

The Nonlinearity Between the Economic Growth, International Economy and Income Inequality Using Method of Moments Quantile Regression

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Abstract

The relationship between inequality, economic growth, and the international economy is one of the most studied topics and is seen as a major problem to be solved. What is new is that researchers and policymakers have shifted their attention to divisible inequality at levels of its value. In this context, our article contributes to examining the link between inequality and economic growth by taking into account the international economic relations of three panels of countries grouped according to their income levels during the period 1990–2020. The study used a method of moments quantile regression to examine these variables at different levels of inequality. The estimates yielded the following findings: There were that disparities between various quantiles in each of the three panels' countries (HIC, MIC, and LIC) were influenced differently by the international economy, economic growth, and financial development. In order to solve inequality based on financial development, economic growth, or/and international economic variables, policymakers can benefit greatly from our findings, which have a number of implications. Therefore, it is crucial from an economic policy perspective because they offer empirical support for the distributional effects of FDI: Governments can use foreign direct investment (FDI) to improve population wellbeing and reduce inequality.

Keywords: *Inequality, Economic Growth, International Economy, Quantile Regression.*

Introduction

Income inequality has been a detrimental phenomenon in economies for decades, and especially the relationship between economic growth and income inequality has been the subject of particular attention in recent years (Chadli & Boutouil, 2022; Dugas, 2022). It presents itself in several dimensions, whether economic, political, or social, which political decision-makers in developed, developing, and emerging countries must take into account (Blanchard & Rodrik 2021). Several studies have shown that the consequences of inequality are fatal. It can be the root of inefficiency, low economic growth, political instability, and social welfare (Stewart and Samman 2014). It also increases the probability of having a severe recession (Berg & Ostry, 2017). The fight against income inequality must therefore be a central issue for decision-makers in their development programs.

Previous studies converge on the negative relationship between economic growth and inequality in the early stages of development. More recent research has shown that this relationship can be negative or positive depending on the level of development of the country (Lewis, 1954; Kuznets, 1955; and Kaldor, 1955). Specifically, these studies have shown that inequality has a potential increasing effect of economic growth on income inequality in the early stages of economic development and a decreasing effect in later stages (Kaldor, 1955; Kuznets, 1955; Lewis, 1954).

In this context, it is important to question the nature of the relationship between inequality and economic growth according to the level of inequality. In addition, research since the mid-1990s (Jaumotte et al., 2013; Roser and Cuaresma, 2016) has shown that inequalities from one country to another remain dependent on its international economy. For this, the objective of this research is to study the impact of income inequality

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on economic growth according to the income levels of countries, according to their stage of development, and taking into account their international economic relations.

The empirical results regarding the relationship between growth, income inequality, and external factors are also highly contentious in light of this theoretical ambiguity. Therefore, our study's key contribution is to quantify the relationship between inequality in income and growth while accounting for their degree of development and external relationships. We employ the Method of Moments Quantile Regression to do this.

Our study is divided into four sections: Section II presents a review of the literature, first on the relationship between inequality and economic growth and then on the causal links between the variables of the international economy and inequality. Section III describes the theoretical framework of the model. Section IV presents the empirical analysis of the study. It describes the data and presents the estimation as well as the main results. The main conclusions are the subject of the last section.

Literature Review

Inequality is an important concept that is the subject of many debates. Official reports and studies have multiplied in recent years to study the link between economic growth, the international economy, and the rise of inequalities at the global level.

Economic Growth

Since the 1960s, many studies have examined the relationship between economic growth and inequality, such as the work of Kaldor (1956) and Kuznets (1955). They have shown that growth can be negative or positive with inequalities. Alesina and Rodrik (1992) studied the relationship between income distribution policies and economic growth. They found a negative relationship between these two variables. The same result was obtained by Panizza (2002), who used the generalized method of moments (GMM) to re-estimate the relationship between income inequality and economic growth in the United States between 1940 and 1980. Besides these negative results, some other research findings on the link between inequality and growth are inconclusive. Finally, many studies show a positive relationship in high-income countries. For example, Castelló Climent (2010) and Barro (1999) confirmed that the relationship between inequality and economic growth is positive in high-income countries and negative in low- and middle-income countries.

In addition to research that has studied the relationship between economic growth and inequality, several other studies have focused on the relationship between inequality and variables of the international economy, such as foreign direct investment (FDI), trade openness, etc.

After the 1970s, many developed and developing countries underwent a process of financial and trade liberalization. Recent studies have focused on how the international economy affects income distribution in developing and developed economies (Cornia and Kiiski 2002; Lustig and Kanbur 1999; Ravallion 2001; Galbraith and Kum 2002; Tarchoun M. & Ghraieb I. (2018)).

These studies have examined the impacts of the international economy on inequalities through certain phenomena of globalization, liberalization, and integration. Some studies suggest that these phenomena have no effect on inequalities, but, on the other hand, others argue that they increase inequalities in poor countries. International trade theory finds that increased trade and foreign investment should make the distribution of income more equal in poor countries and less equal in rich countries. It has proven difficult to find these effects.

Openness

The literature on the impact of openness on economic growth is abundant. Some theoretical models are advanced by Wood (1994, 2000); Benarroch and Gaisford (1997); and Kremer and Maskin (2003), which discuss the trade effect on income distribution. Other empirical analyses have investigated the effects of

economic change, including market reforms and increased international integration, on income distribution (Tarchoun M. & Ghraieb I., 2022). These studies are essentially limited to Latin America. Harrison, Hanson (1999), and Robertson (2000) study wage inequality following Mexican trade reforms. Beyer et al. (1999) examine a similar problem in Chile. Arbache (1999) studies the effect of market liberalization on sectoral wage dispersion in Brazil. Behrman et al. (2003) assess the impact of various policy changes (including trade liberalization and capital account opening) on wage differentials in Latin American countries. But there are relatively few studies on the impact of openness on income distribution in

Recent studies by researchers such as Lundberg and Squire (2003) and Dollar and Kraay (2002) have examined the relationship between openness and economic growth and found conflicting evidence on the relationship between openness and inequality. Lundberg and Squire (1999, 2003) find that openness, measured by the Sachs-Warner indicator (0–1), has no effect or has a slight negative effect on inequality. Barro (2000) and Ravallion (2001) found statistically significant nonlinearity in the relationship between openness and inequality, with openness associated with increased inequality in poor countries.

For Spilimbergo et al. (1999), he finds that openness reduces inequality in capital-rich countries while increasing inequality in countries with abundant skilled labor. They argue that the effect in capital-rich countries is driven by the reduction in capital rents once domestic capital markets open, while the effect in labor-rich countries is consistent with the Heckscher-Ohlin framework.

In any case, international studies give inconsistent results on the effects of openness on inequalities. On the one hand, Li et al. (1998), Birdsall and Londono (1998), and Dollar and Kraay (2001, 2002) find that openness has no systematic and significant effect on inequality. On the other hand, Lundberg and Squire (1999), Barro (2000), and Ravallion (2001) find that openness has a negative effect on equality in poor countries and that, in some formulations, it has a negative effect on the real income of the poor as well.

Foreign Direct Investment

Economic studies rely on the existence of a causality between FDI and growth to deduce the nature of their effects on poverty. However, it is not certain that the growth of the average income is synonymous with an increase in the incomes of the poor. The study of this channel constitutes the object of this work. The aim is to understand how FDI, by affecting growth and the structure of income distribution, can contribute to reducing absolute poverty. These different results (summarized in Table 1) gave rise to intense discussions. Our article presents another attempt to discern the effects of the international economy using trade openness and FDI. The paper examines the impact of openness (trade to GDP ratio) and foreign direct investment on relative income shares across the income distribution.

This empirical work differs from the existing literature by constructing an econometric model in simultaneous equations on an unbalanced panel. To do this, we first present the basic model, then the estimation method.

Methodology

Sample and Data

We used a sample of 135 countries, including three panels presented as follows: low income (LIC) (20 countries), middle income (MIC) (77 countries), and high income (HIC) (38 countries). This classification was issued by the World Bank in 2021.

For a deep understanding of the U-shaped relationship, five variables are used in this study: The Gini Index (GI) is an indicator of inequality; real GDP per capita (GDP) as a measure of economic growth; financial development (FD) as a computation of domestic credit to the private sector; foreign direct investment (FDI); and openness (OPN), estimated by the sum of exportation and importation as a percentage of GDP.

Measures of Variables

The data is spread over the period from 1990 to 2020 and was collected from the World Development Indicators (WDI). All variables are converted to natural logarithms in order to overcome the potential heteroscedasticity problems and make the analysis more meaningful. As follows, Table 1 describes the different variables:

Table 1. Variables Definition

Variable	Definition	Source
GI	Gini Index	World Development Indicators
GDP	Real gross domestic product per capital (constant 2015 US\$)	World Development Indicators
FD	Domestic credit to private sector (% of GDP)	World Development Indicators
FDI	Foreign Direct Investment (% of GDP)	World Development Indicators
OPN	Exports and imports (% of GDP)	World Development Indicators

All the variables are obtained from world bank (World Development Indicators) during the period 1990–2020. The choice of the period is based on availability of data for all countries.

The countries selected based on their level income. We applied 3 samples (low, middle and high income) based on the classification of the world bank.

Models and Data Analysis Procedure

The purpose of our analysis is to test and apply the U-shaped Environmental Kuznets Curve (EKC) hypothesis based on the conventional income and to test the effects of international economics on inequality slices value. as no. In accordance with the EKC hypothesis (Grossman and Krueger (1995)), we perform the following model:

$$GI_{it} = \alpha_{0i} + \alpha_{1i}GDP_{it} + \alpha_{2i}GDP_{it}^2 + \beta_iFD_{it} + \gamma_iFDI_{it} + \omega_iOPN_{it} + \varepsilon_{it} \quad (1)$$

Where α_0 refers to the country fixed effects. α_1, α_2 , design the elasticity of inequality with economic growth (GDP) along with its squared. γ and ω are the weight of international economy on inequality. β measure the pressure of financial development on inequality. ε_{it} is the error term supposed to be independent and normally distributed.

The EKC will take on different shapes conditioned on both the significance and the expected signs of α_1, α_2 (Allard et al., 2018; Alvarez and Balsalobre, 2016):

- There is a classical U shaped EKC when $\alpha_1 < 0$ and $\alpha_2 > 0$
- There is an inverted U shaped EKC when $\alpha_1 > 0$ and $\alpha_2 < 0$
- There is a monotonic relationship between GDP and GI (dependent variable) if only α_1 is significant.
- The coefficient β_i, γ_i and ω_i is expected to have different sign depending on whether financial development and international economy of countries affects the inequality.

Econometric Modelling

In this study, we employed panel quantile regression introduced by Koenker and Bassett (1978) to identify the impact of income per capita, international economy, and financial development variables on inequality

and to verify the U-shaped Kuznets curve hypothesis. The advantage of this approach led to its selection. In fact, a nonlinear relationship between variables is examined by the panel quantile regression approach. This approach is more potent than conventional regression techniques focused on average effects, such as OLS, because it yields more thorough and accurate results of the influence of independent variables on the quantiles of the dependent variable (inequality). Furthermore, if the random error term is not regularly distributed or there are outliers, this approach is more accurate (Zhu et al. 2018).

Finally, the robustness of the method of moments quantile regression estimate results is tested using standard errors as defined by Driscoll and Kraay (1998). Because the Driscoll-Kraay standard errors may be applied to both fixed and random effects models, they are used. Accordingly, using panel quantile regression makes it possible to investigate the inequality factors under the condition of incomes in countries. However, quantile regression with individual effects suffers from some problems, such as the fact that it does not take into account possible unobserved heterogeneity across individuals. Hence, we adopted the method of moment quantile regression with fixed effect recently introduced by Machado and Silva (2019). Based on conditional means, this method makes it possible to estimate the conditional quantiles through combined estimates of the location and scale functions. Indeed, the MM-QR permits the individual effects to influence both the location and scale of the dependent variable Y (inequality) and to impact the entire distribution instead of just shifting location, as in Koenker (2004) and Canay (2011). That is, this method provides information on how the conditional heterogeneous covariance effects of the factors of inequality are identified. In addition, MM-QR is very relevant when one's estimate of quantile regression includes individual effects and when the explanatory variables possess endogenous properties. The MM-QR estimates the conditional quantiles of a dependent variable Y whose distribution is conditional on a k-vector of covariates X and belongs to models of location-scale variants. Y is defined by the following form:

$$Y_{it} = \alpha_i + X'_{it}\beta + (\delta_i + Z'_{it}\gamma) U_{it} \quad (2)$$

where the probability, $P\{(\delta_i + Z'_{it}\gamma) > 0\} = 1$ ($\alpha, \beta, \delta, \gamma$) are unknown parameters to be estimated.

(α_i, δ_i), $i = 1, \dots, n$, represent the individual i fixed effects and Z includes k-vector of specified components of X. These components are differentiable transformations with element l given by:

$$Z_l = Z_l(X) \quad l = 1, \dots, k \quad (3)$$

$$Q_y(\tau | X_{it}) = (\alpha_i + \delta_i q(\tau)) + X'_{it}\beta + Z'_{it}\gamma q(\tau) \quad (4)$$

$$\text{Min}_q = \sum_i \sum_t \rho_\tau(R_{it} - (\delta_i + Z'_{it}\gamma)q) \quad (5)$$

$$\text{With } R_{it} = Y_{it} - (\alpha_i + X'_{it}\beta) \quad (6)$$

$$\text{and } \rho_\tau(A) = (\tau - 1) |A| \{A \leq 0\} + \tau |A| \{A > 0\} \quad (7)$$

Estimations and Results

The application of the method MM-QR show the following results for the three samples selected:

Table 2. Descriptive Statistics for Total Sample

Variable	Mean	Minimum	Maximum	Std. Dev	Skewness	J. Bera	N
High income countries							
GI	3.08	58.2	20.7	0.42	1.5	939.97	1178
						(0.00)	

GDP	0.08	11.63	8.3	0.75	-0.28	45.99 (0.00)	1178
FD	2.85	304.58	0	3.92	0.77	168.22 (0.00)	1178
FDI	0.23	449.08	-57.53	7.56	9.69	697239 0	1178
OPN	4.19	380.1	15.81	6.73	1.86	1698.74 (0.00)	1178
Middle income countries							
GI	1.61	64.8	24	0.01	0.43	100.65 (0.00)	2387
GDP	0.94	9.56	5.9	0.76	-0.26	61.12 (0.00)	2387
FD	32.87	182.87	1.17	26.09	1.72	2679.75 (0.00)	2387
FDI	3.18	55.07	-37.17	4.56	3.02	83471 (0.00)	2387
OPN	78.85	220.41	0.02	35.65	0.6	142.502 (0.00)	2387
Low income countries							
GI	42.75	61.3	29.6	7.21	0.59	35.52 (0.00)	620
GDP	6.37	7.76	5.32	0.47	0.76	75.59 (0.00)	620
FD	10.49	40.06	0	0.74	1.06	152.74 (0.00)	620
FDI	2.96	46.28	-4.85	0.82	4.31	18474.7 (0.00)	620
OPN	51.71	131.49	0.78	19.61	0.66	82.4 (0.00)	620

Note: p-values in parentheses

As reported in Table 3, skewness values are positive and far from zero. This means an excessive skewness to the right for all variables except the GDP variable, which is negative in all panels. The Jarque-Bera statistical test strongly rejects the null hypothesis of normality, confirming, once again, that applying OLS estimation will be inconsistent while employing quantile regression remains suitable and more robust for this study.

Table 3. Correlation Matrix - Variance Inflation Factor

Variable	GI	GDP	FD	FDI	OPN
High income countries					
GI	1	-0.39	-0.10	-0.03	-0.19
GDP	-0.39	1	0.48	0.01	0.08
FD	-0.10	0.48	1	0.18	0.006
FDI	-0.038	0.016	0.19	1	0.30
OPN	-0.19	0.086	0.006	0.30	1
Middle income countries					
GI	1	0.17	-0.024	-0.10	-0.05
GDP	0.17	1	0.36	0.06	0.06
FD	-0.02	0.36	1	0.08	0.13
FDI	-0.11	0.06	0.085	1	0.23

OPN	-0.053	0.059	0.13	0.23	1
Low income countries					
GI	1	-0.19	-0.08	0.01	0.09
GDP	-0.19	1	0.02	0.04	0.06
FD	-0.08	0.02	1	0.14	0.24
FDI	0.01	0.04	0.14	1	0.47
OPN	0.09	0.06	0.24	0.47	1

According to Table 3, we find that the relationship between inequality (GI) and the international economy (FDI and OPN) changes with the distribution of income. Indeed, foreign direct investment and openness reduce inequality in high- and middle-income countries and increase it in low-income countries. Also, these variables (FDI and OPN) seem to be pillars of economic growth.

Moreover, there is a positive relationship between financial development (FD) and economic growth (GDP) in all three panels. However, the same variable (FD) has a negative relationship with inequality.

Table 4. Estimation Results for High Income Countries (Hic)

	GDP	GDP²	FD	FDI	OPN
Location	-58.22 (0.000)	2.72 (0.000)	0.019 (0.001)	0.005 (0.474)	-0.24 (0.000)
Scale	-26.74 (0.010)	1.263 (0.012)	-0.137 (0.004)	-0.0007 (0.897)	-0.00014 (0.971)
5th	-10.26 (0.707)	0.46 (0.731)	0.444 (0.001)	0.0063 (0.58)	-0.0.243 (0.22)
10th	-17.83 (0.47)	0.819 (0.49)	0.40 (0.001)	0.0061 (0.66)	-0.0244 (0.11)
20th	-28.36 (0.17)	1.31 (0.20)	0.035 (0.000)	0.0058 (0.62)	-0.0244 (0.003)
30th	-37.40 (0.040)	1.74 (0.05)	0.03 (0.000)	0.0056 (0.59)	-0.0245 (0.001)
40th	-46.80 (0.002)	2.19 (0.04)	0.025 (0.000)	0.0053 (0.54)	-0.0245 (0.000)
50th	-55.68 (0.000)	2.60 (0.000)	0.021 (0.001)	0.0053 (0.48)	-0.0245 (0.000)
60th	-64.24 (0.000)	3.01 (0.000)	0.016 (0.001)	0.0048 (0.44)	-0.0246 (0.000)
70th	-73.01 (0.000)	3.42 (0.000)	0.012 (0.009)	0.0046 (0.41)	-0.0247 (0.000)
80th	-84.17 (0.000)	3.95 (0.000)	0.006 (0.17)	0.0043 (0.44)	-0.0247 (0.000)
90th	-100.69 (0.000)	4.73 (0.000)	-0.002 (0.748)	0.003 (0.592)	-0.0.24 (0.000)
95th	-121.03 (0.000)	5.69 (0.000)	-0.124 (0.156)	0.033 (0.755)	-0.0.24 (0.001)

Note: p-values in parentheses

The results of this table show that: Firstly, there is a relationship between inequality and economic growth from the 30th quantile: The curve describes a U-shaped relationship between inequality and growth: inequality first decreases and then increases in the process of economic development. (columns 2 and 3 of Table 4).

Secondly, it indicates that the coefficient estimate of trade openness is negative when the relative inequality shares of the higher income are used as the dependent variable. The effect of trade openness, however, is only statistically significant in the 20th quantile (column 6 of Table 4).

Finally, financial development reduces inequality at all quantile levels, its impact dampens inequality. (Column 4 of Table 4).

For those countries, this relationship is explained by Numerous transmission channels involving income inequality and economic growth were revealed by theoretical examinations of the inequality–growth nexus. These consist of (i) the degree of technological and economic growth, (ii) social-political upheaval, (iv) the savings rate, (v) the credit market imperfections, (vi) the economic and political environment, (vii) institutions, and (viii) the level of fertility. These models led us to conclude that there may be a positive or negative correlation between growth and income inequality.

Table 5. Estimation Results for Middle Income Countries (MIC)

	GDP	GDP²	FD	FDI	OPN
Location	14.56 (0.000)	-0.765 (0.001)	-0.030 (0.000)	-0.2171723 (0.000)	-0.008 (0.101)
Scale	14.01 (0.000)	-0.8363 (0.001)	-0.0235 (0.000)	-0.413 (0.095)	-0.0066 (0.004)
5th	-11.29 (0.011)	0.777 (0.006)	0.127 (0.115)	-0.14 (0.004)	-0.208 (0.001)
10th	-6.74 (0.092)	0.506 (0.005)	0.005 (0.48)	-0.15 (0.000)	-0.018 (0.001)
20th	-0.99 (0.784)	0.16 (0.48)	0.0045 (0.49)	-0.17 (0.000)	-0.015 (0.002)
30th	4.13 (0.234)	-0.14 (0.52)	-0.013 (0.039)	-0.18 (0.000)	-0.013 (0.005)
40th	8.43 (0.015)	-0.39 (0.07)	-0.02 (0.001)	-0.19 (0.000)	-0.011 (0.019)
50th	12.16 (0.001)	-0.62 (0.007)	-0.026 (0.000)	-0.21 (0.000)	-0.009 (0.055)
60th	17.41 (0.000)	-0.93 (0.000)	-0.035 (0.001)	-0.22 (0.000)	-0.007 (0.191)
70th	23.28 (0.000)	-1.28 (0.000)	-0.045 (0.001)	-0.24 (0.000)	-0.004 (0.48)
80th	29.47 (0.000)	-1.65 (0.000)	-0.055 (0.000)	-0.26 (0.000)	-0.001 (0.84)
90th	38.57 (0.000)	-2.19 (0.000)	-0.07 (0.000)	-0.28 (0.000)	-0.02 (0.747)
95th	45.86 (0.000)	-2.63 (0.000)	-0.083 (0.000)	-0.309 (0.000)	-0.006 (0.539)

Note: p-values in parentheses

However, for the middle-income countries, we find the results as follows: Firstly, there is a relationship between inequality and economic growth in the 50th quantile: The curve describes an inverted U-shaped relationship between inequality and growth: inequality first increases and then decreases in the process of economic development. (Columns 2 and 3 of Table 5).

Secondly, it indicates that the coefficient estimate of the international economy, presented by the variables trade openness and foreign direct investments, is negative when the relative inequality shares of the middle income are used as the dependent variable. The effect of trade openness, however, is only statistically

significant in the 40th quantile. The effect of foreign direct investment is statistically significant at all quantile levels (columns 5 and 6 of Table 5). Finally, financial development reduces inequality from the 30th quantile, it dampens inequality. (Column 4 of Table 5).

Table 6. Estimation Results for Low Income Countries (LIC)

	GDP	GDP ²	FD	FDI	OPN
Location	28.50 (0.013)	-2.41 (0.005)	-0.113 (0.011)	-0.048 (0.057)	0.0409 (0.023)
Scale	0.2201021 (0.978)	-0.081882 (0.89)	-0.0176624 (0.559)	0.0445853 (0.443)	0.0250984 (0.041)
5 th	28.119 (0.026)	-2.26 (0.018)	-0.082 (0.093)	-0.126 (0.178)	0.0031 (0.876)
10 th	28.15 (0.005)	-2.28 (0.002)	-0.118 (0.062)	-0.118 (0.209)	0.0014 (0.359)
20 th	28.27 (0.017)	-2.32 (0.011)	-0.094 (0.016)	-0.95 (0.177)	0.014 (0.940)
30 th	28.40 (0.00)	-2.37 (0.002)	-0.105 (0.008)	-0.068 (0.361)	0.029 (0.064)
40 th	28.35 (0.00)	-2.35 (0.002)	-0.100 (0.007)	-0.079 (0.361)	0.023 (0.064)
50 th	28.45 (0.00)	-2.39 (0.002)	-0.109 (0.008)	-0.058 (0.361)	0.035 (0.064)
60 th	28.52 (0.035)	-2.41 (0.007)	-0.114 (0.012)	-0.044 (0.611)	0.043 (0.021)
70 th	28.60 (0.035)	-2.44 (0.017)	-0.121 (0.021)	-0.028 (0.778)	0.052 (0.015)
80 th	28.72 (0.18)	-2.49 (0.12)	-0.13 (0.044)	-0.004 (0.85)	0.065 (0.015)
90 th	28.89 (0.18)	-2.55 (0.12)	-0.144 (0.08)	-0.029 (0.85)	0.084 (0.015)
95 th	29.09 (0.308)	-2.62 (0.221)	-0.16 (0.146)	-0.070 (0.789)	0.108 (0.016)

Note: p-values in parentheses

Firstly, there is a relationship between inequality and economic growth. The curve describes an inverted U-shaped relationship between inequality and growth: inequality first increases and then decreases in the process of economic development until the 70th quantile. (Columns 2 and 3 of Table 6). Secondly, it shows that the coefficient estimate of trade openness is positive when the relative inequality shares of the lower income are used as the dependent variable. The effect of trade openness, however, is only statistically significant at the 60th quantile (column 6 of Table 6). Finally, financial development reduces inequality from the 10th to 80th quantile, it dampens inequality. (Column 4 of Table 6). In countries with low levels of development, economic growth result in a more unequal distribution of income, and is it necessary for per capita income to reach a certain minimum level before income inequality begins to decrease.

Conclusion and Policy Implications

The main objective of our study is to analyze the relationship between income inequality, economic growth, and the international economy in 135 countries, including three panels selected according to income. The results of the method of moments quantile regression confirm that there are three groups of countries to be analyzed separately in the econometric modeling. Using panel data, the main conclusions of this study are as follows:

The empirical results showed heterogeneous effects of the international economy, income, and financial development on inequality across different quantiles in each panel country. The panel quantile regression shows interesting results about the effect of the international economy on inequality. In particular, the international economy begins to exert negatively significant effects on inequality, mainly from the beginning to medium quantiles in HIC and at higher quantiles in MIC and LIC.

On the contrary, we do not find significant results from international to inequality in higher quantiles in HIC, meaning that in low inequality, openness flows could lead to a fall in inequality through the technological diffusion channel.

As for financial development, this factor exerts a combined influence on inequality within different panels according to the levels of financial development. We obtain a negative effect from (20th–80th) in LIC and from (30th–95th) in MIC. In HIC, financial development is downward until it becomes negative due to inequality from lower quantiles to higher quantiles (5th–95th). These results mean that inequality is affected by financial development in two directions: It appears that, through financial development, the increase in liquidity directly benefits households with low income levels. However, the external liberalization in HIC reduces inequality in its first stage.

To conclude, our findings have several implications and offer valuable perceptions for policymakers. First, policies need to be established individually for each country depending on their specificities in terms of inequality, incomes, financial systems, and openness. Second, as another policy implication to reduce inequality, the implementation of policies should be developed for low- and middle-income countries to have access to financial support and financial tools for creating their own businesses. This idea is supported by Mehmet A., Avik S., and Samuel A. (2020), who advise that “investment in education and health sectors that are considered to reduce income inequality should also be supported by the financial sector.”

An important implication is that economic growth and inequality are two mutually reinforcing processes. Therefore, a reduction in inequality promotes economic growth. This means that the combination of economic growth in the presence of a redistribution policy is the most favorable scenario for fighting against inequality. These results are confirmed by the study of Dollar and Kraay (2000).

Also, our results will assist policymakers in suggesting systems aimed at ensuring an adequate distribution of the aggregate net benefits of increased openness in middle- and high-income countries. Given the characteristics of the economies of the three panels (high-, middle-, and low-income countries), these results are very important from the point of view of economic policy, as they provide empirical evidence of the distributional implications associated with FDI: governments can mobilize FDI to reduce inequalities by taking advantage of FDI to enhance the welfare of the population.

In summary, this study is a contribution to the empirical literature, principally for the evidence it provides on the effect of economic growth and the international economy on inequality through a recent method of moments quantile regression. Thus, the results show that inequality is dependent on the income levels of countries.

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