

# FINANCIAL DEVELOPMENT AND THE DISTRIBUTION OF INCOME IN LATIN AMERICA AND THE CARIBBEAN

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## Abstract

**O**ne of the central concerns in Latin America and the Caribbean (LAC) has been the reduction of poverty and inequality so prevalent in the continent. Using large world samples, the literature has found that financial development increases economic growth, increases the income of the poor, and reduces inequality. This paper studies the effects of financial development on the whole distribution of income in LAC. We find that the income of the poorest quintile has not been affected by expansion in the financial system. However, we do find that financial development has had a disproportionate positive effect on the incomes of the second, third and fourth quintiles. We also find some evidence for the Greenwood-Jovanovic (1991) hypothesis that this positive effect only begins after a country crosses a certain economic development threshold.

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JEL codes: O11, O16, G00.

## Introduction

**M**ost Latin American governments have declared growth with equity to be their overachieving goal; finance is a key instrument—one that can assist them or undermine them. Barbara Stallings and Rogerio Studart (2006).

Persistent income inequality and poverty have been fundamental issues of concern in Latin America and the Caribbean (LAC). To some degree, many political and economic experiments in the last century have been driven by the search for a system that would reduce inequality and poverty in the continent. These political and economic experiments include: direct government

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intervention and protectionism, followed by privatizations and market-oriented reforms, followed recently in some countries by the undoing of market reforms and nationalization of natural resources. Among the many reforms implemented in developing countries in the last 30 years, the liberalization and expansion of financial markets has been prominent. According to Edwards (1995), LAC countries practiced “financial repression” policies from the 1940s to the 1970s. There was a significant government presence among the financial institutions with directed lending to chosen sectors and interest rate ceilings with the purpose of raising investment and growth. With the influential work of McKinnon (1973) and Shaw (1973), financial liberalization ensued starting in the mid 1970s. Financial markets expanded steadily in LAC after that period.

The effects of financial development across the world have been extensively studied in the academic literature with a general consensus that finance increases economic growth (Levine 2005). Some authors have also begun studying how financial development affects poverty and inequality. Using data from a world-wide sample, Beck, Demirgüç-Kunt and Levine (2007) find that financial development disproportionately raises the income of the poorest quintile and that it reduces income inequality. Similarly Li, Squire and Zou (1998) found that financial development lowered inequality and raised the average income of the bottom 80th percentile of the population. A study by Dollar and Kraay (2002) finds that changes in financial development only affect the income growth of the poor by raising average growth. Honohan (2004) also finds that financial depth is negatively associated with a headcount measure of poverty.<sup>1</sup>

In this paper, we focus on the experience of countries in Latin America and the Caribbean. We extend the literature in studying the effects of financial development on all income quintiles—not just the poorest. Examining the effects for the whole range of income allows us to better understand the effect of financial development on overall inequality. Individuals in different income categories may have different access or use of financial services. Contrary to the world-sample results from the literature, we find that the income of the poorest quintile in LAC countries was *unaffected* by financial development. This finding has very important policy implications since the poor do not seem to be benefitting from or accessing the growing financial system. On the positive side, we do find that the income of the second, third and fourth quintiles disproportionately benefitted from financial expansion. The largest effect is found in the second quintile which is composed of individuals that can be fairly categorized as poor. Hence, finance has been successful in raising income in the middle ranges of the income distribution in LAC.

Theory does not offer a clear-cut hypothesis of the effect of finance on the income of the poor. Given their lack of collateral and scant credit histories, poor entrepreneurs may be the most affected by financial market imperfections such as information asymmetries, contract enforcement costs, and transactions costs. As a result poor entrepreneurs with good projects may receive little funding from financial markets and remain in poverty perpetuating inequality in the country (Galor and Zeira 1993). Increased financial development in the country would serve to relax this funding constraint, particularly on the poor, and give them more access to financing. Hence, financial development would reduce poverty and inequality as well as increase growth due to the improved allocation of capital to productive projects.

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<sup>1</sup> Other research on the topic includes Clarke, Xu, and Zou (2006) and Jalilian and Kirkpatrick (2002).

Other theories (e.g., Bourguignon and Verdier 2000) propose that financial development may not reduce poverty. These theories posit that the poor rely more on informal networks for credit. Hence, financial development would only benefit the rich and raise inequality. Along these lines, Greenwood and Jovanovic (1990) propose a non-linear effect of finance on inequality. At early stages of economic development, only the rich have access to the limited financial markets, so as the economy and the financial system grow, inequality rises. Once higher levels of economic development are reached, larger segments of society can access the growing financial markets, so inequality can be reduced. Consequently, there must be some threshold level of economic development after which the incomes of poorer segments increase with expansion of financial markets. Another reason why financial development may not reduce poverty is that when liberalization is done rapidly crisis seem to follow. In the LAC case, this was due generally to liberalization without adequate expansion of prudential regulation and supervision. Resulting crisis would then increase unemployment and reduce incomes across the board (Stallings and Studart 2006).

We test these theories using data for 20 LAC countries from 1960 to 2005. We use GMM dynamic panel estimators from Arellano and Bond (1991) and Blundell and Bond (1998) to confront potential econometric pitfalls like country specific effects, endogeneity and reverse causation. The paper proceeds as follows: Section 1 describes the measures of poverty, inequality, and financial development. Section 2 discusses the hypotheses and methodology, then Section 3 discusses the results and Section 4 concludes.

## 1. Data Description

We use measures of poverty, inequality, and financial development that have been typically used in the literature. The United Nations Wider database is the source for all income distribution data. While the coverage extends back to 1960 in some cases, the data are a compilation of various country-level surveys that were conducted at irregular intervals. Hence, the income distribution data have gaps for various years especially prior to the 1990s.

First, we compute the average per capita income of every quintile from the poorest (Q1) to the richest (Q5). We obtain the average per capita income of each quintile as in Beck, Demirgüç-Kunt and Levine (2007) using the following calculation. Define  $Y$  as the economy-wide per capita income and  $Y_i$  as the per capita income of quintile  $i=1, \dots, 5$ . Also, define a Lorenz function  $L$  which depicts the share of income earned by quintile  $i$ . Then we could compute the average per capita income for a quintile (0.20 percent) as follows:  $Y_i = Y * L(0.20) / 0.20$ .<sup>2</sup> We use the income shares ( $L$ 's) reported by the Wider data base. Table 1 shows the evolution of the average income by quintile in LAC in

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<sup>2</sup> For example, suppose income per capita is \$2,000 and the share of income of the a quintile is 5%. Hence, the total income of the quintile would be:  $(\$2,000 \times \text{Total Population}) \times 0.05$ . The total number of people in the quintile is  $0.20 \times \text{Total Population}$ . Then the income per capita in the quintile is:  $(\$2,000 \times \text{Total Population}) \times 0.05 / (0.20 \times \text{Total Population}) = (2000 \times 0.05) / 0.20$ .

constant dollars. Income of the poorest quintile (Q1) rose from the 1960s through the 1980s, but has declined since then to about \$1,165 in the 2000-2005 period. While this is the average for the continent, there is of course significant variation among countries. The lowest average income for Q1 in the 2000-05 period was \$444 in Guatemala and the highest was \$2,578 in Uruguay. Average incomes for quintiles Q2 and Q3 show a similar pattern to Q1 since they rose from the 1960s through the 1980s and then declined in the 1990s and 2000-05. Conversely, incomes for Q4 and Q5 (the richest) have risen in 2000-05 with respect to their 1990s averages. The average income of the rich (Q5) in the continent was \$19,777 in 2000-05 as Table 1 shows. The highest average income for the Q5 group is found in Chile at about \$37,000 and the lowest is found in Bolivia at about \$8,500.

**Table 1**  
**Income Distribution, Financial Development and Growth in LAC Countries**

<b>Variable</b>	<b>1960s</b>	<b>1970s</b>	<b>1980s</b>	<b>1990s</b>	<b>2000-05</b>
Income Q1	1,106	1,496	1,538	1,223	1,165
Income Q2	1,991	2,724	3,119	2,600	2,516
Income Q3	2,916	4,302	4,996	4,230	4,076
Income Q4	4,413	6,582	7,995	6,516	6,682
Income Q5	11,196	16,380	18,981	17,109	19,777
Gini	47.76	47.49	47.57	50.70	52.93
Private Credit	14.56	20.72	26.08	27.37	34.73
Per capita growth	2.299	2.309	-0.470	1.124	0.856

A second variable of interest is the Gini coefficient which is a commonly used measure of inequality.<sup>3</sup> According to Table 1, the Gini declined slightly from the 1960s to the 1980s, then rose in the 1990s and 2000-05. Inequality in LAC has risen in the last 15 years. In our most recent period 2000-05, the highest inequality levels are found in Brazil (Gini = 61.2) and the lowest in Jamaica (38.6).

Third, we measure the degree of financial development in a country using the Private Credit variable. This variable is defined as the amount of credit issued by financial intermediaries to the private sector. Private Credit is the most commonly used measure of financial development in the literature (Levine 2005). It accounts for credit issued by bank and non-bank financial institutions,

<sup>3</sup> The Gini coefficient is defined as a ratio. The numerator is the area between the Lorenz curve of the distribution and the uniform (perfect) distribution line. The denominator is the area under the uniform distribution line. Expressed as a percentage, the Gini coefficient ranges from 0 (perfect equality) to 1 (extreme inequality). Hence, higher values mean more inequality.

but excludes credit issued by central banks and development banks. These data come from the “Financial Structure and Development Data Base” available from the World Bank (Beck, Demirgüç-Kunt and Levine 2000). Since it measures credit issued by all financial institutions (banks and non-banks), it should also capture credit issued by microfinance institutions which are quite important for lower income households.<sup>4</sup> As Table 1 shows, Private Credit rose from about 15% of GDP in the 1960s to about 35% of GDP in 2000-2005. Hence, there has been a significant expansion in the financial system in Latin America. Financial repression policies were practiced from the 1940s through the 1970s and consisted of heavy government participation in financial markets; interest rate ceilings; barriers to the establishment of new financial institutions; and credit directed to particular sectors of the economy that were deemed important by government planners (Edwards 1995). The basis for these policies was the belief that they would encourage investment and growth. By the 1970s the work of McKinnon (1973) and Shaw (1973) became influential in promoting financial liberalization to promote growth. The effects can be seen in the Private Credit data that shows a steady increase starting in the 1970s.

To gain further perspective of the evolution of financial markets and of the inequality variables in Latin America, it is useful to compare them with East Asian countries.<sup>5</sup> The comparison is appropriate because these East Asian countries had a similar incomes per capita and inequality to LAC in the 1960s. However, the evolution of these variables over the following 40 years has been more successful in East Asia. Hence, the comparison provides a benchmark for LAC countries. Furthermore, Stallings and Studart (2006) also compare the two groups of countries. Figure 1 depicts this comparison. While Private Credit in East Asia was comparable to LAC in 1965-1975, it increased by much more by 1995-2005 to over 70% of GDP. That means that financial development in East Asia is now about twice that of Latin America and the Caribbean. Regarding the Gini coefficient comparison, inequality in LAC increased, while it decreased in East Asia and it is now lower than in LAC. The data on the income of the poorest (Q1) tell of an even more dramatic comparison. The average income of Q1 was lower in East Asia in 1965-1975, but has since increased significantly to around \$2500. Conversely in LAC, the average income of Q1 has decreased to around \$1,200. The average income of the remaining quintiles show a similar pattern: stagnation or small increases in LAC and large increases in East Asia.

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<sup>4</sup> Unfortunately, informal loans are not captured by the Private Credit measure, but clearly they can be an important source of financing for the poor.

<sup>5</sup> The East Asian countries are: Indonesia, Malaysia, Mongolia, Myanmar, Philippines, Singapore, South Korea, and Thailand.

**Figure 1**  
**LAC and East Asia**

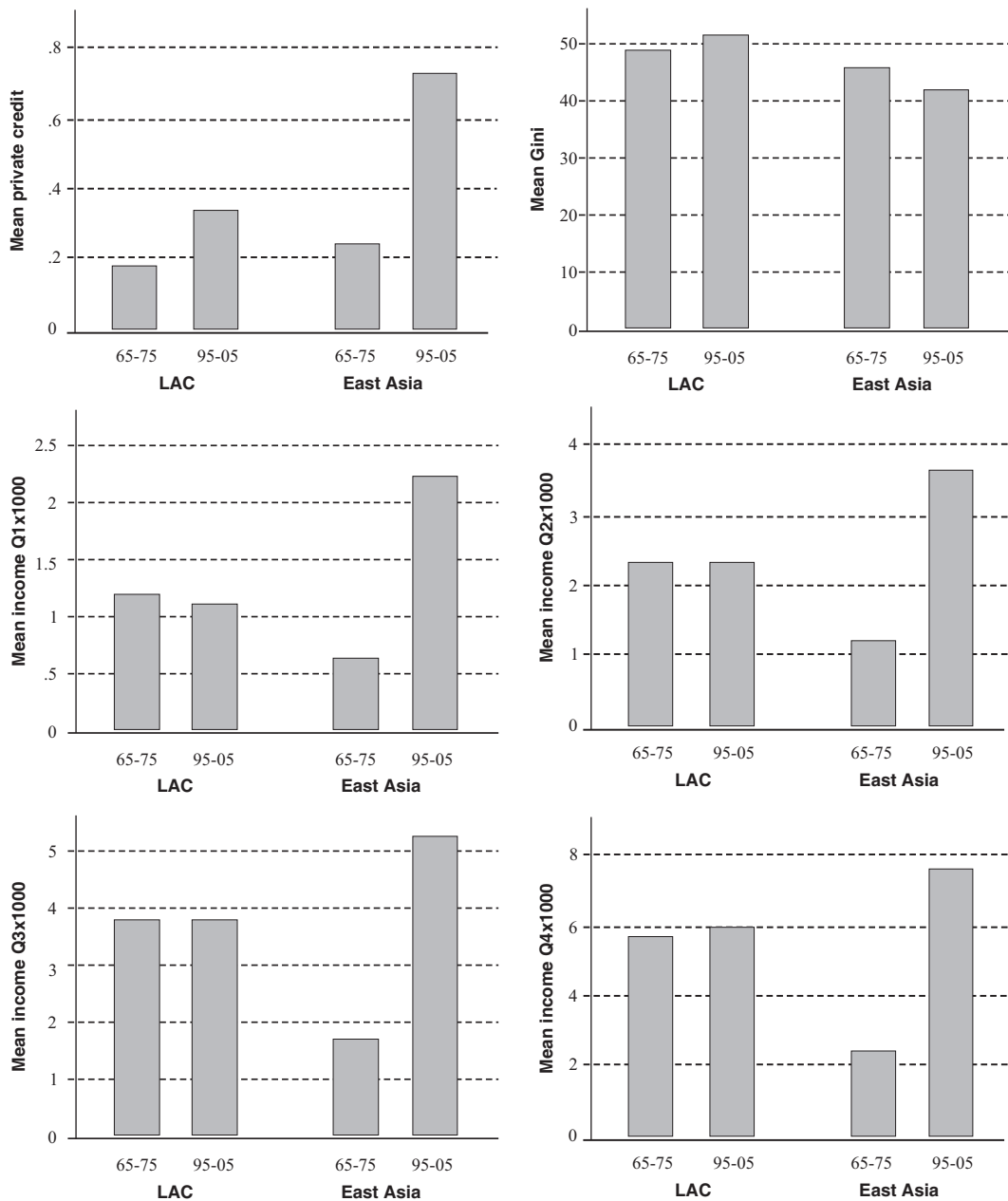
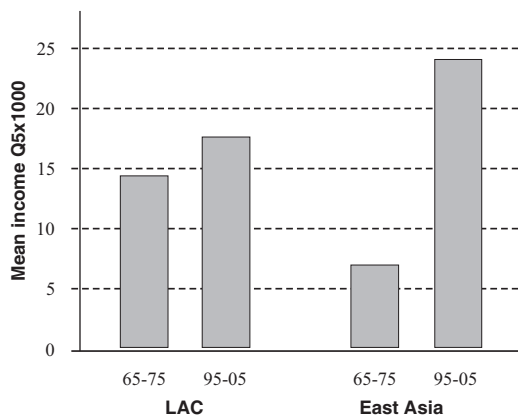


Figure 1 (continued)



While average incomes of all quintiles in LAC have experienced modest increases (compared to East Asia), it is our task to try to establish if changes in these incomes were to any degree driven by the expansion of the financial system after accounting for the effects of other variables that may affect incomes and inequality. We will analyze in particular if the growth rates of income and inequality variables were affected by aggregate financial development. While using data of Private Credit extended to each quintile would be desirable, no such data are available, hence we use overall Private Credit for each country. Data for the period 1960 to 2000 are used when available. Our units of observation are five-year non-overlapping averages of the variables as typically done in the growth literature. Five-year averages are used in this literature to smooth out the effects of short run fluctuations and focus on the long-run growth trend. While we are primarily interested in the long-run effects of financial development, the effects of rapid credit expansions that yielded banking or financial crisis are not entirely averaged out. Following Beck, Demirgüç-Kunt and Levine's (2007) approach, we compute yearly growth rates of average income for Quintile 1 through 5. We also compute the yearly growth rate in the Gini coefficient. Table 2 presents descriptive statistics for all the variables used in the regression analysis.

**Table 2**  
**Descriptive Statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
Private Credit	102	0.2808	0.1652	0.0428	1.0136
Growth of Income Q1	78	0.0003	0.0622	-0.1781	0.1810
Growth of Income Q2	74	0.0067	0.0493	-0.1526	0.1874
Growth of Income Q3	74	0.0101	0.0341	-0.0968	0.1654
Growth of Income Q4	74	0.0110	0.0298	-0.1056	0.1172
Growth of Income Q5	76	0.0142	0.0246	-0.0681	0.0833
Growth of Gini	108	0.0011	0.0261	-0.1218	0.0741
Growth of GDP	108	0.0119	0.0213	-0.0615	0.0567
Average Years of schooling	106	5.1450	1.4938	1.7800	8.9100
Log Inflation	107	2.8080	1.5401	-0.7208	7.4189
Openness	108	55.8477	41.8263	7.2420	190.96

According to Table 2, the growth of income of the poor (Q1) was a very low 0.03% per year. In general, the income of higher quintiles grew faster at about 1% per year. Also, the Gini coefficient increased on average by 0.11% per year, so inequality increased on average. The list of countries is provided in the Annex.

## 2. Hypothesis and Methodology

We follow the basic regression specification from the growth literature:

$$y_{i,t} - y_{i,t-1} = (\alpha - 1) y_{i,t-1} + \beta_1 FD_{i,t} + \gamma X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (1)$$

This is the typical representation for dynamic panel estimation. In this equation,  $y_{i,t}$  represents, alternatively, the logarithm of the average income for each quintile and the Gini coefficient. Hence,  $y_{i,t} - y_{i,t-1}$  is the growth rate in income for the relevant quintile or the growth rate of the Gini coefficient. The first explanatory variable is the lagged value of the dependent variable,  $y_{i,t-1}$ , which introduces a dynamic specification. The level of financial development,  $FD_{i,t}$ , is the key explanatory variable that we are interested in. The hypothesis to be tested is whether  $\beta_1$  is positive



and significantly different from zero. The vector  $X_{i,t}$  includes a number of control variables. We are guided by the controls variables used in Beck, Demirgüç-Kunt and Levine (2007). These variables are: the growth rate of GDP per capita (as in Dollar and Kraay 2002, Chen and Ravallion 1997, and Kraay 2006), the average number of years of schooling in the population (a proxy for the stock of human capital in the population), the inflation rate (an indicator of the macroeconomic environment), and the openness of the economy (computed as exports plus imports as a share of GDP). In addition, we include a dummy variable for those years when a major regulation change (i.e, a major liberalization or reversal) took place in the country. This is to control for major changes in financial markets that may have affected how individuals access the financial system.<sup>6</sup> Since financial development may also affect income of a particular quintile by its effect on overall GDP per capita, it is important to control for GDP per capita. Then we can establish if there is a disproportionate effect of financial development on the income of a particular quintile (beyond its effect on GDP per capita). Finally,  $\eta_i$  captures unobserved country-specific effects.

As described in the introduction, Greenwood and Jovanovic (1990) propose a hypothesis of a non-linear effect between financial development and inequality. In early stages of development, financial development may raise inequality as only the rich benefit. In later stages, the poor may also benefit so further financial development reduces inequality. To test this hypothesis we examine several thresholds levels in per capita GDP which we place alternatively at the 10th, 20th, 30th,...,90th percentiles of GDP per capita as in Rioja and Valev (2004). We create a dummy variable  $DUM$  which equals 1 when GDP per capita is above the threshold. Then we interact this variable with financial development. The regression equation then becomes:

$$y_{i,t} - y_{i,t-1} = (\alpha - 1) y_{i,t-1} + \beta_1 FD_{i,t} + \beta_2 (DUM \times FD_{i,t}) + \gamma X_{i,t} + \varepsilon_{i,t} \quad (2)$$

Greenwood and Jovanovic's (1990) hypothesis would imply that  $\beta_1$  is either zero for the growth-in-quintile-income regressions or positive for the growth-in-Gini regressions. In addition, the hypothesis is that  $\beta_1 + \beta_2$  is positive for the growth-in-quintile-income regressions and negative for the growth -in-Gini regressions. As we do not know where the threshold lies exactly, we estimate equation 2 repeatedly varying the threshold as described above. In addition, this hypothesis has only been partly tested in the literature examining the relationship between the Gini coefficient and financial development. Since Greenwood and Jovanovic's (1990) hypothesis has implications for the overall inequality measure, it should also apply to the various income levels that make up the inequality measure. Hence, we test their hypothesis for all quintiles as well as for the Gini.

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<sup>6</sup> The Regulation Change dummy is obtained from the data set in Abiad, Detragiache, and Tressel (2008). A value of 1 is assigned to those years when a very large change in the liberalization index of a country took place.

As it is well known, there are concerns of reverse causation and endogeneity in estimating equations like (1) and (2). First, the inclusion of the lagged dependent variable could bias the coefficients estimates. Also, there is the distinct possibility of reverse causation from quintile incomes to the real GDP per capita and other explanatory variables. To confront these problems, dynamic panel estimators developed by Arellano and Bond (1991) and Blundell and Bond (1998) have been used in the growth literature in recent years. These GMM systems estimators have become well known (see Greene 2008), hence we will only describe them briefly here. Internal instruments are used to address the potential endogeneity. The GMM systems estimator is a stacked estimator in differences and levels. The differences equations use lagged levels as instruments. The level equations use lagged differences as instruments. There are two specification tests for this methodology. First, the Hansen J test establishes whether the instruments used are valid (i.e., uncorrelated with the error terms). Second, the AR(2) test establishes whether there is second-order serial correlation in the errors. If both of these tests are satisfied, then one cannot reject the null that the coefficient estimates are consistent.

### 3. Results

Table 3 presents the benchmark results for the estimated coefficients and their p-values which are in parenthesis. The income of the poorest quintile, Q1, is the dependent variable for the first column of results. Private Credit does not have a statistically significant effect on the income of the extremely poor in LAC. Furthermore, even the growth in per capita GDP had no effect on the income of the poor in LAC since its coefficient is also not significant. Conversely, Beck, Demirgüç-Kunt, and Levine (2007) find that financial development had a disproportionate effect on the income of the poor using a world sample. Unfortunately for the extremely poor in LAC, we find no effect. Clearly, this result needs more discussion and elaboration which we do later in the paper. Furthermore, the coefficient on initial income is negative and statistically significant. In our setting the interpretation is that countries with the relatively low income of Q1 experienced subsequent higher growth in the income of Q1. This is akin to the convergence effect of the Solow growth model.<sup>7</sup>

The average income of the second poorest quintile, Q2, is the dependent variable for the regression shown in the second column of Table 3. Private Credit has had a positive and statistically significant (at the 0.1% level) effect on the income of Q2. Furthermore, the coefficient on growth of GDP per capita is 1.111, and it is also statistically significant. This implies that GDP per capita increases have raised the average income of Q2 about one-for-one. Consequently, the positive

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<sup>7</sup> This effect can be illustrated with a country comparison in the 1995-1999 period. Honduras had the lowest income per capita in Q1 with \$322. Panama was in the 30th percentile of countries with an income per capita for Q1 of \$789. The estimated coefficient in Table 3 of -0.403 implies that income per capita of Q1 in Honduras would grow by 0.36% faster. This is close to the median value of 0.33% in the same period observed in Chile. The computation is straightforward keeping in mind that income per capita is in logarithms in the regressions.

**Table 3**  
**The Effect of Financial Development on the**  
**Distribution of Income and Inequality**

Variable	Q1	Q2	Q3	Q4	Q5	Gini
Private Credit	-0.081 (0.839)	0.121 (0.001)	0.073 (0.034)	0.052 (0.055)	-0.083 (0.392)	-0.032 (0.527)
Growth of GDP per cap.	-1.000 (0.764)	1.111 (0.036)	1.222 (0.000)	1.461 (0.000)	0.664 (0.099)	-0.281 (0.022)
Initial Level of Income	-0.403 (0.012)	-0.074 (0.119)	-0.031 (0.274)	0.005 (0.845)	0.014 (0.487)	
Initial Gini						-0.003 (0.000)
Regulation Changer	-0.320 (0.676)	-0.047 (0.778)	-0.038 (0.420)	-0.017 (0.762)	0.106 (0.428)	0.075 (0.383)
Constant	4.307 (0.143)	0.510 (0.192)	0.219 (0.339)	-0.070 (0.759)	-0.108 (0.565)	0.159 (0.008)
Obs	75	71	71	71	73	75
AR(2) test p-value	0.31	0.48	0.18	0.44	0.19	0.61
Hansen J test p-value	0.44	0.78	0.78	0.15	0.31	0.27

*Note:* p-values in parenthesis correspond to robust standard standar errors as in Windmeijerndmeijer (2005).

significant coefficient on Private Credit indicates that Private Credit has had a disproportionate positive effect on the income of this quintile. Hence, while the expansion of financial markets has not helped the poorest of the poor, it has helped the lower-middle income group (Q2).<sup>8</sup>

It is further important to interpret the size of the 0.121 coefficient on Private Credit for the Q2 regression to establish its economic significance. The country of Guatemala, for example, had the fourth smallest financial sector among the countries in our sample in 1995-2000; Private Credit was about 0.18 or 18% of GDP. If Guatemala expanded its financial markets to the median level of 0.26 (Dominican Republic), this would yield a rise in the growth rate of income of Q2 of 0.97% per year ( $0.121 \times (0.26 - 0.18)$ ). This is a sizable effect, although an expansion in the financial sector of 8% of GDP would have to be undertaken slowly over a couple of years and accompanied by adequate supervision.

<sup>8</sup> The AR(2) test rejects the presence of second order autocorrelation. The Hansen J tests rejects that the instruments are correlated with the errors.

Regarding the effects of financial development on quintiles Q3 and Q4, Table 4 shows that Private Credit has also had a disproportionate effect on the average income of these middle and middle-high income quintiles. The coefficient estimate for Q3 is positive and significant at the 5% level, while the coefficient for Q4 is positive and significant at the 10% level. Note that the coefficients in the Q3 (0.073) and Q4 (0.052) regressions are smaller in magnitude than that for the Q2 regression. Hence, the positive effect of Private Credit is larger in the low-middle income quintile (Q2). Also, note that the coefficient on the Growth of GDP per capita for both Q3 and Q4 regressions is significant and slightly over 1. This means that the increase in GDP per capita in the economy raised incomes in Q3 and Q4 about one-for-one and that Private Credit had a positive effect beyond its effect on GDP per capita.<sup>9</sup>

Next, we examine the regression for the richest quintile Q5. While the growth of GDP per capita raised the income of the rich, the evidence does not support a disproportionate effect of financial development as the estimated coefficient is not statistically significant. Finally, the last column of Table 3 reports the regression with the Gini coefficient as the dependent variable. The estimated coefficient for Private Credit is negative which would indicate that financial development may have reduced inequality in LAC. However, since the estimated coefficient is not statistically significant it is more correct to say that it has not affected the Gini coefficient. Recall that the Gini coefficient summarizes the whole income distribution in one number which is not an easy task. Given that financial development appears to not have affected the poorest and the richest quintiles, but affected the low-middle, middle, and middle-high income groups to different degrees, it is possible that Private Credit has had no effect on the Gini measure of inequality.

We next proceed to test the Greenwood and Jovanovic hypothesis by estimating equation (2). As described above, we created a dummy variable at several discrete intervals of the GDP per capita distribution. We run regressions for each potential threshold. We find evidence of a non-linear effect that seems to roughly start when the threshold is placed at the 40th percentile of the distribution. For conciseness, we only report the results using this 40th percentile threshold; the results for other thresholds are available from the authors. Table 4 describes these results. The regressions are estimated using two controls sets. The “Simple Control Set” includes the lagged level of income (or lagged Gini for the inequality regression), the growth rate of GDP per capita and the Regulation Change dummy. The “Full Control Set” includes the lagged dependent variable, the growth rate of GDP per capita, schooling attainment, the log of inflation, and trade openness. Consider first the regression for the poorest quintile (Q1). Again there is no evidence of an effect of financial development on the income of the poor even accounting for a potential non-linear effect. Next consider the regression for the low-middle income quintile (Q2) shown on the third and fourth columns. Private credit does not have a statistically significant effect when below the threshold. However, once the threshold is passed, the effect is statistically significant and positive. The estimated coefficient reported for  $PC+(DUM \times PC)$  is basically  $\beta_1 + \beta_2$ , from equation (2) and it is 0.185, which is larger than its counterpart from the regression without a threshold discussed

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<sup>9</sup> The Regulation Change dummy variable is not statistically significant in any of the specifications. We also tried an interaction term with Private Credit with similar results; these results are available from the authors.

Table 4  
Testing the Greenwood-Jovanovic Hypothesis (DUM = 1 if GDP per capita > 40 percentile)

Variable	Q1		Q2		Q3		Q4		Q5		Gini	
	Simple	Full	Simple	Full	Simple	Full	Simple	Full	Simple	Full	Simple	Full
Private Credit (CP)	-0.092 (0.915)	0.212 (0.916)	-0.049 (0.741)	-0.126 (0.468)	-0.152 (0.018)	-0.262 (0.048)	-0.048 (0.629)	-0.093 (0.745)	-0.143 (0.210)	0.059 (0.481)	0.011 (0.922)	-0.084 (0.463)
PC + DUM*PC	-0.087 (0.813)	-0.059 (0.913)	0.185 (0.051)	0.148 (0.122)	0.171 (0.027)	0.128 (0.106)	0.162 (0.009)	0.142 (0.117)	-0.014 (0.814)	0.108 (0.714)	-0.018 (0.734)	-0.054 (0.300)
Growth of GDP	-0.843 (0.831)	-0.445 (0.792)	1.072 (0.018)	1.099 (0.103)	1.297 (0.006)	1.525 (0.002)	1.362 (0.081)	1.456 (0.005)	0.612 (0.007)	0.573 (0.150)	-0.316 (0.002)	-0.206 (0.057)
Initial Income	-0.384 (0.006)	-0.428 (0.386)	-0.132 (0.107)	-0.146 (0.080)	-0.072 (0.210)	-0.0620 (0.087)	-0.068 (0.054)	-0.045 (0.681)	-0.031 (0.403)	-0.074 (0.777)		
Regulation Chance	-0.396 (0.733)	-0.332 (0.770)	0.037 (0.795)	0.153 (0.527)	0.032 (0.432)	0.131 (0.474)	0.061 (0.165)	0.094 (0.760)	0.062 (0.604)	0.041 (0.642)	0.048 (0.466)	0.054 (0.481)
Schooling		0.024 (0.665)		-0.007 (0.711)		-0.006 (0.701)		-0.002 (0.963)		0.010 (0.861)		0.010 (0.183)
Log Inflation		0.003 (0.952)		-0.004 (0.677)		-0.004 (0.590)		-0.002 (0.782)		0.013 (0.583)		0.001 (0.771)
Trade Openness		-0.0014 (0.8720)		0.0007 (0.7290)		0.001 (0.785)		0.000 (0.976)		-0.000 (0.960)		0.000 (0.983)
Initial Gini											-0.003 (0.008)	-0.002 (0.012)
Constant	4.036 (0.053)	3.289 (0.540)	0.956 (0.155)	1.122 (0.116)	0.532 (0.248)	0.492 (0.102)	0.531 (0.107)	0.353 (0.714)	0.3124 (0.371)	0.617 (0.80)	0.183 (0.010)	0.074 (0.204)
Obs	75	75	71	71	71	71	71	71	73	73	75	75
AR(2) test p-value	0.393	0.644	0.333	0.193	0.993	0.097	0.613	0.947	0.466	0.960	0.629	0.745
Hansen J test p-value	0.476	0.681	0.858	0.852	0.772	0.437	0.414	0.322	0.336	0.356	0.301	0.388

Note: p-values in parenthesis correspond to robust standard errors as in Windmeijer (2005). "Simple" denotes Simple Control Set. "Full" denotes Full Control Set.

previously. Hence, there is a larger effect of Private Credit on income growth of Q2 after this threshold is crossed.

The results for Q3 and Q4 are similar. There is a positive and generally significant effect above the threshold as Greenwood and Jovanovic's (1991) theory predicts and no effect below the threshold. The regression for the richest quintile Q5 again indicates no effect of financial development on the rich as in the previous table. The results for the Gini coefficient are not statistically significant above or below the threshold, though the coefficients after the threshold are negative. A negative sign would agree with the hypothesis that inequality is reduced after the threshold is crossed. We do observe, however, that the growth rate of GDP has been statistically significant in reducing inequality.

#### **4. Discussion of Results and Conclusions**

The expansion of financial markets has received quite a bit of attention in Latin America and the Caribbean (LAC) from governments and multilateral organizations. Larger financial systems have been found to increase growth and reduce poverty and inequality in large world samples. We studied the effect of financial development on the distribution of income in LAC. We find that financial development has not had an effect on the incomes of the poorest quintile. Conversely, it has a positive and disproportionate effect on the incomes of quintiles Q2, Q3, and Q4. Given the serious concern in LAC countries with reduction of extreme poverty, it is important to understand why financial services may not be reaching the poorest segments of society.

One conjecture is that the poor are likely to use microfinance institutions, rather than full-fledged commercial banks or other financial institutions. According to Bouillon and Tejerina (2007), the effects of microfinance have been mixed with a positive effect on income found in Brazil and Peru, but a zero or negative effect found in Bolivia and Chile. These mixed results from micro-level studies may explain why there seems to be no effect at the aggregate level as well as in our paper. According to a World Bank study, microfinance institutions reach the moderate poor, but do not reach the extremely poor (Sebstad and Cohen 2000). Navajas and Tejerina (2007) estimate that the average loan size of these institutions in LAC in 2005 was about \$1,000, which is likely out of the question for the extremely poor. In addition, the poor may have difficulty getting financing even from some microlending institutions since many of them may require collateral to make a loan. Hernando De Soto's (2000) well known hypothesis is that lack of land titling implies that it cannot be used as collateral to borrow from banks, so investments that may have raised the incomes of poor farmers are curtailed. While micro-level studies of land titling programs in Argentina, Nicaragua, and Peru show positive effects on school attendance and health, they find no effect on credit access which was the primary purpose of these policies (Bouillon and Tejerina 2007).

It is possible that the extremely poor simply do not have enough access to financial services, or that they only have access to a subset of financial services. Here we focused on a financial size measure, but the more relevant measure for the poor may be access and use of financial services.

Unfortunately, data on this has only been recently collected and it is only available for a recent period (see Beck, Demirgüç-Kunt, and Martinez Peria 2006). The poor's low level of access may be also due to their location: a large share of the poor live in rural areas where banking services have trouble reaching. Yet another possibility is that their demand for financial services is low. Why the extremely poor are not benefitting from expanded financial services remains a question of interest for future research.

The positive findings of the paper are that financial development seems to have succeeded in raising the income of individuals in the middle income ranges (Q2 to Q4). This is an encouraging finding. In particular, the effect for the low-middle quintile Q2 seems to be even larger than that in Q3 and Q4. Hence, the second poorest quintile has been able to access financial markets and benefit, perhaps due to living in urban areas. In summary, the efforts placed on developing financial markets to help a country prosper appear to have yielded some positive effects. Much work remains in understanding why the poorest in LAC have not yet benefitted.

## **Annex**

### **Country List**

Argentina  
Bolivia  
Brazil  
Chile  
Colombia  
Costa Rica  
Dominican Rep.  
Ecuador  
El Salvador  
Guatemala  
Honduras  
Jamaica  
Mexico  
Nicaragua  
Panama  
Paraguay  
Peru  
Trinidad and Tobago  
Uruguay  
Venezuela



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