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The Effect of Financial Liberalization and Inflation on Poverty

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Summary

The overall objective of this paper is to examine the existence of a relationship between financial liberalization, inflation and poverty. The link between financial liberalization and poverty is of two types, a direct link and an indirect one. The first is the McKinnon effect, and the second is through economic growth that reduces poverty.

We use an empirical investigation containing three econometric studies of three samples from developing countries, namely 19 low-income countries, 47 middle-income countries, and the total sample grouping the first two samples. The study uses annual from 1985 to 2013.

The findings show that poverty is a persistent phenomenon, with the current level of poverty influenced by its preceding level. As for financial development, an increase in its level is found to reduce reduction poverty. This result confirms the conclusions reached by Mc Kinnon's work. However, financial development goes hand-in-hand with financial instability, which undermines the level of well-being and increases poverty, like inflation.

Keywords: Inflation, financial liberalization, poverty, dynamic panel, simultaneous equations.
Jel Classification: C33, O47, N40.

1. Introduction

The concern about the effect of inflation on poverty has been much in the news. A study by the Institute of Fiscal Studies (2011)[1] showed that inflation hits poor families much more than the rich in the UK. Similar concerns were also expressed in developing countries. Evidently, the factors that affect and disrupt the social context such as poverty, inequality and social stratification are very important, as they can generate considerable economic and social costs.

Given the importance of this topic, namely in the context of the 2030 Agenda for Sustainable Development, we study the potential links between these three variables. This will also respond to the question whether or not the promises made by the international bodies through the structural adjustment programs concerning the improvement of the standard of living of the citizens have been realized. Even if it is plausible to admit the existence of beneficial effects of financial liberalization on growth and economic development, only a few economists have examined the relationship between financial liberalization and poverty, although the economic growth induced by financial liberalization has allowed an increase in production in general. However, nothing guarantees a good distribution of this wealth among the different groups of society. Similarly, poverty reduction depends on how income changes and also the initial levels of income inequality.

[1] The journal ''Mu Europ'', October 13, 2011.

According to Klasen (2001), two ways in which financial liberalization can bring benefits to the poor through economic growth:

Direct benefits stipulating that financial liberalization favors the poorest regions where the poor live.

Indirect benefits based on income redistribution policies such as taxes and transfers.

However, financial development and increased international trade are intensifying the different forms of inequality. It is exactly in this context that the present research focuses on answering the following question: To what extent, and by which mechanisms, can poverty be influenced by financial liberalization and inflation?

2. Literature Review

2.1. Financial Liberalization

Financial liberalization in the industrialized countries came in response to the violent financial crises that affected these countries in the 1970s and 1980s. The emergence of a broad movement to expand the range of financial services in the 1980s allowed these countries to bow to the winds of change of financial liberalization. This process was marked by two main categories, the regulations in terms of rates and regulations applicable to deposits and bank loans and the institutional regulations.

Financial liberalization has caused major changes in the financial sphere and allowed the creation of a new economic vocabulary among which we can mention financial integration, financial globalization (globalization), and financial development. Financial integration means the existence of a coherent and uniform set of rules governing trade, undifferentiated access to the set of financial instruments and services and fair treatment of financial market participants. Globalization or so-called financial globalization is defined as the process by which goods and services, flows of capital, people, information and ideas move across borders and lead to greater integration of economies and societies.

2.2. Inflation

Inflation is a general and long-term process of cumulative increase in the general level of prices. It is a macroeconomic variable that allows the use of other indicators to judge the overall performance of an economy. For the quantitative theory of money, inflation is the result of too much money issuance. Inflation can also be associated with a market imbalance, hence the demand inflation disclosed by Keynesian theory. Supply theorists point out that the production process (input cost) can lead to an increase in the general level of prices. The leader of the monetarist theory Milton Friedman (1963)[2] promulgates that inflation would be "always and everywhere a monetary phenomenon". Economists agree that the ideal would be inflation levels both low and stable. Although high rates of inflation have been observed in both industrialized and non-industrialized countries, in general the phenomenon is more common in developing countries. The industrialized countries seem to have mastered this issue now. Many of these countries manage to keep inflation within a target range in a sustainable manner, while, by contrast, in many developing countries, inflation rates are both high and volatile.

The interest in the phenomenon of inflation has started long way back. As early as 1958, New Zealand economist Alban William Phillips published a research paper on a possible link between the growth of the nominal wage rate and the unemployment rate[3]. His research was based on the study of the English economy from 1861 to 1957. He found a negative relationship between the growth rate of nominal wages and the unemployment rate in the United Kingdom during this period. Phillips explains the negative link between nominal wage growth and the unemployment rate as a simple effect of an adjustment between supply and demand.

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[2] Friedman. M & Schwartz. A J (1963); A Monetary History of the united States 1867-1960.

[3] Phillips. A W (1958) ; The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957.

This relationship, more commonly known as the Phillips Curve, has benefited from several improvements over time, the most important of which were due to Robert Lipsey, Paul Samuelson, and Robert Solow in 1960. These authors have developed an analysis showing that the inflation rate can easily be substituted for the rate of change of the nominal wage rate, because the bond between the two quantities is strong. The most significant improvement came by Milton Friedman and Edmund Strother Phelps in 1968, introducing for the first time the idea of expectations giving rise to the increased Phillips Curve (expectations of the rate of inflation). They enriched this concept by the notions of natural level of production and deviations from this level for the different dates (GDP deviations).

2.3. Poverty

Poverty is not defined by itself, but depends on other concepts, such as equity, exclusion or growth. Certainly, it is useful to go for a clear definition of poverty, while taking into account the development paradigm defined by the United Nations Development Program (UNDP).

Definitions of poverty are developed according to the comparative situation of individuals, which depends on their level of well-being. Depending on the importance attached to individual perception in this definition, there are two great schools of thought, namely "utilitarians" and "non-utilitarians".

2.4. The Transmission Channels

Many economists believe that financial development is a vital element of increased financial liberalization, which is a necessity for the rich and the poor alike. This is explained by the need for financing, to protect oneself against economic crises. Likewise, liberalization is a *sine qua non* for combating the emergence and severity of multidimensional problems affecting the economic and social context, such as poverty. However, in developing countries, financial liberalization stimulates the self-financing of small entrepreneurs who do not generally have access to credit, except through the possibility of profitable deposits (McKinnon's conduit effect).

To achieve these goals, the poor must participate in accessing various financial services (insurance, deposits, and credit) to achieve poverty reduction. However, according to Kpodar (2006), how financial development can be beneficial for poverty reduction by promoting growth on the one hand and directly by McKinnon's conduit. However, any financial development induces financial instability, which is detrimental to the poor and can reduce the positive effect of financial development on poverty reduction.

The McKinnon's Conduit Effect of Capital : McKinnon (1973) is credited with developing this effect. It takes place in an economy characterized by the self-financing of economic units – that is investors are themselves savers, for lack of organized financial markets. These are the characteristics of the majority of developing countries where economic agents are forced to self-finance themselves. This shows the complementarity between money and physical capital.

Generally speaking, the financing circuits of the economy are either capacity and financing needs or external financing. The latter is subdivided into direct financing (via the financial market) and indirect financing (via the intervention of the banks as financial intermediary). However, in developing countries, external financing is almost absent, which leads to a weak financial system. This encourages economic agents, and especially the poor, in order to cover their private investment expenditures, to focus on the accumulation of capital in its two forms, real assets and cash balances.

However, the complementarity of money and physical assets is due to the self-financing of the poor. Thus, one can no longer talk about currency arbitrage and physical assets, or even about real money and asset substitution. This complementarity is usually explained by two facts; namely, the incentive for investment and the parallel increase in the real returns of money holdings, i.e. the increase in real yields of money holdings encourages the poor to hold money. This will allow the self-financing of a large part of the investments. This is what McKinnon called "the conduit of capital", which expresses the concept of money as a conduit of capital.

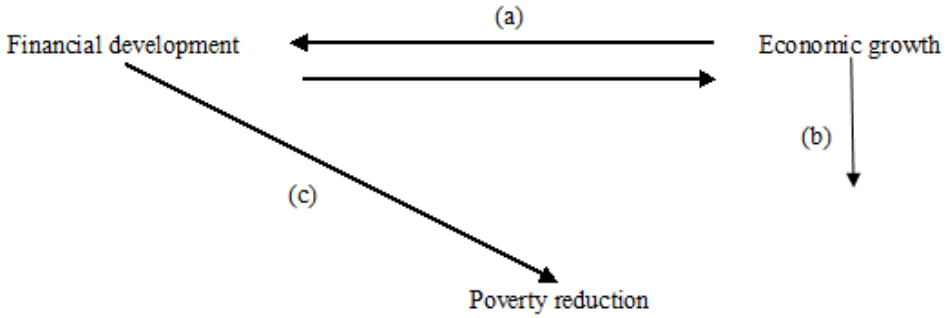
The threshold effect of financial development: This effect was developed by Kpodar (2004). It proves the existence of a direct relationship between financial development and poverty. That said, as McKinnon (1973) has already recommended, the development of the financial system is a necessity. What Kpodar (2004) added is the existence of a threshold for this development to make it more efficient and competitive in providing services to the poor. According to Kpodar (2004), three factors hinder poor people's access to formal credit markets, namely:

- lack of sufficient or acceptable guarantees;
- physical constraints; and
- lack of formal financial institutions specializing in financial services to the poor.

According to Kpodar (2004), there is an indirect transmission channel between financial liberalization and poverty, which assumes a double hypothesis. On one hand, a financial development relationship that generates growth, and, on the other hand, economic growth that in turn reduces poverty.

The following chart summarizes the direct and indirect links between financial development and poverty.

Figure 1: Direct and indirect links between financial development and poverty



Source: DFID, (2004)

This graph illustrates the following axes:

(a) + (b): the indirect effect of financial development on poverty through economic growth.

(c): the direct effect of financial development on poverty.

In the economic literature, many economists agree on the harmful nature of financial repression for inflation and economic growth. Nevertheless, other economists continue to consider it as one of the cheapest means of financing economically. They argue that financial repression helps to maintain the financial viability of the banking system, reduces the costs of financing the budget deficit, avoids inflation and promotes growth. Among those who see financial repression as one of the main sources of economic hardship in developing countries, there is the school of thought associated with the McKinnon-Shaw School that advocates the liberalization of the financial system, as it seen to contribute to lower inflation and higher economic growth.

The effect of financial development on poverty was also explained by the features of the level of financial development that Kpodar (2004) presents in the form of three indicators, all of which are influenced by inflation, namely: the share in GDP of credits allocated to the private sector; the share of commercial bank assets in GDP; and the financial system liability to GDP.

Economic theory as well as economic institutions emphasize that a good control of the level of inflation is a prerequisite to ensuring a certain level of economic growth, which is an indirect effect to lower inflation. However, it should be emphasized that inflation also has a detrimental and beneficial effect on economic activity.

Like many economists such as Kpodar (2004) who believe in the direct link between financial liberalization through financial development and poverty; macroeconomic policies can have a direct effect on poverty alleviation. However, monetary and exchange rate policies affect the poor in three main ways, namely through production, the real exchange rate, and inflation. However, even if

monetary and exchange rate policies are able to affect the poor through these three channels, the monetary authorities are not always able to assess the nature and importance of impact that these factors can cause. In this way, changes in the money supply can lead to random consequences and insufficiently explained in the short term on real variables, also on employment and production. However, the monetary authorities are unable to benefit from this impact.

With regard to financial instability, the economic literature distinguishes two methods for measuring it:

- A systemic crisis indicator that uses dichotomous variables as a unit of measure; and
- An indicator of financial instability that measures the irregularities of financial development in relation to a long-term trend.

It is not difficult to understand that financial development brings benefits to the economy, but this development can also generate costs through financial instability. The crucial question is whether it is the irregularities of financial development or the financial crises that are really responsible for the financial instability.

3. Methodology

Inspired by previous studies, and especially the work of McKinnon (1973), and like Jeanneney and Kpodar (2008), we assume that financial liberalization has, through financial development, a positive impact on economic growth, which is beneficial for the poor. Similarly, thanks to McKinnon's driven effect, we also assume that financial development has a direct and positive effect on the income of the poor. However, in regions where financial instability is combined with financial development, this could be detrimental to growth and poverty reduction, reducing the beneficial impact of financial development. For the inflation variable, the inflation rate measured by the GDP deflator is the best indicator of inflation. Indeed, studies reviewed in this paper show the existence of a positive relationship between inflation, financial repression and the financial system. However, this relationship becomes weaker and weaker as the inflation rate increases.

Poverty is not accidental; it is a phenomenon that persists. It is a structural condition. Poverty in the current period is strongly influenced by poverty in the preceding period. In order to test this persistence in poverty, we use a dynamic panel data model, with the following equation to estimate:

$$Pov_{i,t} = \beta_1 Pov_{i,t-1} + \beta_2 \text{Log}(y_{i,t}) + \beta_3 DvF_{i,T} + \beta_4 Inst_{i,\text{T}} + \beta_5 Inf_{i,t} + \beta_6 Invest_{i,t} + \beta_7 Ouve_{i,\text{t}} + \mu_i + \varepsilon_{i,t} \quad (1)$$

Where Pov is an indicator of poverty, is a delayed endogenous variable; y is the real GDP per capita; DvF is the level of financial development; Inst represents the level of instability of financial development; Inf is the inflation rate; Invest is the level of investment, measured by GFCF as a proportion of GDP; Ouve represents trade openness or also called economic integration measured by the sum of exports and imports as a share of GDP; ų a specific effect on unobserved country; and ε is an error term. Similarly, and in the same equation, i denotes the country, t is the measurement year for poverty and income, while T is the measurement period for the other variables (the three-year average is the year of poverty measurement and the two previous years). We opted for eliminating the constant in the equation to estimate in order to embed all the possible effects on the dependent variable in the variables of interest and the control variables.

In dynamic models that propose the delayed dependent variable as an explanatory variable, standard econometric techniques, such as the OLS method[4], do not provide effective estimates of the parameters[5]. Thus, we propose to perform the estimation by adopting the method of GMM in system because it method provides solutions to the problems of inverse causality bias, omitted variables, measurement errors and simultaneity bias.

[4] The Ordinary Least Squares Method
[5] See Sevestre. P (2002)

Our study period covers 28 years from 1985 to 2013. Our sample is made up of 19 "low income" countries and 47 "middle income" countries, which makes a "total sample" of 66 countries.

3.1. Description and Definitions of Variables

- The endogenous variable:

To measure poverty, that is, the variable to be explained, several indicators can be chosen. These are particularly the average income of the 20% of the poor population, the proportion of individuals below the poverty line, the poverty rate, the absolute poverty index, the poverty gap and the squared poverty gap.

We use this last indicator as the endogenous variable to represent poverty. This measure is generally described as indicative of the severity of poverty. However, the squared poverty gap takes into account the distance that separates the poor from the poverty line to the square. The use of the squared poverty gap is to capture the poverty gap on its own, so that people in extreme poverty are privileged, that is, this indicator takes into account inequality among the poor. This indicator, noted P_2, is calculated as follows:

$$P_2 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^2 \quad (2)$$

Where:

n = size of the population

z = poverty line

y_i = the income of individual i

- The variables of interest:

Our model has four explanatory variables of interest, namely the level of real GDP per capita, the level of financial liberalization represented by the level of financial development and the level of financial instability, and the level of inflation.

The first variable, the level of real GDP per capita, takes into account the level of poverty and economic growth. This variable is expressed in logarithmic form (the Neperian log of average income per capita) and indexed in the same year as the endogenous variable, i.e. the poverty indicator. However, the use of the logarithmic form allows to smooth the series given that all the numbers in the series are positive.

With regard to financial liberalization, the economic literature justifies its direct impact on poverty. Generally, its effect is clearly observed through a considerable component, namely financial development. The economic literature suggests three indicators of financial development, the share of credit to the private sector in the GDP, the ratio M2 or M3 as a share of GDP, and the share of commercial bank assets in GDP. Due to the unavailability of data, we use the ratio M2 as a proportion of GDP. This variable is measured as an average over three years (the three-year average, that is, the year of the poverty measure and the two preceding years). However, this indicator provides a link between financial institutions and households through financial transactions, such as transactions and savings transactions, which in turn can control the McKinnon's Conduit Effect of Capital.

Financial instability is, among other things, a variable of interest. This is the standard deviation of the growth rate of the defined variable. In our case, it is the standard deviation of the growth rate of the financial development variable defined as follows:

$$V^x = \sqrt{\sum_{t=1}^{n}\frac{1}{n-1}(g_t^x - \overline{g}^x)^2} \quad (3)$$

Where V^x is the indicator of instability of the variable x and g^x is its growth rate.

The last variable of interest is the rate of inflation measured by the growth rate of the GDP deflator. The economic literature suggests the latter as an indicator par excellence of the rate of

inflation. Likewise, it proves the existence of a positive correlation between the level of poverty and that of inflation.

- The control variables:

In order to take into account external economic shocks that may affect the national economy in a macroeconomic and institutional framework, other control variables are used. As an example, we cite an indicator of the rule of law or freedom, an indicator of political instability, public consumption as a percentage of GDP, an indicator of financial openness, an indicator of budget deficit, an indicator of the level of investment or an indicator of trade openness. In our case, based on the work of Jeanneney and Kpodar (2008), and in view of the unavailability of institutional data, the level of investment, i.e. GFCF as a proportion of GDP $\left(\frac{GFCF}{GDP}\right)$ and trade openness, also known as economic integration $\left(\frac{X+IM}{GDP}\right)$, are the two ultimate control variables.

- escription of the sample:

To determine the factors that can explain the extent of poverty in developing countries, we opted for a total sample of 66 countries divided into two groups. The first is for "middle-income" countries where gross national income is more than US$ 1,000 a year. The second represents "low-income" countries where gross national income is less than US$ 1,000 per year.

The list of the selected "low-income" countries, taking into account the needed data, is as follows: Benin, Burundi, Burkina Faso, Central African Republic, Democratic Republic of Congo, Ethiopia, Gambia, Guinea-Bissau, Guyana, Papua New Guinea, Malawi, Madagascar, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Togo and Uganda[6].

The list of the selected "middle-income" countries, taking into account the needed data, is composed of 47 nations. Their inhabitants have a higher standard of living than those with low incomes and also have access to more goods and services. Like in low-income countries, many citizens in middle-income countries are unable to meet their basic needs. The nominative list is as follows: Albania, Algeria, Argentina, Azerbaijan, Belarus, Belize, Botswana, Brazil, Bulgaria, China, Chile, Colombia, Costa Rica, Croatia, Dominica, Egypt, Ecuador, Estonia, Fiji, Gabon, Guatemala, Hungary, India, Indonesia, Iran , Iraq, Jamaica, Jordan, Malaysia, Mexico, Morocco, Namibia, Pakistan, Panama, Paraguay, Peru, Philippines, Romania, El Salvador, Sri Lanka, Suriname, Swaziland, Thailand, Tunisia, Turkey, Ukraine, Venezuela.

4. Dynamic Panel Model Estimates and Simultaneous Equation Model

4.1. Estimate of the “Total Sample”

This sample comprises 1508 observations for over 66 countries and covers a period of 28 years. The unit root test for stationarity is no longer a necessity given the number of observations. It may be noted from the descriptive statistics table that the dependent variable has the value 0 as the minimum value and the value 50.52 as the maximum value.

With regard to the autocorrelation matrix of the error terms, we note the absence of a strong correlation between the variables of the model for this sample. The autocorrelation results of the error terms are presented in the following table.

[6] These are the 19 low-income countries that produce the least wealth, sorted alphabetically according to Lynge Nielsen (2011) ‘’Classifications of Countries Based on Their Level of Development : How it is Done and How it Could be Done’’. IMF Working Paper . WP/11/31.

Table 1: Autocorrelation matrix of error terms for 'total sample' countries

				Total sample		
Variables	**Dvf**	**Inf**	**Invest**	**Ouve**	**Inst**	**Log y**
DvF	1					
Inf	- 0.0384	1				
lnvest	0.4428	-0.0687	1			
Ouve	0.4640	-0.0612	0.2343	1		
Inst	0.3737	0.0125	0.1930	0.1284	1	
Log y	0.3903	0.0300	0.3066	0.3325	0.1542	1

The results of the dynamic panel model estimates are summarized in the following table.

Table 2: Dynamic panel model estimation results for 'total sample' countries

Variable	Coefficient	P-Value
Pov_{-1}	0.970795	0.000
DvF	-0.0064068	0000
Inf	-0.000123	0.000
Invest	-0.0063783	0.000
Ouve	-0.0098505	0.000
Inst	0.128461	0.000
Log y	0.1311641	0.000

The results show that all the estimated coefficients are statistically significant. The coefficient of the variable Pov_{-1} is significant and of the expected sign; it is of the order of 0.97. It confirms that past poverty has an effect on current poverty and that poverty is a lasting and persistent phenomenon. As for the coefficient of the financial development variable (DvF), it is of the order of -0.0064. Any improvement in the level of financial development is reflected in a narrowing of the poverty gap. This result is consistent with the work of Kpodar (2004) and Boukhatem and Mokrani (2012). The coefficient of the Inflation variable (Inf) is of the order of -0.000123. The coefficient of the investment level variable (Invest) is -0.0063783 and of the expected sign. This result is consistent with the work of Jenneney and Kpodar (2008). The idea is that the presence of disruptions in the level of financial development widens the poverty gap squared, which makes poverty to keep decreasing. The coefficient of the trade opening variable (Ouve) is of the order of -0.00985 and of the expected sign. The coefficient of the Financial Instability variable (Inst) is of the order of 0.128461 and is of expected sign. The coefficient of the Log variable of the GDP per head (Logy) is of the order of 0.1311641 and not of the expected sign. Indeed, this variable is a measured average for the entire society, including the rich. In this case, the redistributive mechanisms may be inefficient in the sense that poor social classes do not benefit from social assistance, and this is the case for almost the majority of the developing countries.

The result of the autocorrelation test of Arellano-Bond second order error terms AR (2) has a value of -2.419, with a probability of 0.0156. We accept the null hypothesis, indicating the absence of second-order autocorrelation of the error terms. For the Sargan test of overidentification restrictions, it is built under the assumption that the error term is not correlated with all the exogenous variables when the instruments are valid. The result of this test has a chi-squared value of 46.84447, implying that the error term is not correlated with the set of exogenous variables.

In order to focus the analysis on the interdependence between poverty and economic growth, we have opted for a model of two simultaneous equations that allow us to take into account the reciprocal relationship between poverty → growth and growth → poverty. Indeed, simultaneity implies the existence of a correlation between the regressors and also between the error terms of each of the equations of the system.

In the poverty equation, we looked for the integration of the constant because we consider that the explanatory variables of poverty are insufficient to fully explain the full extent of poverty, considering that there are other variables that can explain poverty and that can be embedded in the constant. As for the second equation, that of growth, we preferred the elimination of the constant because we believe that the explanatory variables explain perfectly the economic growth.
The two equations are specified as follows:

$$\begin{cases} Pov_{i,t} = \alpha_0 + \alpha_1 DvF_{i,T} + \alpha_2 Inf_{i,t} + \alpha_3 Inst_{i,T} + \alpha_4 \operatorname{Log}(y_{i,t}) + \mu_i + \varepsilon_{i,t} & (4) \\ \operatorname{Log}(y_{i,t}) = \gamma_1 Inf_{i,t} + \gamma_2 Pov_{i,t} + \gamma_3 Invest_{i,t} + \gamma_4 Ouve_{i,t} + \beta_5 DvF_{i,T} + \mu_i + \varepsilon_{i,t} & (5) \end{cases}$$

The results of the estimates of the first equation (equation 4) are summarized in the following table.

Table 3: The results of the estimation of the simultaneous poverty equation for "total sample" countries

Variable	Coefficient	P-Value
DvF	-0.0725896	0.000
Inf	0.0004957	0.053
Inst	0.0504421	0.042
Log y	-5.280853	0.000
constant	49.45071	0.000

The results show that all the coefficients are statistically significant (at least at 10%). The coefficient of the variable (DvF) is significant and of the expected sign, it is of the order of -0.0725896, which is also confirmed in the first estimate. The coefficient of the Inflation (Inf) variable is of the order of 0.0004957. This coefficient is significant at the 10% level. The coefficient of the Financial Instability variable (Inst) is of the order of 0.0504421. It is significant at the threshold of 5% and expected sign. The coefficient of the Log variable of the GDP per head (Log y) is of the order of -5.280853, it is significant and of the expected sign. This confirms the inverse relationship between the poverty gap and GDP per capita. As for the constant, it is of the order of 49.45071. It is significant and shows that the variables suggested in the equation are insufficient to fully explain the full extent of poverty.

The results of the second equation estimates (equation 5) are presented in the following table.

Table 4: The results of estimating the simultaneous growth equation for 'total sample' countries

Variable	Coefficient	P-Value
Inf	-0.000156	0.191
Pov	0.3231348	0.000
Invest	0.0707481	0.000
Ouve	0.012824	0.000
DvF	0.0467374	0.000

All the coefficients, with the exception of inflation, are statistically significant. We note that the effect of poverty on the level of GDP is of the order of 0.3231348 and not of the expected sign. This variable is an average measure for the entire society, including the rich. In this case, the mechanisms of redistribution may be inefficient in the sense that the poor social classes do not benefit from social assistance, and this is the case for almost the majority of the developing countries. The coefficient of the investment level variable (Invest) is in the order of 0.0707481. It is meaningful and of the expected sign. Indeed, the effect of the increase in the level of investment on the level of GDP is positive. This result is in line with economic theory. The coefficient of the trade openness variable (Ouve) is of the order of 0.012824. It is also of expected sign and conforms to economic theory. The coefficient of the financial instability variable (Inst) is of the order of 0.128461 and is of the expected sign. As for the

coefficient of the financial development variable (DvF), it is around (0.0467374). Any improvement in the level of financial development is reflected in an increase in the level of GDP.

In order to test if there is a change in the determinants of poverty according to the level of development of the country in question, we opt for a segmentation of our total sample into two sub-samples: the countries "low-income countries" and "middle-income countries".

4.2. Estimation of the "Low Income" Sample

The sample includes 551 observations, covering over 19 countries over a period of 28 years. The absence of the unit root test for stationarity is no longer a necessity given the number of observations. It can be seen from the descriptive statistics table that the dependent variable has a minimum value of 1.76 and a maximum value of 45.64.

With regard to the autocorrelation matrix of the error terms, except for a strong correlation between the variable (Ouve) and the variable (DvF), we note the absence of a strong correlation between all the other model variables for this sample.

Table 5: Autocorrelation matrix of error terms for 'low income' countries

				"Low income"		
Variables	**Dvf**	**Inf**	**Invest**	**Ouve**	**Inst**	**Log y**
DvF	1					
Inf	- 0.0369	1				
Invest	0.3871	-0.0718	1			
Ouve	0.7310	-0.0348	0.3782	1		
Inst	0.3432	0.0151	0.3063	0.2452	1	
Log y	0.5312	0.0210	0.2228	0.6546	0.2566	1

The strong correlation between the variable (Ouve) and the variable (DvF) (correlation coefficient = 0.7310), suggests the non integration of these two variables, i.e. in the same estimation.

The results of the two dynamic panel model estimates are summarized in the following table.

Table 6: The results of the dynamic panel model estimation for "low income" countries including the variable "Financial Development" (DvF)

Variable	**Coefficient**	**P-Value**
$Pov._{-1}$	0.8903322	0.000
DvF	0.0004024	0.958
Inf	-0.0001019	0.023
Invest	-0.359288	0.027
Inst	0.36037	0.097
Log y	-2.344328	0.342

The results of the autocorrelation test of Arellano-Bond second order error terms AR(2) have a value of -2.0441 with a probability of 0.0409. We accept the null hypothesis of the absence of second-order autocorrelation of the error terms. As for the Sargan test of overidentification restrictions, it has a chi-squared value of the order of 14.23157, indicating that the error term is not correlated with the set of exogenous variables.

Table 7: The results of the dynamic panel model estimation for "low income" countries including the variable "Commercial Open" (Ouve)

Variable	Coefficient	P-Value
Pov.$_{-1}$	0.9768004	0.000
Ouve	- 0.0762	0.189
Inf	-0.000108	0.006
Invest	-0.0286625	0.075
Inst	0.0264123	0.333
Log y	0.9598316	0.780

The results show the existence of three non-significant coefficients, namely the coefficients of the trade opening variable (Ouve), of the variable Financial instability (Inst) and of the Log variable of GDP per capita. With respect to two variables (Ouve) and (Inst) among the three cities, the explanation is that these factors, qualified as possible imperfection, may not identify their real impacts on poverty. The coefficient of the investment level variable (Invest) is significant and of expected sign, it is of the order of (-0.0286625). This result is consistent with the work of Jenneney and Kpodar (2008).

The results of the autocorrelation test of Arellano-Bond second order error terms AR(2) has a value of the order of -1.9778 with a probability of 0.0479. We accept the null hypothesis signifying the absence of second-order autocorrelation of the error terms. As for the Sargan test of overidentification restrictions, its result has a chi-squared value of the order of 15.08031, that is, the error term is not correlated with the set of exogenous variables.

In order to test the interdependence between poverty and economic growth, we have opted for a model of two simultaneous equations that allow us to take into account this reciprocal relationship[7]. The results of the estimates of the first equation, of the two simultaneous equations, are presented in the following table.

Table 8: The results of the estimation of the simultaneous poverty equation for "low income" countries

Variable	Coefficient	P-Value
DvF	-0.3171105	0.000
Inf	0.0005337	0.113
Inst	0.016109	0.614
Log y	2.766478	0.141
constante	9.36711	0.359

The estimation results show that all the coefficients are statically insignificant, except that of the variable (DvF) which is significant and of expected sign, it is of the order of -0.3171105, which is confirmed also in the first estimate. In this case, financial development is the only determinant of poverty for low-income developing countries. For the rest of the variables, the non-significance of the coefficients means that these variables do not influence poverty for low-income developing countries. In this case, it is a problem of approximation of the variables, that is to say, there are omitted variables.

The results of the estimates in the second equation are presented in the following table.

Table 9: The results of estimating the simultaneous growth equation for "low income" countries

Variable	Coefficient	P-Value
Inf	-0.0001142	0.091
Pov	0.218362	0.000
Invest	0.0040335	0.172
Ouve	0.0031101	0.298
DvF	0.0694147	0.000

[7] See the equations on page 13.

The estimation results show that all the coefficients, with the exception of those of financial development and commercial opening, are statistically significant. We note that the effect of inflation on the level of GDP is of the order of -0.0001142, it is of expected sign. Indeed, economic theory advocates this negative correlation between inflation and the level of GDP per capita. The coefficient of the poverty variable is of the order of 0.218362, it is of unexpected sign. This variable is a measured average for the entire society including the rich. Thus, redistributive mechanisms may be inefficient in a sense that poor social classes do not benefit from social assistance and this is the case for almost the majority of developing countries, especially those with low incomes. As for the coefficient of the financial development variable (DvF), it is of the order of 0.0694147. Any improvement in the level of financial development can be explained by an increase in the level of GDP.

4.3. Estimation of the "Middle-Income" Sample

The sample includes 957 observations, covering 47 countries over a period of 28 years. The unit root test for stationarity is no longer a necessity since our study period is less than thirty. Note from the descriptive statistics table that the dependent variable has the value 0 as the minimum value and the value 50.52 as the maximum value.

Regarding the autocorrelation matrix of the error terms, we note the absence of a strong correlation between all the variables of the model for this sample which allows us to integrate them into the same equation.

Table 10: Autocorrelation matrix of error terms for middle-income countries

				''Middle income''		
Variables	**Dvf**	**Inf**	**Invest**	**Ouve**	**Inst**	**Log y**
DvF	1					
Inf	- 0.0571	1				
Invest	0.3816	-0.0756	1			
Ouve	0.3611	-0.1540	0.0573	1		
Inst	0.3706	0.0785	0.1303	0.0722	1	
Log y	-0.0681	0.0090	0.0288	0.1749	0.0989	1

The results of the dynamic panel model estimate are summarized in the following table.

Table 11: Results of dynamic panel model estimation for middle-income countries

Variable	Coefficient	P-Value
Pov_{-1}	0.9526271	0.000
DvF	-0.008731	0.000
Inf	-0.0000827	0.000
Invest	0.0170627	0.000
Ouve	-0.0013399	0.000
Inst	0.0036733	0.000
Log y	-0.441679	0.000

The results show that all the estimated coefficients are statistically significant. The coefficient of the variable Pov-1 is significant and of expected sign, it is of the order of 0.9526271, past poverty has an effect on the current poverty as poverty is a lasting and persistent phenomenon. As for the coefficient of the financial development variable (DvF), it is of the order of -0.008731. In other words, any improvement in the level of financial development is reflected in a reduction of the poverty gap. This result is consistent with the work of Kpodar (2004) and Boukhatem and Mokrani (2012). The coefficient of the Inflation (Inf) variable is of the order of -0.0000827. The coefficient of the investment level variable (Invest) is in the order of 0.0170627. The coefficient of the Open Trade (Ouve) variable is of the order of -0.0013399 which is of expected sign. The coefficient of the

Financial Instability variable (Inst) is of the order of 0.0036733 and is of expected sign. The coefficient of the Log variable of the GDP per head (Logy) is of the order of -0.441679, it is of expected sign. Indeed, the higher the per capita income, the lower the poverty. This result is consistent with the work of Kpodar (2004) and Jenneney and Kpodar (2008).

The results of the autocorrelation test of Arellano-Bond second order error terms AR(2) have a value of the order of -1.3571 with a probability of 0.1748. We accept the null hypothesis signifying the absence of second-order autocorrelation of the error terms. As for the Sargan test of overidentification restrictions, its result has a chi-squared value of the order of 28.89277, that is, the error term is not correlated with the set of exogenous variables.

In order to focus the study of the interdependence between poverty and economic growth, we have opted for a model of two simultaneous equations that allow us to take into account this reciprocal relationship[8]. The results of the estimates of the first equation, of the two simultaneous equations, are summarized in the following table:

Table 12: The results of the estimation of the simultaneous poverty equation for middle-income countries

Variable	Coefficient	P-Value
DvF	-0.01359	0.193
Inf	-0.0001954	0.847
Inst	-0.1103388	0.001
Log y	8.360551	0.000
constant	9.36711	0.000

The preceding table allows us to notice that all the coefficients are statistically significant, with the exception of those of the variables (DvF) and (Inf). The lack of significance of these coefficients means that these variables do not influence poverty for middle-income developing countries. It is a problem of approximation of the variables, that is to say there are omitted variables. The coefficient of the Financial Instability variable (Inst) is of the order of -0.1103388. It is significant of unexpected sign. Financial instability can lead to a decline in the incidence of poverty, which is quite surprising. The coefficient of the Log variable of the GDP per head (Logy) is of the order of 8.360551, it is significant and of unexpected sign. This proves the inverse relationship between the poverty gap and GDP per capita. Indeed, the variable to be explained is a measured average for the whole of society including the rich. In this case the redistributive mechanisms may be inefficient in a sense that poor social classes do not benefit from social assistance and this is the case for almost the majority of developing countries. As for the constant, it is of the order of 9.36711. It is significant and shows that the variables suggested in the equation are insufficient to fully explain the full extent of poverty.

The results of the second equation estimates (equation 5') are presented in the following table.

Table 13: The results of the estimation of the simultaneous growth equation for middle-income countries

Variable	Coefficient	P-Value
Inf	-0.0001654	0.865
Pov	1.764797	0.000
Invest	0.0877874	0.000
Ouve	-0.517099	0.000
DvF	0.0753604	0.000

The preceding table allows us to notice that all the coefficients, with the exception of the inflation variable (Inf), are statistically significant. The coefficient of the poverty variable (Pov) is of the order of 1.764797 and of unexpected sign. However, this variable is measured from an average for the entire population including the rich. Thus, redistributive mechanisms may be inefficient in the

[8] See the equations on page 13.

sense that poor social classes do not benefit from social assistance and this is the case for almost the majority of developing countries. For the coefficient of the investment variable (Invest) it is of the order of 0.0877874 and expected sign. In fact, economic theory advocates a positive correlation between the two variables. The coefficient of the trade opening variable (Ouve) is of the order of -0.517099 and of unexpected sign. This surprising result can be explained by the risk represented by a broad trade opening in developing countries. As for the coefficient of the financial development variable (DvF), it is of the order of 0.0753604. Any improvement in the level of financial development is reflected in an increase in the level of GDP.

5. Conclusion

The purpose of this work was to study the measures and mechanisms of a possible relationship between poverty and financial liberalization and inflation. To set the stage for the study, the paper started by discussing the theories that focus on financial liberalization, poverty and inflation.

First, there has been discussion of the orthodox or neo-liberal currents associated with the McKinnon and Shaw schools, which advocate the liberalization of the financial system, which lowers inflation and demolishes the financial repression and thinking of the neo-structuralists who advocate the same liberalization as it allows to attract foreign capital. With regard to inflation, it can also be associated with a market imbalance, hence the demand inflation disclosed by Keynesian theory. In particular, because of the negative impact of inflation on production, on the one hand, and the cost of disinflation, on the other hand, governments have realized that controlling the level and evolution of inflation is one of the major objectives of economic decision-makers. However, if inflation hurts the poor, it is by the decline in the purchasing power. For example, studies have attempted to highlight the reduction effect of financial development on poverty, mainly through improving the access of poor people to deposit and credit services.

Then, we exposed the transmission channels between the different variables. Indeed, the link between financial liberalization and poverty is of two types, a direct link that manifests itself in McKinnon's driven effect and another indirect one resulting from economic growth that drives down poverty.

Our empirical work has been aimed at trying to determine the links between poverty, financial liberalization and inflation. To do this, we used an empirical investigation containing three econometric studies of three samples from developing countries, namely nineteen "low-income" countries, forty-seven "middle-income" countries, and the "total sample" which groups together the first two. The data are annual and are from 1985 to 2013.

Two models were estimated. First, we opted for a Dynamic Panel model. For the second econometric study, a simultaneous equations Model has been tested.

The results of these estimates state that poverty is a persistent phenomenon. Indeed, the current level of poverty is influenced by its preceding level. As for financial development, any increase in its level is reflected in a reduction of poverty. This result confirms the conclusions reached by Mc Kinnon's work. However, financial development goes hand-in-hand with financial instability, which undermines the level of well-being and increases poverty, as does inflation.

Despite the importance of the results reached in this research work, shortcomings can always be highlighted:

- Other factors that may influence the relationship between financial liberalization, inflation and poverty have not been used.
- Other mechanisms to improve this relationship such as institutional mechanisms, namely corruption, political instability, the rule of law, etc. were not included in this study.

These issues can be addressed in future research, especially in a national and international context, where the demands of social equity and inclusive growth are becoming increasingly important and part of the new development agenda.

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