Inequality and Economic Growth in Latin America

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Abstract:

This paper investigates the possibility of a relationship between the level of inequality and the GDP per capita in the countries in Latin America. Using a panel data model with fixed countries effects. we expect to examine the influences of GDP per capita and the variables that affect it in the countries of the region. The expected results of this paper are to find that the relationship between the income inequality and GDP per capita is negative.

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1.0 INTRODUCTION

Inequality and its relationship to economic growth is an important topic in macroeconomics. There are a wide variety of types of economic inequality, most notably measured using the distribution of income and the distribution of wealth. Inequality is affecting the lives our lives and society at large in a variety of ways that we seek to explore in this paper.

This paper aims to enhance understanding the relationship between the level of economic inequality in a country and its GDP per Capita. From a policy perspective, this analysis is important because of the variety of policies that are proposed to alleviate inequality and its affects in society. Policies that tax the wealthiest in a society and redistribute that income are constantly being debated and this study aims at enhancing our understanding on how income inequality affects a nations GDP per Capita and how necessary the policies to redistribute income and wealth are in countries today. Policies such as a progressive income tax and establishing minimum wages are key steps that some developing countries can take to limiting inequality. This study is clearly relevant in considering whether these policies are the best path to follow among countries with varying degrees of development and how to approach the problems of inequality to maximize economic growth.

Income inequality is the extent to which income is distributed unevenly in a group of people. Some reasons for this becoming a major issue over the last few years can be contributed to changes in the economy such as globalization and changes in technology that leave behind some workers with different skills while rewarding others.

This paper seeks to focus on the region of Latin America and find out how inequality affects the GDP per Capita of a nation. there are key differences in the dynamic of a society based on its level of inequality and its necessary to explore this relationship. This is very important to any policy decisions that any Latin American countries would be considering about how to limit inequality or whether or not it would be a appropriate to consider the types of policies that are needed to ensure continued economic growth and prosperity in their nation.

This paper was guided by three research objectives that differ from other studies: First it investigates the possibility of interdependence between levels of inequality and its effect on GDP per capita. Second, it uses a dynamic panel data analysis with country fixed effects and uses several controlling variables to accomplish this objective. Third, this paper focuses on the issue of inequality in the Latin American region to see if a countries GINI coefficient has any effect on its gross domestic product. This paper successfully fills that void.

The rest of the paper is organized as follows: Section 2 looks at the history of inequality in Latin America. Section 3 gives a brief literature review. Section 4 explores the data and outlines the empirical model. Finally, section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

2.0 Income Inequality in Latin America Over Time

In 2008, According to the United Nations International Children's Emergency Fund, Latin America and the Caribbean region had the highest combined income inequality in the world with a measured net Gini coefficient of 48.3, an unweighted average which is considerably higher than the world's Gini coefficient average of 39.7. Based on figure 1 we can see the income distribution curve for the entire Latin American region this graph shows the cumulative income of each

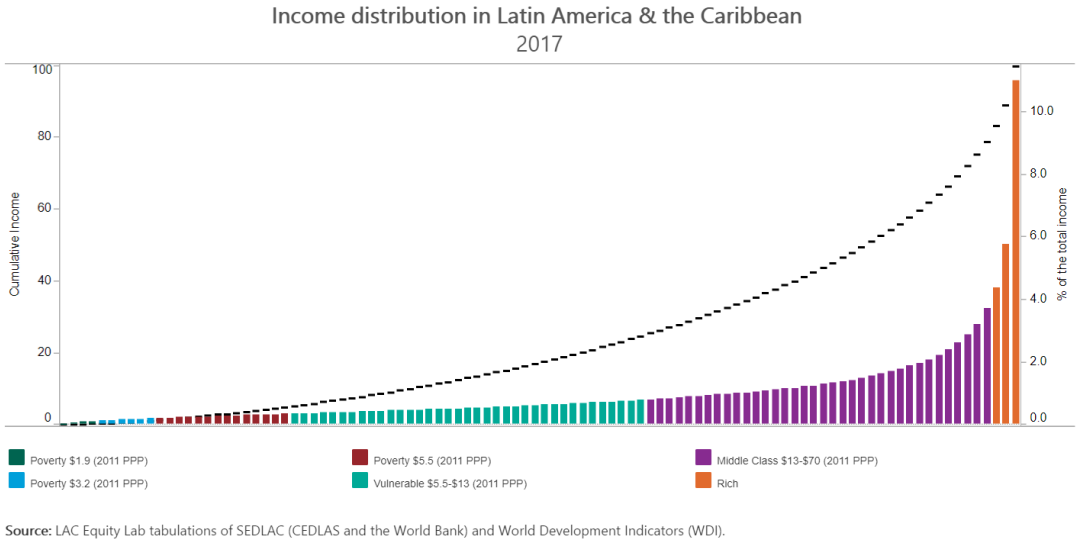


Figure 1, source: LAC Equity Lab

percentile as shown by the dotted lines. This is used to calculate a family of indicators called generalized entropy measures. The most widely used measure of inequality is the GINI index, this measures the area between the Lorenz curve and a hypothetical line of absolute equality. The GINI is expressed as the percentage of the maximum area under this hypothetical line. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual,

similar to the graph in Figure 1. This means that a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

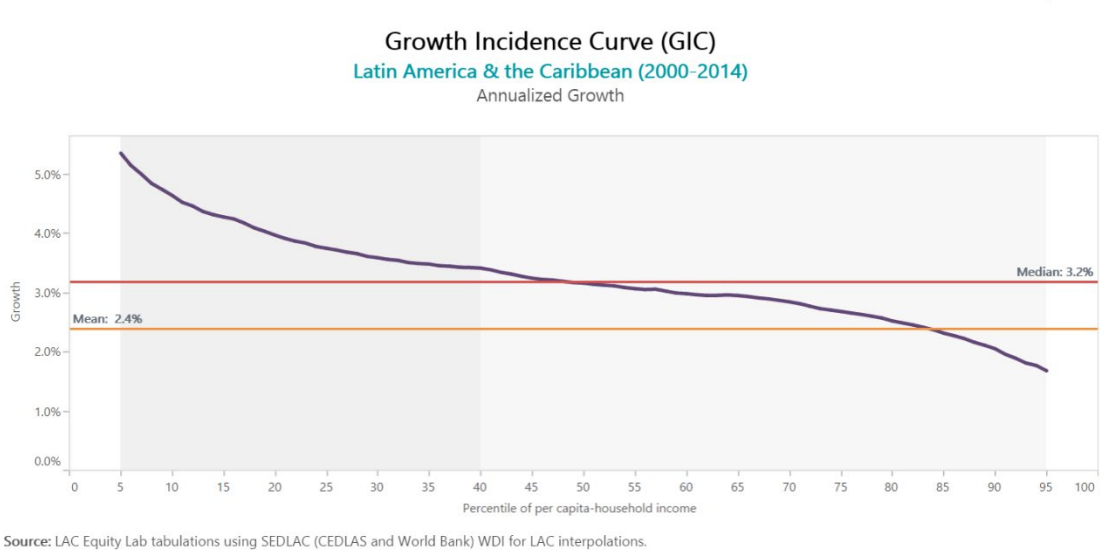
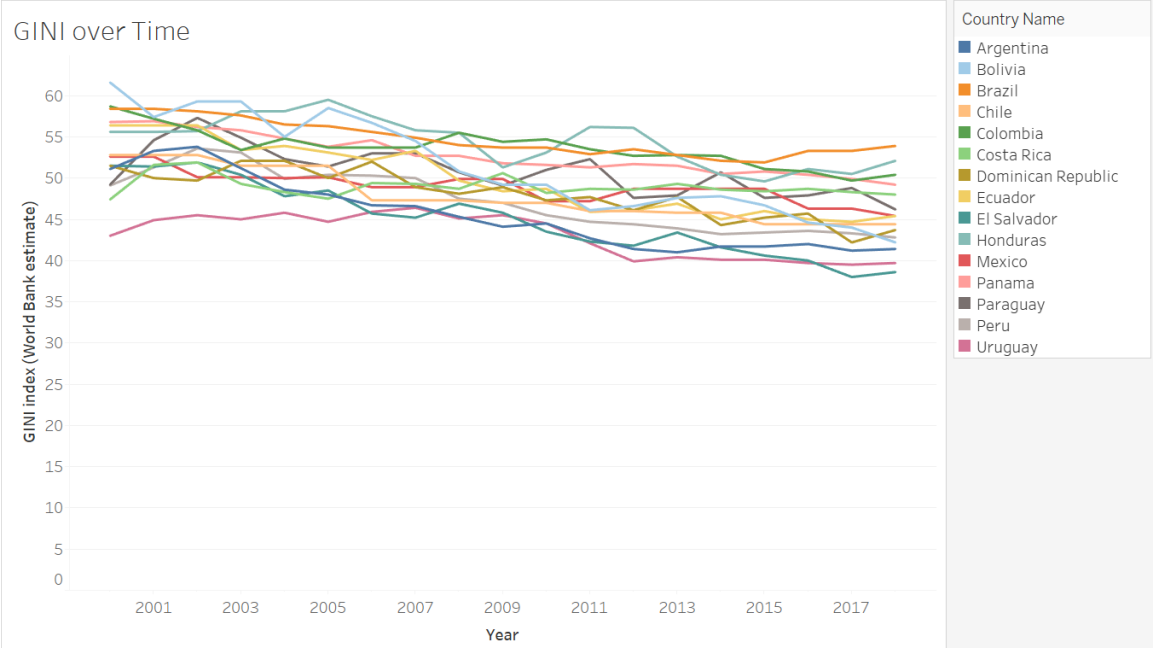


Figure 2, Source: LAC Equity Lab

In recent years however the region has managed to decrease its levels of inequality. As can be best illustrated the growth incidence curve in figure two. This captures graphically the annualized growth rate of per capita income for every percentile of the income distribution between two points in time. Over the last decade, a period of solid decline in inequality, income growth of the households at the bottom of the income distribution in most countries was significantly higher than those at the top. However, the region remains one of the most inequal parts of the world today. As can be seen in figure three the overall trend of inequality is negative at the same time the on the world stage inequality has been steadily increasing. We can see how this looks geographically by looking at the graph with each country getting its own separate line. This can show us how inequality has been concentrated areas of Latin America.



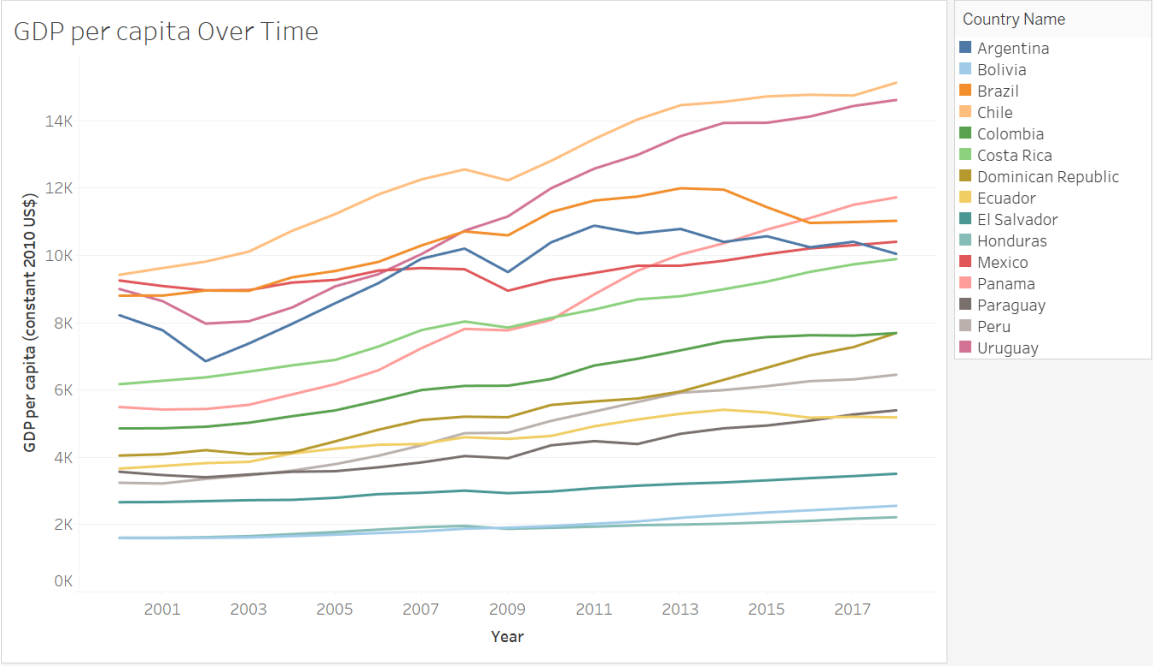


Figure 4 Source: World Bank

Based on figure 4 we can see the trends in GDP per capita you can see that some countries have seen some extensive economic growth while other countries have been left

behind and experienced very little growth. This is important to see theses contrasts in the economic realities in each of these countries in this region. As we try to determine the causality of the differences in economic growth its important to keep these discrepancies in mind.

3.0 LITERATURE REVIEW

The theoretical model of Galor and Zeira (1993) predicts that the effect of inequality on transitional growth differs depending on the average wealth in the economy. They showed that differences in macroeconomic adjustment to aggregate shocks can be attributed to differences in wealth and income distribution across countries. Forbes (2000) was the first paper in the literature to estimate an effect of inequality on transitional GDP per capita growth using a dynamic panel model that used country fixed effects eliminating a potential source of omitted-variable bias. Forbes (2002) found that inequality has a significant positive effect on transitional GDP per capita growth in the long run. Panizza (2002) uses state-level panel data for the United States during 1940-1980. Using both standard fixed effects and GMM estimations, His estimates show a significant negative effect of the Gini on transitional GDP per capita growth.

Adrian et al. (2013) investigated the long-run relationship between economic growth and income inequality in the country of Mexico. Being related to a single country, there results are suffering less from problems such as endogeneity, heterogeneity, and measurement errors, which are commonly encountered in cross-country growth regressions. They find that the relationship between those variables economic growth and income inequality is negative.

Kim (2016) found income inequality has a very negative effect on GDP growth and that the negative relationship between income inequality and GDP growth is strong in low-income countries. In addition, income inequality has a stronger effect on reducing economic growth in high-fragility countries. Kim (2016) used panel data with several controlling variables to isolate the effects of income inequality on economic growth. Caraballo et al. (2017) used a dynamic panel estimation, the results show that income inequality has a positive influence on economic growth for richer countries, and a negative effect for poorer countries.

Brueckner and Lederman (2018) were the first to use an instrumental variable that takes into account how income inequality is affected by GDP per capita and found that at lower GDP per capita countries economic inequality is a positive effect on economic growth and a negative effect at higher levels of initial income. Brueckner and Lederman (2018) examine how the effect of inequality on transitional growth differs depending on countries' initial incomes using an econometric model that is specified and includes an interaction term between inequality and initial income. They used a simultaneous equation model using instrumental variables to estimate the effect that the level of GDP per capita had on the level on inequality. Results from instrumental variables regressions show that in Low Income Countries transitional growth is boosted by greater income inequality. In High Income Countries inequality has a significant negative effect on transitional growth.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

This paper uses a panel data set with the years from 2000 to 2018. This data was obtained from the website world development indicators as a part of the world bank. This data includes fifteen countries in Latin America totaling 285 observations. Summary statistics are provided in table 1

Table 1 Summary Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
GDP per capita	285	6782.026	3533.787	1597.642	15130.15
GINI	285	49.49965	4.738771	38	61.6
Consumption	285	80.74237	8.353277	61.34019	107.0122
FDI	285	3.887115	2.650214	-2.49888	16.22949
inflation	285	6.915289	6.9853	-7.71407	45.16631
Population Growth	285	1.265829	0.5060437	-0.07134	2.734716
Unemployment	285	6.426898	3.207253	2.007	20.52

Table 2 correlation coefficient

	GDP per capita	inflation	GINI	population	unemployment	Consumption	FDI
GDP per capita	1						
Inflation	0.1206	1					
GINI	-0.3315	-0.0381	1				
population	-0.42	-0.0006	0.5788	1			
unemployment	0.3404	0.2612	0.1002	-0.384	1		
Consumption	-0.4102	-0.0843	-0.052	-0.2106	0.0464	1	
FDI	0.24	-0.1551	0.1249	0.1002	-0.0746	-0.1282	1

4.2 Empirical Model

Following Kim (2016) this study adapted and modified the original model into a panel data analysis with country fixed effects. We have added the variables of foreign direct investment and consumption expenditures

The model could be written as follow:

$$Y_{it} = a_i + \beta 1 GINI_{it} + \beta 2 U_{it} + \beta 3 CONS_{it} + \beta 4 P_{it} + \beta 5 FDI_{it} + \beta 6 i_{it} + \varepsilon_{it}$$

Y_{it} represents GDP per capita in country i at year t. it is defined as the gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars. The independent variable a_i represents the country fixed effects between the 15 different countries $GINI_{it}$ represents the Gini index estimate from the world bank that measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. This means a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

Independent variables consist of seven variables obtained from various sources. A_i represents fixed effects for each country. $Cons_{it}$ represents the final consumption expenditures of a country I in year t. This is the sum of household final

consumption expenditure and general government final consumption expenditure. This variable is expressed in constant 2010 U.S. dollars.

P_{it} represents population growth Annual population growth rate. Population is based on the definition of population, which counts all residents regardless of legal status or citizenship.

U_{it} uses a standard definition of unemployed persons is those individuals without work, seeking work in a recent past period, and currently available for work. This definition includes people who have lost their jobs or who have voluntarily left work. Persons who did not look for work but have an arrangement for a future job are also counted as unemployed. Some unemployment is unavoidable. It is the labor force or the economically active portion of the population that serves as the base for this indicator, not the total population.

FDI_{it} represents Foreign direct investment. This is the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor. This is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows defined as new investment inflows less disinvestment in the reporting economy from foreign investors and is divided by GDP.

i_{it} represents inflation as measured by the annual growth rate of the GDP deflator to show the rate of price change in the economy. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. ε_{it} represents the error term

after collecting all the data, we can perform the Breusch and Pagan Lagrangian multiplier test for random effects. After being able to reject the null hypothesis on this test we can conclude that a random or fixed effects model would be a better fit for the panel data set as opposed to a pooled regression model. To determine which of these would be a better fit we can perform the Hausman's specification test. After rejecting the null hypothesis, we can conclude based on this test that the fixed effects model is the best fit for our panel dataset.

5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Table 2. The empirical estimation of a panel data model with country fixed effects shows the negative relationship between the GDP per Capita of a country with the level of its GINI.

Table 2: Regression results

Fixed-effects regression		**Number of Observations**	**= 285**
Group variable: Country		**Number of groups**	**= 15**
R-sq: within = 0.5294			
corr(u_i, Xb) = -0.1397		**F(6,264)**	**= 49.50**
		Prob > F	**= 0.0000**
Dependent Variable:	**GDP per capita**		
	Coef.	**Standard Error**	
GINI	**-185.8551*** **	**19.72332**	
Population Growth	**71.2762**	**300.4424**	
Unemployment	**-193.5557*** **	**34.72197**	
Inflation	**-21.76583** **	**9.809185**	
FDI	**67.04398** **	**30.69668**	
Consumption	**-50.8804*** **	**15.01252**	
Constant	**21133.64**	**1386.798**	
Sigma U	**3490.6777**		
Sigma E	**881.61768**		
rho	**0.94003665**		

Note: * , **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses**

The first thing to look at in this model is the F statistic which is 0.000 this means that we can be 99 percent confident that our model has explanative power. We also need to look at the R-squared within which is .5294 this means that within each of the panels for each country in our data set we found that the model explains about 52.94 percent of the

variation between the data. We can also look at the Rho statistic of 0.94 this gives us the proportion of the variation in the dependent variable that can be explained by differences between the individual countries in our panel data set. This highlights the differences between the countries in each of our panels because of the large amount of variance between the individual countries controlled for by the fixed effects model.

We found that the variable of GINI is significant at the one percent level. The parameter estimate of this variable is -185.8551 and this means that for every increase in the GINI index of a country we can predict that GDP per capita will fall by 185.8551 dollars. is consistent with the results of Kim (2016) and Adrian et al. (2013). Its also shown that the variables of consumption expenditures as well as unemployment are both significant at the one percent level. Its shown that these both have negative relationships with GDP per capita. Its shown that for every increase in unemployment we can expect that there will be a 193.5557 decrease in GDP per capita.

We can also say that final consumption expenditures have a negative relationship with GDP per capita in this model significant to the one percent level the coefficient for consumption is -50.8804 meaning that for every increase in consumption expenditures as a percentage of GDP. This model also shows that the variables of inflation and foreign direct investment are both significant at the five percent level. It shown in the model that inflation has a negative relationship with GDP per capita and foreign direct investment has a positive relationship with GDP per capita. The coefficient for inflation is -21.76583 meaning that for every increase in the GDP deflator we can predict a 21.76583 dollar difference in a country's GDP per capita. The coefficient for FDI is 67.04398 this means

that for every increase in FDI inflows as a percentage of GDP we can predict a increase in GDP per capita of 67.04398 dollars.

Interpreting the results of the model shows that the GINI index has a negative impact on the countries in Latin America We found that the variable of GINI is significant at the one percent level. This relationship is consistent with the results of Kim (2016) and Adrian et al. (2013)

6.0 CONCLUSION

In this paper, we attempt to estimate whether income inequality, expressed as the GINI has a negative effect on GDP per capita. To accomplish this, we use panel data for fifteen countries in Latin America from the years 2000 to 2018. From the results of the empirical analysis income inequality has a very negative effect on GDP per capita in Latin America. We can predict that for every increase in the GINI index we can predict GDP per Capita to fall by -185.85 dollars. the empirical results show consistency with Kim (2016) and find that income inequality and GDP per capita have a negative relationship. While Over the last decade, Latin America has experienced a decline in inequality, income growth of the households at the bottom of the income distribution in most countries was still significantly higher than those at the top and, the region remains one of the most inequal parts of the world today. The results of this paper should be of great interest to policy makers in Latin America when considering programs that would reduce or exacerbate inequality. Policies such as Increase the minimum wage or Increasing the minimum wage as well as move to a progressive tax code may be a good way to drive GDP growth.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
GINI	measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution	World Development Indicators
FDI	Net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor	World Development Indicators
U	unemployed persons is those individuals without work, seeking work in a recent past period, and currently available for work	World Development Indicators
P	Annual population growth rate	World Development Indicators
CONS	the sum of household final consumption expenditure and general government final consumption expenditure	World Development Indicators
i	inflation as measured by the annual growth rate of the GDP deflator	World Development Indicators
GDP	Gross domestic product divided by midyear population	World Development Indicators

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