



Contribution of financial inclusion in reducing poverty in Algeria

MEDJAHED Kenza*

Maghnia centre university, (Algeria)

medjahedkenza@gmail.com

Gherbi Nacer Salah Eddine

Tlemcen university, (Algeria)

sgherbi@yahoo.fr

Abstract ;

This research aims to examine the effect of financial inclusion on poverty rate in Algeria through using time series analysis that outline in ARDL model during the period 1980 up to 2019 depending on data disponibility, Algeria as all developing countries applicates financial reforms through financial liberation policy to realise high level of financial system development one from that access to different financial services that is financial inclusion. for measuring this effet we use household consumption as a proxy poverty rate, financial institutions access index for financial inclusion, and other explanority variables (economic growth, inflation and enemployment) . The results show that financial inclusion does not contribute to reduce poverty in Algeria,

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* Corresponding author

1. Introduction

Recently, the concept of financial inclusion has received significant attention on the part of developing countries, because of its accuracy in setting the economic development goals, and most of empirical studies confirmed the positive impact it has on the economic growth in developing countries, as well as in improving community members' well-being and reducing poverty levels. As such, financial inclusion is the avenue from financial exclusion or financial deprivation under which members of the society are unable to access financial services and benefit from the products offered by the financial system due to several considerations, including: high costs or the remoteness of the point of providing these services, the quality of financial services, incompatibility with the financial needs of individuals, or the absence of financial education (financial illiteracy), to name a few. Hence financial inclusion allows individuals to access and obtain financial services under proper condition in terms of quality, cost and proportionality with their requirements on an ongoing basis, which is positively reflected on the level of their well-being and thus reduces poverty rates and enhances the economic growth of the country.

This research paper aims to explain how financial inclusion permits improving the public's well-being and reducing poverty. It also attempts to conduct a standard in Algeria to determine the extent to which financial inclusion contributes to poverty reduction using the ARDL model along with the variables presented in the poverty index (dependent variable), financial inclusion, inflation, economic growth and unemployment rate as explanatory variables. For achieving the main purpose of this study, firstly we take into account the literature review on the relation between financial inclusion and poverty, secondly empirical study on testing how financial inclusion contributes to reducing poverty in Algeria during the period 1980-2019, with using econometrics model that reflect this link between dependent and independents variables after we discuss the estimation results, finally conclusion of the study.

2. Literature Review

Recent financial crises have with no doubt revived the debate on the impact of financial system on economic growth, incomes distribution and poverty reduction. However, since the early 1960s, several researchers have been focused on the role played by a financial system in enhancing growth, specifically in developing and low-income countries.

For instance, in 1960 Gurley and Shaw highlighted the impact of financial diversification on economic development, income inequality and poverty, while McKinnon and Shaw (1973) argued that financial inclusion is the unique solution against economic recession. They think that financial repression is very harmful for financial development and economic growth. McKinnon and Shaw

emphasized the role of financial institutions in providing funds and showed that financial development implies higher diversification of financial institutions to enhance competitiveness and to ensure better resources allocation.

However, financial inclusion, when defined as better access and more intensive use of financial services still limited around the world. In many developing countries, the banking sector offers poor access to finance and therefore represents a severe impediment on growth and poverty reduction. It goes without saying that a developed banking and financial sector is crucial in an advanced economy and several studies have demonstrated the impact of financial development on economic growth and consequently on poverty and income inequalities (Levine et al., 2000; Beck et al., 2000; Demirgüç-Kunt and Levine, 2008).

In the relevant literature, a number of empirical results support the link between financial inclusion and economic growth. The first works of Kapur (1983), Vogel and Buser (1976), Galbis (1977) and Mathieson (1980) highlight the beginnings of the use of financial liberalization concept, then those of Roubini and Sala-i-Martin (1995), King and Levine (1993), relying on ordinary least squares techniques, fixed and random effects models and defending the assumption that an inclusive financial system plays a positive role in financing economic growth and mitigating the effects of poverty.

Since the early 2000, financial sector policies have become the cornerstone of the debate on how to boost growth in low-income countries, reduce levels of extreme poverty and ultimately contribute to the achievement of the long-term development goals (Beck et al., 2011). For example, Africa's future is particularly in its ability to make its economic and financial sector more inclusive. Therefore, financial inclusion has become one of the pillars of the international development agenda.

On the other hand, many other authors argue that financial inclusion can only positively impact the growth of economies after reaching a certain level of development, and that it is rather economic growth which leads to financial inclusion (Quinn, 1997; Deidda and Fattouh, 2002).

However, in this context a fact needs to be clarified. Countries with advanced levels of financial development are growing faster and fighting poverty more effectively in comparison to other countries (Čihák et al., 2012). But excessive financial liberalization does not always lead to expected results because financial markets are not always perfect as it was mentioned by Stiglitz and Weiss (1981). Some factors, mainly like asymmetric information on borrowers' solvability also play an important role in the development of the financial sector. This is why excessive financial liberalization can also be, unfortunately, a potential source of crises.

According to Boyd and Smith (2005), financial inclusion plays an important role in enhancing financial services and growth. From an institutional view, institutional factors can have an impact on the relationship between finance and growth. Indeed, according to Demetriades and Hook Law (2006), McDonald and Schumacher (2007), there is a correlation between legal institutions and the development of the financial sector. Financial inclusion can also stimulate economic growth, by improving capital allocation, through risk diversification (Obstfeld, 1994), although the long-term effect on growth does not appear (Grilli and Milesi-Ferretti, 1995).

In their study, Aghion et al. (2005) shows that in developing countries, financial inclusion has a positive and significant impact on long-term growth. Similarly, the financial development process must be accompanied by an efficient legal and institutional framework by the establishment of a system of supervision and regulation of financial institutions which is the center of economic development and growth.

Rancière et al. (2006), using the ordinary least squares model, split down the effect of financial development into two ways: a positive/direct effect and a negative/indirect effect through crises on economic growth. But they come to the conclusion that the positive effect outweighs the negative effect. It is clear that financial liberalization strengthens, on the one hand, financial development, which is necessary for long-term growth, and, on the other hand, leads to increasingly frequent crises, which reduce the positive effect of financial inclusion on growth and poverty reduction.

However, other studies have shown that financial inclusion does not have a significant impact on economic growth as it is the case of Quinn (1997). They showed that some financial variables (like interest rate) act negatively on financial inclusion and, therefore, on economic growth and poverty reduction. A rise in the interest rate increases the borrower's opportunism and risk of solvability, while a policy of lowering interest rates can lead to an increase in the profitability of investment projects financed by bank credit (Boyd and De Nicolo, 2005). Restrictions on real interest rates at low levels can reduce household gross saving and impede economic growth (Stiglitz et al., 1993). However, the increase in savings in poor countries leads, through the accumulation of capital, to economic growth. Credit risk resulting from asymmetries in credit market information has a direct/negative effect and an indirect/negative effect on economic growth.

Somehow, findings on the impact of financial inclusion on economic growth and poverty in developing countries are contradictory. The first experiments, carried out after the work of McKinnon and Shaw (1973) in South Korea and Taiwan, have led to a sharp increase in bank deposits, enhanced economic growth and reduced poverty rates. On the other hand, financial liberalizations at the end of the seventies in Latin America (Argentina, Chile, Uruguay), and in the Philippines and Turkey in the eighties, can be considered as failures. Indeed, they have resulted in excessive rises in real interest rates and massive inflows of foreign capital.

Without claiming to be exhaustive, and even though the literature review on the link between the development of the financial system and economic growth has been widely discussed in several researches, the impacts of financial inclusion on economic growth, income inequality and poverty in general remain very difficult to assess due to the high number of socioeconomic factors that could be .

3. Empirical Study

3.1 Data

Data collect from financial development database on world bank and IMF , time series are annual data from 1980-2019 for Algeria country, which collect from world Bank database (consumption , inflation , unemployment ,GDP growth) , and the financial institutions access from IMF database).

3.2 Model

Depends on theoretical and emprical evidence that studied how financial inclusion affect poverty ,we conclus to estimate the following equation that measure this effect:

$$\text{Poverty} = f(\text{Financial inclusion})$$

$$\text{LPOV}_t = f(\text{FII}_t, \text{GDPG}_t, \text{INF}_t, \text{UNM}_t) \dots \dots \dots (1)$$

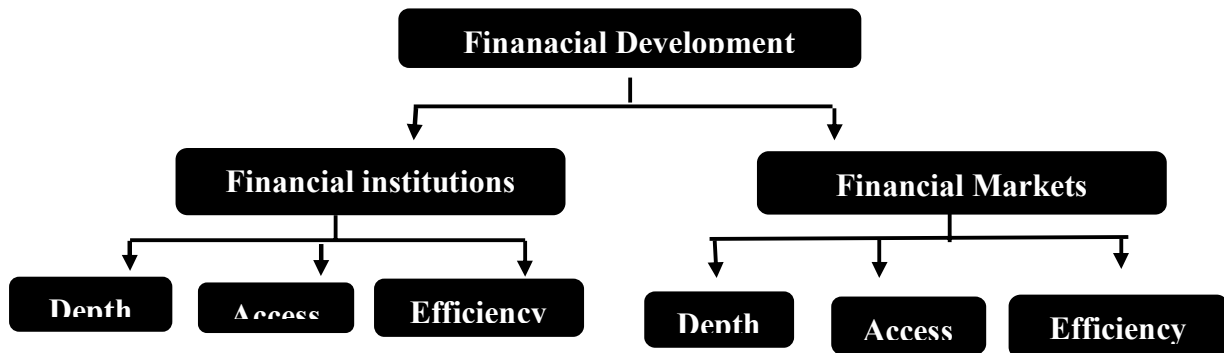
$$\text{LPOV}_t = \beta_0 + \beta_1 \text{FII}_t + \beta_2 \text{GDPG}_t + \beta_3 \text{INF}_t + \beta_4 \text{UNM}_t + \varepsilon_t \dots \dots (2)$$

LPOV : as dependent variable log of poverty rate , we use household consumption as proxy of poverty level, that depends (depending) on luck of poverty rate data on World Bank DATABASE .Thus, we follow many previous studies household consumption that use it to measure living standard that reflet to poverty level. (Hicham ,2017, Kheir ,2018).

GDPG : GDP per capita growth rate .INF : inflation rate as annual growth of consumer prices level .UNM : unemployment rate as percentage of total labor force.FII : financial inclusion index (financial instituions access index) . Financial inclusion variables we use one side of financial developmet as show in Sahay et al (2015) work that financial development is summarizes how developed financial institutions and financial markets are in terms of their depth (size and liquidity) , access (ability of individuals and companies to access financial services) and efficiency (ability of institutions to provide financial financial services at low cost and with sustainable revenues and the level of activity of capital markets) as show in following figure . So IMF database take into accout all dimensionel of financial development to provide the index , in our study we will focus on access index that reflect the financial inclusion for disponibility of data , because financial development data on World Bank database it has huge gap for the case of Algeria , access index take into account two variables that are Bank branches per 100,000 adults and ATMs per

100,000 adults (Svirydzenka, K. ,2016) , therefore we focus on financial institutions services , result to absent of financial market activity in Algeria.

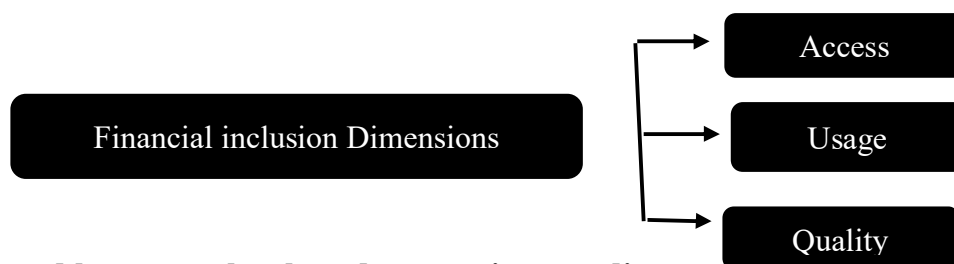
Fig1 .Financial development dimensions



Source : prepared by researcher based on Sahay, R., et al ,2015

For financial inclusion proxies many studies use the variables that reflect financial inclusion like number bank branches depending on data gap on world Bank database, for that not reflect the main meaning of financial inclusion that does not mean, that inclus access to financial servies thus just one side because financial inclusion inclus three dimensions : financial access , usages and the quality. And also focus on just functon related to financial intermediation depot and credit but banking makes more and differents financial services like as mention in the following figure.

Fig 2. Financial inclusion dimensions.



Source :prepared by researcher based on previous studies.

3.3 Methodology :

We use the Autoregressive Distributed lag Model (ARDL) to examine the effect of financial inclusion on poverty rate , depends that model allows to measure this effect in short and long run , and it does not exist a condition that have to all variables stationary at same level , but mix up between $I(0)$ and $I(1)$. To estimate this model, we use the ARDL bound test methodology elaborated by Pesaran et.al. (2001) to analyse the short and long run relationship. The ARDL bound test can be used just when we have not any series stationary at second differences $I(2)$, using Augmented Dickey-Fuller and Phillips- Perron unit root tests to establish that all series in order $I(0)$ or $I(1)$. Then, we formulate an unrestricted error-correction model (UECM) as a particular type of ARDL model as follows :

$$\begin{aligned} \Delta LPOV_t = & \beta_0 + \beta_1 LPOV_{t-1} + \beta_2 FII_{t-1} + \beta_3 GDPG_{t-1} + \beta_4 INF_{t-1} + \beta_5 UNM_{t-1} \\ & + \sum_{j=1}^q \alpha_j LPOV_{t-j} + \sum_{n=1}^q \alpha_n FII_{t-n} + \sum_{s=1}^q \alpha_s GDPG_{t-s} + \sum_{z=1}^q \alpha_z INF_{t-z} \\ & + \sum_{w=1}^q \alpha_w UNM_{t-w} + \varepsilon_t \dots \dots \dots (3) \end{aligned}$$

4. Results and discussion:

4.1 Unit root test:

Table 1 .Unit root tests

Variables	ADF			PP		
	Level	First difference	Decision	Level	First difference	Decision
LPOV	-2.60	-1.72	I(1)	-0.65	-4.85	I(1)
FII	-1.06	-4.65	I(1)	-1.60	-4.58	I(1)
INF	-1.79	-5.66	I(1)	-1.91	-5.66	I(1)
GDPG	-3.43	-	I(0)	-3.53	-	I(0)
UNM	2.22	-4.44	I(1)	-1.68	-3.47	I(1)

Source : prepared by researcher based on Eviews11 output.

The first step is testing for unit roots in all time series, from ADF and PP tests we conclude that LPOV FII INF UNM are stationary at the first differences and GDPG is stationary at level.

4.2 The relationship between financial inclusion and poverty rate estimation :

We compare the F-stat with the critical value, upper and lower bound, (Pesaran, et al.(2001). The hypothesis of no cointegration will be rejected (accept alternative hypothesis, $H_1 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5$) if the F-statistic exceeds the upper critical bound. But, when the F-stat is less than the lower critical bound, in this case we accept the null hypothesis ($H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5$), means that there is no long-run association between the variables.. The results in following table shows that F-statistic is 7.609813 which it is larger than the upper bound critical value of at 1, 5 and 10 % significance levels , so we conclude that exist a long-run relationship between variables , the step next about estimation equation above with lags that are ARDL(1, 0, 0, 0, 0) that selected automatically

Table 2. Bound test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.609813	10%	2.2	3.09
		5%	2.56	3.49
		1%	3.29	4.37

Source : prepared by researcher based on Eviews11 output.

Table 3. VECM-ARDL

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LPOV(-1)	-0.070609	0.098053	-0.720114	0.4770
D(GDPG)	0.013157	0.002745	4.792175	0.0000
D(FII)	0.110549	0.841076	0.131438	0.8963
D(INF)	0.000816	0.000844	0.966821	0.3414
D(UNM)	-0.003012	0.001510	-1.995541	0.0551
ECT(-1)	-0.070609	0.009674	-7.298540	0.0000
EC = LPOV - (0.1863*GDPG + 1.5656*FI + 0.0116*INF -0.0427*UNM + 7.6794)				
Long run coefficients				
GDPG	0.186332	0.269609	0.691120	0.0000
FII	1.565644	10.22676	0.153093	0.8794
INF	0.011559	0.017311	0.667706	0.5094
UNM	-0.042661	0.044822	-0.951793	0.0488
C	7.679408	1.380701	5.561963	0.0000

Source : prepared by researcher based on Eviews11 output.

The short and long run relationship results in table indicate that all the variables have the expected sign, just INF variable has a positive sign (in economic theory the relationship between household consumption and inflation is adversely , if price goes up then consumption goes down) .

4.3 Diagnostic test for model :

We have to take many steps to show validity model ,table indicates that R-squared equal 97.15%,shows that the regression of the underlying ARDL model fits well and it reveals the model does not have, normality, and heteroscedasticity problems.

Table 4. Diagnostic tests results

	Test	Result
Normality Test	Jarque Bera	3.197313 (0.202168)
Specification Test	Ramsey RESET	2.25 1731(0.1443)
Heteroscedasticity	ARCH LM	1.388770 (0.2476) Prob. Chi-Square(1): 0.2342
R-squared		0.971503
Adjusted R-squared		0.966754
F-statistic		204.5520
Prob(F-statistic)		0.000000

Source : prepared by researcher based on Eviews11 output.

Nevertheless , figure shows in all 16 observations p-value for Q stat are higher than 5% significant level thus we accept the null hypothesis that indicates (occurs) no existence of autocorrelation in residuals.

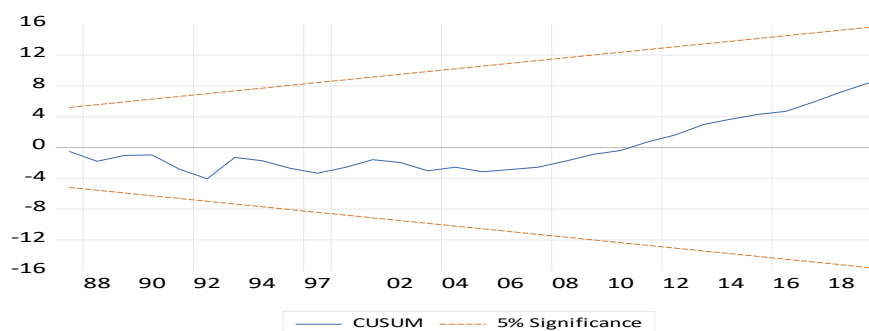
Fig 3 . Autorrelation test for residuals

	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*
1			0.204	0.204	1.6319	0.201
2			0.149	0.111	2.5194	0.284
3			0.112	0.066	3.0420	0.385
4			-0.073	-0.128	3.2704	0.514
5			-0.044	-0.032	3.3539	0.646
6			0.195	0.244	5.0904	0.532
7			0.161	0.131	6.3113	0.504
8			-0.010	-0.142	6.3164	0.612
9			0.199	0.145	8.3284	0.501
10			0.067	0.064	8.5673	0.574
11			-0.036	-0.045	8.6398	0.655
12			-0.011	-0.109	8.6470	0.733
13			-0.079	-0.100	9.0205	0.771
14			0.018	0.155	9.0402	0.828
15			-0.064	-0.122	9.3060	0.861
16			-0.032	-0.149	9.3771	0.897

Source : prepared by researcher based on Eviews11 output.

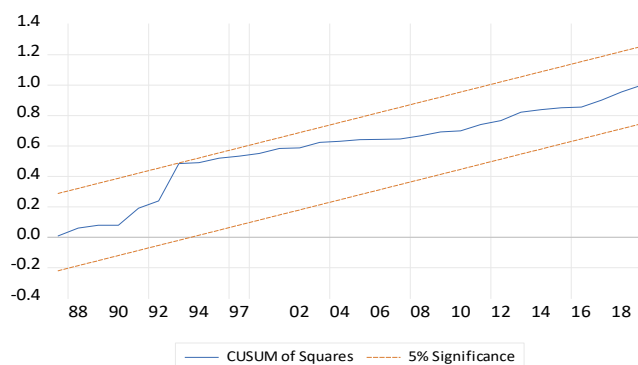
Furthermore ,testing for stationary the model the following figures allow to capture model stability through the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) graphs tests show that there is stability at 5 % significant level .

Fig 4.CUSUM Test



Source : prepared by researcher based on Eviews11 output.

Fig 5. CUSUM of Squares



Source: prepared by researcher based on Eviews11 output.

Since it is expected that the sign of both financial inclusion and economic growth are positive, which reflects the relationship between them and the dependent variable, which is household consumption which significant at 1 % for growth and not significant with financial inclusion index , this results indicate that growth is the most variables affecting household consumption (reducing the level of poverty in Algeria) through the meaning of its parameter (0.000) ,that is when growth rates rise at a rate of 0%, this leads to an increase in consumption by 1.31% in short run .

As for the value of the error correction coefficient of -0.070, it is negative as expected and is very significant (1%), and this indicates the existence of a long-term equilibrium relationship between the economic variables studied in the short-term. So in long run estimation illustrates that variables have the expected indication of the impact on consumption (poverty level) . As it is expected that the sign of both financial inclusion and economic growth will be positive , which reflects the relationship between them and the dependent variable, which is household consumption , although financial inclusion effect is not a statistically significant, that is, in other words, a clear impact on the level of poverty (consumption) in Algeria through GDP growth , which reflects the banking system in Algeria does not play the main role in providing financial services that have a positive impact on consumption ,which reflect in this the weak financial inclusion level in Algeria .

5. CONCLUSION

This research presented an empirical study with the aims to examine the effect of financial inclusion on poverty reduction in Algeria during the period from 1980-2019 through using financial access as a proxy for financial inclusion and household consumption for poverty rate . We find through econometrics method (ARDL model) that financial inclusion does not play any effect on reducing poverty in Algeria that affected just by GDP . Thus, the level of inclusion did not improve welfare living standard and reduce poverty also financial inclusion did not help achieve rates of financial development that has positive effect on consumption, because financial inclusion contributes to improving financial development through financial services delivery (for example an increase in the volume of deposits, loans granted and the provision of money) , so in Algeria poverty reduction affected by GDP growth.

The results showed in this research related to less development in financial system that banks delivery financial services traditionary and absence of competition also islamic society does not deal with banks , and absent of financial market activity in Algeria.

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