

Effects of Financial Inclusion on Poverty in WAEMU: Empirical Evidence Through the Channels of Income Inequality and Growth

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Abstract

In WAEMU, financial inclusion has been made a priority with the adoption in 2016 of the Regional Financial Inclusion Strategy. It constitutes a privileged instrument promoting the integration of the most disadvantaged social strata into the economic and social fabric of the Union. This paper examines the contribution of financial inclusion to poverty reduction. The study focuses on the eight WAEMU countries and covers the period 2008-2020. The results obtained by the method of triple least squares show that on the one hand financial inclusion reduces income inequality and subsequently reduces poverty and that on the other hand it does not affect economic growth. Robustness tests indicate that the overall rate of use of financial services reduces poverty both by increasing overall income and by reducing income inequality. These tests also show that for countries not plagued by terrorism, financial inclusion reduces poverty through reduced inequality and increased overall income. On the basis of these results, the paper formulates recommendations that could serve as a guideline for poverty reduction policies in WAEMU.

Keywords: Financial inclusion, aggregate income, poverty

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1. Introduction

Financial inclusion is a mechanism for ensuring easy access, availability and use of the formal financial system at an affordable cost for all categories of the population (Sarma and Pais, 2011). It is a powerful lever for economic development and the fight against poverty and inequality. According to Swamy (2010), access to financial services for the poor is essential for inclusive growth and sustainable development. Inclusive growth is defined as growth that not only creates new economic opportunities, but also ensures equal access to these opportunities for all segments of society, particularly the poor (Ali and Hwa Son, 2007). This definition implies growth that reduces poverty and income disparities within the population. Thus, extending financial services to previously unserved populations is a factor in unlocking growth potential and reducing income inequality (Jagtap, 2016). However, in developing economies in general and in WAEMU countries in particular, most people do not have access to basic financial services (savings, credit and insurance). In 2020, the synthetic financial inclusion index was 52%, compared with 50.1% in 2019 and 44.2% in 2018. Over the rest of the period covered by this research (2008 to 2017), although the index increased, it did not reach the 40% threshold. In 2018, the financial inclusion rate in the broad sense was 57.1% in the WAEMU, including a relatively modest share from the banking sector (17.0%), a significant contribution from the microfinance sector (21.7%) and a strong contribution from financial services via mobile telephony (33.9%). According to Sethy (2016), these percentages indicate an average level of financial inclusion between 2018 and 2020, and a low level between 2008 and 2017. This low level of financial inclusion puts a large part of the population on the margins of the production system, which could increase inequalities and poverty.

There is a broad consensus in economic literature on the importance of financial inclusion in the fight against poverty. People's access to financial services was highlighted as a key element in the fight against poverty when the Millennium Development Goals were defined in 2000 and the Sustainable Development Goals in 2015. In the WAEMU, financial inclusion was made a priority with the adoption of the Regional Financial Inclusion Strategy by the Council of Ministers in 2016. The debate on the effects of financial inclusion on poverty focuses mainly on the way in which financial inclusion reduces poverty. Indeed, financial inclusion reduces poverty through two channels: increasing income on the one hand and reducing inequality on the other (Sarma, 2008). Financial inclusion contributes to growth through the creation of added value by small businesses, with a positive impact on human development indicators, particularly poverty (Park and Mercado, 2015; Nanda and Kaur, 2016). Furthermore, by facilitating access, availability and use of the conventional financial system (Sarma, 2008), financial inclusion corrects market imperfections and improves the income of the poor. Inequalities are reduced because poor people's access to credit enables them to invest in income-generating activities, thereby reducing income disparities and poverty over time. A number of studies have explored the links between economic growth, income inequality and poverty. These studies are unanimous on the fact that economic growth reduces poverty (Lopez, 2004). They also show that improving income distribution is

conducive to poverty reduction. While it is difficult to assert that poverty reduction can be achieved through redistribution policies in the absence of economic growth, it is clear that growth associated with an improvement in distribution will have a greater impact on poverty reduction than growth that leaves income distribution unchanged (Ravallion, 2002; Bourguignon, 2002). However, there is no solid empirical evidence to suggest a general tendency for growth as such to make the income distribution more or less equal (Lopez, 2004). Deninger and Squire (1996) show that economic growth and income inequality are not even linked. The effects of financial inclusion on poverty can therefore be achieved through either economic growth or income inequality, or both.

The question then is through which channels financial inclusion contributes to the fight against poverty in the WAEMU. Since poverty reduction outcomes will depend on how financial inclusion affects growth and income inequality, assessing the relevance of a financial inclusion policy to a poverty reduction strategy will require knowledge of the links between financial inclusion and growth on the one hand, and between financial inclusion and income inequality on the other.

The aim of this article is to provide an empirical assessment of the effects of financial inclusion on poverty. More specifically, the aim is to analyse the contribution of financial inclusion to the fight against poverty through the channels of inequality and income. In the WAEMU, most studies on this subject focus on the effect of financial inclusion on economic growth (Gourène and Mendy, 2017), on the analysis of the determinants of financial inclusion (Dieme, 2020) or on the dynamics of financial inclusion (Senou et al. 2019). These studies do not address the link between financial inclusion and poverty, let alone check the transmission channels. This research attempts to fill this gap and could serve as a guideline for poverty reduction policies in the WAEMU.

The rest of the article is structured as follows. Section 2 presents the literature review on the link between financial inclusion and poverty. The methodology, estimation strategy and data are presented in section 3. The results of the estimations and their implications are presented in section 4. The conclusion and policy recommendations are presented in section 5.

2. Literature review

According to Abiola et al (2015), financial inclusion involves the population's access to financial services, which contributes to improving well-being and living standards, and therefore promotes economic growth. Furthermore, financial inclusion, by allowing previously excluded people to save in the financial system, subsequently allows the financial market to ensure an efficient allocation of these funds in long-term investment projects (Sethi and Acharya, 2018). In this way, the financial market secures the liquidity risk that is induced by the lack of fund flows in the market and encourages investment. This process in turn leads to increased production and employment, which in turn leads to poverty reduction (Claessens and Perotti, 2007). Indeed, stylised evidence shows that countries with the greatest reduction in poverty are those that have experienced prolonged periods of sustained economic growth (Lopez, 2004). Studies suggest that the poor generally benefit from increases in overall income and suffer from economic contractions (Dollar and Kraay, 2002).

Market imperfections prevent wider access to financial services, which limits the ability to save for education, health or other future events, and also limits firms access to capital for economic growth. According to Aghion and Bolton (1997), this situation alone can explain the persistence of inequalities in the net present value of wealth. Indeed, information asymmetries, transaction costs and contract enforcement costs can be particularly constraining for poor entrepreneurs who lack collateral, credit history and connections. These credit constraints will impede the flow of capital to poor individuals with high return projects (Galor and Zeira, 1993), thereby reducing the efficiency of capital allocation and intensifying income inequality. From this point of view, financial inclusion reduces poverty by relaxing credit constraints on the poor and reducing income inequality.

The direction of the relationship between growth and inequality has not always been unanimous in the economic literature. For some, economic growth tends to increase rather than reduce inequality in developing countries (Chenery et al., 1974). These early arguments on the relationship between growth and inequality were strongly influenced by the Kuznets hypothesis. According to this hypothesis, growth and inequality are linked by an inverted U-shaped curve: in the early stages of economic development, income inequality tends to rise and does not fall until countries reach middle-income status.

The issue of the link between financial inclusion and poverty has been the subject of several empirical studies. Honohan (2008) examines the relationship between the percentage of adults with access to the formal financial system, poverty and income inequality in 162 countries. The results show that access to financial services significantly reduces poverty and income inequality. Similarly, Omar and Inaba (2020) analyse the effect of financial inclusion on poverty and income inequality in 116 developing countries over the period 2004-2016. Their results provide strong evidence that financial inclusion significantly reduces poverty and income inequality. More recently, Sekali and Lakhroufi (2022), study the effects of financial inclusion on income inequality in Morocco using a staggered lag autoregressive model between 1985 and 2014. The results show that access to the banking sector significantly reduces income inequality.

3. Methodology and data

3.1 Theoretical model

The degree of poverty in a given country depends essentially on two factors: the level of average income and the degree of income inequality (Lopez, 2004). Formally :

$$P = P(Y, L(P)) \quad (1)$$

With P a measure of poverty, Y the GDP per capita and L(P) the percentage of income enjoyed by the 100×P per cent of the population with the lowest incomes.

Changes in poverty can result from changes in per capita income or changes in income inequality, or both. In general, an increase in average income reduces poverty. If we measure the income elasticity of poverty, we can write :

$$\gamma = \frac{\partial P}{\partial Y} \frac{Y}{P} < 0$$

Measuring the effect of income inequality on poverty is a little more complex because inequality can change infinitely. Although a change in income distribution is likely to reduce poverty, this result cannot be generalised without additional assumptions. Indeed, when redistribution takes place between the rich and the extremely rich, this may reduce inequality but not poverty. To take account of the problem of the impact of changes in inequality on poverty, Lopez and Serven (2004) suggest assuming that income follows a lognormal distribution. Under this assumption, it is possible to express the elasticity of poverty in relation to inequality as follows :

$$\phi = \frac{\partial P}{\partial G} \frac{G}{P} > 0$$

On this basis, the effect of financial inclusion (F) on poverty can be expressed as follows :

$$\frac{\partial P}{\partial F} \frac{F}{P} = \frac{\partial Y}{\partial F} \frac{F}{Y} \frac{\partial P}{\partial Y} \frac{Y}{P} + \frac{\partial G}{\partial F} \frac{F}{G} \frac{\partial P}{\partial G} \frac{G}{P} \quad (2)$$

Replacing the expressions for γ and ϕ in equation (2) gives :

$$\frac{\partial P}{\partial F} \frac{F}{P} = \frac{\partial Y}{\partial F} \frac{F}{Y} \gamma + \frac{\partial G}{\partial F} \frac{F}{G} \phi \quad (3)$$

This equation shows that the effect of financial inclusion on poverty will depend on the one hand on the impact of financial inclusion on per capita income and how changes in per capita income translate into poverty reduction, and on the other hand on the impact of financial inclusion on inequality and how reductions in inequality translate into poverty reduction.

3.2 Choice of variables

The dependent variables used are: economic growth, income inequality and poverty. The variable of interest is a measure of financial inclusion.

The economic growth variable used is the growth rate of GDP per capita (GDP), which measures a country's economic performance. This variable is expected to reduce the incidence of poverty in the WAEMU.

The indicator commonly used in the literature to measure income inequality is the Gini index (Lopez, 2004, Beck et al., 2004). A positive relationship is expected between this variable and poverty.

In the literature, three indicators are commonly used to measure poverty: the incidence of poverty, the depth of poverty and the severity of poverty. In this research, the aim being to find out how financial inclusion reduces the percentage of poor people, we use the incidence of poverty. This measures the percentage of people living on less than 1.9 dollars a day.

Financial inclusion is multidimensional. There are three dimensions to financial inclusion: access, use and affordability.

In the WAEMU, two indicators are used to measure people's access to financial services. These are: the overall demographic penetration rate of financial services (TGPD), which measures the number of service points available per 10,000 adults; and the overall geographical penetration rate of financial services (TGPG), which assesses the degree of proximity, i.e. the number of service points available over an area of 1,000 km².

Three indicators are used to assess the use of financial services. These are the strict bancarisation rate (TBS), which measures the percentage of the adult population holding an account in banks, postal services, national

savings banks and the Treasury; the extended bancarisation rate (TBE), which is equal to the TBS plus the number of account holders in microfinance institutions; the global financial services usage rate (TGUSF) or financial inclusion rate, which measures the percentage of the adult population holding an account in banks, postal services, national savings banks, the Treasury and microfinance institutions, plus the percentage of electronic money account holders.

Two indicators are used to assess the affordability of financial services and, in part, the quality of these services. These are: the nominal interest rate on deposits (NIRD), which measures the return on savers deposits at banks and DFSs; and the nominal interest rate on loans (NIRL), which provides information on the costs incurred by customers in accessing loans granted by banks and DFSs.

The overall level of financial inclusion, in all its dimensions, is assessed using a synthetic index calculated by taking into account all seven indicators. This is a single value, between 0 and 1, reflecting a situation of total exclusion and complete financial inclusion respectively. It is obtained from a weighted average of the different indicators presented above.

Financial inclusion is supposed to reduce poverty by boosting economic growth and reducing income inequalities.

3.3 Empirical model

The specification of the empirical model is based on that of Lopez (2004) and Beck et al (2004).

$$y_{it} - y_{it-1} = \delta y_{it-1} + \omega f_{it} + \theta x_{it} + v_i + \tau_t + \mu_{it} \quad (4)$$

$$g_{it} - g_{it-1} = \alpha g_{it-1} + \rho f_{it} + \beta x_{it} + \psi_i + \eta_t + \varepsilon_{it} \quad (5)$$

With y the logarithm of per capita income, g the logarithm of the Gini index, f the level of financial inclusion, x a set of control variables, v and ψ unobserved country-specific effects, τ and η time-specific effects and μ and ε error terms. The index i represents the country and t the time period.

Equations (4) and (5) do not take into account the simultaneous effects of income and income inequality. However, in the economic literature, authors such as Barro (2000) show that there is a Kuznet-type relationship between inequality and the level of income. While Benabou (1996) and Perotti (1996) find that inequality negatively affects income levels, Forbes (2000) finds the opposite effect.

To take account of the potential interactions between income and income inequality, we consider the following equations :

$$y_{it} - y_{it-1} = \delta y_{it-1} + \omega f_{it} + \theta x_{it} + \xi g_{it} + v_i + \tau_t + \mu_{it} \quad (6)$$

In this first equation, as control variables, we use a variable measuring the degree of political instability and violence (SPAV), trade openness (OUV) and the rate of investment (INV). While the political instability and violence variable is assumed to have a negative effect on economic activity, we expect trade openness and investment to have a positive influence on economic growth. The econometric model to be estimated is :

$$PIB_{i,t} = \alpha_0 + \alpha_1 INC_{i,t} + \alpha_2 IG_{i,t} + \alpha_3 SPAV_{i,t} + \alpha_4 PIB_{i,t} + \alpha_5 OUV_{i,t} + \alpha_6 INV_{i,t} + \varepsilon_{i,t} \quad (7)$$

With GDP the per capita growth rate, INC the level of financial inclusion and IG income inequality.

The second model is written :

$$g_{it} - g_{it-1} = \alpha g_{it-1} + \rho f_{it} + \beta x_{it} + \chi y_{it} + \psi_i + \eta_t + \varepsilon_{it} \quad (8)$$

The control variables used are: the share of agriculture in GDP (AGRI) and the inflation rate (INF). The econometric model to be estimated is therefore :

$$IG_{i,t} = \beta_0 + \beta_1 INC_{i,t} + \beta_2 PIB_{i,t} + \beta_3 IG_{i,t-1} + \beta_4 AGRI_{i,t} + \beta_5 INF_{i,t} + \mu_{i,t} \quad (9)$$

Agriculture's share of GDP is thought to have a negative impact on income inequality. In fact, when agriculture's share of GDP increases, the income of farmers who were previously low-income earners increases, which helps to reduce inequality.

Unexpected inflation will benefit debtors and penalise creditors, since most debt contracts are in nominal terms. This will, of course, have an equalising effect on income distribution and, above all, on the distribution of wealth (Park and Mercado, 2015). Proponents of low inflation as a tool for improving income distribution sometimes put forward another argument, namely the indirect link with growth. The argument is that lower inflation will contribute to growth, that higher growth rates will increase the level of income per capita and that this higher level of income will be beneficial for income distribution (as richer countries generally have a more equal distribution of income). In this research, inflation is therefore assumed to reduce inequality.

Finally, to analyse the impact of growth and income inequality on poverty, we consider the following equation :

$$p_{it} - p_{it-1} = \delta y_{it} + \xi g_{it} + \theta x_{it} + a_i + b_t + c_{it} \quad (10)$$

The only control variable taken into account in this model is the level of education measured by the primary school enrolment ratio (PSER). The equation to be estimated is :

$$PAUV_{i,t} = \theta_0 + \theta_1 IG_{i,t} + \theta_2 PIB_{i,t} + \theta_3 EDUC_{i,t} + v_{i,t} \quad (11)$$

With PAUV the incidence of poverty.

According to endogenous growth theory, investment in human capital (health, education, etc.) is a potential source of growth and therefore of poverty reduction. We therefore expect the level of education to have a negative impact on the incidence of poverty.

In the three equations to be estimated, certain variables such as the growth rate (GDP) and the Gini index (GI) are both dependent variables and explanatory variables. The appropriate estimation methods are those based on systems of simultaneous equations. The system of simultaneous equations that we estimate in this work is therefore written as :

$$\begin{cases} PIB_{i,t} = \alpha_0 + \alpha_1 INC_{i,t} + \alpha_2 IG_{i,t} + \alpha_3 SPAV_{i,t} + \alpha_4 PIB_{i,t-1} + \alpha_5 OUV_{i,t} + \alpha_6 INV_{i,t} + \varepsilon_{i,t} \\ IG_{i,t} = \beta_0 + \beta_1 INC_{i,t} + \beta_2 PIB_{i,t} + \beta_3 IG_{i,t-1} + \beta_4 AGRI_{i,t} + \beta_5 INF_{i,t} + \mu_{i,t} \\ PAUV_{i,t} = \theta_0 + \theta_1 IG_{i,t} + \theta_2 PIB_{i,t} + \theta_3 EDUC_{i,t} + v_{i,t} \end{cases}$$

3.4 Estimation methods and data sources

We use the triple least squares (3SLS) method because, after checking the order and rank conditions, each of the three equations is over-identified. The matrices of the coefficients of the endogenous variables are invertible, so it is possible to find the parameters of the structural forms from those of the reduced forms.

The data used cover the period 2008-2020 and come from the BCEAO and the World Development Indicators (WDI, 2022) of the World Bank. The choice of period is justified by the fact that BCEAO data on financial inclusion is only available for this period.

4. Results and interpretation

This section presents the estimation results and analyses their robustness. The robustness analysis will consist of using the seven (07) financial inclusion indicators as alternative variables for financial inclusion and carrying out a heterogeneity test by excluding from the base the countries affected by terrorism over the period 2008-2020.

4.1 Financial inclusion and the fight against poverty

First, financial inclusion is measured by the synthetic index of financial inclusion. The hypothesis that financial inclusion reduces poverty is tested using the triple least squares (3SLS) method. The first equation of this system measures how financial inclusion affects economic growth, the second equation analyses how financial inclusion affects income inequality and the third equation assesses the impact of economic growth and income inequality on poverty. The overall significance test indicates that the three models are globally significant at the 1% level. The results are shown in Table 1.

The results show that financial inclusion significantly reduces income inequality and that income inequality significantly increases poverty in the WAEMU. This means that financial inclusion contributes to the fight against poverty by reducing income inequalities. These results are in line with our expectations. They are also similar to the results found by Dollar and Kraay (2002); Lopez (2004); Omar and Inaba (2020); Sekali and Lakhloufi (2022). Financial inclusion reduces inequality by facilitating access, availability and use of the conventional financial system for all members of the population, which in turn reduces poverty. It also reduces poverty by relaxing credit constraints on the poor. On the other hand, the results of the estimation indicate that financial inclusion does not significantly affect economic growth but that economic growth contributes to significantly reducing poverty in the WAEMU. This result is not in line with our expectations. Indeed, like Jagtap (2016), Claessens and Perotti (2007) and Sethi and Acharya (2018), we expected financial inclusion to have a positive and significant impact on economic growth, which in turn helps to significantly reduce poverty. Financial inclusion contributes to economic growth through the increase in the volume of savings (Sethi and Acharya, 2018) and the creation of added value by small businesses (Agnello et al., 2012; Park and Mercado, 2015; Nanda and Kaur, 2016). However, in WAEMU countries, high lending rates and difficult access to credit are factors that limit the contribution of SMEs to GDP formation. Given these results and the fact that income inequality has no effect on economic growth, it is clear that in the WAEMU the main channel through which financial inclusion contributes to the fight against poverty is through the reduction of income inequality. Furthermore, political instability and violence slow down economic growth. This result is explained by the fact that in the presence of political instability, the risk of capital loss increases, which reduces the volume of investment (Fosu, 1992). In a country where political stability is threatened, domestic and foreign investors tend to look for other, more favourable investment opportunities. The consequences can be enormous: a fall in

investment, a deterioration in export performance, and difficulties in financing private and public projects. Investment has a positive and significant influence on economic growth in the WAEMU, which is in line with economic theory. According to Keynesian theory, investment is considered to be the main engine of growth. It is what links the future economy to the present economy. In Keynes's view, from the point of view of the economic cycle, a return to expansion, starting from a period of low activity pressure, is possible from a budget deficit policy thanks to the multiplier effect. As expected, agriculture's share of GDP significantly reduces inequality. This result can be explained by the fact that when the share of agriculture in GDP formation increases, the income of farmers previously low-income earners increases, which helps to reduce inequality (Estudillo and Otsuka, 2010; Imai et al., 2016). Finally, we find that the level of education significantly reduces the incidence of poverty in the WAEMU. This result is also in line with our expectations and the predictions of human capital theory. According to this theory, any expenditure likely to improve an individual's level of education increases his productivity and consequently his future income (Becker, 1962).

Table 1: Result of the estimation of the system of simultaneous equations

VARIABLES	(1) Incidence of poverty	(2) GDP growth rate	(3) Income inequality
Financial inclusion		2.734 (1.914)	-3.500*** (1.030)
Income inequality	1.126*** (0.406)	0.0305 (0.0603)	
Political instability and violence		-0.783** (0.399)	
GDP growth rate (-1)		-0.0232 (0.0976)	
Commercial opening		1.317 (2.720)	
Investment rate		0.541*** (0.173)	
GDP growth rate	-5.743*** (1.909)		0.111 (0.219)
Gross primary school enrolment rate	-1.026*** (0.255)		
Income inequality (-1)			1.018*** (0.0318)
Share of agriculture			-0.0707*** (0.0159)
Inflation rate			-0.0379 (0.124)
Constant	30.45 (18.87)	0.997 (2.474)	1.805 (1.714)
Chi-square	24.33	30.40	1067.70
P-Value	0.0000	0.0000	0.0000
Observations	83	83	83
R- square	-0.510	-0.090	0.923

Note: Standard errors are in brackets; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: Constructed by the authors from estimation results.

4.2 Robustness analysis

In order to check the robustness of the results obtained with the synthetic financial inclusion index, we first use each of the seven indicators measuring financial inclusion one by one to test their effect on poverty. Secondly, we carry out a heterogeneity test by excluding Guinea Bissau and the countries affected by terrorism over the period 2008-2020 (Mali, Niger and Burkina Faso) from the base in order to obtain a homogenous panel.

Analysis of the impact of the seven financial inclusion indicators

The results are summarised in table 2. Like the summary financial inclusion index, the demographic and geographical penetration rates significantly reduce poverty in the WAEMU through the income inequality channel. Indeed, when we substitute one or the other for the synthetic index of financial inclusion, it emerges that financial inclusion significantly reduces income inequality and that income inequality significantly increases poverty. The same is true of the extended banking rate and the strict banking rate. These two rates, along with the overall rate of use of financial services, are the three indicators used to measure the degree of use of financial services. However, when we use the overall rate of use of financial services instead of the synthetic index, we

find that financial inclusion significantly reduces poverty through the two transmission channels of reducing inequality and increasing overall income (Omar and Inaba, 2020; Sekali and Lakhroufi, 2022). The significance of the effect of the overall rate of use of financial services on economic growth could be explained by the fact that, unlike the broader bancarisation rate, the overall rate of use of financial services takes into account holders of electronic money accounts. Indeed, analysis of the overall rate of use of financial services reveals that in recent years electronic money has made a significant contribution to the use of financial services in the Union. By using in turn the nominal interest rate on deposits and the nominal interest rate on credit instead of the synthetic index, it emerges that only the nominal interest rate on credit reduces poverty through the economic growth channel. These two interest rates are used to assess the affordability of financial services and, in part, the quality of these services. According to Keynesian theory, interest rates have an impact on growth mainly through companies investment decisions. The mechanism is that lower interest rates reduce the cost of capital for companies and lead to an increase in the volume of investment. The result is an increase in aggregate demand and output.

Table 2: The seven financial inclusion indicators

VARIABLES	Incidence of poverty	GDP growth rate	Income inequality
Demographic penetration rate		0.00685 (0.00542)	-0.0137*** (0.00332)
Income inequality	1.251*** (0.435)		
GDP growth rate	-7.271*** (1.949)		
Geographic penetration rate		0.000789 (0.000961)	-0.00279*** (0.000553)
Income inequality	1.243*** (0.427)		
GDP growth rate	-6.827*** (1.938)		
Strict bank penetration rate		0.0539 (0.0359)	-0.0405* (0.0246)
Income inequality	1.169** (0.462)		
GDP growth rate	-8.781*** (2.000)		
Extended banking rate		0.0184 (0.0127)	-0.0232*** (0.00853)
Income inequality	1.161** (0.488)		
GDP growth rate	-9.682*** (1.890)		
Overall rate of use of services		0.0253** (0.0107)	-0.0234*** (0.00728)
Income inequality	1.129** (0.473)		
GDP growth rate	-8.883*** (1.976)		
Nominal interest rate on deposits		0.0367 (0.491)	0.327 (0.435)
Income inequality	1.361*** (0.425)		
GDP growth rate	-8.007*** (1.813)		
Nominal interest rate on credit		-0.373* (0.225)	0.130 (0.102)
Income inequality	1.070*** (0.405)		
GDP growth rate	-5.991*** (1.946)		

Note: Standard errors are in brackets; *** p<0.01, ** p<0.05, * p<0.1

Source: Constructed by the authors from estimation results

Heterogeneity test

When we carry out the heterogeneity test by excluding from the database the countries affected by terrorism over the period 2008-2020 in order to obtain a homogenous panel, we arrive at the results (table 3) according to which financial inclusion significantly reduces poverty through the two channels of reducing inequality and increasing overall income (Omar and Inaba, 2020; Sekali and Lakhloufi, 2022). The absence of terrorist violence in this group of countries (Benin, Côte d'Ivoire, Senegal and Togo) could be behind the significant effect of financial inclusion on economic growth. Terrorist attacks always inflict great suffering and sometimes colossal material damage. In addition to the loss of human life and the destruction of infrastructure, they repel foreign capital, create a climate of uncertainty and lead to distortions in the allocation of internal resources, as well as indirect costs arising from the security measures that have to be put in place. In the case of WAEMU countries, the closure of financial establishments at the first signs of insecurity, the destruction of infrastructure such as electrical and telecommunications installations by terrorists and the displacement of populations slow down financial inclusion and alter its effects on poverty.

Table 3: Heterogeneity test

VARIABLES	Incidence of poverty	GDP growth rate	Income inequality
Financial inclusion		7.567** (3.117)	-8.177*** (1.232)
Income inequality	4.636*** (0.526)	0.482*** (0.158)	
Political instability and violence		-0.741 (0.661)	
GDP growth rate (-1)		-0.000686 (0.122)	
Commercial opening		2.804 (3.184)	
Investment rate		0.000583** (0.000245)	
GDP growth rate	-3.749*** (1.258)		0.249 (0.171)
Gross primary school enrolment rate	-0.252 (0.248)		
Income inequality (-1)			0.850*** (0.0558)
Share of agriculture			-0.0652*** (0.0177)
Inflation rate			0.00925 (0.120)
Constant	-137.7*** (23.07)	-20.45*** (7.736)	9.480*** (2.608)
Chi-square	84,98	19,32	549,98
P-Value	0.0000	0.0037	0.0000
Observations	47	47	47
R- square	0.442	0.000	0.888

Note: Standard errors are in brackets; *** p<0.01, ** p<0.05, * p<0.1

Source: Constructed by the authors from estimation results.

5. Conclusion

The aim of this research was to analyse the contribution of financial inclusion to poverty reduction in the WAEMU. To do this, we estimated a system of simultaneous equations using the triple least squares method. The investigations covered the eight (08) WAEMU countries and the data used cover the period 2008-2020. Firstly, using the synthetic financial inclusion index, the results show that financial inclusion reduces income inequality, which in turn reduces poverty, and that it does not significantly affect economic growth. Secondly, robustness analyses show that the overall rate of use of financial services reduces poverty both by increasing overall income and by reducing inequality. When we exclude countries affected by terrorism from the database, we find that financial inclusion significantly reduces poverty by reducing inequality and increasing overall income.

In view of these results, financial inclusion policies should focus more on the use of financial services, particularly digital financial services via mobile phones. Obstacles to the use of digital financial services, in particular the high cost of financial services via mobile telephony, need to be removed. This will require

increased competition and the pooling of transaction processing costs. It will also require greater transparency on the pricing of financial services via mobile telephony in order to reduce the asymmetry of information between providers and users. In the WAEMU, high lending rates and difficult access to credit are factors that limit the contribution of SMEs to GDP. Financial inclusion should therefore be accompanied by a policy of reducing lending rates in order to improve the contribution of financial inclusion to economic growth and poverty reduction. The results also suggest that improving the security situation in countries affected by terrorism would enhance the effect of financial inclusion on poverty. The study paves the way for future research that could use microeconomic data to understand how financial inclusion affects income inequality and poverty, taking into account the gender dimension.

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