. First, the paper will study the association between the different measures of poverty and credit to the private sector, allowing for a nonlinear relationship between financial development, and investigate whether property rights help alleviate poverty both directly and indirectly, through a more efficient financial system. We expect to see that stronger property rights not only decrease poverty but also enhance the contribution of financial deepening towards lowering poverty.

For this purpose, a standard model along the lines of Dollar and Kraay (2002) and Clarke et al. (2006) will be used, where poverty depends on financial development, and a set of economic and institutional conditions. We also introduce an index on property rights (PR) and an interaction term with our financial development variable. The model specification is as follows:

$$\log(P_{i,t}) = \alpha_0 + f(FD_{i,t}) + \alpha_2 \cdot \log(PR_{i,t}) + \alpha_3 \cdot \log(FD_{i,t}) \times \log(PR_{i,t}) + \alpha_4 \cdot X_{i,t} + u_i + v_t + \varepsilon_{i,t} \quad (1)$$

where $P_{i,t}$ is one of the poverty indicators in country i at time t . $FD_{i,t}$ represents private credit over GDP, $X_{i,t}$ stands for a set of control variables, u_i is an unobserved country-specific effect; v_t is a time dummy, and $\varepsilon_{i,t}$ is the error term.

and:

$$f(FD_{i,t}) = c_1 \cdot \log(FD_{i,t}) + c_2 \cdot (\log(FD_{i,t}))^2$$

As a second step, to enrich our analysis of financial development, we replace private credit-to-GDP with the indices reflecting financial liberalization and the degree of information-sharing. The model specification becomes:

$$\log(P_{i,t}) = \alpha_0 + \alpha_1 \cdot FL_{i,t} + \alpha_2 \cdot \log(PR_{i,t}) + \alpha_3 \cdot Info_shar_{i,t} + \alpha_4 \cdot X_{i,t} + u_i + v_t + \varepsilon_{i,t} \quad (2)$$

To estimate the coefficients of these two models, we used the Feasible Generalized Least Squares (FGLS) method, which allows us to address the problem of heteroscedasticity. It is also more appropriate for our panel data than fixed effect models because the time span is short; for each country, data are available from at most three periods. Furthermore, a Hausman test failed to reject the null hypothesis that the right-hand-side variables are not correlated with the error term, favoring the random-effects specification. The results are presented in Tables 3-6.

Consistent with Clarke et al. (2006), the results from model 1 (Tables 3-6, column 1) suggest a nonlinear relation between financial deepening and poverty. The coefficient of the square

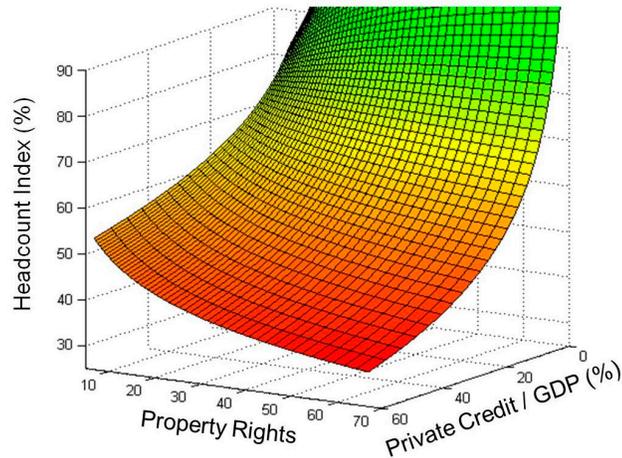
term of $\log(FD_{i,t})$ is significant, indicating that as the ratio of private credit to GDP increases its marginal contribution to reducing poverty and income inequality will decline. The association with the Gini coefficient is, however, not significant.

We next examine the role of property rights. The results indicate that the coefficients on both the property rights variable and its interaction term with the financial development indicator are generally significant: negative when the dependent variable is the headcount index, the poverty gap, or the Gini coefficient, and positive when the response variable is the income of the poor. These results suggest that stronger property rights significantly enhance the extent to which financial development alleviates poverty.

They also indicate that the impact of property rights on poverty reduction is positively associated with the level of financial development. As we expected, the poor benefit more from financial deepening in countries with secure property rights, which allow them to use collateral for better access to credit. As a robustness check, the rule of law variable was taken out because of its correlation with the property rights index, but the results were not significantly different (Tables 3-6, column 2).

Turning to the control variables, we find a significant negative association of GDP per capita and poverty, whether measured by the headcount index, the poverty gap, or the income of the poorest quintile. Interestingly, the results also suggest a significant positive correlation between GDP per capita and the Gini coefficient, which would indicate that income inequality is higher in the richer SSA countries. This could be due to the Kuznets effect, which states that in the early stages of development, higher GDP per capita could be correlated with greater income inequality. The results from model 1 also indicate that inflation is consistently detrimental for the poor. Trade openness does not have a significant impact on any of the poverty indicators. There also seems to be a positive correlation between the rule of law and poverty.

Figure 1 depicts the interrelations between property rights, private credit, and poverty as measured by the headcount index. The surface represents the headcount index computed from the estimated coefficients and the variables are transformed into their original scales for easier interpretation. The negative relationship between financial development and headcount poverty becomes stronger as property rights are better defined and enforced. Similarly, the contribution of property rights to poverty alleviation is enhanced as financial intermediation deepens.



The relationship between financial development and our measures of poverty could, however, face an endogeneity problem, stemming notably from reverse causality. One could argue, for instance, that as poverty drops, a larger share of the population becomes bankable, deepening the financial sector through an increase in demand for financial services. The problem could also result from omitted variables that would influence at the same time financial development and poverty. Using the lagged values for financial development and income per capita to reduce the risk of endogeneity (Tables 3-6, column 1 IV) confirms our earlier findings.⁴ In particular, the coefficients on both property rights and their interaction term with the instrumented financial development indicator are significant; negative when the dependent variable is the headcount index, or the poverty gap, and positive when the response variable is the income of the poorest.

As the second step, we looked at determinants of private credit and their impact on poverty and income distribution. The results (Tables 3-6, column 3) suggest that liberalizing interest rates and lending alone could be detrimental to the poor, irrespective of the indicator used to assess poverty. The coefficient on the financial liberalization index appears significant in all specifications: positive for the headcount index, the poverty gap, and the Gini coefficient, and negative for the income of the poorest quintile. By contrast, strengthening the institutional framework, such as allowing wider access to creditor information and enhancing property rights, is generally associated with a reduction in poverty.

⁴ We also used as instruments for private credit the country's legal origin. Although the results are in line with expectations, the coefficient for financial development inflates significantly, the legal origin being a weak instrument for financial development.

To test for the robustness of the results:

- We changed our sample from SSA countries to a dataset including low-income countries only. The results were unchanged (Annex 1, Tables 1-4).
- We also tested for the potential influence of outliers by dropping from the sample the observations related to Botswana, Gabon, Mauritius, and South Africa. The results were also unaffected (Annex 1, Tables 5-8).

IV. SUMMARY AND CONCLUSIONS

While financial development and its effects on economic growth have attracted considerable attention in the literature, far less work has been done on the relationship between financial deepening and poverty. Theory provides conflicting predictions and the empirical results have been mixed. By focusing on SSA countries and introducing institutional variables such as property rights, we hoped to reach more conclusive results.

Our estimations suggest that financial deepening is associated with less poverty and income disparities in SSA countries. This association seems to be most important at the early stages of financial development. There also seems to be evidence that stronger property rights reinforce the effect of private credit on poverty reduction. Liberalizing interest rates or lending alone, however, could be detrimental for the poor, if not accompanied by institutional reforms (property rights, creditor information).

The main policy implications are that fostering an expansion in credit to the private sector is not enough to reduce poverty and income inequalities. If financial development is to be pro-poor, liberalization needs to be accompanied by efforts to expand creditor information and firm up creditor rights. These are, however, equally complex processes.

The coverage of existing credit bureaus should be extended to include as much information as possible on the repayment profile of customers. This should be achieved while preserving privacy and safeguarding sensitive information. Strengthening creditor rights would require changes in the laws governing debt collection and collateral. Good legislation on debt recovery would depend in turn on efficient property registration and land surveying in both urban and rural areas. Land rights are, however, very often defined by customary law in rural areas. While moving towards more formal property registration care should be taken not to undermine customary rights and transfer unintentionally property to richer segments of the population. Finally, it would be vital to reform courts to improve enforcement.

Further work to refine the analysis provided in this paper could thus include the study of country cases where such improvements have been successfully achieved. Further empirical studies using multi-dimensional poverty indicators and longer time-series, as these become

available, could be carried out to confirm the results presented in this paper. Furthermore, possible future research could include an extension to include micro-finance where data are available.

Table 3. Dependent Variable: *Headcount Index*

	Feasible Generalized Least Squares			
	(1)	(2)	(1 IV)	(3)
Private Credit / GDP (log)	0.052	0.015	0.467	
	(0.29)	(0.08)	(4.23)***	
(Private Credit / GDP (log)) ²	-0.026	-0.025	-0.016	
	(3.52)***	(3.10)***	(1.90)*	
Financial Liberalization				0.010
				(2.64)***
GDP per capita (\$US, log)	-0.423	-0.434	-0.547	-0.551
	(8.84)***	(6.85)***	(7.38)***	(9.06)***
Inflation (log)	0.241	0.084	0.544	0.517
	(1.39)	(0.65)	(2.81)***	(2.07)**
Rule of Law	0.176		0.240	0.009
	(1.86)*		(2.18)**	(0.07)
Trade Openness (log)	0.059	0.114	0.024	0.191
	(0.71)	(1.40)	(0.25)	(1.90)*
Property Rights (log)	-0.302	-0.153	-0.504	-0.324
	(1.74)*	(0.95)	(2.63)***	(1.85)*
Interaction (lpror, lpred)	-0.123	-0.110	-0.211	
	(2.62)***	(2.22)**	(4.47)***	
Information sharing				-0.133
				(1.59)
Constant	6.180	5.370	7.781	7.116
	(7.38)***	(7.27)***	(9.11)***	(9.13)***
Observations	66	66	43	57
Number of countries	34	34	31	28
Adjusted R2	0.380	0.396	0.713	0.460
Chi square (Walden test)	306.09	301.78	1406.40	154.91

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Dependent Variable: *Poverty Gap*

	Feasible Generalized Least Squares			
	(1)	(2)	(1 IV)	(3)
Private Credit / GDP (log)	0.101	0.027	0.559	
	(0.37)	(0.09)	(4.75)***	
(Private Credit / GDP (log)) ²	-0.045	-0.036	-0.024	
	(4.80)***	(3.72)***	(2.02)**	
Financial Liberalization				0.013
				(2.26)**
GDP per capita (\$US, log)	-0.528	-0.565	-0.653	-0.731
	(9.65)***	(7.34)***	(6.58)***	(8.05)***
Inflation (log)	0.545	0.497	0.932	0.748
	(2.58)***	(3.22)***	(3.18)***	(2.11)**
Rule of Law	0.283		0.249	-0.052
	(2.65)***		(2.17)**	(0.28)
Trade Openness (log)	0.123	0.136	0.078	0.474
	(1.07)	(1.24)	(0.71)	(3.07)***
Property Rights (log)	-0.548	-0.206	-0.591	-0.488
	(2.10)**	(0.84)	(2.87)***	(1.94)*
Interaction (lpror, lprcd)	-0.211	-0.162	-0.277	
	(3.06)***	(2.25)**	(5.18)***	
Information sharing				-0.274
				(2.06)**
Constant	5.772	4.731	6.967	6.502
	(5.32)***	(4.56)***	(7.86)***	(5.88)***
Observations	66	66	43	57
Number of countries	34	34	31	28
Adjusted R2	0.399	0.428	0.808	0.293
Chi square (Walden test)	913.21	344.65	2943.43	186.90

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Dependent Variable: *Gini Coefficient*

	Feasible Generalized Least Squares			
	(1)	(2)	(1 IV)	(3)
Private Credit / GDP (log)	0.026	0.020	-0.075	
	(0.48)	(0.37)	(1.22)	
(Private Credit / GDP (log)) ²	-0.004	-0.003	0.002	
	(1.45)	(1.06)	(0.64)	
Financial Liberalization				0.001
				(1.76)*
GDP per capita (\$US, log)	0.078	0.080	0.066	0.061
	(4.78)***	(4.59)***	(3.32)***	(4.62)***
Inflation (log)	0.182	0.156	0.238	0.173
	(5.37)***	(4.68)***	(4.81)***	(5.19)***
Rule of Law	0.040		-0.025	-0.009
	(1.71)*		(0.88)	(0.49)
Trade Openness (log)	0.021	0.027	0.011	0.074
	(0.81)	(1.06)	(0.42)	(3.46)***
Property Rights (log)	-0.003	0.037	0.173	0.044
	(0.06)	(0.88)	(3.48)***	(0.96)
Interaction (lpror, lprcd)	-0.023	-0.017	0.023	
	(1.67)*	(1.32)	(1.50)	
Information sharing				-0.012
				(0.35)
Constant	3.143	2.961	2.668	2.958
	(14.17)***	(14.68)***	(11.56)***	(16.01)***
Observations	70	70	43	61
Number of countries	36	36	31	30
Adjusted R2	0.746	0.828	0.508	0.475
Chi square (Walden test)	894.11	851.94	224.48	277.16

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6. Dependent Variable: *Income of the Poorest Quintile*

	Feasible Generalized Least Squares			
	(1)	(2)	(1 IV)	(3)
Private Credit / GDP (log)	-0.135	-0.131	-0.335	
	(0.66)	(0.62)	(2.38)**	
(Private Credit / GDP (log)) ²	0.019	0.017	0.012	
	(3.27)***	(2.54)**	(1.81)*	
Financial Liberalization				-0.005
				(1.93)*
GDP per capita (\$US, log)	0.200	0.170	0.251	0.362
	(4.30)***	(3.12)***	(4.85)***	(7.62)***
Inflation (log)	-0.496	-0.376	-0.702	-0.639
	(6.33)***	(4.73)***	(3.97)***	(3.81)***
Rule of Law	-0.166		-0.217	-0.118
	(2.14)**		(2.34)**	(1.12)
Trade Openness (log)	-0.090	-0.116	-0.089	-0.357
	(1.20)	(1.58)	(1.23)	(5.41)***
Property Rights (log)	0.236	0.079	0.341	0.311
	(1.28)	(0.48)	(2.37)**	(1.55)
Interaction (lpror, lprcd)	0.128	0.122	0.165	
	(2.45)**	(2.42)**	(4.04)***	
Information sharing				0.130
				(1.38)
Constant	1.603	2.565	0.879	0.617
	(2.07)**	(3.79)***	(1.44)	(0.67)
Observations	64	64	41	55
Number of countries	34	34	31	28
Adjusted R2	0.726	0.730	0.866	0.374
Chi square (Walden test)	2979.11	552.80	1781.65	365.49

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

APPENDIX I—Robustness Tests

Tables 1-4 show regression results for the impact of financial development on the poor in low-income countries, for 1992–2006. These countries are: Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Congo, Dem. Rep., Côte d'Ivoire, Ethiopia, Gambia, Ghana, Guinea-Bissau, Haiti, Kenya, Kyrgyz Republic, Lao PDR, Madagascar, Malawi, Mali, Mauritania, Mongolia, Mozambique, Nepal, Niger, Nigeria, Pakistan, Papua New Guinea, Rwanda, Senegal, Sierra Leone, Togo, Uganda, Vietnam, Yemen, Rep., Zambia

The 12 countries underlined, about one-third of those in the sample, are in the low-income group but not in the SSA region. They contribute 27 observations, which is also about a third of the total observation points.

Tables 5-8 show regression results for the impact of financial development on the poor in SSA countries excluding the four richest countries—Botswana, Gabon, Mauritius, and South Africa—for 1992–2006.

Appendix I: Table 1. Low-Income Countries - Dependent Variable: *Headcount Index*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	0.307	0.351	
	(2.04)**	(2.33)**	
(Private Credit / GDP (log)) ²	-0.024	-0.021	
	(3.11)***	(2.93)***	
Financial Liberalization			0.017
			(4.25)***
GDP per capita (\$US, log)	-0.689-	0.701	-1.019
	(8.53)***	(8.86)***	(9.33)***
Inflation (log)	-0.370	-0.330	1.208
	(1.49)	(1.41)	(2.55)**
Rule of Law	0.073		
	(1.27)		
Trade Openness (log)	-0.217	-0.189	-0.039
	(4.22)***	(4.09)***	(0.40)
Property Rights (log)	-0.534	-0.524	-0.304
	(3.91)***	(3.83)***	(1.82)*
Interaction (lpror, lpred)	-0.194	-0.197	
	(4.39)***	(4.37)***	
Information sharing			-0.009
			(0.11)
Constant	9.515	9.422	9.893
	(13.10)***	(13.51)***	(13.02)***
Observations	73	73	44
Number of countries	35	35	19
Adjusted R2	0.522	0.575	0.342
Chi square (Walden test)	341.82	326.49	157.76

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 2. Low-Income Countries - Dependent Variable: *Poverty Gap*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	0.470	0.492	
	(1.81)*	(1.95)*	
(Private Credit / GDP (log)) ²	-0.040	-0.037	
	(3.36)***	(3.23)***	
Financial Liberalization			0.026
			(4.00)***
GDP per capita (\$US, log)	-0.975	-0.980	-1.321
	(7.65)***	(7.62)***	(7.54)***
Inflation (log)	-0.220	-0.120	2.034
	(0.46)	(0.25)	(2.58)***
Rule of Law	0.057		
	(0.53)		
Trade Openness (log)	-0.357	-0.352	0.030
	(3.81)***	(4.22)***	(0.17)
Property Rights (log)	-0.702	-0.673	-0.415
	(3.15)***	(3.07)***	(1.55)
Interaction (lpror, lpred)	-0.309	-0.305	
	(4.11)***	(4.05)***	
Information sharing			-0.001
			(0.01)
Constant	10.623	10.538	10.185
	(9.48)***	(9.59)***	(8.58)***
Observations	73	73	44
Number of countries	35	35	19
Adjusted R2	0.529	0.489	0.252
Chi square (Walden test)	310.12	318.71	210.54

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 3. Low-Income Countries - Dependent Variable: *Gini Coefficient*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	0.164	0.138	
	(4.12)***	(2.80)***	
(Private Credit / GDP (log)) ²	-0.005	-0.011	
	(1.62)	(4.58)***	
Financial Liberalization			0.002
			(2.07)**
GDP per capita (\$US, log)	0.024	0.013	0.029
	(0.79)	(0.43)	(0.52)
Inflation (log)	-0.040	0.026	0.303
	(0.33)	(0.19)	(2.25)**
Rule of Law	-0.112		
	(4.34)***		
Trade Openness (log)	0.031	0.013	0.014
	(1.43)	(0.82)	(0.31)
Property Rights (log)	-0.047	-0.101	-0.024
	(1.28)	(2.57)**	(0.33)
Interaction (lpror, lprcd)	-0.068	-0.081	
	(5.23)***	(6.24)***	
Information sharing			-0.030
			(0.80)
Constant	3.382	3.653	3.540
	(14.33)***	(16.31)***	(12.36)***
Observations	79	79	46
Number of countries	37	37	20
Adjusted R2	0.180	0.219	0.170
Chi square (Walden test)	257.96	187.77	33.71

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 4. Low-Income Countries - Dependent Variable: *Income of the poor*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	-0.563	-0.526	
	(4.61)***	(4.26)***	
(Private Credit / GDP (log)) ²	0.016	0.016	
	(2.59)***	(2.42)**	
Financial Liberalization			-0.016
			(4.81)***
GDP per capita (\$US, log)	0.504	0.500	0.951
	(7.88)***	(7.07)***	(7.23)***
Inflation (log)	-0.129	-0.134	-1.690
	(0.39)	(0.40)	(3.39)***
Rule of Law	0.059		
	(0.78)		
Trade Openness (log)	0.122	0.144	-0.148
	(1.96)*	(2.45)**	(0.94)
Property Rights (log)	0.451	0.437	0.067
	(3.96)***	(3.88)***	(0.39)
Interaction (lpror, lprcd)	0.246	0.234	
	(6.62)***	(6.10)***	
Information sharing			-0.123
			(1.17)
Constant	-1.533	-1.598	-1.538
	(2.66)***	(2.94)***	(1.80)*
Observations	71	71	42
Number of countries	35	35	19
Adjusted R2	0.705	0.760	0.538
Chi square (Walden test)	378.80	319.41	132.94

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 5. Excluding Outliers - Dependent Variable: *Headcount Index*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	-0.230	-0.243	
	(1.38)	(1.39)	
(Private Credit / GDP (log)) ²	-0.053	-0.053	
	(6.44)***	(7.35)***	
Financial Liberalization			0.006
			(1.86)*
GDP per capita (\$US, log)	-0.279	-0.309	-0.480
	(5.27)***	(7.49)***	(5.58)***
Inflation (log)	-0.051	-0.181	0.360
	(0.45)	(2.24)**	(1.93)*
Rule of Law	0.130		
	(1.37)		
Trade Openness (log)	0.015	0.075	0.179
	(0.20)	(1.11)	(2.41)**
Property Rights (log)	-0.198	-0.123	-0.328
	(1.29)	(0.98)	(2.39)**
Interaction (lpror, lprcd)	-0.134	-0.132	
	(3.51)***	(3.67)***	
Information sharing			-0.171
			(2.39)**
Constant	4.571	4.329	6.912
	(6.35)***	(6.91)***	(12.05)***
Observations	62	62	53
Number of countries	0.510	0.501	0.382
Adjusted R2	31	31	25
Chi square (Walden test)	1049.37	1571.16	110.64

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses;
* significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 6. Excluding Outliers - Dependent Variable: *Poverty Gap*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	-0.357	-0.365	
	(1.36)	(1.33)	
(Private Credit / GDP (log)) ²	-0.079	-0.076	
	(6.76)***	(7.71)***	
Financial Liberalization			0.011
			(1.96)*
GDP per capita (\$US, log)	-0.328	-0.380	-0.617
	(4.28)***	(6.13)***	(4.98)***
Inflation (log)	0.151	0.027	0.619
	(1.07)	(0.26)	(2.21)**
Rule of Law	0.153		
	(1.00)		
Trade Openness (log)	0.097	0.170	0.452
	(0.83)	(1.43)	(3.94)***
Property Rights (log)	-0.250	-0.136	-0.650
	(1.04)	(0.67)	(3.18)***
Interaction (lpror, lpred)	-0.196	-0.184	
	(3.50)***	(3.42)***	
Information sharing			-0.381
			(3.62)***
Constant	2.932	2.777	6.775
	(2.85)***	(2.91)***	(8.50)***
Observations	62	62	53
Number of countries	31	31	25
Adjusted R2	0.482	0.329	0.315
Chi square (Walden test)	474.83	535.78	181.82

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 7. Excluding Outliers - Dependent Variable: *Gini Coefficient*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	0.006	0.000	
	(0.11)	(0.01)	
(Private Credit / GDP (log)) ²	-0.006	-0.005	
	(1.93)*	(1.71)*	
Financial Liberalization			0.001
			(2.04)**
GDP per capita (\$US, log)	0.074	0.075	0.060
	(3.78)***	(3.73)***	(3.15)***
Inflation (log)	0.139	0.118	0.158
	(3.08)***	(2.78)***	(3.86)***
Rule of Law	0.027		
	(1.18)		
Trade Openness (log)	0.041	0.049	0.073
	(1.43)	(1.76)*	(2.80)***
Property Rights (log)	0.013	0.043	-0.036
	(0.27)	(1.04)	(0.66)
Interaction (lpror, lpred)	-0.023	-0.019	
	(1.68)*	(1.41)	
Information sharing			-0.057
			(1.79)*
Constant	2.994	2.868	3.279
	(12.40)***	(13.46)***	(15.31)***
Observations	65	65	56
Number of countries	32	32	26
Adjusted R2	0.543	0.556	0.405
Chi square (Walden test)	432.81	442.07	134.52

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix I: Table 8. Excluding Outliers—Dependent Variable: *Income of the Poor*

	Feasible Generalized Least Squares		
	(1)	(2)	(3)
Private Credit / GDP (log)	-0.081	0.033	
	(0.39)	(0.16)	
(Private Credit / GDP (log)) ²	0.034	0.031	
	(3.97)***	(4.13)***	
Financial Liberalization			-0.006
			(2.34)**
GDP per capita (\$US, log)	0.178	0.167	0.329
	(2.29)**	(2.68)***	(3.79)***
Inflation (log)	-0.418	-0.211	-0.493
	(3.90)***	(2.48)**	(3.27)***
Rule of Law	-0.178		
	(1.97)**		
Trade Openness (log)	-0.097	-0.185	-0.383
	(1.14)	(2.18)**	(5.45)***
Property Rights (log)	0.233	-0.004	0.363
	(1.31)	(0.03)	(2.23)**
Interaction (lpror, lpred)	0.166	0.124	
	(3.32)***	(2.76)***	
Information sharing			0.225
			(2.62)***
Constant	2.140	3.224	0.807
	(2.50)**	(4.60)***	(1.25)
Observations	60	60	51
Number of countries	31	31	25
Adjusted R2	0.726	0.537	0.141
Chi square (Walden test)	381.13	7778.89	138.55

Notes: Data are averaged over five years. Absolute value of z statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%.

APPENDIX II: Variable Definitions and Data Sources

Variable	Definition	Source
Headcount index	Headcount index is the percentage of population living in households with consumption or income per person below the poverty line (\$1 per day). It is also called poverty incidence.	PovcalNet
Poverty gap	Poverty gap is a ratio of the distance of mean shortfall from the poverty line (\$1 a day or less) and the poverty line. It characterizes how far below the poverty line the average poor's income lies.	PovcalNet
Gini coefficient	The Gini coefficient is the ratio of the area between the Lorenz Curve, which plots share of population against income share received, to the area below the diagonal. It lies between 0 and 1, where 0 is perfect equality and 1 is perfect inequality.	WIDER database PovcalNet
Income of the poorest quintile	Defined as the share of income earned by the poorest quintile times average income divided by 0.2; however, when the first quintile share is not available, we assume that the distribution of income is lognormal, and obtain the share of income accruing to the poorest quintile as the 20 th percentile of this distribution, using Gini coefficient.	Dollar and Kraay (2002), WIDER database PovcalNet
Private credit over GDP	Private credit by deposit money banks to GDP.	Financial Structure Database (2007), and International Financial Statistics (2007)
Financial liberalization	An aggregate index capturing whether interest rates are liberalized or not, the number of years real lending and deposit rates have been positive, the existence of significant informal financial sectors and presence of directed credit allocation mechanisms.	McDonald and Schumacher (2007)
Property rights	An index measuring the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state.	Heritage Foundation database (2007)
Information sharing	A dummy variable recording the presence of either public or private credit registries	Djankov, McLeish, and Shleifer (2005)
GDP per capita	Nominal gross domestic product divided by the size of the population	IMF database
Inflation	Annual change in consumer price index (CPI)	WDI database
Rule of law	A score measuring the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence	Governance Matters (World Bank)
Trade openness	Sum of imports plus exports as share of GDP (in percentage)	WDI database

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