Financial Development and Poverty Reduction in Crisis Periods: Panel Data Evidence from Six Countries of ECOWAS

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Abstract

In this study, we analyze the direct effect of financial development on poverty in crisis periods for a panel of Economic Community of West African States (ECOWAS) sample composed of six countries (Ivory Coast, Senegal, Gambia, Ghana, Mali and Benin) during the period 1996–2015, using econometric tests and static panel data. The main empirical result of this paper is that the financial development indicators and poverty proxies are significant and negatively correlated. The findings support the fact that financial development reduces directly poverty by increasing access for poor population to various sources of financing. As a result, finance makes transactions easier, provides opportunities for smoothing consumption and asset accumulation, and enables poor households to cope better with shocks, thus reducing the risk of recrudescence into poverty.

Keywords	JEL code
Poverty, financial development, crisis, panel data, econometric tests, ECOWAS countries	*I32, O16*

INTRODUCTION

The majority of empirical works focuses on the study of the effects of financial development on economic growth and abandons their direct effects on poverty. They argue that increasing national wealth reduces the poverty rate. Moreover, even if one agrees that financial development affects economic growth positively, it is unlikely that this growth will increase the incomes of the poor and reduce poverty accordingly.

The aim of this paper is to clarify the effects of financial development on poverty in times of crisis by proposing several estimation methods, based on a series of econometric tests. We consider this paper

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an in-depth empirical assessment of the direct relationship between financial development (banking and monetary systems) and poverty. We use panel data modeling as well as time series and cross sectional studies. The panel data analysis relates mainly to heterogeneity among individuals. In other words, it allows us to examine the behavioral diversity of agents.

1 LITERATURE REVIEW

1.1 Theoretical literature

In the economic literature, the arguments that can justify the direct impact of financial development on poverty are of the order of three: the McKinnon conduit effect, the Shaw intermediation effect and the thresholds effect.

McKinnon (1973) initially suggested the conduit effect. In explaining this effect, McKinnon states that when the poor enter the financial system as savers, the conduit effect is likely to have a reducing impact on financial development for the well-being of the poor. McKinnon assumes that the investment is indivisible. This hypothesis is verified since "small peasants or poor artisans" form the representative economic units in the McKinnon study. In addition, investor-savers have limited access to external financing. Any prior accumulation (savings), in the form of real assets or cash balances, always precedes any expenditure devoted to investment. Thus, self-financing represents itself as the capital source of the investment of the poor.

Shaw (1973) pioneered the theory of the "Intermediation effect". Financial deepening helps to facilitate access to credit for the poor and can therefore benefit from it. Shaw's studies have found that an increase in the interest rate of deposits stimulates savings. In this case, the banks can reap significant savings and therefore they give more credit to investors whose poor can benefit. Thus, investment, which is, financed externally, increases.

The thresholds effect is based on the following assumption: "As the financial system grows, it may expand its services to the poor". In other words, assuming that the financial system grows, the result is that poor's access to financial services becomes more and more profitable. Thus, in order to extend these services to the poor in an efficient and competitive way, it is essential that the financial system reaches a certain threshold of development (e.g. Aghion et al., 2005). In developing countries where the financial system is not sufficiently developed, the poor moves towards the non-formal financial system and ousts the formal financial system. As a result, three major factors hinder their access to formal credit markets and/or financial services: the lack of acceptable or sufficient guarantees, the physical constraints and the lack of financial institutions specializing in financial services offered to the poor.

In summary, theoretical arguments presage three direct effects of financial development on poverty reduction. These effects are the McKinnon conduit effect, the intermediation effect of Shaw and the effect of the thresholds. If the McKinnon conduit effect and the effect of the thresholds require measures to free financial systems from constraints and restrictions that handicap their development in the supply of financial services to the poor (Kpodar, 2004), the intermediation effect of Shaw requires putting implementation of these measures within well-defined deadlines. In addition, other empirical studies complete these theoretical works.

1.2 Empirical literature

Tunjung et al. (2019) define poverty as a condition in which people are below the poverty line. This concept is the subject of numerous studies in different time segments (Aleksandrovna Kormishkina et al., 2018). According to the direct linkage between financial development and poverty alleviation in developing countries, it is one of the most discussed and acute scientific issues that was dealt with in intense researches. However, results are mixed and controversial across data, countries and methodologies of estimation. Hence, two views are as follow:

First, financial development is conducive in poverty reduction. Jalilian and Kirkpatrick (2002), and Beck et al. (2007) find that the degree of financial intermediation has a positive impact on the income of the poor. Jalilian and Kirkpatrick (2002) use the GDP rate of return to interpret the payment process in a low-income sample. Beck et al. (2007) focus on developing countries and the role of finance measured by the ratio of private sector credit as a percentage of GDP. Kpodar (2004) indicates that the financial development (proxied by the liabilities of financial institutions in the proportions of GDP, the transactions of commercial banks in GDP and the credit in the private sector in GDP) are likely to reduce absolute poverty or the income of the 20% poorer from 1988 to 1997. Using money supply (M2) as a percentage of GDP, Odhiambo (2009) concludes that financial development in the sense of Granger involves poverty reduction in South Africa. Guillaumont-Jeanneney and Kpodar (2011) declare that financial development is beneficial for the reduction of poverty only through the Conduit Effect of McKinnon. For example, the study finds that positive relationship exists between financial development (as measured by Liquid liabilities M3 as percentage of GDP) and poverty. Nevertheless, if the ratio of private credit to GDP is employed as financial development proxy, the linkage turns out to be statistically insignificant. Their empirical results indicate that the poor can benefit mainly from the banking system through the ease of transactions and the offer of savings opportunities at the expense of better access to credit. Perez-Moreno (2011) observes that financial development (as measured by liquid assets of the financial system to GDP ratio or by money and quasi money to GDP ratio) reduces the moderate poverty in the period of the 1970s–1980s. However, his analysis does not find evidence to support this last hypothesis for the period of the 1980s–1990s or when he uses the ratio of the value of credits granted by financial intermediaries to the private sector to GDP as measures of financial development, whereas they seem to be strengthened when he employs financial development's summary measures. Furthermore, the consequences do not found any Granger causality from poverty to financial development. Salah Uddin et al. (2012) examine empirically the long-run and causality relationship that exist between financial development and poverty in the case of Bangladesh for the period 1976–2010. Applying an ARDL co-integration approach, the evidence indicates that there is a long-term relationship between the development of the banking sector and the reduction of poverty. It is also observed that the causal linkage is bidirectional between banking sector development and poverty reduction. In the same spirit, Khan et al. (2012) employ the ARDL bounds testing the approach to co-integration to investigate the linkage between financial development and poverty in the Pakistan context using several indicators of financial development over the period during 1981–2010. The survey findings suggest that financial development contributes to poverty reduction. Focusing in 28 Indian states, Inoue and Hamori (2012) find similar results concerning credits and deposits. The research of Boukhatem and Mokrani (2012) deals with direct effects of financial development on poverty reduction in 67 low and middle income countries using data for the period of 1986–2009. The econometric analysis proves the existence of direct effects of financial development and poverty reduction. Using an innovative empirical technique based on ARDL co-integration with Structural Breaks and quarter frequency data in time period of 1975 to 2011 in Bangladesh, research conducted by Salah Uddin et al. (2014) finds significant poverty-reduction impact of financial development, but it is not linear. Chemli (2014) states that private credit relative to GDP is positively associated with lower poverty in Algeria, Iran, Jordan and Tunisia during the period between 1990 and 2012. The ARDL model is used to examine the relationship between variables. Quartey (2005) and Odhiambo (2010) endorse similar results for Ghana and Zambia. Abosedra et al. (2015) attempt to study the long-run relationship between financial deepening and poverty reduction by applying the Structural Break Autoregressive Distributed Lag-Bounds testing technique in Egypt between 1975Q1–2011Q4. Authors employ Zivot-Andrews unit root test in the presence of structural break to discuss the stationarity of series. Their research reports two major findings according to direct effects: (1) Domestic credit to private sector by bank (as percentage of GDP) contributes significantly to alleviate

poverty; (2) Financial development contributes directly to facilitate the access or broad the access of the poor to financial services such as insurance-risk and domestic credit. Sehrawat and Giri (2016) attempt to analyze the relationship between financial sector and poverty in the case of India for the period 1970 to 2012 applying also an ARDL model. The empirical results support the claim that financial development affects negatively poverty reduction in both long-run and short-run. Causality test reveals a positive and unidirectional causality from financial development prevalence's measure to poverty reduction. Donou-Adonsou and Sylwester (2016) apply the instrumental variables approach in a panel of 71 developing countries for the period of 2002–2011. Estimation results from an impact evaluation show that banks reduce poverty when the incidence is reduced, and this when the private credit ratio as a percentage of GDP is used as proxy of financial development. On the other hand, by using microfinance institutions (MFIs) as a financial development measure, this indicator does not appear to have the negative impact on poverty. Results imply that banks have some ability to reduce poverty, MFIs do not. Boukhatem (2016) extends the work of Boukhatem and Mokrani (2012) and tries to identify and quantify the channels through which financial development influences poverty applying GMM-system estimation. The analysis is carried out on 67 low and middle-income countries provinces from 1986 to 2012. His paper's results showed that financial development played an important role in declining poverty, and this, independently of the econometric methods applied. Furthermore, the findings of the study found evidence that the instability of financial development would penalize the poorest people and would eradicate the positive impact of financial development. Covering annual observations of a sample of 42 Sub-Saharan African countries for the period 1980–2012, Zahonogo (2017) formulates the System Generalized Method-of-Moment (GMM) to highlight the linkage between financial development and poverty indicators, after controlling country specific effects and endogeneity. For this purpose, the research adopted poverty headcount and poverty gap as proxies of poverty and private credit as proxy of financial development. All variables used are transformed into natural logarithm. Author shows the existence of a certain threshold of financial development below which financial development has harmful effects on sub-Saharan African poor people and above which it could be related with less poverty. In addition, he promises and upholds the idea that the relation between financial development and poverty may be nonlinear. Rewillak (2017), by dividing financial development into four sub-categories and employing GMM panel regression in developing countries over the period 2004–2015 shows both financial deepening and greater physical access are beneficial in diminishing the percentage of households below the poverty line. Author adds that financial instability (fragility) has not a harmful impact on poverty alleviation. In a 2019 study conducted in Indonesia from the1980–2014 periods, the financial depth measured by credit volume affects negatively the rural poverty by using an ARDL approach to co-integration and Granger causality based on the VECM test. More especially, results show that there are both long-run and short-run relationships among the variables in the model. Additionally, findings for direction of causal relationship indicate that a bi-directional causality exists between the financial sector and poverty (Majid et al., 2019). A recent research employing Instrumental variable regressions in 15 Indian states from the 1983–2005 periods, suggests that financial depth post-1991 (as measured by credit volume) reduces rural poverty by fostering entrepreneurship and incorporating geographic-sectoral migration (Ayyagari et al., 2020). Using a Multiple Correspondence Analysis to generate a financial inclusion index, and Three-stage Feasible Least Squares to estimate households' vulnerability to poverty in Ghana, research conducted by Koomson (2020) finds two major effects of financial inclusion on poverty. Financial inclusion is linked to a diminishing in a household's probability of being poor. The drop of this probability is capped in 27%. Likewise, it avoids the exposure of a household to future poverty of around 28%. Yet, the negative impact of financial inclusion on alleviation poverty and vulnerability to poverty is more important in rural than in urban areas and when households are derogated by women than men. Policymakers should be more responsive to enhance financial inclusion in developing countries.

In contrast, some evidence proves that financial development does not affect poverty. Fowowe and Abidoye (2012) use a private credit as a financial development measure and examine its effects on poverty in a sample of countries in sub-Saharan Africa. Their empirical results show that this indicator of financial development has not a significant influence on poverty in these countries. Yet, macroeconomic variables such as the rate of trade openness and low inflation lightened poverty level. By applying an Autoregressive Distributed Lag (ARDL) model in Nigeria for annual series covering the period from 1970 to 2011, Dandume (2014) points out that financial sector development does not involves the poverty reduction. This can be explained by the fact that an increase in the supply of loan able funds due to financial sector development is not enough to reduce the poverty. As a result, strong measures seem to be needful. More recently, research carried out by Ayad (2018) resorts to the regime shift analysis for both unit root tests with structural breaks and Hensen co-integration test in order to detect the long-run and short-run elasticities between poverty (as measured by the consumption per capita) and financial development (as measured by the sum of total external liabilities and total external assets divided by GDP) in Algeria in the period between 1970–2017. Findings prove that there is a long-run relationship among the poverty and financial development with a regime shift in 2009, and financial development is not able to decrease the poverty.

Our contribution in this study is empirical. The theoretical and empirical literatures mentioned above provide the rationale for our consideration of the direct effects of financial development on poverty alleviation.

2 DATA AND METHODOLOGY
2.1 Presentation of data and model

Data were extracted from the World Bank (World Development Indicators, 2016) spanning the period 1996–2015. Our original purpose was to insert all ECOWAS countries, but all data are available only for 6 countries (Ivory Coast, Senegal, Gambia, Ghana, Mali and Benin). Beside, the number of observations is expected to be similar across countries leading to estimations over a balanced panel data. A number of missing observations characterizes poverty data.[3] In order for the balanced databases to be complete (Bangoura et al., 2016), we have tried to fill the gaps by using a simple extrapolation method on the previous or historical value. According to Little and Rubin (2002), if the percentage of missing values for a variable was up to 5%, the values cannot be excluded or deleted. Hence, it is essential to change each missing value by an imputed value.

Our econometric model with panel data is inspired by the studies of Kpodar (2004) and Guillaumont-Jeanneney and Kpodar (2011) in which the poverty indicator is regressed on the indicator of financial development and a set of variables of control presented by the following expression:

$$PV_{it} = \alpha_i + \alpha_0 + \alpha_1 FD_{it} + \alpha_2 Ln(Y)_{it} + \alpha_3 crisis + \alpha_4 INF_{it} + \alpha_5 OPN_{it} + \alpha_6 GINI_{it} + \alpha_7 GV_{it} + \alpha_8 UNP_{it} \qquad (1)$$
$$+\alpha_9 EDU_{it} + \alpha_{10} HEL_{it} + \alpha_{11} TEL_{it} + \varepsilon_i,$$

where: PV_{it} refers to the indicators of poverty presented by the headcount poverty and the poverty gap, respectively. Headcount poverty (PV1) denotes the proportion of population living below the international poverty line of 1.9\$ a day following Honohan (2004). Poverty gap (PV2) measures the average distance between the income of the poor population and the poverty line. According to Guillaumont-Jeanneney and Kpodar (2011), this last indicator makes it possible to determine the extent to which poor populations are below or above the poverty line.

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[3] *<http://iresearch.worldbank.org/PovcalNet/povOnDemand.aspx>.*

FD_{it} is the level of financial development including banking and monetary variables. Money supply to GDP ratio (M3) measures the liquidity's degree of the financial system, presented by the "McKinnon Conduit Effect". To measure bank development, we use the variable (CB) which equals the domestic credit provided by the banking sector divided by GDP. We use also private credit (CP) which equals the value of credits by financial intermediaries to the private sector divided by GDP following Levine and Zervos (1998), Rousseau and Wachtel (2000), and Beck and Levine (2004). In general, (M3) and (CP) are commonly used in empirical studies to estimate the impact of financial development on poverty (e.g. King and Levine, 1993; Levine et al., 2000; and Kpodar, 2006).

On the other hand, we introduce the natural logarithm of GDP per capita (Ln $(Y)_{it}$) which controls the impact of economic growth on poverty, following Beck et al. (2006).

To account for periods of financial instability, we include the recurrence of crisis (crisis). It is a dichotomous variable that takes the value of 1 in the period of crisis and 0 otherwise. We take into account crises that started from 1996 to 2015: the Asian crisis (1997), the Russian crisis (1998), the Brazilian crisis (1998–1999), the crisis of Turkey (2000), the stock market crash of 2001–2002, the economic crisis of Argentina (2001), the attacks of September 11 (2001) in the United States, the Brazilian crisis (2002), the global financial crisis: "subprime" crisis (2007–2009) and finally the Greek crisis (2009). We consider the extreme form of financial instability (e.g. Chemli and Smida, 2013).

Inflation rate (INF_{it}), measured by the consumer price index and reflects the effect of macroeconomic stability on poverty.

Rate of trade openness (OPN_{it}) measured by the ratio of the sum of exports and imports of goods and services to GDP and reflects the trade integration policy on poverty.

Inequality index ($GINI_{it}$) measures the inequality of income distribution. It ranges from 0 (distribution is uniform and perfectly equal, where households have the same income) to 1 (where distribution is perfectly unequal).

GV_{it} denotes the ratio of government consumption to GDP. Various practitioners use this variable as a control variable for government intervention.

In order to capture the effect of the labor market on poverty, we use the rate of the Unemployment (UNP).

Additional control variables that include the ratio of public expenditure in education to GDP (EDU_{it}) and the ratio of public expenditure in health to GDP (HEL_{it}) to capture the impact of human capital investment on poverty (e.g. Agénor, 2003).

Last, we include the infrastructure indicator (TEL_{it}), measured by the number of telephone line (by 100 capita). This indicator contributes both to the economic growth and to the improvement of the population's living standards.

Finally, α_i is an unobserved country specific effect ε_i is the error term with $E(\varepsilon_{it} = 0) \forall i, t$, i is the county and t is the time period.

2.2 Econometric methodology

Before the implementation of our econometric model, we verify the homogeneity or heterogeneity of the data generating process. Econometrically, it comes down to testing whether the coefficients of the model retained are equal in the individual dimension. We test the overall homogeneity of behaviors (constants) in time and space with the Fischer test. In the case where the sample is totally homogeneous, we use the OLS on panel data. In the case of heterogeneous behaviors, we choose between the Fixed Effect Model and the Random Effect Model according to the results obtained by the Hausman (1978) specification test. If the model to be retained is a Fixed Effect Model or Random Effect Model, we use then the Wooldridge (2002) autocorrelation test, if not, our estimators will be biased. Thus, if the errors are autocorrelated, we apply Baltagi and Wu (1999) first-order autocorrelation correction method

to reduce this potential bias. We test the heteroscedasticity of the errors with Breush-Pagan (1979) test. Such heteroscedasticity is then corrected by the method of White (1980). If the errors are both heteroscedastic and autocorrelated, we use the Quasi Generalized Least Squares (MCQG) method. Dutta and Osei-Yeboah (2008) have used this method, in particular. We suspect endogeneity of the explanatory variables, we refer to the test of Nakamura-Nakamura (1981). Finally, we discuss the results obtained.

3 RESULTS AND DISCUSSIONS

From the Correlations Table 1 between poverty proxies and financial development indicators, it can see that all Pearson's correlations coefficients are negative.
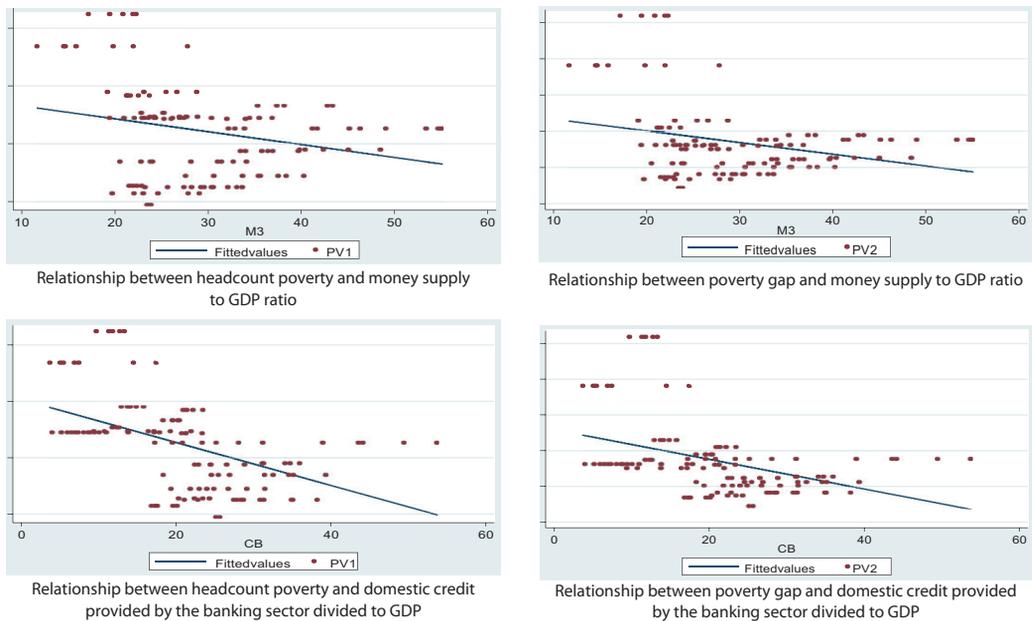
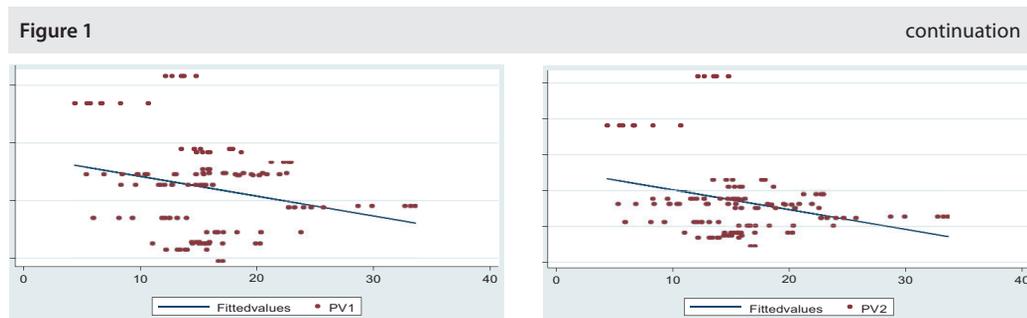**Table 1** Correlation between poverty and financial development indicators

	PV1	PV2	M3	CB	CP
PV1	1.0000				
PV2	0.9412*(0.0000)	1.0000			
M3	−0.2573*(0.0046)	−0.2859*(0.0016)	1.0000		
CB	−0.4920*(0.0000)	−0.4143*(0.0000)	0.7382*(0.0000)	1.0000	
CP	−0.2405*(0.0081)	−0.2994*(0.0009)	0.5208*(0.0000)	0.3848*(0.0000)	1.0000

Notes: * indicates statistical significance at 1%. Numbers in parentheses under the coefficients are p-values.
Source: Data processing by using STATA 12

Turning to the correlation between financial development indicators, there is a positive and significant correlation between them. Furthermore, values are at high levels. In fact, this suggests that these indicators capture the same information. We register also the highly positive correlation between the money supply to GDP ratio and the domestic credit provided by the banking sector to GDP ratio (0.7382). As shown by Kpodar (2006), financial development indicators are negatively correlated with poverty and positively correlated with each other.

Figure 1 Graphs between poverty and financial development

Relationship between headcount poverty and money supply to GDP ratio

Relationship between poverty gap and money supply to GDP ratio

Relationship between headcount poverty and domestic credit provided by the banking sector divided to GDP

Relationship between poverty gap and domestic credit provided by the banking sector divided to GDP

Figure 1   continuation

Relationship between headcount poverty and credits by financial intermediaries to the private sector divided to GDP

Relationship between poverty gap and credits by financial intermediaries to the private sector divided to GDP

Source: World Bank and PovcalNet, formulated by authors

Figure 1 illustrates the relationship between headcount poverty and financial development, also the relationship between poverty gap and financial development. We can note that financial development indicators do not favor the two indicators of poverty, with a mighty descending slope which crosses the group of points. A negative impact of the financial development indicators on the two indicators of poverty can be established.

Table 2 Results of Fischer test of global homogeneity

Endogenous variable : PV_1	M3	CB	CP
F	$F(16,103) = 4.95$	$F(16,103) = 5.33$	$F(16,103) = 5.11$
Prob >F	0.0000	0.0000	0.0000
Endogenous variable : PV_2	M3	CB	CP
F	$F(16,103) = 8.16$	$F(16,103) = 8.82$	$F(16,103) = 8.21$
Prob >F	0.0000	0.0000	0.0000

Source: Data processing by using STATA 12

Firstly, we begin with testing of global homogeneity. The results are shown in Table 2. Indeed, the probability of the Fischer test for the headcount poverty and the poverty gap is close to zero. Therefore, we reject the null hypothesis of the total homogeneity of the constants. On the other hand, we accept the model with individual specific effects (Fixed Effect Model or Random Effect Model). Before proceeding with discussions of the results of estimation, we carry out a set of tests in order to perceive the possible problems that may persist on the data. We examine whether the autocorrelation and the heteroscedasticity across errors. Yet, we carry out the Nakamura-Nakamura test in order to control the endogeneity bias.

Table 3 Results of Wooldridge test of autocorrelation

Endogenous variable : PV_1	M3	CB	CP
F	$F(1,5) = 1.625$	$F(1,5) = 43.777$	$F(1,5) = 6.600$
Prob >F	0.2584	0.0012	0.0501
Endogenous variable : PV_2	M3	CB	CP
F	$F(1,5) = 2.478$	$F(1,5) = 27.536$	$F(1,5) = 6.747$
Prob >F	0.1763	0.0033	0.0484

Source: Data processing by using STATA 12

Results of the Wooldridge test[4] for the variable M3 show that the null hypothesis of no autocorrelation in order 1 is accepted at the 5% since the probability of this test is greater than 5% for the two poverty indicators. Consequently, we do not need to make such a correction. On the other hand, for the variable CB, the probabilities associated to the Wooldridge test are less than 5% for the two indicators of poverty. In this case, we take again the estimation of the Random Effect Model by using the method of Baltagi and Wu.[5] For the variable CP, we estimate the Random Effect Model by using the method of Baltagi and Wu for the poverty gap.

The results of the Breusch-Pagan of heteroscedasticity test show that all Breusch-Pagan statistics for the two indicators of poverty are greater than the tabulated value. Therefore the errors are heteroscedastic whatever the indicator of the financial development used.

Table 4 Results of Breusch-Pagan test of heteroscedasticity

Endogenous variable : PV$_1$	M3	CB	CP
R^2	0.6901	0.6893	0.6893
Khi2 calculated	82.812	82.716	82.716
Endogenous variable : PV$_2$	M3	CB	CP
R^2	0.6623	0.6632	0.6630
Khi2 calculated	79.476	79.584	79.56

Notes: Under a Chi-square law at k-1 degrees of freedom. N and R^2 are respectively the number of observations and the coefficient of determination of the model of step 3 and k is the number of explanatory variables including the constant. Tabulated Chi2 is 19.6751 for dd1 = 11 and α = 5%. *, **, *** indicate statistical significance respectively at 10%, 5% and 1%.
Source: Data processing by using STATA 12

Also, we carry out the Nakamura-Nakamura test in order to control the endogeneity bias. According to Kpodar (2004), the financial development variables, Ln (Y) and GINI can be suspected of endogenous to poverty indicators, in other words they can be correlated with the errors. To solve this problem, lagged financial development indicators of one period, lagged Ln (Y) variable of one period and lagged GINI of one period were chosen as instrumented variables. The Nakamura-Nakamura test results show that the endogeneity hypothesis has been rejected at 5%. As a result, the financial development variables (M3, CB and CP), Ln (Y) and GINI are not endogenous.

Table 5 Results of Nakamura-Nakamura test of endogeneity

Endogenous variable: PV$_1$	M3	CB	CP
Residue1 (associated to FD)	4.543012(0.130)	−1.465696(0.491)	26.8704(0.304)
Residue2 (associated to Ln(Y))	9.191219(0.188)	2.793045(0.174)	2.383958(0.132)
Residue3 (associated to GINI)	0.7156593(0.416)	−0.3834397(0.442)	2.43887(0.217)
Endogenous variable: PV$_2$	M3	CB	CP
Residue1 (associated to FD)	3.309656(0.120)	−0.6115025(0.673)	18.45365(0.303)
Residue2 (associated to Ln(Y))	8.393632(0.106)	2.49063*(0.099)	2.036284*(0.085)
Residue3 (associated to GINI)	−0.9033365(0.289)	−0.3970353(0.299)	2.049209(0.166)

Notes: * indicates statistical significance at 10%. Numbers in parentheses under the coefficients are p-values.
Source: Data processing by using STATA 12

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[4]   The Wooldridge test (2002) is programmed on the "xtserial" command. A second way to do the autocorrelation test is to proceed indirectly using the "xtregar" command.
[5]   The method of Baltagi and Wu is preprogrammed on STATA 12 under the command "xtregar".

According to Table 6, the statistics of Hausman test for headcount poverty appear with a probability Prob > 5% for the three financial development indicators M3, CB and CP. Thus, we keep the Random Effect Model for the three indicators of financial development. It is globally significant with a zero probability of the Wald Chi2 test for the whole of specifications.

We conclude that the impact of financial development is always negative with significance varying with the nature of the measure introduced either for monetary development or for banking development. Individually, the coefficient associated to CB (Column 3) is negative and statistically significant with the high level of 1%. At this step, we can note that an increase of 1% of the money supply to GDP ratio will generate a decrease in headcount poverty of 0.233% (Column 1). For the domestic credit provided by the banking sector divided to GDP, an increase of 1% in this indicator will result a deterioration of the headcount poverty of 0.266% (Column 3). According to ratio of credits by financial intermediaries to the private sector to GDP, an increase of 1% will reduce the headcount poverty of 0.374% (Column 4). This last result is confirmed with the studies of Beck et al. (2007) which affirm that an increased credit to the private sector leads to a decline in people living below the poverty line.

Table 6 Direct impact of financial development on headcount poverty in ECOWAS: Static panel model results

Variables	REM	REM	REM with AR(1) disturbance	REM
	(1)	(2)	(3)	(4)
M3	−0.233*(0.060)			
CB		−0.261**(0.012)	−0.266***(0.010)	
CP				−0.374*(0.083)
Ln(Y)	−16.422*(0.084)	−14.974(0.109)	−15.302*(0.093)	−14.262(0.133)
crisis	0.991*(0.093)	0.898(0.131)	0.891(0.136)	0.837(0.165)
INF	−0.062(0.173)	−0.057(0.205)	−0.0568(0.211)	−0.063(0.167)
OPN	0.006(0.790)	−0.001(0.994)	−0.001(0.970)	0.002(0.911)
GINI	1.4***(0.000)	1.424***(0.000)	1.422***(0.000)	1.425***(0.000)
GV	−0.973*(0.075)	−0.942*(0.081)	−0.926*(0.085)	−0.905*(0.098)
UNP	0.517(0.161)	0.502(0.166)	0.498(0.168)	0.474(0.197)
EDU	0.457(0.398)	0.468(0.376)	0.477(0.366)	0.401(0.455)
HLT	−2.732**(0.003)	−2.783***(0.002)	−2.776***(0.003)	−2.846***(0.002)
TEL	−0.099(0.947)	−0.803(0.587)	−0.798(0.589)	−0.375(0.801)
Constant	−0.417(0.788)	0.02(0.990)	0.077(0.960)	−0.141(0.927)
Wald Chi2 test	77.95***(0.000)	82.54***(0.000)	82.61***(0.000)	77.10***(0.000)
Hausman test (Prob)	0.9944	0.9804		0.9414
Number of countries	6	6	6	6

Notes: *, **, *** indicate statistical significance respectively at 10%, 5% and 1%. Numbers in parentheses under the coefficients are p-values; REM indicates Random Effect Model. AR (1) indicates Durbin-Watson test for first order serial correlation.
Source: Data processing by using STATA 12

Similarly, Honohan (2004) finds a significant and robust impact of financial development (measured by the ratio of domestic credit to the private sector to GDP) on the headcount poverty. Its result suggests that there is a direct relationship between financial development and poverty eradication and that this relationship is independent of the indirect impact via the economic growth. In ECOWAS countries,

the growth of the private sector generates employment opportunities through the creation of small and medium-sized enterprises (SMEs). Recently, several private sector studies from World Bank member countries have focused on the role of SMEs in the fight against poverty.

Generally, the results of this work reveal that SMEs help to reduce unemployment and thus contribute to alleviating household poverty. Additionally, Ayyagari et al. (2007) argue that low entry costs, easy access to finance, availability and dissemination of information lead to an increase in private firms in the manufacturing sector and that SMEs account for around 60% of employment in this sector.

In columns (1), (3) and (5) of Table 7, results suggest that the ratio of money supply to GDP ratio and the domestic credit provided by the banking sector to GDP are negative and significantly correlated with poverty gap. The effect of financial development on poverty reduction is more powerful in the case of the headcount of poverty than in the poverty gap. In fact, an increase in a point of the percentage of M3 reduces the poverty of 0.161%. These results support the McKinnon conduit effect. Likewise, an increase in CB from 1% will lead to a reduction of the poverty gap of 0.209%. In contrast to headcount poverty, CP is not significant. Therefore, financial development contributes directly to poverty reduction by improving the access of poor population to financial services, which is in conformity with theoretical analyzes and thus corroborate with empirical studies.

Table 7 Direct impact of financial development on poverty gap in ECOWAS: Static panel model results

Variables	REM	REM	REM with AR(1) disturbance	REM	REM with AR(1) disturbance
	(1)	(2)	(3)	(4)	(5)
M3	−0.161*(0.080)				
CB		−0.202***(0.008)	−0.21***(0.006)		
CP				−0.206(0.196)	−0.219(0.172)
Ln(Y)	−11.965*(0.088)	−11.004(0.109)	−11.423*(0.097)	−10.52237(0.134)	−11.349(0.109)
crisis	0.552(0.219)	0.496(0.255)	0.494(0.260)	0.442(0.320)	0.44(0.330)
INF	−0.049(0.145)	−0.045(0.168)	−0.045(0.175)	−0.049(0.147)	−0.048(0.164)
OPN	0.004(0.812)	−0.001(0.976)	−0.001(0.946)	0.001(0.930)	0.001(0.983)
GINI	1.565***(0.000)	1.585***(0.000)	1.583***(0.000)	1.578***(0.000)	1.574***(0.000)
GV	−0.793**(0.049)	−0.775**(0.050)	−0.754*(0.055)	−0.747*(0.065)	−0.713*(0.076)
UNP	0.253(0.352)	0.249(0.349)	0.244(0.355)	0.217(0.424)	0.213(0.431)
EDU	0.554(0.165)	0.584(0.132)	0.597(0.123)	0.49(0.218)	0.503(0.205)
HLT	−1.839***(0.007)	−1.874***(0.006)	−1.876***(0.005)	−1.91***(0.006)	−1.911***(0.006)
TEL	-0.34(0.758)	−0.857(0.429)	-0.865(0.424)	−0.538(0.626)	-0.534(0.628)
Constant	−0.174(0.878)	0.155(0.890)	0.209(0.855)	−0.009(0.993)	0.081(0.946)
Wald Chi2 test	130.26***	138.80***	139.32***	127.26***	126.96***
Hausman test (Prob)	0.9933	0.9758		0.9497	
Number of countries	6	6	6	6	6

Notes: *, **, *** indicate statistical significance respectively at 10%, 5% and 1%. Numbers in parentheses under the coefficients are p-values. REM indicates Random Effect Model. AR (1) indicates Durbin-Watson test for first order serial correlation.
Source: Data processing by using STATA 12

In Tables 6 and 7, results of estimation of the direct impact of the money supply on GDP ratio and domestic credit provided by the banking sector to GDP ratio on headcount of poverty and poverty gap suggest that the growth rate of the GDP per capita is negative and statistically significant at 10%.

The hypothesis of a negative effect of economic growth on the poverty is not rejected. In addition, Ahmad and Riaz (2012), and Inoue and Hamori (2012) argue that economic growth is an instrument of poverty alleviation. However, this positive effect can be hindered and slowed down by the presence of income inequalities. Šhare and Oržiklas Druežta (2016) conclude that economic growth is good for poverty reduction but it is not enough. Keho (2017) reveals bidirectional long-run causality between the two phenomena. As Guillaumont-Jeanneney and Kpodar (2006), the indicator of financial instability, measured by the dummy variable (crisis) has a positive effect on poverty. In some developing countries, setting up safety nets such as social assistance programs, conversion aids, etc can reduce the negative effect of financial instability and especially the effect of banking crisis. With regard to the variable (INF) which captures the effect of macroeconomic stability on poverty, it has a negative sign but its coefficients are not significant at conventional levels. Results are in conformity with those found by an abundant number of economists, such as Levine and Renelt (1992), Fisher (1993), Baldacci et al. (2002), and Enami and Lustig (2018), who argue that the relationship between inflation and poverty is negative. Similarly, Dollar and Kraay (2002) show that the impact of the inflation rate on the income of the poorest 20% population is negative. Inflation is a factor which can erode purchasing power, makes false the expectations of agents, attenuates the value of assets and penalizes relatively more the poor since their assets are not indexed to inflation. Furthermore, high inflation hampers countries' economic convergence. On the other hand, by introducing the variable OPN, we notice that coefficients are sometimes positive, sometimes negative with indicators of poverty. Inoue and Hamori (2012) agree that trade openness helps to eradicate poverty in developing countries. In addition, Basanta and Malvika (2014) find that poverty is significant and negatively correlated with total trade, exports imports and merchandise trade. However, the surprising positive sign of trade openness may, however, be explained by the risk of a broad opening to foreign capital flows. A second explanation relates to the fact that financial globalization is likely to increase income inequality when only some countries take advantage of its favorable effects. In addition, the coefficient associated to the GINI index is positive and statistically significant at a high level, reflecting the positive effect of the income inequality index on poverty found by Bamba (2001), Meng et al. (2005), and Zaman et al. (2020) who note empirically that there is a positive relationship between poverty and the level of inequality income, adding that a high inequality can increase poverty. Similarly, this result is corroborated by studies of Ravallion (2005), and Mchiri and Moudden (2011), who affirm that high inequality can deteriorate the situation of the poor. Unemployment (UNM) contributes positively to reducing poverty. Thus a 1% increase in unemployment leads to an increase of poverty. By introducing the variable (GV) that represents public expenditure (% of GDP), the results of different estimations indicate that only all coefficients associated to this variable is statistically significant at 1%. With regard to education expenditure (EDU), the results show that there is a positive and surprising relationship between this variable and poverty indicators. In other hand, we find that health expenditure (HEL) is negative and significantly correlated with poverty at 1%. An increase in spending on health helps to reduce headcount poverty and poverty gap. According to Castro-Leal et al. (2000), the solution is not only to increase budgets for health but also to break down all the constraints that prevent poor of benefiting from social services subsidies. In order to examine the impact of infrastructure on poverty, we introduce the variable (TEL). All coefficients allotted to this variable are negative but lacked of significance. In fact, this indicator of infrastructure can essentially affect the quality of life of poor (Chemli and Smida, 2013). Infrastructure plays a crucial role in the development process. It not only helps to connect operators to markets, reduce factor costs and improve the competitiveness of the economy, but provides also the services to the poor and determines their quality of life. In addition, this indicator promotes both economic growth and improves the standard of living of population. Guillaumont-Jeannenney and Kpodar (2005) affirm this result by revealing that a high road density may reduce poverty.

CONCLUSION

Using a sample of six ECOWAS countries from 1996 up to 2015 for the periods of crisis, this paper tries to investigate the relationship between financial development and poverty. It tests the direct impact of both monetary system and bank system on poverty. Generally, we report using static panel and across different control variables that the financial development is important or even detrimental for poverty reduction in the ECOWAS countries. As a matter of policy implications, it's obvious to promote the development of financial systems. In order to affect poor population favorably, financial development must provide them better access to financial services (loans, deposits, insurance, etc.) so that the McKinnon capital effect and the intermediation effect of Shaw intervene. Furthermore, policymakers must also consider the risks associated with crisis. Therefore, to encourage financial development polices to be accompanied by measures enhancing the stabilization of the macroeconomic environment. In ECOWAS countries, public authorities should mainly support the establishment and development of decentralized financial systems, especially microfinance institutions. Their main purpose is the provision of savings accounts and loans to the poor population. Firstly, these institutions are considered to be financial institutions that specialize in providing financial services to population with limited access to banking services. Secondly, these institutions can overcome the constraint of the absence of collateral by the mobilization of guarantee funds. Finally, since these micro-finance institutions are closer to the poor, they solve the problem of territory coverage of bank branches.

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