

Financial Development and Poverty: Evidence from the CFA Franc Zone

Youssef KIENDREBEOGO* and Alexandru MINEA†

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Abstract

The financial liberalization in the 1980s and the early 1990s led the CFA Franc Zone countries to deepen reforms in their financial systems. These reforms fostered financial development, which in turn may have reduced income poverty, as emphasized by several theoretical arguments in the literature. This study aims at estimating the contribution of financial development to poverty alleviation in CFA Franc Zone. Results based on a sample of CFA Franc Zone countries for the 1981-2010 period support that financial development is associated with a drop in the proportion of the poor population. In addition, financial development reduces the extent to which the income of individuals falls below the poverty line. Finally, we find that the effect of financial development on poverty is subject to important nonlinearities. Our findings are robust to the use of alternative measures of financial development and hold after controlling for a potential simultaneity and a small sample biases.

Keywords: Financial Development, Poverty, CFA Franc Zone.

JEL classification: O11, G00, O16.

* CERDI, University of Auvergne, BP 320, 63009 Clermont-Ferrand, France. Email: youssef.kiendrebeogo@udamail.fr.

† Corresponding Author: CERDI and School of Economics, University of Auvergne, BP 320, 63009 Clermont-Ferrand, France. Email: alexandru.minea@udamail.fr. Website: <https://sites.google.com/site/mineaalexandru/>.

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1 Introduction

In most CFA franc zone countries the overall situation of the underprivileged populations has deteriorated over the past decades. Between 1981 and 1993, the population living below the poverty line (corresponding to less than \$ 1.25 per day, according to the World Bank) increased from 46.95% to 52.47% of the total population in the CFA franc zone. These facts are confirmed by the analysis of social indicators of countries in the region, as in 2010 the average Human Development Index (HDI) of these countries equals 0.390, largely below its value for all developing countries (0.586) and for the whole world (0.624).

In this context, the fight against poverty became a priority for policy makers in the CFA franc zone, especially since the adoption of the Millennium Development Goals (MDGs). This shift in the development strategy, based on the fight against poverty, increased the interest on the contribution of financial development in reducing poverty. This potential role for the financial development arises from an important literature emphasizing several theoretical arguments,¹ predicting that financial development may have a reducing impact on income poverty, directly or indirectly through its effect on economic growth.

In the debate on the contribution that finance makes to development, most studies restrained to the relationship between financial development and economic growth (see for instance [Bencivenga and Smith, 1991](#); [King and Levine, 1993](#); [Levine, 1997](#); [Rajan and Zingales, 1998](#); [Levine *et al.*, 2000](#)). Indeed, the underlying idea was that the development of the financial system should not have any effect on the income of the poor, but an *indirect* effect through higher economic growth, since the poor do not have access to financial services.² However, given that in many developing countries the distribution of income appears to be highly skewed in favor of the richest population who is a minority ([WorldBank, 1995](#)), a positive effect of financial development on growth is not likely to imply a poverty reduction, as emphasized by [Beck *et al.* \(2007\)](#).

Consequently, a recent and growing literature focused on the *direct* impact of financial

¹These arguments are mainly the McKinnon's "conduit" effect and the Shaw's "intermediation" effect, and they are detailed in the next section.

²For example, [Greenwood and Jovanovic \(1990\)](#) assert that the access of poor people to bank credit can be hindered by high costs of small loans.

development on poverty (see for instance [Honohan, 2004](#); [Jalilian and Kirkpatrick, 2005](#); [Beck *et al.*, 2007](#); [Guillaumont and Kpodar, 2011](#)). These studies show that access constraints to the formal financial sector may be particularly damaging to the poor who lack collateral and/or credit histories.³ By improving efficiency in the mobilization and allocation of savings, the monitoring in the use of funds, the managing risks, and by providing increased productivity of financial intermediaries and access to microcredit for the most disadvantaged social strata, the development of the financial sector can provide adequate financial services to the poor and thus contribute significantly to poverty alleviation.

However, despite their wealth, these empirical studies present a number of limitations. The first relates to the sample composition, as in most cases the sample is made on the basis of data availability on poverty. Since household survey data are not available for relevant periods for most developing countries, the sample mixes both developing and developed countries (see for instance [Jalilian and Kirkpatrick, 2005](#); [Beck *et al.*, 2007](#)). Unfortunately, this can lead not only to a sample heterogeneity problem, but also, and more importantly, to a selection bias consisting to the fact that countries that present data on poverty are those with strong institutions and therefore are likely the least poor countries. [Guillaumont and Kpodar \(2011\)](#) reduce the problem of heterogeneity by focusing on a sample of developing countries, but they do not account for this selection bias. The second limitation is the use of the broad money stock, namely usually M2 and M3, as a measure of financial development (see for instance [Odhiambo, 2009](#); [Guillaumont and Kpodar, 2011](#)). However, the extent to which these ratios, reporting a wide measure of money supply, capture the McKinnon's "conduit" effect can be questioned, since the conduit effect makes reference to individual financial savings and in developing countries the broad money stock is essentially held outside the banking system. Finally, the direct impact of financial development on poverty is not sufficiently explored in these studied, as emphasis was placed on the indirect effect of finance on poverty through economic growth.

The goal of this article is to re-examine the relationship between financial development and poverty, in a panel data analysis that accounts for the problems encountered by previous

³With the notable exception of [Arestis and Caner \(2010\)](#) who fail to find a significant effect of capital account liberalization on poverty in developing countries.

work on this topic. First, we focus exclusively on the direct impact of financial development on income poverty on a sample of CFA Franc Zone countries. By so doing, not only our paper provides, to the best of our knowledge, the first analysis of a possible direct effect of financial development on poverty in the CFA Franc Zone, but we equally mitigate both the sample heterogeneity and selection bias. Indeed, CFA Franc Zone countries were selected because of displaying comparable levels of development, having experienced essentially the same reforms in their financial systems in the 1980s and the 1990s, and having adopted similar monetary and financial policies that are anchored on the monetary policy of the European Central Bank. Second, we employ alternative measures of financial development that have the merit of properly taking into account the McKinnon's conduit effect, namely the ratio of bank deposit liabilities to GDP, as well as additional measures of poverty, namely the poverty gap index. Finally, our study is performed on a wider and up-to-date database on poverty, controlling for both the possible endogeneity of financial development and for the small sample bias that may arise from using a reduced number of countries.

Our findings are the following. First, financial development is robustly and significantly associated with a drop in the poverty headcount, irrespective of the way we measure financial development. Second, financial development reduces the extent to which the average income of individuals may fall below the income defining the poverty line. Third, the favorable effect of financial development on poverty is subject to important nonlinearities. On the one hand, a certain development of the credit activity is needed before the gap between rich and poor starts decreasing. On the other hand, irrespective of the way we measure financial development, its positive impact on reducing the gap between rich and poor is significantly mitigated by increased financial instability. Our findings contribute to the literature on the determinants of poverty in the CFA Franc Zone, by showing that financial development exerts a direct effect on poverty. Consequently, the design of monetary and financial policies in this zone should account for the role of financial development, which could be a virtuous tool to alleviate poverty.

The rest of the article is organized as follows. Section 2 presents the theoretical and empirical arguments of the direct relationship between financial development and poverty, Section 3 presents the econometric strategy, Section 4 provides estimates of the impact

of financial sector development on poverty in the CFA franc Zone, Section 5 analyzes the robustness of our main results and Section 6 concludes.

2 Financial development and poverty: a review of theory and empirical evidence

2.1 A Review of Theoretical Arguments

The literature distinguished mainly two arguments that can justify a direct impact of financial development on poverty, namely the McKinnon “conduit” effect and the Shaw “intermediation” effect.

2.1.1 The McKinnon’s “conduit” effect

Financial saving is the fundamental element in the analysis of [McKinnon \(1973\)](#). The starting point is a domestic capital market in which market infrastructures and information are weak. Due to the lack of access to external financing and the indivisibility of investment, agents, modeled as small-size firm-households, have few incentives to accumulate additional capital. Indeed, in this context in which self-financing investments are of a considerable importance, poor people are in a situation in which it is more convenient to accumulate funds in monetary assets until they have enough resources to invest in higher-yielding physical assets. Given the lack of access to financial saving, these monetary assets are weakly remunerated, with a negative consequence on the wealth (and the investment) of agents.⁴ In such a context, the establishment of appropriate financial structures facilitates the setting up of financial saving, since saving is better remunerated. As a result, a higher level of financial development increases the wealth and the opportunities of self-financing for the poor people.

⁴Notice that in this case investment financing implies a sacrifice in terms of consumption, since there is a complementarity between money and physical capital, instead of the traditional substitution among them.

2.1.2 The Shaw’s “intermediation” effect

Unlike McKinnon, who focuses on the effect of the financial sector on the supply of resources, i.e. financial saving, [Shaw \(1973\)](#) looks at the effect of the financial sector on the distribution of resources, i.e. credit activities. According to [Shaw \(1973\)](#), a situation of financial repression takes the form of an administrative setting of nominal interest rates below their competitive equilibrium value, usually accompanied by high inflation rates due to the willingness of authorities to collect seigniorage (the inflation tax), and resulting weak (or even negative) real interest rates. Since savings are considered to be decreasing in the real interest rate, these low interest rates engender a lack of savings, and moreover of investment, since investment is conditioned by the amount of savings collected by the financial sector. As a result, the adverse consequences in terms of degradation of living conditions of the individuals are numerous: *(i)* outflows of domestic capital, in search for higher remuneration, that limit the supply of loanable funds for less wealthy investors; *(ii)* an artificially low real interest rates which makes the self-financing a dominant phenomenon; *(iii)* rationing of bank credit due to a lack of resources; *(iv)* substitution of labor by capital (unemployment) because of low real interest rates; *(v)* agents are forced to finance themselves on informal financial markets that are only imperfect substitutes for formal financial markets. Consequently, as emphasized by [Shaw \(1973\)](#), financial deepening facilitates access to credit, which in turn can have a direct effect on the poor population.

2.2 A review of the evidence linking finance and poverty

To the best of our knowledge, the empirical literature examining the impact of financial sector development on poverty is remarkably scarce, mainly given the lack of cross-country reliable data.⁵ One of the first studies aiming at answering this question is [Honohan \(2004\)](#). Using cross-country data for 76 countries, the author finds that a 10% increase in the ratio of private credit to GDP should reduce poverty ratios by 2.5 to 3 percentage points. In

⁵One alternative to compensate for the lack of cross-country poverty data is to perform country analysis. For example, [Burgess and Pande \(2005\)](#), using data on rural banks in India, shows that a 1% increase in the number of bank branches in rural unbanked locations in India was associated with a rural poverty reduction of 0.34%.

an attempt to explore the robustness of these findings, [Jalilian and Kirkpatrick \(2005\)](#) examine the links between financial development and poverty reduction in 42 countries, including 26 developing countries, from a wider perspective accounting for the interaction between financial development, economic growth, inequality and poverty. Their findings back up the conclusions of [Honohan \(2004\)](#), since an increase in the ratio of private credit to GDP improves the growth prospects of the income of the poor in developing countries. Such a differentiated effect among developing and developed countries equally emerges from the analysis of [Beck *et al.* \(2007\)](#), performed over the period 1960-2005. Using the same measure of financial market development as [Jalilian and Kirkpatrick \(2005\)](#), namely the ratio of private credit to GDP, they show that financial development increases the income of the poor relatively more compared to the increase of the average per capita income, which reduces poverty rates. In addition, the authors also find that financial development is associated with a drop in the fraction of the population living below the poverty line. More recently, [Guillaumont and Kpodar \(2011\)](#) use a sample of developing countries for the period 1966-2000 and show that financial development, measured by the private credit to GDP ratio and by the M3 to GDP ratio, improves the average income of the poorest 20% households of the countries considered.

On the whole, this literature supports a favorable effect of financial development on poverty.⁶ Nevertheless, a major limitation of these studies is the use of traditional indicators of financial development, which appropriately capture the indirect impact of financial development on poverty through economic growth, but are less adequate to reflect the di-

⁶Alternatively, there exists an important literature focusing on the specific relationship between financial development and inequality. [Greenwood and Jovanovic \(1990\)](#) defended an “inverted-U” curve between the evolution of the financial system and income inequality, by showing that the development of the former is initially associated with high levels of inequality (initially, the services offered by financial intermediaries do not benefit poor people because they are excluded from the market), while poor people have access to such services as the financial system develops. However, these results are questioned by [Clarke *et al.* \(2002\)](#), who failed to identify such an inverted-U curve on a sample of 91 countries over the period 1960-1995, but instead find that financial development reduces inequality even in the early stages of the evolution of the financial system, confirming previous conclusions of [Banerjee and Newman \(1993\)](#) or [Dollar and Kraay \(2001\)](#) (see also the recent survey of [Demirguc-Kunt and Levine \(2009\)](#)). When it comes to the transmission channels, [Beegle *et al.* \(2003\)](#) or [Dehejia and Gatti \(2005\)](#) look at the links between financial sector development, child labor, and education, and show that access to financial services could enable poor households to diversify their income, leading to a reduction of child labor and an increase in school enrollment at the aggregate level (see [Claessens and Perotti \(2007\)](#) for an overview of the transmission channels between financial development and inequality).

rect impact of increased access to financial services by the poor, all the more in developing countries where the broad money stock is essentially held outside the banking system. The following section attempts to further deepen these issues in the case of CFA Franc Zone countries.

3 Empirical Strategy

3.1 Econometric Model

In light of the previous section, we consider that an eventual effect of financial development on poverty transits through two channels, namely the McKinnon conduit effect, based mainly on access to savings services, and the Shaw intermediation effect, which focuses on the access to credit. To measure these effects, we follow [Beck *et al.* \(2007\)](#) and regress the growth rate of the poverty indicator on the measure of financial development and a set of explanatory variables that are supposed to influence poverty

$$Poor_{i(t+1)} - Poor_{it} = a_0 + a_1 Poor_{it} + a_2 Finance_{it} + AX_{it} + u_i + v_t + \epsilon_{it}, \quad (1)$$

where $Poor_{it}$ and $Finance_{it}$ are the indicators of poverty and financial development respectively, X_{it} is a set of control variables assumed to affect poverty, u_i and v_t are country and time fixed effects controlling for fixed effects common across countries and for business cycle effects respectively, ϵ is an idiosyncratic error term and $t + 1$ stands for the next three-years sub-period.

3.2 Identification Strategy

We identify several econometric problems that may arise in the estimation of our model. First, despite the introduction of several control variables, it is likely that remained unobserved characteristics may affect poverty. Second, as we estimate an equation of poverty, it is likely that there are potentially endogenous regressors; this may be particularly the case for the indicator of financial development and for the GDP per capital growth.⁷ Finally,

⁷This endogeneity problem may have several origins, including the double causality in the relationship between financial development and poverty, which involves a simultaneity bias in the estimation, or the

as this could be the case for the indicator of financial development, observing one or more regressors with measurement errors could disrupt the identification of the coefficients to be estimated.

To mitigate the estimation biases emphasized above, several strategies can be employed. One of the most common techniques to address a possible endogeneity of the regressors is the Fixed Effects Two-Stage Least-Square (FE-2SLS). This estimator allows taking into account unobserved heterogeneity which could affect the level of poverty; however, its performances are intimately related to the quality of the instrumental variables (IV). For example, to analyze the influence of financial development on economic growth, financial development was instrumented by variables such as the legal origin, the religious composition, the legal rights of secured creditors, and indicators of institutional quality (see, for example, [Beck *et al.* \(2000\)](#) or [Levine *et al.* \(2000\)](#)). Unfortunately, most of these variables are not available for wide time periods for developing countries, and particularly for CFA Franc Zone countries, while institutional variables are often time-invariant variables. Consequently, we selected two instrumental variables: on the one hand, we instrument financial development with the Freedom House Political Rights Index, which is supposed to be strongly correlated with our indicators of financial development, but with no direct impact on the indicator of poverty (except indirectly through financial development). On the other hand, all control variables were instrumented using their one period-lagged value.

In addition, our results could be polluted by the small sample problem, arising from the presence of a relatively reduced number of countries. To mitigate this problem, we use the Bias corrected LSDV dynamic panel data technique. In particular, this technique was found to often outperform other dynamic panel estimations, like for example System-GMM, in terms of bias and roots mean square error (RMSE), especially when the number of cross-sectional units is small ([Bruno, 2005](#)), which is precisely the case of our analysis performed on the CFA Franc Zone countries.⁸

omission of relevant regressors in the equation of poverty, which yields an endogeneity bias if these variables are correlated with one or several explanatory variables.

⁸In particular, notice that the use of a relatively reduced number of countries prevented us from using System-GMM estimators to control for the possible endogeneity of the financial development.

3.3 Data

Our main sample is composed of 13 CFA Franc Zone countries observed over the period 1981-2010 (see Appendix 1 for the list of countries). This period was divided into 10 sub-periods of 3 years to match the availability of data on income poverty; consequently, the indicators of poverty take their value of the considered period. The other variables are averaged over each sub-period, to smooth short-run variations. In the following we present our indicators of financial development, poverty, and the main control variables used.

Our dependent variable, i.e. income poverty, is measured using the poverty headcount (H0), defined as the proportion of the population living below the poverty line (according to the World Bank, we consider a monthly poverty line of \$ 1.25 per day; see Appendices 2 and 3 for data definitions and sources and descriptive statistics). The advantage of this indicator is to render our results comparable with previous studies on the relationship between financial development and poverty (see, for example, [Honohan \(2004\)](#) or [Beck *et al.* \(2007\)](#)). However, as emphasized by [Ravalion and Bidani \(1994\)](#), its main weakness is that it does not take into account any improvement or deterioration of the income of a poor person, as long as this person remains below the poverty line. To control for this problem, we use alternatively the poverty gap index (H1), which measures the extent to which the income of individuals falls below the poverty line as a proportion of the poverty line.⁹

Regarding the main explanatory variables, we measure financial development by the private credit to GDP ratio, in order to account for the Shaw's intermediation effect and to make our results comparable with previous studies. In addition, recent contributions, including [Odhiambo \(2009\)](#) or [Guillaumont and Kpodar \(2011\)](#), use different measures of the broad money stock, usually the ratios of M2 and M3 to GDP, to account for the McKinnon's conduit effect. However, the extent to which these broad money supply ratios capture the conduit effect can be questioned, since this effect focuses on individual financial savings and in developing countries the broad money stock is essentially held outside the banking system. Consequently, we account for the McKinnon's conduit effect using the

⁹Other studies on this topic measure poverty by the growth of the income of the poor population ([Jalilian and Kirkpatrick, 2005](#)) or the average income of the poor population ([Guillaumont and Kpodar, 2011](#)). The only reason for which we do not account for poverty with these variables is data availability.

ratio of bank deposit liabilities to GDP, which captures more accurately private financial savings.

Finally, control variables were chosen such as to make our results comparable with previous studies on income poverty. Following [Jalilian and Kirkpatrick \(2005\)](#), [Beck *et al.* \(2007\)](#) and [Guillaumont and Kpodar \(2011\)](#), we control for the GDP per capita growth and the initial level of school enrollment to account for the effect of economic growth and education on poverty, while we capture the influence of trade integration and of the quality of the macroeconomic environment using trade openness and inflation respectively. In addition, for robustness issues, we use the age dependency ratio and population growth to seize the structure of the population and its dynamics.

4 Results

The choice of the measure of poverty is of course of crucial importance. For the sake of providing a rigorous analysis, we alternatively use two measures of poverty, namely the poverty headcount index and the poverty gap index.

4.1 Poverty measured by the poverty headcount (H0)

The poverty headcount index (H0) has the advantage of being available for many countries over a long period, explaining why it was widely used in the literature to estimate the relationship between financial development and poverty (see for instance [Honohan \(2004\)](#) and [Beck *et al.* \(2007\)](#)). The results are presented in Table 1.

Let us first focus on the left side of Table 1, namely regressions (1)-(6) performed using the FE-2SLS technique. Remark that the Hansen over-identification test supports the validity of our instrumental variables at conventional levels of significance for all regressions (1)-(6). To compare our results with previous studies, we perform in columns 1-3 several regressions using the private credit to GDP as a measure of financial development. According to regression (1), an increase in the ratio of private credit to GDP significantly decreases the growth rate of the headcount index of poverty for the countries of the CFA Franc Zone. This effect holds when controlling for the effect of GDP per capita growth and for initial

Table 1: Financial development and changes in the poverty headcount index (H0)

Dependent variable : Growth of H0	FE-2SLS						Bias corrected LSDV dynamic panel					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Growth of H0 (-1)							0.348*** (0.134)	0.359** (0.164)	0.305** (0.154)	0.336** (0.134)	0.364** (0.159)	0.301* (0.154)
Initial H0	-0.072*** (0.010)	-0.072*** (0.012)	-0.076*** (0.012)	-0.069*** (0.009)	-0.071*** (0.016)	-0.072*** (0.016)	-0.061*** (0.014)	-0.063*** (0.019)	-0.070*** (0.019)	-0.057*** (0.014)	-0.064*** (0.019)	-0.071*** (0.018)
GDP per capita growth	-1.814*** (0.598)	-2.775*** (0.393)	-1.601** (0.744)	-1.965*** (0.425)	-1.959*** (0.618)	-2.805* (1.509)	-1.629*** (0.423)	-1.606* (0.877)	-1.955** (0.908)	-3.112*** (0.980)	-2.153** (0.987)	-0.914** (0.419)
Private credit	-0.364** (0.156)	-0.495*** (0.168)	-0.228*** (0.044)				-0.507* (0.283)	-0.482*** (0.072)	-0.212** (0.090)			
Bank deposit liabilities				-0.657** (0.311)	-0.749** (0.327)	-0.661* (0.339)				-0.306** (0.140)	-0.480*** (0.102)	-0.377*** (0.056)
Initial primary schooling		-0.026 (0.096)	-0.036 (0.095)		-0.031 (0.103)	-0.048 (0.098)		-0.079 (0.142)	-0.065 (0.137)		-0.071 (0.140)	-0.060 (0.135)
Trade openness		-0.402*** (0.047)	-0.355*** (0.055)		-0.520* (0.284)	-0.503 (0.681)		-0.152* (0.081)	-0.376*** (0.200)		-0.257** (0.110)	-0.463** (0.198)
Inflation		0.193 (0.147)	0.229 (0.160)		0.229 (0.144)	0.264 (0.162)		0.059 (0.379)	0.147 (0.369)		0.188 (0.371)	0.161 (0.363)
Age dependency			0.251* (0.144)			0.265* (0.152)			0.163* (0.089)			0.164* (0.088)
Population growth			0.024*** (0.004)			0.048* (0.026)			0.088* (0.046)			0.093** (0.043)
Constant	-2.206*** (0.460)	-2.018*** (0.640)	-2.420*** (0.629)	-6.992** (3.205)	-5.894* (3.044)	-3.303*** (0.438)						
Observations	91	83	83	91	83	83	91	83	83	91	83	83
Number of countries	13	13	13	13	13	13	13	13	13	13	13	13
Hansen OID p-value	0.657	0.259	0.693	0.163	0.266	0.580						

Robust p-value (columns 1-6) and Bootstrapped p-value (columns 7-12) in parenthesis; *significant at 10%; **significant at 5%; ***significant at 1%. Growth of H0 (-1) is the one three-years sub-period lagged value of the growth rate of H0. First stage regressions for columns 1-6 are available upon request. For the Bias corrected LSDV estimator, the bias correction is initialized by the standard Blundell-Bond System GMM estimator with no intercept.

H0 in regression (1), for initial primary schooling, trade openness and inflation in regression (2), and for the age dependency ratio and population growth in regression (3). Regarding these control variables, the negative and significant coefficient of initial H0 is consistent with the phenomenon of convergence in poverty levels in CFA Franc Zone countries, more economic growth and trade openness are poverty-reducing, while countries with a higher share of dependent population and increasing population are poorer.

Thus, according to our findings, a 1 percentage point increase in the private credit to GDP ratio decreases the growth rate of the poverty headcount index by a value between 0.2 and 0.5 percentage points, namely at least 4 times higher compared to [Beck *et al.* \(2007\)](#), see their Table 4 at page 44. One simple explanation of this gap may come from the use of panel data, instead of cross section. However, our results could be considered as more reliable, for the following reasons. First, the use of FE-2SLS allows controlling for the simultaneity bias between financial development and poverty, which could under-estimate OLS coefficients. Second, performing our estimations on a sample composed exclusively of the African developing countries that are part of the CFA Franc Zone, allows to better control for the heterogeneity bias. Consequently, our results extend the findings of [Beck *et al.* \(2007\)](#) by showing that the effect of the financial development (measured by the private credit to GDP ratio) on reducing poverty (measured by the growth of the poverty headcount index) is remarkably stronger for the Sub-Saharan African countries from our sample.

Let us now turn our attention to the second measure of financial development, namely the ratio of bank deposit liabilities to GDP. Remark that accounting for this variable in columns 4-6 does not alter the effect of control variables on the growth rate of H0. More importantly, a higher ratio of bank deposit liabilities to GDP is always found to significantly decrease the growth rate of the poverty headcount index. Consequently, in addition to the favorable effect of the private credit ratio to GDP, which could reproduce the Shaw's intermediation effect, our analysis emphasizes the presence of a robust McKinnon conduit effect, captured by the bank deposit liabilities ratio, in the relation between financial development and poverty.

One critique of our findings could concern the small sample bias, arising from the use of relatively few countries. To tackle this issues, we present in columns 7-12 of Table 1 es-

estimations performed using the Bias corrected LSDV dynamic panel technique. Compared to FE-2SLS, these estimations do not exhibit qualitative changes in the significance of the control variables; in addition, the one period lagged growth rate of H0 positively influences the current growth rate of H0, suggesting the presence of persistence in the poverty dynamics. Regarding our main results, regressions (7)-(9) show that a higher private credit to GDP ratio significantly decreases the growth rate of H0, confirming the robustness of our previous results based on FE-2SLS estimations (see columns 1-3). Analogously, regressions (10)-(12) illustrate that the negative effect of the bank deposit liabilities ratio on the growth rate of H0 holds irrespective of the method used to correct for endogeneity. On the whole, our findings emphasize that CFA Franc Zone countries enjoying higher levels of financial development are more likely to experience faster reductions in their poverty headcount rate.

4.2 Poverty measured by the poverty gap index (H1)

The main criticism of the poverty headcount index (H0) is that it fails to account for improvements or deteriorations of the income of a poor person, provided this person stays below the poverty line. To tackle this shortcoming, we perform estimations based on the poverty gap index (H1), which measures the extent to which the income of individuals falls below the poverty line as a proportion of the poverty line.

Table 2 displays the effect of the private credit to GDP ratio on the growth rate of H1 using FE-2SLS (columns 1-3) and bias corrected LSDV (columns 7-9), and the effect of the bank deposit liabilities to GDP ratio on the growth rate of H1 using FE-2SLS (columns 4-6) and bias corrected LSDV (columns 10-12). Compared to results performed using the growth rate of H0 (see Table 1), the use of the growth rate of H1 does not lead to dramatic changes in the sign and significance of control variables, except for some significance loss for trade openness, and some significance gain for inflation who positively acts on the growth rate of H1. In particular, as this was the case for the growth rate of H0, the negative coefficient of initial H1 suggests a convergence process among poverty rates for the countries in our sample, while higher economic growth reduces poverty as measured by the growth rate of H1.

Let us now focus on the main results. According to regression (1) in Table 2, an

Table 2: Financial development and changes in the poverty gap index (H1)

Dependent variable : Growth of H1	FE-2SLS						Bias corrected LSDV dynamic panel					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Growth of H1 (-1)							0.093*** (0.021)	0.084*** (0.016)	0.087*** (0.017)	0.097*** (0.023)	0.090*** (0.022)	0.089*** (0.012)
Initial H1	-0.016*** (0.004)	-0.019*** (0.003)	-0.061*** (0.014)	-0.014*** (0.003)	-0.016*** (0.002)	-0.063*** (0.011)	-0.051** (0.017)	-0.046* (0.026)	-0.055** (0.023)	-0.040** (0.017)	-0.051* (0.027)	-0.054*** (0.025)
GDP per capita growth	-0.205*** (0.034)	-0.260*** (0.040)	-0.161** (0.064)	-0.171*** (0.026)	-0.181*** (0.059)	-0.200*** (0.046)	-0.408*** (0.108)	-0.481*** (0.080)	-0.574*** (0.084)	-0.238*** (0.036)	-0.103*** (0.022)	-0.681*** (0.108)
Private credit	-0.010** (0.004)	-0.035* (0.019)	-0.019*** (0.003)				-0.059* (0.032)	-0.062** (0.030)	-0.012*** (0.002)			
Bank deposit liabilities				-0.027** (0.012)	-0.066** (0.032)	-0.060* (0.033)				-0.038*** (0.010)	-0.044** (0.017)	-0.013*** (0.003)
Initial primary schooling		-0.022 (0.076)	-0.012 (0.082)		-0.001 (0.008)	-0.009 (0.085)		-0.078 (0.133)	-0.063 (0.128)		-0.070 (0.135)	-0.059 (0.131)
Trade openness		-0.006 (0.005)	-0.007 (0.005)		-0.002 (0.003)	-0.009 (0.006)		-0.001 (0.012)	-0.004 (0.012)		-0.002 (0.013)	-0.005 (0.012)
Inflation		0.011* (0.006)	0.026* (0.015)		0.025* (0.014)	0.029* (0.016)		0.035* (0.019)	0.016* (0.008)		0.010 (0.050)	0.023* (0.012)
Age dependency			0.020 (0.014)			0.019 (0.039)			0.018 (0.029)			0.013 (0.024)
Population growth			0.003 (0.002)			0.001 (0.006)			0.008 (0.057)			0.009 (0.056)
Constant	1.726*** (0.391)	-0.407*** (0.092)	-2.401*** (0.629)	-3.230* (1.740)	-0.549*** (0.123)	-1.833*** (0.342)						
Observations	91	83	83	91	83	83	91	83	83	91	83	83
Number of countries	13	13	13	13	13	13	13	13	13	13	13	13
Hansen OID p-value	0.538	0.124	0.444	0.142	0.347	0.668						

Robust p-value (column 1-6) and Bootstrapped p-value (column 7-12) in parenthesis; *significant at 10%; **significant at 5%; ***significant at 1%. Growth of H1 (-1) is the one three-years sub-period lagged value of the growth rate of H1. First stage regressions for columns 1-6 are available upon request. For the Bias corrected LSDV estimator, the bias correction is initialized by the standard Blundell-Bond System GMM estimator with no intercept.

increase in the private credit ratio significantly reduces the growth rate of H1. This result is robust not only to the presence of additional control variables (regressions (2) and (3)), but also when using alternative methods to control for endogeneity in regressions (4)-(6). This confirms, yet again, that a Shaw intermediation effect might be at work for the CFA Franc Zone countries. In addition, as emphasized by regressions (4)-(6) and (10)-(12), countries with higher bank deposit liabilities ratios present significantly lower poverty gap index growth rates. Consequently, irrespective of the measure of poverty, namely as the percentage of poor in the population (H0) or as the gap between the income of the poor population and the poverty line (H1), our results support the presence of a significant McKinnon conduit for the group of CFA Franc Zone countries.

Finally, on the basis of columns 3 and 6, and 11 and 12 from Tables 1 and 2, the drop in poverty (i.e. in the growth rates of H0 or H1) is of higher magnitude in the virtue of McKinnon' "conduit" effect (measured by the coefficient of the bank deposit to liabilities to GDP ratio), relative to the Shaw's "intermediation" effect (measured by the coefficient of the private credit to GDP ratio).¹⁰ This result is explained by the analytical framework of McKinnon, which consists of an economy being in a state of "primitive finance" and where the self-financed investments are important, with poor infrastructure and business communication, as the CFA Franc Zone countries. Consequently, in light of our results, CFA Franc Zone countries could extensively benefit, in terms of poverty reduction, of policy aimed at promoting financial development through better access to financial savings services.

5 Robustness tests of the effect of financial development on poverty

In the previous section we assumed the existence of a linear link between financial development poverty. However, other studies, including [Deidda and Fattouh \(2002\)](#) or [Aghion *et al.* \(2005\)](#), emphasized the presence of threshold effects of financial development

¹⁰To some extent, our findings are supported by [Guillaumont and Kpodar \(2011\)](#), exhibiting an important McKinnon "conduit" effect in developing countries.

on economic growth. Consequently, it might be appropriate to explore the possible presence of thresholds effects in the specific relationship between financial development and poverty.

Following the financial development-growth literature, we assume this threshold mechanism to be governed by the level of financial development (see for instance [Aghion *et al.*, 2005](#)).¹¹ Regressions (1) and (2) in Table 3 test for the presence of non linear effects in the relation between financial development and the growth rate of the poverty headcount index H_0 .¹² Although our estimations refute the presence of non linear effects of bank deposit liabilities, it appears that the effect of private credit to GDP ratio on H_0 is subjected to nonlinearities, since a higher credit ratio is reducing poverty only above a certain threshold. Intuitively, this result can be explained by the fact that the more developed the financial system, the higher its ability to expand its services (loans, deposits, insurance) to the poor. In countries with underdeveloped financial systems, banks may not have effective procedures for evaluating credit applications, lack the expertise to monitor the performance of borrowers or suffer from inadequate coverage of bank branches, which prevent the poor's access to formal financial system. Therefore, it might be necessary that the financial system reaches a certain threshold of development before it can provide sustainable financial services to the poor.

Analogously, regressions (1) and (2) in Table 4 explore potential threshold effects in the relation between financial development and poverty measured by the changes in the poverty gap H_1 . Irrespective of the measure of financial development, through either bank deposit liabilities (column 1) or private credit to GDP (column 2), its effect on the poverty gap does not seem subject to nonlinearities. In particular, compared to its nonlinear effect on H_0 , the absence of such effects of the private credit on H_1 might suggest that enabling access to credit decreases income inequalities between the poor from the very early stages of financial development for the Sub-Saharan countries in our sample.

An alternative robustness test for the presence of nonlinearities is to consider the effects

¹¹An alternative assumption is to consider that the effect of financial deepening on growth varies with the level of economic development of the country, as in [Deidda and Fattouh \(2002\)](#) or [Jalilian and Kirkpatrick \(2005\)](#). However, this effect is not likely to emerge in our analysis, which focuses on CFA Franc Zone countries with reasonably close levels of economic development.

¹²Results are based on FE-2SLS estimations, and the squared terms of financial development indicators are instrumented using their one period lagged value.

Table 3: Financial development and changes in poverty headcount H0: Robustness check

Dependent variable : Growth of H0	(1)	(2)	(3)	(4)
Initial H0	0.059*** (0.011)	0.060*** (0.014)	0.063*** (0.012)	0.056*** (0.014)
Bank deposit liabilities	0.072 (0.119)		-0.060* (0.032)	
Bank deposit liabilities-squared	-0.026 (0.021)			
Private credit		0.225** (0.108)		-0.261* (0.141)
Private credit-squared		-0.012* (0.006)		
Instability of Bank deposit liabilities			0.026** (0.012)	
Instability of Private Credit				0.324* (0.176)
GDP per capita Growth	-0.911*** (0.170)	-0.799*** (0.182)	-1.720*** (0.618)	-0.852*** (0.189)
Initial primary schooling	-0.018 (0.088)	-0.023 (0.082)	0.009 (0.086)	0.039 (0.080)
Trade openness	-0.077* (0.042)	-0.029* (0.015)	-0.096* (0.052)	-0.076 (0.057)
Inflation	0.217 (0.160)	0.256 (0.153)	0.286 (0.178)	0.224 (0.172)
Age dependency	0.255* (0.135)	0.199 (0.142)	0.213 (0.147)	0.201 (0.134)
Population growth	0.026 (0.024)	0.041 (0.029)	0.034 (0.027)	0.030 (0.026)
Constant	-3.664* (1.845)	-2.321*** (0.491)	-1.281* (0.748)	-4.196*** (0.950)
Observations	83	83	83	83
Number of countries	13	13	13	13
R-squared	0.776	0.754	0.769	0.758

Robust p-value in parenthesis; *significant at 10%; **significant at 5%; ***significant at 1%. Growth of H0 (-1) is the one three-years sub-period lagged value of the growth rate of H0. Consistent with the instrumentation procedure in Tables 1 and 2, the squared term of each measure of financial development is instrumented by the squared term of the instrumental variable used. Since the indicator of financial instability is computed using a regression (see Appendix 2), its standard error is computed by bootstrapping.

Table 4: Financial development and changes in poverty gap H1: Robustness check

Dependent variable : Growth of H1	(1)	(2)	(3)	(4)
Initial H1	0.244*	0.094 **	0.310***	0.701***
	(0.135)	(0.040)	(0.067)	(0.163)
Bank deposit liabilities	-1.084**		-0.109	
	(0.038)		(0.813)	
Bank deposit liabilities-squared	-0.022			
	(0.809)			
Private credit		-0.121***		-1.790**
		(0.010)		(0.745)
Private credit-squared		-1.722		
		(2.044)		
Instability of Bank deposit liabilities			1.472	
			(1.930)	
Instability of Private Credit				-1.003
				(0.855)
GDP per capita Growth	-0.140**	-0.974***	-1.615*	-0.430
	(0.058)	(0.211)	(0.922)	(0.808)
Initial primary schooling	-0.092	-1.748	-0.010	-1.857
	(0.102)	(1.481)	(0.037)	(1.116)
Trade openness	-1.082	-0.265*	-0.141	-2.873
	(1.619)	(0.153)	(0.419)	(1.900)
Inflation	2.660**	2.847**	1.216	1.437*
	(0.150)	(0.064)	(0.124)	(0.802)
Age dependency	0.179	0.502	1.707	-0.878
	(0.513)	(0.438)	(1.679)	(1.377)
Population growth	0.093***	0.084***	0.819**	0.134*
	(0.014)	(0.004)	(0.348)	(0.074)
Constant	4.106***	5.552**	-1.563***	0.994**
	(1.052)	(2.177)	(0.411)	(0.422)
Observations	83	83	83	83
Number of countries	13	13	13	13
R-squared	0.599	0.429	0.593	0.502

Robust p-value in parenthesis; *significant at 10%; **significant at 5%; ***significant at 1%. Growth of H1 (-1) is the one three-years sub-period lagged value of the growth rate of H1. Consistent with the instrumentation procedure in Tables 1 and 2, the squared term of each measure of financial development is instrumented by the squared term of the instrumental variable used. Since the indicator of financial instability is computed using a regression (see Appendix 2), its standard error is computed by bootstrapping.

of the instability of financial development on poverty.¹³ On the one hand, regressions (3) and (4) in Table 3 illustrate the influence of the instability of bank deposits liabilities and private credit to GDP on the poverty headcount index H_0 .¹⁴ According to column 3, a higher instability of the bank deposits liabilities ratio increases the growth rate of H_0 . Thus, a more irregular access to savings services mitigates the positive effect it might have in reducing the growth rate of the share of the population leaving below the poverty line. Similarly, important variations in the amount of the credit offered by financial institutions is an obstruction in decreasing the expansion of H_0 (see column 4). On the other hand, a higher instability of both bank deposits liabilities and private credit has no effect on the growth rate of the poverty gap H_1 , as emphasized by regressions (3) and (4) in Table 4. This suggests that decreasing the volatility of the degree of financial development reduces the gap between the rich and the poor, while it has no significant on the inequalities between the poor population in CFA Franc Zone countries.

6 Conclusion

In this paper we found that financial development reduces poverty in the CFA Franc Zone countries. This result is valid when using alternative (*i*) measures of financial development, namely the ratio of private credit to GDP or the ratio of bank deposits to GDP, (*ii*) measures of poverty, namely the poverty headcount index or the poverty gap, (*iii*) control variables, or (*iv*) econometric techniques that control for the possible endogeneity of financial development or for a small sample bias. Consequently, both the McKinnon’s “conduit” and the Shaw’s “intermediation” effects are at work when it comes to reducing poverty through fostering financial development, although the former effect was found of higher magnitude. Nevertheless, the extent to which financial development reduces poverty through these channels is subject to important nonlinearities. On the one hand, although better access to savings unambiguously decreases poverty, the development of the credit

¹³The financial instability is captured by the deviation from the trend for each indicator of financial development (see Appendix 2).

¹⁴For coherence with our previous analysis, financial instability variables are instrumented using their one period lagged value.

activity must reach a certain threshold before starting rolling back differences between rich and poor (in addition to contracting the gap between poor). On the other hand, an inappropriate expansion of both deposits and credits might aggravate the differences between rich and poor if associated to higher financial instability.

By emphasizing direct effects of financial development on poverty reduction, our results outline the crucial role of financial reforms for fighting poverty in CFA Franc Zone countries. These financial reforms should be pro-poor through improved access of the poor to financial services (deposits, loans, insurance, etc.). In particular, policy makers should particularly support the creation and development of decentralized financial institutions, intended to provide access to deposit accounts and to loans for the poor. Examples include financial services to people who cannot access banking services or lack collateral through the creation of guarantees funds which could be financed by public institutions and multilateral donors, under the surveillance of monetary authorities especially for preventing excessive financial instability. Finally, since these financial services should be designed for the poor, future work could focus on how they could also tackle the problem of insufficient geographical coverage of bank branches.

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A Appendix

A.1 List of countries

Bénin, Burkina Faso, Cameroun, Centrafrique, Comores, Congo, Côte d'Ivoire, Gabon, Mali, Niger, Sénégal, Tchad, Togo.

A.2 Variables' definitions

Variable	Variable's Definition	Source
Poverty headcount index	Percentage of population living on \$1.25 a day or less	Povcalnet, World Bank
Poverty gap index	Average poverty gap in the population as a proportion of the poverty line, such that the non-poor have zero gaps	Povcalnet, World Bank
Bank deposit liabilities	Ratio of bank deposit liabilities to GDP	International Financial Statistics, IMF
Private credit	Ratio of domestic credit to private sector to GDP	World Development Indicators, World Bank
GDP per capita growth	The growth rate of the ration between GDP and population	World Development Indicators, World Bank
Initial primary schooling	School enrollment, primary (% gross)	World Development Indicators, World Bank
Inflation	Change in consumer prices (annual %)	World Development Indicators, World Bank
Trade openness	Ratio of imports plus exports to GDP	World Development Indicators, World Bank
Age dependency	Ratio of population below 15 years and above 65 years to population between 15 years and 65 years	World Development Indicators, World Bank
Population growth	Average annual growth rate of total population	World Development Indicators, World Bank
Instability of Private credit	Average absolute value of residuals obtained by regressing the private credit on its lagged value and a time trend	World Development Indicators, World Bank
Instability of Bank deposit liabilities	Average absolute value of residuals obtained by regressing the Deposit liabilities on its lagged value and a time trend	World Development Indicators, World Bank

A.3 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
Poverty headcount index	130	68.37	38.30	23.00	90.76
Poverty gap index	130	46.44	22.91	1.17	86.94
Bank deposit liabilities	117	52.29	39.05	4.70	178.24
Private credit	130	51.32	43.34	55.36	128.40
GDP per capita growth	130	3.69	4.45	-16.47	13.99
Initial primary schooling	104	99.66	14.81	2.65	160.37
Inflation	130	23.40	81.60	-21.67	87.64
Trade openness	130	31.54	47.38	5.77	445.91
Age dependency	117	67.00	70.11	16.41	89.76
Population growth	130	1.68	11.73	0.72	11.82
Political Rights Index	117	4.34	2.21	1	7
Instability of Private credit	117	3.74	6.82	1.66e-03	138.64
Instability of Bank deposit liabilities	104	3.00	3.96	1.17e-03	41.76