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Financial development and income inequality, the Latin America case

Desarrollo financiero y desigualdad del ingreso, el caso de América Latina

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Abstract

The relationship between financial development and income inequality was analyzed using a database comprising 13 Latin American countries, covering a period from 1990 to 2015. The main variable is financial development, which is measured through the credit to GDP ratio. On the other hand, to measure income inequality, the Gini index was used. To carry out the analysis, the following econometric methods were used: fixed effects, estimated generalized least squares and the method of generalized moments together with estimated generalized least squares. In addition, the following control variables were used: GDP per capita, government expenditure to GDP ratio, trade opening, the inflation rate and the population. It was found that the development of the financial system increases income inequality. These results were validated using different econometric specifications.

JEL code: G10, O15, O54
Keywords: Financial development; Income inequality; Latin America

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Resumen

Se analizó la relación entre desarrollo financiero y desigualdad del ingreso empleando una base de datos que comprende 13 países de América Latina, en un período que abarca del año 1990 al año 2015. La variable principal es el desarrollo financiero, la cual es medida través de la proporción crédito a PIB. Por otro lado, para medir la desigualdad del ingreso se empleó el índice de Gini. Para realizar el análisis se emplearon los siguientes métodos econométricos: efectos fijos, mínimos cuadrados generalizados estimados y el método de momentos generalizados junto con mínimos cuadrados generalizados estimados. Además, se utilizaron las siguientes variables de control: PIB per cápita, gastos del gobierno con respecto al PIB, apertura comercial, la tasa de inflación y la población. Se encontró que el desarrollo del sistema financiero incrementa la desigualdad del ingreso. Dichos resultados se validaron empleando diferentes especificaciones econométricas.

Código JEL: G10, O15, O54
Palabras clave: Desarrollo Financiero; Desigualdad del ingreso; América Latina

Introduction

A great deal of research has been carried out exploring the origin and socio-economic consequences of income inequality and the disadvantages of its continued existence.

Among the disadvantages of income inequality are problems such as the reduction of social cohesion, and a delay in efforts to reduce poverty. Inequality can also have a multiplier effect on other forms of inequality, such as inequality between men and women, according to Fuentes-Nieva and Galasso (2014). On the other hand, extreme inequality can also have an adverse effect on egalitarian political representation; i.e. when the rich use their wealth to capture the political decision-making process, then the rules bend in their favor at the expense of others. This could be a cause of the erosion of democratic government, which affects social cohesion and increases social unrest according to Tita and Meshach (2016).

The advantages of the existence of financial markets may include: a boost to economic growth, allowing both rich and poor to apply for loans to finance investments, and thus ensuring that capital is distributed efficiently, particularly in a way that is not related to inherited wealth. When financial markets are more efficient and better developed, a loan applicant can take a larger loan with a given collateral. This reduces dependence on inherited wealth. The success of microloans for the poor in developing countries is just one example of what the financial sector can do for society. Since there are parts of a society that previously could not apply for a loan and now they can build their own business and thus increase their in-

come. The remaining income inequality would be optimal or justified in the sense of being independent of inherited wealth.

On the other hand, a different approach suggests that banks and financial markets in developing countries have not provided sufficient access to financing. Unequal access to financing is a persistent factor in the generation of income inequality and also leads to lower economic growth. One branch of the literature focuses on the fact that limited access to the financial system has two sources: the first is capital market imperfections and the second is restrictions on the granting of loans. Financial market imperfections are a key factor in patterns of poverty and income inequality such as in the works of Greenwood and Jovanovic (1990) and Banerjee and Newman (1993). These imperfections prevent low-income individuals from investing in human capital, health, and entrepreneurial activities.

Although extensive research has been conducted on income inequality and the development of the financial system, the exact impact of the development of the financial system on income inequality has not yet defined in both theoretical and empirical research. Moreover, the recent financial crisis and macroeconomic instability have increased interest in the relationship between income inequality and the development of the financial system. The literature considers that the financial system has a potentially important role to play in ensuring equal economic opportunities and reducing inequality.

Likewise, the continued existence of inequality has been one of the main concerns in Latin America. This is due to the fact that this region has one of the highest levels of income inequality on the planet, but on the other hand it is the region where most progress has been made in reducing this inequality in the last 15 years, according to the work of Székely and Mendoza (2016) and Cord, Barriga-Cabanillas, Lucchetti, Rodríguez-Castelán, Sousa, and Valderrama (2017). In comparative terms, the countries of Latin America have a level of income inequality of one and a half to two times higher than that of high-income countries, according to Alvaredo and Gasparini (2015).

The hypotheses of the works of Galor and Zeira (1993), and Banerjee and Newman (1993) are empirically examined, which expresses that the development of the financial system has a reducing effect on income inequality. This relationship is analyzed using proxy variables, which are standard in the literature of financial development; these are: the private credit to GDP ratio and the Gini coefficient of income distribution. The analysis is made through the estimation of a data panel; the countries considered in the study are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama; and it covers the period from 1990 to 2015. The contribution of this research to the literature studying the relationship between income inequality and financial development focuses on the use of three different econometric approaches: first, fixed effects; second, the Method of Generalized Estimated Least Squares; and third, the Generalized Method

of Moments altogether with Estimated Generalized Least Squares are used to analyze the case of Latin America. Likewise, the specific characteristics of each country are controlled.

The structure of this work is as follows: section (2), review of the literature, presents a summary of the literature on the subject; section (3), data, is the description and basic statistics of the variables used. In section (4), results, the results of the econometric estimation are presented; section (5), robustness tests, contains the tests carried out to validate the results; and in the last section (6) the conclusions are presented

Review of the literature

The theories on the effect of financial system development on income inequality are divided into two: one branch of the literature proposes a non-linear relationship —it specifically proposes an inverted U-shaped relationship between financial system development and economic growth—, while the other part of the literature predicts a linear relationship. An example of the above is the work of Greenwood and Jovanovic (1990), which predicts a non-linear relationship between finance and inequality. According to this approach, income inequality first increases and then decreases when higher levels of financial development are reached and when a larger proportion of the population has access to the growing financial markets. Consequently, the model of Greenwood and Jovanovic (1990) predicts an inverted U-shaped relationship between financial development and income inequality.

Although the different theories provide conflicting conclusions in the finance-inequity nexus, some empirical works suggest that the development of the financial system contributes to the reduction of inequality and poverty. Some cross-country comparative studies suggest that the expansion of private credit can stimulate income growth for the lowest income quintiles, and thus help reduce income inequality; this is the case of the works of Hamori and Hashinguchi (2012); Agnello and Sousa (2012); Kunieda, Okada, and Shibata (2014); and Naceur and Zhang (2016). The previous works have the use of the private credit to GDP ratio as a measure of financial development in common, and in addition these works find that there is a negative linear relationship between financial development and income inequality.

On the other hand, there are studies that refute the hypothesis that financial development has a reducing effect on income inequality. These studies are those of: Jauch and Watzka (2015); Denk and Cournede (2015); Seven and Coskun (2016); and De Haan and Sturm (2017).

The results of the work of Jauch and Watzka (2015) show that when there is greater development of the financial system, income inequality increases. The estimate is made using an unbalanced data panel of 138 countries with fixed and temporary effects, for the 1960-2008 period. Using a sample of 33 OECD countries over the 1970-2011 period, Denk and Cournede (2015) find that higher levels of credit intermediation and equity markets are related to

more unequal income distribution. Seven and Coskun (2016) make use of the Generalized Method of Moments, with a sample of 45 emerging countries in the 1987-2011 period; the data are structured in six averages of 4 years. They find that, although economic growth is positively affected by the development of the financial system, there is no reducing effect of income inequality by financial development. Using a panel of fixed-effect data and a sample of 121 countries covering the 1975-2005 period, De Haan and Sturm (2017) find that all the financial variables used in the study increase income inequality.

Studies that review the theory of the existence of a non-linear relationship between financial development and income inequality are: Tan and Law (2011); Nikoloski (2012); Law, Tan, and Azman-Saini (2014); and Bahmani, Oskooee, and Zhang (2014).

On the other hand, the study on financial development and income inequality for Latin America and the Caribbean is that of Canavire-Bacarreza and Rioja (2008). They use data from 21 Latin American and Caribbean countries from 1960 to 2005. They use a dynamic panel with the Generalized Method of Moments. Their results suggest that the income of the lowest quintile has not been affected by the expansion of the financial system. However, they find that financial development has a disproportionate positive effect on the second, third, and fourth quintiles.

Data

The sample used contains data from 17 Latin American countries over a 25-year period from 1990 to 2014. Measures of inequality and development of the financial system previously used in the literature are utilized, for which 425 observations are considered. The variable used to measure income inequality in this study is the Gini coefficient, which is a relative proportion of the areas on the Lorenz curve diagram. It has a scale from zero to the hundredth percentile. Zero represents a perfectly egalitarian income distribution, in which each individual receives the same level of income. One hundred percent reflects an extremely unequal distribution, where one person takes all the income in the economy.

Specifically, the available Gini is used as the dependent variable and the data come from the Standardized World Income Inequality Database (SWIID) developed by Solt (2016). The available Gini is an estimate of the Gini index in terms equivalent to disposable income, i.e. after taxes and transfers. According to Ortiz and Cummins (2011), the SWIID is the most comprehensive attempt to develop a nationally comparable database of Gini indices over time

The source for the data for the bank credit variable with respect to GDP is the version updated to June 2017 of the Financial Structure Database developed by Beck, Demirguc-Kunt, and Levine (2010). The private credit variable is calculated according to the International Financial Statistics of the International Monetary Fund, and consists of the credit provided by

monetary bank deposits and other financial institutions to the private sector. This variable is the standard measure of financial development and the empirical literature mentioned above. High values of this indicator suggest greater depth of financial institutions and financial markets.

Finally, other variables that have previously been used as determinants of income inequality are controlled: GDP per capita, government spending relative to GDP, trade openness, inflation rate, and population. GDP per capita is included to control the effects of economic growth. The literature suggests a strong relationship between income inequality and economic development; therefore, the sign of the GDP per capita coefficient is expected to be negative, because lower inequality is related to higher levels of income. The ratios of government spending to GDP and trade openness are also expected to be negative. These variables are included to capture the benefits of public spending and openness to foreign trade. The expected sign of the variable is positive. According to the work of Easterley and Fischer (2001), the inflation rate coefficient is expected to be positive, because inflation affects the poor more than the rich. The data come from the World Development Indicators database of the World Bank. Table (1) shows a summary of the definitions and sources of all variables in the work. Table (2) shows the basic statistics of the variables used.

Table 1

Basic statistics

Variable	Abbreviation	Mean	Standard Deviation	Minimum	Maximum
Gini	*GINI*	46.9	4.09	36.30	55.86
Private credit	*PCT*	32.3	18.92	4.89	103.86
Inflation	*Inflation*	80.68	577.55	-1.16	7485.49
Trade openness	*Trade*	63.06	31.20	13.75	165.34
Population	*Population*	29385847	45172496	2471010	206077898
GDP per capita	*GDPpc*	5831.05	3600.22	1068.31	14687.97
Government spending	*GE*	12.28	3.66	43.47	2.97

Source: own elaboration

Methodology

Following the work of Jauch and Watzka (2015), the hypotheses of Galor and Zeira (1993) and Banerjee and Newman (1993) are empirically tested. These hypotheses argue that financial development has a negative impact on income inequality. The hypothesis of Greenwood and Jovanovic (1990) that this relationship follows an inverted form is also tested. Therefore, the basic estimate herein allows non-linearity, since the effect of the development of the financial system is to increase inequality in a first stage, and in a second stage the effect of financial development is to decrease inequality, according to the Kuznets curve. Equation (1) allows us to compare our findings with the results of other researches:

The following is the basic specification of regression that is standard in the literature on income inequality and development of the financial system:

$$Gini_{i,t} = \alpha + \beta_1 PCT_{i,t} + \beta_2 PCT_{i,t}^2 + \beta_3 GDPpc_{i,t} + \beta_4 GDPpc_{i,t}^2 + \beta_j X_{i,t} + \varepsilon_{i,t} \quad (1)$$

Following the hypothesis of the existence of a negative linear relation, should then be negative and significant, and the parameter should not be significant. According to the inverted-U hypothesis, should be significant and positive and should be negative and significant. The variable and its square term are added to control for the Kuznets curve. Therefore, should be positive and significant, and should be significant and negative. Where are the control variables.

A problem with estimating equation (1) is that some of the countries in the sample are very diverse and the unobserved effect may bias the slope of the parameters. A panel estimate with fixed effects is used to eliminate the unobserved effect.

The following control variables are used: government spending, population, inflation, and trade openness. The lagged dependent variable is included on the right side of the equation, because: inequality generally does not have many variations over time and has a high degree of persistence; it allows explanatory variables to have an effect that extends beyond the current period; and it serves as an approximate variable for omitted variables associated with cross-sections.

On the other hand, in order to control the problem of serial correlation between cross-sections, as well as to control heteroscedasticity, the method of Estimated Generalized Least Squares with cross-section SUR and fixed effects is used.

Finally, the Generalized Method of Moments is used altogether with the Estimated Generalized Weighted Least Squares method and cross-section SUR for two reasons: first, inequality generally does not have many variations over time and has a high degree of persistence.

Therefore, income inequality is included as a lagged variable in the fixed-effect data panel model, making it a dynamic panel model. Second, financial development could itself be an endogenous variable, so an instrumental variable can be used to obtain consistent parameters. However, instrumental variables commonly used in the literature as the legal origin may not be a good instrument for financial development, especially when talking about the nexus finance inequality. The GMM estimator is well adjusted to treat the endogeneity problems that arise from the two previous considerations according to Jauch and Watzka (2015).

Therefore, a dynamic version of the panel model with fixed effects in levels is estimated as shown in equation (2).

$$Gini_{i,t} = \rho Gini_{i,t-1} + \beta_1 PCT_{i,t} + \beta_2 PCT_{i,t}^2 + \beta_3 GDPpc_{i,t} + \beta_4 GDPpc_{i,t}^2 + \beta_j X_{it} + \gamma_t + a_i + \varepsilon_{it} \quad (2)$$

Where are time approximations and are specific characteristics of each country. Back values of the following variables are utilized: Gini index, financial development, and GDP per capita as instruments in the GMM estimator.

Results

Three data panel models were estimated: the first is an ordinary least-squares model with fixed effects, the second is an Estimated Generalized Weighted Least Squares model with cross-section SUR, and the third model was estimated using the Generalized Method of Moments altogether with the Estimated Generalized Weighted Least Squares method and cross-section SUR.

The results of the model using the Ordinary Least Squares method suggest that the development of the financial system increases income inequality, since the sign obtained from the estimate is positive and statistically significant. Therefore, there is no evidence to support economic theories that predict a reducing effect of financial development on income inequality. Similarly, the results of the estimation using the Generalized Weighted Least Squares method with cross-section SUR show evidence against the theories of Galor and Zeira (1993) and Banerjee and Newman (1993), which predict a reducing effect of income inequality by financial development.

Table 2

Results of the estimation of the models: Ordinary Least Squares, EGLS and GMM EGLS.

Dependent variable: *GINI*

Coefficients	Ordinary Least Squares (Fixed Effects) (1)	EGLS (cross-section SUR) (2)	GMM EGLS (cross-section SUR) (3)
C	50.06901***	49.40225***	144.7963***
GINI (-1)	0.842341***	0.847722***	0.836011***
PCT	0.045431***	0.045441***	0.043877***
PCT^2	-.000202	-0.000208***	-8.12E-05
GDPpc	-0.000544*	-0.000469***	0.001613***
GDPpc^2	1.56E-08	1.17E-08***	-9.08E-08***
LogPopulation	-2.611683***	-2.608450***	-9.279473***
LogGE	-0.007511	0.046294***	0.853493**
Inflation	-0.000122	-0.000198***	-0.000916**
LogTrade	-0.346986	0.344121***	1.661585***
N	408	408	357
R^2	.93	.98	.98
Durbin-Watson	2.15	2.08	1.94
Sargan test			.56

Source: own elaboration

The results of model 2 show that the financial development measured by the variable has a positive and statistically significant coefficient, and the quadratic term has a negative and statistically significant sign. This supports the theory of Greenwood and Jovanovic that the development of the financial system has an inverted U-shaped relationship to income inequality. The results of models 1 and 3 do not provide significant evidence to support the theory of Greenwood and Jovanovic, because although the coefficient of the financial development variable is positive and statistically significant, the quadratic term is negative and it is not statistically significant in both models.

The results generally suggest that theories that predict a reducing effect on income inequality of financial development should be rejected. Instead, financial development is found to produce greater income inequality. In addition, there is evidence to support the inverted U theory of Greenwood and Jovanovic.

The results for the GDP per capita variable show that, in contrast to the inverted U theory of Kuznets, GDP per capita has, first, a reducing effect on income inequality and, second,

GDP per capita increases income inequality for models 1 and 2. The results of model 3 instead support the inverted U theory of Kuznets. Therefore, the evidence obtained is not conclusive in relation to the inverted U theory of Kuznets.

Regarding control variables, is statistically significant for all models. The results of the estimation indicate that high levels of the population variable have a reducing effect on income inequality; however, this variable does not present the expected sign. The variable is not significant in model 1, but in models 2 and 3 it has a positive sign and it is statistically significant. This implies that government spending has the effect of increasing income inequality. On the other hand, the variable is not statistically significant in model 1, and for models 1 and 3 the sign is negative and it is statistically significant. However, the value of the coefficients is very small. The results of the estimations for the variable in models 1 and 2 show a positive sign and it is statistically significant. The results of the model show that the variable is not statistically significant. Therefore, according to the results obtained, this variable has an amplifying effect on income inequality.

In summary, the results obtained for the private credit variable, which measures the development of the financial system, do not show evidence to support the hypothesis that greater financial development will always reduce income inequality. In other words, the empirical results obtained reject the predictions of the theories of Galor and Zeira (1993) and Banerjee and Newman (1993). Therefore, the results obtained are in line with those obtained by Nikoloski (2012), which indicate that the development of the financial system increases income inequality. Other works that conclude that the development of the financial system has a positive relationship with income inequality are those of Jauch and Watzka (2015), Seven and Coskun (2016), De Haan and Sturm (2017), these being among the most recent. In contrast, other works find that financial development decreases income inequality, among which are the works of Clarke, Xu, and Zou (2006), and Hamori and Hashinguchi (2012).

In this manner, the empirical results are in line with the theoretical predictions of Greenwood and Jovanovic (1990). The works of Jauch and Watzka (2015) and that of Nikoloski (2012) find an inverted U-shaped relationship between financial development and income inequality, which coincides with the results of the present research. On the other hand, the works of Tan and Law (2011); Law, Tan, and Azman-Saini (2014); and Bahmani, Oskooee, and Zhang (2014) find that financial development first has a reducing effect.

Robustness tests

In order to validate the results obtained below, different robustness tests are presented. The first stage is to estimate the variables in levels and not incorporate the lagged dependent variable in the right side of the equation. With respect to the influence of financial development, the

results are in line with the estimate made. This means that higher financial development is associated with an increase in income inequality. For the economic development variable, there is no evidence to suggest the existence of an inverted Kuznets curve. Not including the lagged dependent variable substantially diminishes the explanatory power of the estimate using the fixed-effect Ordinary Least Squares method.

Table 3
Level estimation

Dependent variable: *GINI*

Coefficients	Ordinary Least Squares (Fixed Effects)	EGLS (cross-section SUR)
C	92.87698***	92.87663***
PCT	0.069841**	0.062989***
PCT^2	-0.000431	-0.000364***
GDPpc	-0.001849***	-0.001803***
GDPpc^2	5.49E-08**	5.15E-08***
LogPopulation	-2.573370	-2.556861***
LogGE	2.170685***	1.990297***
Inflation	7.62E-06	2.35E-05
LogTrade	-0.608614	0.344121***
N	425	425
R^2	.76	.98
Durbin-Watson	.34	1.78

Source: own elaboration

A second step to control reverse causality is to take lagged values from the explanatory variables. This considers the arguments that explanatory factors need time to influence the dependent variable. This estimate measures the influence of economic and financial development on the distribution of income from a previous year.

The explanatory power of income inequality is reduced. The sign of financial development remains positive and the coefficient increases. The medium-term influence of financial deve-

lopment on income inequality is substantially greater than the short-term influence. Moreover, the results of economic development are in line with previous results.

Table 4
Lag estimation

Dependent variable: *GINI*

Coefficients	OLS	EGLS (cross-section SUR)	GMM EGLS (cross-section SUR)
C	131.7359***	131.4998***	-76.95582***
PCT(-1)	0.089367***	0.068578***	0.125512***
PCT^2	-0.000475**	-0.000293***	-0.001324***
GDPpc(-1)	-0.001355***	-0.001097***	-0.007294***
GDPpc^2	2.76E-08	1.30E-08***	3.33E-07***
LogPopulation	-5.096598***	-5.093430***	13.70042***
LogGE	2.381977***	2.409538***	-2.603874**
Inflation	0.000510	0.000414***	-0.006827***
LogTrade	-0.648206	-0.715586***	-17.37834***
N	408	408	357
R^2	.77	.97	.97
Durbin-Watson	.41	1.63	1.87
Sargan test			.61

Source: own elaboration

As a third step, the first difference model is estimated, which in turn estimates the effects of the change in the explanatory variables on changes in the dependent variable. It is found that further development of the financial sector leads to an increase in income inequality. The results for the economic development variable are not significant.

Lastly, the estimation is carried out utilizing logarithms.

The test indicates that financial development continues to have a positive effect on income inequality, while the variable continues to have an inequality-reducing effect.

Table 5

First difference estimation

Dependent variable:		
Coefficients	Ordinary Least Squares (Fixed Effects)	EGLS (cross-section SUR)
C	-0.685982**	-0.676773***
dPCT	0.060124	0.055649***
dPCT^2	-0.000149	-0.000135
dGDP	0.000430	0.000304
dGDP^2	-3.11E-08	-2.42E-08
LogPopulation	1.17E-06	1.18E-06***
LogGE	-0.012560	0.023052
Inflation	-2.54E-05	1.81E-05
LogTrade	0.015938	0.010392**
N	425	408
R^2	.06	.24
Durbin-Watson	2.17.	2.04

Source: own elaboration

Table 6

Estimation using logarithms

Dependent variable: *LogGINI*		
Coefficients	Ordinary Least Squares (Fixed Effects)	EGLS (cross-section SUR)
C	5.096588***	5.062349***
LogPCT	0.032883***	0.030317***
PCT^2	.63E-07	7.88E-07
LogGDP	-0.224370***	-0.214370***
GDP^2	1.09E-10	4.43E-11
LogPopulation	0.024291	0.022708***
LogGE	0.034474***	0.032582***
Inflation	8.49E-07	1.37E-06**
LogTrade	0.011654	0.009422**
N	425	425
R^2	.78	.98
Durbin-Watson	.37	1.76

Source: own elaboration

Conclusions

In Latin America, two phenomena can be observed: an increase in financial development and a slight reduction in income inequality (Székely and Mendoza, 2016; Cord, Barriga-Cabanillas, Lucchetti, Rodríguez-Castelán, Sousa, and Valderrama, 2017). To analyze this situation, different theoretical models are tested, which explain the relationship between financial development and income inequality. These models predict that more developed financial markets tend to decrease income inequality levels. Previous empirical research has found a reducing effect of financial development on income inequality. Previous research used cross-country approaches, which do not consider specific characteristics, nor use data panel approaches, which similarly do not consider country-specific effects.

Using the fixed-effect approach, different conclusions are reached in the analysis between development of the financial system and income inequality by finding evidence to reject the above theories. By integrating country-specific characteristics, it is found that financial development has a positive effect on income inequality. The results were validated by means of different robustness tests. In the first stage, the estimation is carried out in levels; in the second stage, to control inverse causality, lagged variables are used; in the third stage, the variables in first differences are used; and finally, the estimation is carried out using logarithms. The positive relationship found is highly significant, but of a small magnitude. A 10% increase in private credit leads to an average .04% increase in income inequality for all three models. On the other hand, there is evidence to support the inverted U-shaped relationship hypothesis of Greenwood and Jovanovic (1990) between financial development and income inequality. As for the theory proposed by Kuznets (1955) regarding the existence of an inverted U-shaped relationship between economic development and inequality, the evidence found is in conflict; the evidence from model 3 supports Kuznets' theory, while the evidence from models 1 and 2 point against it. It should be noted that of all the estimated models the only model that provides evidence in favor of the Kuznets inverted U hypothesis is model 3.

Based on the results obtained, public policies that promote the development of the financial system should aim to include all people, especially the poorest, in the benefits derived from the financial system. Above all, these policies should focus on the comparability, quality, and sustainability of financial products in order to ensure their use and avoid rentier behavior on the part of financial institutions. In Latin America, investment in education and innovation is of the utmost importance, which is why there is a need for public policies that encourage financial institutions to grant loans for these activities. This would in turn promote increased productivity and higher income.

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